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HEALTH DATA WAREHOUSE  
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## Executive Summary

**Human Services Research Institute (HSRI)**, a nonprofit corporation headquartered in Cambridge, Massachusetts, is pleased to submit this proposal in response to RFP # 201207352, Health Data Warehouse. Maine Health Data Organization (MHDO)'s objectives for a highly robust and secure data warehouse can be met with our qualified team of professionals using the specifications and budget outlined in this proposal. We believe that the Health Data Warehouse solution that we will describe in this proposal will offer the MHDO the best data warehouse that is: designed based on a systematic assessment of the requirements of MHDO staff and other constituencies; is managed in a way that involves MHDO staff in all aspects of system design and testing; provides a secure environment for data storage; provides seamless remote data access to authorized data users; and, provides training and technical support to insure that data users are able to make maximum use of this unique resource.

We understand that it is imperative that the successful bidder be adept in responding to emerging priorities as well as longer term planning in order to make this project a success. This proposal will demonstrate that the team that HSRI is proposing, with our partners the National Opinion Research Center (NORC) as our IT provider, and the Public Consulting Group (PCG) providing health data content expertise, will be able to offer to MHDO the products they have requested with value added through services already developed by HSRI and our partner organizations. In addition, our management team will be headquartered in our Maine offices providing MHDO with easy in-person access to data warehouse project staff.

This proposal will show that HSRI and its partners have the content, technical and organizational capabilities to meet these requirements, including:

- Experience managing large and complex projects and competently managing multiple projects simultaneously;
- Capacity to mobilize resources quickly for ad hoc requests;
- Breadth and depth of content areas and technical skills;
- The ability to bring multiple disciplinary perspectives to bear on the project;
- Knowing how to assemble teams appropriately to assign work so MHDO gets the best staff, value and service.

The HSRI team proposes to build a state-of-the-art system that will utilize a multi-tiered model to deliver data upload, automated data cleaning, data warehousing and self-service access functionality that will be accessible to data submitters, MHDO staff and other authorized users via the internet. This system will make use of cloud technologies to provide a robust, scalable and highly secure data platform capable of handling high volumes of data and achieving high levels of availability. It will provide a flexible ETL platform that will load data to a set of common data structures that will support the creation of Master Indexes that will provide unique identifiers and other information for patients, providers and payers in the State of Maine. The ETL system will be configurable by MHDO staff through an online interface that will enable them to define file validation rules at the submitter level and upload irregularly formatted data

files into the warehouse. The system will provide authorized users access to raw datasets and a variety of pre-generated and interactive reports on data held in the warehouse, both through the online interface and through web services.

Our teaming arrangements will provide MHDO with the full range of staff expertise required to successfully complete this project. HSRI will be heading up the project, performing core Project Management functions and will lead and staff the Product Development team, which will develop the user-facing elements of the web applications, the ETL processing and the self-service reporting and download functions. HSRI staff will also be involved in the process of defining the common data structures and the creation of the master indexes. HSRI will also lead and staff the Quality Assurance Team. The IT technical infrastructure team will be led and staffed by NORC; they will be hosting the system as a part of their Secure Data Enclave and will be responsible for the core engineering and maintenance of the warehouse infrastructure, in partnership with **Metadata Technology North America Inc. (MTNA)**. NORC will also be developing the core web services that will provide access to warehoused data and will take the lead in providing training to MHDO staff on system and database architecture, system administration and other technical tasks. PCG will lead and contribute staff to the Health Data Content Team. They will be involved in the Data Governance and Management tasks as well as working with HSRI on the common data structure definition. Project teams and staffing, including the HSRI team organizational chart can be found in Section 2.16 – Staff.

## Section 1.0 Organization Qualifications and Experience

### Why HSRI?

We have extensive experience working with IT firms and multiple stakeholders to develop shared understanding of complex problems and their solutions.

We are small and agile to respond to the needs of MHDO and we understand that environment under which they are operating.

We have secured partners who have already developed the technology that is needed to support the Data Warehouse and have internal Cloud technology that no one else has.

We have experience combining multiple datasets for multiple stakeholders.

We have vast experience with stakeholder and customer interface.

We understand the cost benefit of data submissions and that costs are associated with submitting data in formats that require changes to current structures.

**Human Services Research Institute (HSRI)**, a nonprofit corporation headquartered in Cambridge, Massachusetts, is pleased to submit this proposal in response to RFP # 201207352, Health Data Warehouse. In the 35 years since its inception, HSRI has been an innovator in combining a set of quantitative and qualitative skills to assist states and provider organizations to understand: the needs of clients being served, the degree to which services provided are congruent with client needs, the costs of services, and outcomes associated with the receipt of services. We have done this through a variety of measurement strategies including: conducting needs assessments, analyzing claims and associated data, collecting data from service users and other relevant stakeholders, and designing synthetic estimation procedures to help states and provider organizations understand the size and needs of untreated populations and the service planning and cost implications of these data.

As will be described in Section 1.3, Organizational Experience, HSRI has both conducted and managed projects that involve the construction of complex databases and the design of automated data cleaning and reporting functions. In addition, HSRI has content expertise using these types of data related to health and behavioral health care regulations, funding streams, service use patterns, service costs, the service needs of special populations, and the types of data required for evaluation research. This places HSRI in an ideal position to manage a project such as the Maine Health Data Warehouse. We have the technical expertise to understand and provide oversight of the functions related to the design and operation of the data warehouse. We also have the content expertise to anticipate how these data will be used by various stakeholders, the technical assistance needs of potential users with varying levels of IT expertise, and the ability to act as a “translator” between the IT staff and multiple stakeholders. The importance of this go-between function cannot be overstated. It will allow HSRI to insure that: the MHDO staff, data submitters and other stakeholders are able to effectively communicate their needs and expectations to the technical staff, resulting in a product that fully meets their needs.

In addition to our substantial in-house expertise, our proposed team of partner organizations and consultants includes:

- The National Opinion Research Center (NORC): NORC will use its considerable experience in designing secure data warehouses to create the database structure to house the disparate data from all sources, design and implement automated data cleaning processes and reporting functions, and provide ongoing technical assistance to MHDO related to data capture and processing.
- The Public Consulting Group (PCG): PCG with extensive experience working the policymakers and Maine health data will provide ongoing assistance related to financial management, health care reform issues, long-term care issues, Medicaid and Medicare requirements and potential changes, and strategic planning.

HSRI understands that this RFP intends to create a Data Warehouse that will include a broad range of clinical, financial, and quality of care data that will be made available and accessible to the Maine Health Data Organization (MHDO), stakeholders and the public. The creation of this data warehouse requires a range of capabilities that include:

- Understanding of the range of formats and structures of data submitted by various providers and vendors;
- Experience in designing and creating a data infrastructure that will accommodate multiple data formats and structures;
- Knowledge of confidentiality and security requirements for data that are accessible to multiple constituencies;
- The ability to work collaboratively with individuals who provide the data as well as those who use the data for evaluation and policy related applications;
- Experience in managing large projects that involve multiple contractors and staff working from multiple locations;
- The ability to create project tracking mechanisms that provide clear guidance to project staff concerning task sequencing, interdependencies and deadlines; and,
- A proven track record of working collaboratively with project funders to insure that project activities meet funders' needs, adhere to project scheduling deadlines, and provide products that meet the needs of the multiple constituencies involved in the project.

We understand that it is imperative that the successful bidder be adept in responding to emerging priorities as well as longer term planning in order to make this project a success. This proposal will demonstrate that the team that HSRI is proposing, with our partners the National Opinion Research Center at the University of Chicago (NORC) as our IT provider, and the Public Consulting Group (PCG) to provide health data content expertise, will be able to offer to MHDO the products they have requested with value added through services already developed by HSRI and our partner organizations.



This proposal will show that HSRI and its partners have the content, technical and organizational capabilities to meet these requirements, including:

- Experience managing large and complex projects and competently managing multiple projects simultaneously;
- Capacity to mobilize resources quickly for ad hoc requests;
- Breadth and depth of content areas and technical skills;
- The ability to bring multiple disciplinary perspectives to bear on the project;
- Knowing how to assemble teams to appropriately assign work so MHDO gets the best staff, value and service.

## Section 1.1 Description of the Organization

### Section 1.1.1 HSRI Organizational Capacity and Qualifications



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This section describes HSRI's areas of expertise and organizational infrastructure and assets. Information on specific projects relevant to the MHDO RFP is included in section 1.3.

The Human Services Research Institute (HSRI), a nonprofit, tax-exempt corporation based in Cambridge, Massachusetts, was founded in 1976 to improve the availability and quality of behavioral, development, and physical health services. Since its founding, HSRI has conducted needs assessments, evaluation, and research efforts at both the state and federal levels in the following focus areas: Physical Health, Intellectual & Developmental Disabilities, Child and Family Services, Mental Health, and Substance Use. To achieve this, HSRI undertakes the following:

- Provides assistance to policymakers concerned with implementing the statutory, regulatory, and administrative changes necessary to assure that persons with behavioral, development, and physical health services needs enjoy the basic civil and legal rights to which all citizens are entitled.
- Collaborates actively with consumers, family members, and other advocates and includes their concerns in all aspects of planning, study design and reporting.
- Works collaboratively with information technology experts on the design of data systems that: meet the needs of provider organizations and states to manage their information assets; are designed to facilitate retrieval of relevant information quickly and efficiently; and meet the needs of multiple data users related to program oversight, cost monitoring, quality assurance and program evaluation.
- Provides technical assistance and training related to the use of data for purposes of needs assessments, cost analyses, evaluation and planning.

- Evaluates processes, costs and outcomes of health and human service programs and procedures and develops sound strategies for their reform as needed.
- Designs and implements mental health, substance use, developmental disabilities, physical health and child welfare service program planning, budgeting, needs assessment, gap analysis, quality assurance, and administrative systems for improved service delivery.

HSRI team members represent an array of constituencies and skills. HSRI employs 75 full-time staff at its offices in Cambridge, MA, Tualatin, OR and Bethel, ME. Our staff represent the following areas of expertise: Information technology, statistics, sociology, political science, evaluation research, training and technical assistance, health care policy and health care reform, use of Medicaid, Medicare, and state level claims data, and cost analyses.

In addition to substantial in-house expertise, our team includes partner organizations – the majority of whom have a long history of collaboration with HSRI and who have been specifically chosen to reinforce our ability to carry out the responsibilities outlined in the Maine Data Warehouse RFP.

HSRI takes seriously its responsibilities related to the ethical conduct of all research projects undertaken by Institute staff. HSRI staff are trained in all aspects of data confidentiality and the protection of human subjects. We have an Institutional Review Board that has been approved by the Office for Human Research Protections within the federal Department of Health and Human Services.

HSRI has the facilities, office equipment, computer hardware and software to manage all work required by this RFP. The capacity and stability of the facilities and equipment have been tested by large multi-year contracts described in Section 1.3 - Organizational Experience. Staff are kept informed of our internal security policies and procedures and complete the National Institutes of Health's Information Security Awareness training.

HSRI, with the leadership of our Vice President for Information Technology, supports a secure IT work environment, through both hardware and software that allows us to quickly acquire and implement new technologies. HSRI maintains a Windows-based local area network. The network is securely firewalled and measures are implemented to prevent data loss, including such safeguards as daily system backups, disaster recovery protocols, and anti-virus software with daily virus definition updates.

HSRI's server infrastructure consists of current Windows Server and Microsoft SQL technologies. We also contract with third-party server hosting partners. These partners have passed the strictest security audits and guarantee an uptime of 99.9%. Our servers are suited to host computationally intensive applications and are capable of streaming media such as audio/video for pre-recorded events to be broadcast via the Internet. HSRI is capable of authoring multimedia content and has a dedicated multimedia workstation equipped with the latest software and hardware. HSRI provides staff members with a basic set of hardware and software, including Microsoft Office and several communications programs, as well as a tailored set of hardware and software packages that matches their skills and job requirements.

HSRI has a long history of supporting project funders using the latest affordable third-party technologies to quickly deploy project management websites that facilitate virtual team collaboration, such as Microsoft SharePoint. This provides project task tracking, shared calendars, timelines, and document version control in an easy-to-use environment that promotes individual accountability and adherence to deadlines.

### Section 1.1.2 NORC Organizational Capacity and Qualifications



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Founded in 1941, NORC is a public policy and social science research organization affiliated with the University of Chicago (U. Chicago). Our mission is to conduct high-quality research in the public interest. Our work frequently helps to inform decision-makers about the issues facing society through data collection and interpretation. NORC expands the reach and power of this research through policy analysis and technical assistance activities that support the aims of many government and nonprofit organizations.

Headquartered in Chicago, Illinois NORC has offices in Bethesda, Maryland; Atlanta, Georgia; Boston, Massachusetts, and San Francisco, California; as well as a field operations staff throughout the country. NORC's presence on the University of Chicago campus fosters collaborations that include investigator-instigated projects led by U. Chicago faculty members and federal contract research that benefits from the expertise of both NORC staff members and faculty.

Currently, more than 30 projects rely on the scholarship of faculty members and the expertise and resources of NORC. This diverse set of projects involves faculty from the University's graduate divisions of the biological and social sciences; graduate schools of business, medicine, public policy, and social work; and University centers and committees focused on children's policy, crime, and education. This long experience of nuanced collaboration with the U. Chicago faculty members creates at NORC an environment in which collaboration between NORC and faculty members at other leading public and private research universities also flourishes.

Through each of our eight departments (Economics, Labor, and Population; Education and Child Development; Health Care Research; International; Public Health Research; Security, Energy, and the Environment; Statistics and Methodology; and Substance Abuse, Mental Health, and Criminal Justice) and the Academic Research Centers, NORC conducts research of significance to local, regional, national, and international policymakers. NORC's clients include federal and state government agencies, universities, foundations, and other nonprofit organizations, and occasionally, commercial clients. We only do work that we consider to be in the public interest.

#### NORC Data Enclave

Launched in 2006, the NORC Data Enclave provides a confidential, protected environment within which authorized researchers can access sensitive microdata remotely. While public-use

data can be disseminated in a variety of ways, fewer options exist for sharing sensitive microdata that have not been fully de-identified for public use. Some data producers have sufficient economies of scale to develop advanced in-house solutions that serve the needs of external researchers, but most lack the resources to archive, curate, and disseminate the datasets they collect. The Data Enclave provides our partner organizations with a secure platform where they can both host and build a research community around their data. The Data Enclave currently serves more than 350 researchers and hosts confidential data for several federal agencies, foundations, and universities.

The Data Enclave team values NORC's core mission to support informed decision making through objective data and analysis. The Data Enclave offers the full cycle of data services, ranging from study design and concept to data archiving and access. In addition to its expertise in metadata documentation and data dissemination, the Data Enclave provides a comprehensive set of analytic services.

Members of the team come from a wide range of backgrounds and are thoroughly trained in research methods and statistical analysis, and can leverage the full array of NORC's analytic capabilities. In addition, the Data Enclave engages the research community in developing a knowledge infrastructure around each dataset through its virtual, collaborative workspace, which enables geographically dispersed researchers to share information, replicate results, and provide feedback to data producers.

The NORC Data Enclave has a number of years of experience designing, implementing, supporting, and enhancing secure remote data access facilities. With original funding from the National Institute of Standards and Technology (NIST) in July of 2006, NORC developed a data enclave and e-collaborative that has grown to host sensitive microdata from a number of federal statistical agencies, including the Departments of Commerce and Agriculture, and as well as data producing foundations, such the Ewing Marion Kauffman Foundation, MacArthur Foundation, and Annie E. Casey Foundation. It is also worth noting that the NORC Data Enclave – or the “NORC Model” – is increasingly referred to as the standard bearer in providing secure remote microdata access solutions. Among others, the “NORC Model” has been implemented for the UK Data Archive's new Secure Data Service (SDS) and is being considered by the Council of European Social Science Data Archives (CESSDA) as they plan to provide access to sensitive data across its 20-country consortium. In addition, NORC provided technical assistance to the University of Pennsylvania's and Columbia University's Population, Aging Research Centers in developing a secure enclave again using the model.

The enclave technical model employs security technologies used by the military and banking sectors. The security interface is based around a Citrix infrastructure that effectively renders end users' computers as 'secure remote terminals' providing access to data, statistical software, and collaborative spaces on central secure server farms double firewalled within NORC's secure network. The system is flexible in that, depending upon data producers' preferences, access may be restricted to particular users and/or particular locations. It maintains security in that all data manipulation occurs on NORC's secure servers, which are maintained to very strict security protocols.

In short, NORC has the resources and expertise necessary for designing and conducting virtually any type of data collection or analysis, and we can assist our clients and their grantees in a wide variety of other ways as well. In partnership with Metadata Technology North America Inc. (see below), they will provide the IT infrastructure solution for the Maine Health Data Warehouse.

### **NORC Subcontractor – Metadata Technology North America Inc.**

Metadata Technology North America Inc. (MTNA) is a privately owned eGovernment data management and information technology solution provider whose mission is to facilitate production, open access, and improve the quality and use of statistical and scientific data. The firm is at the forefront of information technology and our solutions built on industry standard architectures and robust technologies such as J2EE, Spring Framework and XML and specializes in developing products and web services leveraging XML technology, metadata standards, and related best practices and is staffed with globally recognized experts in emerging data standards such as SDMX, DDI, and statistical data management. In addition to expertise in metadata and data management solutions MTNA provides data support services such as data archiving, integration, and harmonization and support for big data platforms and other cloud based infrastructures. MTNA also is a leading implementation consultant for DDI-L, with notable engagements including the Canadian RDC Network, support for the NORC Data Enclave, IAB's metadata management system in Germany, design assistance for the ABS MRR Proof of Concept, and participation in the Data without Boundaries project.

### **Section 1.1.3 PCG Organizational Capacity and Qualifications**

This section describes PCG's areas of expertise and organizational infrastructure and assets. Information on specific projects relevant to the MHDO RFP is included in section 1.3.



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Public Consulting Group, Inc. (PCG) was established in 1986 as a government consulting firm. Today PCG operates from 35 offices across the U.S. and in Montreal, Canada, Lodz, Poland and London, England. We employ over 1,100 staff with extensive experience and subject matter knowledge in a range of government-related topics. For this engagement, PCG's Health Practice Center of Excellence professionals are part of the HSRI team and provide deep health care data knowledge for the data warehouse solution.

The firm has extensive experience in all 50 states, clients in six Canadian provinces, and a growing practice in the European Union. PCG's current work includes more than 1,000 active contracts in over 40 states. PCG has helped clients in all 50 states expand program financing options available from public and private sources, reduce or contain costs, improve business processes, improve compliance, and improve client outcomes. This experience

provides PCG with our deep understanding of the data streams and information needs for the public health care system.

PCG welcomes the opportunity to be part of the data warehouse solution team with HSRI. PCG has helped clients with similar scopes of work including: **Massachusetts Department of Early Education and Care (EEC)** who contracted with PCG to perform the initial analysis and design of an Early Childhood Information System (ECIS) and **The State of New Hampshire** who required a more effective and efficient system of organizing, collecting and sharing the behavioral health information from the regional providers. The PCG team members for this project will also bring professional Medicaid data warehouse development experience from the **State of New York eMedNY Medicaid Data Warehouse** project. Two of these projects are further described in Section 1.4, Experience with Similar Projects.

## **Section 1.2 Organizational Description and Qualifications**

HSRI's corporate headquarters are in Cambridge, MA, with additional offices in Cambridge, MA, Portland, OR and a satellite office in Bethel, ME. This contract will be managed out of the Bethel, ME satellite office, promoting the employment of Maine residents, as further described in Section 4.0, Economic Impact on the State of Maine.

HSRI's Certificate of Liability Insurance can be found in Appendix A.

## **Section 1.3 Organizational Experience**

### **Section 1.3.1 Strengths of the Team's Technical Approach**

#### **Central Coordination and Oversight.**

The current project requires coordination across multiple constituents: the MHDO, the Maine Health Data Processing Center (MHDPC), the prime contractor (HSRI) and multiple sub-contractors (NORC, and PCG).

MHDO's Data Warehouse will be strengthened and maintained via a strong management and coordination dashboard used to track all major project functions to which the MHDO will have access. The core project staff being proposed has a proven track record of managing complex projects that involve the execution of multiple tasks concurrently, and that involve personnel from multiple departments and organizations. With HSRI as the project lead, we understand the technical and content requirements that will ensure that MHDO priorities are captured and communicated in ways that enhance development efforts. This, along with our use of Agile Methodologies, is further detailed in Section 2.10, Project Management.

The following projects illustrate HSRI's ability to manage projects of similar scope and complexity:



**Data Analysis Coordination and Consultation Center (DACCC), 2008-2012, funded by the Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Substance Abuse Prevention (CSAP).** HSRI is the prime contractor on this CSAP project that involves coordinating multiple tasks across all CSAP funded grant and contract programs. The DACCC is responsible for receiving data from all grants and contracts, creation of a common data structure to house data, cleaning data, working with grantees/contractors to resolve data-related issues, generating reports for CSAP staff that describe grant and contract performance and responding to ad hoc requests for information.

**Coordinating Center for Adolescent Managed Care Knowledge Development and Application, 1997 - 2000, funded by SAMHSA.** HSRI was the Coordinating Center for this five site study that compared Medicaid managed care and fee-for-service arrangements for adolescents with substance use disorders. The Coordinating Center was responsible for helping sites to develop a common protocol, development of common service taxonomies across sites, creation of cross-site databases, data analysis and report generation.

**Coordinating Center for Managed Care and Vulnerable Populations Project, 1996 - 1999, funded by SAMHSA.** HSRI was the lead organization for the Coordinating Center for this 15 site comparison of mental health and substance abuse services provided under Medicaid managed care and fee-for-service arrangements. The Coordinating Center was responsible for helping sites to develop a common protocol, development of common service taxonomies across sites, creation of cross-site databases, data analysis and report generation. The main tasks include facilitating the construction of a common protocol, providing training to study sites in data gathering and assessment, establishing procedures for data transfer, incorporating site data into common data structure, converting data from stored form to analyzable form, conducting data analyses, and knowledge exchange.

### **Ability to Mobilize Quickly and Optimally Manage Projects with Tight Timelines.**

As a longstanding organization that has responded to industry shifts for 35 years, HSRI fosters a work climate with a high tolerance for change and a high comfort level with technological adoption. Moreover, our depth of experience allows us to anticipate areas that might pose challenges and rapidly develop approaches to mitigate these.

Examples of HSRI's ability to respond quickly and efficiently under tight timelines include the following:

- HSRI is currently the prime contractor for SAMHSA's Center for Substance Abuse Prevention (CSAP)'s Data Analysis Coordination and Consolidation Center (DACCC). This project requires HSRI staff to be constantly available to address ad hoc requests from CSAP ranging from simple requests for information such as rapid literature reviews to more complex analytic tasks involving statistical analyses of complex data sets. The project has supported approximately 45 FTEs. Over the past five years, HSRI has successfully responded to over 250 such ad hoc requests.
- HSRI was the prime contractor for the SAMHSA Center for Mental Health Services (CMHS) Evaluation Center@HSRI. In this capacity, HSRI was charged with

responding to requests for analytic assistance from evaluators all across the country. These requests for assistance covered a wide range of evaluation-related issues including: sampling strategies and power analyses, instrument selection, statistical techniques, survey design, study design, performance measurement systems, and measurement issues related to recovery. CMHS' award of the Evaluation Center to HSRI over multiple contract periods attests to our ability to respond quickly and competently to such requests.

### **Depth of Knowledge of Proposed Data Warehouse Construction and Functions will allow for Quick Start-up.**

Because the proposed team has vast experience with health claims data, creating warehousing solutions, designing user interfaces, as well as related data processing and file management, the MHDO Data Warehouse will be able to move very quickly to transition files and materials and commence productive work on Data Warehouse activities and deliverables.

Examples of HSRI projects related to the development of data warehousing and the management and analysis of claims data, include the following:

- HSRI is engaged in a contract with the US Department of Health and Human Services (DHHS) to develop an assessment informed, resource allocation model for people with intellectual and developmental disabilities served on the Maine's Medicaid waiver. The project will result in a prototype model that can be used to identify appropriate budget amounts for individuals based on their independently assessed support needs. To complete the work required under this contract, HSRI will use individual assessment data from the Supports Intensity Scale and MaineCare expenditure data for services billed through the state's comprehensive waiver. HSRI has a fully executed Business Agreement with DHHS that allows access to the required MaineCare data.
- **California Health Reform Initiative, 2011 – Present, funded by SAMHSA and the California Endowment.** This is an ongoing study to examine how the health reform initiative will impact the behavioral health system in California. HSRI partnered with the Technical Assistance Collaborative (TAC) in developing decision-support in forecasting the costs and service utilization the state will require as health reform takes shape. Administrative claims and eligibility Data from the Center for Medicare and Medicaid Services and State Mental Health (DMH) and Substance Use (ADP) agency over a 5 year period are being examined to identify trends. Techniques such as synthetic estimation are also being employed to link national large scale databases to state data to examine trends at the county level as well as the overall state level.
- **New Mexico Healthy Homes, 2011 – Present, funded by the New Mexico Department of Health.** HSRI is currently partnering with the Technical Assistance Collaborative (TAC) to examine and forecast the trend of behavioral health service utilization and costs as the state is preparing a new model of integrated primary care service delivery. Two years of Center for Medicare and Medicaid Services claims and eligibility data (FY2010 and FY2011) have been received and analyzed to describe



current utilization and cost patterns and we are currently using these data to project utilization and cost patterns under a health homes initiative.

- **Federal Block Grant Cost Efficiency Study, 2004-2008, funded by SAMHSA, Center for Mental Health Services (CMHS).** HSRI contracted with SAMHSA, CMHS to develop and test a cost-efficiency measure using the HSRI-developed simulation model. A total of 5 states and 1 county (Los Angeles) participated by providing Medicaid, Medicare, and State Mental Health Authority and Substance Abuse Authority Data for the efficiency analysis. The findings from the report generated through this modeling project resulted in the Government Accounting Office approving the continuation of the Block Grant program.

### **Understanding of MHDO Data Warehouse Needs and Potential Challenges**

In anticipation of contract award, the proposed MHDO Data Warehouse team has brainstormed potential challenges and solutions that may occur throughout the life of the project. These challenges and our proposed solutions are identified throughout the proposal. Although we realize that other challenges may arise, this initial planning led to the first cross organizational information sharing which has prepared the team for rapid information sharing and has increased the likelihood of rapid deployment of the project upon contract award.

### **Quality Assurance as Hallmark of Our Work.**

HSRI has developed an extensive set of Standard Operating Procedures to guide all analytic work to ensure accuracy in processing data files from the point of reception (source data files) to the pages of a report. Our standard operating procedures include the following:

- Contract management
- Communication and coordination across HSRI staff teams, sub-contractors and funders
- Project management
- Data management procedures (including tracking receipt of data files, integrating files into common data structures, cleaning data, corresponding with data submitters, creating analytic files)
- Data analysis procedures (defines standard analytic and quality assurance procedures)
- Measure development (work plan development, selecting and convening of expert panels, compiling background information, report development, and material development)
- Publication and clearance (description of procedures to comply with funders' publication and clearance regulations and practices)
- Quality control (editing and design quality control procedures, printing quality control procedures, and a product delivery protocol)

- System security (procedures to establish the controls and system operating policies and procedures that assure confidentiality, integrity, and availability of information systems)

In addition to the need for accuracy, we believe that ethical standards are an important consideration in maintaining high-quality work. For that reason, all staff members who work with data are trained and certified in human subjects research ethics and data security/privacy awareness.

## Section 1.4 Description of Experience with Similar Projects

HSRI and its partners have extensive experience in types of tasks required for the MHDO health Data Warehouse. The following five projects illustrate the breadth of the team's capabilities.

### Section 1.4.1 HSRI's Experience with Similar Projects

**HSRI Project 1: California Health Reform Initiative** (2011 – Present, funded by SAMHSA and the California Endowment).

Project Contact:

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<http://www.dhcs.ca.gov/provgovpart/Pages/BehavioralHealthServicesAssessmentPlan.aspx>

The California Department of Health Care Services (DHCS) contracted with the Technical Assistance Collaborative (TAC) and HSRI, to conduct a Mental Health and Substance Use System Needs Assessment and to develop a Mental Health and Substance Use Service System Plan. The Needs Assessment was carried out to satisfy the Special Terms and Conditions required by the Centers for Medicare and Medicaid Services (CMS) as part of California's Section 1115 Bridge to Reform waiver approval.

The primary purpose of the Needs Assessment was to review the needs and service utilization of current Medicaid recipients and identify opportunities to ready Medi-Cal, California's Medicaid program, for the expansion of enrollees and the increased demand for services resulting from health reform. While the project focused primarily on the Medi-Cal mental health and substance use systems, it also included analysis of data from the State's Department of Alcohol and Drug Programs' California Outcomes Measurement System Treatment (CalOMS Tx) database, and the Department of Mental Health's Client and Services Information (CSI) data set. This was done to provide a full picture of the behavioral health system in California.

In addition to analysis of the three major datasets listed above, site visits, focus groups and interviews with over 140 key informants were an important element of the information collection

process. TAC/HSRI also collected and reviewed over 100 documents related to California's mental health and substance use service systems. These activities resulted in a comprehensive report focusing on the following areas:

- Estimation of the prevalence of mental illness and substance use disorders (SUDs) among the population of California;
- Analysis of service utilization, expenditures, and service penetration rates for the Medi-Cal, Department of Alcohol and Drug Programs (DADP), and Department of Mental Health (DMH) programs;
- Projected numbers for and characteristics of the 2014 Medi-Cal expansion population;
- Identification of issues related to certain special populations enrolled in the Medi-Cal program;
- Analysis of provider capacity and mental health and substance use workforce issues;
- Analysis of the state of health integration in California; and
- Review of issues related to health information technology for mental health and substance use providers.

This project demonstrates HSRI's ability to:

- Develop complex databases integrating disparate data from multiple sources: CA Medicaid, the State Department of Alcohol and Drug Programs and the Department of Mental Health clinical information system
- Using these combined data to estimate prevalence rates, monitor service utilization, project service needs given assumptions about health care reform, and examine work force needs.

**HSRI Project 2: Data Analysis Coordination and Consolidation Center (DACCC) 2008-2012, funded by the Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Substance Abuse Prevention (CSAP).**

Project Contact:

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The Substance Abuse and Mental Health Administration's (SAMHSA) Center for Substance Abuse Prevention (CSAP) collects and manages large amounts of program and service-related data and processes those data to create and disseminate information and reports. These reports

assess CSAP's performance and its funded programs to provide information to key stakeholders and advance the prevention field by contributing to its evidence base. In September of 2007 CSAP established a contract for the Data Analysis Coordination and Consolidation Center (DACCC) to provide a centralized, comprehensive and coordinated data management and analytic resource to support its accountability, program planning and policy making functions. Human Services Research institute has been the prime contractor for the DACCC since 2007.

Since its inception and responsive to the leadership of the CSAP Contracting Officer's Representative (COR), DACCC supported CSAP and its managers in planning, implementing and overseeing their funded programs and in providing guidance to grantees and the field. Through DACCC, CSAP created an enhanced data infrastructure that provided ongoing analysis and reporting of process, capacity, outcome and trend data for all program levels. The infrastructure also continuously improved the quality and accessibility of CSAP data using internal quality management processes and information products developed to support Project Officers and management. DACCC also aggressively enhanced the analysis of available data, thus promoting SAMHSA's national prevention agenda.

The data management infrastructure created and maintained during the DACCC contract managed and processed new data files as they arrived from grantees and contractors; harmonized files using the evolving Uniform Coding Convention (UCC) data standards; created a metadata database to organize the files; and ensured that data files were appropriately structured to produce master files for required reports, to populate the Web Analytic Tool (WAT), and to respond efficiently to ad hoc requests. Under this task, the Data Management Team (DMT) also developed tools that helped grantees improve the quality of the data they submitted and supported CSAP staff in the management of their grantees. These tools, including cleaning sheets, monthly inventories, and data dashboards are currently being used by CSAP Project Officers and managers.

As part of the DACCC contract, HSRI developed standard, special reports, and ad hoc reports that met the information needs of CSAP and the prevention field; assisted CSAP in meeting its federal reporting requirements; assisted CSAP in monitoring program effectiveness; and provided important prevention-related information to States and localities as they managed their own prevention programs and resources. Analytic rules and procedures were developed in consultation with the COR.

This project demonstrates HSRI's ability to:

- Manage a contract that created a single database that integrated data from all CSAP grant and contract programs;
- Create a system for cleaning data and improving data quality over time; and
- Use these data to create reports that assisted CSAP in meeting its federal reporting requirements and assessed the performance of individual programs over time

## Section 1.4.2 NORC's Experience with Similar Projects

### **NORC Project 1: Comparative Effectiveness Research (CER) Public Use Data Pilot Project** *2011-Present, funded by Center for Medicare and Medicaid Services*

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NORC partnered with IMPAQ International and Buccaneer Computer Systems & Services to conduct the Comparative Effectiveness Research (CER) Public Use Data Pilot Project. The project pioneered the creation, dissemination, and support of Medicare claims public use file (PUF) to conduct comparative effectiveness research. The final data products for this project include Basic, Enhanced, and Linked PUF for a 5% sample of Medicare beneficiaries across 3 years of data using all nine Medicare claims limited data sets (Denominator, Inpatient, Outpatient, PDE, Carrier, Skilled Nursing Facility, Durable Medical Equipment, Hospice, and Home Health Agency). To guarantee the confidentiality of Medicare beneficiaries' Protected Health Information (PHI) and assure an overall low risk of disclosure, NORC implemented sophisticated de-identification methods (e.g., GRLS-PC, GenMASSC) and rigorous re-identification analysis. In addition to the creation of the public use file, the project empaneled a Technical Expert Panel/Data User's Group, developed and implemented cutting secure data access solutions, created user support documentation, and initiated outreach/marketing activities. Other tasks performed under this contract included: environmental scans, needs assessments, CMS research data on-demand, and ad hoc program and policy analysis. The CMS 2008 Chronic Conditions PUF and eight Basic Stand Alone (BSA) PUFs including the CMS 2008 BSA Inpatient Claims PU, which includes basic demographic (age and gender) and claim-related information (diagnosis and procedure codes, length of stay, and average Medicare payment amount), are available on the CMS website. With its extensive experience in providing remote secure microdata access, Data Enclave served as the platform where geographically dispersed analysts collaborate with one another perform sophisticated de-identification and re-identification models.

### **NORC Project 2: Secure Data Access Facility** *2009-Present, funded by National Science Foundation*

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On October 1, 2009, the National Science Foundation (NSF) joined the Data Enclave, with the objective of housing the Survey of Earned Doctorates (SED) and Survey of Doctorate Recipients (SDR) data and metadata with Data Enclave innovations. This involved providing secure remote access to these data at a Secure Data Access Facility (SDAF) housed within the Data Enclave as well as technical support to approved researchers and National Center for Science and Engineering Statistics (NCSES) staff at NSF. The enclave team created a publically facing query analysis tool for data users - the SED Tabulation Engine - to access sensitive variables such as sex, race/ethnicity, and citizenship data from 2007 onward. This new tool is designed to display estimates that do not disclose personally identifiable information in tables using sex, race/ethnicity, or citizenship variables. It provides users with the ability to generate statistics using all of the SED variables previously available in WebCASPAR except baccalaureate institution and the highest degree awarded by those institutions. NCSES is exploring the possibility of adding the baccalaureate institution variable to the tabulation engine in a future release. Building on the success of the SDAF, NORC entered another contract with NSF on April 20, 2010 (later renewed in 2011) to initiate a new project called "Discovery in Research Portfolio." Specifically, the Data Enclave was tasked to support a project to build novel analytic tools that could glean information from their large database of submitted grant proposals. The Enclave hosted leading researchers in large scale text analysis, machine learning and data visualization to design software to make the database of proposals more transparent.

#### **Section 1.4.1 PCG's Experience with Similar Projects**

**PCG Project 1: Analysis & Design of an Early Childhood Information System (ECIS) 2010**  
– 2011 funded by Massachusetts Department of Early Education & Care (EEC)

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The Massachusetts Department of Early Education and Care (EEC) contracted with PCG to perform the initial analysis and design of an Early Childhood Information System (ECIS).

PCG's work steps to date include:

- Facilitated a two-day Strategic Planning Institute at Harvard University consisting of national, state, and local leaders, community providers, advocates, researchers, and other early childhood stakeholders
- Conducted a national review of best practices in ECIS development

- Conducted a policy review of relevant legislation

PCG's work steps currently in progress include:

- Providing an analysis of EEC's extant data and legacy systems, including data dictionaries and data mapping
- Defining the business specifications for the ECIS, including desired data elements, data relationships, data sources and data collection and transfer protocols
- Creating a data integration plan
- Drafting an RFP for Phase II of the ECIS development process with specifications for the system build.

### **Project Achievements**

When fully developed and implemented, the Massachusetts ECIS will be able to: 1) track children across ages and over time, 2) include children's demographic data, 3) include child outcomes across developmental domains that can be linked across sectors, agencies and programs, 4) link to program and fiscal data, 5) support geographic analysis useful to communities engaged in birth through age eight strategic planning, resource management, program improvement, and accountability, and 6) provide internal and external policy makers, EEC staff, researchers, and other stakeholders with EEC data in diverse formats.



## Section 2.0 Specifications of Work to be Performed

The HSRI team proposes to build a state-of-the-art system that will utilize a multi-tiered model to deliver data upload, warehousing and self-service access functionality that will be accessible to data submitters, MHDO staff and other authorized users via the internet. This system will make use of cloud technologies to provide a robust, scalable and highly secure data platform capable of handling high volumes of data and achieving high levels of availability. It will provide a flexible ETL platform that will load data to a set of common data structures that will support the creation of Master Indexes that will provide unique identifiers and other information for patients, providers and payers in the State of Maine. The ETL system will be configurable by MHDO staff through an online interface that will enable them to define file validation rules at the submitter level and upload irregularly formatted data files into the warehouse. The system will provide authorized users access to raw datasets and a variety of pre-generated and interactive reports on data held in the warehouse, both through the online interface and through web services.

The HSRI team is made up of three companies: HSRI, NORC and PCG. The HSRI team's roles and responsibilities are highlighted in Table 1. HSRI will be heading up the project, performing core Project Management functions and will lead and staff the Product Development team, which will develop the user-facing elements of the web applications, the ETL processing and the self-service reporting and download functions. HSRI staff will also be involved in the process of defining the common data structures and the creation of the master indexes. HSRI will also lead and staff the Quality Assurance Team. The IT technical infrastructure team will be led and staffed by NORC; they will be hosting the system as a part of their Secure Data Enclave and will be responsible for the core engineering and maintenance of the warehouse infrastructure, in partnership with MTNA. NORC will also be developing the core web services that will provide access to warehoused data. NORC will also take the lead in providing training to MHDO staff on system and database architecture, system administration and other technical tasks. PCG will lead and contribute staff to the Health Data Content Team. They will be involved in the Data Governance and Management tasks as well as working with HSRI on the common data structure definition. Project teams and staffing, including the HSRI team organizational chart can be found in Section 2.16 – Staff.

**Table 1. HSRI Team Roles and Responsibilities**

Team	Roles	Lead Company
<b>Project Leadership</b>	Overall project direction and oversight	HSRI (Lead) NORC
<b>Project Management</b>	Project management	HSRI



<b>IT Infrastructure</b>	Responsible for core engineering and maintenance of the warehouse infrastructure Provides core web services Provides hosting of and access to warehouse	NORC (Lead) MTNA
<b>Training</b>	Provide training on system and database architecture, system administration and other technical tasks Develops user manuals	NORC (Lead) PCG
<b>Quality Assurance</b>	Overall quality assurance	HSRI
<b>Health Data Content</b>	Develop data management and governance process Develop common data structure definitions Develop Master Indexes	PCG (Lead) HSRI
<b>Product Development</b>	Develop the user-facing elements of the web applications Develop the ETL processing Develop the self-service reporting and download functions Work with Health Data Content Team on the Master Indexes	HSRI

## Section 2.1 Technical Architecture

### Section 2.1.1 Overview of System Functionality

The HSRI team will develop a custom ETL solution that will provide a high-performance system for loading raw data files to the data warehouse. This ETL solution will allow data submitters to encrypt sensitive information in data files and receive immediate feedback on formatting and data integrity issues before file upload, which will improve the data submitters' user experience. The ETL solution will allow MHDO users to create and maintain submitter and file-specific validation edits, perform manual/ad hoc uploads of irregular data files, and perform other administrative functions via web applications ("the portal").

The ETL solution will load submitted data files into a set of common data structures stored in the warehouse (stored within a Vertica data store). Accompanying documentation files will be stored in a companion unstructured data store (Cloudera Hadoop). The system will process newly submitted data to match records against master index files for patients, providers and payers. It will add and update index records as necessary in order to ensure that each patient, provider and payer is represented only once in the corresponding index.

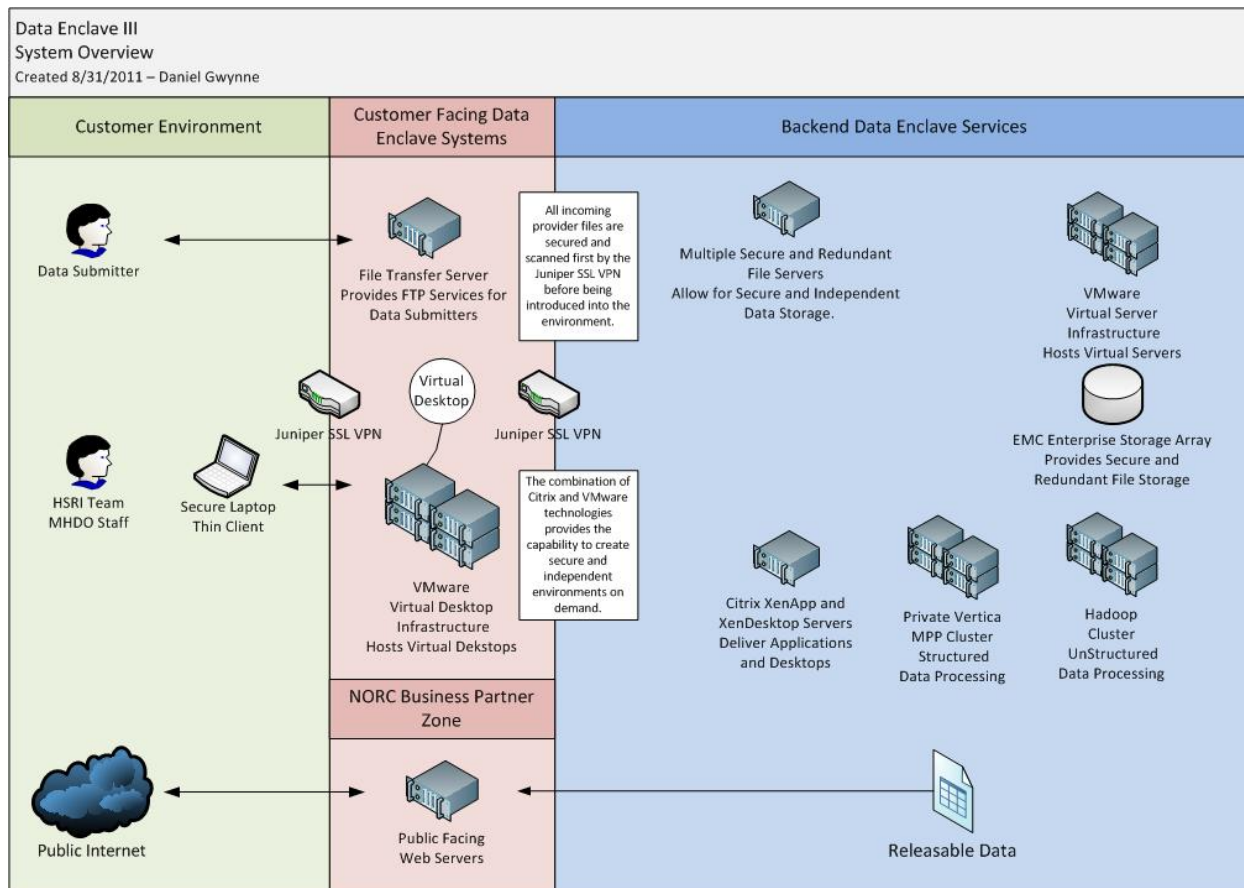
Once data have been loaded to the warehouse and master index processing is complete, the data will be made available via web services for access by authorized users. User-friendly web

applications will be built on top of these services to provide self-services access to “raw” datasets, generated query results and standard reports. Additional “drill-down” and data visualization functionality will be provided to MHDO staff within the Data Enclave with third party business intelligence and visualization tools (Pentaho and Tableau) which will aid these users in making innovative uses of the data and producing ad hoc reports. The MHDO staff will also have resource and system usage statistics available via an online “portal dashboard” that provides a quick status summary of the overall system.

### **Section 2.1.2 Overview of IT Infrastructure**

All systems will reside in NORC’s secure network. The Business Partner Zone (BPZ) will host any system that requires external access over the internet by authorized users or the public. The remaining systems will be housed either within the NORC Data Enclave or on customer facing elements of the Data Enclave and will require secure authentication. Data submitters uploading data will have a client-side application for data validation that will authenticate with the secure FTP servers in the Enclave and allow for seamless, transparent uploads. Data submitter uploads will then be transferred to a staging area where the ETL solution will reside. The warehouse itself will reside on structured and unstructured data management solutions. MHDO staff and HSRI team members who require direct access to warehouse resources will log in with thin client machines and multi-factor authentication tokens and have access to a virtual desktop with business intelligence, monitoring and database management tools. Releasable reports and datasets will be migrated to web servers in the NORC BPZ where users can either download files or perform queries through online data visualization tools or custom developed web applications and services. Access to data on BPZ servers will be restricted to authorized users or open to the public in a manner consistent with the warehouse’s Data Governance policy. An optional public Vertica cluster can be deployed in the BPZ to support high volume queries, as necessary.

**Figure 1: Data Warehouse System Overview**



NORC plans to use the following infrastructure and software platforms to support the work of this project:

**Structured Data: Vertica Systems**

For data use cases such as the MHDO’s Data Warehouse, with data volumes in the range of 10 terabytes and data updates that are regular but not continuous, NORC recommends the use of the analytic database management system Vertica. Curt Monash of Monash Research, a leading DBMS consulting firm notes:

*“Vertica has a very attractive product offering. It’s perhaps the most scalable analytic DBMS outside of Teradata, running on the hardware of your reasonable choice. It’s also the one I recommend most often to clients in the 1-50 terabyte range.”<sup>1</sup>*

<sup>1</sup> <http://www.dbms2.com/2011/11/21/big-vendor-execution-analytics/>

Using Vertica as the centerpiece of this kind of data warehouse will allow queries and data extracts to be returned at speeds multiple orders of magnitude faster than traditional enterprise database systems, and brings a number of other advantages.

1. Vertica organizes data on disk as columns of values from the same attribute, as opposed to storing it as rows of tabular records. Thus when a query needs to access only a few columns of a particular table, only those columns need to be read from disk. Conversely, in a row-oriented database, all values in a table are typically read from disk, which fails to optimize I/O bandwidth.
2. Vertica employs efficient compression of data on disk, as well as a query execution engine that is able to keep data compressed while it is in operation. Compression in Vertica is particularly effective, as values within a column tend to be quite similar to each other and compress very well—often by up to 90 percent. In a traditional row-oriented database, values within a row of a table are not likely to be very similar, and hence are unlikely to compress well. Columnar compression and direct operation on compressed data shift the bottleneck in query processing from disks to CPUs.
3. Because data is compressed so efficiently, Vertica has sufficient space to store multiple copies of the data to ensure fault tolerance and to improve concurrent and ad hoc query performance. Logical tables are decomposed and physically stored as overlapping groups of columns, called “projections,” and each projection is sorted on a different attribute (or set of attributes), which optimizes them for answering queries with predicates on its sort attributes.

A Vertica database is composed exclusively out of these query-optimized structures on disk, without the overhead of base tables. This is similar in concept to a database comprised entirely of materialized views (with no base tables). In addition to remarkable performance on a variety of database workloads, Vertica includes several other features designed to offer performance, scalability, reliability, and ease of use. These include:

4. A shared nothing, grid-based database architecture that allows Vertica to scale effectively on clusters of commodity CPUs.
5. A hybrid data store, where newly inserted records are added to a write optimized portion of the database to allow continuous, high-performance insert operations concurrently with querying to enable real-time analytics.<sup>2</sup>
6. Automated physical database design tools that determine how data should be organized both locally on each node in a cluster, as well as horizontally partitioned across a cluster. In addition to choosing projections and sort orders, these tools ensure k-safety, meaning that all data is replicated on multiple nodes so that k node failures can be tolerated by the system without interrupting functionality. These tools reduce administrative costs by

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<sup>2</sup> In fact, in December 2008, Syncsort, HP and Vertica teamed up to break the world record<sup>1</sup> for data warehouse data loading. It took 57 minutes 21 seconds to load 5.4TB of TPC-H data (generated retail sales data) into Vertica by the Syncsort ETL software running on an HP BladeSystem C7000, which beat the previous record set by Microsoft (2.36TB in 1 hour).

simplifying physical database design decisions. This also allows Vertica to automatically adapt to on-the-fly the addition or removal of database nodes.

7. High-performance, ACID-compliant database system with a light-weight transaction and concurrency control scheme that is optimized towards loading and querying data. Vertica's failure recovery model is based on replication (ksafety) rather than traditional log-based methods.
8. Monitoring and administration tools and APIs for controlling performance, backup and disaster recovery, etc.

Vertica is currently an industry leader in high performance, query-focused database management systems in the single to double digit terabyte range.

### **Unstructured Data: Cloudera Hadoop (CDH)**

NORC recommends CDH as a platform to store and, if MHDO determines a need to do so, analyze the unstructured data, such as documentation in the form of PDFs or images, that will accompany claims records and other submitted data. CDH is Cloudera's open source Hadoop distribution, built specifically to meet enterprise demands. Comprised of Apache Hadoop and a number of other leading open source projects, CDH combines storage and computation into a single, scalable system and delivers the flexibility required to perform operations on large volumes of unstructured data that are not possible with traditional solutions. CDH helps operationalize data by giving users the ability to:

- Store data in any format, free from rigid schemas
- Process data in parallel and in place
- Perform complex analysis across large, diverse data sets and
- Use Hadoop together with existing data analysis tools

CDH delivers the core elements of Hadoop – scalable storage and distributed computing – as well as all of the necessary enterprise capabilities such as security, high availability, and integration with a broad range of hardware and software solutions. Ideal for enterprises seeking a stable, tested, open source Hadoop solution without proprietary vendor lock-in, CDH is the bridge between the insights of organizations using Hadoop in production and the continuous stream of innovations from the Apache community. CDH is the most widely deployed distribution of Hadoop and runs at scale in production environments across a broad range of industries and use cases.

### **Data Cluster Servers: Dell PowerEdge**

The NORC Data Enclave uses commodity Dell servers for virtualization and dedicated clusters. These are either PowerEdge M610 or R 510 servers. The Dell PowerEdge M610 allows for quick virtualization deployment with embedded hypervisors from world-class vendors using a Secure Digital (SD) card or internal USB. Intel VT FlexMigration integrates multiple generations of Intel Xeon processor-based servers, improving flexibility and investment protection. The M610's

enhanced memory capacity is crucial for virtualization performance while lower-cost memory configurations can help balance cost. These servers are deployed primarily to support the virtual infrastructure, desktops and applications in the Enclave.

The PowerEdge R510 is an Intel processor-based 2-socket, 2U rack server ideal for email, virtualization, workload consolidation and core business applications with large, local storage needs. These servers are deployed in the Vertica and Cloudera clusters.

### **Transfer and Staging Storage: EMC VNX**

The Data Enclave uses an EMC VNX as the primary storage facility for data on virtual servers and desktops as well as all data files that do not reside within a Hadoop/DBMS cluster. The VNX 5500 is a robust platform for consolidation of legacy block storage, file servers, and direct-attached application storage. The VNX series enables the sharing and cost-effectively management of multi-protocol file systems and multi-protocol block storage access. The VNX operating environment enables Microsoft Windows and Linux/UNIX clients to share files in multi-protocol (NFS and CIFS) environments. At the same time, it supports iSCSI, Fibre Channel, and FCoE access for high-bandwidth and latency-sensitive block applications. The combination of EMC Atmos Virtual Edition software and VNX storage supports object-based storage. The VNX series storage platform is powered by the Intel Quad Core Xeon 5600 series with a 6-Gb/s SAS drive back-end.

### **Business Intelligence: Pentaho Business Analytics**

Although there are a number of BI solutions from which to choose, NORC recommends the use of Pentaho as a platform for internal data warehouse users to navigate and analyze the production system. Pentaho Business Analytics provides a highly interactive and easy to use web-based interface for business users to access data, create and interact with reports and dashboards, and analyze data across multiple dimensions, without depending on IT or developers. For IT, Pentaho Business Analytics is built on a contemporary lightweight high-performance platform and can be flexibly deployed on-premise, in the cloud, or seamlessly embedded into other software applications. It works with data of any type and from any source, including Big Data sources such as Hadoop and NoSQL databases.

### **Data Visualization: Tableau Server**

NORC recommends the use of Tableau Server for rich data visualization by public users of releasable data. Tableau Server is a business intelligence solution that provides browser-based visual analytics and allows users to publish or embed live, interactive graphs, dashboards and reports. With Tableau, current data can be automatically customized and visually rendered according to user needs.

### **Access Gateway: Juniper/RSA**

NORC uses a Juniper Secure Access Appliance to control access to the Enclave. The Juniper Networks Secure Access 4500 (SA 4500) SSL VPNs enable the provision of cost-effective remote and partner extranet access from any standard Web browser. Based on the IVE platform, the SA 4500 appliances feature rich access-privilege management functionality that can be used to create secure customer/partner extranets with no infrastructure changes, no DMZ deployments and no software agents. Of particular note to this effort, the functionality also allows administrators to secure access to sensitive systems so that different staff and visitor populations can utilize exactly the resources they need while adhering to security policies. Built-in compression for all traffic types speeds performance and SSL acceleration is available via a hardware module option for more demanding environments.

### **Intrusion Detection System/Intrusion Prevention System: Cisco**

NORC recommends that we utilize Cisco IDS/IPS to monitor and prevent malicious activity within our information systems. Cisco intrusion detection and prevention systems (IDS/IPS) are network-based platforms designed to accurately identify, classify, and stop malicious traffic, including worms, spyware, ad ware, network viruses, application abuse, and policy violations. This is achieved through detailed traffic inspection at Layers 2 through 7. The IDS/IPS features of the Cisco IPS platforms are key elements of an integrated, defense-in-depth approach to network security, performing complementary and collaborative roles in threat detection and mitigation.

### **Access Point Security: Wyse Thin Clients**

NORC deploys thin client machines to all authorized users of the Enclave at the direction of MHDO, estimated at 20-30 machines (with the exception of data submitters who will not access any of the internal infrastructure of the Enclave). The Wyse X90c7 mobile thin client is both a highly secure access endpoint and a convenient portable workstation. Because the Wyse X90c7 mobile thin client has no hard drives and no server-side data stored on the device, these devices are highly secure. As all data is stored and accessed remotely, the risk of data loss through stolen or mislaid laptops is eliminated.

The Wyse X90c7 weighs 3.2 lbs, with an 11.6" LED backlight widescreen. The devices draw as little as 18 watts of energy and the 6-cell Li-Ion battery provides up to 8 hours of autonomy. Wyse Device Manager supports the Wyse X90c7 thin client with scalable system-wide management including simple deployment, patching and updates and asset management - all with secure end-to-end encrypted communications.

### **Infrastructure Virtualization: VMware vSphere**

The NORC Data Enclave uses vSphere for infrastructure virtualization within the Enclave. VMware vSphere uses virtualization to transform datacenters into scalable, aggregated computing infrastructures. Virtualization is a process that breaks the hard connection between



the physical hardware and the operating system and applications running on it. After being virtualized in a vSphere virtual machine, the operating system and applications are no longer constrained by the limits imposed by residing on a single physical machine. Virtual equivalents of physical elements such as switches and storage operate within a virtual infrastructure that can span the enterprise.

A virtual infrastructure presents IT organizations with increased flexibility in how they deliver their services. A virtual infrastructure also serves as the foundation for cloud computing. VMware manages large collections of infrastructure, such as CPUs, storage, and networking, as a seamless and dynamic operating environment, and also manages the complexity of a datacenter.

### **Application and Desktop Virtualization: Citrix XenApp and XenDesktop**

The NORC Data Enclave uses XenApp and XenDesktop for application and desktop virtualization inside the Enclave. Citrix XenApp is an on-demand application delivery solution that enables any Windows application to be virtualized, centralized, and managed in the datacenter and instantly delivered as a service to users anywhere on any device. Citrix XenDesktop is a desktop virtualization solution that transforms Windows desktops and applications into an on-demand service available to any user, anywhere, on any device. XenDesktop securely delivers individual Windows, web and SaaS applications, or full virtual desktops, to PCs, Macs, tablets, smartphones, laptops and thin clients.

### **Section 2.1.3 Development and Project Management Tools**

The HSRI team will use Microsoft SharePoint as a central document repository and as an overall project management tool (complementing the use of GreenHopper). A SharePoint site for the project will be accessible to all contract staff and relevant MHDO staff. It will provide shared calendaring, issue and action item tracking, document management, and document version control functionality.

Microsoft SharePoint is an industry standard enterprise collaboration and content management system. It is widely used to facilitate communication on project teams, providing a flexible platform that team members manage documents, lists and other information. It provides workflow and version control capabilities.

The HSRI team will utilize Atlassian GreenHopper as its Agile Project Management tool. This package is a light-weight tool that aids in the creation of user stories, the estimating of story points, creating and updating of the sprint backlog, visualizing team activity and reporting progress. It will be utilized primarily as a communication tool within the Agile teams and between the teams, the Agile Product Owner and, potentially, MHDO staff. In contrast, SharePoint will be used as the primary project management and communication tool for higher-level tasks and activities not well suited to the Agile model.

The Product Development team will make use of Microsoft Visual Studio 2010 to develop C# web applications making use of the .NET and MVC frameworks. Microsoft Visual Studio is an



integrated development environment that was designed to support enterprise-level application development. It directly supports the .NET and MVC frameworks and is considered an industry standard tool for the development of Windows-based solutions.

The team will utilize Apache Subversion as its source control tool. Subversion is an open source version control system that has seen widespread adoption. This full featured package provides a flexible, directory-based model of versioning that integrates well with Agile methodology. It provides full history and documentation of changes and allows for the easy recovery of past versions of files.

## Section 2.2 Data Governance and Management

The HSRI team knows the importance for everyone involved with the MHDO project to have a clear understanding of what data governance means for all of the data streams (currently the All Payer Claims Database (APCD), Chapter 241 hospital inpatient and outpatient data, Chapters 300 and 630 Hospital Financial and Organizational data and the Chapter 270 quality metrics data). To assure that all stakeholders and team members know what we mean when we talk about data governance, we plan to address the details for data governance as part of the kick-off meeting (discussed further in section 2.10 Project Management) and establish the roles; identify the processes and protocols from the beginning of the project. This approach will establish clarity, assure that data governance is a valued function for the project, and create a clear mission. Then, the HSRI team will establish the system of decision rights and accountabilities, and define who can take what action; with what information and when through the development and communication of the data governance road map. After a road map is complete, the HSRI team will publish data governance policies, dictionary and controls and manage all of these processes throughout the life of the project. The approach for this project is designed to support the effective use of the new data warehouse and the associated business intelligence function with properly crafted data standards and policies in place that have been well communicated. The following subsections will provide the details regarding how the HSRI team will accomplish effective data governance and management.

### Section 2.2.1 Data Definitions and Organization

The first step will be to define the MHDO goals for the data coming in to the new warehouse. This will be accomplished during initial project meetings. The HSRI team will facilitate the discussion to fully understand the goals. For example, in data warehouses it is important to emphasize decision rights – therefore the goals will include which policies, rules and data definitions have to be included in the data dictionary. Other goals identified during this session may include:

- **Data quality requirements** – Data quality generally relates to the usability of data and will be driven by the business users who identify issues with current data;
- **Privacy/Security** – Privacy and security of health care data can be driven by either the business or IT user and relates to access management; compliance with federal and/or Maine statutes and regulations; Discussions may include how to locate

sensitive data elements; what protections are required and how to manage system controls.

- **Data integration** – This goal may be the most important goal for data governance and will most likely be a key discussion. The discussion may include how to reach consistent data definitions; how to support maintenance of metadata; and how to identify stakeholders and decision rights.

During the initial meeting, HSRI team will work with MHDO to determine the cross-functional team members who will be the designated “data stewards.” It is important to note here, that HSRI recommends that the data stewards be from the business operations to set the policy for the IT and data groups to follow as the warehouse infrastructure is being built. HSRI team fully understands the challenges facing the new MHDO data warehouse team as it works toward interoperability of siloed data streams and data stewards will be important to achieve the enterprise envisioned by MHDO.

Once the HSRI team understands the goals for MHDO we will then work to create the data governance road map. The roadmap will identify:

- **Organizational body** – This will be comprised of the MHDO representative(s), as well as the members of the vendor and stakeholder project team that will have responsibility for making data decisions; monitoring compliance with the data rules end resolving issues. This group can be considered as a committee, a council, or working group, the title is not important, it’s the work they do! These people may have multiple roles on the project, and may participate in the higher level project management board. For example, the vendor data architect or the MHDO business analyst. The HSRI team will bring expertise, templates and tools to facilitate and achieve the work with the organizational body
- **Stakeholders and stewards** - These people make the data-related decisions; set policy and specify standards. They bring the expertise necessary to make decisions, for example to define data quality standards;
- **Specific data rules and definitions** – the MHDO, along with its stakeholders and project team will adopt policy; HSRI will provide best practices and recommendations and create draft policies for the organizational body to adopt;
- **Decision rights** – The organizational body will adopt a decision tree and hierarchy of who has the obligations and responsibilities to make specific decisions regarding whether the proposed data element meets MHDO and project requirements;
- **Accountabilities** – The organizational body will define the stakeholders and data stewards with responsibility. The HSRI team will bring recommendations and best practices for definition of the accountabilities;
- **Controls** – The controls are the processes designed for the data governance organization so that data governance issues can be resolved as quickly as possible. These processes will be described and the decision maker with decision rights will be identified through the Change Management Plan that will be part of the Controls section of the roadmap;

- **Approving Data Architecture and Data Security;**
- **Approving and prioritizing DW project work.**

The purpose for the data definitions and organization is to provide protections and services to the data stakeholders; be able to react and resolve issues with non-compliance and focus on the issues relevant to DW and business intelligence for MHDO. The deliverable road map will provide the necessary substance to achieve these protections and services. Section 2.2.2 that follows will provide additional details regarding how MHDO will enforce consistent data standards across the warehouse.

### **Section 2.2.2 Data standards that will be adhered to in the DW**

From the outset, establishing clear definitions and requirements for data will help inform not only the data to be stored in the DW, but also what interface specifications are required. The HSRI team will help identify the appropriate interface specifications based on either industry standards or other formats as agreed to with MHDO and the various stakeholders, document these standards, and work with stakeholders to ensure compliance. Tentatively, the HSRI team will consider the data documentation initiative (DDI) standards as well as the Statistical Data and Metadata Exchange (SDMX) standards. Both are XML based and have well established links between the two. However, the HSRI team will confirm the standards based on a process of validation and verification with the MHDO team. Specifically, we will plan to verify and document the data standards for the following:

- Business definitions & business rules;
- Identification of critical data elements;
- Data quality monitoring, issue identification & resolution;
- Identification of trusted sources of data;
- Documentation needed by the Extract/Transform/Load (ETL) processes needed to enforce data meets a common internal specification of types and values.

As a known set of required data elements emerges, we will update the data standards

### **Section 2.2.3 How to enforce data consistency across the DW**

After a road map has been created, the next step will be to effectively communicate the data governance roadmap to all MHDO project team members and stakeholders and establish the regular agenda items for regular project meetings. The HSRI team prides itself on effective communications. We will develop the communications in accordance with the overall project communications plan. Additionally, we will be responsible for developing and publishing all data standards, data dictionary, interface data specifications, and data policies (for example data retention requirements). Each of the data governance decisions will be communicated to the project team.

The question of enforcement of data consistency is always challenging and the HSRI team is well versed in meeting the challenges of data disputes. This will be a challenge for this engagement as well because of the current non-integrated data streams. Therefore, we plan to specify the data resolution process as part of the data governance roadmap. Data consistency will be included in the Change Management Plan as well as the organizational stakeholders who have responsibility for managing non-compliance.

## **Section 2.3 ETL / Business Rules Engine**

In order to provide MHDO with a flexible, powerful and user-friendly system that meets their needs, the HSRI team will develop a custom ETL solution that will provide a high-performance system for loading raw data files to the data warehouse.

This solution will allow data submitters to encrypt sensitive information in data files and receive immediate feedback on formatting and data integrity issues before upload. Once files have been validated, they will be uploaded to the warehouses staging tables for further processing, along with any supporting documentation files. All loads will also have a rich set of Load Metadata associated with them that will provide full file identity information, information on the validation rules used and other contextual information.

The solution will provide a web-based facility that will allow MHDO users to create and maintain submitter and file-specific validation edits, create custom mappings to allow for the easy manual/ad hoc upload of irregular data files, and load and maintain external data that will be used to validate certain fields (such as lists of valid CPT codes).

The ETL solution will improve performance, especially during periods of high volume, and allow MHDO to more easily specify and control the definition and application of file validation rules to submitted data files:

- File validation will be done prior to file upload on the data submitter's system to prevent server resource bottlenecks.
- Large files may be broken up using parallel TCP streams during upload to increase the efficiency of transmission, depending on the characteristics of the data submitter's network connection.
- MHDO will be able to configure all file validation rules, including submitter-specific criteria, through the web portal.

### **Section 2.3.1 Pre-Submission Hashing and Encryption of Sensitive Information**

Currently, all data submitters are provided with a stand-alone application by MHDO which allows them to hash certain data elements prior to submission. This ensures that sensitive, personally identifiable information never leaves the submitter's system in a readable format. The proposed ETL solution that will be developed by the HSRI team will continue the practice of pre-submission hashing of sensitive information via a client-side application.

Certain data fields containing personally identifiable information (PII) will be hashed using SHA-512 following the current algorithm, to ensure compatibility with previously submitted data. Once hashed, these fields are converted to unique values from which the original values cannot be recovered. This information, upon receipt, will be encrypted using the 3DES method using salted hashes for two complex keys or an equivalent method approved by MHDO before being written to the data store. This will ensure that PII is protected both “in transit” and “at rest.”

### **Section 2.3.2 Client-Side Validation of Data Files**

In order to reduce the burden on server resources and improve turn-around time for data submitters, the file validation routines (“edits”) will be performed on the submitter’s machine before the file is uploaded to the data warehouse. This will be done by the same stand-alone application that performs the pre-submission hashing of sensitive information.

This application will be developed in C# using the .NET framework and will be targeted to run in a Microsoft Windows environment. If MHDO determines that this application must run in a Linux and/or Apple OS X environment, a version of the application will be developed making use of the Mono Framework, which provides a significant portion of the .NET framework on non-Microsoft systems.

Performing the validation on the client machine (“locally”) means that data submitters will not need to wait while large files are transferred to the data warehouse before data files can be checked. In situations where there are multiple data quality problems that require data changes, this will drastically speed up the process. Validation begins as soon as the data submitter tries to submit a data file and the data submitter will be able to see a real-time status update of the percentage of data scanned and the number and type of errors. This will give submitters the opportunity to preemptively cancel a load and investigate a problem if large numbers of errors are being generated rather than having to wait for the entire submission to be processed.

Performing edits locally prevents this part of the process from becoming a performance bottleneck when many files are being submitted at the same time. Every submitter uses primarily local resources until the data submission has no failure messages and no non-overridden warning messages. Only a small amount of data needs to be retrieved from the web services by the local application on every run. Files are not uploaded to the data warehouse until they have passed validation and no further data submitter interaction is anticipated.

Another advantage of performing edits in the same application that performs the pre-submission hashing is that it helps ensure that a file format error doesn’t inadvertently miss hashing sensitive information. In our past experience, one of the most common data submission errors when data files are generated by multiple systems and processes is “column shifting.” This is where a column of data has been accidentally inserted on some or all records. Any process performing operations on un-validated data may inadvertently process the wrong fields. This could result in personally identifiable information being transmitted in clear-text format.

Even though the file validation routines will be happening locally, edits will still be fully configurable by MHDO via the portal, as outlined below. The local application will pull information about file formats and edit rule sets (see below) from the cloud so that every submitter would always be using the latest MHDO rules. The local application will also be equipped with an auto-updating function, which will allow most application changes to be rolled out without requiring data submitters to go through a separate application installation process.

The local application will seamlessly handle transmitting the data file to the data warehouse. Depending on bandwidth and latency assessments, the local application will have functionality built in to break apart large files into smaller segments and transmit them using parallel TCP streams to further increase the efficiency of the data upload process. This will only be done when the local application detects that doing so would result in a performance gain.

### **Web Application Fallback**

There may be some circumstances where certain data submitters are not able to run the local application. Some data submitters may not have sufficient local computing power to allow them to perform validation in a reasonable timeframe. Others may have incompatible hardware or policies and procedures which preclude the use of such an application. At MHDO's discretion, data submitters will also have the option of having file validation performed by a web-based application. This is also the option that will be used if MHDO determines that it does not want file validation routines to be performed by a local application.

In the case of web-based file validation, it is still assumed that pre-submission hashing of sensitive information would still be performed before file upload. This does leave the potential for some personally identifiable information to be un-hashed in some circumstances (see above). However, the files themselves would be transferred via Secure FTP (SFTP), in order to reduce the potential for privacy breaches.

With this option, the overall process is largely the same from the data submitter's perspective. Using the web application, they will submit a data file for process. They will then receive a link which will allow them to view the percentage of data scanned and the number and type of errors. They will have the option to cancel processing preemptively and they will be sent a link to the error report as soon as validation is complete. However, due to performance bottlenecks, it is possible that their data submission may be queued for processing for a period time while other data files are processed during periods of heavy activity. Also, the data submitter will have to wait for the file to upload before initial scanning can begin, and again every time the file is changed. This could add substantial time to the data submission process for certain problematic files. However, the data submitter will not have to re-upload a data file merely to override warning-level messages. They will only have to re-upload to resolve failure-level messages and non-overridden warning messages.

### **Section 2.3.3 Functionality of the Business Rules Engine**

As noted above, the ETL/Business Rules Engine will typically run on the data submitter's system before a file is uploaded. It will poll an MHDO server for rule updates and then perform



file validation as outlined below. In the case of “web fallback,” files will be uploaded to a temporary data store, where file validation will occur. Other than this slight difference in the ordering of validation and upload, the two processes will be identical.

The ETL/Business Rules Engine will check the file structure of submitted files to determine that they are readable. Then, the engine will perform the formatting, content legitimacy, business logic and quality validation checks that MHDO has defined. The specific checks and thresholds may differ depending on the submitter.

The ETL/Business Rules Engine will perform all the checks it is able to in a single pass, returning a “File Passed” message to the user if no issues are found. If any errors are found, the submitter will be presented with an error report detailing any warning-level or failure-level messages. The submitter will then be allowed to resubmit a modified version of the file (overwriting the previous version) or override any warning-level messages. As soon as there are no further failure-level or non-overridden warning-level messages associated with a submitted file, the submitter will be presented with a “File Passed” message.

Different submitters may be set up to have different file validation rule sets by MHDO. Also, existing rule sets may be modified over time by MHDO. Every data file that is uploaded to the system will have the validation rule set that was used to process it recorded as a part of its Load Metadata. This will allow future users of the data to access and make use of this information.

### **MHDO User Interface**

Authorized MHDO users will interact with the ETL/Business Rules Engine via the portal system. There, they will be able to access web applications that will allow them to:

- Create and Edit File Formats
- Create and Edit File Format Maps
- Create Edit Rule Sets including:
  - Field Format Edits
  - Content Legitimacy Edits
  - Business Logic and Quality Validation Edits
- Associate Input File Types and Edit Rule Sets with Submitters
- Add or Update Validation Sets
- Perform Manual/Ad Hoc Uploads

## **Create and Edit File Formats**

While each of the data streams that will be submitted to the warehouse has a pre-defined format as defined by statute and the rules promulgated by the Agency, there is a need to be able to process “irregular files.” These files may have differing layouts, formats, and naming conventions. Therefore, MHDO staff will have the ability to define new file formats that specify a different input format. Currently, it is anticipated that the MHDO staff will be able to specify, delimited (with differing delimiter characters), fixed width or XML format files.

To facilitate the creation of new file formats, the portal will provide access to a web-based wizard-like interface that will scan a sample file and assist MHDO staff in specifying its structure using elements such as header rows and field characteristics. MHDO will then be able to upload data files to the warehouse using the newly defined formats. They will also have the option of making the newly defined formats available to specific data submitters in the event there is a need for the routine submission of irregular files.

## **Create and Edit File Format Maps**

Files that are submitted using the pre-defined formats are expected to have a default mapping to the tables in the staging tables of the warehouse. However, irregular files may use different field names or be missing some content completely. Once a File Format has been defined to the system, the MHDO user will be able to create a mapping between the source fields and the destination fields by selecting from dropdown list boxes or another appropriate input mechanism.

## **Create Edit Rule Sets**

It is understood that the Agency may need to have different validation thresholds or rules (called “edits”) for different submitters. Also, the standard set of validation edits for a given data stream may be revised over time. For manual/ad hoc uploads, some or all validation edits may be omitted entirely.

The set of formatting, content legitimacy, business logic and quality validation checks that are applied to a file submission are referred to as an “Edit Rule Set.” This set of rules fully represents all of the validation logic that is applied to a submission. The active Edit Rule Set and time stamp will be recorded in the Load Metadata, allowing the set of rules in place at the time of submission to be retrieved at a later date.

The MHDO user will be able to create new Edit Rule Sets for a file format (either from scratch or by cloning an existing set), or modify a pre-existing Edit Rule Set. Changes to existing Edit Rule Sets are time stamped so that the state of the set at any point in time can be established.

Edit Rule Sets are specific to a file format. Each edit in an Edit Rule Set is defined as warning-level or failure-level. There are three types of edits that can be defined in an Edit Rule Set. These are formatting edits, content legitimacy edits, and business logic and quality validation edits.



### ***Formatting Edits***

Each field in the file format may be assigned a formatting edit that, at a minimum, describes the basic data type (defaults can be assigned by scanning a sample file). So, for instance, a field might be described as being an integer, a decimal or alphanumeric. In addition, one or more validation masks can be defined using regular expressions. If a field has validation masks defined, it must match one of the masks defined.

### ***Content Legitimacy Edits***

Each field in a file format may be assigned one or more content edits. These can either test the contents of the field against a logic expression (e.g., “< 100”), test it using a pre-defined function (e.g., testing whether value is a valid date given a certain format string), or test it against a Validation Set. A Validation Set is a set of values that has been loaded to the system; the rule can either require that the field contents exist in the Validation Set (e.g., CPT code is on the list of valid CPT codes) or not exist in the Validation Set.

### ***Business Logic and Quality Validation Edits***

Each field in a file format can be assigned one or more business logic or quality validation edits. These edits test the contents of other fields depending on the value of the current field. So, if the current field indicates that this is a certain type of record, other fields can be tested to ensure that they contain a valid value (if a certain value of the current field indicated that this was an inpatient record, one or more other fields could be tested to ensure that at least one had a valid IDC-9 code). The current field can be tested against one or more other fields; if all tests are true, the overall test is considered to be true.

## **Associate Edit Rule Sets with Submitters**

Each file format will have a default Edit Rule Set defined. However, MHDO will be able to associate an alternate Edit Rule Set for a given data submitter. Alternate rule sets will typically be derived from the default rule set with changes applied to various thresholds. However, MHDO will have the option of defining completely different rules, if necessary.

## **Add or Update Validation Sets**

Validation Sets will be able to be created and/or updated through the portal. Values can be added manually or they will be able to be added from a file upload. Validation Sets may also be defined as the union or intersection of two other sets (such as a list of official codes might be joined with a list of provisional codes to form the set of acceptable codes for a field).

## **Manual/Ad Hoc Uploads**

There will be an ongoing need to allow authorized MHDO users to upload data that does not match the predefined formats for various data. An example of this would be Medicare data. The

ETL Process will provide the capability to upload these data to the staging tables of the warehouse.

The ETL/Business Rules Engine will allow authorized MHDO users to define the mapping of these ad hoc uploads to the predefined formats. This load process will optionally be able to bypass all formatting, content legitimacy, business logic and quality checks.

Once the manual/ad hoc data submissions are successfully written to the Staging Database in remapped form, they will be able to be processed just like any other data.

### **Section 2.3.4 Staging Tables**

The staging tables will be created in the Vertica data store as Write Optimized Stores (WOS). These are structures that are optimized for fast, reliable loading, rather than fast data access or reporting. Data files will be bulk loaded to the staging tables as soon as their upload is complete. The WOS is the entry point of data into the warehouse.

Uploaded files will be written to the staging tables, along with appropriate Load Metadata. This Metadata will detail any overridden warning-level messages as well as full file identity information. Any supporting documentation files such as PDFs, Word Documents or images will be written to a companion data store that will be implemented using Cloudera Hadoop, which allows for the easy management and potential future analysis of unstructured data and its associated metadata. The URIs of the documentation files will be recorded in the data file's Load Metadata.

Once all data, Load Metadata and supporting files have been successfully written to the staging tables and its companion data store, a "File Successfully Uploaded." message will be sent to the submitter.

### **Section 2.3.5 Load to Read Optimized Store**

Once a submission has been successfully written to the staging tables, the data will be loaded to Vertica as a Read Optimized Store (ROS) optimized for fast data access and reporting. The load process will load handle mapping input data structures into the Common Data Field definitions. These remapped data will be available in the data store as "Raw" Data, along with pertinent Load Metadata. The supporting documentation files will also be migrated to the warehouse's companion data store. The URIs in the Load Metadata will be updated to reflect these moves.

All records written to the Data Warehouse will be assigned globally unique identifiers (GUIDs) as entity IDs.

### **Section 2.3.6 Building the Master Indexes**

As new data come into the warehouse, a matching process needs to be performed to determine if patients, payers or providers on the new records correspond to existing entities already in the

Warehouse. The goal is that each patient, payer and provider should only be represented once in the corresponding master index.

In order to accomplish this goal, every entity that is added to the warehouse will receive an entry in a GUID Mapping table. This table will relate the GUID of a patient, payer or provider to the GUID of an entry in the corresponding master index. A given master index entry might have dozens of entity GUIDs associated with it.

The matching process will use information such as the encrypted subscriber social security number and name to perform initial matching. If no match can be made, a new master index row will be created, representing a new patient, payer or provider.

The portal will allow MHDO to review entries on the GUID Mapping table and perform edits. For instance, if claims records have been erroneously associated with a certain provider, MHDO would be able to go into the system and change the association between those records and the Master Provider Index entries. This change in association would be recorded in the metadata associated with the data file for future use.

When new master index rows are added, they may lack certain critical information, such as National Provider Identifier (in the case of providers), federal EIN and/or NAIC number (in the case of payers). The system will compare the information on new index records to external data in an attempt to make an exact match. If an exact match cannot be made, the system will determine if any “candidate matches” can be made, by looking at records with minor data variations and spelling differences. MHDO or, at MHDO’s discretion, the HSRI team, will be able to “endorse” candidate matches via the portal system. Endorsing a candidate match will cause the system to treat the candidate match as an exact match for this and any future records. New index records that remain unmatched will be visible to MHDO via the portal dashboard. Information for unmatched records will be able to be entered by MHDO or, at MHDO’s discretion, the HSRI team.

The external data to be reviewed to make a match can be from potentially any data source. It will initially include information from the National Plan & Provider Enumeration System and practitioner license file data. New external data will be able to be added or edited via the portal by MHDO or the HSRI team.

## **Section 2.4 Security**

As a federal contractor that currently maintains sensitive data from multiple data producers, including the Bureau of Labor Statistics, Internal Revenue Service, the Departments of Energy, Commerce, and Agriculture, and others, NORC has in place an extensive security program to protect all aspects of computer and data assets. Our security program is compliant with the federal government regulations and has been, and will continue to be, adapted to meet the unique requirements of Maine’s Health Data Warehouse project. As called for in the RFP, NORC will implement procedures to protect the privacy of MHDO data securely housed in the Health Data Warehouse, and will protect against disclosure of sensitive or individually identifiable information through a multi-tiered approach of access control and monitoring, data encryption

during transmission, and continuous upgrade of plans and policies. Our proposed team will stringently control access to individually identifiable information. For example, all MHDO data in the Health Data Warehouse will be archived and stored within NORC's secure enclave, which is double firewalled within NORC's existing, secure network. Data will be secured on dedicated servers, and access to the sensitive claims data will be restricted to authorized MHDO staff members and authorized users with clearance to use sensitive data, as determined by MHDO (i.e., NORC will ensure that only authorized personnel with a need to know will have access to such sensitive data).

All NORC systems reside within secure facilities with controlled physical access with restricted hours of access as necessary for the project. Systems are in a data center with boundary protection utilizing network firewalls, Intrusion Prevention Systems (IPS) and security monitoring using a unified situational platform. The IT environment is documented and managed utilizing NIST 800-53 Revision 3 security framework. Security provisions are established and maintained to include: Managed firewall and IPS; configuration management baselines (Federal Desktop Core Configuration (FDCC) and USGCB Compliance for laptops), and Center for Internet Security (CIS) benchmarks for network and server systems); least privilege access to system boundary; continuous physical and system security monitoring for the secured data center. Security provisions are established and maintained to include:

- Managed firewall and IPS
- Configuration management baselines: FDCC\USGCB for laptops
- Center for Internet Security (CIS) benchmarks for network and server systems
- Least privilege access to system boundary
- Continuous physical and system security monitoring
- Managed security policies using domain group policies for complex passwords and mandatory renewal
- Domain-managed virus protection
- Access control procedures for data and systems
- Virus and spam filtering of email
- Encryption, FIPS 140-2 Level 2 – laptops (Full Disk), VPN connection (2-factor authentication), Encrypted backups tapes

All users of releasable data will be provided credentials to access NORC's Business Partner Zone (BPZ), and all data submitters and users of sensitive data will be given credentials for NORC's Data Enclave. Access will be managed and synchronized across servers and zones using Active Directory. Account creation will be performed with Varonis<sup>3</sup>, which also will serve as the platform for monitoring and auditing all accounts and permission levels within the system.

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<sup>3</sup> <http://www.varonis.com/>

Within the Data Enclave environment, users are logically separated within their work area and prevented from removing any data files without first being reviewed to protect confidentiality. Any inbound or outbound files are managed and audited by the NORC Data Custodians. Access control is maintained by Active Directory groups with least privilege access to the designated researcher work area. Sharing of files occurs within the logical project work area where researchers are able to analyze files. However, no results will be exported from the environment per without prior approval per agreed upon standards of confidentiality as established by MHDO.

Several preventative measures have been taken regarding virus protection; all NORC systems are protected from computer viruses by extremely robust security features and procedures. NORC's approach to limiting user access to internal network data storage services is designed specifically to minimize the possible impact of a virus that may breach NORC's virus protection software and procedures. Several actions are taken on a daily basis to assist in the prevention of a virus breaching the system.

All sensitive client data resides within the system boundaries of the Enclave. No data are stored on portable or removable media with the exception of backup tapes. Data are transferred into and out of the Enclave via an encrypted network channel. All remote sessions completed by MHDO users will be encrypted and meet the FIPS 140-2 levels. All electronic data transfers will occur via the NORC Data Enclave Secure Access SSL VPN. Any physical media containing sensitive data from MHDO or data providers will contain PGP encrypted files. Data Custodians and the select System Administrators who administer the Data Enclave environment have full disk FIPS 140-2 encrypted systems.

To protect against physical intrusion (i.e., physical access) to the its Health Data Warehouse, NORC personnel keep logs of all personnel with authorized access to facilities containing information systems (except for those areas within the facilities officially designated as publicly accessible) and issues appropriate credentials (e.g., badges, identification cards, smart cards) to personnel. Designated officials within the organization review and approve the access list and authorization credentials annually. Access to restricted areas is granted only after the request is made through individual's manager, i.e., all such requests must be approved by the appropriate manager. Entry points into NORC buildings and restricted areas are controlled by access control cards that are issued in accordance with physical access authorizations, and these cards are deactivated immediately when employees cease employment at NORC.

Physical keys (for data centers and access to general space; i.e., access control card areas) are not widely distributed. Keys are meant to be used only in the event of a failure of the proximity software used to control access to spaces. Only "super" users have keys (i.e., Director of Facilities, ISO representative). Key areas of NORC's offices are monitored by a closed circuit video system, including lobby doors, back exits, fire escapes, hallways, and entrances to data centers. The closed circuit video system uses digital cameras and is recorded by a digital media system. The closed circuit video system is set-up to record based on motion detection. Recordings are made to a 300 GB hard drive, which allows for 1-2 months of recording. The oldest recordings are recorded over first when space runs out on the hard drive. Currently there are 25 days of video available at any given time. The Facilities department is responsible for the

issuing of access control cards and the implementation and maintenance of the closed circuit video system.

### Section 2.4.1 NORC Data Enclave Risk Management and Mitigation Plan

At the core of NORC’s Data Enclave’s Risk Management and Mitigation Plan is a System Certification and Accreditation (C&A) package that includes an approved IT Security Plan, Data Protection Plan, and a System Certification Test Plan, as outlined in DOC IT Security Program Policy, Section 6.5.2. The Data Enclave IT Security Plan is fully compliant with the Federal Information Security Management Act (FISMA), provisions of mandatory Federal Information Processing Standards (FIPS), and meets all of NIST’s IT, data, system, and physical security requirements. Per the Federal Information Security Management Act and provisions of mandatory Federal Information Processing Standards (FIPS) 199 and NIST Security Plan 800-60, NORC’s Data Enclave system impact levels have been determined as follows:

NIST Sensitivity Element	NIST Impact Rating	Short Description of Basis for Rating
Confidentiality	Moderate	The Data Enclave contains information of a proprietary nature. If this proprietary information were disclosed, it could result in serious loss of customer trust for the Federal Statistical Agency.

### Portfolio Protection Approach

The NORC Data Enclave implements a portfolio of security measures that safeguard sensitive data from malicious activity and unintentional breaches. This portfolio protection approach includes technical, IT & Systems Security, physical, organizational, operational, educational/training and legal protections.

### Technical Protection

NORC’s technical approach to protecting confidential data combines industry standard solutions to ensure that persons accessing the Data Enclave are properly identified and the data are fully protected, including authentication, authorization, encryption, monitoring, backups, and others. The NORC model leverages VPN technology to protect the data by controlling the environment in which access is provided. Data are not distributed; rather, access to data is distributed. Controlled access prevents outsiders from reading the data transmitted between a computer accessing the Data Enclave and the host network. Files may not be downloaded. Users cannot use the “cut and paste” feature or save or print data on a local computer. Statistical applications, including business intelligence solutions, and data (read only) are provided through the host network.

NORC currently maintains sensitive data from multiple data producers, including the Bureau of Labor Statistics, Internal Revenue Service, the Centers for Medicare and Medicaid Services, the Departments of Energy, Commerce, and Agriculture, and others. NORC has in place an extensive security program to protect all aspects of data and systems security. All data held in

the NORC Data Enclave are archived and stored within a secure farm of servers which are double firewalled within NORC's secure network. Access to microdata is restricted only to authorized researchers with clearance to use sensitive data.

Controlled access prevents unauthorized users from reading the data transmitted between a researcher's computer and the host network. Files may not be downloaded. Users cannot use the "cut and paste" feature or save or print data material. Data producers may also choose to implement additional physical restraints on researchers, e.g., webcams, biometrics, RSA cards, secure rooms, and electronic card entry. Moreover, a number of Windows functionalities are disabled in the Data Enclave, such as print screen and right clicking, for security purposes. Ensuring statistical protection by making only appropriate, de-identified data available to the public and applying relevant disclosure review processes to outgoing information are typically responsibilities shared by the data producer and the remote access facility agency. The NORC Data Enclave is therefore equipped with the relevant tools to facilitate such operations, manage the information flows, and audit the various processes involved in the release of de-identified claims data.

### IT & Systems Security Protection

The NORC Data Enclave complies with the following federal compliance guidance:

- NIST Special Publication (SP) 800-55, Security Metrics Guide for Information Technology Systems
  - NIST SP 800-53, Recommended Security Controls for Federal Information Systems
  - NIST SP 800-51, Use of the Common Vulnerabilities and Exposures (CVE) Vulnerability Naming Scheme
  - NIST SP 800-37, Guide for the Security Certification and Accreditation of Federal Information Systems
  - NIST SP 800-34, Contingency Planning Guide for Information Technology Systems
  - NIST SP 800-26, Security Self-Assessment Guide for Information Technology Systems
  - NIST SP 800-18, Guide for Developing Security Plans for Information Technology Systems
  - Health Insurance Portability and Accountability Act (HIPAA) of 1996
  - FIPS 200, Minimum Security Requirements for Federal Information and Information Systems
  - FIPS 199, Standards for Security Categorization of Federal Information and Information Systems
  - FIPS 191, Guideline for the Analysis of Local Area Network Security
  - IEEE Std 829-1998, IEEE Standard for Software Test Documentation
- **IT System Security Requirements.** The enclave operates under a System Certification and Accreditation package, including IT Security Plan and a System Certification Rest Plan, as outlined in DOC IT Security Program Policy, Section 6.5.2. The NORC Data Enclave IT



Security Plan is fully compliant with the Federal Information Security Management Act, provisions of mandatory Federal Information Processing Standards (FIPS), and meets all of NIST's IT, data, system and physical security requirements.

- **Network Connectivity Requirements.** There are no direct connections between NORC's facilities and clients, except as described under Access Controls by remote access. In addition, there are no other interconnections other than those identified in the IT Security Plan documentation and accompanied by the system diagrams. All system connectivity occurs via TCP/IP across the NORC Network Infrastructure. The Network Infrastructure systems provide all services for physical cabling, network frame synchronization/flow control/error checking, routing, switching, DNS, and remote dial-in access.
- **Remote Access Requirements.** Remote connections to NORC's internal resources (i.e. telecommuting, travel, etc.) are made via Virtual Private Network (VPN) Secure Client/Secure Sockets Layer (SSL) Remote Access services, all of which is managed as part of the NORC Network Security system.
- **Network security.** Protection of the communication channels and of the information exchange between the connected components is essential. The network security plan includes products such as firewalls, crypto capable routers, other network encryption devices, Transport Layer Security (TLS) or Secure Sockets Layer (SSL) certificates for communication over the Internet.

### Physical Protection

To ensure the optimal security solution NORC custom configures and controls the machines through which authorized researchers access the Data Enclave. These machines offer the strongest security features by rendering users' "home" session into a remote terminal with limited processing and data storage capabilities, thus reducing the risk of security breach and/or nefarious tampering.

Thin client machines are compact, energy efficient desktops with all the dynamic user-experience of a PC – without the day-to-day complexities and risks associated with one (e.g. USB not supported, web browsing disabled, etc). Thin clients have no moving parts. Their service lives are extended beyond those of comparable PCs and the noise from fans and hard drives is eliminated. Better still, their low power consumption means low-heat output enabling comfortable working environments with a reduced dependence on costly carbon-heavy air conditioning.

This thin-client model can be accompanied by multi-factor authentication to further increase security. For instance, thin client machines can be equipped with GIS devices to make certain that users are only accessing the Data Enclave at authorized locations (office or home). Other security features such as smart cards, fingerprint scan, iris scan, and facial recognition also can be incorporated. Cameras can be installed to monitor users' behavior. In summary, the thin client model allows multiple layers of security protection that are complementary to the existing stringent security features currently deployed in the NORC Data Enclave.

## **Organizational Protection**

Well defined and implemented operational/organizational components also are important. NORC will work with MHDO to establish a set of operational and management procedures to ensure the appropriate de-identification and release of data to the public.

## **Operational Protection**

All NORC employees are explicitly trained to uphold respondent confidentiality. Indeed, they all must sign a legally binding pledge regarding this responsibility as a term of their employment. In addition, several members of the Data Enclave management team and task leaders have successfully completed the Human Participant Protections Education for Research Teams online training course sponsored by the National Cancer Institute and are CIPSEA-certified.

As data custodian, NORC is responsible to ensuring that only trusted, approved and authorized researchers have access to the data and that appropriate IT security protocols are followed. All research activities in the NORC Data Enclave are monitored at the keystroke level. If necessary, other monitoring devices such as webcam can be deployed in accordance with clients' needs. All information inflow and outflow are strictly controlled by confidentiality officers who are experienced in disclosure analyses. The users cannot themselves remove any data from the system and all exports from the system must be cleared by enclave statisticians as well as personnel from the data producer. Only then will non-disclosive analytical output be placed on a secure server for download by the user. Disclosure reviews will be performed on each export request individually as well as in comparison to prior outputs and user activity to minimize the risk of residual entity disclosure.

## **Educational/Training Protection**

NORC views researcher training as one of the most critical components of the portfolio protection approach. Training sessions focus on the importance of having safe projects (approved projects); safe people (i.e. authorized researchers); safe settings (i.e. remote access); and safe conduct (care with handling and releasing data). The goal is to instill a "culture of confidentiality" among all authorized researchers. Fundamental to fostering this shared trust, users are made aware of their responsibilities –that with the shared benefit of gaining convenient access to sensitive data comes a shared burden of ensuring data confidentiality.

All NORC Data Enclave employees must undergo annual IT security awareness training in DOC IT policies, procedures, computer ethics, and best practices, in accordance with DOC IT Security Program Policy, section 3.13.

## **Legal Protection**

As a standard practice the NORC Data Enclave requires all potential enclave researchers to submit Data User Agreements certifying that they are aware of and agree to abide by the terms and conditions of using the Data Enclave. The DUA must be signed by all members of your research team who plan to access the Data Enclave. The DUA must also be signed by a representative with signature authority from the institution to which the user is affiliated. All

users also must sign a Non-Disclosure Agreement that certifies that all team members will abide by the confidentiality terms and procedures in the Agreement and that users will not attempt to re-identify any individual. The DUAs are updated annually.

Data producers may require researchers to obtain Institutional Review Board (IRB) certification from their corresponding affiliate institution. IRB certifications are updated annually. After the initial project protocol is approved for certification, any new procedures affecting contacting materials, instruments, the handling of confidential data, and steps taken to protect survey respondents in the course of implementing the new procedures, must be described and submitted for IRB review. Details of legal requirements are listed below:

- **Nondisclosure Agreements.** In addition to internal NORC confidentiality and ethics statements, all NORC Data Enclave employees must sign project specific Non-disclosure Agreements as specified in Commerce Acquisition Regulation (CAR) 1352.209-72, Restrictions against Disclosures.
- **Rules of Behavior Requirements.** NORC is in compliance with DOC IT Security Program Policy, section 4.5 and the NIST IT Security Management Handbook, including section 8.3 regarding policy on rules of behavior. The NIST Policy on IT Resources Access and Use must be followed for rules of behavior for this system. Users must have received and signed the rules of behavior *prior* to receiving authorization to access this system. All NORC employees must sign a Confidentiality/Professional Ethics statement. Data Producer staff and all external researchers also must sign a confidentiality statement.
- **Applicable Laws and Regulations.** The NORC Data Enclave is subject to the DoC IT Security Program Policy and Minimum Implementation Standards along with the IT security laws and federal regulations noted in Appendix A of that document including:
  - Public Law 107-347 E-Government Act of 2002 (FISMA included), Title V: Confidentiality Information Protection and Statistical Efficiency Act (CIPSEA).
  - Public Law 200-253 Computer Security Act of 1987
  - OMB Circular No. A-130 , Appendix III, Security of Automated Information Resources
  - Department of Commerce Administrative Orders and
  - NIST Administrative Manual Chapter 11.02 and the NIST IT Security Management Handbook.

## Section 2.5 Storage Component

For data use cases such as the Maine Health Data Warehouse, where data volumes range from 1 to 50 terabytes and data updates are regular but not continuous, NORC recommends the use of the analytic database management system Vertica. Using Vertica as the centerpiece of this kind of data warehouse will allow queries and data extracts to be returned at speeds multiple orders of magnitude faster than traditional enterprise database systems, and brings a number of other advantages.

NORC handles a variety of data and as such is familiar with a broad spectrum of best practices with regard to data management systems. These range from proprietary data appliances to massively parallel database management systems. The Vertica system in particular was purchased by NORC expressly to handle complex, ad hoc analyses of health care claims data. Rigorous evaluation of competing products has convinced us that in terms of high speed custom analytics and ease of management, the Vertica product is ideal for this application and offers a number of features that offer improved performance over comparable systems:

- Column-oriented storage, which allows for much faster and targeted retrieval of stored data.
- A very high compression ratio which conserves disk space and I/O.
- Shared nothing architecture that runs on commodity servers, allowing for rapid and cost-effective storage and compute scaling as well as improved resilience through gradual performance loss in the event of hardware failure.
- Hybrid data store that allows for read and write optimized storage, increasing query performance and load speed
- Automatically optimized projections on disk which allows for higher compression and faster analysis

Vertica also offers Hadoop integration which is an excellent solution for managing the unstructured data that will accompany claims data as linked documentation. For this project, NORC recommends deploying a Cloudera Hadoop to fill this need. MHDO also will be provided with a secure transfer site and staging area (within the Data Enclave) that will be hosted on an EMC VNX 5500. The VNX 5500 is a robust platform for consolidation of legacy block storage, file servers, and direct-attached application storage. The VNX series enables the sharing and cost-effective management of multi-protocol file systems and multi-protocol block storage access. The VNX operating environment enables Microsoft Windows and Linux/UNIX clients to share files in multi-protocol (NFS and CIFS) environments. At the same time, it supports iSCSI, Fibre Channel, and FCoE access for high-bandwidth and latency-sensitive block applications. The combination of EMC Atmos Virtual Edition software and VNX storage supports object-based storage. The VNX series storage platform is powered by the Intel Quad Core Xeon 5600 series with a 6-Gb/s SAS drive back-end.

To provide 24 hour disaster recovery, NORC will replicate all project relevant systems in a secure collocation facility using Zerto. Zerto is an industry leading disaster recovery solution with the following features:

- Multi-site Replication, Protection and Migration: Enables the protection of data and applications in the main data center and also at branch offices. Workloads can be replicated from site to site, and automatically recovered within minutes. Replication is also possible from many sites to one shared infrastructure, significantly reducing the cost of the BC/DR Solution.
- Extended Protection and Recovery: ZVR now includes offsite cloning and backup. Companies can create a copy of VMs on the replication site for testing, backup or development, with no impact on the production environment. Additionally, the ZVR

journal can now store up to five days of data, providing more options for failover, especially in the case of data corruption.

- Improved Application-Aware and Virtual-Aware Replication: Features include automated updates of VMware vApp changes and support for VM boot order, ensuring successful recovery of complex applications.
- Enhanced Reporting and Management: One installation of ZVR 2.0 gives complete visibility into BC/DR processes across locations and departments. New Recovery Time Objective (RTO) reports document actual results of BC/DR tests.
- Cloud-ready: Features such as VMware vCloud Director integration enable centralized management and fully automated failover and testing in the vCloud. Additional features include cloud management reports and infrastructure masking.
- System Administrators will be able to monitor system performance through native dashboards in the EMC VNX, Vertica and VMware. System Administrators also receive alerts in the case of any significant performance event with any server in the system.

## Section 2.6 Cloud

For the MHDO we propose to leverage the NORC Data Enclave 3.0. Originally funded, certified, and accredited by the National Institute of Standards and Technology (NIST) the Data Enclave is a Community Cloud environment offering Software as a Service (SaaS) and High Performance Computing as a Service (HPCaaS). According to NIST, a Community Cloud is defined as “The cloud infrastructure that is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations)”<sup>4</sup>.

From an architectural standpoint the Data Enclave Community Cloud is physically isolated from the NORC Corporate IT Infrastructure thereby creating a highly secure Cloud working environment for the customers within the community. Each member of the community is logically and virtually separated to prevent the possibility of security breaches between community members. The Cloud environment has been architected from its inception to meet FISMA and NIST 800-53 security standards. The Data Enclave 3.0 Community Cloud has been designed to leverage Infrastructure, Desktop, and Application Virtualization technologies from VMware and Citrix. The use of Virtualization allows for rapid expansion and seamless integration of new physical resources preemptively as necessary to facilitate growth and to forecast and meet our customer’s performance and capacity requirements.

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<sup>4</sup> Mell, P., & Grance, T. (2011, September). Special Publication 800-145. *National Institute of Standards and Technology*.

The NORC Data Enclave is built upon Dell Blade Servers connected via a 10GB Network Infrastructure and an 8 GB Fiber Channel Storage Networks to an EMC VNX 5500 SAN. Our High Performance Computing environment is built around a multi-node Vertica Massive Parallel Processing (MPP) cluster capable of scaling to process petabytes of data. The environment is primarily running a mix of Windows 2008 R2 and Red Hat Enterprise Linux, augmented by Ubuntu and Debian servers. Virtual Desktops are provided to the members of the community preloaded with Windows 7 and customer specific applications. The core of the Data Enclave Community Cloud is built as a highly secure environment due to this; large data transfers both in and out of the cloud are facilitated by an exchange of encrypted physical media. In the event that a customer chooses to transition out of the cloud environment the customer's data can be returned to them or transferred to another cloud vendor by way of encrypted physical media or virtual machine images. All systems are located within our data center in Chicago, IL.

## Section 2.7 Web Services and Interoperability

In order to accommodate the broadest possible array of data exchange protocols and device connectivity, we recommend deploying both SOAP and REST architectures to provide web services to end users. Each has its own set of strengths geared toward different usage scenarios, which are outlined below

Representational state transfer (REST) architecture, based on the HTTP protocol, is ideal for public users who seek basic access to MHDO claims data via the World Wide Web. In this context, REST is useful because of its significant interoperability – it allows for any device with a web browser to connect to MHDO resources. The simplicity of RESTful architecture further enhances the accessibility of data by providing for the creation of user-defined queries and views with a familiar web-based syntax, as well as the retrieval of data in multiple formats such as XML, JSON, YAML, and CSV. Finally, RESTful architecture leverages the clean URL structure inherent in the Model/View/Controller design of the public web interface to provide end users with semantically meaningful URLs that are both memorable and capable of being indexed by search engines. For example, the URL designated by <http://www.mhdo.org/claims/2011/ICD/789.00> is easily understood to refer to claims submitted in 2011 for which the primary diagnosis was generalized abdominal pain. Such a URL would also be discoverable to third party search engines like Google and could act as persistent identifier. In this manner, static reports with a high degree of granularity are also made accessible.

To address the needs of enterprise users or applications requiring access to more complex queries and analytical capabilities, we will also implement web services via the Simple Object Access Protocol (SOAP). SOAP-based services will extend REST methods and allow users to connect to MHDO-defined functions and business logic that are inaccessible or impractical when simply retrieving and viewing data. For example, a user wanting to conduct an analysis involving a large number of claims will be able to invoke SOAP operations, which is much preferred to downloading all of the individual claims before analyzing them. SOAP further strengthens the system by delivering secure services, reliable messaging capabilities, and atomic transactions. Practically, the REST services will simply be implemented on top of the SOAP operations. The extensibility of SOAP will also allow MHDO to provide more functionality over time based on



user needs. Finally, the use of SOAP allows for the creation of client apps for tablets and smartphones to provide mobile accessibility, and will also ensure that future platforms utilizing non-HTTP protocols have connectivity to MHDO resources. Delivering both REST and SOAP based services will maximize accessibility, scalability, security and openness of the platform. We propose, when relevant and applicable, to implement these services in compliance with the Statistical Data and Metadata Exchange standard (SDMX), to align on global best practices.

## **Section 2.8 Web Site Presentation**

In order to improve the maintainability of the web portal, the Product Development Team will use an MVC architectural pattern for all web development. This pattern is particularly well-suited to Agile development techniques and yields discrete and easily testable components. Much of this development will make use of the .NET MVC Framework to automate and enforce this separation of concerns; however it is possible that some components will be developed using this pattern without making use of this specific framework.

### **Section 2.8.1 MVC Components**

The MVC pattern has three main components: the Model, the View and the Controller. The Model component contains the core business logic. It is responsible for pulling information from web services or updating an underlying database. The View component formats information returned from the model and presents it to the user, typically in the form of a web page. It may also provide links or other objects that the user can interact with. Finally, the Controller component actually responds to the user interaction. This component will handle determining what is requested from the model and which view should display it.

The main advantages of developing web applications using this architectural pattern is that the data and business logic is kept distinct from the user interaction logic, which is in turn kept distinct from how the data are represented to the user. Each type of component does a single type of thing which makes development and maintenance easier and reduces the risk of introducing unanticipated side effects into an application.

This pattern also makes concurrent development easier. A simple “scaffolding” version of a Model component can be made available to programmers developing the user interaction portion of a web application while the actual business logic is still being developed. Similarly, developers working on the Model component can easily use “scaffolding” versions of Views and Controllers. These “scaffolding” versions of components can be auto-generated by the MVC framework to boost productivity.

### **Section 2.8.2 Accessibility**

All web applications developed for the portal will be designed to be compliant with Section 508 of the Rehabilitation Act. The HSRI team maintains processes for ensuring that its web-based products are 508 compliant. This testing is performed as a part of the QA team’s standard Acceptance Tests.



The HSRI team has extensive experience in presenting technical materials using a “plain language” approach designed to be understandable to a broad audience. Our approach in user interface design will be informed by this goal. In general, we will seek to provide an uncluttered and simple user interface with additional help or contextual information available in “pop-able regions” or as supporting web pages. This approach will allow “expert users” to work efficiently, will allowing others to receive more complete explanations of operations or concepts.

### **Section 2.8.3 Incorporating Stakeholder Feedback**

All users of the web portal will be able to offer usability feedback through the use of the “Offer Feedback/Suggestions” link that will appear prominently on the portal home page and elsewhere. The user will then have the opportunity to submit comments and suggestions on the functionality of the site. The Agile Product Owner will review these comments and, on a quarterly basis, report them to MHDO along with suggested modifications or actions.

While stakeholders will be welcome to offer feedback at any time on the usability and design of the web portal system, the HSRI team will convene focus groups periodically to gather targeted input on these issues. One use of these groups may be to gather additional information on an issue raised via user comments. This can help differentiate an issue that is an isolated concern from something that is widely problematic.

The QA team will convene two focus groups a year via webinar to investigate these and other issues. The QA team will work with MHDO to determine the specific users and subject matter to be investigated during each webinar. HSRI may offer a small incentive to focus group participants if recruiting volunteers proves difficult.

Particular care will be taken to ensure that focus groups include stakeholders from culturally and educationally diverse backgrounds.

### **Section 2.9 Operations / Service Level Agreements**

The Data Enclave service offering adheres to the NORC Corporate policies on Service Level Agreements. A copy of the NORC Service Level Agreement Implementation Procedure is available upon request, the goal of which is to increase the level of customer service provided by all tiers of technical support. This is accomplished by providing:

- Better communication to customers of the NORC Data Enclave technical support
- Greater visibility into team assignments and
- Team and individual metrics to evaluate performance

There are two key metrics defined in the service level agreement to set expectations for all tiers of technical support as well as the customer base:

***Response Time*** – this metric is defined as the time required to contact a customer. A service support ticket is considered “responded to” the first time a ticket reached the

“investigating” status and has an acknowledgement in the description providing a status update to the customer.

***Resolution Time*** – the length of time it takes to have a support ticket resolved and the customer confirms the resolution. A ticket has reached this state when a ticket has the “closed” status.

**Table 2: Service Level Agreement Terms**

Service Agreement	Terms
<b>Work Schedule</b>	The work schedule as defined in the SLA Procedures is as follows: 8am to 5pm Monday – Friday. As a result, a “day” in the Service Management incident tracking system is nine (9) hours long. The SLAs take into account the work schedule when defining both the response and resolution times. These times are calculated based on the time when the customer submits a service support ticket.
<b>Service Response SLAs</b>	Customers can expect support for the service to be available during all regular business hours. All support requests will be addressed within two hours of the initial request as defined in the response time metric.
<b>Afterhours Support SLAs</b>	Afterhours support is not guaranteed at the same response rate as is defined for regular business hours; however, special accommodation may be made as required by MHDO.
<b>Overall Service Availability</b>	The required level of availability for the Data Enclave environment is set at 99% uptime measured by a rolling 6-month period.
<b>Change Management SLAs</b>	As defined in NORC’s Change Management Procedures Customers must submit a “change request” at least two days prior to the next Change Advisory Board meeting.
<b>Change Control</b>	Periods of planned outage as defined in the Change Management procedures will be clearly communicated to all Enclave Customers and are not considered part of the system uptime statistics.
<b>IT Service Continuity</b>	As per NORC’s Corporate Disaster Recovery plan, the Data Enclave environment is considered a Tier 1 system. The expected Recovery Point Objectives and Recovery Time Objectives for the environment in the event of a major catastrophe are currently set at 4 hours RPO and 4 hours RTO.
<b>Metrics</b>	Key metrics on all aspects of the service tickets are tracked within the Service Management system and available upon request for pre-defined service level review periods.
<b>Transition</b>	In the event that the contract for hosting is not renewed the customer’s data and other related aspects to the hosted customer’s environment will be made available to be transferred to another hosting provider.

## Section 2.10 Project Management

Successful implementation of the Maine Health Data Warehouse requires an experienced group of managers, developers, health data content specialists, IT experts, information systems analysts, business analysts and trainers working in consort to execute a solid management plan, supported by well-tested project management tools that have been tailored to MHDO’s needs.

As a longstanding organization that has responded to industry shifts for 35 years, HSRI fosters a work climate with a high tolerance for change and a high comfort level with technological adoption. Moreover, our depth of experience allows us to anticipate areas that might pose challenges and rapidly develop approaches to mitigate these.

HSRI's reputation for managing complex and challenging projects is based on successful planning, coordination, and completion of diverse activities by teams of talented professionals that require involvement from a variety of stakeholders and subcontractors. We pride ourselves with being able to stay on budget and on time with efficient and effective communication practices implemented at every stage. This section will describe in detail our management structure, approach to the Maine Health Data Warehouse, work plan, process and tools used to accomplish tasks, staffing and how this is all consistent with Agile Methodology.

### **Section 2.10.1 Management Team Approach**

The foundation of our approach is a highly organized and empowered team structure led by an experienced and highly regarded Project Director and Deputy (David Hughes and Tim Mulcahy) and equally capable Project Manager/Product Owner (Leanne Candura) and open lines of communication among team leads—within and across partner organizations. In addition to being prepared for any management challenges, HSRI and the proposed project team places a high premium on understanding the landscape in which MHDO and its Stakeholders work. This deep understanding of MHDO will allow us to develop tailored management plans that describe how HSRI in conjunction with NORC and PCG will efficiently organize team resources around each story; provide staff coverage appropriate to content, data and IT issues; and assures high quality, timely, and on-budget completion of all phases. As such, HSRI proposes a management plan with the following components to foster success across all aspects of the project:

- A strong organization and infrastructure to ensure coordination and high quality deliverables, as well as cost and schedule management;
- A skilled, experienced, and deeply dedicated project team composed of staff with superior management, technical and assessment competence as well as research and policy expertise;
- A detailed, yet flexible, project schedule to serve as a roadmap for activities; it will become a “living” document of the work steps required by each organization, and will allow the management team and MHDO to ensure the contract requirements are consistently fulfilled;
- Open and effective communication paths across the Maine Health Data Warehouse project team, with MHDO and with Stakeholders; and
- Well-established quality control processes that ensure superior deliverables. The quality control processes to ensure superior deliverables include multiple internal reviews beginning with peer reviews up through the QA Team, and depending on the deliverable, the Project Director and Project Manager.

In order to meet the goals laid out in this RFP, it is imperative that a strong, adaptable project management structure is in place. Transparency in our project management approach will allow

MHDO to have full understanding of day to day activities that are taking place at the Maine Health Data Warehouse. During the development of the Maine Health Data Warehouse there will be a level of uncertainty that will exist because it will be difficult to plan each step of such a large project ahead of time and there is an operating assumption that late changes will be inevitable. Our ability to leverage tools to help track and communicate development processes will help everyone involved have a common understanding of the uncertainty that does exist until users are actually using our system and do our best to mitigate risk. Sound project management practices which support iterative and incremental development methods will help to ensure successful implementation of the Maine Health Data Warehouse and continual improvement of processes.

The HSRI team will use the Agile processes to plan, manage and track development activities, based primarily on Scrum. This methodology outlines an organic process that is meant to maximize the flexibility and productivity of project teams. It stresses people over processes, working software over documentation, customer collaboration over negotiation and responding to change over following a plan. Agile methods have been shown to allow small teams to turn out quality products much more quickly than traditional development methods.

However, the Maine Health Data Warehouse is a large, complex project with many non-development tasks. Activities such as QA testing, working with external stakeholders and maintaining the production environment are not well suited to Agile methods. It is important that the testing, change management, deployment and disaster recovery processes be carefully planned and documented. These tasks are well suited to traditional work plans and process tracking.

Therefore, we follow a highbred approach to project management. Development tasks such as the development of the ETL/Business Rules Engine make extensive use of Agile methodology. Other tasks, particularly those which require inter-team coordination, will be tracked and managed using more traditional project management techniques. However, even for these non-development tasks, we still will always strive for flexibility and “welcome change” in order to best support MHDO’s needs.

Project management will work with the project teams and MHDO to revise non-development work plans as needed while still making sure that key deadlines are met. It will also make sure work plans are followed once they have been established and will also serve as leaders who promote and sustain the vision of the MHDO and the Maine Health Data Warehouse.

In order to ensure that large, multi-team projects stay on track, experience has shown that it is critical to have a clear roadmap with well defined milestones. While this may require constant revision as user needs and requirements change, having such a roadmap helps ensure that all parties to the development process are fully aware of key deadlines and “the big picture.”

### **Project Management Tools**

A Microsoft SharePoint site will act as a central document repository and project management tool for all contract staff and relevant MHDO staff. This site will enhance our ease of

collaboration through shared calendaring, document management, and version control. Along with documents, calendars, and work plans, the SharePoint site will house all action items developed during meetings. All project staff members will have access to this website. The Health Data Warehouse contract staff members are required to use it in order to facilitate cross-team activities. The SharePoint calendar will have a high level project view of major milestones and meetings while the development management tool (below) will manage the details of development sprints.

Atlassian GreenHopper will be used by the Agile teams, the Agile Product Owner and, potentially, MHDO staff, to gather, develop and track user stories, the sprint backlog and sprint progress. It will be used in a complementary role to Microsoft SharePoint, which will be used to track activities not well suited to Agile processes.

### **Detailed Work Plans for Non-Development Tasks**

Non-development task work plans will be prepared by the Task Leaders and then approved and integrated into the overall project work plan and submitted to MHDO for approval before any work begins on that task. Any revisions to the non-development task work plans must also be approved by MHDO. The work plans will detail task activities, products, and deliverables. They will specify the performance benchmarks that form the heart of the task's QA/QC plan. We recognize that in the change-oriented context of health care, work plans may be subject to frequent modification as MHDO adjusts to new information, mandates or policy driven by the change process.

### **Agile Project Management Process for Development Tasks**

HSRI's Product Development Team and NORC's IT Infrastructure teams will both use Agile methodology for development tasks. In both cases, the Project Manager (Candura) will act as the Agile Product Owner. The Product Owner is responsible for coordinating the gathering of use cases and business requirements (called "user stories") and prioritizing them based upon the value they provide. The set of user stories that have not yet been completed are called the Sprint Backlog. This backlog will be tracked using Atlassian GreenHopper.

The Product Owner will work with each team to review user stories once per sprint. During this meeting, stories will be evaluated to determine if additional information is needed or if single stories need to be broken out into multiple stories. Time estimates will also be assigned to stories.

At the beginning of each sprint, the Product Owner will meet with each team and present the stories with the highest priorities. Based upon past experience and the time estimates, the team and the Product Owner will select the stories to be completed during that sprint. The team will then work collaboratively throughout the sprint period to complete the stories, with the goal of having a demonstrable product by the last day of the sprint.

During the sprint, the team will continually document tasks that remain to be accomplished in order to complete the stories. Generally, early in the process, the team will be discovering new

tasks that need to be accomplished, so the total number of tasks will rise. Near the end of the sprint, the number of remaining tasks will typically go down. The number of outstanding tasks is tracked daily in what is called a “burn down chart” which allows everyone to see how the sprint is progressing at a glance. This allows a team to identify potential slippage early in the sprint and inform the Product Owner if some stories may not be completed. This provides an opportunity for joint problem solving and, potentially, scope revision. It also allows the Product Owner to inform the stakeholder as early as possible about potential delays.

The Greenhopper tool is used for creating user stories, estimating the stories, creating and updating of the sprint backlog, visualizing team activity and reporting progress.

At the end of every sprint period, the teams will demonstrate the stories that have been completed. MHDO staff will be invited to attend, although their attendance is not mandatory. Project Management staff will also attend the demonstration to gather feedback, which may give rise to future user stories.

HSRI’s Product Development team will use a 2 week sprint period. NORC will use a 2-4 week period, depending on MHDO’s preference.

Both teams will detail their specific processes by creating a Design Reference, Project Management Plan, Risk Log, and Deployment and Contingency Plan. Each document will evolve as the project changes, but will serve as important touchstones to ensure that development activities yield predictable results with a consistent level of quality. The Design Reference will serve as a guide to coding standards during the project. This document will cover such areas as coding conventions and variable naming standards. The Project Management Plan will document the priority of each Story, the estimated time to implement the Story, all resources needed, and the project schedule including demonstration dates and projected project milestones. Both teams will use a standard Risk log to document all identified risks associated with a project. The log will contain the compiled list of risks along with each risk’s severity, probability, plan (i.e. mitigate, share, transfer, avoid), date identified, resource(s) responsible, and resolution. Each team will also create a comprehensive Deployment and Contingency Plan that will include detailed steps to deployment along with a backup plan should the deployment fail (see Deployment for more details).

### **Careful Allocation of Labor and Resources**

For high-quality products to be delivered according to schedule and budget, resources will be allocated commensurate with each task’s requirements and as approved in the work plan. These allocations are experience-based estimates that ensure the availability of proper and sufficient staff and physical resources. If issues arise where the estimates need adjustment, these will be handled internally to the extent possible and discussed with MHDO if necessary.

### **Comprehensive Communications**

Comprehensive and effective communications are a cornerstone of our management approach. The tasks assigned under this RFP will not be work in which the contractor can be distant and



function independently. The work described in the RFP is aimed at program and process improvement and, hence, occurs in a policy environment. Therefore, we can only be effective by forming a partnership with MHDO. We must form a communications bond that enables us to fully comprehend MHDO's objectives and needs, to act in lockstep with its philosophies and preferences, and to deliver top-quality products within budget and on schedule. Effective communication has been built into our project organization and presented as part of a communication plan that will be developed with MHDO. This plan will not only cover communication between the HSRI data warehouse team and MHDO, but will also include our approach to external stakeholder management. We value the importance of two-way communication with our stakeholders and our communication plan will reflect that.

### Regular Meeting Schedules

- **Kick-Off Meeting** The kick-off meeting will serve as an opportunity to establish procedures for consistent and timely communication between the Health Data Warehouse team and the State project team. Staff will include the Project Director David Hughes, Deputy Project Director Tim Mulcahy, Product Owner Leanne Candura, Product Development Team Lead Kevin Rogers, NORC, PCG leads. The main focus of the kick-off meeting will be to confirm requirements, review the work plan, staffing requirements, and schedules. During the kick-off meeting a framework for Standard Operating Procedures (SOPs) will be established. This will include communication protocols and a regular meeting schedule as well as expectations for these meetings (i.e., purpose, agenda, summary).
- **Monthly Leadership Meetings** Monthly meetings will be held between Health Data Warehouse staff and the State project team. Staff will include Project Director David Hughes, Deputy Project Director Tim Mulcahy, Product Owner Leanne Candura, Product Development Team Lead Kevin Rogers, NORC, PCG leads and other technical and content experts as necessary. HSRI will prepare a draft agenda and will send to the State project team 5 days in advance of any regularly scheduled meeting. The agenda will include discussion and resolution of any high priority issues, a review outstanding action items and stories, and goals for the next 3-6 months. Meeting minutes along with an action item list will be submitted to the State project team no later than 1 week after each meeting and posted to SharePoint once finalized.
- **Weekly Team Meetings** Weekly meetings will be held between project management staff, team leads and MHDO staff to review a weekly status report of action items and stories, outstanding issues, and plan for the next two weeks. Meeting minutes will be taken during these meetings and posted to SharePoint within one business day. It is important that all action items and stories are up to date on SharePoint and Green Hopper to insure that accurate information is available for Weekly Team Meetings.
- **Ad hoc Meetings** Ad hoc meetings will follow the same structure as weekly (if time allows) and meeting minute structure will also be expected for any ad hoc, special meetings as requested by the State project team. The Project Manager's location in Maine and the HSRI offices in Massachusetts offer MHDO easy access to key staff for face-to-face meetings, if necessary.

## Cost Management

Procedurally, HSRI's Business Office employs cost-centered accounting systems to manage all of its contracts. Each contract is established within the system upon award, with sub-accounts assigned based on funders' requirements for tracking and invoicing. Costs then can be aggregated to permit monitoring by our project management team at the level(s) they desire (e.g., subtask, task, project, subcontractor, consultant, and time period). Each month, project cost reports are prepared by the Business Office and distributed to the Project Director and Project Manager. The Business Manager and Project Managers review each month's expenditures and invoices to ensure accuracy and compliance with funders' and HSRI policies and procedures. They then evaluate projected and past expenditures to measure status with respect to the overall budget, identifying and implementing corrective measures if needed. HSRI's Business Manager, Anna Edwards, coordinates with the PD and is available to the funder's Contract Officer as needed for information or problem solving. It is also formally monitored: weekly by Task Leaders and monthly by the PD and Project Manager. The completion status of tasks and work products is checked against the project schedule and the schedule of deliverables. The status of deliverables is continually updated in weekly meetings with the funder. Cost-control issues that require resolution are addressed internally through collaboration among the PD, Project Manager, Business Manager, and relevant Task Leads.

Cost containment is very important at the organizational level, so HSRI looks for proactive strategies to reduce costs. Our innovative use of automation technologies to reduce manual and repetitive analytic and report production tasks, frees up staff to focus on higher value tasks. Our use of virtual work environments and other related technologies help reduce our overhead and travel costs. We also ensure that staff assigned to tasks have the appropriate training and experience level for the work being done, ensuring efficiency and maintaining overall quality.

## Risk Management Plan

### Technical Protection

The HSRI team's technical approach to protecting confidential data combines industry standard solutions to ensure that persons accessing the Data Enclave are properly identified and the data are fully protected, including authentication, authorization, encryption, monitoring, backups, and others. The team leverages VPN technology to protect the data by controlling the environment in which access is provided. Data are not distributed; rather, access to data is distributed. Controlled access prevents outsiders from reading the data transmitted between a computer accessing the Data Enclave and the host network. Files may not be downloaded. Users cannot use the "cut and paste" feature or save or print data on a local computer. Statistical applications, including business intelligence solutions, and data (read only) are provided through the host network.

### Statistical protection

Ensuring statistical protection by making only appropriate, de-identified data available to the public and applying relevant disclosure review processes to outgoing information are typically responsibilities shared by the data producer and the remote access facility agency. The NORC Data Enclave is therefore equipped with the relevant tools to facilitate such operations, manage

the information flows, and audit the various processes involved in the release of de-identified claims data.

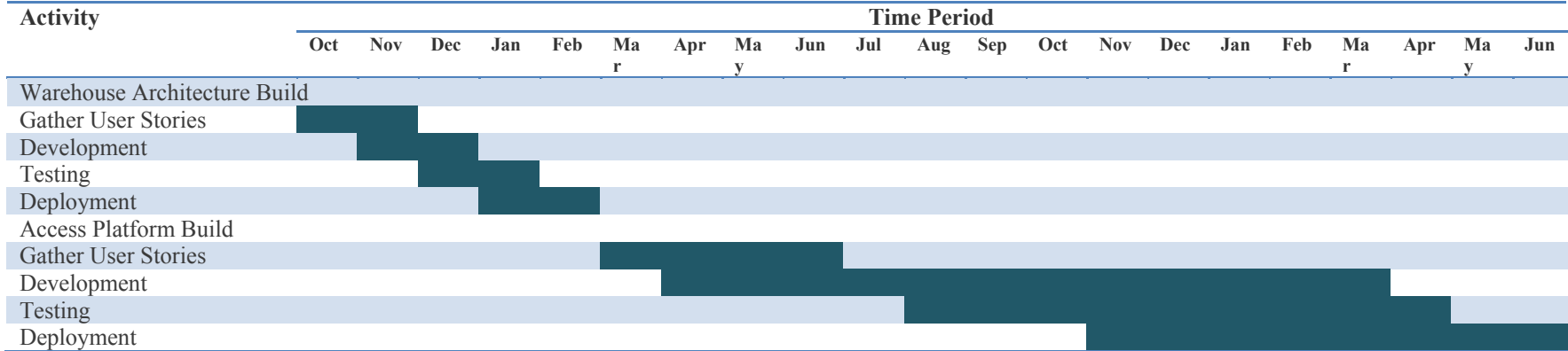
**Organizational/operational protection**

Well defined and implemented operational/organizational components also are important. NORC will work with MHDO to establish a set of operational and management procedures to ensure the appropriate de-identification and release of data to the public.

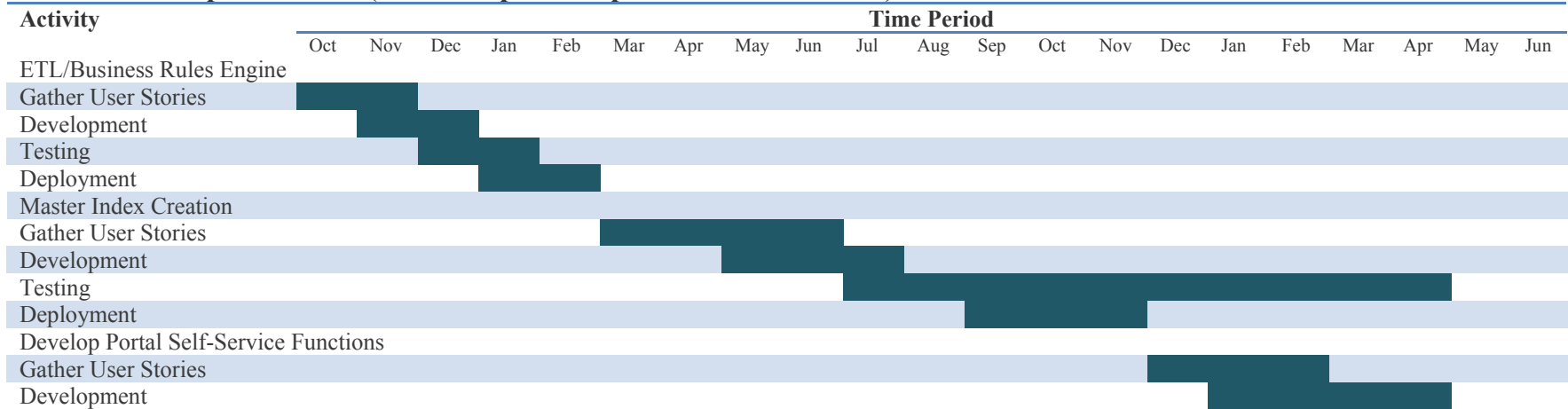
**Section 2.10.2 Proposes Project Timelines**

The following timeline shows a breakdown of activities for each team during the period Oct. 1, 2012 – June 30, 2014.

**IT Infrastructure Team**

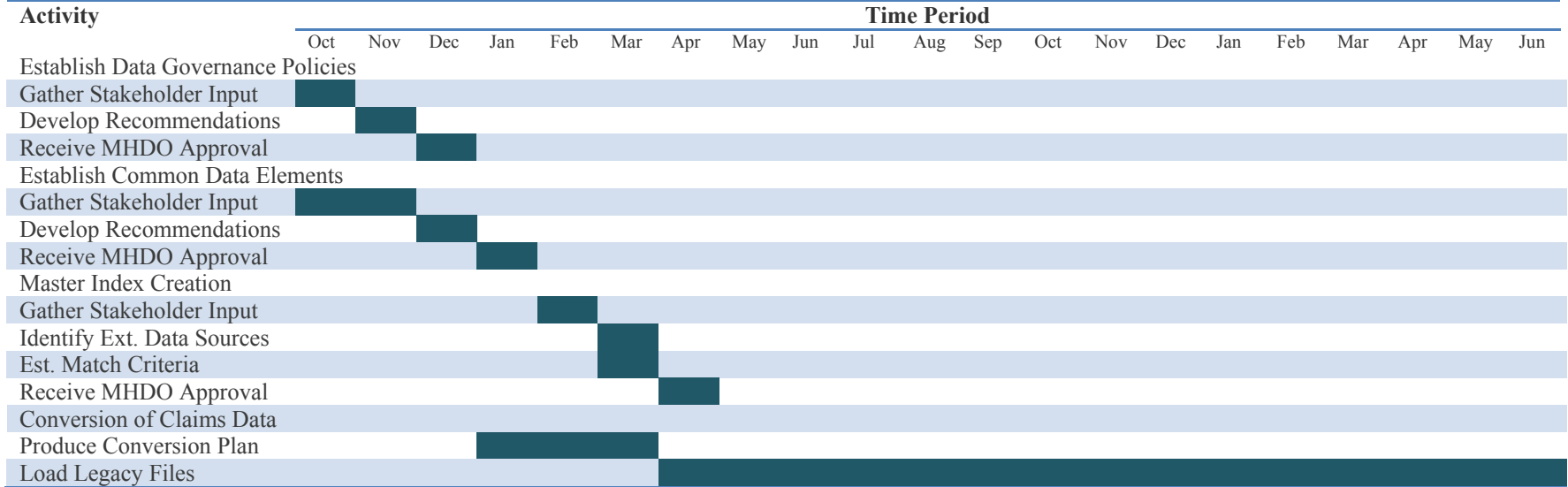


**Product Development Team (each time period represents two iterations)**

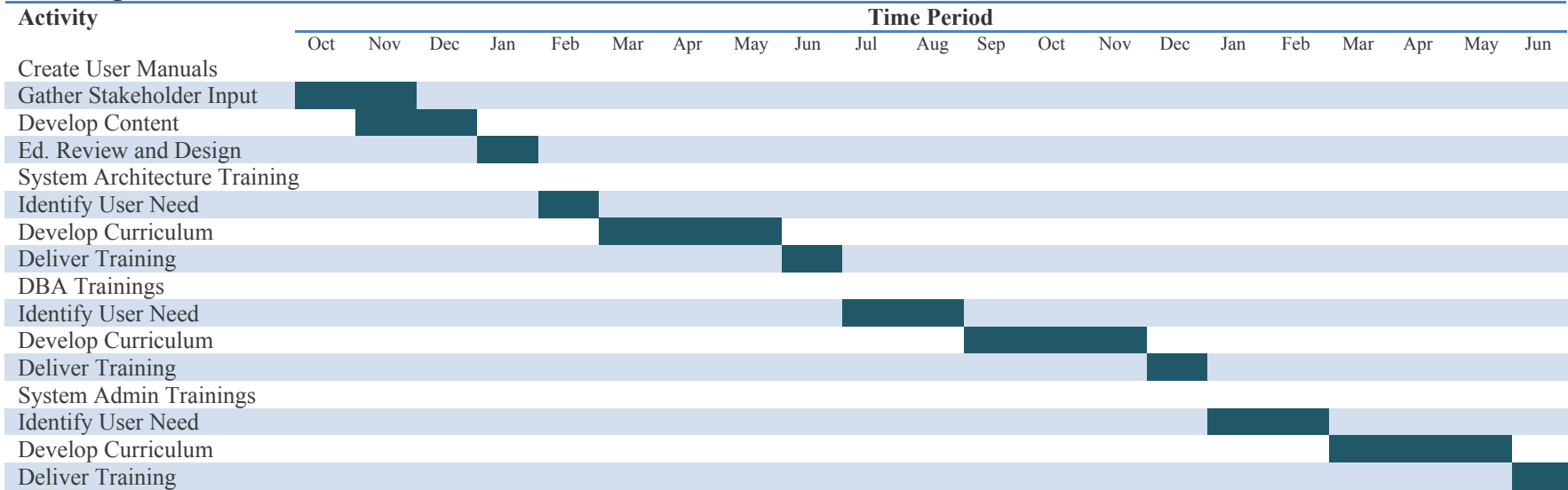




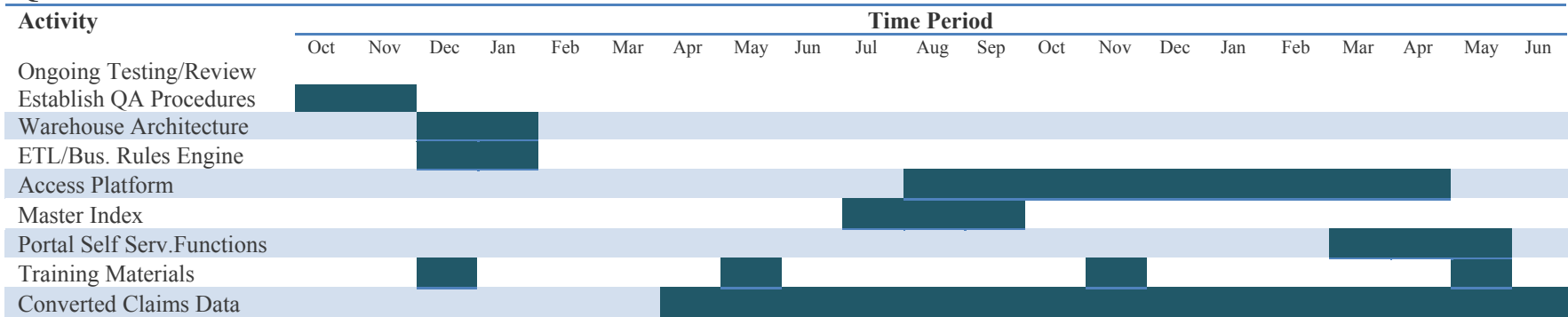
**Health Data Content Team**



### Training Team



### QA Team



## **Section 2.11 Change Management**

Even though the Data Enclave environment is physically separated from the NORC Corporate IT Infrastructure the service offering adheres to the strict change control process established for Corporate Operations. The change control procedures are outlined in detail in the Revision 3 of the NORC Change Management Overview and Procedures document which is available upon request. According to NORC's Change Management Policy (2012), *"IT Change Management is the process of defining, planning and scheduling, administering, implementing and maintaining changes that affect the corporate IT infrastructure. It is also ensures that standards and methods are implemented within the environment in order to effectively maintain stability and security while minimizing risk and downtime"*. In specific reference to the questions outlined in this RFP in relation to the change control process, we strictly adhere to procedures and processes by which approved changes are promoted from pre-production to production environments. The following excerpts from the NORC Change Management Overview and Procedures document address specific questions. All changes are thoroughly documented in the Corporate Footprints platform based change management system and communicated when appropriate to the Enclave community.

### **Section 2.11.1 Scheduling Changes**

All scheduled changes must be submitted into the change control database no later than the close of business the previous Tuesday before the maintenance window. Each change will be reviewed by the change management committee every Wednesday morning at 9:30 am CST in room 1427. If approved, the change will be implemented during the scheduled window on Thursday between the hours of 12 am and 4 am CST. If required, and agreed upon, by the business, an alternate schedule may be chosen. The change executor must be present during the meeting or send an appropriate designee.

### **Section 2.11.2 Emergency Changes**

All emergency changes must begin with the creation of a TSS service support ticket, email notification to the ISO Admin Group or a change control request. Upon completion of a change control request, the Change Management group will escalate to the emergency change approvers group. A member of the change approvers group will then contact the requestor to discuss the proposed change. If approved, the requestor is responsible for coordinating with the business an appropriate time for implementation. The requestor must also have full support and authorization for the requested change and timeframe. Once implementation is complete, the requestor is responsible for submitting a change control request within the database. The status is updated accordingly.

### **Section 2.11.3 Emergency Change Approver**

This position owns all requests that are submitted outside the regularly scheduled change window. An approval is required from this individual(s) to implement any production changes



that have not been brought before the Change Management Committee. Upon change implementation, they ensure appropriate documentation is completed, documented, and tracked.

## **Section 2.12      Testing**

In order to ensure the quality and reliability of the solutions provided, the HSRI team will use a standard set of testing procedures and tools as a part of its testing and deployment process. The testing workflow will be tracked using tracking functions within the project's Microsoft SharePoint site.

At a high level, the testing and deployment process is:

- Code and database changes are made in the development environment and unit tested there.
- Changes are promoted to QA. Unit test and acceptance tests are run.
- A deployment plan is written that includes the change. Often, multiple changes will be included in a deployment plan.
- Changes are promoted to pre-production following the deployment plan and deployment testing is run. Optional MHDO testing and signoff happens at this point.
- The change is rolled out to production as part of a release.

### **Section 2.12.1      Description of Test Environments**

While the HSRI team may, from time to time, establish additional test environments for specific purposes, the standard development process will make use of the following three basic environments: Development, QA and Pre-Production. These environments will be set up to mirror the code, table structures and overall architecture of the production environment. These environments will be established within the Secure Data Enclave.

The development environment is used by developers to make and debug their changes. They develop and run sets of “unit tests” to ensure that their intended changes work and that they haven't introduced errors to the code. The QA environment is used by the QA team to perform “user acceptance testing.” The pre-production environment is used to perform deployment testing, as a “model office environment” to test data changes and as an environment to recreate production problems, when necessary.

The basic process for making and testing a change is:

1. The developer or engineer makes a change in the development environment and develops “unit tests” to ensure it does what it is supposed to.
2. The change is turned over to the QA team who bring it into the QA environment. They re-execute the unit tests to ensure they still pass.

### 3. The QA team defines additional “acceptance tests”

There is also a third “environment” that is used extensively: development. This is where developers and engineers make their initial changes and perform unit tests before turning code over to QA for testing. All tests that run in the QA environment are expected to first pass in the development environment.

#### **Section 2.12.2 Issue Reporting and Tracking**

All issues and defects identified during the testing process will be logged using the HSRI team’s SharePoint system or a related tool. This system will allow issues to be entered along with supporting documentation to assist in the recreation or understanding of the bug. Once an issue is logged, the QA team will evaluate it and gather any additional information related to the problem.

Issues entered in the Issue Tracking system will be tied to a specific environment: QA, Pre-Production or Production. Issues in QA or Pre-Production will be considered to be “blocking” or “non-blocking” (see below for more details on how this status is used). Production issues will be considered to be “critical” or “non-critical.” All “critical” issues will be reviewed by the Agile Product Owner to confirm this status. Issues with this status will be given priority in determining the next sprint’s development priorities and may give rise to an emergency fix. “Non-critical” issues will most likely be reflected in future User Stories.

#### **Section 2.12.3 MHDO Testing/Acceptance**

The Deployment plan should include whether or not there will be MHDO testing and signoff before deployment. This differs from the “Acceptance Testing” that is performed by the QA team. The MHDO testing and acceptance typically comes after all other testing has been performed. This is done to minimize the issues that MHDO staff may encounter and make the use of their time as efficient as possible. However, at MHDO’s discretion, they can be involved earlier in the testing for certain changes.

#### **Section 2.12.4 Automated Testing Procedures**

In general, unit testing and acceptance testing will make use of automated test frameworks to execute tests in an efficient and consistent manner. For instance, .NET code will be tested using the Visual Studio Unit Testing Framework, allowing a large number of pass/fail tests to be executed automatically.

Each component that is developed will have a series of unit tests defined using the testing framework. Every function should have tests defined that establish:

- the component produces the expected results given expected inputs
- the component produces an appropriate failure given invalid inputs

When modifying a component, the developer should modify old and add new unit tests as necessary to confirm proper operation of the component. All unit tests for a component must pass successfully in the development environment before a component is turned over to QA.

The QA team will re-execute all unit tests for the component and any dependent components in the QA environment. This will help identify hidden dependencies and other integration issues.

### **Section 2.12.5      Acceptance Testing**

Once the QA team has run all unit tests successfully, they will proceed to formal Acceptance Testing. The testing plan will actually be developed at the same time the User Stories (business requirements and use cases) are developed. At that time, the QA team will work with the Agile Product Owner to define appropriate tests. These tests should ensure that the change has produced the value it was intended to produce.

The QA team will also test all web applications to ensure that they fully meet the accessibility requirements of Section 508 of the Rehabilitation Act. The team will utilize the standard outlined at <http://www.section508.gov/>. It will make use of tools such as the WAVE toolbar to ensure that all online content is properly tagged and accessible via a screen reader or that another suitable accommodation is provided.

Issues found by the QA team will be documented in the Issue Tracking system and be defined as either blocking or non-blocking issues. Blocking issues will require resolution before a component can proceed through the testing process. Generally, it will return to development for fixes. Non-blocking issues do not require resolution, however, the number and type of issues may affect the decision on whether a component should proceed through testing or be returned to development. The Agile Product Owner will be responsible for making this decision.

### **Section 2.12.6      Handling of Failed Cases**

All unit test failures in the development environment must be resolved before a component can proceed to QA. This may require changes to the component or it may require revisions to the tests (functional changes may have made a test legitimately invalid).

Unit test failures in the QA environment are considered to be blocking issues that must be documented in the Issue Tracking system. Components cannot proceed through testing while there are blocking issues, so the component will generally have to return to development.

Acceptance Test failures may be blocking or non-blocking. Either way, all issues will be recorded by the QA tester in the Issue Tracking system. Blocking issues will generally require a return to development. Non-blocking issues will be considered by the Agile Product Owner when determining if a component should proceed to pre-production for ultimate inclusion in a release. The Agile Product Owner may also determine that a non-blocking change requires a return to development.

Pre-production test failures can also be blocking or non-blocking. Any non-blocking acceptance test issues already in the Issue Tracking system are assumed to be non-blocking in pre-production. However, by default, any other issues are assumed to be blocking issues unless deemed otherwise by the Agile Product Owner. This is because new issues that come up in pre-production that didn't come up in QA could be an indication that there is a mismatch between the environments which could actually mask a more serious error. Typically, the Agile Product Owner will only sign off on a pre-production test failure as being non-blocking when its cause is clearly understood and known not to be an environment issue.

### **Section 2.12.7            Validation of Documentation and Business Processes**

To ensure that the deployment plan has properly identified necessary training and documentation updates in its stakeholder communication plan, the QA Team will be responsible for reviewing the User Manual and any other applicable documentation to ensure it accurately reflects the current state of the application. If these materials are to be updated as part of a deployment plan, they will review the revised materials.

To ensure that the system and its documentation meet the needs of the business users, the QA team will convene two focus groups a year via webinar. These webinars will be used gather feedback from users about different aspects of the system. The QA team will work with MHDO to determine the specific users and subject matter to be investigated during each webinar. HSRI may offer a small incentive to focus group participants if recruiting volunteers proves difficult.

### **Section 2.12.8            Data Backup Testing**

On a quarterly basis (except in the quarter where the full disaster recovery test is scheduled), the HSRI team will perform a backup recovery test. This will involve completely refreshing the pre-production environment (code, database objects and data) from the encrypted backup media. The specific timing of this test will be contingent on the release schedule and other uses of the pre-production environment.

The state of the pre-production environment will be validated by the QA team. They will compare summary statistics from the DB tables and perform parallel testing to ensure that the production environments and pre-production environments match. Any defects will be logged in the Issue Tracking system. In addition, a Backup Recovery Test report will be prepared for the Project Director and MHDO detailing the outcome of the test.

On an annual basis, NORC will perform a disaster recovery test. This will involve the replication of all project relevant systems in a secure collocation facility using Zerto. The results of this BC/DR test will document key information such as the actual recovery time. A full test report will be provided to the Project Director and MHDO detailing the outcome of the test.

### **Section 2.12.9 Volume Testing**

Before any major release or other change that is anticipated to have an impact on system performance, Volume Testing will be performed in the pre-production environment. This should be outlined in the Deployment Plan and should be followed by a “Go/No Go” decision point.

Volume testing will be the responsibility of the QA team, working together with the other teams as appropriate. During volume testing, transactions such as ETL operations, queries, dataset exports and other user-initiated actions that interact with the component(s) being modified will be executed concurrently with the goal of reproducing “peak load.” The system response time and stability during this load will be monitored and reported to the Project Director, the Agile Product Owner and MHDO in a Volume Testing Report. The “Go/No Go” decision on deployment will be made by the Project Director and the Agile Project Owner in consultation with MHDO based upon the results.

The method of reproducing “peak load” may vary depending on the nature of the components being modified. Database load may be simulated by the engineering team when appropriate. Web response times may be evaluated using automated testing tools running from multiple locations.

### **Section 2.13 Conversion**

Once the data warehouse has been created and is able to accept new data, one of the critical tasks will be to load legacy data to the system. These data may reside in existing databases, or they may have the form of irregular data files. Regardless of source, it is critical that these data are loaded to the warehouse in such a way that they are fully available for reporting and indexing purposes.

To accomplish this, the data conversion process will load legacy data to the staging tables similar to how the ETL process loads new data files. Once the legacy data have been successfully introduced to the data warehouse on the staging tables, it will be processed identically to how new data are. This means that it will be written to the Read Optimized Store and added to the master indexes following the standard processes.

#### **Section 2.13.1 Data Conversion Plans**

The HSRI team will develop Data Conversion Plans that inventory all available legacy claims data and outline the decision process for each legacy data source. These decisions will be made in cooperation with MHDO, although the HSRI team will provide a report with recommended decisions to facilitate the process. The key decisions that need to be made for each legacy data source are the following:

- do the legacy data need to be transformed or otherwise pre-processed in order to be mapped into the staging tables?

- are there any file validation rules that should be applied to the data, or should all rules be bypassed?
- is there any additional data cleaning that must be performed on the data before it is added to the Data Warehouse?
- is there any data that simply should not be loaded, due to low data quality?

The Claims Data Conversion plan will be completed by 6 months after contract award. The Hospital inpatient/outpatient Data Conversion plan will be completed by July 2014. The Hospital Quality, Financial and Organizational Data Conversion Plan will be completed by July 2015.

Each Data Conversion plan will also outline a proposed schedule for the load of legacy data. It is anticipated that this will be done in a phased manner, with subsets being loaded and evaluated on a regular basis.

### **Section 2.13.2 MHDO Approval of Data Loads**

When practical, the general approach will be to perform data cleaning and pre-processing on a set of legacy data and upload it to the pre-production environment in the period between releases. MHDO would then have the opportunity to evaluate the data load and approve it before it was actually loaded to production. It is anticipated that, due to data quality issues, certain sets of legacy data may require an iterative, multi-pass approach between MHDO approves it for loading to production.

### **Section 2.13.3 Development Process**

Before the decisions outlined in the Data Conversion Plan have been made, it is anticipated that the HSRI team will need to provide initial assessment reports to MHDO detailing issues and potential solutions.

The HSRI team will develop basic software that will pre-process and transform legacy data into a format that can be loaded using the standard ETL process. Since the ETL process can handle basic remapping, the pre-processing software will likely be very basic in scope; it will not interface directly with the database in any way. This software will have limited reusability, since it will be specific to the legacy data in question.

The HSRI team will perform a data assessment process and load each set of legacy data to the development environment to prototype cleaning rules and transformations. Depending on the complexity of the data and the size of the load, HSRI may instead use a subset of the full data for this process. It may also code dummy records to test certain types of transformations.

Once MHDO has signed off on any decisions, the HSRI team will develop stand alone software following its regular procedures (see Testing) to perform any pre-processing or specialized data cleaning. Once legacy data have been transformed and cleaned, the ETL process will be used to load it to pre-production and then, after final MHDO approval, production.

## Section 2.14 Deployment

The HSRI team will plan on deploying changes to production on a quarterly basis. However, the actual release schedule may involve more or less frequent deployments depending on actual need. The Project Management Team will work with MHDO to determine the need and timing for releases as a part of the overall Agile Project Management process. The goal is that deployment windows will be identified at least 30 days in advance for minor changes and at least 90 days in advance for major changes, in order to allow for sufficient planning and notification. Emergency fixes and other urgent changes may be scheduled on an accelerated basis, if necessary.

### Section 2.14.1 The Deployment Plan

For each scheduled release, the Project Management Team will develop a deployment plan. Every deployment will have a “Deployment Lead” designated who will be ultimately responsible for the execution of the plan, which will include the following:

- A list of fixes, enhancements and upgrades to be included that shows the relationships and dependencies between items, including any “Go/No Go” decision points
- Whether MHDO users will take part in Acceptance Testing before deployment (timeline should reflect this and include “Go/No Go” decision points)
- A list of stakeholders who will be potentially impacted by the change
- A list of individuals who will be involved in the deployment and their specific roles.
- A detailed list of tasks and the anticipated timeline for the deployment
- A communications plan detailing how stake holders will be notified. This will include any decision points that may be necessary based on stakeholder communications, as well as a plan for any training that will be necessary and required documentation updates.
- A communications plan detailing who the individuals involved in the deployment will communicate during the deployment and immediately after.
- The criteria by which deployment (or a portion of a deployment if there are multiple, independent changes) will be considered a success or a failure
- The procedure that will be followed if the deployment or a portion of the deployment is considered a failure (e.g., back out procedures)
- Contingency procedures and escalation schedule in the event of unanticipated problems. For instance, what happens if a key component fails to come online after a change and the back out procedures do not work? How long does the primary team try to resolve the problem before calling in backup?

### The Burn-In Period

The deployment plan will also designate a “burn-in period” for each release, during which the members of the deployment team will remain on call and performance monitoring will be



stepped up. The period directly following a deployment is when defects or anomalies are most likely to be encountered and noted. The anticipated “burn-in period” may differ, depending on the size of the change, but is generally presumed to be a week for elements of the system that are consistently accessed.

At the end of the “burn-in period,” the Deployment Lead will produce a deployment report for the Project Director and MHDO that will detail any performance issues, reported problems or deployment anomalies that were encountered. It will allow include assessments of the impact of the changes on overall system performance or anything else that might give rise to the need for future changes. Of course, any performance issues, reported problems or deployment anomalies deemed by the Deployment Lead as placing the stability of the production platform at risk will immediately be reported to the Project Director in case there is a need for emergency fixes or the back out of changes.

### **Section 2.14.2            Staging of Changes**

Before any change is made to production, it must first be staged in the pre-production environment. This will be accomplished by performing all of the tasks outlined in the deployment plan in the order that they would be performed in production. Any “Go/No Go” decision points should be evaluated in pre-production and the deployment must meet the plan’s criteria for success before changes are considered to have been successfully staged.

Once changes have been staged in pre-production, all acceptance tests should be rerun to ensure there are no unexpected variances. If variances are found that cannot be easily resolved, this may necessitate a delay in the deployment of the changes. This decision would be made by the Project Management team in consultation with MHDO.

The timing of this staging is dependent on the overall release schedule. However, typically, changes should be successfully staged to pre-production at least one week prior to the scheduled release, in order to allow for sufficient time for testing and problem resolution.

### **Section 2.14.3            Contingency Planning**

As noted above, every deployment plan should include contingency procedures and an escalation schedule of what to do if a deployment results in a “breakage” that cannot be resolved by the deployment team.

In general, the contingency procedure should involve how to handle the failure of the entire component to which a change is being made. So, for instance, if a change is being made to a portion of the web application that provides self-service access to data, the contingency procedure should cover what should be done if the entire application becomes unavailable. However, if no database changes were a part of the change, contingency procedures would not have to cover a potential outage of that component. If a database outage did occur, of course, the standard disaster recovery plans and procedures would still apply (these are, essentially, the default contingency plans that are always in effect and apply to all aspects of the system).

The contingency procedures represent a set of procedures that go beyond the regular problem escalation and disaster recovery procedures. They may make certain personnel more easily accessible. They may involve extra backups or other risk mitigation strategies that are deemed appropriate given the size and complexity of the change being made. There may be times when the existing procedures are deemed to be adequate in case of failure and no additional contingency procedures are necessary.

## **Section 2.15 Training**

NORC Data Enclave support staff regularly conducts training for Data Enclave users and sponsors. These training cover a variety of subjects related to the Enclave and take place in person, over the phone, training videos, or via webinar. All webinar material is also provided as a recording for future review by trainees. This innovative multi-format training material is developed in conjunction with the needs and preferences of the sponsor. Usually, training sessions consist of the following modules: thin client use, access and authentication into the Enclave, confidentiality and security concerns with the data and environment, application and database usage, disclosure review process, file transfer protocols, and collaborative tools.

In addition, NORC support and engineering staff hosts presentations giving more detailed technical training on the environment from a management perspective. The goal is to assist data archivists and providers in conceptualizing the challenges faced by the Data Enclave and similarly situated organizations, raising awareness of the tools and emerging technologies. Additional information is provided on operational aspects of the Data Enclave such as staffing and user support.

NORC Data Enclave staff also provide training as part of consulting agreements with other institutions (such as the UK Data Archive and the University of Pennsylvania) to establish similar secure remote access data solutions. Training sessions involve both management and engineering staff from the Data Enclave and provide thorough documentation and instruction on the technical solutions and processes of environment.

NORC's approach to training staff at MHDO will synthesize these approaches to deliver a targeted learning experience to staff members serving in each of the enumerated roles. Trainings will take place in person, on the web, and also be accessible as recordings.

## **Section 2.16 Staff**

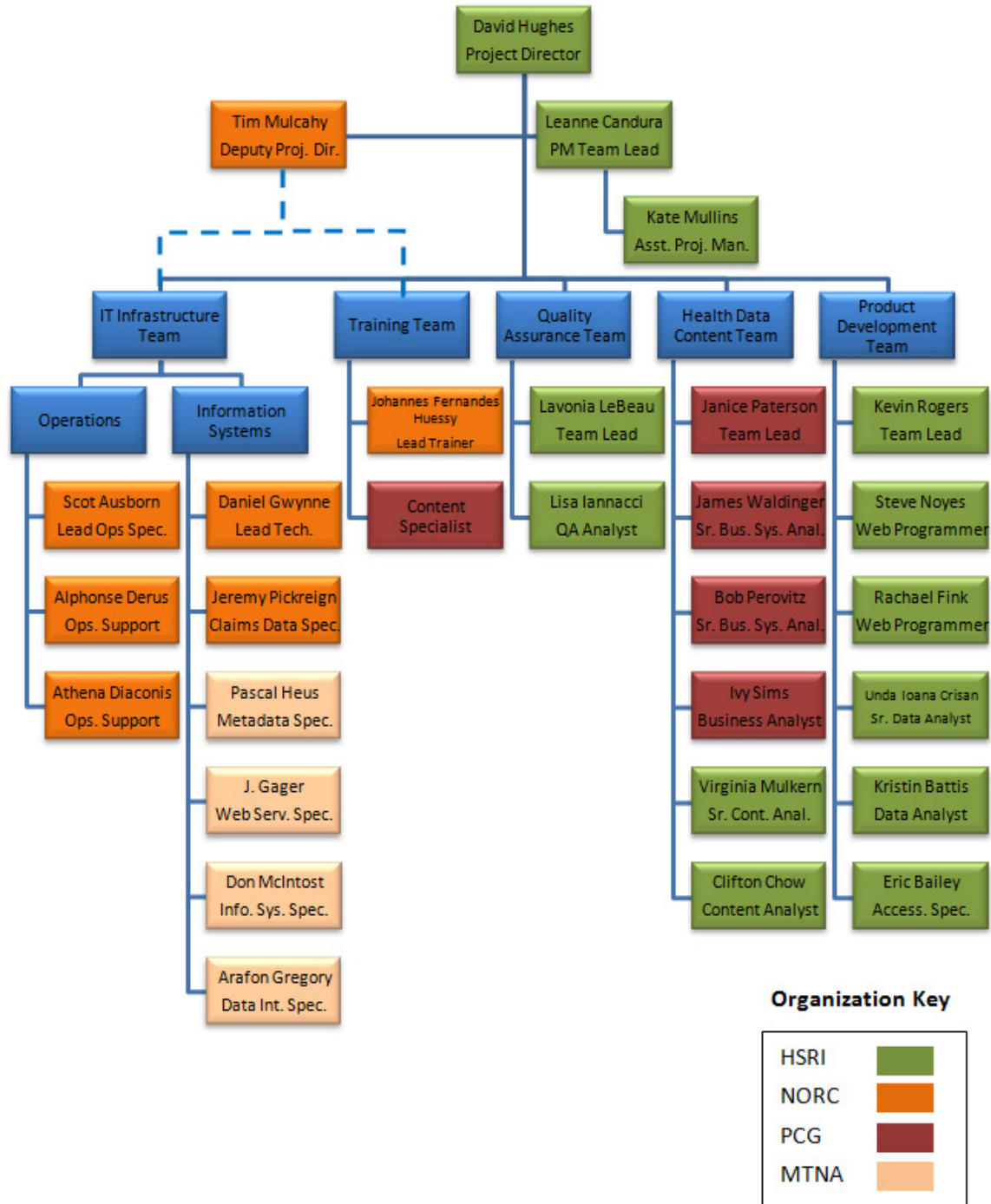
HSRI has assembled a team of extraordinary professionals with the range of skills and management experience required to successfully conduct this project. Our team has been constructed to insure that all tasks required for this project are accomplished effectively and efficiently. As our proposed staff biographies and resumes will demonstrate, we have the requisite expertise to:

- Systematically identify various constituents' needs related to file content, file structure and data processing requirements

- Identify regular channels of communication with MHDO and other constituencies to insure that they are continuously involved in all aspects of this project
- Construct a data warehouse that accommodates constituents' requirements and facilitates the use of data to identify Maine's health care challenges, successes, and planning needs
- Provide a secure environment for data storage
- Provide a structure that insures seamless remote data access to authorized data users
- Provide staff with high levels of content expertise to insure that the warehouse content and database structure are designed to facilitate the types of analyses anticipated related to health care planning, utilization management, cost analyses, service gap analyses, and system/program evaluation
- Provide management expertise and experience to insure that task sequencing remains viable, that teams are coordinated and work together to insure timely completion of interim tasks, and to work collaboratively with team leads to assess potential risks and to strategize remediation strategies as required
- Design a team structure that facilitates communication and interdependencies across teams to insure that a "pod" mentality does not develop and that teams work collaboratively to achieve project goals

The following section includes brief summaries of our team members' relevant expertise and experience. These bios have been arranged by organization and to correspond roughly to the organizational chart shown as Figure 2 on the next page. Complete resumes are included in Appendix B.

**Figure 2: HSRI Team Organizational Chart**



## Section 2.16.1 Human Services Research Institute Staff

### Project Leadership

#### **David Hughes, Ph.D.**

David Hughes, Ph.D. is proposed as Project Director for the Maine Data Warehouse project. Dr. Hughes is a Vice President at HSRI. He has worked for more than 20 years on projects related to analyses of health care system utilization and cost assessment, mental health services research, evidence-based practices, cost simulation models for planning mental health systems, and the intersection of the mental health and criminal justice systems. He is currently the HSRI Project Director for the California Health Reform Initiative which is using Medicare and Medicaid claims data as well as data from the state mental health and substance abuse authorities to examine how the health reform initiative will impact the behavioral health system in California. He has directed several SAMHSA multi-site studies, including the SAMHSA Managed Care and Vulnerable Populations Study and the CSAT Adolescent Managed Care Study, and was the Technical Assistance Provider to CMS Real Choice Systems Change Mental Health Transformation grantees. He also served as the Project Director and Developer for the Mental Health/Jail Diversion Resource Allocation and Planning Model Project, a project funded by SAMHSA to develop a computerized budget simulation and resource allocation model for projecting the costs and potential cost offsets of implementing jail or prison diversion programs for offenders with mental illness and substance use disorders. Dr. Hughes co-directed the SAMHSA-funded Block Grant Evidence-based Practices Cost-Efficiency Study, in which HSRI conducted studies and gave technical assistance to the SAMHSA-CMHS Block Grant program in response to OMB inquiries about the cost efficiency of implementing evidence-based services. More recently, he directed the Milwaukee County Mental Health Redesign project and the Evaluation of the Permanent Supported Housing Program in Louisiana. Currently, Dr. Hughes serves as a senior research specialist for the SAMHSA-funded National Evaluation of SAMHSA's Homeless Programs. He also serves as the Mental Health Technical Assistance Director on the CMS-sponsored National Quality Enterprise and provides technical assistance on mental health issues for the following project: Family or Individual Directed Community Services (FIDCS) Research – Compliance with 1915(i) provisions of the Deficit Reduction Act of 2005: Technical Assistance for Self-Directed Services.

### Project Management

#### **Leanne Candura, M.P.H.**

Leanne Candura, M.P.H. is proposed as the Team Lead for the Project Management Team. Ms. Candura is currently the Assistant Project Director of the Data Analysis Coordination and Consolidation Center (DACCC) project for SAMHSA's Center for Substance Abuse Prevention (CSAP)., a five-year, \$25 million project. In this capacity she has been responsible for managing and coordinating all activities performed by a staff of 45 individuals across three separate organizations. Many of the activities that she managed for this project are similar to those that will be involved in the Maine Health Data Warehouse project including: designing and constructing a common database to house data from all CSAP grant and contract programs, creating data files that facilitate analyses by multiple constituency groups, and working collaboratively with multiple CSAP staff to insure that project activities were meeting their

expectations and to modify project calendars and staff allocations as required to meet these needs. She has more than 10 years of experience working at the local, state, and federal level in the field of behavioral health research and evaluation, with a special focus on substance abuse prevention. Prior to her work on the DACCC, Ms. Candura worked at HSRI as a Research Analyst for CSAP's Data Consolidation and Coordination Center (DCCC). Before joining HSRI, she worked as a Research Associate at OMNI Research and Training in Denver. At OMNI, she honed her research and management skills working on a variety of prevention research and evaluation projects funded through SAMHSA and the Colorado Alcohol and Drug Abuse Division.

### **Kate Mullins**

Kate Mullins is proposed as the Assistant Project Manager for the Maine Health Data Warehouse project. Ms. Mullins is currently the Project Manager for the Data Analysis Coordination and Consolidation Center (DACCC) project for SAMHSA's CSAP. She has nearly seven years of management and administrative experience supporting organizational leadership and responding to client needs in a high-pressure and visible environment. Her current responsibilities include management of the DACCC, a 5-year, \$25 million contract involving 45 staff members across multiple subcontractors. She plays an integral role in developing project plans; coordinating project staff; tracking the project budget; planning and scheduling project timelines; tracking project deliverables; quality assurance; and monitoring and reporting on progress of the project to stakeholders. Ms. Mullins supports project staff by prioritizing tasks based on project plans and project priorities. She holds a Bachelor's degree in Psychology from Northeastern University.

## **Product Development Team**

### **Kevin Rogers**

Kevin Rogers is proposed as the Product Development Team lead for the Maine Health Data Warehouse project. Mr. Rogers is currently a senior member of the Data Analysis Team of the Data Analysis Coordination and Consolidation Center (DACCC) project for SAMHSA's Center for Substance Abuse Prevention (CSAP). He has more than 20 years of experience in the information technology field, and has been involved in the development of prevention science-related data processing and reporting applications for the last 10 years. Currently, as part of the DACCC, he is the team lead of the Automation Development Team and is responsible for developing data analysis automation and reporting applications as well as overseeing the team's quality assurance processes, including 508 compliance. Before joining HSRI, he worked as an independent consulting providing business and systems analysis, application development and database design services to a variety of clients in the healthcare, substance abuse prevention and pharmaceutical fields. Prior to this, he worked as a senior database and application developer at the Channing Bete Company where he developed application and database code for a high-volume survey scanning and reporting operation. Mr. Rogers began his IT career at the Phoenix Home Life Company where he worked as a team leader and senior systems analyst, maintaining and developing programs for the Agency and Actuarial departments. Before assuming this role, he worked in various roles within the company in data processing operations and technical services.

**Steven Noyes, M.A., M.S.**

Steven Noyes is proposed as a web programmer for the Maine Health Data Warehouse project. Mr. Noyes is currently responsible for the design, development, and implementation of numerous internet, database, and data processing applications produced for an array of projects at HSRI. He is also responsible for ensuring data security and 508 compliance for all publicly available internet applications. Mr. Noyes has created a web-based implementation of a statistical model which uses simulation to help inform system and program planning by mental health agencies. For the Mental Health Transformation State Incentive Grant Evaluation project, he developed a web-based application called Transformation Tracker which integrated project management and evaluation specifically designed for monitoring of activities involved in mental health system transformation. Additionally, he developed a highly customizable online survey engine known as ODESA that is currently used for multiple projects including the National Core Indicators consumer and family surveys. Prior to joining HSRI, Mr. Noyes was a senior software engineer for Sodalis Technologies where he developed multimedia web applications such as real-time video chat. He also served as senior programmer for the Massachusetts Behavioral Health Partnership where he produced reports and tools for analysis of the State of Massachusetts mental health programs within Medicaid.

**Rachel Fink**

Rachel Fink is proposed as a web programmer for the Maine Health Data Warehouse project. Ms. Fink is a software developer and has worked with several of HSRI's survey and data collection applications. Prior to this, she worked as a programmer/analyst lead at New England Research Institutes, where she developed systems for public health studies as well as clinical trials. Ms. Fink received a Bachelor's degree in Psychology from Oberlin College and has done graduate-level work in Computer Science, Web Development, and Media Production.

**Eric Bailey**

Mr. Bailey is proposed as a Accessibility Specialist/Designer for the Maine Health Data Warehouse project. Currently he is responsible for design and development of numerous web and print projects at HSRI. He is also responsible for ensuring compliance for Section 508 Amendment to the Rehabilitation Act of 1973's accessibility guidelines, as well as the Web Content Accessibility Guidelines (WCAG) 2.0 for all outgoing materials. Mr. Bailey believes in creating visually pleasing, easy to interpret designs that are also accessible for users with visual and cognitive impairments, as well as semantic, device agnostic websites capable of easily interfacing with assistive technologies. Mr. Bailey has had over 5 years' experience designing and producing websites and rich-media applications on top of a decade's worth of graphic design experience

**Unda Ioana Crisan, M.A.**

Unda Ioana Crisan is proposed as a data analyst for the Maine Health Data Warehouse project. Ms. Crisan is a senior research analyst at HSRI and is currently a member of the Data Analysis Team of the Data Analysis Coordination and Consolidation Center (DACCC) for SAMHSA's Center for Substance Abuse Prevention (CSAP). Ms. Crisan is responsible for assessing multiple datasets of various size and complexity with SPSS programming, creating reporting datasets, and preparing and applying analysis syntax tailored to specific deliverables. Current data analysis experience includes working with datasets from the following federally-funded substance abuse



prevention programs: Strategic Prevention Framework State Incentive Grant (SPF SIG), Substance Abuse Prevention and Treatment (SAPT) Block Grant 20% Set-Aside for Primary Prevention, Native American Center for Excellence (NACE), and Town Hall Meetings (THM). Among other roles within the DACCC, she was involved from 2008 to 2012 as a co-author of CSAP's annual Accountability Report and as a task co-lead of this report in 2011 and 2012. Prior positions include research assistant with the evaluation of the SAMHSA-funded Minority Fellowship Program at HSRI, and project and research assistant with the Promoting Healthy and Safe Employment in Healthcare (PHASE) Project at UMass Lowell.

### **Kristin Battis**

Kristin Battis is proposed as a data analyst for the Maine Health Data Warehouse project. Ms. Battis is currently a research analyst at HSRI and a member of the Data Analysis Team of the Data Analysis Coordination and Consolidation Center (DACCC) for SAMHSA's Center for Substance Abuse Prevention (CSAP). Ms. Battis is currently responsible for managing and analyzing national substance use data from multiple federally-funded substance abuse prevention programs, and compiling and interpreting analytic findings for use in detailed, brief, and ad hoc reports for the purpose of program monitoring and evaluation. She is the task lead for the annual National Outcome Measures: State-Level Trends report as well as a lead analyst on the Strategic Prevention Framework State Incentive Grant (SPF SIG), Partnerships for Success, Prevention Fellowship, and Underage Drinking Prevention Education Initiatives programs. Prior to her work on the DACCC as a research assistant, Ms. Battis worked as a clinical research assistant, a mental health residential counselor, and also performed HIV, STI, and safer sex outreach. She holds a Bachelor's degree in Sociology from Northeastern University, as well as minors in Psychology and Women's Studies.

## **Quality Assurance Team**

### **Lavonia Smith LeBeau, Ph.D.**

Dr. LeBeau is proposed as the Quality Assurance Team Lead for the Maine health Data Warehouse project. Dr. Smith LeBeau is a social psychologist who spends her time at HSRI as a senior researcher on the Data Analysis Coordination and Consolidation Center (DACCC) for SAMHSA's Center for Substance Abuse Prevention (CSAP). In this capacity, Dr. LeBeau oversees the analytic work of approximately 12 analytical staff to insure that HSRI data quality standards are met and that all projects meet the expectations of the funder. She has more than 14 years of experience as a professional researcher in the social sciences, and has focused on data analysis and report production in prevention science for the past four years. Prior to joining the HSRI team, Dr. Smith LeBeau was a post doctoral fellow at Harvard University conducting research in social psychophysiology.

### **Lisa Iannacci, M.A.**

Ms. Iannacci is proposed as Quality Assurance Analyst for the Maine health Data Warehouse project. Ms. Iannacci is currently a research analyst for the Data Analysis Coordination and Consolidation Center (DACCC) for SAMHSA's Center for Substance Abuse Prevention (CSAP). In this role, Ms. Iannacci works in conjunction with Dr. LeBeau to insure that HSRI data quality standards are met and that all projects meet the expectations of the funder. She also

processes and analyzes data collected from numerous CSAP grant programs and contracts. Currently, she is the lead analyst for all data files submitted to the DACCC from Fetal Alcohol Spectrum Disorders (FASD) Center for Excellence. Responsibilities as lead analyst include coordinating meetings and timelines for FASD workgroup tasks; leading tasks such as assessing data files, writing syntax for program outcomes (SPSS), technical writing, and proofing; and preparing written draft of FASD chapter for CSAP's annual Accountability Report. Ms. Iannacci is also lead analyst on technical assistance and training files including the CAPT and SPFAS, and an analyst on Strategic Prevention Framework State Incentive Grant (SPF SIG), Drug-Free Communities (DFC), and Town Hall Meetings (THM). Prior to joining HSRI, she worked as a research assistant for the Office of Institutional Research at Massasoit Community College. In this role, she assisted in creating and managing institutional data files for federal and state reports, developed survey instruments used to evaluate programs and services offered at the college, and prepared written reports summarizing statistical data from program/service outcomes. She was also a teaching assistant and research assistant for the Criminal Justice Department at UMass Lowell. As a graduate student, she worked on the first large-scale research project that examined police response to intimate partner violence and the practice of dual arrest.

### **Health Data Content Team**

#### **Virginia Mulkern, Ph.D.**

Virginia Mulkern is proposed as Senior Content Analyst for the Maine Health Data Warehouse project. Dr. Mulkern is a sociologist who has worked in the field of behavioral health services evaluation for over twenty years and has managed over 40 federal and state grants and contracts, most related to health and behavioral health services research. This includes several national multi-site evaluations for CMHS, CSAT and NIMH. She has served on a number of CMHS advisory boards and work groups. Dr. Mulkern currently serves as Co-Project Director for the Data Analysis Coordination and Consolidation Center (DACCC) for SAMHSA's Center for Substance Abuse Prevention and Co-Deputy Project Director for the National Evaluation of SAMHSA's Homeless Programs. Recently completed projects include: Project Director for the CMHS Evaluation of the Minority Fellowship Program, Co-Project Director for the National Co-Occurring State Incentive Grant (COSIG) Evaluation, Co-Project Director of the Technical Support Center for CSAT's Practice Improvement Collaboratives Program, Co-Principal Investigator for CMHS' Employment Intervention Demonstration Project Coordinating Center and, Principal Investigator for the SAMHSA Coordinating Center for the Managed Care and Vulnerable Populations Evaluation Project. Dr. Mulkern has taught courses in evaluation methods and medical sociology at both the undergraduate and graduate levels, and has been a reviewer on numerous CMHS and CSAT grant and contract review panels.

#### **Clifton Chow, Ph.D.**

Dr. Chow is a Research Associate and Analyst at Human Services Research Institute who has over 10 years of research, consulting and Project Management & Analytic experience with Human Services Research institute. Mr. Chow currently serves as the chief analyst of the California and New Mexico health reform planning projects. He was previously the senior analyst and project manager for the Mental Health Transformation State Incentive Grant Evaluation project funded by the Substance Abuse and Mental Health Services Administration (SAMHSA). He was also a chief analyst for the mental health Block Grant Cost-Efficiency

simulation modeling project numerous resource allocation projects involving the use of the HSRI-developed planning simulator. His primary areas of expertise are quantitative synthesis and econometric analysis using techniques such as meta-analysis, cost-effectiveness/cost-benefit analysis and duration model techniques (survival analysis), structural equation modeling and hierarchical linear modeling. He also has experience with data reduction techniques that include factor analytic techniques, cluster analysis and discriminant function analysis. For cost and utilization studies he has employed advanced econometric methods including discrete and continuous Markov modeling methods, Stochastic Frontier Analysis, Tobit and Heckman regression for censored and selection samples, logit and probit multivariate analysis for binary outcomes and Generalized Linear Models with appropriate link function. Additionally, he has developed for use multiple imputation methods using Markov Chain Monte Carlo.

## **Section 2.16.2 National Opinion Research Center Staff**

### **Project Management Team**

#### **Timothy M. Mulcahy, M.A.**

Tim Mulcahy is proposed as Deputy Project Director for the Maine Health Data warehouse project. Mr. Mulcahy is a Principal Research Scientist in the Economics, Labor, and Population Studies department at NORC at the University of Chicago and Program Director of the NORC Data Enclave. He has nearly 20 years' experience in social science research developing and implementing complex, data-centric projects involving sensitive data, evidence-based research, and data warehousing. He is a leader in promoting international adoption of data and metadata standards, best practices in data documentation, statistical disclosure control, and digital age dissemination and is a recognized expert in secure remote data access and security technologies, data privacy, and confidentiality. Mulcahy has served as keynote speaker for the European Union's Eurostat's Annual Conference on *New Techniques and Technologies for Statistics* in Brussels and the National Academy of Sciences and also as an invited speaker, panel chair, and panelist at numerous conferences, workshops, and seminars issues related to data security, cyber infrastructure, data access modalities, privacy, confidentiality, and statistical disclosure control, most recently for Academy Health; the Joint Statistical Meetings; Wolfram Data Summit; International Association of Social Science Information Services and Technology; Federal Committee on Statistical Methodology's (FCSM) Subcommittee on Confidentiality; USDA Expert Panel on Data Security, Confidentiality, and Research; and as Chair of the Academy of Management Session on New Approaches to Accessing Confidential Business Data. Currently he is Project Director of the Center for Medicare and Medicaid's Program: Availability of Medicare Data for Performance Measurement for which he leads the certification review of all standards relating to CMS administrative claims data privacy, security, and transfer, and the monitoring and oversight of qualified Entities (QEs) to ensure data and systems compliance. He also is the Lead Data Security Officer supporting CMS's Comparative Effectiveness Research Public Use Data Pilot Project assisting the de-identification and re-identification teams in creating public use files. Prior to that, he served Project Manager of the Patient Safety Research Coordinating Center (PSRCC), Evidence based Practices Center (EPC), and the American Hospital Association's (AHA) Quality Center. Mulcahy earned his graduate degree from the Institute for Policy Studies (IPS) at the Johns Hopkins University; conducted his international economics and foreign policy studies at the Johns Hopkins University Paul Nitze School of

Advanced International Studies (SAIS); and earned his undergraduate degree from the University of Virginia.

## **IT Infrastructure Team - Operations Team**

### **Scot Ausborn, MSLIS, AMRS**

SCOT Ausborn is proposed as the Lead Operations Specialist for the Maine Health Data Warehouse project. Mr. Ausborn is a Senior Research Analyst at NORC at the University of Chicago who earned his Master of Science of Library and Information Science from the University of Illinois and Master of Arts in Religious Studies from the University of Chicago. Ausborn regularly assesses technological requirements for partnering agencies and coordinates implementation of the most effective solutions within the NORC Data Enclave. As a Data Enclave Manager, Ausborn oversees the development of metadata and metadata services within the secure virtual environment. Ausborn has made tremendous strides in developing the usability of metadata catalogue deployment, maximizing the potential for data analysis by implementing National Data Archive Software. Working with the Data Enclave SCOPE project, Ausborn has guided users into the environment, assisting with account configuration, data access, technical training, and troubleshooting. In providing data access, Ausborn retrieved data from numerous public use data files and has loaded them into the Data Enclave's big data solution, allowing Data Enclave sponsors to test the environment. Ausborn is also familiar with front-end business intelligence solutions such as Tableau and Pentaho, which provide partners in the cloud environment with ease of access to regularly used analytic tools. Prior to his position at NORC, Ausborn served as Director of IT and Library Services at the Institute for Psychoanalysis. Ausborn was responsible for development and support of the Institute's entire technology infrastructure as well as patron assistance, collections development, cataloguing, and circulation at the Institute's McLean Library and Sigmund Freud Archives.

### **Alphonse Derus, B.S.**

Mr. Derus, Research Analyst and Data Enclave Manager in the Economics, Population and Labor Studies department at NORC at the University of Chicago, has experience in data management for clinical research studies and healthcare, databases, data analytic infrastructure, longitudinal survey research, and data support. Additionally, he is experienced with HIPAA and HITECH compliance practices as a covered entity in research and practice. He has assisted in the evaluation of big data solutions, performing supporting analyses in benchmark query performance. Derus supports the Center for Medicare and Medicaid's Qualified Entity Certification Program, assisting with policy research, opinion memos, and ongoing work. He also provided technical assistance in the harmonization of longitudinal database development. Most recently, Derus has led efforts to migrate data enclave sponsor data from multiple flat file structure to a relational database management system. Prior to working with NORC, Derus served as a data coordinator for a prospective longitudinal study examining the risk and resilience factors to the development of post-traumatic stress disorder. He earned his B.S. in Psychology from Loyola University of Chicago and is currently pursuing his M.S. in Biomedical Informatics at Nova Southeastern University.

## **IT Infrastructure Team - Information Systems Team**

### **Daniel Gwynne, M.B.A.**

Daniel Gwynne is proposed as lead Information Systems Technician on the Maine Data Warehouse project. Senior Systems Engineer with NORC at the University of Chicago, brings expertise in large data integration and computing architectures with a particular focus on CMS claims data; high performance computing, data management; distributed data sharing; encryption technologies; security administration and data enclave architectures. Gwynne provided technical leadership necessary to ensure the successful implementation of the Data Enclave III environment. He successfully on boarded multiple sponsors such as USDA, CMS, SCOPE, PCRI, NIS, NCSSES, FDIR, and CIS. The Data Enclave III environment is a Cloud based Software AsA Service (SAAS) solution that provides a fully featured virtualized environment to our end users. The environment is built on VMware ESXi, Citrix XenApp, Citrix XenDesktop, Juniper, and RSA technologies. Applications provided include SAS, STATA, SPSS, ArcGIS, and R. As part of the continued efforts to provide the latest in Big Data and High Performance computing, Proof of Concepts were performed of EMC Greenplum, HP Vertica, and Infobright. Technologies such as Fusion-io and Riverbed Whitewater were also evaluated to improve the performance and capabilities of the service offering. Gwynne received a Bachelor of Science in Business and E-Business as well as a Master's in Business Administration. Currently Gwynne is pursuing a PhD in Organizational Management and Information Technology Management.

### **Jeremy D. Pickreign, M.S.**

Jeremy Pickreign is proposed as the Claims Data Specialist for the Maine Health Data Warehouse project. Mr. Pickreign, Senior Research Scientist with NORC at the University of Chicago, brings over 15 years of experience as a statistician on health services research. His areas of research include claims analysis and evaluation; employer health benefits; retiree health benefits; and small group and individual insurance markets. Mr. Pickreign has been a lead statistician and programmer on several projects directing the management and analysis of several large secondary databases. He has experience using Medicare Part A and Part B claims data for the Center for Medicare and Medicaid Services (Develop and Implement Accountable Care Organization Quality Measures – 2011; Examining Medicare Spending on Care Before and After Starting Dialysis – 2008). He has constructed and analyzed TRICARE administrative claims databases (inpatient, outpatient, ancillary, and pharmacy) for the TRICARE Management Activity (Multiple System Utilization for TRICARE Beneficiaries – 2008-2012). Also for TRICARE Management Activity, Mr. Pickreign has worked with Thomson-Reuters MarketScan Commercial Claims and Encounters databases. He has directed the analysis of claims from a large private company (2011) for the Employee Benefit Research Institute. Mr. Pickreign has experience analyzing risk selection as a part of these studies, including the Heirarchical Condition Categories (HCC) risk adjustor developed for the Medicare population and the Adjusted Clinical Group (ACG) risk adjustor developed by Johns Hopkins for the privately insured population. Further, he has experience using the ACG software to calculate risk scores for TRICARE beneficiaries. Additional large datasets Mr. Pickreign has analyzed include the Medicare Current Beneficiary Survey, the Area Resource File, and the AHA Annual Survey among other databases. He is an experienced and efficient statistical programmer with close to 15 years of experience using SAS, SPSS, and SUDAAN. Mr. Pickreign has extensive statistical training and experience with various analytic techniques including: exploratory data analysis;



categorical data analysis; OLS regression; logistic regression; generalized linear modeling; principal components analysis; boot-strapping techniques; and propensity score matching techniques. He has an M.S. in Biometry and Statistics and a B.S. in Mathematics from the State University of New York University at Albany.

### **MTNA Subcontract**

#### **Pascal Heus, M.S.**

Mr. Heus is an IT specialist with over 20 years of professional experience and an internationally recognized authority on the preservation, dissemination, and management of survey microdata and official statistics. Since the late 90's, he has collaborated with international organizations, statistical agencies, data archives and research centers around the globe, fostering the adoption of standards and the development of data and metadata management tools. Pascal is a founder of the Open Data Foundation to which he continues to contribute as executive manager.

#### **J Gager**

Mr. Gager is an IT specialist with 10 years of experience, specializing in XML technologies. Jack's career began with Accenture (Andersen Consulting), where he contributed to the development efforts of xCBL for Commerce One 3.0. After permanently joining Commerce One, he contributed to xCBL 3.5 and participated in the Universal Business Language initiative on behalf of Commerce One. In 2005, Jack became involved with the SDMX and DDI standard initiatives; developing the start up tools for SDMX and serving as an external technical expert for the DDI initiatives. Since joining Metadata Technology, Jack has continued to develop tools for working with both SDMX and DDI as well as providing training and consulting services on using the SDMX and DDI standards

#### **Arofan Gregory**

Mr. Gregory has over 15 years of experience in the IT industry, firstly with automating book publishing using the SGML standard, from which XML evolved, and then with the XML standard for e-business applications. He developed and maintained major and minor versions of the XML Common Business Library (XCBL) produced by Commerce One, which was used by many leading industries worldwide for e-commerce applications. This library was given royalty free to the UBL (Universal Business Language) initiative as a starting point for the development of core (XML) components for e-business. UBL itself was born out of the ebXML initiative and is now working with UN/CEFACT to develop core business components. Arofan has played a key role in the ebXML core components group, and in the UBL naming and design rules technical committee. Over the past few years Arofan has been involved in projects focused on statistical standards such as the SDMX framework and DDI 3.0, as well as the creation of tools to provide support for them. He is also working as an external technical expert for The Data Documentation Initiative (DDI) helping to model and revise the XML schema-based standard for metadata relating to the collection, use, and archiving of raw statistical data and microdata. He has developed and given many training courses in both SGML and XML, and has presented papers at many leading XML conferences.

**Don McIntosh**

Don McIntosh has extensive knowledge and skills designing and implementing best practices for statistical information systems. He has over 15 years' local and international experience working with clients in large organizations in roles such as solution architect, product manager, software development manager, and senior software developer. In addition to his experience presenting to high level management and bridging the gap between business and technical groups he has extensive expertise in information management and software development, including: statistical systems; business intelligence; data visualization solutions; data modeling with relational databases for complex analytics; metadata solutions, including use of various standards such as SDMX, DDI and RDF; Agile (XP, Scrum); waterfall and lean techniques; software architecture principles; SOA, REST, OO design, design patterns, UML, and Software development background with many years of C++, Perl, Python and SQL.

**Training Team****Johannes Fernandes-Huessy, M.A.**

Senior Research Analyst in the Economics, Population and Labor Studies department at NORC at the University of Chicago, has several years of experience managing analytic data warehouses for academic researchers and the federal statistical community as Deputy Director of the NORC Data Enclave, a brick and mortar cloud based secure data access facility. In addition to managing sponsor relationships, supporting end users and overseeing program staff members he has focused on implementing cutting edge cloud and big data technologies to deliver efficient and innovative secure data access solutions to clients. Through his leadership role in the Data Enclave program he has broad familiarity with cloud services including data security policy, data analysis software and techniques, database administration and the support of complex virtual systems that deliver research platforms and software as a service. Fernandes-Huessy has worked on several projects with CMS including the Comparative Effectiveness Research for Medicare claims data. In conjunction with this project, he has served as the lead evaluator of big data solutions. As lead evaluator, he has coordinated benchmark queries to execution in seconds down from several hours. He has also worked on a number of substantive research projects, most prominently on a recent study of retail methamphetamine markets where he made significant contributions to the study's design and methodology. He earned his B.A. in Liberal Arts from St. John's College in Annapolis, MD and his M.A. in Political Science from American University in Washington, DC.

**Section 2.16.3 Public Consulting Group, Inc. Staff****Health Data Content Team****Jan Patterson, Esq., PMP**

Attorney Paterson has been with PCG since 2008, providing consulting services for state clients as they undertake seismic Medicaid strategic program design, development and implementation. She has led state efforts to submit the State Medicaid Health Information Technology Plans (SMHP) and implementation advance planning documents (IAPD) for implementation funding for the electronic health record incentive programs. In addition to her Medicaid strategic



planning work, she has completed statewide health information exchange strategic and operational plans for state clients through the Office of the National Coordinator (ONC). Ms. Paterson is also working with many PCG state clients as they plan their health benefit exchanges.

In addition to her strategic health information exchange and health benefit exchange planning experience, Ms. Paterson has participated in drafting RFPs and contracts for state solutions for MMIS, data warehouse and IV&V vendors. Ms. Paterson has requirements planning experience and vendor evaluation expertise. She is a certified project management professional (PMP) through the Project Management Institute and has managed projects related to quality assurance, process improvements, business process re-design and Medicaid Management Information System (MMIS) design, development, and implementation. During a previous government career, Ms. Paterson was responsible for Medicaid policy and planning in New Hampshire and was the Medicaid agency's interim director during reorganization. Part of her work included implementing significant strategic cost saving initiatives through outsourcing pharmacy services that resulted in pharmacy savings for Medicaid and provided robust fraud and abuse monitoring and recovery operations. She also directed the member and provider appeals office.

### **Jim Waldinger**

Mr. Waldinger, an Associate Manager in PCG's Boston office, focuses on health care reform, Medicaid policy, analysis and implementation. His specific areas of focus are health care reform and its impact on the Medicaid program and the behavioral health system. Prior to joining PCG, Mr. Waldinger served as the CFO and Budget Director for the Massachusetts Medicaid program, MassHealth, and more recently as the CFO for the Massachusetts Behavioral Health Partnership, which managed the behavioral health needs of >300,000 Medicaid members. While at MassHealth, Mr. Waldinger focused on calculating and tracking hospital payment mechanisms, including Upper Payment Limit (UPL), Disproportionate Share Hospital (DSH), and other supplemental payments. Mr. Waldinger also served as MassHealth's lead finance analyst during the creation of Massachusetts's landmark Health Care Reform legislation. He created the financial documents used in submission of Health Care Reform 1115 waiver to the Centers for Medicare and Medicaid Services (CMS). As CFO for the Massachusetts Behavioral Health Partnership (MBHP) – the state's behavioral health carve-out vendor – Mr. Waldinger re-vamped the organization's cost projection methodologies and calculated and implemented aggressive inpatient pay-for-performance measures.

Since joining PCG, Mr. Waldinger has served as a Project Manager and subject matter expert for various health care reform, rate-setting, revenue enhancement, cost containment, program design, and auditing projects. Of note, Mr. Waldinger has led PCG's health care reform efforts in North Carolina, working with the Medicaid agency to implement the numerous Affordable Care Act (ACA) provisions. He has led PCG's health homes efforts, assisting in the identification of high-cost utilizers and discussions about various intervention activities. Mr. Waldinger also manages PCG's customer service center contracts in Maine.

Mr. Waldinger received his Bachelor of Arts in Communications from the University of Connecticut and completed a Master's Degree in Public Administration (MPA) at Northeastern University in Boston.

**Bob Petrovitz**

Mr. Petrovitz has been part of the PCG team since 2004 and has managed several technical projects since joining the firm. Most recently, Mr. Petrovitz served in the capacity of Technical Architect for the BOSS Medicaid claim and eligibility data warehouse project. This in-house effort was a “from scratch” design and development project that included data modeling and ETL processes that supported a multi-state implementation.

Mr. Petrovitz previously served in the capacity of Data Conversion Manager for Maine’s MMIS system replacement. His experiences with other large system implementations made him uniquely qualified to lead that effort. Mr. Petrovitz was responsible for planning the work effort and managing the technical team in all aspects of data conversion and system interface construction. Additionally, he worked with the customer and their IV&V vendor regarding project status, as well as, risk and mitigation planning.

Mr. Petrovitz was also responsible for leading EdSmart during their transition period in 2006 as a newly acquired PCG division. He was responsible for bringing new technology and processes into the division and meeting challenging deadlines in order to successfully meet customer needs. Other projects that Mr. Petrovitz has been involved with were NH Special Education upgrade to PCG’s EasyIEP; PM/technical lead in design and development of a Data Warehouse for NH Bureau of Behavioral Health; Technical Lead and Architect for PCG’s project management suite and accounting system integration.

Mr. Petrovitz served as the Interface Architect for Maine’s ACES project during the period 2000-2003 and became very familiar with Medicaid/Medicare and many Federal interfaces between CMS and SSA systems.

A Bachelor of Science degree was granted to Mr. Petrovitz by the University of Maine with the Honor of Summa Cum Laude.

**Ivy W. Sims**

Ivy Sims, business analyst at PCG, she has experience working with Health Care Reform and Medicaid related projects. Currently, she is working on a variety of projects including: researching and writing reports on the Arkansas Navigator Program; interviewing and writing reports on the impact of ACA on the North Carolina Department of Health and Human Services (NCDHHS) customer service systems; interviewing and writing a report to resolve complaints and appeals to capture the processes used throughout NCDHHS, to Classify and map major categories of complaint/appeals handling/resolution among other projects.

Prior to joining PCG, she worked with the Department of Mental Health for eight years to develop and implement Individualized Action Plans, Individualized Service Plans, and other assessments to engage individuals in exploring their awareness and commitment to change. Ms. Sims also provided crisis intervention and supportive counseling to assist individuals in meeting their goals.

Ms. Ivy Sims received her Bachelor of Arts degree and her Master’s Degree in business Administration (MBA) at Clark University.

## **Section 2.17      Documentation**

NORC produces detailed technical documentation of all systems and processes related to the NORC Data Enclave. Because each solution is customized to meet the needs of our partners, documentation may vary between solutions. Sections may include Logon and Authentication, Server Infrastructure, Network Environment, Enterprise Storage, Thin Clients, and Hosted Applications.

### **Section 2.17.1      Technical Documentation**

Appendix C contains an overview of the latest version of the environment during the first production deployment in September, 2011 as well as documentation for vDesktop maintenance within the Data Enclave. Appendix C is customized to the specifications of one of our clients. Our infrastructure of virtualization allows for rapid deployment of applications to meet the demands of our partnering organizations.

### **Section 2.17.2      Training Guides**

Similar to our technical documentation, our user training guides are customized to meet the desired state the deployed environment. Appendix D contains an example of a user guide used for Logon and Authentication. While traditional websites require a username and password, our documentation guides them through the process using screenshots in conjunction with instructions provided through the access portal. Many of our training resources have been converted to online video training complete with quiz modules to record understanding. Appendix E is a user guide developed for a computerized budget simulation and resource allocation model developed by HSRI. It provides users with detailed instructions on the use of this custom developed software.

## Section 3.0 Cost Proposal

**State of Maine  
Maine Health Data Organization  
COST PROPOSAL FORM  
RFP #201207352  
Health Data Warehouse**

Note: The cost proposal must be quoted on the bidder's total all inclusive maximum cost for the scope of work described in the request for proposal. For example all licensing and support costs must be included in the total all inclusive maximum price.

Bidder's Organization Name: Human Services Research Institute (HSRI)

Phase	Contract Period	Description	Cost Proposal
1	October 1, 2012-June 30, 2014		\$3,496,082
2	July 1, 2014-June 30, 2015	Refer to Part 2 for Scope of Services	\$2,170,908
3	July 1, 2015-June 30, 2016		\$2,217,887
4	July 1, 2016-June 30, 2017		\$535,693
5	July 1, 2017-June 30, 2018		\$548,178
6	July 1, 2018-June 30, 2019		Operations
7	July 1, 2019-June 30, 2020	Operations	\$574,394
8	July 1, 2020-June 30, 2021	Operations	\$588,157
9	July 1, 2021-June 30, 2022	Operations	\$602,377
<b>Total Cost</b>			<b>\$11,347,514</b>

This total includes \$786,335 in infrastructure and licensing costs as detailed below.

Phase 1	\$173,335
Phase 2	\$71,000
Phase 3	\$71,000
Phase 4	\$71,000
Phase 5	\$71,000
Phase 6	\$116,000
Phase 7	\$71,000
Phase 8	\$71,000
Phase 9	\$71,000
<b>Total</b>	<b>\$786,335</b>

State of Maine RFP # 201207352

## Section 4.0 Economic Impact within the State of Maine

Human Services Research Institute will be providing full-time employment to one Maine resident through the Health Data Warehouse project. This will yield approximately \$442,850 over the life of the contract.

The Public Consulting Group has had a substantial economic impact on the State of Maine over several years. The following describes this impact.

- Since 2004, PCG has spent over \$10 million on its Maine project expenses.
- Using data from the Maine-based Institute for Local Self-Reliance, that spending has generated an additional \$4.2 million in secondary spending since 2004.
- Currently PCG employs 35 Maine residents as full-time staff who realized \$1,226,723.46 in gross earnings in FY11, generating \$61,993.19 in state tax revenue.
- In FY2012 alone, PCG has spent approximately \$1 million on a Maine-based staffing agency and paid \$136,800 in rent on its Augusta office location.

## Appendices

- Appendix A: Certificate of Insurance
- Appendix B: Resumes
- Appendix C: Data Enclave III Environment Overview
- Appendix D: Accessing the NORC Data Enclave (v 3.0)
- Appendix E: Mental Health Jail Diversion Resource Allocation Program (JDRAP)



# CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)  
**08/16/12**

**THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.**

**IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).**

PRODUCER <b>Dwight Rudd &amp; Company, Inc.</b> 170 Milk Street Boston, MA 02109 Philip L. Ladd	617-542-1915 617-542-8501	CONTACT NAME: <b>Mabelyn Lopez</b> PHONE (A/C, No, Ext): <b>617-912-4904</b> E-MAIL ADDRESS: <b>mlopez@dwightrudd.com</b> PRODUCER CUSTOMER ID #: <b>HUMAN-1</b> FAX (A/C, No): <b>617-542-6734</b>														
INSURED <b>Human Services Research Inst.</b> <b>Anna Edwards</b> <b>2336 Massachusetts Avenue</b> <b>Cambridge, MA 02140</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;">INSURER(S) AFFORDING COVERAGE</th> <th style="width: 20%;">NAIC #</th> </tr> </thead> <tbody> <tr> <td>INSURER A : <b>Philadelphia Insurance Co</b></td> <td></td> </tr> <tr> <td>INSURER B : <b>Travelers Property Casualty</b></td> <td></td> </tr> <tr> <td>INSURER C :</td> <td></td> </tr> <tr> <td>INSURER D :</td> <td></td> </tr> <tr> <td>INSURER E :</td> <td></td> </tr> <tr> <td>INSURER F :</td> <td></td> </tr> </tbody> </table>		INSURER(S) AFFORDING COVERAGE	NAIC #	INSURER A : <b>Philadelphia Insurance Co</b>		INSURER B : <b>Travelers Property Casualty</b>		INSURER C :		INSURER D :		INSURER E :		INSURER F :	
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**COVERAGES    CERTIFICATE NUMBER:    REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	<b>GENERAL LIABILITY</b>			PHPK762563	09/30/11	09/30/12	EACH OCCURRENCE \$ <b>2,000,000</b>	
	<input checked="checked" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="checked" type="checkbox"/> OCCUR  GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="checked" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC						DAMAGE TO RENTED PREMISES (Ea occurrence) \$ <b>100,000</b>	
A	<b>AUTOMOBILE LIABILITY</b>			PHPK762563	09/30/11	09/30/12	COMBINED SINGLE LIMIT (Ea accident) \$ <b>1,000,000</b>	
							<input type="checkbox"/> ANY AUTO	BODILY INJURY (Per person) \$
							<input type="checkbox"/> ALL OWNED AUTOS	BODILY INJURY (Per accident) \$
							<input type="checkbox"/> SCHEDULED AUTOS	PROPERTY DAMAGE (Per accident) \$
A	<input checked="checked" type="checkbox"/> HIRED AUTOS			PHPK762563	09/30/11	09/30/12	\$	
A	<input checked="checked" type="checkbox"/> NON-OWNED AUTOS			PHPK762563	09/30/11	09/30/12	\$	
A	<b>UMBRELLA LIAB</b> <input checked="checked" type="checkbox"/> OCCUR			PHUB356684	09/30/11	09/30/12	EACH OCCURRENCE \$ <b>1,000,000</b>	
	<b>EXCESS LIAB</b> <input type="checkbox"/> CLAIMS-MADE						AGGREGATE \$ <b>1,000,000</b>	
B	<b>WORKERS COMPENSATION AND EMPLOYERS' LIABILITY</b> ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below		Y / N <input type="checkbox"/> N / A	INUB6865L80410	11/19/11	11/19/12	<input type="checkbox"/> WC STATUTORY LIMITS <input checked="checked" type="checkbox"/> OTHER	
							E.L. EACH ACCIDENT \$ <b>500,000</b>	
							E.L. DISEASE - EA EMPLOYEE \$ <b>500,000</b>	
A	<b>Professional Liab</b>			PHPK762563	09/30/11	09/30/12	<b>Aggregate</b> 4,000,000 <b>Indicent</b> 2,000,000	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER	CANCELLATION
<b>State of Maine</b> <b>Division of Purchases</b> <b>Burton M. Cross Bldg, 4th FL</b> <b>111 Sewall St 9 State House St</b> <b>Augusta, ME 04333-0009</b>	<p>SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.</p> <p>AUTHORIZED REPRESENTATIVE</p>



## DAVID HUGHES, Ph.D.

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### *Vice President*

#### **Education**

2011	Ph.D.	Brandeis University Heller School of Social Policy and Management, Waltham, MA (Social Policy)
2004	M.A.	Brandeis University Heller School of Social Policy and Management, Waltham, MA (Social Policy)
1997	M.A.	University of Massachusetts Boston, Boston, MA (Applied Sociology)
1992	B.A.	Trent University, Peterborough, ON, Canada (Honors Sociology)
1991	B.A.	Trent University, Peterborough, ON, Canada (Sociology/Psychology)

#### **Selected Project Experience**

**California Health Reform Initiative, Project Director (2011-Present).** This is an ongoing study to examine how the health reform initiative will impact the behavioral health system in California. HSRI partnered with the Technical Assistance Collaborative in developing decision-support in forecasting the costs and service utilization the state will experience as health reform takes shape. Administrative claims and eligibility data from CMS and the State Mental Health (DMH) and Substance Use (ADP) agency over a 5 year period are being examined to identify trends. Techniques such as synthetic estimation are also being employed to link national large scale databases to state data to examine trends at the county level as well as the overall state level.

**Mental Health System Redesign in Milwaukee County, Project Director (2009-2011).** The Milwaukee County Mental Health System Redesign project addresses systemic issues involving access and service delivery within the adult mental health system and it is a combination of working closely with stakeholders in Milwaukee to understand the system relationally, as well as using the HSRI system planning simulation model which has been used in 25 states to forecast dynamically the impact of delivering different service options. As project director, Dr. Hughes convened all stakeholders, including county administrators, Medicaid representatives and consumer and provider groups to develop a rigorous redesign plan. He also supervised all IRB submission and developed data security and confidentiality plan. Dr. Hughes also supervised the database layout and oversaw the implementation of the service planning and evaluation survey. He was the primary person responsible for drafting all reports.

**Study of the Cost Efficiency of the Mental Health Block Grant Program, Project Director (2008-2010).** This project is funded by the Substance Abuse and Mental Health Services Administration (SAMHSA) to study the cost-efficiency of implementing evidence-based practices in three states (AZ, OR, WV). As the co-Project Director, Dr. Hughes coordinated all efforts at data collection, including development of data layout plan for administrative data and all pertinent cross-walk designs. He also directed efforts at integrating SAMHSA URS (Uniform Reporting System) and NOM measures into the data analytic design and oversee all response to requests by senior SAMHSA Block Grant program staff.

**Louisiana Permanent Supported Housing Evaluation, Project Director (2008-2011).** HSRI received a contract to evaluate permanent supported housing programs based in Louisiana. As project Director, Dr. Hughes designed the evaluation component, engaged all stakeholders, and supervised data collection

efforts, including data already collected at the state level. Dr. Hughes also developed a management plan for multisite database, including data security and confidentiality and prepared site specific IRB submission. He also directed efforts at responding to a variety of requests for information with quick turn around time on issues surrounding housing and homelessness.

**Mental Health Jail Diversion Resource Allocation and Planning Model, Developer (2006-2009).**

This project was funded by SAMHSA to develop a computerized budget simulation and resource allocation model for projecting the costs and potential cost offsets of implementing jail or prison diversion programs for offenders with mental illness. Dr. Hughes oversaw all relevant aspect of model implementation, including convening expert panels that included consumers as well as providers and administrators and federal SAMHSA policymakers and drafting data collection plan. He also supervised all analysis involving the model and designed several implementation targeting at trauma-informed care for mental health consumers involved in the criminal justice system.

**Coordinating Center for Managed Care and Vulnerable Populations Project, Project Director (1997-2004).**

This SAMHSA-funded project facilitated common data collection approaches and analyses across 21 managed care evaluation Studies. HSRI oversaw the development of a multisite dataset and managed all aspects of data collection from documentation to ensuring timeliness of data submission. HSRI conducted multivariate statistical analyses and qualitative data documenting the nature of managed care provided by each site.

**Bibliography**

- Hughes, D., Steadman, H., Case, B., Griffin, P., & Leff, H.S. A Simulation Modeling Approach for Planning and Costing Jail Diversion Programs for Persons With Mental Illness (2012). *Criminal Justice and Behavior*, 39(4), 434-446.
- Hughes D., Mulkern V., & Witham S. (2010). Medicaid Managed Care for Adolescent Substance Abuse Treatment Clients. In: McFarland, B.H., McCarty, D., & Kovas, A.E. (Eds.), *Medicaid and Treatment for People with Substance Abuse Problems*. Hauppauge NY: Nova Science Publishers, Inc.
- Leff, H.S., Hughes, D.R., Chow, C.M., Noyes, S., & Ostrow, L. "A Mental Health Allocation and Planning Simulation: A Mental Health Planner's Perspective." In *Handbook for Healthcare Delivery Systems*. Edited by Y. Yih. In press.
- Hughes, D.R. *Forensic Diversion and Diversion Simulation Model: Chester County, PA*. Human Services Research Institute, Cambridge, MA, 2004.
- Hughes, D.R. *Evaluation Report for the Forensic Access to Community Services (FACS) Program: Boston, MA*. Human Services Research Institute, Cambridge, MA, 2004.
- Leff, H.S., Hughes, D.R., & Chow, .C.A. *CMHS Decision Support Simulation Pilot Cost-Efficiency Study*. Human Services Research Institute, Cambridge, MA, 2007.
- Leff, H.S., Hughes, D., Fisher, W., & Warren, R. Consumer comparisons of hospital and community care resulting from Department of Mental Health facility consolidation: Results of a follow-up of Danvers State Hospital consumers transferred to Tewksbury State Hospital. *Proceedings of the Fourth Annual Conference on State Mental Health Agency Services Research* (pp. 22-23.). Alexandria: National Association of State Mental Health Program Directors Research Institute, 1993.
- Hughes, D. (editor) *Evaluating Models of Medicaid Managed Mental Health Care: Program Evaluations and Evaluation Materials from States*. The Evaluation Center@Human Services Research Institute, 1995.

- Hughes, D.R. and Leff, H.S. Getting Started: Implementation of the Special Care Initiative. Human Services Research Institute, Cambridge MA, 1995.
- Hughes, D.R. and Leff, H.S. Enrollment Patterns in the Special Care Initiative. Human Services Research Institute, Cambridge MA, 1995.
- Hughes, D.R. and Leff, H.S. Analyzing the Validity and Reliability of Cost Data in the Special Care Initiative. Human Services Research Institute, Cambridge MA, 1996.
- Hughes, D.R. and Leff, H.S. Savings to the State for the Special Care Initiative. Human Services Research Institute, Cambridge MA, 1996.



## LEANNE CANDURA, M.P.H.

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### *Assistant Project Director*

#### **Education**

- |      |      |   |
|------|------|---|
| 2008 | MPH  | University of Massachusetts at Amherst, Northampton, MA |
| 2001 | B.A. | Stonehill College, Easton, MA (Sociology)               |

#### **Professional Positions**

- |              |   |
|--------------|---|
| 2010-Present | Assistant Project Director, Human Services Research Institute, Cambridge, MA                                    |
| 2007-2010    | Project Manager, Human Services Research Institute, Cambridge, MA   |
| 2006-2007    | Research Analyst, Human Services Research Institute, Cambridge, MA  |
| 2003-2006    | Research Assistant, OMNI Research and Training, Denver, CO  |
| 2001-2003    | Researcher, United Way of Larimer County/Larimer County Department of Health & Human Services, Fort Collins, CO |

#### **Selected Project Experience and Previous Employment**

**SAMHSA-CSAP Data Analysis Coordination and Consolidation Center (DACCC), Assistant Project Director (2010-Present), Project Manager (2007-2010).** The DACCC is designed to provide a centralized, comprehensive and coordinated data and analytic resource (for process, capacity, outcome and trend data at all levels of analysis including individual, project, community, state and national) for accountability, program planning, and policy decisions for CSAP. The DACCC also supports CSAP program staff in their planning processes, implementation and oversight of sponsored programs, and in the provision of guidance to grantees and to the field. The role of assistant project director involves all aspects of DACCC activities to ensure that procedures and timelines are being developed and followed, deliverables are being met and tailored to specified audience, subcontractor work is coordinated, stakeholders are being included in project work, and budgets are followed.

**Human Services Research Institute, Cambridge, MA, Research Analyst (2006-2007).** Responsible for conducting analysis and report writing for the Data Consolidation and Coordination Center (DCCC) for SAMHSA's Center for Substance Abuse Prevention (CSAP).

**OMNI Research and Training, Denver, CO, Research Assistant III (2003-2006).** Responsible for designing and managing continuing development, including data quality protocol, of innovative ASPIRE Database (Assessment of Prevention Indicators and Resources) which brings together data on hundreds of social indicators and prevention resource information from thousands of agencies which is used by policy makers, foundations, and state and local governments to help direct funding decisions and tailoring to support Colorado's SPF SIG process; helped produce Colorado's comprehensive Healthy People 2010 report; coordinated Colorado's Youth Risk Behavior Survey effort and helping inform data analysis and reporting; led over forty local communities in surveying over 30,000 Colorado middle school and high school students to determine health behaviors and creating report from data collected and training community leaders on how to use this data to understand local substance use rates and for prevention planning; conducting qualitative and quantitative analysis using multiple software analysis tools; participated in numerous literature searches and reviews; produced evaluation reports which included written and graphical data presentations; Managed teams of up to five co-workers and

directly supervising the professional development of two staff members; developing scopes of work; and managed budgets and timelines for small and large projects. Additionally, served as Vice President of the Omni Institute – the non-profit arm of OMNI Research and Training whose mission is to provide pro-bono services to enhance and improve the research capacity of programs and communities.

**United Way of Larimer County/Larimer County Department of Health & Human Services**, Fort Collins, CO., **Researcher** (2002-2003). Responsible for assisting in the development of a quality of life index using statistical analysis software to assess the level of community need and informing responsive grantmaking and resource allocation; co-authoring research article about index published in peer reviewed journal; developing specialized reports using social indicator data tailored for varied audiences; and collecting, analyzing and organizing social indicator data from a variety of local, state and national sources for the Compass Website.

**United Way of Larimer County/Larimer County Department of Health & Human Services**, Fort Collins, CO., **AmeriCorps VISTA/Researcher** (2001-2002). Responsible for maintaining Compass of Larimer County, a comprehensive, online resource database which featured key social indicators to support the work of county government and social service agencies.

## **Bibliography**

### **Publications**

Bobbitt, L., Green, S., Candura, L., & Morgan, G.A. (2005). The Development of a County Level Index of Well-Being. *Social Indicators Research*, 73(1), 19 – 42.

### **Technical Reports**

Co-Author: Accountability Report, Volume V: FY 2006, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2007.

Co-Author: Accountability Report, Volume IV: FY 2005, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2006.

Co-Author: Trends and Directions in Substance Abuse Prevention, Volume V: 2002-2005, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2007.

Co-Author: Trends and Directions in Substance Abuse Prevention, Volume IV: 2002-2004, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2006.

Co-Author: National Outcome Measures: State-Level Trends, Volume I: 2002-2005. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2007.

## KATE MULLINS

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### *Project Manager*

#### **Education**

2014 (Expected) M.P.A. Northeastern University, Boston, MA  
2005 B.A. Northeastern University, Boston, MA (Psychology)

#### **Professional Positions**

2011-Present Project Manager, Human Services Research Institute, Cambridge, MA  
2009-2011 Assistant Project Manager, Human Services Research Institute, Cambridge, MA  
2008-2009 Project Assistant, Human Services Research Institute, Cambridge, MA  
2005-2008 Administrative and Publications Assistant, Berklee College of Music, Office of the Registrar, Boston, MA

#### **Selected Project Experience**

**SAMHSA-CSAP Data Analysis Coordination and Consolidation Center (DACCC), Project Manager (2011-Present), Assistant Project Manager (2009 - 2011), Project Assistant (2008-2009).** Responsible for planning, executing, and finalizing complex project activities to ensure that goals and objectives are completed within prescribed time frames, staffing requirements, and funding parameters. Duties include: coordinating the development of administrative reports across teams; planning for both internal and external management meetings; maintaining project Standard Operating Procedures (SOPs); triaging requests to appropriate team members; and providing support to project team.

#### **Previous Employment**

**Berklee College of Music, Office of the Registrar, Administrative and Publications Assistant (2005-2008).** Responsible for providing administrative support for the Registrar (and the Office of the Registrar Leadership Team) while maintaining office forms, supplies, and publications. Assisted the Registrar in budget management, policy research, and ad hoc assignments. Provided backup to the office's front-line operation. Maintained college wide Master Calendar.

## KEVIN ROGERS

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### *Senior Research Associate/Application Developer*

#### **Education**

1992            A.A.            Regent's College, State University of New York, Albany, NY (Liberal Arts)

#### **Selected Professional Positions**

2007-Present    Senior Research Associate/Application Developer, Human Services Research Institute, Cambridge, MA

2006-2011      Consultant, Data Integration Group, Madison, MS

2005-2011      Consultant, Rothenbach Research and Consulting, Northampton, MA

2006-2009      Consultant, Analytica Group, New York, NY

2001-2005      Prevention Science Application Developer, Channing Bete Company, South Deerfield, MA

2000- 2001      Web/News Producer, WGGB-TV, Springfield, MA

1999-2000      Consultant, Tobin Systems, Springfield, MA

1996-1999      Advisory Systems Analyst, Phoenix Home Life, Enfield, CT

1990-1996      Technical Coordinator, Phoenix Home Life, Enfield, CT

#### **Selected Project Experience**

**SAMHSA–CSAP Data Analysis Coordination and Consolidation Center (DACCC), Senior Research Associate/Application Developer (2007-Present).** Leads the analytic workgroups that created the annual *Trends and Directions in Substance Abuse Prevention* and *State Package* reports. Developed report automation code and procedures for the annual *State NOMs* and *Accountability Reports*. Created tools to assist in the automated creation of maps, graphs, scattergrams, and tables for a variety of DACCC products. Developed, maintained, and provided training for a variety of applications to support the team's analytic and reporting needs. Act as the technical liaison to CSAP's Data Information Technology Infrastructure Contract (DITIC) providing analyses of user requirements and creating detailed specifications for online data entry systems; worked to create and conduct joint trainings for end users. Worked with DITIC personnel to create specifications for revisions to the Web Analytic Tool (WAT). Led the effort to convert numerous table and graph heavy reports to 508-compliant formats, including the creation of HTML e-kits for all major deliverables.

**Survey Research Group, Channing Bete Company, Prevention Science Application Developer (2001-2005).** Developed application and database code for high-volume survey scanning and reporting operation. Worked with research team to create sampling and weighting schemes for a number of state-level youth surveys. Created automated report production tools for the Communities That Care Youth Survey. Worked with team to create a weighted national database of survey results for norming purposes. Worked with Operations Department to gather and report on a wide variety of time study data.

**SmartTrack, Data Integration Group, Consultant (2006-2011).** Took over development and maintenance of web-based online survey and reporting tool. Developed user interface and backend



database code to support a variety of high-volume state survey efforts. Created custom reporting applications. Oversaw the processing and loading of scanned paper survey results to the online system.

**Pennsylvania Youth Survey/ Florida Youth Substance Abuse Survey, Rothenbach Research and Consulting, Consultant (2005-2011).** Developed data processing and automated reported production software to facilitate the production of school, district and county-level reports from state-level datasets.

## **Bibliography**

### **Publications**

- Co-Author: National Outcome Measures: State-Level Trends, Volume V: 2002-2009. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2011.
- Co-Author: Trends and Directions in Substance Abuse Prevention, Volume VIII: 2002-2009, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2011.
- Co-Author: Accountability Report, Volume VIII: FY 2009, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2010.
- Co-Author: Trends and Directions in Substance Abuse Prevention, Volume VII: 2002-2008, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2010.
- Co-Author: Accountability Report, Volume VII: FY 2008, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2009.
- Co-Author: National Outcome Measures: State-Level Trends, Volume III: 2002-2007. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2009.
- Co-Author: Accountability Report, Volume VI: FY 2007, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2008.
- Co-Author: National Outcome Measures: State-Level Trends, Volume II: 2002-2006. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2008.
- Co-Author: Trends and Directions in Substance Abuse Prevention, Volume V: 2002-2006, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2008.

### **Presentations**

- Rogers, K. HIV Cohort 6: Data Processing and Preliminary Analysis Results, presented at the Minority HIV/AIDS Initiative Grantee Technical Assistance (TA) Meeting (Cohort 6) , Ft. Lauderdale, FL, September 2009.
- Rogers, K., Isvan, N. & Bailey, D. Predicting Participant Retention in Direct Service Prevention Programs: The Case of CSAP's Methamphetamine Prevention Grant Initiative, presented at the annual meeting of the Society for Prevention Research, Washington DC, May 2009.
- Rogers, K. Methamphetamine Cohort 3: Data Processing and Preliminary Analysis Results, presented at the Methamphetamine Prevention Program Cohort 3 Grantee Meeting, Austin, TX, July 2008.

## STEVEN NOYES, M.A., M.S.

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### *Software Architect*

#### **Education**

2002	M.S.	Boston University, Boston, MA (Computer Science)
1997	M.A.	University of Pennsylvania, Philadelphia, PA (Germanic Languages and Literatures)
1995	B.A.	University of Pennsylvania, Philadelphia, PA (German and Japanese)

#### **Professional Positions**

2003-Present	Software Architect, Human Services Research Institute, Cambridge, MA
2002-2003	Consultant/Contractor, Join Together, Boston, MA
2000-2001	Senior Software Engineer, Sodalis Technologies, Cambridge, MA
1998-2000	Senior Programmer, Massachusetts Behavioral Health Partnership, Boston, MA
1996-1998	Programmer, Corporate Technology Ventures, Philadelphia, PA

#### **Selected Project Experience**

**National Core Indicators (NCI), Software Architect (2008-Present).** NCI is a partnership between HSRI and the National Association of State Directors of Developmental Disabilities Services. This collaboration enables the over 30 participating states to create performance monitoring systems, identify common performance indicators, work out comparable data collection strategies, and share results. Mr. Noyes developed a web-based survey engine called ODESA which is used by the states to collect consumer and family performance indicator data.

**Quality Assessment Services: Implementing Surveys of People with Developmental Disabilities and Family Members in California, Software Architect (2009-Present).** The California Department of Developmental Disabilities Services began participating in the National Core Indicators project. Mr. Noyes developed a custom implementation of HSRI's web-based survey engine (ODESA) along with a tailored management platform for surveyors and regional coordinators.

**SAMHSA-CMHS Mental Health Transformation State Incentive Grant (MHT SIG) Evaluation, Web/Database Manager (2005-2010).** Mr. Noyes was the chief database programmer of the Transformation Tracker system, a web-based application that integrates project management and evaluation specifically designed for on-time monitoring of activities involved in mental health system transformation. He designed the 508-compliant website (both internal and public version) and was responsible for all activities recorded on Transformation Manager. He worked closely with analysts to ensure that data collected electronically were secure and met all aspects of SAMHSA requirements.

**Study of the Cost Efficiency of the Mental Health Block Grant Program, Software Architect/Data Analyst (2008-2009).** Mr. Noyes worked with the states in receiving high volume data through a secure FTP format and manages the data storage on site. He also conducted data management tasks in preparation for data analysis including the creation of a tool for performing data aggregation on extremely large Medicaid datasets with hundreds of millions of claims records.

**Ohio Transformation Manager, Software Architect (2006-Present).** Mr. Noyes created and provides ongoing support for a web-based project management application called Transformation Manager which was tailored specifically for mental health system transformation efforts in Ohio.

**The Evaluation Center@HSRI, Web Architect (2006-2008).** The mission of the Evaluation Center@HSRI was to provide technical assistance in the area of evaluation to States and nonprofit public entities within the States for improving the planning, development, and operation of adult mental health services carried out as part of the Community Mental Health Services Block Grant program. Mr. Noyes was responsible for website design and development as well as ongoing content management and functional updates.

## RACHEL FINK

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### *Software Developer*

#### **Education**

1979            B.A.            Oberlin College, Oberlin, OH (Psychology)

#### **Professional Positions**

2010-Present    Software Developer, Human Services Research Institute, Cambridge, MA

2007-2010      Contract Web and Database Developer, Self-employed

2000-2007      Programmer/Analyst, New England Research Institutes, Watertown, MA

1998-2000      Programmer/Analyst, Tufts Graduate School of Arts and Sciences, Medford, MA

#### **Selected Project Experience**

**Quality Assessment Services: Implementing Surveys of People with Developmental Disabilities and Family Members in California, Software Developer (2010-Present).** The California Department of Developmental Disabilities Services began participating in 2010 in the National Core Indicators survey. DDS has contracted with HSRI to help manage the implementation of the survey process. Ms. Fink helped develop both the data collection system and the administrative management module, and provides ongoing support to this project.

**Evaluation of Ohio's Title IV-E Waiver, Software Developer (2010-Present).** The evaluation of Ohio's Title IV-E Waiver examines the impact of child welfare system reforms in 18 demonstration and 17 comparison counties. The intent of the Waiver is to provide child welfare agencies with financial flexibility to enable them to modify their agency practice, with a focus on keeping children out of placement and thus reducing child welfare expenditures and improving outcomes for children and families.

**Evaluation of Ohio's Differential Response Research and Demonstration, Software Developer (2010-Present).** HSRI is conducting a three-year evaluation of the Differential Response (DR) Initiative in Ohio, a best-practices approach to serving families reported for child abuse or neglect. DR provides an alternative to the traditional child welfare investigative approach, rather offering families a more critical role in assuring the safety and well-being of their children. Ohio is one of three states implementing a DR model and the Children's Bureau is funding a cross-site QIC evaluation of the three sites to contribute to the scientific evidence of the effectiveness of this approach.

**Evaluation of Enhanced Kinship Navigator in Ohio, Software Developer (2010-Present).** HSRI is conducting an evaluation of the Enhanced Kinship Navigator Project, a demonstration project involving seven counties and led by the Public Children Services Association of Ohio. The Kinship Navigator project is focused on systems level improvements, increased outreach, and enhancement of services and supports, all targeted at better supporting kinship caregivers. The Kinship Navigator evaluation strives to further the evidence base for kinship care supports and includes a control group design and analyses at the systems, implementation/outputs, and outcomes levels.

**SAMHSA-CMHS Mental Health Transformation State Incentive Grant Evaluation, Software Developer (2010-Present).** HSRI received a subcontract through MANILA Consulting to evaluate the overall effectiveness of the SAMSHA-funded Mental Health Transformation State Infrastructure Grant (MHT SIG) program. The objectives of the cross-site evaluation center around determining the extent to

which the mental health systems have become recovery focused, how these transformations impact mental health consumer recovery, how the transformations result in changes in client outcomes (measured using SAMHSA's NOMs), and to identify factors that contribute to successful transformation of the systems and difficulties encountered along the way.

## UNDA IOANA CRISAN, M.A.

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### *Senior Research Analyst*

#### **Education**

- |      |      |  |
|------|------|--|
| 2006 | M.A. | University of Massachusetts Lowell, MA (Community Social Psychology) |
| 2002 | B.A. | West University, Timisoara, Romania (Psychology)                     |

#### **Professional Positions**

- |              |  |
|--------------|--|
| 2010-Present | Senior Research Analyst, Human Services Research Institute, Cambridge, MA  |
| 2007-2010    | Research Analyst, Human Services Research Institute, Cambridge, MA   |
| 2006-2007    | Research Assistant, Human Services Research Institute, Cambridge, MA   |
| 2004-2006    | Project and Research Assistant, Promoting Healthy and Safe Employment in Healthcare (PHASE) Project, UMass Lowell, MA    |
| 2005         | Lead Facilitator and Technical Writer, Career Center of Lowell and Greater Lowell Workforce Investment Board, Lowell, MA |
| 2003-2005    | Teaching and Research Assistant, Psychology Department, UMass Lowell, MA   |
| 2004         | Program Evaluation Intern, Cambodian Community Health 2010, Center for Family, Work and Community, UMass Lowell, MA      |

#### **Selected Project Experience**

**SAMHSA–CSAP Data Analysis Coordination and Consolidation Center (DACCC), Senior Research Analyst/ Research Analyst/ Research Assistant (2006-Present).** Awarded in 2007, the DACCC is designed to support managers in SAMHSA’s Center for Substance Abuse Prevention (CSAP) in their planning processes, implementation and oversight of sponsored programs, and in the provision of guidance to grantees and to the field. The DACCC promotes efficiency and effectiveness in data collection, analysis and reporting, thus resulting in increased accountability and availability of data for CSAP and the substance use prevention field. Ms. Crisan’s role includes data assessment, data analysis, and technical report development.

#### **Bibliography**

##### **Technical Reports**

- Co-Author: Prevention of Methamphetamine Abuse Cohort 3 Report, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2011.
- Co-Author: Accountability Report, Volume IX: FY 2010, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2011.
- Co-Author: National Outcome Measures: State-Level Trends, Volume V: 2002-2009. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2011.
- Co-Author: Accountability Report, Volume VIII: FY 2009, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2010.
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Co-Author: Trends and Directions in Substance Abuse Prevention, Volume V: 2002-2006, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2008.

### **Presentations**

Crisan, U. Place Attachment Characteristics Among Foreign-Born Residents of Lowell, MA. Master thesis research presented at Spring Research Colloquium Series, Psychology Department, University of Massachusetts Lowell, March 22, 2006.

Coppens, N., and Crisan, U. Factors Related to the Use of the Campus Recreation Center. Research presented at Spring Research Colloquium Series, Psychology Department, University of Massachusetts Lowell, May 2, 2005.



## KRISTIN BATTIS

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### *Research Analyst*

#### **Education**

2008            B.A.            Northeastern University, Boston, MA (Sociology)

#### **Professional Positions**

2011-Present    Research Analyst II, Human Services Research Institute, Cambridge, MA

2009-2011      Research Analyst I, Human Services Research Institute, Cambridge, MA

2008-2009      Research Assistant, Human Services Research Institute, Cambridge, MA

2007            Clinical Research Assistant, Massachusetts General Hospital Pediatric Psychopharmacology Unit, Cambridge, MA

2006            Residential Counselor, North Suffolk Mental Health Association, Chelsea, MA

#### **Selected Project Experience**

**SAMHSA-CSAP Data Analysis Coordination and Consolidation Center (DACCC), Research Analyst (2009-Present).** Responsibilities include performing data quality assessments and quantitatively analyzing substance abuse prevention program data in SPSS, Access databases, and Excel workbooks; reporting and interpreting findings in analytic reports, state packages, one page reports, and ad hoc reports; calculating program performance statistics for GPRA and NOMs reporting purposes; developing the timeline and proposal for the *National Outcome Measures: State-Level Trends* report as well as coordinating the production of the report and managing the report workgroup; and providing quality assurance for numerous reports and data requests.

#### **Previous Experience**

**SAMHSA-CSAP Data Analysis Coordination and Consolidation Center (DACCC), Research Assistant (2008-2009).** Responsible for performing quality control procedures for proposal, report, and presentation materials; assisting in conducting computerized background research and literature searches and reviews; tracking and compiling items for quarterly team progress reports; tracking CSAP grantee queries and triaging them to appropriate team members; assisting in production of materials; and collection of panel feedback for the NOMs review and in the production of the subsequent *NOMs Recommendation Report*.

#### **Bibliography**

##### **Technical Reports**

Co-Author: Prevention of Methamphetamine Abuse Cohort 3 Report, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2011.

Co-Author: Accountability Report, Volume IX: FY 2010, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2011.

Co-Author: National Outcome Measures: State-Level Trends, Volume V: 2002-2009. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2011.

Co-Author: Accountability Report, Volume VIII: FY 2009, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2010.

Co-Author: Projecting the Nationwide Need for Substance Abuse Prevention Services, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2010.

Co-Author: National Outcome Measures: State-Level Trends, Volume IV: 2002-2008. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2010.

Co-Author: Trends and Directions in Substance Abuse Prevention, Volume VII: 2002-2008, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2010.

## LAVONIA SMITH LEBEAU, Ph.D.

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### *Senior Research Associate*

#### **Education**

2007	Ph.D.	The Pennsylvania State University, University Park, PA (Social Psychology)
2003	M.A.	Towson University, Towson, MD (Experimental Psychology)
1998	B.S.	Northeastern University, Boston, MA (Psychology)

#### **Professional Positions**

2010-Present	Senior Research Associate II, Human Services Research Institute, Cambridge, MA
2008-2010	Senior Research Associate, Human Services Research Institute, Cambridge, MA
2007-2008	Postdoctoral Fellow, Department of Psychology Harvard University, Cambridge, MA
2004-2007	Laboratory Instructor and Instructor (Summer 2007), The Pennsylvania State University, Department of Psychology, University Park, PA
2002-2003	Graduate Research Assistant, Center for School Mental Health Assistance, University of Maryland Medical School, Baltimore, MD
2000-2001	Research Assistant, Department of Neurology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA
1998-2000	Research Assistant, Department of Psychology Northeastern University, Boston, MA

#### **Professional Societies**

American Psychological Association (APA)

American Psychological Society (APS)

Society for Personality and Social Psychology (SPSP); Graduate Student Committee (member at large 2005-2007)

American Evaluators Association (AEA)

Society for Prevention Research (SPR)

#### **Awards and Honors**

2006	Bruce V. Moore Graduate Fellowship Award. Pennsylvania State University, Psychology Department
2007	Bruce V. Moore Graduate Fellowship Award. Pennsylvania State University, Psychology Department
2007	Dissertation Research Award. From the Carolyn Sherif Fund and the Don A. Trumbo Psychology Department Student Research Award Fund, Pennsylvania State University, Psychology Department

## **Selected Project Experience**

### **SAMHSA–CSAP Data Analysis Coordination and Consolidation Center (DACCC), Senior Research Associate (2008-Present).**

Primary role has been the project lead for the annual *Accountability Report*, which entails developing the report timeline and proposal, coordinating report production with the entire data analysis team, senior DACCC staff, editor, and design team as well as acting as primary chapter author. Additional duties include coordinating and managing reports and other analytic work, designing analytic methodology for reports, performing statistical analysis and advising other staff on statistical methods, writing reports, supervising junior staff, providing quality assurance checks on both written and analytic deliverables, and interacting with the client to obtain requirements for deliverables.

## **Bibliography**

### **Publications**

- Grover, K. W., Pinel, E. C., Bosson, J. K., & Smith LeBeau, L. (in press). The boundaries of minimization as a technique for improving affect: Good for the goose but not for the gander? *Journal of Applied Social Psychology*.
- Buckingham, J.T., Smith LeBeau, L., & Klein, W.M.P. (2011). The performance versus ability distinction following social comparison feedback. *Current Research in Social Psychology*, 16 (7), 1-9.
- Gaspar, K., Lozinski, R.H., & Smith LeBeau, L. (2009). If you plan, then you can: How reflection helps defensive pessimists pursue their goals. *Motivation and Emotion*, 33, 203-216.
- Smith LeBeau, L. and Buckingham, J.T. (2008). Relationship social comparison tendencies, insecurity, and perceived relationship quality. *Journal of Social and Personal Relationships*, 25, 71-86.
- Hall, J.A., Coats, E.J., & Smith LeBeau, L. (2006). Is smiling related to interpersonal power? Theory and meta-analysis. In D. A. Hantula (Ed.), *Advances in Social and Organizational Psychology: A Tribute to Ralph Rosnow* (pp. 195-214). Mahwah NJ; Lawrence Erlbaum Associates.
- Hall, J.A., Rosip, J.C., Smith LeBeau, L., Horgan, T.G., & Carter, J.D. (2006). Attributing the sources of accuracy in unequal-power dyadic communication. Who is better and why? *Journal of Experimental Social Psychology*, 42, 18-27.
- Hall, J.A., Coats, E.J., & Smith LeBeau, L. (2005). Nonverbal behavior and the vertical dimension of social relations: A meta-analysis. *Psychological Bulletin*, 131, 898-924.
- Carney, D.R., Hall, J.A., & Smith LeBeau, L. (2005). In the mind of the beholder: Beliefs about social power, nonverbal behavior, and nonverbal communication skill. *Journal of Nonverbal Behavior*, 29, 205-123.
- Lindsey, R.L., Weist, M.D., Smith LeBeau, L., Rosner, L., Dixon, L.B., & Pruitt, D.D. (2004). Significance of self-reported drug or alcohol use among inner-city teenagers. *Psychiatric Services*, 55, 824-826.
- D'Angiulli, A. and Smith LeBeau, L. (2002). On boredom and experimentation on humans. *Ethics and Behavior*, 12, 167-176.
- Hall, J. A., Carter, J. D., Jimenez, M. C., Frost, N. A., & Smith LeBeau, L. (2002). Smiling and relative status in news photographs. *Journal of Social Psychology*, 142, 500-510.
- Hall, J. A., Smith LeBeau, L., Reinoso Gordon, J., & Thayer, F. (2001). Status, gender, and nonverbal behavior in candid and posed photographs. A study of conversations between university employees. *Sex Roles*, 44, 677-692.
- Murphy, N. A., Hall, J. A., & Smith LeBeau, L. (2001). Who's smart? Beliefs about the expression of intelligence in social behavior. *Representative Research in Social Psychology*, 25, 34-42.

### **Technical Reports**

- Co-Author: Accountability Report, Volume IX: FY 2010, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2011.
- Co-Author: Accountability Report, Volume VIII: FY 2009, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2010.
- Co-Author: Trends and Directions in Substance Abuse Prevention, Volume VII: 2002-2008, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2010.
- Co-Author: Accountability Report, Volume VII: FY 2008, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2009.
- Co-Author: National Outcome Measures: State-Level Trends, Volume III: 2002-2007. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2009.
- Co-Author: Accountability Report, Volume VI: FY 2007, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2008.
- Co-Author: National Outcome Measures: State-Level Trends, Volume II: 2002-2006. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2008.
- Co-Author: Trends and Directions in Substance Abuse Prevention, Volume V: 2002-2006, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2008.

### **Presentations**

- Isvan, N. and Smith LeBeau, L. (2010, August). Adolescent Risk and Protective Factors Predicting Young Adult Substance Use. Paper presented at the annual meeting of the American Psychological Association, San Diego, CA.
- Isvan, N. and Smith LeBeau, L. (2009, November). The Impact of Program Dosage and Intervention Strategy on Program Outcomes: An Analysis of Data Submitted to the Center for Substance Abuse Prevention. Paper presented at the annual meeting of the American Evaluation Association, Orlando, FL.

## LISA IANNACCI, M.A.

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### *Research Analyst*

#### **Education**

- 2007 M.A. University of Massachusetts, Lowell, MA (Criminal Justice)  
2005 B.A. University of Massachusetts, Lowell, MA (Psychology)

#### **Professional Positions**

- 2011-Present Research Analyst II, Human Services Research Institute, Cambridge, MA  
2007-2011 Research Assistant, Massasoit Community College Office of Institutional Research, Brockton, MA

#### **Academic Appointments**

- 2005-2007 Teaching Assistant, University of Massachusetts Criminal Justice Department, Lowell, MA  
2006 Research Assistant, Intimate Partner Violence Study funded by U.S. Department of Justice, University of Massachusetts Criminal Justice Department, Lowell, MA  
2003 Intern, Probation Department at Lowell Superior court House, Lowell, MA

#### **Professional Societies**

- North East Association of Institutional Research (NEAIR)  
American Evaluation Association (AEA)

#### **Awards and Honors**

- 2007 Gerald T. Hotaling Research Award, Graduate Student Association, University of Massachusetts Lowell

#### **Selected Project Experience**

**SAMSHA-CSAP Data Analysis Coordination and Consolidation Center (DACCC), Research Analyst (2011-Present).** Responsibilities include validating, preparing, and analyzing data for DACCC deliverables including *Accountability Report*, *Trends and Directions in Substance Abuse Prevention* report, *State Packages*, and *STOP Act Annual Report*. Major tasks for these projects include processing/aggregating data, assessing data files, and writing syntax for program outcomes (using SPSS, Excel, and/or Access); performing quality assurance and control procedures; and summarizing results in technical reports, one pagers, and/or PowerPoint presentations.

#### **Bibliography**

#### **Technical Reports**

- Co-Author: *Accountability Report, Volume IX: FY 2010*, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2011.  
Co-Author: *STOP Act Annual Report, Volume 2*, Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2011.

**Publications**

- Cullinane, D.M., Hirschel, D., Buzawa, E., Pattavina, A., Iannacci, L., & Faggiani, D. (2009). Offender-Victim Body Mass Ratio and the Decision to Arrest in Cases of Domestic Assault. *Medicine, Science and the Law*, 49 (3), 200-206.
- Griggs, L., Barney, S., Brown-Sederberg, J., Keith, S., and Iannacci, L. (2009). Varying Pedagogy to Address Student Intelligences. *Human Architecture: Journal of the Sociology of Self-Knowledge*, II(1), 55-60.

## VIRGINIA MULKERN, Ph.D.

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### *Executive Vice President*

#### **Education**

1979	Ph.D.	Rutgers University, New Brunswick, NJ (Sociology)
1975	M.A.	Rutgers University, New Brunswick, NJ (Sociology)
1972	B.A.	Emmanuel College, Boston, MA (Sociology)

#### **Selected Project Experience**

**SAMHSA-CMHS and CSAT Evaluation of Programs Provide Services to Persons who are Homeless with Mental and/or Substance Use Disorders, Co-Deputy Project Director (2011-Present).** HSRI received a subcontract through RTI International to evaluate four programs administered within CMHS and CSAT (the Cooperative Agreements to Benefit Homeless Individuals (CABHI), Grants for the Benefit of Homeless Individuals (GBHI), Services in Supportive Housing (SSH), and the Programs for Assistance in Transition from Homelessness (PATH)).

**SAMHSA-CSAP Data Analysis Coordination and Consolidation Center (DACCC), Project Director (2007 - 2011), Co-Project Director (2011-Present).** Awarded in 2007, the DACCC is designed to support managers in SAMHSA's Center for Substance Abuse Prevention (CSAP) in their planning processes, implementation and oversight of sponsored programs, and in the provision of guidance to grantees and to the field. The DACCC promotes efficiency and effectiveness in data collection, analysis and reporting, thus resulting in increased accountability and availability of data for CSAP and the substance abuse prevention field.

**SAMHSA-CSAP Data Coordination and Consolidation Center (DCCC), Data Analysis Team Lead (2005-2007).** Responsible for managing all activities of the DCCC Data Analysis Team, collaboration with the Data Management Team, subcontract management, and production of regularly scheduled reports, special reports and Ad hoc reports.

**SAMHSA-CMHS Evaluation of the Minority Fellowship Program, Project Director (2005-2011).** Responsible for overall management of the evaluation and oversight of all products.

**SAMHSA-CMHS Evaluation Technical Assistance Center for Adult Mental Health System Change, Associate Director (1993-2010).** The Evaluation Center was a grant program of the Center for Mental Health Services. The Center provided technical assistance related to the evaluation of adult mental health system change. Responsible for coordinating the work of 12 staff and quality review of products.

**SAMHSA-CMHS, Evaluability Assessment and National Evaluation of the Protection and Advocacy for Individuals with Mental Illness (PAIMI) Program, Project Director (2004-2007).** Responsible for overall project management of the evaluation and oversight of all products.

**Center for Medicare and Medicaid Services National State to State Technical Assistance Center, Project Director (2004-2007).** Responsible for coordinating and providing technical assistance to the 12 Mental Health System Transformation grantees.

**Robert Wood Johnson Resources for Recovery Program, National Evaluator (2004-2005).** Responsible for conducting formative and summative evaluations of this program which sought to improve access to substance abuse services.



**Robert Wood Johnson project to develop a set of performance indicators to monitor the performance of Connecticut's publicly funded behavioral health system, Project Director (2004-2007).** Responsible for developing the performance indicator set, auditing the quality of available data, designing presentation formats and management of project staff.

**SAMHSA-CMHS, Evaluability Assessment of the Mental Health Block Grant Program, Project Director (2003-2004).** This project assessed the degree to which the MHBG program was ready for evaluation and designed evaluation modules for a national evaluation. Responsible for overall project management of the evaluation and oversight of all products.

**SAMHSA-CSAT, Technical Support Center for the Practice Improvement Collaboratives Program, Co-Project Director (2000-2003).** The Technical Support Center provided technical assistance to CSAT and to PIC sites related to the implementation of evidence-based practices in community treatment organizations. Responsible for designing the evaluation, analyzing data, overseeing the development of all products and subcontract management.

**Coordinating Center for SAMHSA's Managed Care and Vulnerable Populations Program, Principal Investigator (1996-1999).** This Coordinating Center was responsible for assisting 21 sites to develop common approaches to evaluating managed care services for four target populations: adults with severe mental illness, adults with substance use disorders, children with severe emotional disorders, and adolescents with substance use disorders. The common protocols for this study included analyses of service use, costs and outcomes in managed care and fee for service conditions.

**Coordinating Center for the National Employment Intervention Demonstration Program, funded by the Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, Co-Principal Investigator (1995-2000).** The Coordinating Center was responsible for designing a common research protocol for this national demonstration program, overseeing the implementation of site research, and conducting cross-site data analyses.

## **Bibliography**

### **Publications**

- Cotter, F., Bowler, S., Mulkern, V., & McCarty, D. (2005). Practice Improvement Collaboratives: An Overview. In E. Edmundson and D. McCarty (Eds.), *Implementing Evidence-Based Practices for Treatment of Alcohol and Drug Disorders*. The Hawthorn Press, Inc.
- Ridgely, M. S., Giard, J., Shern, D., Mulkern, V. & Burnam, A. (August 2002). Managed behavioral health care: An instrument to characterize critical elements of public sector programs. *Health Services Research*, 4, 1105-1123.
- Ridgely, M. S., Mulkern, V., Giard, J., & Shern, D. (April 2002). Critical elements of public-sector managed behavioral health programs for severe mental illness in five states. *Psychiatric Services*, 53(4), 397-399.
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- Mulkern, V. (1995). *The Community Support Program: A model for federal-state partnership*. Washington, DC: Mental Health Policy Research Center.
- Leff, H.S., Mulkern, V., Lieberman, & M., Raab, B. (1994). The effects of capitation on service access, adequacy, and appropriateness. *Administration and Policy in Mental Health*, 21(3), 141-160.

- Leff, J., Mulkern, V., & Leff, H.S. (1995). Preparing community support workers: A training model based on skill standards and performance competencies. In H.S. Harris and D.C. Maloney (Eds.), *Human Services: Contemporary Issues and Trends*. Boston: Allyn and Bacon.
- Mauch, D. and Mulkern, V. (Spring/Summer 1992). The McKinney Act: New England responses to federal support for state and local assistance to the homeless and mentally ill. *New England Journal of Public Policy*, 419-430.
- Mulkern, V., Leff, H. S., & Raab, B. (July 1991). Effectiveness of psychiatric hospitalization: A longitudinal study of adult and child patients. Prepared for Psychiatric Institutes of America. Cambridge, MA: Human Services Research Institute.

**CLIFTON M. CHOW, M.A., Ed.M.**


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*Research Associate/Analyst*
**Education**

2012 (Expected)	Ph.D.	Cand., Brandeis University, Waltham, MA (Health Economics & Policy)
2009	M.A.	Brandeis University, Waltham, MA (Health Economics & Policy)
1997	Ed.M.	Harvard University, Graduate School of Education, Cambridge, MA (Evaluation)
1992	B.A.	University of California, Santa Barbara, CA (Classics & History), Dean's Honors

**Licensure and Certification**

2005	CAGS	University of Massachusetts, Lowell, MA (Post-Master's Certificate in Mathematical & Applied Statistics)
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**Professional Positions**

2002-Present	Research Associate/Analyst, Human Services Research Institute, Cambridge, MA
1999-2002	Research Associate, Human Services Research Institute, Cambridge, MA
1997-1999	Research/Development Assistant, Education Development Center, Newton, MA
1993-1997	Staff Assistant & Health Education Intern, Harvard University, Cambridge, MA

**Professional Societies**

American Society of Health Economists  
 American Evaluation Association  
 American Public Health Association  
 International Health Economics Association  
 United States Psychiatric Rehabilitation Association

**Selected Project Experience**

**Milwaukee Mental Health System Redesign, Chief Analyst (2009-Present).** Project addresses systemic issues involving access and service delivery within the adult mental health system. Combination of working closely with stakeholders in Milwaukee to understand the system relationally, as well as using the HSRI system planning simulation model which has been used in 25 states to forecast dynamically the impact of delivering different service options. Responsible for conducting all analyses with administrative and survey data. Administrative data comes from county behavioral health system as well as state Medicaid office.

**Mental Health System Modeling to Estimate Cost-Effectiveness of Implementing Evidence-based Practices in State Mental Health Systems, Chief Analyst (2004-2008).** Project funded by the Substance Abuse and Mental Health Services Administration (SAMHSA) to study the cost-efficiency of implementing evidence-based practices in three states (AZ, OR, WV). Chief liaison with all sites, and supervised data collection through a secured FTP format, and chief analyst of the simulation model. Aside from conducting analysis through state specific administrative data (Medicaid and State Mental

Health Authority), also developed a method to incorporate SAMHSA URS and NOMS data into the analysis through multivariate 2-stage Least Squares Regression and Probit/Logit analysis.

**SAMHSA-CMHS Mental Health Transformation State Incentive Grant (MHT SIG) Evaluation, Chief Analyst (2005-2010).** Worked with grantees closely on data submission for the recovery/resilience study that includes NOMs measures from TRAC. Designed the data layout and is responsible for timely data submission, including data related technical assistance to grantees; also carried out a similar role with regard to the leadership and provider surveys. Identified and collected all pertinent epidemiological datasets for the other state data component and is co-developing the analytic strategic on the cost impact study. Conducted site visits and worked closely with senior staff and consumer consultants in developing and implementing the site visit protocol and reports; conducted focus groups with consumer representatives both in person and via phone. Coordinated with IT personnel in conducting all electronic submission of data and is responsible for data security and management for the project. As chief analyst on all quantitative data, contributed to the statistical analytic design and was the primary liaison with statistical consultants on multivariate techniques such as meta-analysis and longitudinal data analysis.

**SAMHSA-CMHS Evaluation Technical Assistance Center for Adult Mental Health System Change, Program Manager (1999 - 2007).** Managed the Materials Program through performance indicator measurement and reporting. Conducted E-Learning modules and supervised issue briefs around curriculum development in Seclusion & Restraint reduction programs. Delivered consultation using multimedia format and on-site on developing fidelity. Also delivered time sensitive technical assistance to numerous SAMHSA-funded multisite projects on analysis, evaluation and logic model design. For the Partnership in Youth in Transition project, analyzed the cross-site evidence-base fidelity measures and consulted on the development of fidelity measures for specific grantees. Worked on employment related issues, including the impact of local unemployment rates on individuals with SMI. Conducted meta-analyses for the Evaluation Center on housing intervention, integrated co-occurring disorder, cultural competency and developed the analytic framework for evaluating the evidence-based training strategies for mental health workforce development. Co-developed online training modules using SAMHSA evidence-based practice toolkits.

## **Bibliography**

### **Selected Publications**

- “Mission Impossible: Treating Serious Mental Illness and Substance Co-Occurring Disorder with Integrated Treatment. A Meta-Analysis.” Under Review, 2011.
- Leff, H.S., Hughes, D.R., Chow, C.M., Noyes, S. & Ostrow, L. “A Mental Health Allocation and Planning Simulation: A Mental Health Planner’s Perspective.” In Handbook for Healthcare Delivery Systems. Edited by Y. Yih. CRC Press, 2010.
- “Approaching a Common Fidelity Measure for Youth Transition Programs Using a Modified Delphi Technique.” In progress.
- “The Support for Evidence-based Training Strategies.” *Psychiatric Rehabilitation Journal*, 33:2, 156-9, 2009.
- “The Need for Evidence-based Training Strategies.” *Psychiatric Rehabilitation Journal*, 33:1, 62-65, 2009.
- “Does One Size Fits All? A Meta-Analysis of Housing Interventions for Persons with Serious Mental Illness.” *Psychiatric Services*, 60:4, 473-484, 2009.
- “A New Hope”: The Evidence on Housing for Persons with Severe Mental Illness and Its Implications. Working Paper. Cambridge, MA: Evaluation Center@HSRI, 2007.

- “Mission Impossible: Treating Serious Mental Illness and Substance Co-Occurring Disorder with Integrated Treatment. A Meta-Analysis.” Unpublished Paper, 2007.
- “Measuring the Cost-Efficiency of the Mental Health Transformation State Incentive Program.” Unpublished Paper, 2007.
- “Predicting Mental Health Expenditure in an Age of Mismanaged Care: A Structural Equation Modeling Exercise.” Unpublished Paper, 2007.
- “A Cost-Effectiveness Analysis of Evidence-Based Intervention in an Application of a Simulated Mental Health Planning System.” Unpublished Paper, 2006.
- “Effects of Local Unemployment Rate on Vocational Outcomes in a Randomized Trial of Supported Employment for Individuals with Psychiatric Disabilities.” *Journal of Vocational Rehabilitation* 25, 71-84, 2006.
- “A Theoretical Foundation for the Validity of Ethnic Match as a Mental Health Cultural Competence Strategy.” *The Graduate Journal, Brandeis University*, Vol 5. 2006.
- “A Model for Mental Health Resource Allocation and Planning.” *Academy Health* 22, 2005.
- “A Meta-Analytic Review of Racial/Ethnic Matching for African American and Caucasian American Clients and Clinicians.” *Journal of Counseling Psychology*, 52(1): 45-56, 2005.
- “Knowledge Assessment: A Missing Link Between Knowledge Development and Application.” Submitted to Evaluation and Program Planning, 2002.
- “St. Elizabeths Planning Project: Final Report.” Human Services Research Institute, Cambridge, MA, 2001.
- “Hawaii Needs Assessment Project: Final Report.” Human Services Research Institute, Cambridge, MA, 2000.
- “Knowledge Assessment: A Missing Link Between Knowledge Development and Application.” Submitted to Evaluation and Program Planning, 2002.
- “A Report on the Behavioral Needs and Gaps in New Mexico.” Submitted to the New Mexico Department of Health, Behavioral Health Services, 2002.
- “Who Goes There? Longitudinal Case Studies of Twelve Users of Community Technology Centers.” EDC, Inc., Newton, MA, 2000.
- “Impact of CTCNet Affiliates: Findings from a National Survey of Users of Community Technology Centers. EDC, Inc., Newton, MA, 1998.
- “Patronage and the Seduction of Quantitative Models: The Transformation of Economics at Harvard and the Massachusetts Institute of Technology, 1969-74.” Unpublished Paper. Harvard University & MIT Archives, Cambridge, MA, 1997.

### **Presentations**

- “Building Fidelity Scales for Partnership in Youth Transition.” Partnership for Youth Transition 5th Cross-site Forum. Dallas, TX, February 10, 2005.
- “Approaching Mental Health System Transformation through Simulation Modeling.” Recovery in Action: Identifying Factors and Trends of Transformational Systems, sponsored by the National Mental Health Association (NMHA). Indianapolis, IN, September, 2004.
- “Getting to Evidence-based Practices Using Evaluation.” SAMHSA Targeted Capacity Expansion Programs. Reducing Racial & Ethnic Disparities in Mental Health. Washington, DC, July, 2003.
- “Getting to Evidence-based Practices.” International Association of Psychosocial Rehabilitation Services Conference (IAPSRS). Toronto, Ontario, Canada, June, 2002.
- “Are Managed Care and Fee For Service Mental Health Systems Different, Equivalent, Both, or Neither in Persons Served, Services Utilized, Outcomes and Satisfaction: A Cross-Site Analysis.” American Public Health Association Conference. Boston, MA, October, 2000.”
- “What Do We Know about Measuring Cultural Competence in Mental Health Systems?” IAPSRS 25th Annual Conference. Washington, DC, May, 2000.

- "Challenges in Evaluating the Impact of Community Technology Centers on Individual Participants."  
American Evaluation Association National Meeting. Orlando, FL, November, 1999.
- "Practical Considerations in Doing Evaluation." Community Technology Centers Network All-Affiliate  
Conference. Chicago, IL, June, 1999.
- "Engaging Non-Traditional Learners at Community Technology Centers." New England Education  
Research Conference. Portsmouth, NH, April, 1999.
- "Harvard and the National Science Foundation, 1969-74." Student Research Conference. Harvard  
University. Cambridge, Massachusetts, 1996.

## TIMOTHY M. MULCAHY

### EDUCATION

- M.A. Johns Hopkins University, Institute for Policy Studies, Policy Studies, 1999  
Johns Hopkins University School for Advanced International Studies, International Economics
- B.A. University of Virginia, English, 1990

### PROFESSIONAL EXPERIENCE

<i>NORC at the University of Chicago</i>	
<i>Principal Research Scientist</i>	<i>2011- current</i>
<i>NORC Data Enclave Program Director</i>	<i>2008-current</i>
<i>Senior Research Scientist</i>	<i>2007-2011</i>
<i>Research Scientist</i>	<i>2004-2007</i>
<i>Justice Studies, Inc., Senior Analyst</i>	<i>2003-2004</i>
<i>Mathematica Policy Research, Inc., Survey Manager</i>	<i>2001-2003</i>
<i>Development Services Group, Inc., Senior Research Analyst/Survey Director</i>	<i>1999-2001</i>
<i>CSR, Incorporated, Research Associate</i>	<i>1998-1999</i>
<i>Research Assistant</i>	<i>1993-1998</i>
<i>Johns Hopkins University, Research Consultant</i>	<i>1993-1995</i>

### SELECT STUDIES

*Principal Investigator, Confidential Data in the Cloud, Research & Development Project.* NORC is tasked with designing, developing, and testing alternate cloud configurations for storing confidential data. The work involves Identifying and evaluating the performance of cloud security software (including system/application/data security capabilities); (2) providing benefit/cost analyses of the various tools evaluated to develop specific alternative configurations; (3) designing and testing processes for securely migrating data from individual agencies to cloud platforms; and (4) evaluating the performance of cloud security software in a production environment through application to the virtual server for FedStats. *Sponsor: Interagency Council on Statistical Policy (ICSP), Federal Statistical Community of Practice and Engagement (SCOPE).*

*Project Director, Medicare Program: Availability of Medicare Data for Performance Measurement.* Under subcontract to IMPAQ International, this project supports the implementation of the Qualified Entity Certification Program (QECF) for Medicare Data



Section 10332 of the Affordable Care Act requires that standardized extracts of Medicare claims data under parts A, B, and D be made available to “qualified entities” for the evaluation of the performance of providers and suppliers. NORC leads the certification review of all standards relating to CMS administrative claims data privacy, security, and transfer. Additionally NORC assists with reviewing and certifying QCEP applications, providing technical expertise and guidance (e.g., telephone, email, FAQs, webinars) in the areas of data security, supporting the development of a program operations manual, assisting with the development and implementation of a web-based Information Management System (IMS) in support of the QCEP Quality Assurance Program. NORC also plays a lead role in the monitoring and oversight of QEs to ensure data and systems compliance. *Sponsor: U.S. Department of Health and Human Services, Centers for Medicare & Medicaid Services.*

*Data Security Lead, American Recovery and Reinvestment Act of 2009 – Comparative Effectiveness Research (CER) Public Use Data Pilot Project.* Under subcontract to IMPAQ International NORC is conducting the Comparative Effectiveness Research (CER) Public Use Data Pilot Project. The project pioneered the creation, dissemination, and support of Medicare claims public use file (PUF) to conduct comparative effectiveness research. The final data products for this project include Basic, Enhanced, and Linked PUF for a 5% sample of Medicare beneficiaries across 3 years of data using all nine Medicare claims limited data sets (Denominator, Inpatient, Outpatient, PDE, Carrier, Skilled Nursing Facility, Durable Medical Equipment, Hospice, and Home Health Agency). *Sponsor: U.S. Department of Health and Human Services, Centers for Medicare & Medicaid Services.*

*Principal Investigator, Developing and Sustaining a Virtual Research Community: A Comprehensive Approach.* This project involves customizing a virtual data center and providing authorized researchers, including academics, policymakers, and others access to private equity and venture capital data. This effort will result in a comprehensive database of private capital fund and transactional activity supplied by industry participants, including Actis, Apax Partners, Apollo Global Management, Berkshire Partners, the Carlyle Group, Clayton, Dubilier & Rice, Court Square Capital Partners, First Reserve Corporation, General AKKR & Co., Kohlberg & Company, New Mountain Capital, The Riverside Company, Saybrook Corporate Opportunity Fund: and Thomas H. Lee Partners. *Sponsor: Private Capital Research Institute.*

*Principal Investigator. Sustaining a Virtual Research Community.* The grant will expand the KFS enclave researcher community by providing secure remote access to up to 20 new researchers per year; provide two onsite, in-person training sessions on accessing and working with confidential KFS microdata; and receive, archive, index, and curate new waves of KFS microdata and updated metadata *Sponsor: Kauffman Foundation.*

*Principal Investigator. Entrepreneurial Data Sets.* This project involved supporting outreach efforts to select researchers to encourage use of these business microdata in the NORC Data Enclave. Outreach involves presentations at professional conferences, visits to university departments with research in this area, and a conference held at the Foundation’s headquarters. *Ewing Marion Kauffman Foundation.*

*Principal Investigator. Secure Access to Entrepreneurial Microdata: Kauffman Firm Survey Data.* This project involved providing approved Kauffman Foundation researchers access to sensitive KFS entrepreneurial microdata. Core tasks include: curating, indexing and archiving microdata; applying statistical protection and specific data protection requirements; providing researcher training; and a secure collaborative environment with access to online discovery tools and a suite of statistical and other data applications. The project also includes various outreach and dissemination efforts. *Ewing Marion Kauffman Foundation.*

*Principal Investigator. KFS Small Research Grants Program.* This project involved developing and implementing a small research grants program regarding the Kauffman Firm Survey. Responsibilities involve preparing, disseminating, evaluating, and making recommendation as per RFPs researchers submit to Kauffman to conduct entrepreneurial research projects. Also responsible for tracking progress on grants, providing technical assistance to researchers, assisting in moving research to peer-reviewed publications, and showcasing researcher findings through webinars, conferences and workshops. *Ewing Marion Kauffman Foundation.*

*Senior Research Analyst. Identifying a Uniform Set of Information/Data to Assess the Impacts of OMH-funded Activities.* Assisted in developing a uniform data set across all OMH-funded mental health and substance abuse-related programs to measure performance across OMH's programs portfolio. *Sponsor: Department of Health and Human Services. Office of Minority Health.*

*Project Director. American Competitiveness Survey.* This project involved measuring innovation separately from R&D, measuring the contribution of various actors in the division of innovative labor, and developing models of how firms participate in a division of innovative labor and hence of the nature and extent of the division of innovative labor in the aggregate. The study will include original data collection through a large-scale innovation survey administered to firms in the manufacturing sector and selected service sector industries, a description of our findings, and the development and testing of economic models of the division of innovative labor and its impacts on firms' innovative performance. These results will advance the science of innovation policy by generating new data on innovative activity, creating new metrics, and developing new models for understanding the innovation process and for guiding policy and firm strategy. *National Bureau of Economic Research (NBER).*

*Project Director. Technical Assistance in Program Evaluation.* This project involves collaborating with NIST's Technology Improvement Program (TIP) and Impact Assessment Office (IAO) to create a more streamlined survey data collection instrument for impact assessment of TIP's funding of high-risk, innovative technologies; to assess the influence and progress of that technology in addressing major societal challenges; and to provide the data and analysis to document TIP's impact and progress in the Annual Report to Congress. *Technology Improvement Program (TIP) and Impact Assessment Office (IAO). Department of Commerce, National Institute of Standards and Technology (NIST).*

*Project Director, Evaluation Study Design for the Long-Term Care Ombudsman Program.* This project involves the development of an evaluation study design to better understand and assess the effectiveness of the Long-Term Care Ombudsman Program (LTCOP). The LTCOP serves as

an advocate for residents and consumers of nursing homes, board and care homes, and similar adult care facilities. In addition to resolving individual complaints, ombudsmen advocate for changes at the local, state and national levels that will improve residents' care and quality of life. NORC is building the evidence base on the LTCOP in order to develop recommendations for a comprehensive study design that combines process, outcome, impact, and cost-effectiveness evaluation activities. *Department of Health and Human Services, Administration on Aging, Administration on Community Living.*

*Associate Project Director. Universal Screener for Co-Occurring Disorders.* Assisted in developing and implementing a co-occurring (mental health & substance abuse) screening instrument on a sample of arrestees in the District of Columbia. Assisted in developing data collection instruments, IRB submission, literature review, data collection, and analysis. *Sponsor: The District of Columbia Criminal Justice Coordinating Council.*

*Survey Director. National Treatment Outcomes Monitoring System.* Assisted in developing a national substance abuse and mental health treatment outcomes monitoring system. Assisted in developing survey design, data collection instruments, IRB and OMB packages, pretests, focus group moderation, and cognitive testing with substance abusers, and substance abuse facility coordinators. *Sponsor: Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Treatment.*

*Senior Research Analyst. Workplace Managed Care Program.* Managed the development and implementation of a substance abuse survey across two hospitals of a major healthcare provider. Conducted focus groups regarding alcohol and other substance use and abuse among non-physician employees. Assisted in developing innovative substance abuse screening instrument and wellness program for workforce and corporate leadership. Responsible for managing staff, data collection, analysis, and report writing. *Sponsor: Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Prevention.*

*Senior Research Analyst. Juvenile Accountability Incentive Block Grants Program: Training & Technical Assistance.* Provided training and technical assistance to state JAIBG grantees, juvenile justice practitioners. Facilitated needs assessment and program evaluation of a juvenile detention center in San Diego, CA. *Sponsor: Office of Juvenile Justice Delinquency Prevention, Office of Justice Programs, Department of Justice.*

*Project Director. Multivariate Imputation of Agricultural Resource Management Survey Data – Phase III.* Manages team of researchers from the National Institute of Statistical Sciences (NISS) Research Triangle Park, NC. Cooperative Agreement No. 58-3AEU-9-0026. *Sponsor: U.S. Department of Agriculture, Economic Research Service, National Agriculture Statistical Service*

## **PUBLICATIONS, PRESENTATIONS, PAPERS**

Mulcahy, Timothy, 2012. “*How to Share Research Data: Views from Practitioners.*” Organizer: Jerome P Reiter, Duke University. Chair: Julia Lane. Invited Session Joint Statistical Meetings Annual Conference, San Diego, CA. July 30, 2012.

Mulcahy, Timothy, 2012. “*Statistical Disclosure and De-Identification of Confidential Health Data: Principles, Methods and Policy*” Academy Health Annual Research Meeting in Orlando, FL June 24-25.

Mulcahy, Timothy; Johannes Fernandes-Huessy, Nirmala Kannankutty, 2012. “*A Model for Data Access: Lessons Learned from NCSES and NORC.*” Presentation in collaboration with National Science Foundation (NCSES) to the National Academy of Sciences Committee on National Statistics (CNSTAT) Keck Center in Washington, DC.

Mulcahy, Timothy, 2012. “Methamphetamine and Synthetic Drugs in the Midwest.” Presentation sponsored by the Illinois Law Enforcement Training and Standards Board Executive Institute.

Mulcahy, Timothy, 2012. “*Options for Long-Term Stewardship and Ownership of SHRP 2 Safety Data Results from Requirements Workshop.*” US DOT Headquarters, Washington DC.

Mulcahy, Timothy, 2012. Panel Chair. “*Unlocking the Power of Restricted Data: A Discussion among Researchers, Producers, and Data Service Providers.*” 38<sup>th</sup> Annual International Association for Social Science, Information Services & Technology Conference.

Mulcahy, Timothy; Johannes Fernandes-Huessy, Daniel Gwynne, 2012. “*Confidentiality, Privacy and Security.*” 38<sup>th</sup> Annual International Association for Social Science, Information Services & Technology Conference.

Mulcahy, Timothy; Johannes Fernandes-Huessy, Daniel Gwynne, 2012. “*Can Data Owners and Data Users Think Alike? Designing Incentives to Shape the Provision of Access to Data.*” In collaboration with Richard Welpton, UK Data Archive.

Mulcahy, Timothy and Fritz Scheuren, 2011. Data Enclaves and Alternatives. Eurostat’s Conference on New Techniques & Technologies for Statistics: 21<sup>st</sup> Century Data Dissemination: Practice & Innovations Brussels, 23 February 2011.

Beckler, Daniel and Timothy M. Mulcahy, 2011. “*Data Utility, Confidentiality, and the Production-Possibility Frontier: Striking a Delicate Balance*” UNECE/Eurostat Work Session on Statistical Data Confidentiality Tarragona, Spain • 26-28 October 2011.

Mulcahy, Timothy; Alicia Robb; and David DesRoches, 2011. Kauffman Firm Survey Fifth Follow-up <http://ssrn.com/abstract=1934895> (top 10 in 2011 downloads).

Mulcahy, Timothy M. and Pascal Heus (invited paper). “A Metadata-Driven, Lifecycle Approach to Delivering High Quality Statistics.” Journal of Official Statistics Special Issue of JOS on Systems and Architectures for High Quality Statistics Production.

Brownstein, Henry ; Timothy M. Mulcahy, Johannes Fernandes Huessy; and Bruce Taylor, 2011. Using Quantitative Data to Inform Qualitative Research: Learning about Illicit Retail Methamphetamine Markets. APPAM Category VIII: Methodology Advances in Qualitative Methods.

Taylor, Brownstein, Mulcahy, Woods, Fernandes-Huessy, and Hafford. Forthcoming. "Illicit Retail Methamphetamine Markets and Related Local Problems: A Police Perspective." *Journal of Drug Issues*.

Brownstein, Mulcahy, Taylor, Fernandes-Huessy, and Woods. Forthcoming. "The Organization and Operation of Illicit Retail Drug Markets." *Criminal Justice Policy Review*. Online at Sage as of November 9, 2010 as doi:10.1177/0887403410383010.

Taylor, Brownstein, Mulcahy, Hafford, Woods, and Fernandes-Huessy. 2011. "The Characteristics of Methamphetamine Markets and Their Impact on Communities." *Criminal Justice Review*. 36:312-31.

Brownstein, Mulcahy, Taylor, Fernandes-Huessy, and Hafford, 2011 "Illicit Retail Methamphetamine Markets as Social Organizations." Submitted to the American Sociological Association's magazine, *Contexts*.

Brownstein, Mulcahy, Fernandes-Huessy, Taylor. 2011. "Using Quantitative Data to Inform Qualitative Research: Learning About Illicit Retail Methamphetamine Markets," paper to be presented at the annual meeting of the American Society of Criminology, Washington, DC, November, 2011.

Brownstein, Mulcahy, Fernandes-Huessy, 2011. "Using Virtual Telephone Interviews to Study the Impact of Local Meth Markets on Community Health and Safety," presented at the annual meeting of the Association of American Geographers. Seattle, WA, April 2011.

Taylor, B.G., H.H. Brownstein, T.M. Mulcahy, C. Hafford, D. Woods, and J. Fernandes-Huessy, 2011. "The Characteristics of Methamphetamine Markets and Their Impact on Communities." *Criminal Justice Review*.

Taylor, B.G., H.H. Brownstein, T.M. Mulcahy, D. Woods, J. Fernandes-Huessy, and C. Hafford, 2011. "Illicit Retail Methamphetamine Markets and Related Local Problems: A Police Perspective." *Journal of Drug Issues*.

Brownstein, H.H., T.M. Mulcahy, B.G. Taylor, J. Fernandes-Huessy, and D. Woods, 2011. "The Organization and Operation of Illicit Retail Drug Markets." *Criminal Justice Policy Review*.

Wright, Melanie; Stefan Bender, Tim Mulcahy, Pascal Heus, and John Abowd, 2010. *Providing Secure Access to Data*. International Association for Social Science Information Services and Technology (IASSIST).

Brownstein, Henry H.; Timothy M. Mulcahy; Johannes Huessy; and Bruce G. Taylor, 2009. "How are Methamphetamine Markets Organized? An Analysis Based on Johnson's Freelance/Business Model Distinction of Illicit Drug Markets." American Society of Criminology, Philadelphia, PA.

Mulcahy, Timothy M.; Brownstein, Henry; and Johannes Huessy, 2009. "Methamphetamine Markets in their Communities: Variation in Organization, Operation, and Outcomes." Drugs and Drug Treatment Panel. BJS/JRSA National Conference St. Louis, MO.

Brownstein, Henry; Timothy Mulcahy, and Johannes Huessy, 2009. "The Organization and Operation of Illicit Retail Methamphetamine Markets: A View from Law Enforcement." Prepared for presentation to the Department of Criminology, Law, and Justice University of Illinois at Chicago. October.

Heus, Pascal; Tim Mulcahy; Jostein Ryssevik; and Rob Grim, 2009. "Secure Remote Access System for Upgrading the Council of European Social Science Data Archives." Paper commissioned by the Council of European Social Science Data Archives (CESSDA), United Kingdom.

Stephen Campbell, Stephanie Shipp, Tim Mulcahy, Ted Allen, 2009. Informing Public Policy on Science and Innovation: the Advanced Technology Program Experience. *Journal of Technology Transfer* (2009) 34:304-319.

Scheuren, F.J., Lane, J., Bowie, C. and Mulcahy, T. 2009. NORC Data Enclave: "Providing Secure Remote Access to Sensitive Microdata." Presentation made at the New Techniques and Technologies for Statistics Conference, Brussels, Belgium.

Mulcahy, Tim; Amy Farrell and Kyckelhahan, Tracey, 2009. Combating Domestic Trafficking in Persons: How Task Forces and Local Law Enforcement Respond. Concurrent Panel, 2009 NIJ Annual Conference.

Mulcahy, Timothy M., 2009. Leveraging Advances in Cyberinfrastructure to Provide Secure Access to Sensitive Data, Preserve Data, and Create Virtual Scientific Communities. Joint Statistical Meetings. Washington DC.

Brownstein, Henry; Timothy Mulcahy, Bruce Taylor, and Bruce Kubu, 2009. "The Organization and Operation of Illicit Retail Methamphetamine Markets." ASA Alcohol, Drugs, and Tobacco Section Sessions. 104<sup>th</sup> Annual Meeting San Francisco.

Mulcahy, Timothy M, 2009. Annual Briefing Report to the Advisory Committee on Agricultural Statistics. USDA. Economic Research Service and National Agricultural Statistical Service.

Newton, Phyllis J.; Timothy M. Mulcahy and Susan Martin, 2008. Finding Victims of Human Trafficking. National Institute of Justice. Department of Justice. Washington DC. September.  
Brownstein, H.H., Mulcahy, T. and Newton, P. 2008. "The Dynamics of Methamphetamine Markets: A Systemic Approach to Process," presented at the Joint NIDA/NIJ Grantee Workshop on Illicit Retail Drug Markets, Washington, DC.

Mulcahy, T. 2008. "Developing, Implementing, and Sustaining Virtual Collaboratories," presented to the Washington Statistical Association, Washington, DC.

Bowie, Chet and Timothy M. Mulcahy, 2008. "*The NORC Data Enclave: Secure Remote Access to Sensitive Data.*" Washington Statistical Society. Chair Jeri M. Mulrow, National Science Foundation. Bureau of Labor Statistics, Washington DC.

Lane, J; Heus, P; and Mulcahy, T. 2008. Data Access in a Cyberworld: Making Use of Cyber-infrastructure. *Transactions on Data Privacy* 1 (2008) 2-16. Lane, Julia; Alicia Robb; and

Timothy M. Mulcahy, 2008. Access to Business Microdata: A Professional Development Workshop. 2008 Academy of Management Meetings. Anaheim, California. August.

Brownstein, Henry; P. Newton; T. Mulcahy; B. Taylor, B. Kubu; R. Harwood, 2008. *Conceptual and Methodological Issues in the Operationalization of the Dynamics and Stability of Illicit Drug Markets.* Roundtable: American Sociological Association, Boston, MA. August.

Lane, Julia; Timothy M. Mulcahy; Pascal Heus. "*Confidentiality Training for the National Opinion Research Center's Data Enclave.*" Joint Statistical Meetings. Denver, CO. August.

Brownstein, Henry; P. Newton, T. Mulcahy; B. Taylor, B. Kubu; R. Harwood, 2008. *The Stability of Methamphetamine Markets and Public Health and Safety Outcomes: A Law Enforcement Perspective.* Paper presented at the annual meeting of the Society for the Study of Social Problems, Boston, MA.

Mulcahy, Timothy, M; Chet Bowie, and Pascal Heus. "Providing Remote Access to Business Micro Data Lessons Learned." Joint Statistical Meetings. Denver, Colorado.

Mulcahy, Timothy. "Remote Access and Data Security: Lessons Learned." CESSDA PPP Workshop "How the CESSDA Infrastructure Can Utilise Grid technologies and E-social Science Methodologies to Provide Pan-European Services." Manchester, United Kingdom.

Mulcahy, Timothy, M., 2008. Data Security and Access: Connecting from Afar, IASSIST Conference, Technology of Data: Collection, Communication, Access and Preservation, Stanford, CA.

Mulcahy, Timothy and John Nieszal, 2008. "Data Security Secrets from the Field." Citrix Synergy 2008 Annual Conference. Houston, TX.

Bowie, Chet and Timothy Mulcahy, 2008. "*Building Virtual Collaboratories.* Council of Professional Associations on Federal Statistics Quarterly Meeting.

Mulcahy, Timothy, M. "*NORC Data Enclave. Expedition Workshop/Technology Program Evaluation 2008. Collaborative Expedition #71, Methodologies from the Advanced Technology Program.*" National Science Foundation, Arlington, VA.

Bowie, Chet and Timothy Mulcahy. "*Virtual Collaboratories Workshop: Linking NSF Scientist and Engineering Data to Scientific Productivity Data.*" National Science Foundation, Arl. VA.



Lane, Julia; Tim Mulcahy; and Pascal Heus. "Access to Microdata: Challenges and Practical Approaches" Association of Public Data Users 2007 Annual Conference. Alexandria, VA.

Shane, Scott A., Robb, Alicia, DesRoches, David and Mulcahy, Timothy M, 2007. *Kauffman Firm Survey (KFS) 2005/2006 - Baseline/First Follow-Up: Study Metadata Documentation*. Ewing Marion Kauffman Foundation Firm Survey Research Paper Series Available at SSRN: <http://ssrn.com/abstract=1024312>.

Shipp, Stephanie; Stephen Campbell; Robert Sienkiewicz; Julia Lane, and Timothy Mulcahy, 2007. "Challenges and Opportunities in Accessing Business Microdata to Study Innovation and Entrepreneurship." Atlanta Conference on Science, Technology, and Innovation Policy. Georgia Institute of Technology, Atlanta, Georgia.

Mulcahy, Timothy; Stephanie Shipp; and Julia Lane, 2007. "Ensuring Access and Confidentiality Protection for Highly Sensitive Data." University of Michigan, Institute for Social Research, Data Sharing for Demographic Research. Ann Arbor, Michigan.

Mulcahy, Timothy; Stephanie Shipp; and Julia Lane. "Implementing a Portfolio Approach to the Protection of Confidentiality Data." Joint Statistical Meetings, Salt Lake City.

Mulcahy, Timothy (Chair); Stephanie Shipp, Julia Lane, and Jeffrey Dyer, 2007: "New Approaches to Accessing Confidential Business Data." Academy of Management.

Mulcahy, Timothy. 2007. AHRQ Patient Safety Portfolio: A Compilation of Findings from the Working Conditions Research. AHRQ. Rockville, MD.

Newton, Phyllis J.; Johnson, Candace M. and Timothy M. Mulcahy. 2006. "Investigation and Prosecution of Homicide Cases in the U.S.: The Process for Federal Involvement." Final Technical Report/ Submitted to National Institute of Justice, Washington, DC.

National Opinion Research Center (NORC), 2005. *2005 AHRQ Health IT and Patient Safety Conference Proceedings: A Compendium of Findings*. AHRQ. Rockville, MD.

Mathematica Policy Research, Inc., 2002; 2003. Health Care Survey of DoD Beneficiaries: Adult Codebook, User's Guide, and Technical Manual. Prepared for Department of Defense TRICARE Management Activity.

Mathematica Policy Research, Inc., 2002; 2003. Health Care Survey of DoD Beneficiaries: National Executive Summary Report. Prepared for Department of Defense TRICARE Management Activity.

Mathematica Policy Research, Inc., 2002. Field Interviewer Training Manual: *The National Survey of Supplemental Social Security (SSI) Children*. Prepared for the Social Security Administration, Office of Research, Evaluation, and Statistics.

Mulcahy, T.; Bekelman A.; M. Cohen, 2001. Worksite Health Promotion Research and Practice: "Wellness at Work in a Managed Care Environment." Paper presented at the 129<sup>th</sup> Annual APHA meeting, 2001. Development Services Group, Inc.

Mulcahy, T.; Bekelman A.; M. Cohen, 2000. Substance Abuse Prevention and Early Intervention Strategies in a Workplace Managed Care Setting. Paper presented at the 128<sup>th</sup> Annual APHA meeting, 2000. Development Services Group, Inc.

Development Services Group, Inc. 1999. CSAP Knowledge Development Conference: Presentation of Preliminary Findings from the DSG/Kaiser Permanente Substance Abuse Cost-Offset Study. Knowledge Exchange Workshop (KEW). San Francisco, CA. SAMHSA, CSAP.

Mulcahy, T. 1999. *Economic Implications of Section 1115 Welfare and Medicaid Waivers on Substance Abusers: A Case Study of Baltimore*. Master's Thesis (unpublished). Johns Hopkins University, Institute for Policy Studies.

CSR, Incorporated. 1998-9. *Testing the Anti-Drug Message in 12 American Cities: Interim Report, Final Phase I and II Reports*. Executive Office of the President, Office of National Drug Control Policy (ONDCP).

CSR, Incorporated. 1996-7. Interim, Phase I and Phase II Final Reports on the Effectiveness of the Transitional Living Program (TLP) for Runaway and Homeless Youth. Administration for Children and Families (ACF).

Johns Hopkins University, School of Hygiene and Public Health. 1997. Measuring Baltimore City's Problem Solving Capacity. JHU/HHS/Healthy Start.

CSR, Incorporated and KRA Corporation. 1996. Evaluation of Emergency Child Abuse and Neglect Prevention Services: Third Party Evaluation Plans and Implementation Analyses Report. National Center on Child Abuse and Neglect (NCCAN), Administration for Children and Families (ACF).

Institute for Policy Studies. 1995. Occasional Paper #18: Empowerment Zone Strategies for Baltimore: Lessons from Research and Experience. Johns Hopkins University. Baltimore, MD.

CSR, Incorporated. 1993. Final Report on the Validation and Effectiveness Study of Legal Representation through Guardian ad Litem. Administration on Children and Families (ACF).

## **PROFESSIONAL ACTIVITIES**

American Statistical Association

International Association for Social Science, Information Services & Technology

Academy Health

American Society of Criminology

Data Documentation (DDI) Alliance

Academy of Management

American Public Health Association

Court Appointed Special Advocates Program

**HONORS, DISTINCTIONS**

Keynote Speaker, National Academies of Science –Washington, DC (7/15/11)

Keynote Speaker, Eurostat’s Annual Conference – Brussels (2/22/11)

Referee, Journal of Survey Methodology (2009-current)

Grant Recipient, Center for Excellence in Survey Methodology (2008-2012)

NORC Innovation Days Presenter (2008-2011)

NORC Employee Performance Award (2006)

Proposal Reviewer/Peer Review, Alfred P. Sloan Foundation

# SCOT AUSBORN

## EDUCATION

MSLIS            University of Illinois, GSLIS, 2011

AMRS            University of Chicago, The Divinity School, 2008

## PROFESSIONAL EXPERIENCE

### NORC, BETHESDA, MD

*Senior Research Analyst*

*June 2012 – present*

Data Enclave team member responsible for metadata management and software evaluation

### INSTITUTE FOR PSYCHOANALYSIS, CHICAGO, IL

*Director, IT & Library Services*

*2007 – 2012*

Responsible for development and support of the Institute's entire technology infrastructure, including its website and email operations, network sharing and security, computing hardware and software, UX5000 phone system, and audio-visual equipment. Responsible for patron assistance, collections development, cataloguing, and circulation at the Institute's McLean Library and Sigmund Freud Archives.

- Designed and implemented a patient record and accounting database for the Institute's psychotherapy clinics (Access 2007/VBA).
- Digitized and implemented the online retrieval of curriculum.

### INSTITUTE FOR CLINICAL SOCIAL WORK, CHICAGO, IL

*Electronic Librarian & IT Support*

*2007 – 2012*

Provide online access to syllabi and readings for the educational programs. Assist with student inquiries and resource requests by email. Responsible for ad hoc IT development and support.

## SKILLS

- Linux/Windows/VMWare/Plesk server administration
- XHTML/CSS/LAMP programming using Adobe Dreamweaver, phpMyAdmin, and WordPress
- RelaxNG schema development, XML/XSL transformations, and metadata crosswalks using oXygen

## PROFESSIONAL ACTIVITIES

Member, American Library Association, 2011-present

Member, Society of American Archivists, 2011-present

## ALPHONSE DERUS

### EDUCATION

M.S. Nova Southeastern University, Biomedical Informatics, (2013 expected)

B.S. Loyola University Chicago, Psychology, 2008

### PROFESSIONAL EXPERIENCE

**NORC AT THE UNIVERSITY OF CHICAGO, BETHESDA, MD**

*04/2012–Present*

*Research Data Analyst*

**UNIVERSITY HOSPITALS OF CLEVELAND, CLEVELAND, OH**

*12/2008–04/2012*

*Data Coordinator*

Worked with a team of psychiatric professionals, epidemiologists, statisticians, and trauma researchers with the day to day needs of survey 10 year prospective longitudinal study of soldiers with the Ohio Army National guard examining pre-, peri-, and post- trauma risk and resilience factors for the development of posttraumatic stress disorder. Used PL/SQL to generate real-time report tables accessible to administration. Entered, cleaned, and managed survey metadata. Delivered data to analysts according to specifications.

- Documentation
- Descriptive Analysis
- Survey Development
- Data Management

### MAJOR NORC STUDIES

**Project 6747 (USDA).** Research Analyst. *06/2012–Present.* Guided researchers through the process of gaining access to the Enclave. Explored new solutions optimize the potential for secure access and improve future access to the Enclave. Converted file structure from disparate data types to relational database structure.

**Project 613R (CMS CER),** Research Analyst. *04/2012–Present.* Tested different methods of managing Medicare claims data. Researched alternative methods of storage and retrieval. Assisted with evaluation of enterprise storage solutions.

**Project 6887 (CMS QECP).** Research Analyst. *04/2012–Present.* Researched qualified entity program for availability of Medicare Data to be used for performance measurement. Explored legislation, legal opinions, current practices in security, and delivered to program director.

### OTHER MAJOR STUDIES

**University Hospitals Combat Mental Health Initiative (CMHI).** Data Coordinator. *12/2008–04/2012.* Worked with a team of psychiatric professionals, epidemiologists, statisticians, and trauma researchers with the day to day needs of survey 10 year prospective longitudinal study of soldiers with the Ohio Army National guard examining pre-, peri-, and post- trauma risk and resilience factors for the development of posttraumatic stress disorder. Used PL/SQL to generate real-time report tables accessible to

administration. Entered, cleaned, and managed survey metadata. Delivered data to analysts according to specifications.

**University Hospitals/Case Western Reserve Psychiatry (UHCMC Psychiatry).** Data Coordinator. *12/2008-04/2012.* Assisted with administration of clinical trials including randomization, serving on data safety monitoring board, metadata development, and data team infrastructure support.

**DANIEL W GWYNNE, MBA**

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Tinley Park, IL (916) 869-5972 DGwynne@Hotmail.com

**SUMMARY**

Senior Systems Architect that has extensive experience designing, implementing, and maintaining enterprise level Virtual Application and Virtual Desktop based Cloud Computing solutions. Hands on experience working directly with Senior Engineers from Citrix Systems to develop Access Suite Assessment, Design, and Implementation methodologies.

**CERTIFICATIONS**

PhD Organizational Management and Information Technology Management	In Progress
Masters in Business Administration (MBA)	2010
Bachelor of Science in Business and E-Business (BSB/EB)	2005
Citrix Certified Administrator XenServer (CCA)	2009
Citrix Certified Integration Architect 4.5 (CCIA)	2007
Citrix Certified Enterprise Administrator 4.5 (CCEA)	2007
Citrix Certified Enterprise Administrator XP (CCEA)	2005
Citrix Certified Enterprise Administrator v3 (CCEA)	2004
Citrix Certified Enterprise Administrator v1 (CCEA)	2001
Microsoft Certified Systems Engineer (MCSE)	2005
Microsoft Certified Database Administrator (MCDBA)	2005

**WORK EXPERIENCE**

NORC at the University of Chicago (Chicago, IL) May 2011- Present

Lead Engineer for the Data Enclave (SAAS Cloud Computing Environment)

Provided technical leadership necessary to ensure the successful implementation of the Data Enclave III environment. Successfully on boarded multiple new clients such as USDA, CMS, SCOPE, PCRI, NIS, NCSES, FDIR, and CIS. The Data Enclave III environment is a Cloud based Software As A Service (SAAS) solution that provides a fully featured virtualized environment to our customers. The environment is built on VMware ESXi, Citrix XenApp, Citrix XenDesktop, Juniper, and RSA



technologies. Applications provided include SAS, STATA, SPSS, ArcGIS, and R. As part of the continued efforts to provide the latest in Big Data and High Performance computing, Proof of Concepts were performed of EMC Greenplum, HP Vertica, and Infobright. Technologies such as Fusion-io and Riverbed Whitewater were also evaluated to improve the performance and capabilities of the service offering.

CAPITAL NETWORK SOLUTIONS, INC. (Sacramento, CA) July 2006 – May 2011  
Senior Systems Architect (Cloud Computing Environment, OTech)

Designed, implemented, maintained, and expanded a 60+ server Cloud Computing, Application Service Provider (ASP) service offering for the Office of Technology Services providing fully hosted IT services for over 4000 users at Office of Homeland Security, Office of the CIO, State Consumer Services Agency SCSA, Business Transportation and Housing, Public Safety Communications Division, Department of Corrections and Rehabilitation, Child Welfare Services CWS/CMS, Office of Administrative Law, and California Film Commission utilizing 40+ Citrix XenApp Servers, VMware ESX Servers, multiple redundant SQL and File Server clusters, multiple Citrix Access Gateway/AAC with Safeword integrated front end systems to provide redundant secure access. Implemented multiple redundant Safeword backend AD integrated authentication points. Created detailed customer specific build and design documents including an extensive XenApp Server build document. Utilizing Wise Packaging Studio created unattended MSI/MST packages of all of the applications currently in production to facilitate rapid server deployment. Provided extensive hands on support and documentation for the migration from MetaFrame Secure Access Manager (MSAM) to Advanced Access Control (AAC). Provided technical oversight and hands on integration support for new customer applications including Office of Administrative Law Legal Edge, Dreamweaver, OSI CWS/CMS, Remedy, PureEdge, and RMP review. Upgraded the backend components of the Citrix environment to Citrix Presentation Server 4.5.

FRANKLIN TEMPLETON INVESTMENTS (Sacramento, CA) January 2006 – July 2006  
Next Generation Computing (Contract)

Architected Citrix Presentation Server Proof of Concept and Pilot environment utilizing ten HS20 IBM Blade Center Servers providing forty applications. Performed three phases of pilot testing proving application functionality in a Citrix environment, scalability and capacity testing utilizing Citrix Server Test Kit and Resource Manager, and live pilot environmental feasibility. Created and presented detailed

design, implementation, and scalability planning documentation. Provided basic training to local IT staff focusing on support and implementation best practices.

CAPITAL NETWORK SOLUTIONS, INC. (Sacramento, CA)

July 2002 – January 2006

Sr Systems Engineer (Professional Services)

Lead analysis, design, implementation and deployment of Citrix (MetaFrame) Presentation Server, Web Interface, Secure Gateway, Access Gateway, Password Manager and MetaFrame Secure Access Manager (MSAM) for Corporate and State agencies. Developed and maintained scripted/unattended server deployment processes and best practice methodologies. Developed and instructed end user classes for the Citrix product line and help desk support. Provided high level technical support for clients and internal engineering personnel.

PEREGRINE SYSTEMS (San Diego, CA)

January 2000 – July 2002

Citrix MetaFrame Enterprise Administrator / SQL Database Administrator

Deployed a multinational Citrix MetaFrame solution for Peregrine Systems. Provided technical process planning, direction, and control, consisting of MetaFrame Farms based in San Diego, Ca and Richmond, UK. Utilized MetaFrame 1.8 on NT 4 TSE, Windows 2000 TS, IMS, RMS, and NFuse. Delivered applications including Peoplesoft HR and Financials, Prephix, Siebel 2000, Siebel E-Training, Pivotal Relations, Ceridian, GetPaid, Microsoft applications, and Peregrine's Service Management and Infrastructure Management applications to 4000 employees in 10+ Countries via an NFuse Intranet interface. Provided instruction in the areas of deploying and troubleshooting Citrix MetaFrame 1.8 and XPe for Professional Services, Quality Assurance, Development, and Customer Service staff.

Deployed MetaFrame solutions in support of Peregrine product implementations at multiple client sites. These sites include: a small farm for Apple in Cupertino, CA, a medium sized deployment for The Royal Bank of Scotland, a small farm for the County of LA, and performed extensive testing and training for multiple deployments at Wells Fargo. In addition, deployed a hosted ASP solution for Chevron utilizing MetaFrame XP on Windows 2000 TS.

Supported mission-critical MS SQL Server databases (7.0 and 2000) running in Windows NT and Windows 2000 environments. Provided technical planning, coordination, and administration of SQL Server databases, physical database design, schema management, database development, performance

tuning, data migration, backup and recovery strategies, database software installation and upgrades, troubleshooting, resolving errors and failures, and capacity planning and resource utilization.

PEREGRINE SYSTEMS (San Diego, CA)

April 1999 – December 2000

Team Lead / SQL DBA (Contractor)

Provided technical process planning, direction, and control for a multinational Year 2000 Readiness Program. Lead inventory discovery and analysis, tailoring complex Infrastructure Management Tools to the unique challenges of the Year 2000 problem. Designed, developed, and deployed multiple SQL data repositories. Utilized Visual Basic to develop an application user interface. This application tracked and maintained the Y2K readiness of all corporate assets and integrated with Peregrine's asset management applications. Configured NT servers for file storage, application distribution, and data warehousing. These efforts produced zero Y2K related faults or outages.

DURACOM CORPORATION (Bothell, WA)

January 1999 - April 1999

Field Engineer

Excelled as a Field Engineer for IBM through subcontractor Duracom Corp., was instrumental in the success of the Washington Mutual network conversion. Performed network conversions at multiple sites across the West Coast. Installed Token Ring hubs, IBM servers, and workstations along with Lexmark printers, check readers, and receipt printers. Worked with IBM Help Desk to troubleshoot and resolve Infrastructure Configuration and Remote Management Control errors.

VA HOSPITAL - HSR&D (Seattle, WA)

September 1998 - December 1998

Desktop Support Engineer (Contractor)

Operated Help Desk, provided desktop PC support for 130+ clients. Analyzed and troubleshot software, hardware, and network problems. Performed NT network and server administration. Configured and deployed new workstations. Implemented network-wide conversion from Vista Mail Man to Outlook Exchange server and LAN conversion from Novell to Windows NT.

PUGET SOUND ENERGY (Seattle, WA)

July 1998 - September 1998

SAP Help Desk Analyst (Contractor)

Implemented SAP Deployment Help Desk Support Center. Provided support for 1500+ Clients using SAP GUI R/3 on Win NT 4.0, Win 95 workstations. Designed, developed, deployed, and maintained a Help Desk ticket tracking system using a SQL Database with an MS Access front end. Assisted Pathfinder SAP deployment team and troubleshoot deployment and installation issues. During the operation phase one, troubleshoot SAP GUI operation and printing issues and provided Level 1 support of SAP functionality issues.

ICOS CORPORATION (Bothell, WA)

March 1998 - May 1998

Help Desk Analyst / Network Technician (Contractor)

Provided desktop PC support along with telephone support for 250+ workstations. Troubleshoot software, hardware, and network problems. Performed network and workstation maintenance and upgrades. Configured and deployed new workstations. Installed new Cisco hubs and switches and documented network architecture and fiber links.

EGG HEAD COMPUTERS (Lynnwood, WA)

October 1997 - February 1998

Hardware Technician

Upgraded existing systems, built and configured custom systems for clients, troubleshoot and repaired faulty systems. Consulted with customers about future upgrades, home/office computer maintenance, function, compatibility of hardware, and software components. Located and acquired out of stock hardware components needed for repairs and upgrades. Provided over the telephone technical support and solutions when possible.

GROSSMONT (El Cajon, CA)

January 1997 - June 1997

Desktop Support Technician

Provided PC desktop support for 20+ workstations. Configured and deployed new workstations and upgraded existing workstations. Set up and maintained printers and network connections. Generated a schedule for future hardware and software upgrades.

## EDUCATION

Virtualization Boot Camp Implementing vSphere 4

2010

Citrix XenDesktop Technical Certification Study Sessions at Citrix HQ

2009

Citrix XenServer Technical Certification Study Sessions at Citrix HQ	2009
CTX-1320AW Password Manager	2004
CTX-1210 Migration of MetaFrame 1.8 to MetaFrame XP	2001
CTX-2620 MetaFrame XPe Advanced Management	2001
Connect.It – Peregrine Systems	2001
SA-118 Fundamentals of Solaris for Sys Admin	2000
CTX-302.2 MetaFrame Administration	2000
CTX-401 Resource Management Services	2000
CTX-7120 NFuse Administration	2000
SC-600 Service Center Certification Course - Peregrine Systems	2000
AC-600 Asset Center Certification Course - Peregrine Systems	2000
Networking and Programming Courses – Grossmont College	1995 – 1997

## JEREMY D. PICKREIGN

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### EDUCATION

1995 M.S., Biometry and Statistics, State University of New York at Albany  
1992 B.S., Mathematics, State University of New York at Albany  
Minor: Economics

### POSITIONS

2007-Present Senior Research Scientist, National Opinion Research Center  
2005-2006 Statistician, Center for Studying Health System Change  
1999-2005 Statistician, Health Research and Educational Trust  
1997-1999 Statistician, National Rehabilitation Hospital Research Center  
1995-1997 Health Research Analyst, Center for Studying Health System Change  
1993-1995 Program Research Specialist, Bureau of Analysis and Program Evaluation,  
NYSDOH, Health Research Incorporated

### EXPERIENCE

- Survey Research
  - Design and implement sampling strategies for various surveys of employers, hospitals, health plans, provider groups, patients, and households
  - Develop estimates of sample precision controlling for complex sample designs
  - Take lead responsibility for constructing statistical tests on study findings
  - Responsible for developing and implementing imputation strategies and developing sample weights
- Analytic Research
  - Work with project leaders to develop and implement experimental designs
  - Assist researchers on developing and executing an analytic plan
  - Major responsibility for multivariate analysis using such techniques as OLS regression, logistic regression, generalized linear modeling, and principal components analysis
  - Experience with claims databases such as:
    - CMS Medicare 5% sample
    - Thomson-Reuters MarketScan data of private insurance claims
    - Department of Veterans Affairs administrative claims data
    - Department of Defense TRICARE administrative claims data
  - Experience with risk scoring analysis including HCC and ACG
  - Experience with boot-strapping techniques
  - Experience with propensity score matching techniques
- Other Experience
  - Extensive programming experience with SAS, SPSS, and SUDAAN
  - Work as key analyst on developing analytical plans, and building tables and graphics
  - Serve as a statistical consultant to other researchers
  - Familiar with MapInfo mapping software
  - Provide peer-review of submitted articles to professional journals such *Health Services Research* and *Milbank Quarterly*

## MAJOR NORC STUDIES

- *Multiple System Utilization for TRICARE Beneficiaries (2008-2012)*. This study seeks to describe the role of individual beneficiary choice for increased use of civilian care by analyzing outcomes and processes of care to determine if beneficiaries have care co-ordination problems. The project uses a combination of primary data collection, TRICARE claims analysis, and MarketScan claims analysis.
- *Analysis of Claims Data from a Large Private Company (2011-2012)*. NORC, in partnership with Employee Benefit Research Institute, will analyze claims data to examine how the adoption of a full replacement Health Savings Account plan affects claims expenses and utilization in a large, privately insured population.
- *Kaiser Family Foundation Annual Employer Health Benefits Survey (1999-2011)*. This annual study reports findings from a telephone survey of randomly selected public and private employers with three or more workers. The survey asks each participating company as many as 400 questions about its largest health plans and covers a wide range of topics including the cost of health insurance, offer rates, choice, premiums, employee cost sharing and employer opinions.
- *California HealthCare Foundation Annual Employer Health Benefits Survey (1999-2011)*. This annual survey of employer-based health benefits reports findings from a telephone survey of randomly selected private employers in California. The survey parallels the Kaiser Family Foundation Annual Employer Health Benefits Survey in form and structure so that reasonable comparisons between California and the rest of the nation are possible.
- *Affordability and Other Post-Reform Issues in Employer Sponsored Health Insurance (2010-2011)*. The purpose of this project for the Commonwealth Fund is to examine the state of the individual and small group insurance markets and changes since 2007. The study aims to investigate unintended consequences of incremental reform – such as insurance reform without an individual mandate – on the cost and affordability of coverage.
- *Develop and Implement Accountable Care Organization (ACO) Quality Measures (2011)*. This project, for which NORC is a subcontractor to QRS, seeks to assist CMS in developing, testing, and implementing ACO quality measures. This project involves in-depth environmental scans to identify appropriate measures for quality constructs, assembling a TEP to assess the findings from the environmental scans and subsequently developed and tested measures, engagement of stakeholders to garner buy-in for proposed measures. NORC is currently undertaking the testing and validation, and implementation of potential quality measures for ACO's. Working with Johns Hopkins University, NORC is also creating the necessary algorithms for the PBMR to create an ACO GPRO data collection tool.
- *Department of Veterans' Affairs Office of Rural Health, Policy and Planning Group (2009-2010)*. NORC, in partnership with Atlas Research, provides program support for the Department of Veterans' Affairs Office of Rural Health (ORH). Project activities include targeted studies and analyses aimed at improving access to healthcare services for the nation's rural veterans, development of performance metrics for ORH activities, development of educational symposia, tracking of ORH funded initiatives, and coordination of the Veterans Rural Health Advisory Committee.
- *Examining First Dollar Insurance Coverage (2009-2010)*. This project outlines an effective approach to estimating the costs of voluntary first-dollar coverage by health insurance plans of all costs associated with recommended vaccinations. The project uses a combination of secondary data including the three National Immunization Studies (Child, Teen, and Adult) and private insurance claims data provided by MarketScan.
- *Examining Medicare Spending on Care Before and After Starting Dialysis (2008)*. This project, sponsored by MedPAC, examined the use of services, Medicare spending, and clinical outcomes for chronic kidney disease beneficiaries before and after dialysis by analyzing Part A and Part B claims data from 1996-2006 for a 5% representative sample of fee-for-service.

## PROFESSIONAL MEMBERSHIPS

1997-Present American Statistical Association  
 2010-Present American Association of Public Opinion Research

## PEER REVIEWED PUBLICATIONS

1. Gabel, Jon, Ryan Lore, Roland McDevitt, Jeremy Pickreign, Heidi Whitmore, Michael Slover, and Ethan Levy-Forsythe, "More Than Half Of Individual Health Plans Offer Coverage That Falls Short Of What Can Be Sold Through Exchanges As Of 2014," *Health Affairs*, Web Exclusive, May 23, 2012.
2. Whitmore, Heidi, Jon Gabel, Jeremy Pickreign, and Roland McDevitt, "The Individual Insurance Market Before Reform: Low Premiums and Low Benefits," *Medical Care Research and Review*, Online First, March 21, 2011.
3. Claxton, Gary, Bianca DiJulio, Heidi Whitmore, Jeremy Pickreign, Megan McHugh, Awo Osei-Anto, and Benjamin Finder, "Health Benefits in 2010: Premiums Rise Modestly, Workers Pay More Towards Coverage," *Health Affairs*, Web Exclusive, September 2, 2010.
4. McDevitt, Roland, Jon Gabel, Ryan Lore, Jeremy Pickreign, Heidi Whitmore, and Tina Brust, "Group Insurance: A Better Deal for Most People than Individual Plans," *Health Affairs*, Web Exclusive, December 3, 2009.
5. Gabel, Jon, Jeremy Pickreign, Roland McDevitt, and Tom Briggs, "Taxing Cadillac Health Plans May Produce Chevy Results," *Health Affairs*, Web Exclusive, December 3, 2009.
6. Claxton, Gary, Bianca DiJulio, Heidi Whitmore, Jeremy Pickreign, Megan McHugh, Benjamin Finder, and Awo Osei-Anto, "Job-Based Health Insurance: Costs Climb at a Moderate Pace," *Health Affairs*, Web Exclusive, September 15, 2009.
7. Gabel, Jon, Roland McDevitt, Ryan Lore, Jeremy Pickreign, Heidi Whitmore, and Tina Ding, "Trends in Underinsurance and the Affordability of Employer Coverage, 2004-2007," *Health Affairs*, Web Exclusive, June 2, 2009.
8. Torres, Gretchen, Juliet Yonek, Jeremy Pickreign, Heidi Whitmore, and Romana Hasnain-Wynia, "HIV Testing and Referral to Care in U.S. Hospitals Prior to 2006: Results from a National Survey," *Public Health Reports*, May-June, 2009.
9. Gabel, Jon, Heidi Whitmore, Jeremy Pickreign, Christine Ferguson, Anjali Jain, Shova KC, and Hilary Scherer, "Obesity and the Workplace: Current Programs and Attitudes Among Employers and Employees," *Health Affairs*, January/February, 2009.
10. Gabel, Jon, Heidi Whitmore, Jeremy Pickreign, Will Sellheim, Shova KC, and Valerie Bassett, "After the Mandates: Massachusetts Employers Continue to Support Health Reform as More Firms Offer Coverage," *Health Affairs*, Web Exclusive, October 28, 2008.
11. Claxton, Gary, Jon Gabel, Bianca DiJulio, Jeremy Pickreign, Heidi Whitmore, Benjamin Finder, Marian Jarlenski, and Samantha Hawkins, "Health Benefits in 2008: Premiums Moderately Higher, While Enrollment in Consumer-Directed Plans Rises in Small Firms," *Health Affairs*, Web Exclusive, September 24, 2008.
12. Gabel, Jon, Heidi Whitmore, and Jeremy Pickreign, "Report from Massachusetts: Employers Largely Support Health Care Reform, and Few Signs of Crowd-Out Appear," *Health Affairs*, Web Exclusive, November 12, 2007.
13. Claxton, Gary, Jon Gabel, Bianca DiJulio, Jeremy Pickreign, Heidi Whitmore, Benjamin Finder, Paul Jacobs, and Samantha Hawkins, "Health Benefits in 2007: Premium Increases Fall to an Eight-Year Low, While Offer Rates and Enrollment Remain Stable," *Health Affairs*, September/October 2007.
14. Gabel, Jon, Jeremy Pickreign, Roland McDevitt, Heidi Whitmore, Laura Gandolfo, Ryan Lore, and Katy Wilson, "Trends in the Golden State: Small-Group Premiums Rise Sharply While Actuarial Values For Individual Coverage Plummet," *Health Affairs*, Web Exclusive, June 14, 2007.



15. Gabel, Jon, Heidi Whitmore, Jeremy Pickreign, Katharine Levit, Rosanna Coffey, and Rita Vandivort-Warren, "Substance Abuse Benefits: Still Limited After All These Years," *Health Affairs*, Web Exclusive, June 7, 2007.
16. McDevitt, Roland, Jon Gabel, Laura Gandolfo, Ryan Lore, and Jeremy Pickreign, "Financial Protection Afforded by Employer-Sponsored Health Insurance: Current Plan Designs and High Deductible Health Plans," *Medical Care Research and Review*, April 2007.
17. Whitmore, Heidi, Sara Collins, Jon Gabel, and Jeremy Pickreign, "Employers' Views on Incremental Measures to Expand Health Coverage," *Health Affairs*, November/December 2006.
18. Claxton, Gary, Jon Gabel, Isadora Gil, Jeremy Pickreign, Heidi Whitmore, Benjamin Finder, Bianca DiJulio, and Samantha Hawkins, "Health Benefits in 2006: Premium Increases Moderate, Enrollment in Consumer Directed Health Plans Remains Modest," *Health Affairs*, Web Exclusive, September 26, 2006.
19. Gabel, Jon, Roland McDevitt, Laura Gandolfo, Jeremy Pickreign, Samantha Hawkins, and Cheryl Fahlman, "Generosity and Adjusted Premiums in Job-Based Insurance: Hawaii is Up, Wyoming is Down," *Health Affairs*, May/June 2006.
20. Hurley, Robert E., Laurie Felland, Anneliese Gerland, Jeremy Pickreign, "Public Employees' Health Benefits Survive Major Threats, So Far," *Health Affairs*, Web Exclusive, April 18, 2006.
21. Claxton, Gary, Jon Gabel, Isadora Gil, Jeremy Pickreign, Heidi Whitmore, Benjamin Finder, Samantha Hawkins, Shada Rouhani, and Diane Rowland, "What High Deductible Plans Look Like: Findings from a National Survey of Employers, 2005," *Health Affairs*, Web Exclusive, September 14, 2005.
22. Gabel, Jon, Gary Claxton, Isadora Gil, Jeremy Pickreign, Heidi Whitmore, Benjamin Finder, Samantha Hawkins, and Diane Rowland, "Health Benefits in 2005: Premium Increases Slow to Single-Digits but Coverage Continues to Erode," *Health Affairs*, September/October 2005.
23. Pickreign, Jeremy and Jon Gabel, "Health Benefits Offer Rates: Is There a Nonresponse Bias?" *Health Services Research*, April 2005.
24. Gabel, Jon, Gary Claxton, Isadora Gil, Jeremy Pickreign, Heidi Whitmore, Erin Holve, Benjamin Finder, Samantha Hawkins, and Diane Rowland, "Health Benefits in 2004: Four Years of Double-Digit Premium Increases Take Their Toll On Coverage," *Health Affairs*, September/October 2004.
25. Gabel, Jon, Gary Claxton, Erin Holve, Jeremy Pickreign, Heidi Whitmore, Kelley Dhont, Samantha Hawkins, and Diane Rowland, "Health Benefits in 2003: Premiums Reach Thirteen-Year High as Employers Adopt New Forms of Cost-Sharing," *Health Affairs*, September/October 2003.
26. Barry, Colleen, Jon Gabel, Richard Frank, Samantha Hawkins, Heidi Whitmore, and Jeremy Pickreign, "Design of Mental Health Benefits: Still Unequal After All These Years," *Health Affairs*, September/October 2003.
27. McCormack, Lauren, Jon Gabel, Heidi Whitmore, Wayne Anderson, and Jeremy Pickreign, "Trends in Retiree Health Benefits," *Health Affairs*, November/December 2002.
28. Gabel, Jon, Kelley Dhont, Heidi Whitmore, and Jeremy Pickreign, "Reply: Buy Coverage before You Need It," *Health Affairs*, Web Exclusive, October 28, 2002.
29. Gabel, Jon, Kelley Dhont, Heidi Whitmore, and Jeremy Pickreign, "Reply: Individual Health Insurance: How Much Financial Protection Does It Provide," *Health Affairs*, Web Exclusive, September 5, 2002.
30. Gabel, Jon, Larry Levitt, Erin Holve, Jeremy Pickreign, Heidi Whitmore, Kelley Dhont, Samantha Hawkins, and

Diane Rowland, "Job-Based Health Benefits in 2002: Premium Growth Accelerates, Employees Bear Greater Cost, and Coverage Declines," *Health Affairs*, September/October 2002.

31. Gabel, Jon , Kelley Dhont, Heidi Whitmore, and Jeremy Pickreign, "Individual Insurance: How Much Financial Protection Does It Provide?" *Health Affairs*, Web Exclusive, April 17, 2002.
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## **OTHER PUBLICATIONS**

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2. Claxton, Gary, et. al., "Employer Health Benefits, 2011 Annual Survey," Henry J. Kaiser Family Foundation and Health Research and Educational Trust, 2011.
3. "California Employer Health Benefits Survey 2010," California HealthCare Foundation, December 2010.
4. Claxton, Gary, et. al., "Employer Health Benefits, 2010 Annual Survey," Henry J. Kaiser Family Foundation and Health Research and Educational Trust, 2010.
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13. Gabel, Jon, Jeremy Pickreign, and Heidi Whitmore, "Behind the Slow Growth of Employer-Based Consumer-Driven Health Plans," Center for Studying Health System Change: Issue Brief No. 107, December 2006.
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16. "California Employer Health Benefits Survey 2005," California HealthCare Foundation, November 2005.
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22. Gabel, Jon, et. al., "Employer Health Benefits, 2003 Annual Survey," Henry J. Kaiser Family Foundation and Health Research and Educational Trust, 2003.
23. Whitmore, Heidi, Kelley Dhont, Jeremy Pickreign, Jon Gabel, David Sandman, and Cathy Shoen, "Employer Health Coverage in the Empire State: An Uncertain Future," The Commonwealth Fund, September 2002.
24. Gabel, Jon, Kelley Dhont, and Jeremy Pickreign, "Are Tax Credits Alone the Solution to Affordable health Insurance? Comparing Individual and Group Insurance Costs in 17 U.S. Markets" The Commonwealth Fund, May 2002.
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## PRESENTATIONS

1. Pickreign, Jeremy, Jon Gabel, Heidi Whitmore, Samuel Stromberg, Diana Jeffery, and Thomas Williams, "Comparing the Costs and Use of Services for Military Care in Military and Civilian Facilities," *Academy Health Annual Research Meeting*, June 25, 2012.
2. Gabel, Jon, Jeremy Pickreign, Heidi Whitmore, Samuel Stromberg, Diana Jeffery, and Thomas Williams, "Comparing the Costs and Use of Services in TRICARE Prime with Employer Sponsored Insurance," *Academy Health Annual Research Meeting*, June 25, 2012.
3. Pickreign, Jeremy and Heidi Whitmore, "Evaluating the Effectiveness of Two Strategies to Improve Telephone Survey Response Rates of Employers," *International Conference on Establishment Surveys IV*, June 13, 2012.
4. Pickreign, Jeremy and Heidi Whitmore, "Fielding Employer Surveys – Lessons Learned," *American Association of Public Opinion Research Annual Meeting*, May 14, 2010.
5. Pickreign, Jeremy and Jon Gabel, "Health Benefits Offer Rates: Are We Reaching the Wrong Conclusions Because of Nonresponse?" *Academy Health Annual Research Meeting*, June 8, 2004.
6. DeJong, Gerben and Jeremy D. Pickreign, "Advantages and Disadvantages of Randomized Controlled Trials: Can RCTs Tell Us the Service Mix and Therapy Hours Needed to Optimize Outcomes?" *American Congress of Rehabilitation Medicine Annual Meeting*, October 17, 1999.
7. Pickreign, Jeremy D., Phillip Beatty, and Kelley R. Burden, "Is Managed Care Having a Disproportionate Effect on Disabled Medicare Beneficiaries Utilization of Hospital and Physician Services?" *Association for Health Services Research 16<sup>th</sup> Annual Meeting*, June 28, 1999.
8. DeJong, Gerben, Jeremy D. Pickreign, Phillip Beatty, and Jacqueline M. Ennis, "Age, Length of Stay, and Functional Outcome: Can Longer LOS be Justified for Medicare Patients Because They Are Older?" *National Rehabilitation Hospital Medical Grand Rounds*, January 29, 1999.
9. Pickreign, Jeremy D. and Phillip Beatty, "Evaluating the Impact of Managed Care on Individuals with Disabilities," *American Public Health Association Annual Meeting*, November 18, 1998.
10. Pickreign, Jeremy D. and Phillip Beatty, "Characteristics of Medicare Beneficiaries Enrolled in Managed Care Traditional Health Plans," *American Congress of Rehabilitation Medicine 75<sup>th</sup> Annual Meeting*, November 8, 1998.



## PASCAL HEUS

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Pascal Heus is an Information Technology specialist with over 20 years of professional experience and a strong focus on socio-economic, health, and official statistical data management. He's a skilled IT expert with extensive understanding of national statistical systems and issues surrounding statistical and scientific data production, archiving, dissemination, and analysis. He is a globally recognized expert on the Data Documentation Initiative (DDI), a metadata standard for the documentation of microdata.

Pascal is currently Vice-President of Metadata Technology North America where he leads major research and development projects, collaborates with agencies around the globe on the implementation of innovative data management solutions, and advocates best practices surrounding metadata standards. He's also President of Integrated Data Management Services, an emerging company providing data and metadata processing services. As Executive Manager, he contributes to the Open Data Foundation that he helped establish in 2006.

Prior to joining Metadata Technology, Pascal worked with the World Bank, leading the development and deployment of institutional microdata management systems and collaborating closely with national statistical agencies in developing countries towards the establishment of data archives and data dissemination solutions. Later on, as a technical expert for the International Household Survey Network (IHSN), he played a major role in the implementation of the Microdata Management Toolkit, a set of easy to use tools for the preservation and documentation of microdata.

### EXPERIENCE

#### Metadata Technology North America, Inc., USA

##### Vice-President

Apr 2010 – Present

- Company executive management.
- Coordinate projects and provide technical expertise for the development and deployment of metadata and data management information systems in the field of socio-economic and behavioral science, in particular for microdata and official statistics.
- Work closely with data producers, data archives, research centers, and other stakeholders to foster the adoption of standards and best practices and the development of harmonized tools.
- Investigate emerging technologies and lead the research and development of innovative products and services for the management of statistical and scientific data
- Key Projects/Activities:
  - NORC Data Enclave: technical assistance to NORC around the development and operations of the virtual data enclave<sup>1</sup> and related projects. Coordinate and meet with NORC and its customers to foster best practices and facilitate delivery of data to researchers. These collaborative efforts extend into agencies such as the National Science Foundation, the US Department of Agriculture, the National Institute of Standards and Technologies, the Center for Medicare & Medicaid Services, and other leading US government statistical agencies. Development of tools/utilities for the management of data/metadata within the enclave environment.

<sup>1</sup> <http://www.dataenclave.org>



- Canada Research Data Centre Network<sup>2</sup>: lead for the Canada RDC Metadata project aiming at the establishment of a DDI metadata driven framework for the management of survey data and documentation across the research data centers facilities and to provide innovative tools to the researchers for the discovery, exploration, customization and analysis of the data.
- Statistics Canada: provide expert advisory services around institutional strategies for the adoption of metadata standards and service-oriented architecture around the production, management, and publication of statistical data. Development of tools and utilities for integration of existing systems with DDI in existing
- Data without Boundaries<sup>3</sup>: Scientific advisor and development leader for work packages 8 and 12 of the DwB initiative (<http://www.dwbproject.org>), a project involving 27 partners across Europe aiming at establishing an integrated model for accessing official data and developing tools/portals providing data/metadata access for researchers, irrespective of national boundaries and flexible enough to fit national arrangements.
- ICH DMP-SS: Lead development for the UK Institute of Child Health of DDI / ISO 27001 driven tools for the preparation and automated delivery of Data Management Plans to the Digital Curation Center DMPOnline<sup>4</sup> facility, aligned on requirements stipulated by the major UK funders. This activity is funded by JISC.
- Expert Consultancies: Provide expert inputs to various agencies on the use/adoption of metadata standards and related technologies, in particular around the Data Documentation Initiative specification. Customers include the International Household Survey Network (through OECD), Instituto Nacional de Estadística y Geográfica (INEGI, Mexico), UK Institute for Child Health (ICH), the INDEPTH Network, CESSDA, and others.
- Research: explore the effective use of emerging information technology for the purpose of supporting the management of statistical and scientific data. Particular focus on cloud based infrastructure and services, software and data as a service, innovative web based application and interfaces, big data (SQL and NOSQL), and semantic web technologies.

### **Integrated Data Management Services (IDMS)**

#### **President**

**Jan 2010 – Present**

- General company management and technical support to consultant for data/metadata related activities.
- Key Projects/Activities:
  - NORC Data Enclave: Manage team of metadata/data consultants to support day to day management of the NORC data enclave datasets and the preparation of metadata/documentation

### **Open Data Foundation, Inc. (ODaF)**

#### **Executive Manager**

**Apr 2006 – Present**

- Responsible for the day to day operational and organizational aspects of the Foundation which includes project coordination, administrative business functions, reporting, public relations, and systems development and maintenance.
- Lead development of open source tools for the management of statistical data and metadata.
- Key Projects/Activities:
  - Encourage cross agency collaboration and networking, advocate and foster the adoption of metadata standards and related best practices, event organization

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<sup>2</sup> <http://www.rdc-cdr.ca/>

<sup>3</sup> <http://www.dwbproject.org/>

<sup>4</sup> <https://dmponline.dcc.ac.uk/>



- NORC Data enclave: technical assistance to NORC around the establishment of the virtual data enclave and uses of metadata standards. This activity has been transferred to Metadata Technology North America.
- DDI Foundation Tools Program: collaborative efforts with the DDI Alliance and other partners to support the development of core libraries and tools for the management of DDI metadata and statistical data. This project closed in 2009.
- DDI DEXT: DDI driven open source utilities for the conversion of quantitative data into a standard archiving format and export to common statistical packages or database systems. Focuses on SPSS as the input data format with data export capabilities to ASCII, SAS, Stata, and SPSS. Supported by the UKDA Data Exchange Tools (DEXT), funded by JISC. This project closed in 2008.

**Metadata Technology Ltd., Surrey, UK**

**Director**

**Oct 2007 – Mar 2010**

- Manage projects and provide technical expertise for the development and deployment of metadata and data management information systems in the field of socio-economic and behavioral science, in particular for microdata and official statistics.
- Work closely with data producers, data archives, research centers and other stakeholders to foster the adoption of standards and best practices and the development of harmonized tools.
- Key Projects/Activities:
  - See Metadata Technology North America (above)

**Independent Consultant**

**Mar 2005 – Sep 2007**

- Manage projects and provide technical assistance to international organizations and national statistical agencies in the development and deployment of metadata and data management information systems. Provide technical advisory for the International Household Survey Network and lead the implementation of the IHSN Microdata Management Toolkit.
- Clients: World Bank, United Nations Development Programme (UNDP), Oxford Policy Management (OPM), National statistical agencies in Ethiopia, Tunisia & Rwanda, DDI Alliance, Afristat, International Maize and Wheat Improvement Center (CIMMYT)
- Key Projects/Activities:
  - Microdata Management Toolkit: a set of tools based on the DDI specification for data producers and librarians facilitating the archiving and dissemination of surveys in compliance with international metadata specifications and recommended practices.
  - IHSN Web Site: development and maintenance of the International Household Survey Network web site, including survey catalogs.
  - Training: Organization and delivery of training workshops for statistical agencies and regional consultants on the use of the Microdata Management Toolkit and surrounding practices.

**The World Bank, DC, USA**

**Information Officer**

**Jan 2000 – Feb 2005**

- As project manager, identify requirements, provide specifications and supervise the development of the World Bank survey metadata, documentation and data information systems. Lead systems development teams and assist survey data depositors in archiving and dissemination activities.
- As data manager, administer the Africa Household Survey Databank and Development Data Platform and work with regional partners and national statistical agencies on statistical capacity building, focusing on the improvement of microdata archiving and dissemination systems in the sub-Saharan Africa region. Country experience includes Benin, Burkina Faso, Cote d'Ivoire, Ethiopia, Mali, Mauritania, and Tanzania.



■ Key Projects/Activities:

- Data Development Platform (DDP): Lead the implementation of the microdata components of the Data Development Platform, the World Bank institutional system for managing data across the agency.
- Africa Household Survey Databank (AHSDB): Developed and maintain a web based portal
- National Data Archives: Establishment of IT infrastructure and deployment of DDI driven data/metadata systems in national statistical agencies in the Africa region
- Survey Navigator: developed database system for the compilation of survey metadata and documentation
- Survey Data Analysis Package (SDAP): developed a methodology and set of tools for the dissemination of survey data and metadata on CD-ROM by national statistical agencies in developing countries
- Training: conducted several regional and national workshops around best practices and tools for the archiving and dissemination of survey microdata

**CSS Corporation**

**Analyst/Developer**

**Jan 1999 - Dec 1999**

- As IT Consultant, design web, database and network solutions and provided technical support for customers. Work closely with the World Bank in the conception and initial stages of the Africa Household Survey Databank.
- Key Projects/Activities:
  - World Bank: technical support and development for the World Bank around survey data/metadata management

**Embassy of Belgium, Washington DC**

**Communication Officer**

**Oct 1990 - Jan 1999**

- Data Center Administrator: As manager of the Belgian Ministry of Foreign Affairs regional telecommunication and data center in Washington DC, supervise the LAN/WAN infrastructure for networks located in the North, Central and South America regions. Maintain the computer center hardware, software, telecommunication and security system. Implement custom applications and design/maintain the Embassy and Ministry's Internet web sites.

**Ministry of Foreign Affairs, Belgium**

**Analyst/Developer**

**Dec 1989 - Sep 1990**

- Analyst/Programmer. Development of the electronic mail, database, and network solutions for secure communication between the ministry and its embassies/consulates around the world.

**BCA Informatique**

**Analyst/Developer**

**Jan 1988 - Nov 1999**

- Analyst/Programmer: Implementation of corporate contact management system (SMI Mercure) and sales support for laptop/desktop equipment.

**TECHNICAL SKILLS**

Extensive experience with XML technologies and statistical data/metadata management information systems. Globally recognized expert on the Data Documentation Initiative XML specification.





Proficient with common programming languages (C, Java, .NET), development environments (Eclipse, MS-Visual Studio), common Java packages (Spring framework, Apache, iRODS), web technologies (Apache, IIS, GWT, pHP, Perl, JSP), XML/RDF technologies (XSL, XSchema, XPath/XQuery, SOAP, SKOS, SPARQL), database management systems (MS-SQL, MySQL, IBM DB2, Oracle, BaseX, MS-Access), big data solutions (Greenplum, Vertica, InfoBright, Hadoop), operating systems (Windows, Unix/Linux, Mac OS X, VOS), cloud environment (Amazon), and telecommunication technologies (TCP/IP, WAN, LAN, security)

Strong familiarity with common statistical packages and related tools (SAS, SPSS, Stata, R, StatTransfer, DBMSCopy)

## EDUCATION

### **Master of Science, Computational Science** **Georges Mason University, 2011**

Research focus on quantum computers and quantum information science. Master thesis: "QIS-XML: An Extensible Markup Language for Quantum Information Science", Pascal Heus, Richard Gomez, Jun 2011, arXiv:1106.2684v1

### **Graduate Certificate, Computational techniques and application** **Georges Mason University, 2003**

Various courses in mathematics, statistics, numerical analysis, high performance computing, astrophysics, and quantum physics.

### **Graduat en Informatique** **Institut Paul Lambin, UCL (Belgium), 1986**

Standard core IT curriculum

## PUBLICATIONS

Pascal Heus, Arofan Gregory, "Maximizing the Potential of Data: Modern IT Tools, Best Practices, and Metadata Standards for SBE Sciences", SBE 2020: Future Research in the Social, Behavioral & Economic Sciences, National Science Foundation, October 2010

Arofan Gregory, Pascal Heus, and Jostein Ryssevik, "Metadata," no. 57/2009, German Council for Social and Economic Data Working Paper

Julia Lane, Pascal Heus, and Tim Mulcahy, "Data Access in a Cyber World: Making Use of Cyberinfrastructure," Trans. Data Privacy 1, no. 1 (2008): 2-16.

Mary Vardigan, Wendy Thomas, and Pascal Heus, "Data Documentation Initiative: Toward a Standard for the Social Sciences," Text.Serial.Journal, December 2, 2008.

Pascal Heus and contributors, "Managing social, behavioral and economic data and metadata: Guidelines for Tools Development and Recommendations for Operating Environment", Open Data Foundation, 2008

Arofan Gregory and Pascal Heus, "DDI and SDMX: Complementary, Not Competing, Standards", Open Data Foundation, July 2007

## CONFERENCES & EVENTS

- IASSIST 2012, Washington, DC, Jun 4-8 2012 (Organizer)
- 15<sup>th</sup> Annual FedCASIC workshop, Washington, DC, Mar 2012 (Presenter)



Appendix B: Resumes - Section 2.16 Staff

- US National Children Study Metadata Workshop, Bethesda, MD, Jan 2012 (Presenter)
- IASSIST 2011, Vancouver, Canada, May 30 – Jun 3 2011 (Presenter)
- ODaF Europe 2010, Tilburg, Netherlands, Jul 7-8 2010 (Organizer)
- IASSIST 2010, Ithaca, NY, June 2-4 2010 (Presenter)
- 14<sup>th</sup> Annual FedCASIC workshop, Washington, DC, Mar 2010 (Presenter)
- ODaF Europe 2009, Bonn, Germany, Apr 2-3 2009 (Organizer)
- 13<sup>th</sup> Annual FedCASIC Workshop, Washington DC, Mar 17-19 2009 (Presenter)
- ODaF North America 2008, Washington DC, USA, Dec 3-4 2009 (Organizer)
- The Next Frontier in Documenting Survey Data: What Data Producers and Archivists Need to Know about DDI, XML and SDMX, NORC, Bethesda, MD, USA, Dec 2 2008 (Keynote speaker)
- DDI Alliance Expert Workshop, Dagstuhl, Germany, Nov 10-14 2008 (Invited expert)
- IDSC Workshop on comparability of DDI/SDMX, Wiesbaden, Germany, June 08
- IASSIST 2008, Stanford University, CA, USA, May 27-30 2008 (Presenter)
- ODaF Europe 2008, UKDA, Colchester, United Kingdom, Apr 14-15 2008 (Organizer)
- 12<sup>th</sup> Annual FedCasic Workshop, Washington DC, Mar 11-13 2008 (Presenter)
- 3rd International Digital Curation Conference, Washington DC, Dec 12-13 2007 (Presenter)
- ODaF annual meeting, Washington DC, USA, Dec 2007 (Organizer)
- Workshop on Metadata Standards and Best Practices, IZA, Bonn, Germany, Nov 07
- 10th Annual Open Forum for Metadata Registries, New York, NY, Jul 07
- IASSIST 2007, Montreal, Canada, May 2007 (Presenter)
- 11th Annual Federal CASIC Workshops, Washington, DC, Mar 2007 (Presenter)
- ODaF Napa Valley, St-Helena, CA, USA, Dec 2006 (Organizer)
- ODaF annual meeting 2006, Washington DC, USA, Dec 2006 (Organizer)





# JACK GAGER

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Jack "J" Gager is an IT professional with an extensive and diverse background in software architecture, development, and project management; specializing in XML technologies and web services.

## EXPERIENCE

### Metadata Technology North America, Inc., USA

President

2009-Present

- Focused on delivering metadata driven solutions to a variety of national and international organizations while still being actively involved in the progression of the SDMX and DDI standards.
- Key Contributions:
  - Managing ongoing efforts for developing a survey level metadata management system
  - Architecting / developing numerous metadata based web services
  - Actively involved in the ongoing development of the SDMX standard, including the standardization of SDMX based web services

### Metadata Technology Ltd., Surrey, UK

Director

2007-2010

- Worked on furthering the Statistical Data and Metadata Exchange and Data Documentation Initiative standards, by providing support in application and library development.
- Key Contributions:
  - Provided training on the fundamentals of SDMX
  - Maintained and Designed SDMX XML schemas since version 2.0
  - Developed and maintained offline tool suites for editing / validating SDMX
  - Write and maintained schemas for DDI version 3.0
  - Developing new features for the International Household Survey Network CD-ROM builder

### Aeon LLC, Senatobia, MS, USA

Junior Partner

2004-2007

- Working as a consultant, specializing in XML technologies. Work to date has included working on a tool suite for Statistical Data and Metadata Exchange, business and content analyst for Data Documentation Initiative.
- Key Contributions:
  - Created Microsoft Access database user interface, for creation and maintenance of statistical key families, including modules for importing and exporting between XML and the database.
  - Created Microsoft Excel tool for authoring XML statistical data instances, given a XML key family instance as input.
  - Created numerous complex XSL transformations for creating XSD schemas from XML instances, as well as transformations of data between various XML formats.



- Developed SAX based validation tool, for validating data in XML statistical data against standard metadata.
- Developed tools for integrating SDMX registry with a web based statistical publishing tool.
- Created library of documents for foreign exchange and client management transactions and provided business integration rules for developers for a financial exchange portal developed on Microsoft Biz Talk.

### **COMMERCE ONE, CA, USA**

#### **Software Engineer, Document Engineering**

**2000-2004**

- Initially worked on the design, development, and maintenance of Commerce One's XML Common Business Library (xCBL). As company's focus shifted, became part of the solutions team for Commerce One's Conductor web services platform, responsible for designing, developing, and deploying web service based composite applications.
- Key Contributions:
  - Designed, developed, maintained, and supported 3 releases of xCBL, a XML library with 70+ business documents.
  - Created both XSL and java based mappings between various XML business documents.
  - Developed various tools to aide in the creation, testing, and maintenance of xCBL documents and transformations.
  - Represented company in OASIS Universal Business Language Technical Committee, on the Library Content and Naming and Design Rules Sub Committees.
  - Provided training, both internal and external, on Commerce One Conductor.
  - Developed lightweight application for Invoice Reconciliation using Commerce One Conductor.
  - Developed composite application for financial services company to expose database based application as a web service.

### **ACCENTURE (Formerly ANDERSEN CONSULTING), MI, USA**

#### **Process/Technology Analyst**

**1999-2000**

- Worked as business analyst on a wide range of IT solutions. Projects included assisting Commerce One as a business and content analyst during the design of xCBL 3.0, and the implementation of a project management suite for Dow Chemical.
- Key Contributions:
  - Provided content analysis, including gathering and analyzing customer requirements for xCBL.
  - Participated in design and development and documentation of xCBL 3.0.
  - Migrated database of 2000+ users, 300+ projects, and 50+ cost centers using SQL.
  - Created temporary tools for maintenance of data during migration period.
  - Provided support of new suite to end users.
  - Developed custom tools utilizing application API's.

## **EDUCATION**

### **B.S.E., Chemical Engineering**

Cum Laude

**University of Michigan, 1999**

## **SKILLS**

XML, XSLT, XQuery, Java, Eclipse EMF, Eclipse RCP, AJAX, Visual Basic, VBA, .NET, SQL, MS Access, .NET ADO, SOAP, WSDL, HTML, ASP, ASP .NET, JavaScript





## AROFAN T. GREGORY

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Arofan Gregory's main career emphasis is on the development and deployment of technology standards to promote the use of distributed IT systems. His experience includes working for technical and scientific publishers deploying SGML and XML systems; experience developing standards and technology in the e-commerce sector; experience working with standards for IT supporting statistical and research data; and involvement in many standards-setting bodies, including OASIS and ISO. His main skills include business and systems analysis, training and presentation, systems integration and product architecture and development. Arofan has considerable experience as an expert consultant for systems development, and has broad experience as a technology trainer and presenter.

Main standards initiatives involving active participation:

- XML Common Business Library
- UN/CEFACT
- ISO-15000 ebXML
- Universal Business Library
- BizTalk Steering Committee
- Data Documentation Initiative (DDI)
- Statistical Data and Metadata Exchange (SDMX)

Arofan's experience has focused on the application of mark-up technologies and standards-based technologies since 1992. His recent activities include working as part of a small team of standards experts to develop and write the SDMX technical Specifications, and the Data Documentation Initiative (DDI) Standards version 3.0.

### EXPERIENCE

**Open Data Foundation, Inc. (ODaF), AZ, USA**  
**Executive Manager**

**Aug 2006-Present**

- As Executive Manager, responsibilities include:
  - Identifying and defining project proposals for submission to the Board of Directors
  - Overseeing project execution, including managing timescales, costs, and deliverables
  - Promoting the organization through presentations and publications
  - Organizing and chairing regional meetings several times a year, including identifying topics and inviting interested participants
  - All aspects of business management of the organization, including financial matters, finding interested individuals to serve on the Board of Directors, Executive management team, and Board of Advisors

**Metadata Technology Ltd., Surrey, UK**  
**Director**

**Jun 2005-Present**

- Perform all functions as a senior consultant and director within a small IT company with a focus on standards-based solutions in the areas of statistical and research data.



- Business strategy and development
- Product development, specification, and architecture
- Systems analysis and data design consulting
- Training on SDMX, DDI, and related topics
- Sales and marketing activities
- Presentation and publication at conferences related to relevant standards (DDI, SDMX, etc.)
- Participation in standards fora (ISO, UN/CEFACT, DDI Alliance) and not-for-profits (ODaF) to develop and support standards (DDI, SDMX, etc.)

**Aeon Consulting LLC, MS, USA**  
**Senior Partner**

**Oct 2002 – Present**

- Worked for SDMX Initiative developing, editing, and prototyping standards for aggregate statistical data metadata. Created XML schemas, specifications, tools, and documentation and provided all types of technical support for the standards initiative, including presentation and training.
- Worked as external technical expert for The Data Documentation Initiative (DDI) helping to model and revise XML schema-based standard for metadata relating to the collection, use, and archiving of raw statistical data and microdata. Produced documentation and presented material to the user community.
- Performed tools development and systems integration tasks for various standards-related projects.

**Commerce One, Inc., CA, USA**  
**Lead Scientist and Manager**

**Dec 1998 – Oct 2002**

- Developed and maintained major and minor versions of the XML Common Business Library (xCBL). Travelled worldwide, giving papers at conferences and training and presenting in the library's technical use to various domains. Developed and operated a support site. Worked in related areas in ebXML, UN/CEFACT, Biztalk, and other standards fora.
- Also performed product marketing functions for software products related to the mapping and transformation of standard business vocabularies for e-commerce, identifying and specifying product functionality.

**Documentum Inc., Pleasanton, California, USA**  
**Staff Consultant and Practice Leader**

**Feb 1998 – Dec 1998**

- Worked on large and small projects as business, process, and document analyst. Major projects included integration of Documentum with source-code management systems, and customizations to provide support for internationalization and localization of software and reusable, XML-based documentation.

**Workgroup Management Inc., CA, USA**  
**SGML/XML Consultant**

**Dec 1997 – Feb 1998**

- SGML Consultant. Worked primarily on Cisco project doing document analysis, XML and application training, and DTD writing activities for documentation systems. This included a knowledge management project harmonizing the documentation and metadata across product lines, using SGML technologies.
- (Workgroup Management, Inc. acquired by Documentum, Inc. in February of 1998.)



**Aeon Consulting LLC, MS, USA**  
**Partner and Consultant**

**Jul 1997 – Dec1997**

- SGML Consultant and Partner. Worked in technical publications and translation/globalization systems. Performed XML training for beginners and developers, and helped with architecture and integration of SGML in publishing systems. Major clients included Sun Microsystems, Cisco, CAE, and other large documentation publishers.

**Passage Systems, Inc., CA, USA**  
**Manager of Consulting, Trainer, and Senior Consultant**

**Jan 1995 – Jul 1997**

- Responsible for document analysis, XML training, DTD creation, integration and configuration work for SGML software. Projects included customers such as Cisco, Sun Microsystems, Educational Training Services, and Learning Tree. Position involved presentation of SGML approaches to publishing at international and national conferences. Consulting staff varied between 5 and 12 people.

**FA Davis Co., PA, USA**  
**Electronic Production Editor**

**Sep 1991 – Dec 1995**

- Worked in the production of medical and other technical publications, coordinating authors, typesetters, copyeditors, proofreaders, and interactions with marketing and production staff. Created DTDs for the use of SGML in publishing systems for print and CD-ROM products, and performed training to establish SGML-based electronic production systems throughout the company. Involved in all aspects of design, documentation, and testing of electronic publications, and was responsible for oversight of software development staff. Worked with standard DTDs for the editing and publication of technical content.

**Mosby-Year Book, Inc., PA, USA**  
**Production Editor**

**Mar 1989 – Sep 1991**

- Edited and coordinated the production of medical textbooks and journals. Position involved coordination of copyeditors, proofreaders, typesetters, authors, and other marketing and production staff.

**Editing, Design, and Production, Inc., PA, USA**  
**Production Editor**

**Apr 1987 – Mar 1989**

- Production Coordinator. Worked in the editing and creation of technical publications, textbooks, scientific journals, and fiction anthologies. Worked as copyeditor, proofreader, and coordinator of other production staff.

## **TECHNICAL SKILLS**

Broad experience within standards groups and domain committees, and working with distributed systems to promote interoperability. Systems analysis and automation, documentation, and metadata management are all points of focus.

Possesses at least 17 years experience in informatics, including over 12 years as systems analyst and consultant. Also has over 9 years experience in multi-national electronic data transmission environments.





Significant skills in document and data analysis for XML and relational structures; process analysis for modelling flows and data payloads; expert in W3C XML schema and XML, web services standards (SOAP, WSDL, etc.), and XML sister standards (XPath, XSLT, XQuery, etc.); strong knowledge of UML and modelling techniques. Programming languages include Java, VB, VBA, Perl, C/C++, Javascript, and PHP. Familiar with most major XML development environments/techniques, and with most database approaches for handling XML data and metadata. Familiar with semantic web technologies/standards, and with knowledge-management approaches based on ontologies and on more traditional methods used by data librarians.

## **SOCIAL & ORGANIZATIONAL SKILLS**

Very motivated and energetic, and capable of working well within a team, as a leader or participant. Excellent presentation and communication skills, with lots of experience working in international teams. Training experience provides an ability to understand and communicate viewpoints of others easily, to better work with them.

Excellent organizational skills, particularly in terms of presentation and written communications.

## **EDUCATION**

### **Certificate of Course Completion**

**IDEA Alliance, 1992**

Use of SGML technology and design of SGML data type definitions (DTDs)

### **Bachelor of Arts in English Literature**

**Magna Cum Laude with Honors in Major**

**Temple University, 1987**

Literary and film criticism, social sciences research, economics, philosophy, art history, and history

## **PUBLICATIONS**

Gregory, Arofan. "Throwing SGML Over the Wall: SGML and Commercial Book Publishing." Presented at the SGML 96 Conference, Boston, Massachusetts, November 1996.

Gregory, Arofan. "Wishful Thinking or Thinking Ahead? Envisioning the Next Generation of SGML Editors." Presented at the SGML Europe Conference, Barcelona, Spain, May 1997.

Gregory, Arofan. "XML Schema Development for Business-to-Business e-Commerce." Presented at the XML Europe 2000 Conference, Paris, France, June 2000.

Gutentag, Eduardo and Gregory, Arofan. "XML-based Rules: Automating Business Context Categorization to Produce Semantic Interoperability - The Rules-Based ebXML Approach." Presented at the Extreme Markup Languages 2001 Conference, Montreal, Canada, in August 2001.

Gutentag, Eduardo and Gregory, Arofan. "XSD Type Derivation and the UBL Context." Presented at the XML 2002 Conference, Philadelphia, Pennsylvania, December 2002.

Gutentag, Eduardo and Gregory, Arofan. "Context Methodology Vision for UBL." Presented at the Ontolog Forum Meeting, San Francisco, California, November 2003.





Gutentag, Eduardo and Gregory, Arofan. "UBL and Object-Oriented XML: Making Type-Aware Systems Work" Presented at the XML 2003 Conference, Philadelphia, Pennsylvania, December 2003.

Gutentag, Eduardo and Gregory, Arofan. "XML Schema Libraries: The UBL Case." Presented at the XML Europe 2003 Conference, London, England, May 2003.

Gregory, Arofan. "Web Services and the Financial Statistical Reporting Information Chain." Presented at XML Europe 2003, London, England, May 2003.

Gregory, Arofan. "Release of Statistical Data and Metadata Exchange (SDMX) Standards Version 1.0." Presented at the XML 2004 Conference, Washington DC, December 2004.

Gregory, Arofan. "SDMX Tools." Presented at the Meeting of the OECD Expert Group on Statistical Data and Metadata Exchange, Bratislava, Slovak Republic, April 2005.

Gregory, Arofan and Nelson, Chris. "Report on Data Reporting to the OECD Report from the SDMX Standards Team on Development of the SDMX Standards, Including ISO Related Work." Presented at the Meeting of the OECD Expert Group on Statistical Data and Metadata Exchange, Bratislava, Slovak Republic, April 2005.

Thomas, Wendy, Arofan Gregory, Tom Piazza. "Structural Reform Group Report." Part of a session on "An Inside View of DDI Version 3.0," Chair Jostein Ryssevik. Presented at the annual meeting of the International Association of Social Science Information Services and Technology, Edinburgh, Scotland, May 2005.

Gregory, Arofan. "SDMX Basics: An Introduction to the Use of ISO/TS 17369 - SDMX Technical Standards Version 1.0." Metadata Technology Ltd., Guilford, England, June 2005.

Gregory, Arofan and Nelson, Chris. "SDMX, ISO 11179 and the CMR." Invited paper presented to the Joint UNECE/Eurostat/OECD Work Session on Statistical Metadata (METIS), Geneva, Switzerland, April 2006.

Gregory, Arofan and Nelson, Chris. "The SDMX Information Model - A Pedagogical Explanation for Statisticians." Presented to the OECD Expert Group on Statistical Data And Metadata Exchange, Geneva, Switzerland, April 2006.

Gregory, Arofan. "The SDMX Toolkit." Presented to the OECD Expert Group on Statistical Data And Metadata Exchange, Geneva, Switzerland, April 2006.

Gregory, Arofan. "DDI 3." Part of session "DDI for the Next Decade: Toward Version 3.0 (Part 2)," Chair Pascal Heus. Presented at the annual meeting of the International Association of Social Science Information Services and Technology, Ann Arbor, Michigan, May 2006.

Gregory, Arofan and Nelson, Chris. "Technical Standards." Presented at the World Bank's Toward Implementation of SDMX Conference, January 2007.

Gregory, Arofan and Nelson, Chris. "SDMX Technical Standards Data and Metadata Structures." Presented at the SDMX Capacity Building Workshop, Washington DC, January 2007.

Gregory, Arofan and Nelson, Chris. "Advanced Topics on Technical Standards." Presented at the SDMX Capacity Building Workshop, Washington DC, January 2007.



Gregory, Arofan. "Toward a Global Infrastructure for Data and Metadata: The Open Data Foundation." Presented at the XML 2007 Conference, Boston, Massachusetts, United States, December 2007.

Gregory, Arofan and Heus, Pascal. "DDI and SDMX: Complementary, Not Competing, Standards", Paper published by the Open Data Foundation, Tucson, Arizona, United States, July 2007.

Gregory, Arofan. "Registration." Invited plenary presentation at the 10th Open Forum for Metadata Registries Conference, New York City, New York, United States, July 2007.

Gregory, Arofan and Nelson, Chris. "ISO 17369 - SDMX: Statistical Data and Metadata Exchange." Paper presented at the 10th Open Forum for Metadata Registries Conference, New York City, New York, United States, July 2007.

Gregory, Arofan. "Tutorial on ISO 17369 - SDMX." Workshop conducted at the 10th Open Forum for Metadata Registries Conference, New York City, New York, United States, July 2007.

Gregory, Arofan, Thomas, Wendy, and Wackerow, Joachim. "Using DDI 3.0 to Support Preservation, Management, Access and Dissemination Systems for Social Science Data." Workshop held at the Schloss Dagstuhl, Germany, November 2007.

Gregory, Arofan. "Status on the Mapping of Metadata Standards: ISO/IEC 11179, SDMX, and Others." Invited paper presented to the Joint UNECE/Eurostat/OECD Work Session on Statistical Metadata (METIS), hosted by Eurostat, Luxembourg, April 2008.

Gregory, Arofan and Thomas, Wendy. "Putting DDI 3.0 to Work for You! Part II." Workshop presented at the annual meeting of the International Association of Social Science Information Services and Technology, Stanford University, United States, May 2008.

Gregory, Arofan. "SDMX and DDI: Using the Right Tool for the Job." Presented at the annual meeting of the International Association of Social Science Information Services and Technology, Stanford University, United States, May 2008.

Gregory, Arofan and Thomas, Wendy. "DDI 3.0: Final Revisions and Future Directions." Presented at the annual meeting of the International Association of Social Science Information Services and Technology, Stanford University, United States, May 2008.

Gregory, Arofan and Heus, Pascal. "Compatibility of DDI/SDMX." IZA Data Service Center Workshop, Wiesbaden, Germany, June 2008.

Gregory, Arofan. "The SDMX Toolkit." Presented to the OECD Expert Group on Statistical Data And Metadata Exchange, Geneva, Switzerland, April 2006.

Gregory, Arofan. "DDI 3." Part of session "DDI for the Next Decade: Toward Version 3.0 (Part 2)," Chair Pascal Heus. Presented at the annual meeting of the International Association of Social Science Information Services and Technology, Ann Arbor, Michigan, May 2006.

Gregory, Arofan and Nelson, Chris. "Technical Standards." Presented at the World Bank's Toward Implementation of SDMX Conference, January 2007.

Gregory, Arofan and Nelson, Chris. "SDMX Technical Standards Data and Metadata Structures." Presented at the SDMX Capacity Building Workshop, Washington DC, January 2007.



Gregory, Arofan and Nelson, Chris. "Advanced Topics on Technical Standards." Presented at the SDMX Capacity Building Workshop, Washington DC, January 2007.

Gregory, Arofan. "Toward a Global Infrastructure for Data and Metadata: The Open Data Foundation." Presented at the XML 2007 Conference, Boston, Massachusetts, United States, December 2007.

Gregory, Arofan and Heus, Pascal. "DDI and SDMX: Complementary, Not Competing, Standards", Paper published by the Open Data Foundation, Tucson, Arizona, United States, July 2007.

Gregory, Arofan. "Registration." Invited plenary presentation at the 10th Open Forum for Metadata Registries Conference, New York City, New York, United States, July 2007.

Gregory, Arofan and Nelson, Chris. "ISO 17369 - SDMX: Statistical Data and Metadata Exchange." Paper presented at the 10th Open Forum for Metadata Registries Conference, New York City, New York, United States, July 2007.

Gregory, Arofan. "Tutorial on ISO 17369 - SDMX." Workshop conducted at the 10th Open Forum for Metadata Registries Conference, New York City, New York, United States, July 2007.

Gregory, Arofan, Wendy Thomas, and Joachim Wackerow. "Using DDI 3.0 to Support Preservation, Management, Access and Dissemination Systems for Social Science Data." Workshop held at the Schloss Dagstuhl, Germany, November 2007.

Gregory, Arofan. "Status on the Mapping of Metadata Standards: ISO/IEC 11179, SDMX, and Others." Invited paper presented to the Joint UNECE/Eurostat/OECD Work Session on Statistical Metadata (METIS), hosted by Eurostat, Luxembourg, April 2008.

Gregory, Arofan and Thomas, Wendy. "Putting DDI 3.0 to Work for You! Part II." Workshop presented at the annual meeting of the International Association of Social Science Information Services and Technology, Stanford University, United States, May 2008.

Gregory, Arofan. "SDMX and DDI: Using the Right Tool for the Job." Presented at the annual meeting of the International Association of Social Science Information Services and Technology, Stanford University, United States, May 2008.

Gregory, Arofan and Thomas, Wendy. "DDI 3.0: Final Revisions and Future Directions." Presented at the annual meeting of the International Association of Social Science Information Services and Technology, Stanford University, United States, May 2008.

Gregory, Arofan and Piche, Rene. "SDMX Overview." Presented at the National Science Foundation Accounting Interoperability Workshop, Washington D.C., United States, May 2008.

Gregory, Arofan and Heus, Pascal. "Compatibility of DDI/SDMX." IZA Data Service Center Workshop, Wiesbaden, Germany, June 2008.

Editor, Business Document Specification, CommerceNet eCo initiative. (1999-2000)

Member of Editing Team and contributor, Core Components Technical White Paper, ebXML Initiative, joint OASIS & UN/CEFACT effort. Focus on development of Context classification, constraints language, and methodology. (2000-2001)



Appendix B: Resumes - Section 2.16 Staff

Member of Editing Team and Contributor, Core Components technical Specification, Tools and Methodologies Working Group, UN/CEFACT. (2001 - 2002)

Expert, Applied Technologies Group, UN/CEFACT (2002)

Chair, Tools and Techniques Subcommittee, Universal Business Language Technical Committee, OASIS (2001 - 2002)

Contributor, Naming and Design Rules Subcommittee, Universal Business Language Technical Committee, OASIS (2001 - 2002)

Contributor, Context Methodology Subcommittee, Universal Business Language Technical Committee, OASIS (2001 - 2002)

Editor, Context Classification Subcommittee, Universal Business Language Technical Committee, OASIS (2001 - 2002)

Member, BizTalk Steering Committee, Microsoft (2001)

Technical Advisor to TBG Chair, UN/CEFACT Forum (2006-Present)

Member, Working Group 2 (SDMX), ISO Technical Committee 154 (2004 - Present)

Member, US TAG, ISO Technical Committee 154 (2006 - Present)

Standards Expert, SDMX Initiative (2002 - Present)

XML Expert, DDI Alliance (2002 - Present)



## JOHANNES FERNANDES-HUESSY

### EDUCATION

M.A. Political Science, American University, 2012

B.A. Liberal Arts, St. John's College, 2005

### PROFESSIONAL EXPERIENCE

NATIONAL OPINION RESEARCH CENTER, BETHESDA, MD

*Senior Research Analyst*

*2008-Present*

FRAUNHOFER INSTITUTE, BERLIN, GERMANY

*Research Assistant*

*2006-2007*

### SELECTED PROJECT EXPERIENCE

**Project Manager, Developing and Sustaining a Virtual Research Community: A Comprehensive Approach.** This project involves supporting the Harvard Business School-affiliated Private Capital Research Institute by creating a secure environment to host the aggregation and harmonization of proprietary fund and transaction data from private capital firms. Specific tasks in this project include the creation of a custom virtual environment for database administrators and programmers, the management of multiple streams of sensitive data from private sector institutions, the creation of a robust analytic database and the provision of access to external researchers. *Private Capital Research Institute*

**Assistant Project Manager, Cloud Research and Development.** This project tasked the NORC Data Enclave team with supporting the information technology leadership within the federal statistical community in investigating cloud solutions which could support the task force's goals of harmonizing and streamlining federal statistical data products. This project included five tasks: (1) to design, develop, and test alternate cloud configurations for storing confidential data; (2) to identify and evaluate performance of cloud security software, including system/application/data security capabilities; (3) to provide benefit/cost analyses of the various tools evaluated to develop specific alternative configurations; (4) to design and test processes for securely migrating data from individual agencies to cloud platforms; and (5) to evaluate the performance of cloud security software in a production environment through application to the virtual server for FedStats.. *Statistical Community of Practice and Engagement (OMB Task Force)*

**Assistant Project Manager, Comparative Effectiveness Research Public Use Files.** In this project the NORC Data Enclave team supported multiple teams of internal and external analysts in using sensitive Medicare claims data to generate sophisticated public use files that preserved the confidentiality of beneficiaries while delivering unprecedented analytic utility to researchers. The Data Enclave team delivered a number of customized analytic solutions to facilitate innovative data manipulation techniques with large volumes of claims records. *Center for Medicare and Medicaid Services*

**Assistant Project Manager, National Science Foundation Secure Data Access Facility.** This project involved the creation of a secure data access facility, documentation of NSF educational data, training of select researchers, technical support for data environment users, and the creation of an online tabulation engine for sensitive data. *National Science Foundation*

**Assistant Project Manager, National Science Foundation Discovery in Research Portfolio.** This project involved the creation of a data enclave for select NSF research teams, including specialized areas for

innovative data tool development, curating over 100,000 NSF grant proposals, and training and supporting the research teams inside the data enclave. *National Science Foundation*

**Assistant Project Manager, Financial Crisis Inquiry Commission**, Established by Congress pursuant to sections of the Fraud Enforcement Recovery Act of 2009 (FERA), the FCIC was tasked with examining the causes, domestic and global, of the current financial and economic crisis in the United States and determining the levels of interconnectedness and effect of contagion in the financial services industry. NORC assisted the FCIC in administering a census survey of approximately 300 U.S. hedge funds to study the size, amount of exposure, and other risk-related metrics in markets that have traditionally operated with limited available public data. The survey compiled time series data to track the development of the financial crisis and to gain a deeper understanding of what happened, as measured by specific quantitative metrics rather than speculative qualitative discourse. NORC collected survey responses, cleaned and aggregated the data, and delivered a fully de-identified dataset to the FCIC. *Financial Crisis Inquiry Commission (Congressional Commission)*

**Research Analyst. The Dynamics of Methamphetamine Markets: A Systematic Approach to Process:** This research study sought to enhance the nation's knowledge and understanding of the dynamics of illicit retail meth markets. It utilized a three stage design. The first stage included a screening assessment of approximately 18,000 respondents in cities and counties across the U.S. The second stage consisted of selecting 50 cities or counties where narcotics police are most knowledgeable of the meth trade and conducting semi-structured, web-assisted telephone interviews with narcotics police in those departments. The third stage was composed of on-site focus groups, in-depth interviews, and systematic observation to learn from the people involved in the meth markets at all levels how the markets are organized and operate.

## SELECT PAPERS, PUBLICATIONS, CONFERENCE PRESENTATIONS

Brownstein, Mulcahy, Taylor, Fernandes-Huessy, and Hafford. Forthcoming 2012. "Meth Markets are Personal." *Contexts*.

Prada, Sergio I., González-Martínez, Claudia, Borton, Joshua, Fernandes-Huessy, Johannes, Holden, Craig, Hair, Elizabeth and Tim Mulcahy 2011 "Avoiding Disclosure of Individually Identifiable Health Information : A Literature Review" available at SAGE Open online 14 December 2011 as *doi: 10.1177/2158244011431279*

Brownstein, Mulcahy, Taylor, Fernandes-Huessy, and Woods. Forthcoming. "The Organization and Operation of Illicit Retail Drug Markets." *Criminal Justice Policy Review*. Online at Sage as of November 9, 2010 as *doi:10.1177/0887403410383010*.

Taylor, Brownstein, Mulcahy, Woods, Fernandes-Huessy, and Hafford. 2011. "Illicit Retail Methamphetamine Markets and Related Local Problems: A Police Perspective." *Journal of Drug Issues*, 36: 327-31.

Taylor, Brownstein, Mulcahy, Hafford, Woods, and Fernandes-Huessy. 2011. "The Characteristics of Methamphetamine Markets and Their Impact on Communities." *Criminal Justice Review*. 36:312-31.

"Using Virtual Telephone Interviews to Study the Impact of Local Meth Markets on Community Health and Safety," presented at the annual meeting of the Association of American Geographers. Seattle, WA, April 2011.

"The Changing Structure of Methamphetamine Markets in America," findings presented to the Drug Enforcement Administration and the Office of National Drug Control Policy, both in December, 2010 as a follow-up to the August, 2010 NIDA-NIJ presentation.

Henry H. Brownstein; Timothy M. Mulcahy; Johannes Huessy; and Bruce G. Taylor, 2009. "How are Methamphetamine Markets Organized? An Analysis Based on Johnson's Freelance/Business Model Distinction of Illicit Drug Markets." American Society of Criminology, Philadelphia, PA, November.

Mulcahy, Timothy M.; Brownstein, Henry; and Johannes Huessy, 2009. "Methamphetamine Markets in their Communities: Variation in Organization, Operation, and Outcomes." Drugs and Drug Treatment Panel. BJS/JRSA National Conference St. Louis, MO, October.

Brownstein, Henry; Timothy Mulcahy, and Johannes Huessy, 2009. "The Organization and Operation of Illicit Retail Methamphetamine Markets: A View from Law Enforcement." Prepared for presentation to the Department of Criminology, Law, and Justice University of Illinois at Chicago. October.



**JAN PATERSON, Esq., PMP**  
Senior Advisor  
**Public Consulting Group, Inc.**

**State of Mississippi**

**Statewide Health Information Exchange Strategic and Operational Plan**

Creation, submission and approval of the Statewide Health Information Exchange Strategic and Operational Plans: Conducted environmental scan, managed the Governance, Business and Operations Finance and Legal and Policy work groups. Participated in the document drafts and submission to ONC.

**State of Tennessee, Policy and Operational Consulting Related to Federal Health Care Reform**

CCIO Planning Review: Directed and participated in the development of establishment grant process, including drafting of CCIO documents for the planning, design, and implementation reviews.

Qualified Health Plan Procurement: Planning and drafting RFP for qualified health plans for the Tennessee Health Insurance Exchange.

Document Peer Review: Participated in the peer review of the Tennessee Health Insurance Exchange planning, design, and implementation review documents.

SHOP QHP System Procurement: Develop the RFP and pro forma contract for the procurement of Tennessee's SHOP QHP system.

**State of Mississippi, State Medicaid Health Information Technology Plan**

Development, drafting and submission of the SMHP and the HIT IAPD for CMS approval: Managed the SMHP project through the environmental scan process, the design of the EHR Medicaid Incentive Payment Program(MIPP), completion of the vision sessions; drafting of the As-Is, To-Be, Road Map and final SMHP and Implementation Advance Planning Document (IAPD). MS received approval for the SMHP and IAPD in November 2010 enabling them to be one of the first in the nation to pay EHR incentive payments to providers.

**Mississippi Comprehensive Health Insurance Risk Pool Association (MS CHIRPA)**

Health Insurance Exchange (HIX) Planning: Attorney Paterson is participating in the procurement of a Shop and Compare Portal to establish an Exchange web portal for the MS CHIRPA. This portal is envisioned to be the first phase in establishing a fully functioning, federally certifiable exchange solution that can service the State of Mississippi to achieve compliance with the requirements of the ACA.

**State of Nevada, State Health Care Reform and Health Benefit Exchange Planning**

Legal and Policy SME: As part of its Health Care Reform and Exchange Planning engagement, PCG was engaged to assist with the development of options to improve care management of high cost/high need recipients. Attorney Paterson participated in the development of an 1115 waiver for care coordination and medical homes. Specifically, she developed an evaluation strategy for the waiver that aligns the care management initiatives with the promotion of electronic health record systems.



### **State of Delaware, State Health Care Reform and Health Benefit Exchange Planning Consulting**

Legal and Policy SME: PCG is currently assisting the State to analyze the effects of and plan for the implementation of the Health Benefit Exchange (HBE). Serving in the role of comprehensive program manager, PCG's main role is to provide the state with a "one-stop shop" to access firms and individuals with the necessary technical skills. PCG is conducting on-going research and analysis to keep abreast of local, regional and national changes, additional regulations, legislative and regulatory requirements, industry issues, grant opportunities, planning and implementation projects, etc. as related to the Health Benefit Exchange. Review and analysis of federal and state legislation and regulations relating to establishment of health benefit exchange. Provided an overview deliverable. Analysis and recommendations regarding governance, gaps in legislation and regulations.

### **State of Nevada, State Health Care Reform and Health Benefit, Exchange Planning Consulting**

Legal and Policy SME: PCG is currently assisting the State to analyze the effects of, and plan for, the implementation of the HBE. Provided legal and policy assistance relating to HITECH, HIPAA, ARRA and PPACA. Provided analysis, recommendations and comments to CMS for all Exchange and Medicaid rules. Drafted program integrity planning document for the Level 1 Establishment Grant.

### **State of Nebraska, State Medicaid Health Information Technology Plan**

Development, drafting and submission of the SMHP and the HIT IAPD for CMS approval:

As the project manager, Ms. Paterson managed the SMHP project through the environmental scan process, the design of the EHR Medicaid Incentive Payment Program(MIPP), completion of the vision sessions; drafting of the As-Is, To-Be, Road Map and final SMHP and Implementation Advance Planning Document (IAPD).

### **State of Nevada, State Medicaid Health Information Technology Plan**

Development, drafting and submission of the SMHP and the HIT IAPD for CMS approval:

As the project manager, Ms. Paterson the SMHP project through the environmental scan process, the design of the EHR Medicaid Incentive Payment Program(MIPP), completion of the vision sessions; drafting of the As-Is, To-Be, Road Map and final SMHP and Implementation Advance Planning Document (IAPD)

### **State of Maine, MMIS Design Development and Implementation Unisys**

MMIS DDI Project: PCG participated with Unisys to provide quality assurance services to the Unisys project team during design, development and implementation of the State of Maine MMIS. Responsibilities included:

- Review project work plan and provided project risk/issue identification
- Develop CMS Certification Plan
- Develop and maintain Quality Assurance Plan
- Review DDI project deliverables and artifacts including the Detail System Design Documents and Training Plans
- Participate in unit and system integration testing

### **State of New York, Department of Health**

eMedNY Quality Assurance and Technical Assistance of Medicaid Fiscal Agent: Oversight and monitoring of the current fiscal agent. Planning and preparation for improved change management process and preliminary planning for procurement of replacement MMIS and data warehouse. Responsibilities included:

- Develop Quality Assurance Plan
- Provide critical assessment, review and evaluation of ongoing MMIS evolution (modifications and enhancement) projects through operations and turnover
- Conducted deliverable assessments, including Turnover Plan, Disaster Recovery Plan and User Manuals
- Contract monitoring and oversight included status reporting and project plan review
- Attendance, participation and documentation of project status meetings
- Conduct Joint Application Design facilitated sessions
- Risk identification and corrective action planning
- Participation in change management process improvement
- Participated in the establishment of a Project Management Office and IT Governance structures to improve quality and alignment with business goals
- Participate in the development of the data warehouse replacement RFP. Participation included gathering requirements through the development and facilitation of JAD sessions and preparation of the RFP outline incorporating requirements and Procurement Library documents.

### **Fox Insurance Company, Medicare Part D Insurance Company**

Implementation of a new Medicare Part D Prescription Drug Plan: Fox Insurance was a new insurance company created to participate in the new Medicare market. Compliance with federal and state statutory and regulatory laws regarding start up and operations of standalone Medicare Part D Prescription Drug Plan. Responsibilities included:

- Directed HIPAA compliance efforts
- Drafted HIPAA compliant business associate agreements
- Monitored and evaluated impacts of Medicare regulations to Medicare Part D Plan operations

### **State of New Hampshire, Department of Health and Human Services**

MMIS Reprocurement Design, Development and Implementation: Participated in the independent verification and validation (IV&V) of the replacement MMIS throughout the process of the design of the system. Participated in the Review of the General System Design for SURS, TPL and EPSDT programs.

### **Bull Services**

Healthcare Planning and Policy: Provided subject matter expertise for development of data warehouse and decision support solutions for health and human services programs. Customer solutions included the CA Medicaid Program Data Warehouse and Decision Support. Michigan Enterprise Data Warehouse, Illinois Data Warehouse, New York eMedNY Data Warehouse.

## **State of New Hampshire, Department of Health and Human Services**

Member of:

- Counsel to the Office of Community and Public Health (6/2000—1/2001)
- Families (6/1994—6/2000) Counsel to the New Hampshire Pharmacy and Therapeutics Advisory Committee (During tenure as Bureau Chief of Medicaid Policy and Implementation)
- Counsel to the Division for Children, Youth and
- Responsibilities included:
- Contract management and review
- Regulatory and legal support
- Legal advisor
- Litigation management and support

### **Acting Medicaid Director**

Direct and manage the operations, policy planning and fiscal activities of the state Medicaid program. Was responsible for maintenance of provider network, client services and implementation of important cost savings initiatives Maintained service delivery for 90,000 Medicaid recipients

### **Bureau Chief for Medicaid Policy Planning and Implementation**

Direct and manage the New Hampshire Bureau of Medicaid Policy and Implementation. Was responsible for planning and implementing important Medicaid program changes due to legislative, regulatory and internal policy changes.

## **EDUCATION**

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### **Franklin Pierce Law Center**

Juris Doctor Degree,

### **University of New Hampshire**

Bachelor of Science Degree

### **Boston University**

Project Management Principles

### **Project Management Institute**

Project Management Professional

## **MEMBERSHIPS**

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New Hampshire Bar Association

National Academy for State Health Policy

American Association for Public Welfare Attorneys



**Jim Waldinger**  
*Associate Manager*  
**Public Consulting Group, Inc.**

## **WORK HISTORY**

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### **Public Consulting Group, 2008-present**

*Associate Manager, 2011-present*

*Senior Consultant, 2008-2011*

### **Massachusetts Behavioral Health Partnership, 2006-2008**

*VP of Finance and Chief Financial Officer, 2006-2008*

### **Commonwealth of Massachusetts, 2001-2006**

*MassHealth (Medicaid) Budget Director and Chief Financial Officer, 2002-2006*

*Fiscal Affairs Division's Fiscal Policy Analyst, 2001-2002*

### **Maptech, Inc., 1996-2001**

*Managing Editor, 1999-2001*

*Editor, 1996-1999*

### **Imprint Newspapers, 1994-1996**

*News Reporter and Sports Editor, 1994-1995*

## **CONSULTING PROJECT EXPERIENCE**

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### **Health Care Reform**

#### **State of North Carolina – Department of Insurance (NCDOI)**

***Exchange Planning Consultant:*** Serving as Project Manager for NCDOI's exchange planning efforts. Tasks include the development of work plan and budget documents for submission of Level I and Level II grant applications, assistance in preparation of CCIIO Reviews, and the development of an Exchange Evaluation Plan. Also, provides day-to-day consultation to NCDOI staff.

#### **State of Arkansas – Arkansas Insurance Department (AID)**

***Navigator Program Development:*** Serving as the Project Manager assisting AID with the development of a comprehensive Navigator Program. Work with both AID staff and a Consumer Assistance Advisory Committee to discuss policy options and alternatives. Present options and alternatives to Advisory Committee and the Arkansas FFE Partnership Steering Committee. Working with AID staff to turn policy recommendations into AID policy and procedures. Assisting in the recruitment of Navigator entities and individuals.

#### **State of North Carolina – Department of Health and Human Services (DHHS)**

***Affordable Care Act Consulting and Work Plan Development:*** Led PCG's efforts to help organize and provide technical expertise to DHHS in planning, implementing, and managing all relevant facets of health care reform. Project accomplishments included: 1) creation of centralized work plans for all Affordable Care Act (ACA) initiatives; 2) developed DHHS

communication and oversight plan; 3) develop IT gap analysis; 4) assisted in drafting NC Division of Insurance's Health Benefit Exchange Level I Cooperative Agreement Application.

### **State of Tennessee**

***Strategic Planning Session:*** Assisted in day-long policy strategic planning session with Tennessee exchange officials.

***Design Review Preparation:*** Assisting state with the development of the materials for upcoming Design Review with CCIIO. Responsibilities include creating and managing schedule and creation of documents, policies, and other materials, as needed.

### **State of Colorado – Division of Health Care Policy and Financing (DHCPF)**

***Benefits Design Assistance:*** Leading team assisting state in designing and implementing Medicaid programs for expansion populations, including buy-in programs for the disabled, adults without dependent children, and dually eligible. Performed research on state options, drafted recommendation memos to Medicaid leadership, led consumer and provider stakeholder meetings, drafted state plan amendment language, calculated cost models, and provided general consulting services.

### **Commonwealth of Massachusetts, Commonwealth Care Customer Service Center**

***Financial and Reporting Manager:*** The Customer Service Center serves as the premium billing and call center entity for the Massachusetts CommCare products. As Reporting Manager, documented all contractual reports, improving accuracy and client satisfaction. Reporting has changed from a contractual obligation to a management tool. Financial Manager reviews and reports on daily, weekly, and monthly financial metrics related to bank account balances, member invoices, and related day-to-day fiscal issues. Documented financial internal controls for all premium billing processes.

### **Managed Care**

#### **Commonwealth of Virginia – Virginia Premier Health Plan (VPHP)**

***Hospital Re-Contracting:*** Working with VP of Network Development to formulate hospital negotiation strategies. Involves the pulling of hospital cost, efficiency, and outcomes data from a number of sources, including the CMS-2552 hospital cost report. Once the data is collected and metrics calculated, the negotiation strategy and appropriate back-up materials are created. Output used during contract negotiations with network hospitals to achieve more favorable, fair rates.

### **Various Clients**

***Hospital Administrative Reporting:*** Produce hospital reports that measure major hospital cost metrics against local and national peer facilities. Data is used by clients to develop rate negotiation strategies with contracted hospitals.

### **Care Management and Health Homes**

#### **State of Nevada – Division of Health Care Financing and Policy (DHCFP)**

***Care Management and Patient-Centered Medical Home Report:*** Performed analysis and produced with a preliminary identification of the number of individuals whose utilization patterns may improve with the introduction of care management interventions. We developed a high-level initial estimate of potential net savings that could occur with implementation of a care

management strategy. The goal of this PCG report was to assist DHCFF in analyzing its options to improve care for its FFS clients, as well as achieve cost savings through various care management interventions, including the patient-centered medical home. Additionally, in its report, PCG identified budget estimates in order to complete a high-level analysis of FFS claims and eligibility dates. This project has led to a contract to assist Nevada with the design and implementation of Health Homes.

#### **State of Wisconsin – Department of Health and Human Services (DHS)**

***Medicaid FFS Care Management Assessment:*** Led a team of subject matter experts that quickly scanned Wisconsin Medicaid's FFS population and identified five major recommendations to reduce ER visits and achieve >\$6 million in short-term savings.

#### **Auditing**

##### **Commonwealth of Massachusetts – Division of Health Care Finance and Policy**

***Health Safety Net Audits:*** Conducted provider compliance field reviews of Health Safety Net (HSN) claims (formerly uncompensated care pool). The objective of this review was to ensure hospital compliance with the HSN regulations. Conducted reviews of 20 hospitals and 5 community health centers, identifying findings that resulted in recommended recoveries. Prepared a final report detailing HSN billing error trends and made recommendations for tightening regulations.

#### **Commonwealth of Virginia**

##### **Division of Medical Assistance Services (DMAS)**

**Community Behavioral Health Provider Auditing:** As a subcontractor, PCG is supplying audit process and clinical auditing expertise. Assisted with organizational set-up of audit protocols and development of audit tools. Manage the clinical auditors, whose reviews have produced 15%-20% in recovery opportunities.

#### **Behavioral Health**

##### **County of Alameda, California**

***Behavioral Health Care Services (BHCS):*** Performing an organizational assessment on BHCS, specifically focusing on the finance unit. The goal is to position BHCS to play a significant role in the county's health care delivery system.

#### **Massachusetts Behavioral Health Partnership**

***Emergency Services System Development:*** Hired by the Massachusetts Behavioral Health Partnership to assist in the redesign Massachusetts's Emergency Services Program (ESP). Worked closely with MBHP and State staff to design programmatic elements and determine cost impact of various options. Developed sophisticated cost modeling tool that was used by the state to determine efficacy of various system scenarios.

#### **Massachusetts Behavioral Health Partnership**

***Uninsured and Hospital Cost Analysis:*** Produced an analysis of uninsured utilization and costs across private psych hospitals and psychiatric units within general hospitals.

**State of Ohio – Department of Mental Health (ODMH) and Department of Alcohol and Drug Abuse Services (ODADAS)**

***BH System Administrative Cost Study:*** The State ODMH and ODADAS agencies sought a comprehensive review of the current business operations and system structure of Ohio's public behavioral health system. Produced a report with 15+ major recommendations to improve the efficiency and effectiveness of the administrative processes within the state organizations.

**State of Colorado – Division of Behavioral Health**

***Cost Report Training:*** Assisted in the review of the Accounting and Auditing Guidelines for Community Mental Health Centers of Colorado. Worked with DBH and HCPF to develop and deliver on-site provider trainings for the new supplementary cost report.

**City of San Francisco, California – Department of Public Health**

***Finance Lead – Primary Care-Behavioral Health Integration Initiative:*** PCG was hired to assess and implement a PC-BH Integration project within the city-owned primary care centers. As the Finance Lead worked with City Staff to identify existing financial, utilization, and quality metrics that could be used to develop a pre- and post-implementation cost and revenue analysis.

**State of Maine, Office of Adult Mental Health Services (OAMHS)**

***Organizational Assessment Project Manager:*** Led a team of subject matter experts in the review of OAMHS for the state of Maine. The team performed extensive on-site, organizational, data, and regulatory reviews, which resulted in more than 25 detailed operational improvement recommendations to the OAMHS Director and Commissioner of DHHS.

**Behavioral Health Providers**

**Wayside Youth and Family Support Network, Framingham, Massachusetts**

***Strategic Planning:*** Led the Leadership Team and Board of Directors through a 6-month strategic planning initiative. Conducted a SWOT analysis utilizing input from internal and external stakeholders, performed a health care landscape and trends assessments, performed financial comparison with peer organizations, and assisted Leadership Team in the development of goals.

**Northeast Behavioral Health, Peabody, Massachusetts**

***Billing Process Review:*** Assessed HES's Medicaid contracting processes to proactively identify any issues that could have financial impact (an example is approved site location requirements); Assessed HES's billing practices to proactively identify problems that could result in payment issues, as well as the interface with and the practices of their 3rd party vendor.

***Billing Process Standardization and Training:*** Based on findings from the Billing Process Review, was contracted to develop and document a standardized in-take process across multiple sites, and provide training, as needed. In process

***Management Reporting Consulting:*** Also based on findings and work during the Billing Process Review, was contracted to work with their data vendor to create reports for Leadership and Site Managers. In process.

**Other Payers and Providers**

**State of New Hampshire, Crotched Mountain Rehabilitative Center**

Financial Turn-around: Hired by Crotched Mountain Rehabilitative Center to serve as interim CFO to assist in financial turn-around. Tasked with stabilizing financial unit and improving finance processes and procedures, as well as the organization's financial management tools.

## **OTHER PROFESSIONAL EXPERIENCE**

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### **Massachusetts Behavioral Health Partnership – 2006-2008**

**VP of Finance and Chief Financial Officer:** The Massachusetts Behavioral Health Partnership (MBHP) is the Massachusetts Medicaid program's behavioral health specialty managed care carve-out vendor, managing 305,000 Medicaid members. Accomplishments included:

- Forecasted and managed \$350 million medical claims budget – re-vamped and monitored IBNR model.
- Managed of \$28 million administrative budget - Achieved administrative budget surpluses, and exceeded EBITDA targets.
- Implemented of Pay-for-Performance Strategy among Inpatient Hospital providers

### **Massachusetts Medicaid (MassHealth) – 2002-2006**

**Budget Director and Chief Financial Officer:** MassHealth is the Massachusetts state agency within the Executive Office of Health & Human Services responsible for administering \$7 billion+ Medicaid program. Key accomplishments included:

- Design of Massachusetts Health Care Reform – Served as Medicaid's finance lead during the development of Massachusetts' health care reform initiative. Modeled out various enrollment and cost scenarios. Developed final sources and uses document used health care reform waiver (1115 waiver) submission.
- Accurately budgeted \$8 billion+ in Medical Spending – Improved forecasting accuracy.
- Drafted and negotiated Medicaid State Plan and Waiver Documents

## **CONFERENCE PRESENTATIONS AND TRAININGS**

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- Human Services Financial Officers association (HSFo), Status of National Health Care Reform, 2009, New Orleans, LA
- Human Services Financial Officers association (HSFo), Medicaid 101, 3-day introductory course, Reno, NV
- Human Services Financial Officers association (HSFo), Behavioral Health Funding Challenges, Louisville, KY
- Polish hospital director's conference, Current Structural and Managerial Challenges in Health Care ([www.konferencja.ameryka.com.pl](http://www.konferencja.ameryka.com.pl)), 2011, Ryn, Poland.
- Human Services Financial Officers association (HSFo), Funding Challenges for State Behavioral Health System, 2011, Charleston, WV
- Human Services Financial Officers association (HSFo), Accountable Care Organization Primer, 2011, Charleston, WV

## **PUBLICATIONS**

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- Waldinger, James. *Models to Manage Quality and Costs of Individuals with Multiple Chronic Conditions: U.S. Experience.* [www.konferencja.ameryka.com.pl](http://www.konferencja.ameryka.com.pl), 2011 (published in Polish).



## **EDUCATION**

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**Northeastern University**, Boston, Massachusetts

Master of Public Administration, 2002

- *Pi Sigma Alpha, National Political Science Honor Society, 2002*
- *Massachusetts Public Administration Graduate Student of the Year, 2002, American Society of Public Administration – Massachusetts Chapter*

**University of Connecticut**, Storrs Connecticut

Bachelor of Arts, Communications, 1994

## **PROFESSIONAL ASSOCIATIONS**

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- Healthcare Financial Management Association, Member since 2008



**Bob Petrovitz**  
*Senior Business Systems Analyst*  
**Public Consulting Group, Inc.**

## **RELEVANT PROJECT EXPERIENCE**

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### ***Massachusetts Early Education and Child Care (EEC)***

**Business Advisor / Data Architect** Primary responsibilities of this project were to design a unified data model that would be used by the department to consolidate data from 10 legacy applications; provided guidance on Extract/Transform/Load and data cleansing opportunities; supported the transition from the legacy applications to the unified database; Identified opportunities to utilize data from external State systems; provided technical and management guidance on how to better organize staff and development processes.

### ***Benefit Optimization Strategic Services (BOSS)***

**Application / Data Architect** Modeled the operational data store (ODS) and data warehouse (DW) databases to support a multi-state MEDICAID/MEDICARE claims and eligibility data. Designed and built the application infrastructure to import customer non-standardized file formats, cleanse the data, and import into a normalized ODS; optimized data throughput to support a multi-terabyte database system. Designed and built DW load routines into various Data Mart structures. Optimized databases to support queries based on consulting requirements for various analyses.

### ***Maine Health Information Management System (MIHMS)***

#### **Maine MMIS Payments system replacement with Unisys' COTS solution Health PAS**

**Data Conversion Manager (DCM)** *Replace Maine's current MMIS system with Unisys' COTS application.* Led the management team in determining full scope of activities that would successful implementation of all interfaces and conversion sources; Developed and budgeted work plan; determined resource needs and established time lines for task completion Reported progress to customer and senior management. As DCM, determined project risks and developed contingency plans for mitigation. Directly responsible to Project and Delivery managers for budget and cost; managed 40+ team members – analysts, developers, and database architects/administrators.

### ***Clarity/Solomon Integration***

**Senior Technical Architect** *This PCG internal project was designed to integrate Computer Associates "Clarity" project management suite with Microsoft's "Solomon" accounting system.* Advised in the design and implementation of bi-directional interfaces between Clarity (CA's project management suite) and Solomon (Microsoft's accounting suite). Designed and implemented and Operational Data Store (ODS) that was used to provide a common transaction and messaging platform between both systems. Supported in-house customers with strategies for data augmentation and cleansing; implemented system testing and quality control procedures; Managed external technical teams in their respective builds. Responsible for product delivery and reporting to senior management.

### ***EdSmart Educational Data Warehousing and OLAP Reporting***

**Manager** Data Warehousing and OLAP reporting for schools at both the District and State level. Similar services were provided for a national non-profit organization under grant from the Bill and Melinda Gates foundation. Managed in-house and off-shore technical teams in product delivery across several data warehousing projects. Implemented development controls and processes. Advised in the design and implementation of relational and data warehousing data models; designed ETL processes for DTS/SSIS; designed web portals for various client projects. Responsible for product delivery and reporting to senior management.

*State of New Hampshire – Department of Education / Special Education - EasyIEP*  
**Reverse engineer Oracle quasi-RDBMS database** Conversion and data extraction into EasyIEP. As the Data Architect, defined the entity relationship diagram for a Oracle/IBM Mainframe application. The primary data objective was to build a data map between the existing quasi-RDBMS model and EasyIEP, PCG's proprietary individual education planning package software. Subsequent activities included defining the cross-reference between both systems code /type values; defining the architecture for data cleansing and extraction, augmentation, and data cleansing of the existing system; building PL\SQL package software.

*State of New Hampshire – Bureau of Behavioral Health*  
**Data Warehouse and OLAP Reporting** Project Manager, System and Data Architect. Designed an OLAP system for the Bureau's data warehouse (star and snowflake schemas) and Cognos reporting. The application was designed to import Community Mental Health Center's (CMHC) patient data into the State's Data Mart. Data was subsequently used for Federal and Management reporting through Cognos and decision support reporting for both the State and CMHC's.

## **PROFESSIONAL BACKGROUND**

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### ***Kennebec Consulting, Inc***

**President** The organization provided consulting services to various community health organizations in implementing HIPPA standards and data security measures; designed, developed, and implemented web based applications for commercial entities: real estate, insurance, manufacturing, and health care.

### **Maine Department of Health and Human Services, Maine Automated Client Eligibility System (ACES)**

**Interfaces Architect** The ACES project re-engineered the State of Maine's public assistance programs through job redesign, redeployment of resources, and the introduction of a new computer system that increased the effectiveness and efficiency of the department's employees. The new computer system is a web-based application consisting of physically and logically distinct presentation, business and data tiers. Led a team of eight professionals in designing and implementing the external and internal interfaces needed for the project; Managed deliverables in accordance with project timelines and budgets; Managed Client expectations regarding contractual obligations; Guided the customer through requirements gathering and significantly reduced the number of interfaces needed and by extension reduced ongoing needed staff and maintenance costs. Provided architectural and development guidance and mentoring.

### ***Keane, Inc***

***State of Maine - Bureau of Family Independence (BFI) State Government***

The ACES (Automated Client Eligibility System) project re-engineered the State of Maine's public assistance programs through job redesign, redeployment of resources, and the introduction of a new computer system that increases the effectiveness and efficiency of the department's employees. The new computer system is an internet application consisting of physically and logically distinct presentation, business and data tiers. Led a team of eight professionals in designing and implementing the external and internal interfaces. Provided architectural and hands-on development support. Managed Client expectations regarding contractual obligations. Successfully negotiated the number of contractual interface requirements from 120 to 40 without adversely impacting P&L.

***State of Maine - Bureau of Elderly Assistance (BEAS) State Government***

Modification and implementation of federally mandated software changes required to support HCFA-485 (Physician Home Health Care Plan). Led team effort in designing and implementing the mandated changes within the BEAS MECARE system, a three-tier GUI application with COM architecture. Conducted analysis to assess the development issues, enabling the team to successfully meet the client's requirements and delivery date.

***Bath Iron Works***

Technical integration between the Electrical Support System and an MRP-2 System. Managed the technical integration between the two systems. Managed all phases of design, analysis, implementation, and documentation of the overall systems project, Managed project schedules and daily activities of team members.

**EDUCATION**

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***University of Maine at Augusta, Augusta, ME***

Bachelor of Science, Business Administration / minor in Management Information Systems  
(*Summa Cum Laude*)

**Program Knowledge:** Healthcare, HIPPA, FERPA, MITA, government, insurance, ship building, accounting/finance, construction, real estate

**Software:**

Unix, Oracle, Cognos, PL/SQL (sql, procedure, and package development), SQL Server, T-SQL, Visio, Java 2EE, EJB, WebLogic, XML, DHTML, HTML, ODBC, .NET, ASP, JavaScript, MS SQL Server 2000/2005, C++, VB, MS Access, Crystal Reports, Crystal SQL Designer, COBOL, COBOL II, CICS, DB2, DATACOM, Easytrieve, IBM Mainframe, OS 390/JCL

**Databases:** Oracle, SQL Server



**Ivy W. Sims**  
*Business Analyst*  
**Public Consulting Group, Inc.**

## **RELEVANT PROJECT EXPERIENCE**

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### **State of Arkansas, Arkansas Insurance Department**

**Navigator Program:** Assisted in researching and writing the bi-weekly issue brief of the Navigator Program. The Navigator Program challenges Exchanges to encounter and motivate organizations and individuals across socio-economic and demographic spans, and target and motivate both underserved and economically stable individuals and groups to engage with the Exchange.

### **State of North Carolina, Department of Health and Human Services (NCDHHS)**

**NCDHHS Impact Analysis:** Assisted in interviewing North Carolina Department of Health and Human Services (NCDHHS) key divisional staff and write-up of the final report on the impact of ACA on the (NCDHHS) customer service systems, and how those impacts will influence integration with the North Carolina Health Benefit Exchange (NCHBE).

**NCDHHS Appeals and Mapping:** Assisted in interviewing and the final report write-up of North Carolina Department of Health and Human Services (NCDHHS) staff involved in resolving complaints and appeals to capture the processes used throughout DHHS, to Classify and map major categories of complaint/appeals handling/resolution; Evaluate opportunities for coordinating, expediting, avoiding redundancy; and Establish a mechanism for tracking.

### **State of North Carolina, Division of Medical Assistance (DMA)**

**Medicaid Provider Screening and Enrollment:** Researched and developed the pre-enrollment verification checklist to be used at the Medicaid Providers Site.

**Health Care Reform Project Management and Implementation:** Assisted in developing and updating a work plan and roadmap that is currently used to track progress toward implementation milestone goals of health care reform requirements, plan for and assign resources, and provide status updates for the Department of Health and Human Services' Division of Medical Assistance. Research the legislation and provide complete explanation of requirement. Survey states to determine activity around this requirement and provide suggestions for moving forward.

### **State of North Carolina, Division of Medical Assistance**

**Medicaid Post-Payment Claims Review:** Sample and extrapolate cases in a database software tool and upload claims to the DMA website in an effort to get money back for the State from selected Medicaid providers that have demonstrated abusive or aberrant billing practices.

### **Commonwealth of Massachusetts, Division of Health Care Finance and Policy**

**Health Safety Net – Compliance Review:** Conducted field audits of 25 providers to ensure compliance with Health Safety Net eligibility and claiming regulations. Areas of review included allowable bad debt, Health Safety Net as secondary payer, reporting of bad debt recoveries, reporting of free care income, and service code eligibility.

### **State of Colorado, Department of Health Care Policy and Financing**

***Medicaid Benefits Collaborative:*** Created a systematic process for defining and updating Medicaid benefit coverage policies. Developed a supplementary exceptions process to increase the efficiency and accountability of the client appeals process. Developed the benefits section of a FFS client handbook for distribution to Colorado Medicaid clients.

### **CAB Health and Recovery Services, Inc. and Health Education Services, Inc.**

***MassHealth FFS Contracting and Accounts Receivable Process Analysis:*** Assessed Medicaid contracting processes to proactively identify any issues that could have financial impact. Assessed billing practices to proactively identify problems that could result in payment issues, including the interface with and the practices of 3rd party vendors and identified opportunities to maximize Medicaid claiming.

### **Community Care Services**

***Billing Work Flow Assessment:*** Assessed billing practices at two outpatient settings to proactively identify problems that could result in payment issues, including the interface with the practices of third party vendors. Identified opportunities to maximize third party revenue.

## **PROFESSIONAL BACKGROUND**

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### **Department of Mental Health - Alternatives, Ltd.**

#### **Case Worker**

- Develop Assessments to engage individuals in exploring their awareness and commitment to change, as well as develop strategies to increase readiness using assessments
- Develop and Implement Individualized Actions Plans and Individualized Service Plans to assist Individuals meet their goals.
- Provided crisis intervention and supportive counseling to fifty-three Individuals as needed.
- Taught and practiced budgeting skills, self-medication and interpersonal skills with Individuals.
- Educated Individuals in obtaining resources such as food stamps, medical insurance, and support groups e.g. Alcoholic Anonymous and Narcotics Anonymous meeting as needed

#### **Management Consulting Project**

Developed an extensive Marketing Plan for the Worcester Economic Club that identified all the challenges the organization has been facing, including a decline in membership.

### **Shingle Eater, Inc.**

#### **Marketing Analyst**

Researched roofing industry information such as macro environment; conducted competitive analysis, SWOT analysis and customers demographics, to increase market penetration through broadening network of distributors and wholesalers Planned and executed targeted e-mailing to remind customers of the seasonal product offering; updated Shingle Eater's website to increase customer traffic and create draw from roofers Developed 100 seasonal postcards and display advertisements for Shingle Eater Inc. Identified next generation products such as knives, screwdrivers, ladders, pry bars, marking and layout tools, to diversify its product offering.

**EDUCATION**

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**Clark University**

Masters Degree in Business Administration

**Clark University**

Bachelor of Arts Degree in Business Management

# *Data Enclave III Environment Overview*

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*September 02, 2011*

*Daniel Gwynne*



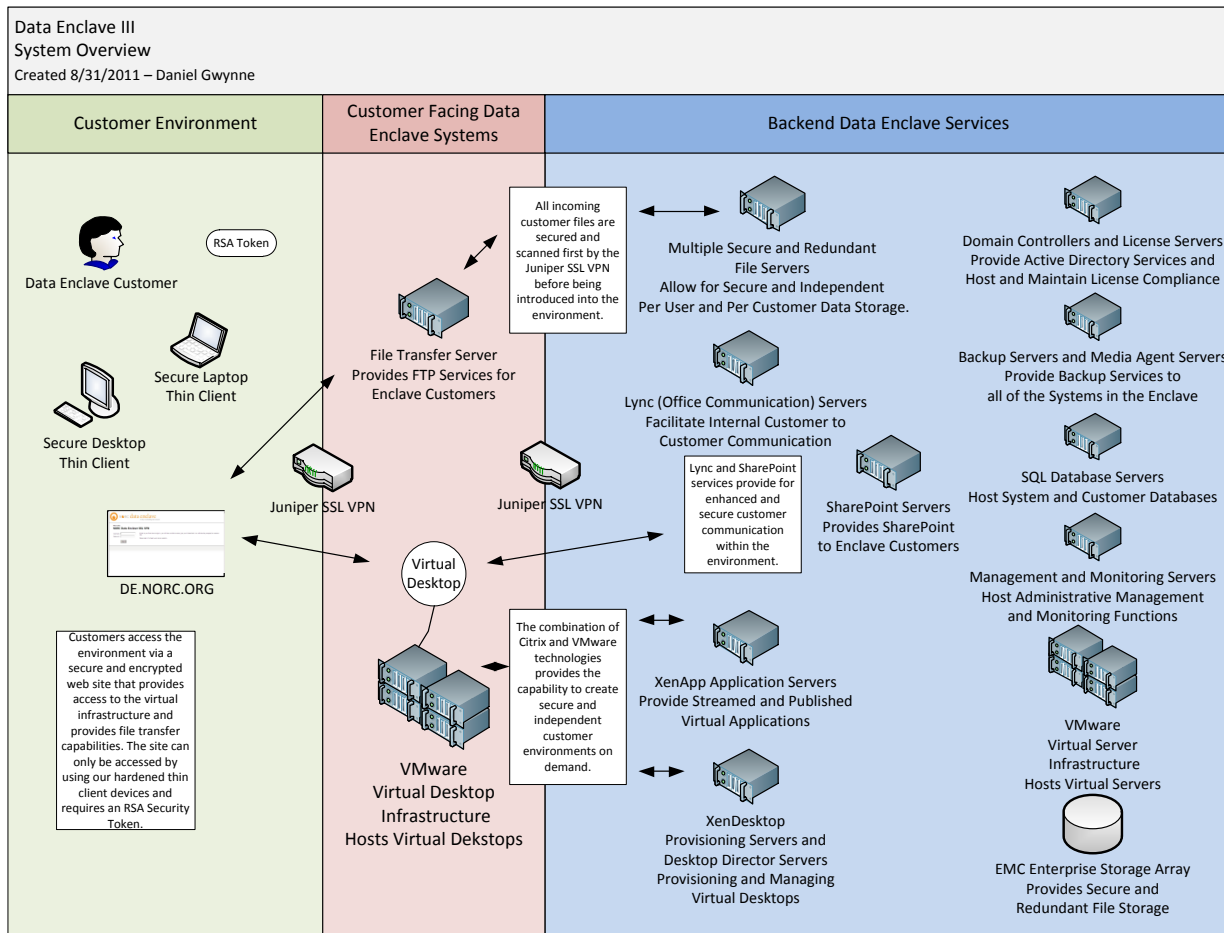
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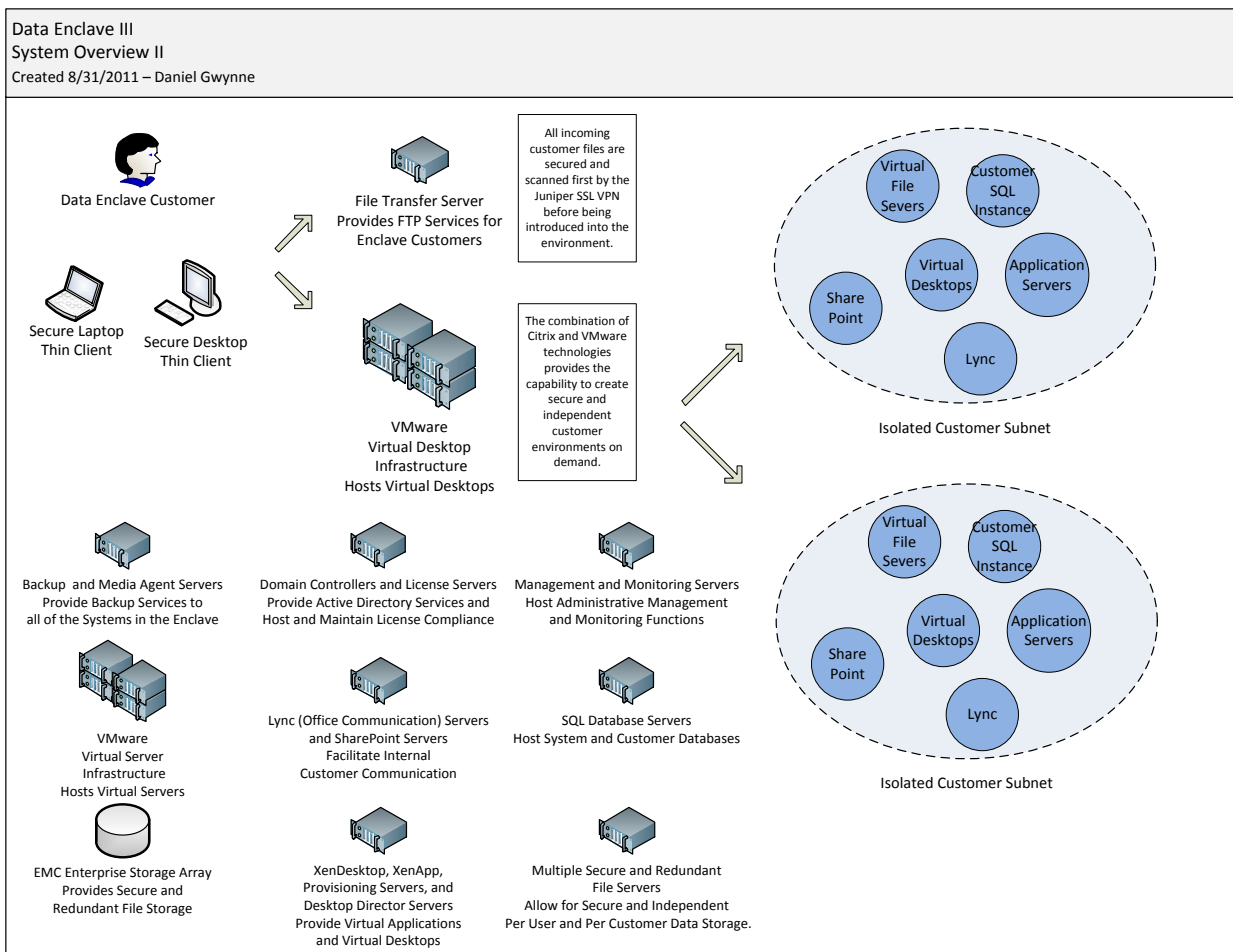
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## Data Enclave III - Environment Overview

The following diagram provides an overview of the Data Enclave III environment. The diagram displays the connectivity between the Customer environment, the Client Facing Systems, and the Backend Data Enclave Systems.

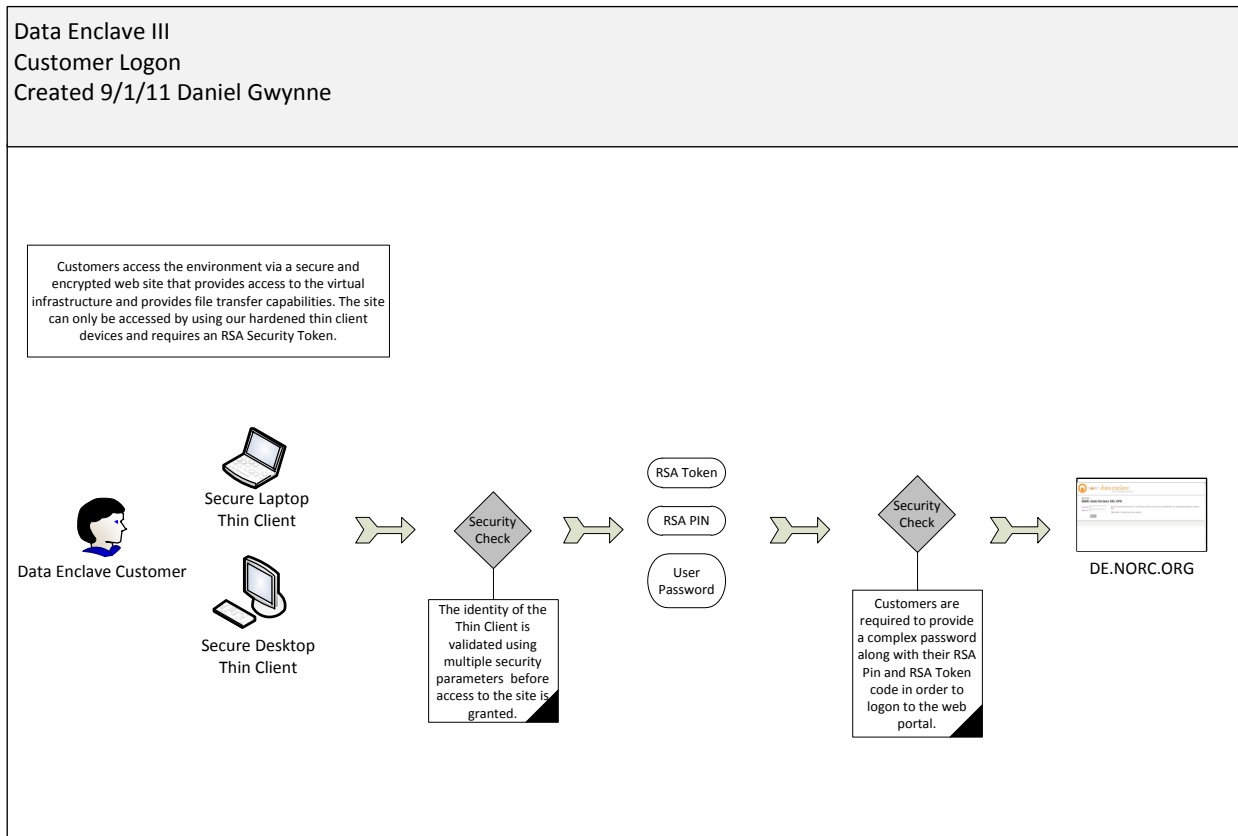


The following diagram provides an overview of the Data Enclave III environment, showing the client connectivity into the environment and their isolated vSubnets.



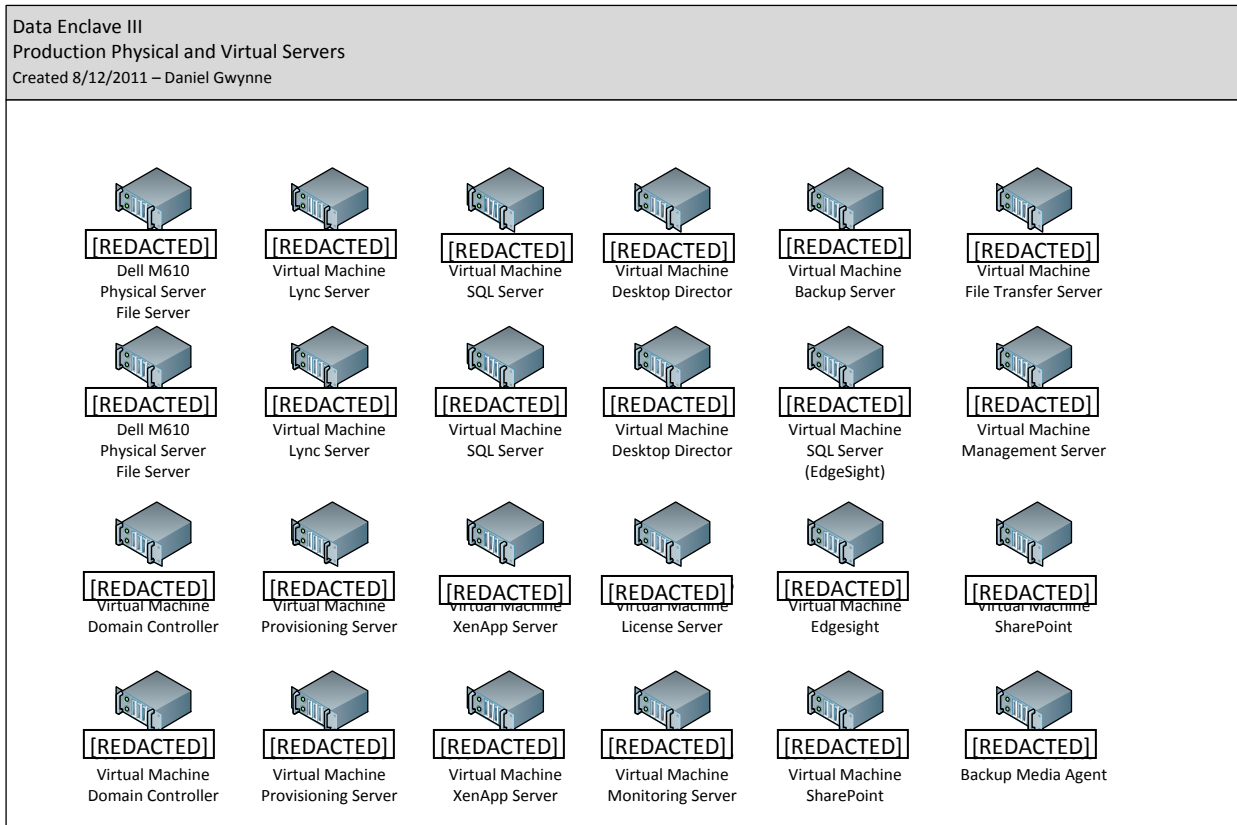
## Client Logon and Authentication

The following diagram outlines the customer logon process.



## Server Infrastructure

The following diagram is a list of the physical and virtual Windows 2008 servers that make up the Data Enclave III environment.



## Physical Servers - Dell PowerEdge M610

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The following is a brief outline of the Dell PowerEdge M610 Server taken from Dells website.

<http://www.dell.com/us/enterprise/p/poweredge-m610/pd.aspx>



Next-generation half-height blade server featuring Intel® Xeon® processor 5500 and 5600 series architecture

### *Enhanced memory capacity*

Great virtualization and database performance

Designed for increased energy efficiency

### *Processor*

Intel® Xeon® processor 5500 and 5600 series

Six-core Intel® Xeon®

Quad-core Intel® Xeon®

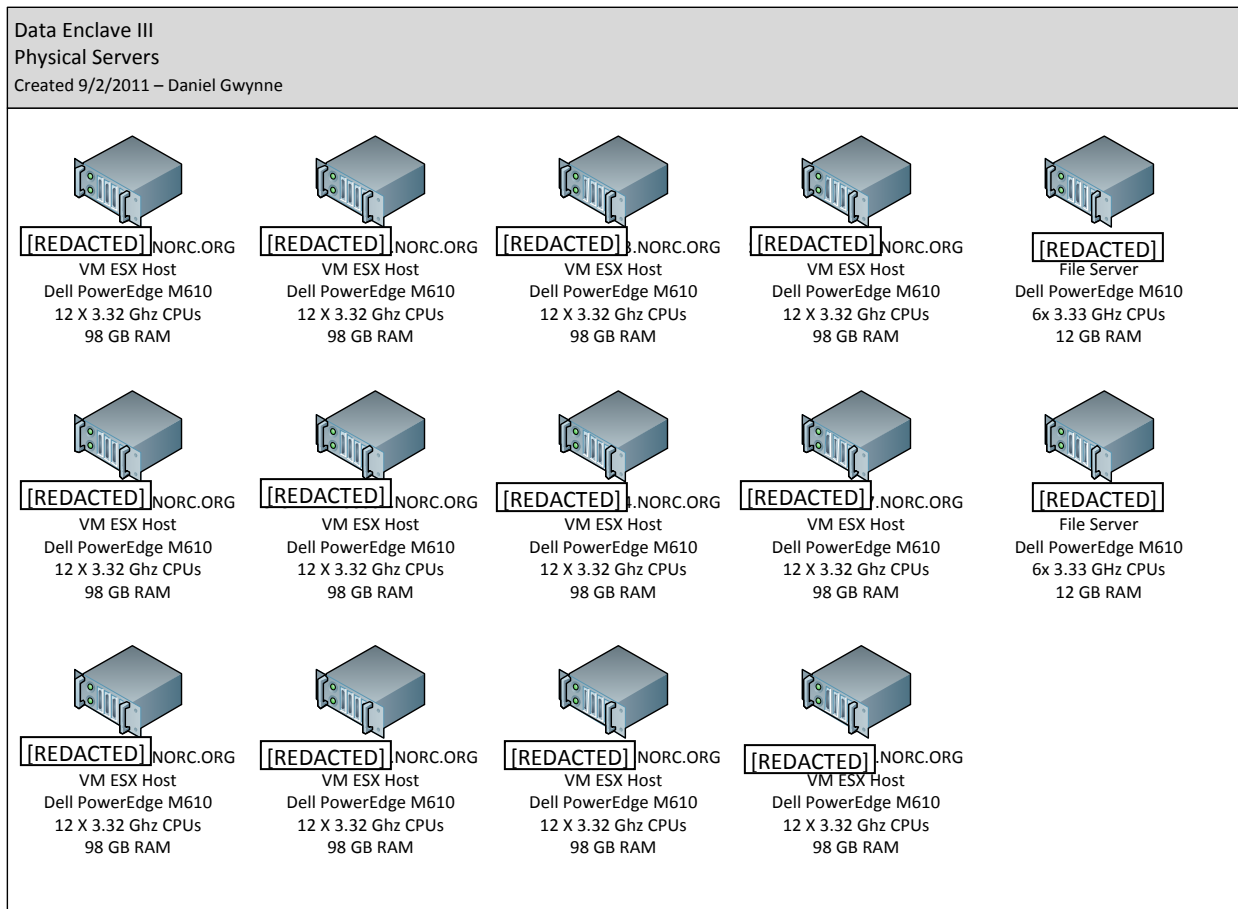
### *Memory*

Up to 192GB (12 DIMM slots): 1GB/2GB/4GB/8GB/16GB ECC DDR3

Up to 1333MHz

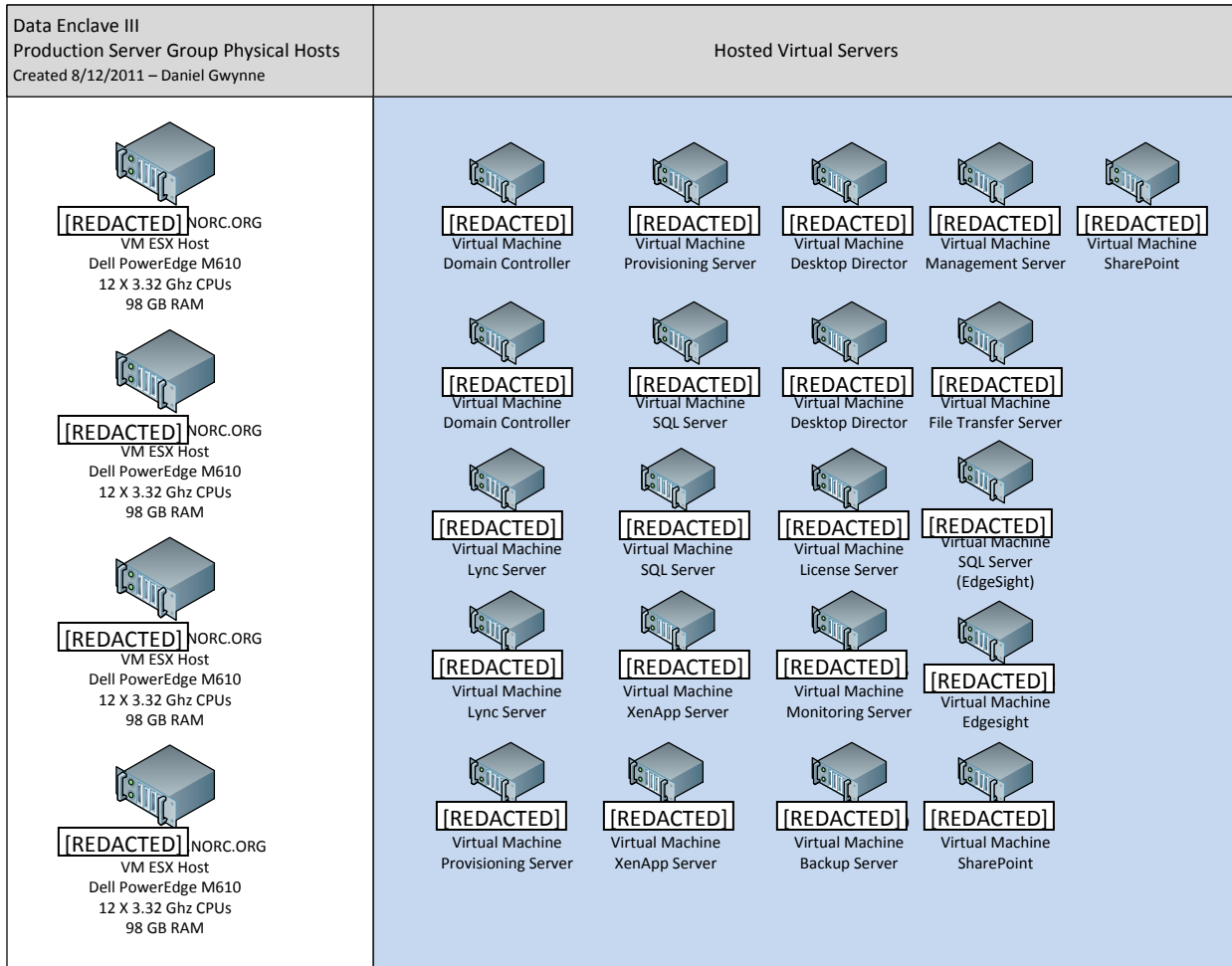
### *Chipset*

The follow diagram provides a representation of the physical servers in the Data Enclave III environment. The majority of the servers are functioning as hosts for the VM environment. Two of the physical servers are running Windows 2008 and functioning as File Servers.



## Virtual Servers

The following diagram provides a representation of the VMware Server Environment. This diagram shows both the physical hosts and associated Virtual Machines.



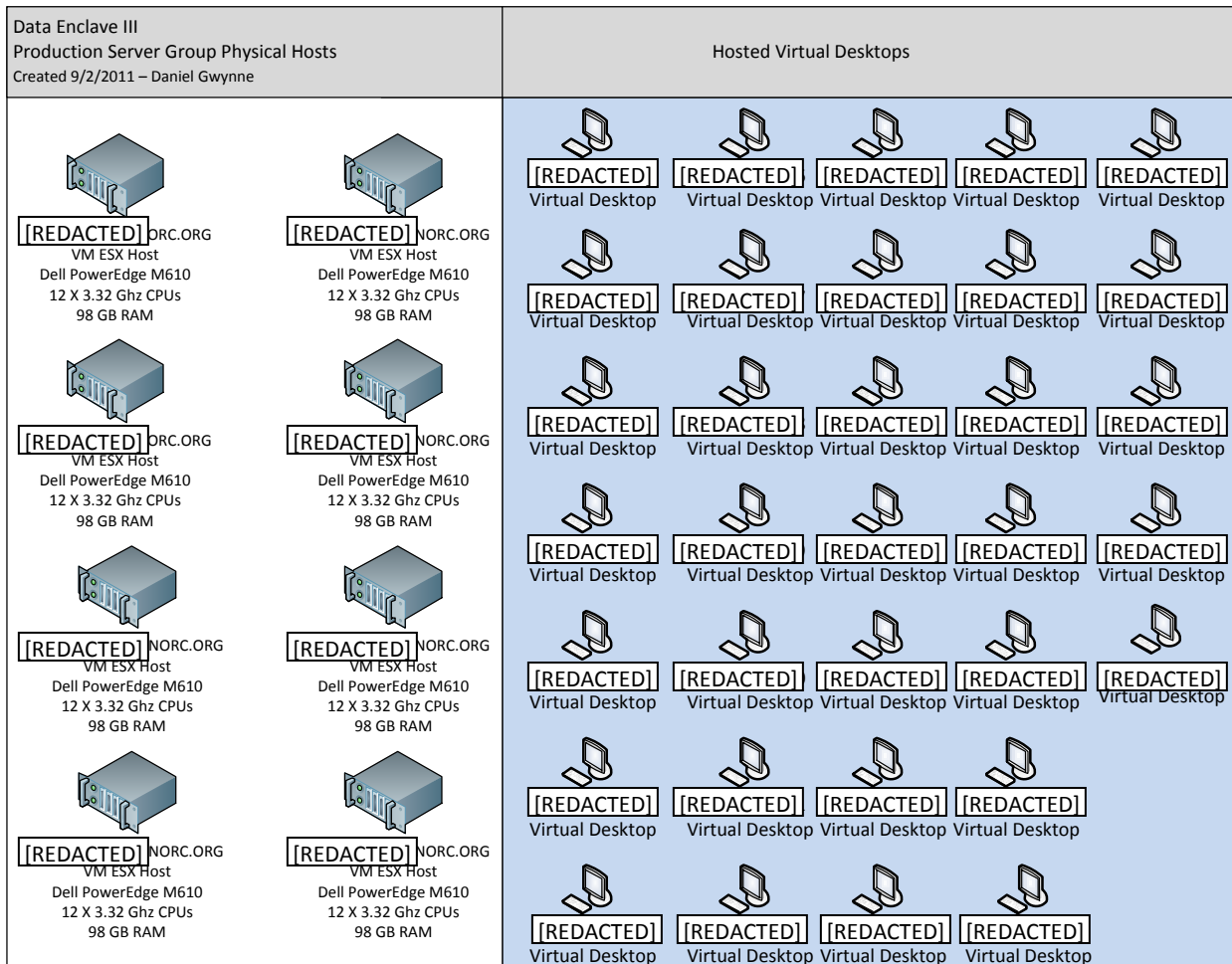
The following table provides a summary of the Physical Resources in the VM Server Cluster.

ITEM	DETAIL
VM Host Pool CPU Total	48 X 3.32GHz or 159GHz
VM Host Pool RAM Total	98GB RAM x 4 or 393GB Ram
Total Number of vServers	21
Total RAM Allocated to the current vServers	114GB



## Virtual Desktop Infrastructure

The following diagram provides a representation of the VMware Virtual Desktop Environment. This diagram shows both the physical hosts and associated Virtual Machines.



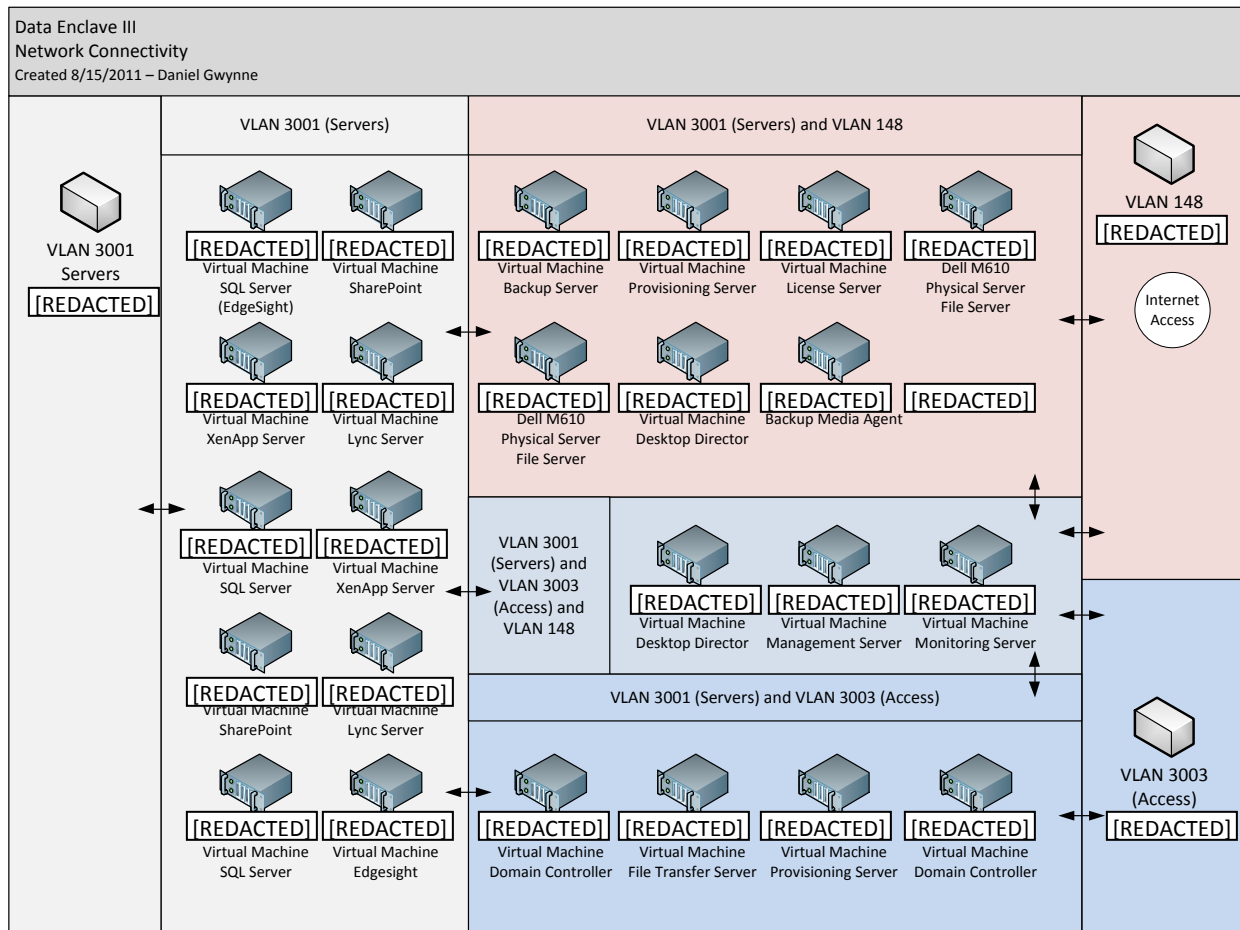
The following table provides a summary of the Physical Resources in the VM Virtual Desktop Cluster.

ITEM	DETAIL
VM Host Pool CPU Total	96 X 3.32GHz or 318GHz
VM Host Pool RAM Total	98GB RAM x 8 or 784GB Ram
Total Number of vDesktops	33
Total RAM Allocated to the current vDesktops	192GB

## Network Environment

### Network Segmentation – Virtual Servers

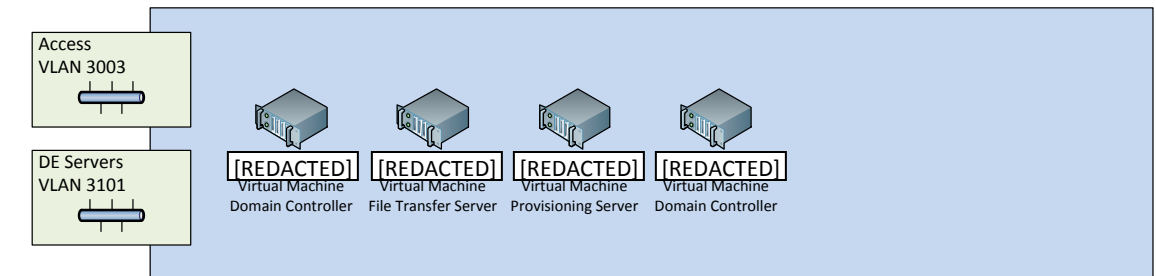
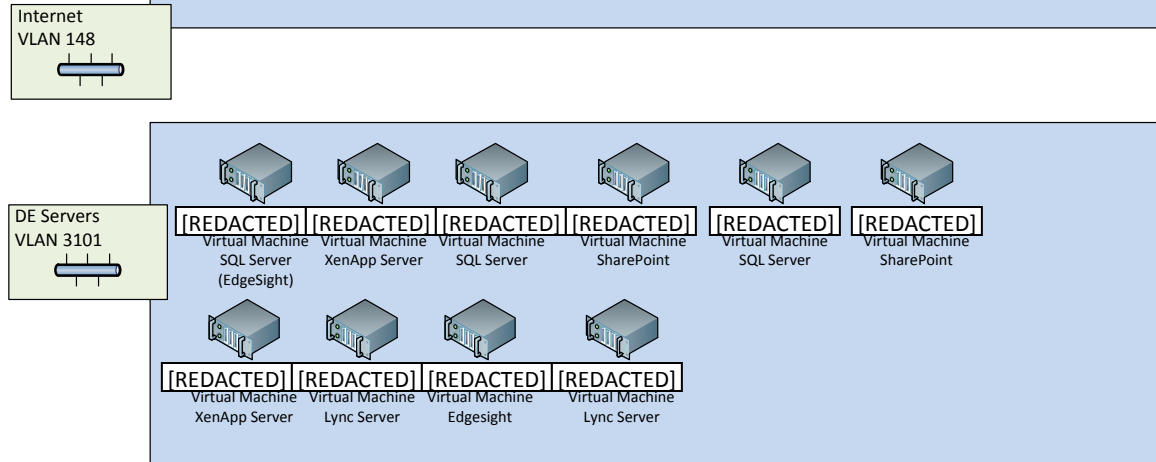
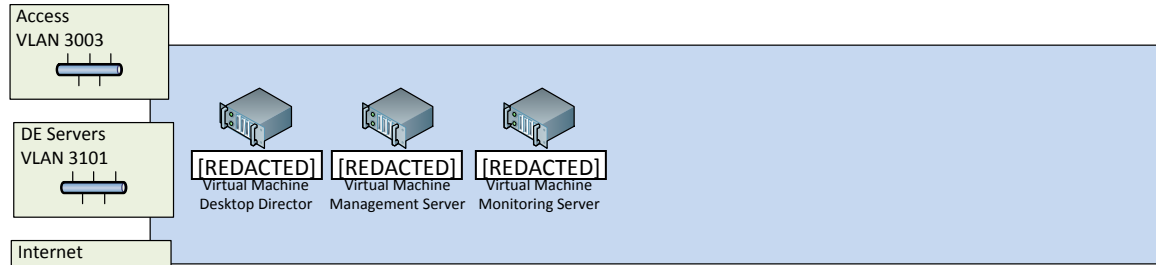
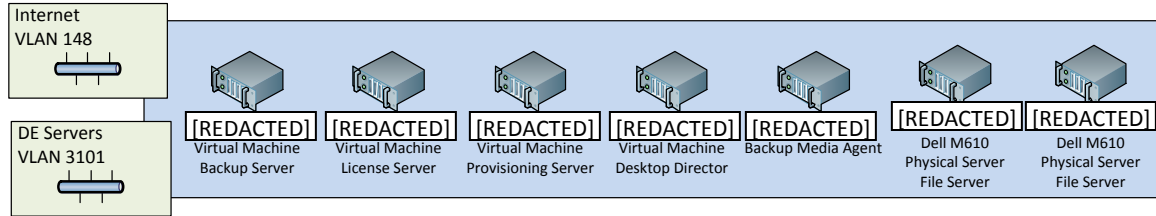
The following diagram provides a visual representation of the Data Enclave III servers and their associated VLANs.



The following diagram provides a representation of the Physical and Virtual Servers in the Data Enclave III environment and shows which subnets they are each connected to.

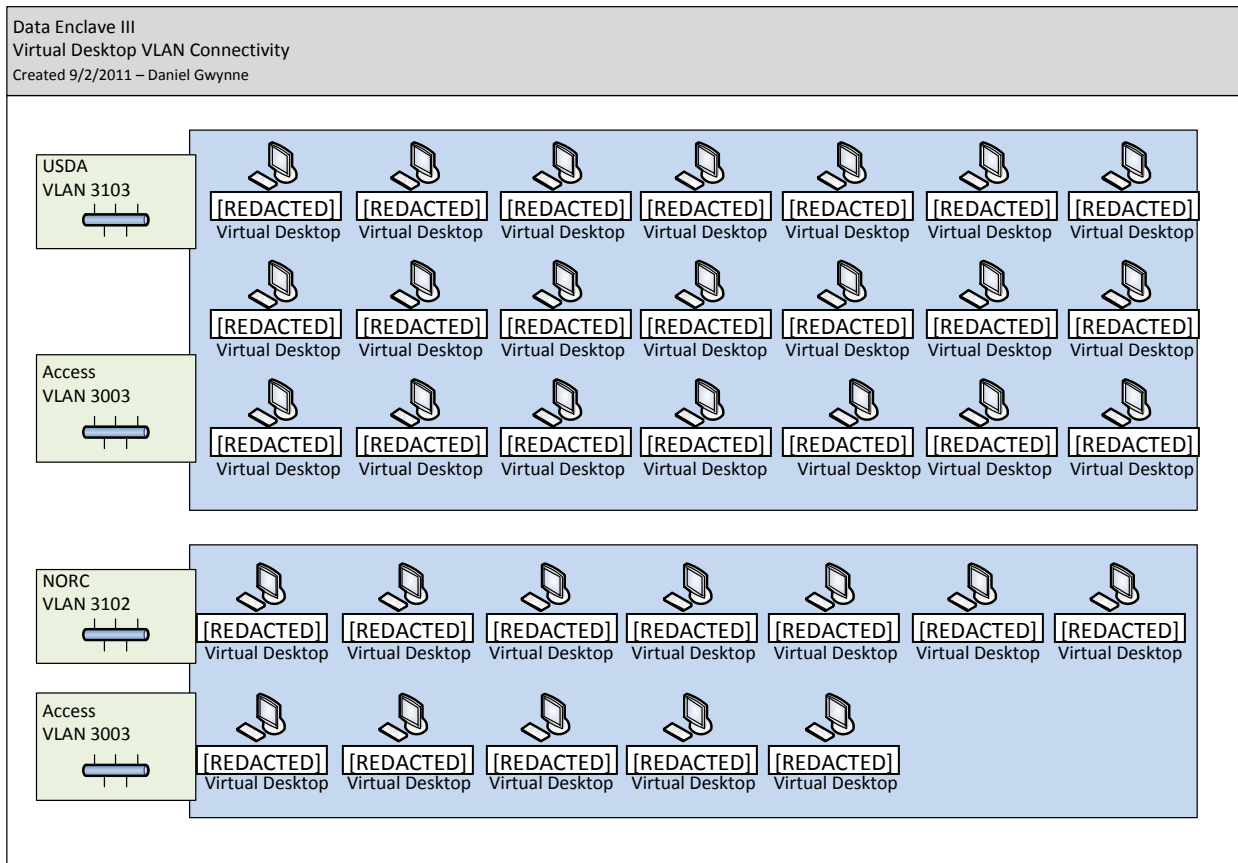
Appendix C: Data Enclave III Environment Overview - Section 2.17 Documentation

Data Enclave III  
 Virtual Server VLAN Connectivity  
 Created 9/2/2011 – Daniel Gwynne



## Network Segmentation – Virtual Desktops

The following diagram provides a representation of the Virtual Desktops in the Data Enclave III environment and shows which subnets they are each connected to.



## Juniper SSL VPN

The following section provides vendor specific information about the Juniper SSL VPN application and was taken from NetFast.com.

<http://www.netfast.com/xq/asp/id.1109/qx/t3-details.htm>

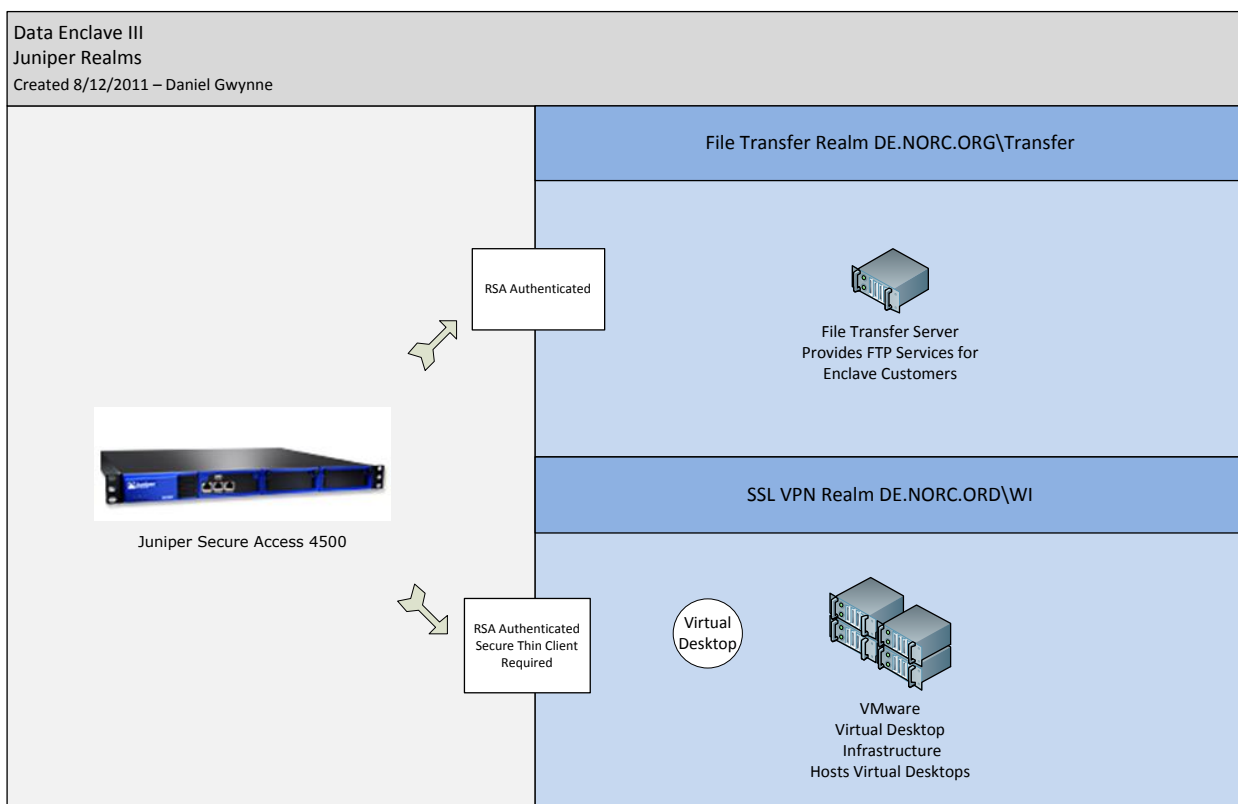


The Juniper Networks Secure Access 4500 (SA 4500) SSL VPNs enable mid- to large-sized organizations to provide cost-effective remote and partner extranet access from any standard Web browser. Based on the award-winning IVE platform, the SA 4500 appliances feature rich access-privilege management functionality that can be used to create secure customer/partner extranets with no infrastructure changes, no DMZ deployments and no software agents.

This functionality also allows the enterprise to secure access to the corporate intranet so that different employee and visitor populations can utilize exactly the resources they need while adhering to enterprise-security policies. Built-in compression for all traffic types speeds performance and SSL acceleration is available via a hardware module option for more demanding environments.

## Juniper Realm Configuration

The following diagram provides a visual representation of the Juniper Realms in the Data Enclave III environment.



## Enterprise Storage

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The following section provides an outline of the VNX Enterprise Storage Array and was taken from a vendor website.

### EMC VNX5500 Unified Storage System

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<http://www.sandirect.com/emc-vnx5500-unified-storage-system-p-1748.html>



#### THE VNX SERIES—SIMPLE, EFFICIENT, AND POWERFUL

A robust platform for consolidation of legacy block storage, file servers, and direct-attached application storage, the VNX series enables organizations to dynamically grow, share, and cost-effectively manage multi-protocol file systems and multi-protocol block storage access. The VNX operating environment enables Microsoft Windows<sup>®</sup> and Linux/UNIX clients to share files in multi-protocol (NFS and CIFS) environments. At the same time, it supports iSCSI, Fibre Channel, and FCoE access for high-bandwidth and latency-sensitive block applications. The combination of EMC Atmos<sup>™</sup> Virtual Edition software and VNX storage supports object-based storage and enables customers to manage web applications from EMC Unisphere. The VNX series next-generation storage platform is powered by the Intel Quad Core Xeon 5600 series with a 6-Gb/s SAS drive back-end and delivers demonstrable performance improvements over the previous generation mid-tier storage:

ITEM	DETAIL
Max. Raw Capacity:	500TB
Max. HDD Count:	250

ITEM	DETAIL
Min. HDD Count:	4
HDD Support:	100GB SSD
	200GB SSD
	300GB 6Gb SAS 10K
	300GB 3Gb SAS 15K
	600GB 6Gb SAS 10K
	600GB 6Gb SAS 15K
	2TB 6Gb SAS 7K
RAID Support:	RAID 0
	RAID 1
	RAID 1+0
	RAID 3
	RAID 5
	RAID 6
Host Connections:	2Gb FC
	4Gb FC
	8Gb FC
	1Gb iSCSI
	10Gb iSCSI
	10Gb FCoE

### Storage Utilization and Capacity

The following section provides an overview of the Storage Capacity and utilization in the Data Enclave III environment.

ITEM	DETAIL
Total Storage Space	≈ 34 TBs

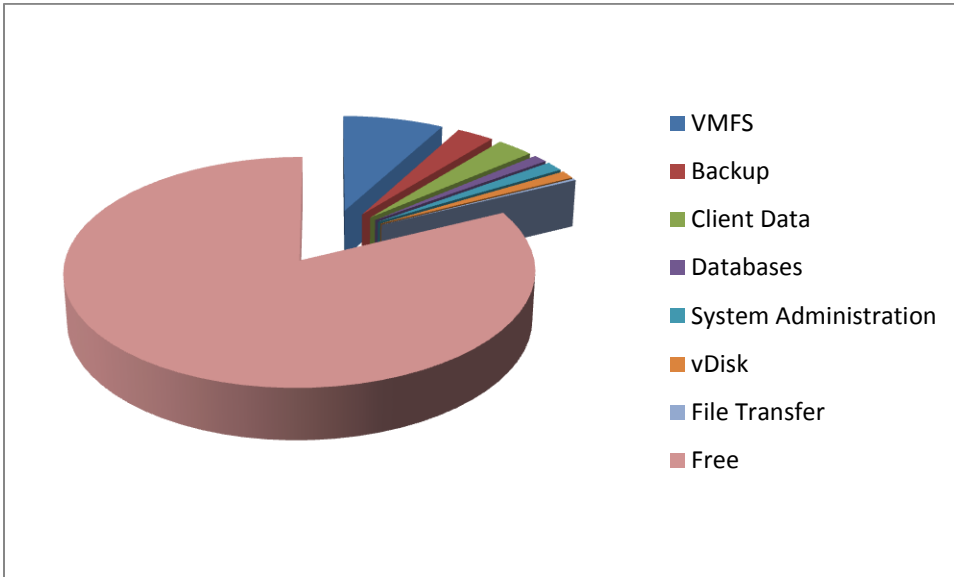


Appendix C: Data Enclave III Environment Overview - Section 2.17 Documentation

Total Free Space	≈ 30 TBs
Storage Allocation – VMFS	2.7 TBs
Storage Allocation – Backup	1 TB
Storage Allocation – Client Data	1 TB
Storage Allocation – Databases	400 GB
Storage Allocation – System Administration	500 GB
Storage Allocation – vDisk	400 GB
Storage Allocation – File Transfer	100 GB

## EMC VNX5500 – Current Storage Utilization

The following diagram provides a visual representation of the storage utilization in the Data Enclave III environment.



## Thin Clients

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The following section provides an overview of the Thin Clients utilized in the Data Enclave III environment.

### Security Features

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Read Only End User Environment  
Restricted Access to IE Only  
IE Locked Down to Only Allow Access to DE.NORC.Org

### Wyse Z90D7

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<http://www.wyse.com/products/hardware/thinclients/Z90/index.asp>

Wyse Z90 - High performance Windows Embedded Thin Client for the most demanding Virtual Desktop Environments



**Performance:** Available dual cores and advanced processing blows away everything we've done before.

It's fast. At the heart of the Wyse Z90 lies a whole new engine, where all the major system elements – CPU cores, vector engines, and a unified video decoder for HD decoding tasks – live on the same piece of silicon. This design concept eliminates one of the fundamental constraints that limit performance. Whether you want the best 2D or 3D graphics, HD video, or the ability to embed custom Windows applications that execute right on the Z90, you'll have power to spare. With available dual core performance, you'll just say "Wow".

**Connectivity: Ever hear the term SuperSpeed used with a thin client? We didn't think so.**

The Wyse Z90 includes the first SuperSpeed USB 3.0 connectivity in a thin client, enabling the newest peripherals and speeds up to 10 times faster than USB 2.0. Z90 includes two SuperSpeed USB 3.0 ports and four USB 2.0 ports (two up front), all under your control. With Z90, you have more display options than ever before: DisplayPort, DVI or VGA. Still have a few legacy devices? Z90 takes them in stride with optional parallel, PS/2 and dual serial port support. Wyse Z90 is no slouch in networking either, with support for gigabit Ethernet, available integrated A/B/G/N dual band Wi-Fi, or FiberNIC\*\*.

**Ease of use: It's the thin client that does it all, without making you do it all.**

The Wyse Z90 is based on Wyse-enhanced Windows Embedded, providing broad functionality for a dynamic world. The familiar user interface, integrated Windows Media Player, Internet Explorer, and full support for embedded Windows applications make the Z90 a powerhouse of capability whether you need a thin client for virtual desktop or cloud applications, a more-secure, solid state PC for custom applications, or a secure work from home station for telecommuters.

The Wyse Z90 is the first Wyse thin client to offer support for Wyse's "Project Pyramid", an industry-first, self-configuration capability for Windows Embedded thin clients, so you can take a unit from box to productivity in minutes. You select desired configuration, and Project Pyramid does the rest, automatically, with no imaging or re-booting required, across your entire installation. Project Pyramid supports SMB to Enterprise environments, stationary or mobile thin clients, in or out of the office, and integrates with Microsoft Active Directory, when present. Project Pyramid will be available late Q1 2011 for WES 7, and Q2 2011 for WES 2009.

[Wyse X90C7](#)

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<http://www.wyse.com/products/hardware/mobile/X90c7/index.asp>



Secure mobile computing. Without compromise.

#### Appendix C: Data Enclave III Environment Overview - Section 2.17 Documentation

The sleek Wyse X90c7 mobile thin client features the benefits of other Wyse virtual clients, but in a form factor ideal for the mobile worker. Because the Wyse X90cw mobile thin client has no hard drives and no server-side data stored on the device, these devices are highly secure. That means that mobile workers no longer have to worry about exposure of sensitive data to unsecure environments. As all data is stored and accessed remotely, the risk of data loss through stolen or mislaid laptops is eliminated. Powered by the Intel Atom processor, this device provides rich performance in a slim robust design allowing more users than ever to gain secure access to corporate networks when and wherever they need to.

The Wyse X90c7 mobile thin client weighs as little as 3.2 lbs, yet the 11.6" LED backlight widescreen delivers the performance for thin client applications. The X90c7 mobile thin client includes rich connectivity options such as a built-in Webcam, integrated wireless b/g/n, Bluetooth 2.1 and support for 3G cards. Enabling organizations to achieve a smaller carbon footprint, the devices draw as little as 18 watts of energy, yet the 6-cell Li-Ion battery provides up to 8 hours of autonomy, making it an ideal solution for road warriors. Wyse Device Manager supports the Wyse X90c7 thin client with scalable enterprise-wide management including simple deployment, patching and updates and asset management - all with secure end-to-end encrypted communications. This device also support Windows Aero functionality within Windows Embedded Standard 7.

## Hosted Applications

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The following section provides a list of the applications currently hosted in the Data Enclave III environment. The applications are sorted based on the method we are using to deliver them.

### Published from XenApp

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APPLICATIONS	DELIVERY METHOD
Adobe Dreamweaver CS3	Published
Adobe Fireworks CS3	Published
Adobe Professional 10	Published
SQL Management Studio	Published

### Streamed from XenApp

---

APPLICATIONS	DELIVERY METHOD
ArcCatalog 10	Streamed
Corda Builder	Streamed
Farm Income Estimation System	Streamed
GAMS	Streamed
Lotus 123	Streamed
Lotus Approach	Streamed
Lotus FastSite	Streamed
Lotus Freelance Graphics	Streamed
Lotus Organizer	Streamed
Lotus vCard	Streamed
Lotus Word Pro	Streamed
NLogit	Streamed
pSFTP	Streamed
R	Streamed
SAS	Streamed
Stat 11	Streamed
Stat Transfer 9	Streamed
WinZip 12	Streamed

### Installed in XenDesktop

---

APPLICATIONS	DELIVERY METHOD
Adobe Reader X	Local
Microsoft Lync 2010	Local

<b>APPLICATIONS</b>	<b>DELIVERY METHOD</b>
Microsoft Office Professional 2010	Local
Notepad ++	Local
SAS 9.2	Local
Secure Zip 12	Local





<b>APPLICATIONS</b>	<b>DELIVERY METHOD</b>
Corda Builder	Streamed
Farm Income Estimation System	Streamed
GAMS	Streamed
Lotus 123	Streamed
Lotus Approach	Streamed
Lotus FastSite	Streamed
Lotus Freelance Graphics	Streamed
Lotus Organizer	Streamed
Lotus vCard	Streamed
Lotus Word Pro	Streamed
Microsoft Lync 2010	Local
Microsoft Office Professional 2010	Local
NLogit	Streamed
Notepad ++	Local
pSFTP	Streamed
R	Streamed
SAS	Streamed
SAS 9.2	Local
Secure Zip 12	Local
SQL Management Studio	Published
Stat 11	Streamed
Stat Transfer 9	Streamed
WinZip 12	Streamed

## File Storage

---

<b>SHARE</b>	<b>DATA SIZE</b>
Master Data Sets	18.7 GB
User Data	5.1 GB
Shared Research Data	102 GB
Total	126 GB

## SQL Databases

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<b>SQL DATABASE</b>	<b>SIZE</b>
[REDACTED]	1.9 GB
[REDACTED]	1.3 GB
[REDACTED]	1.1 GB
Total	3.3 GB



# Accessing the NORC Data Enclave (v 3.0)

Logging in and Accessing  
Data/Applications

# Web Interface Login



**This is the**  
**NORC Data Enclave SSL VPN**

Username

Password

PIN/TokenCode

Sign In

If this is your first time to sign in, you will have no PIN to enter, just your TokenCode. You will then be prompted to create a PIN.

Please sign in to begin your secure session.

# Change Password Screen



## Change Password

---

Consult your help desk or corporate security policy to learn about your company's password guidelines.

Old password:

New password:

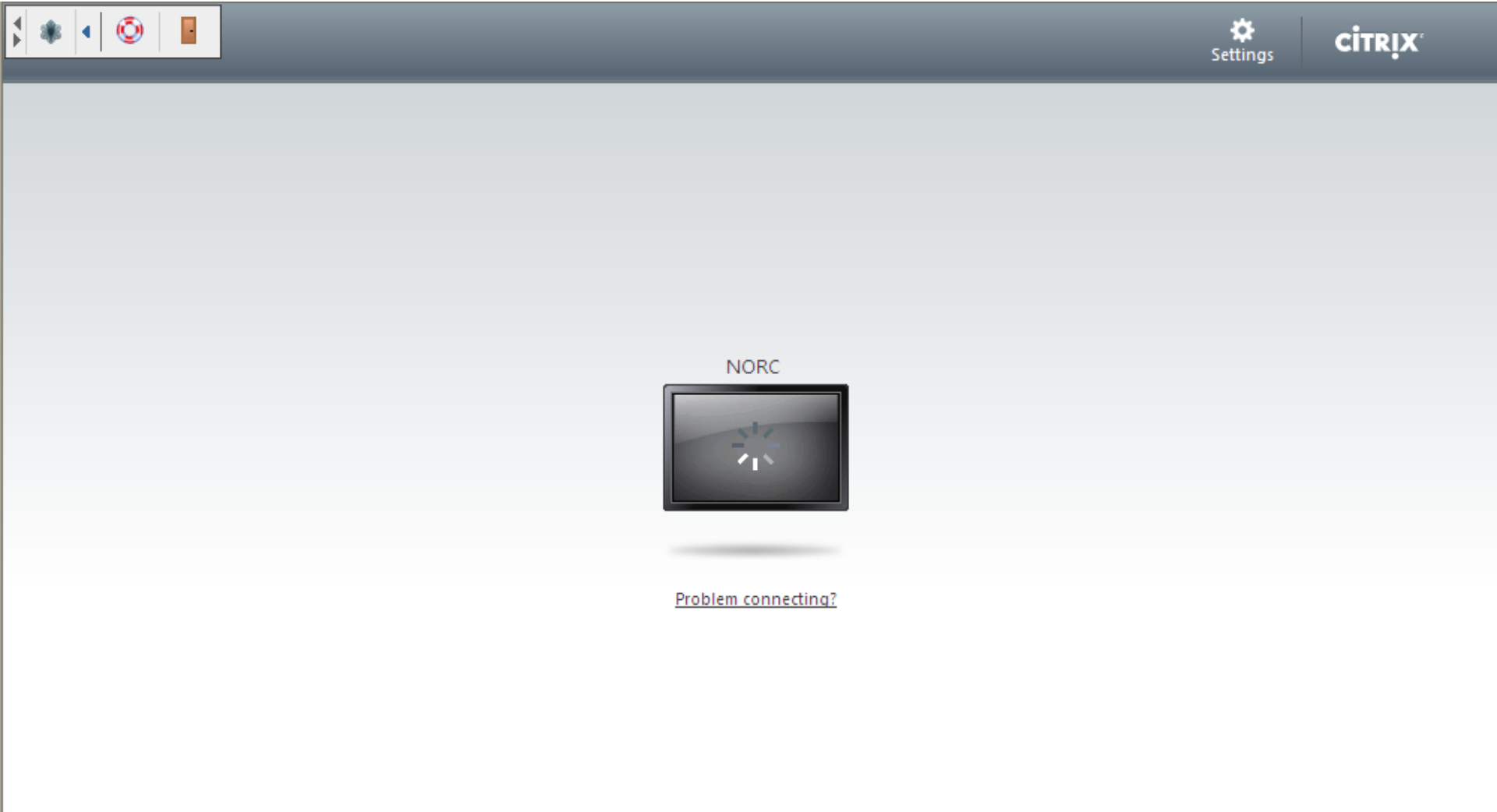
Confirm password:

---

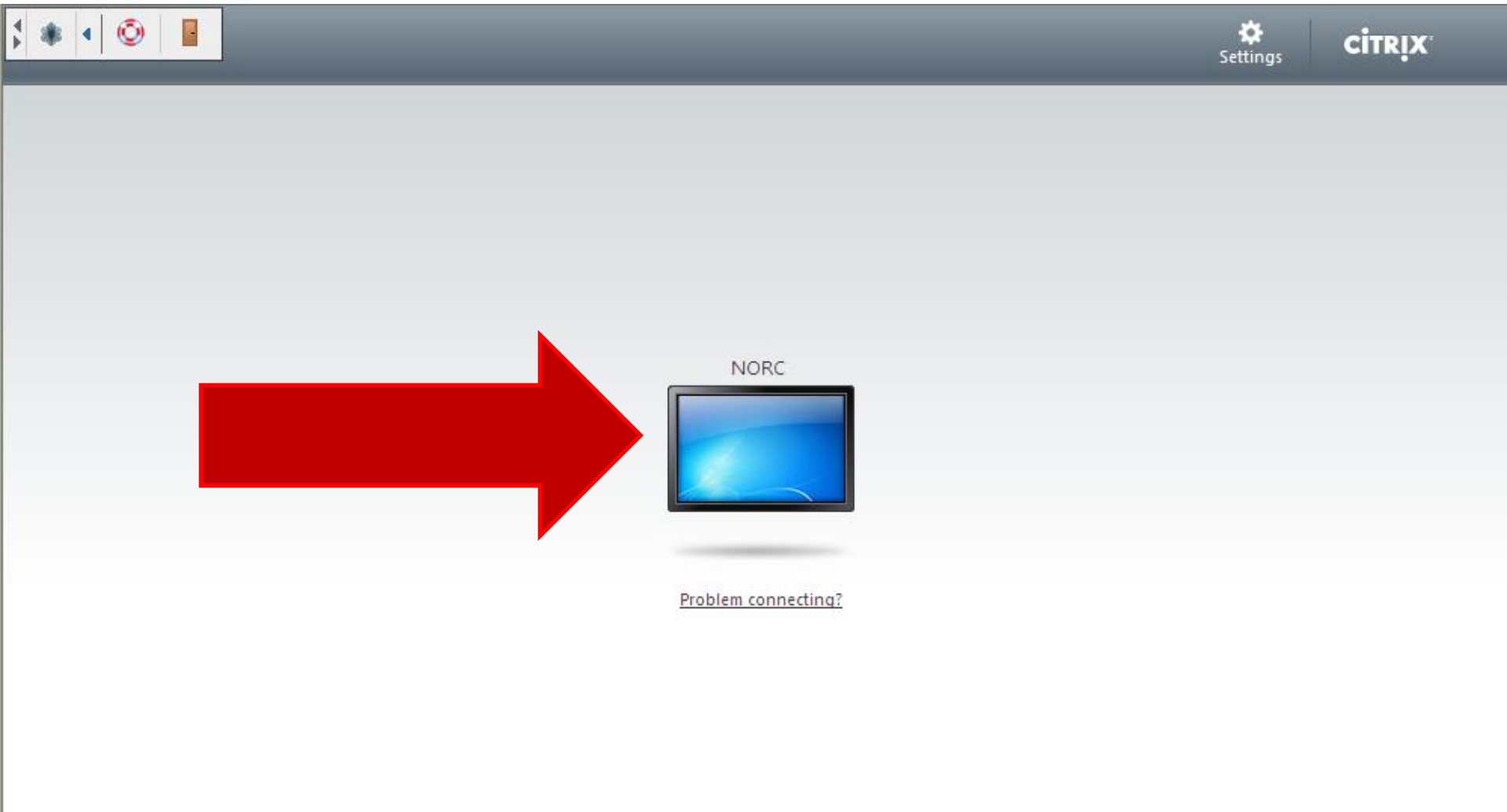
# Starting XenDesktop



# XenDesktop Auto-Launching

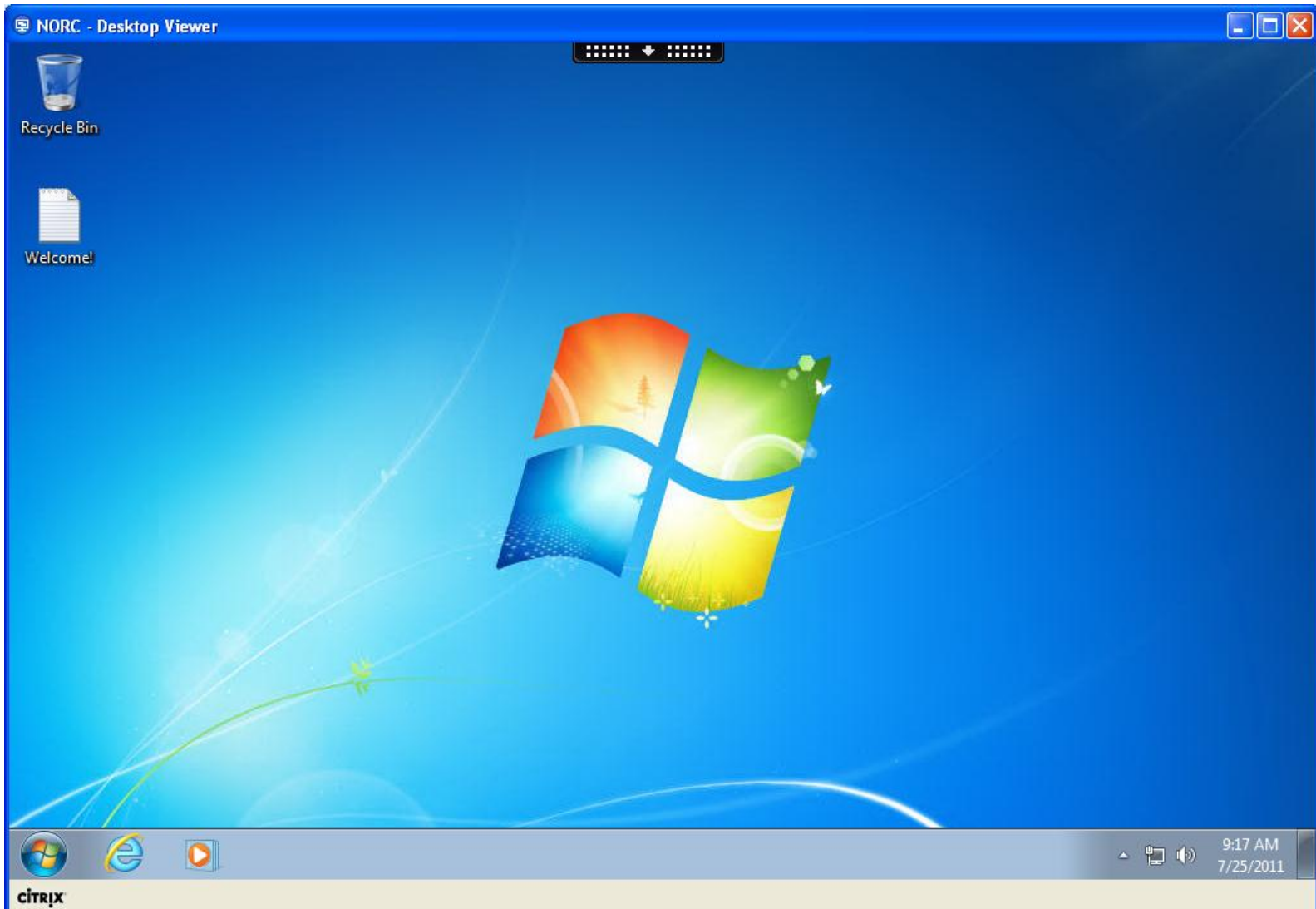


# Manually Starting XenDesktop

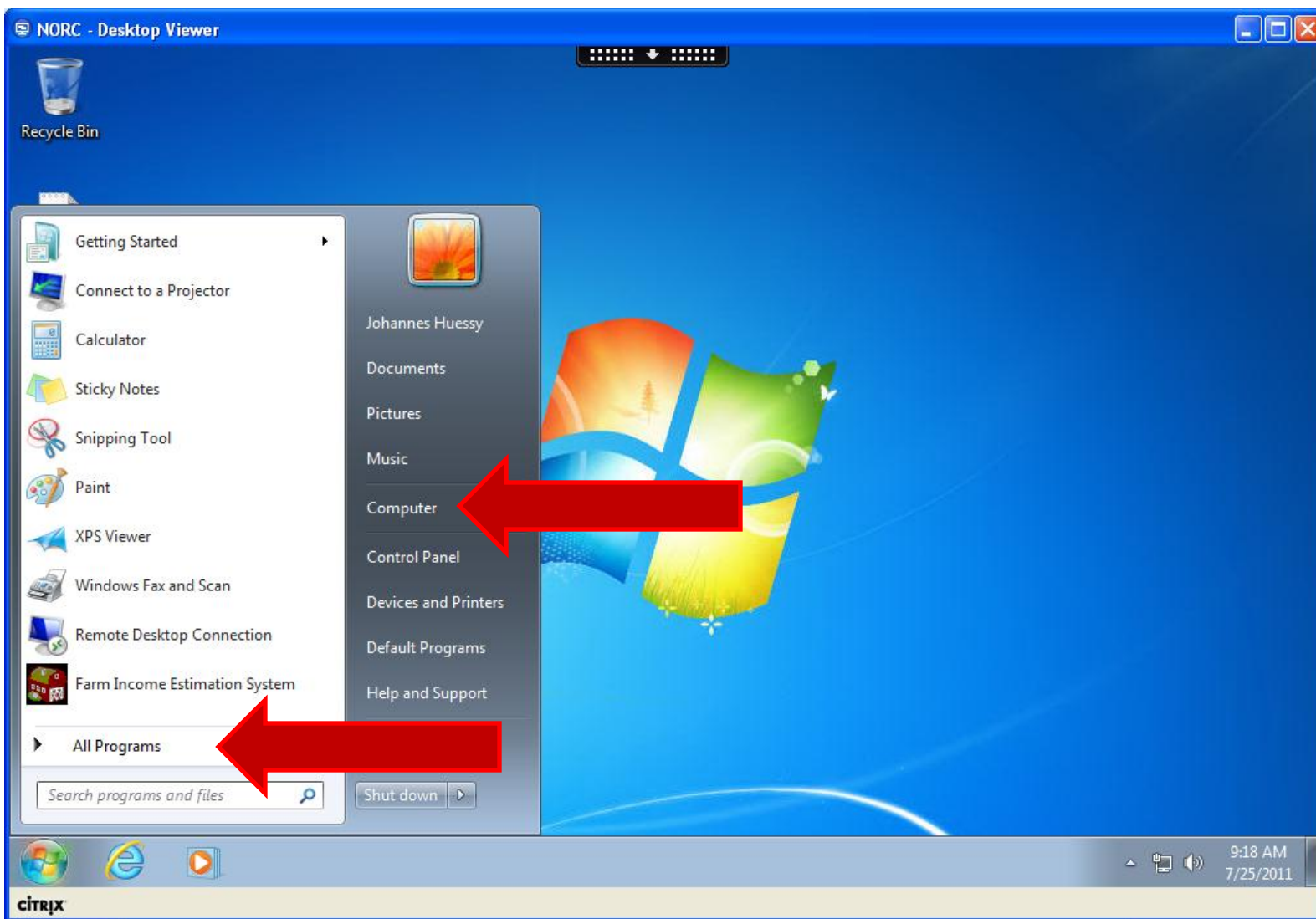




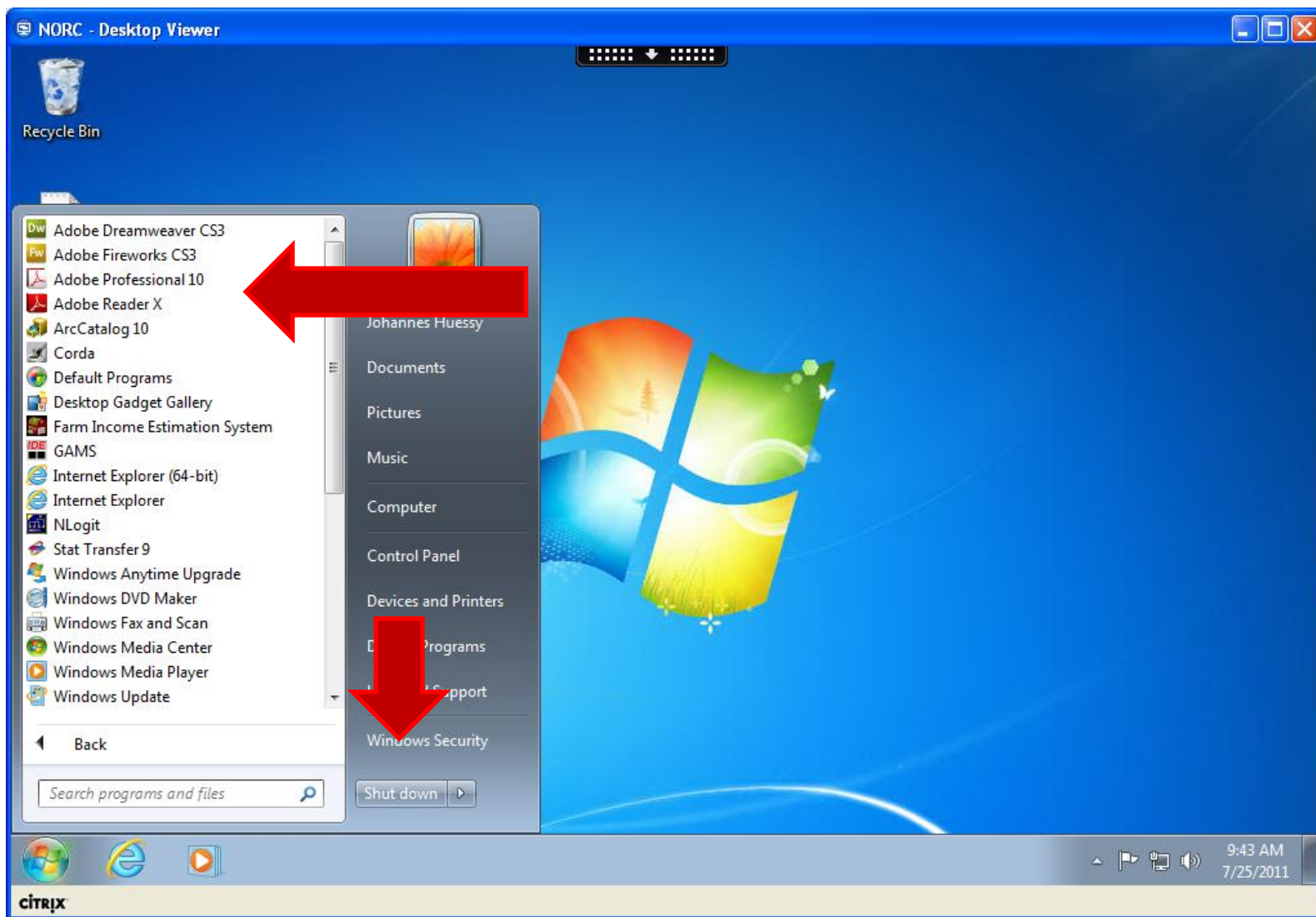
# Desktop Viewer at Startup



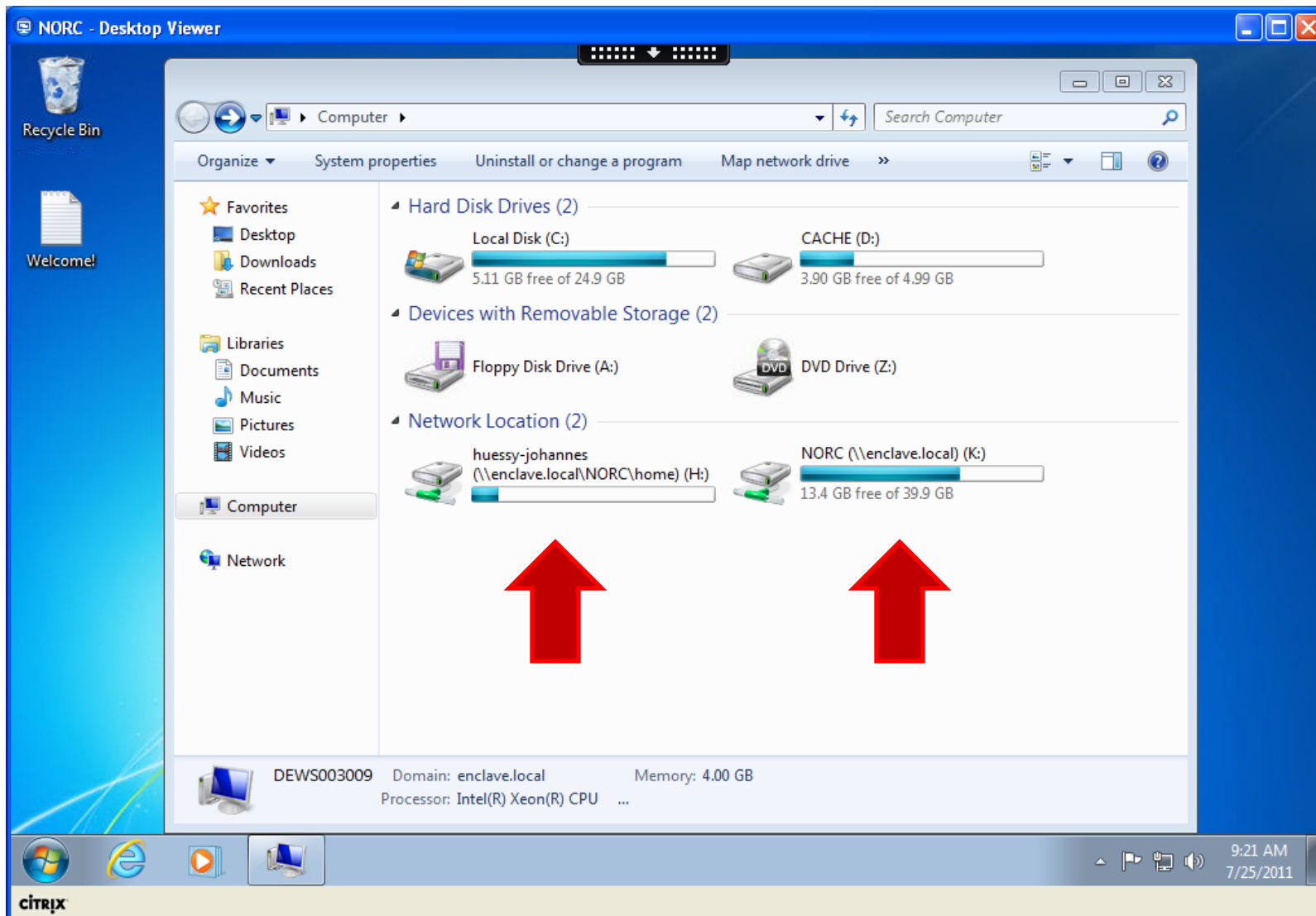
# Start Menu



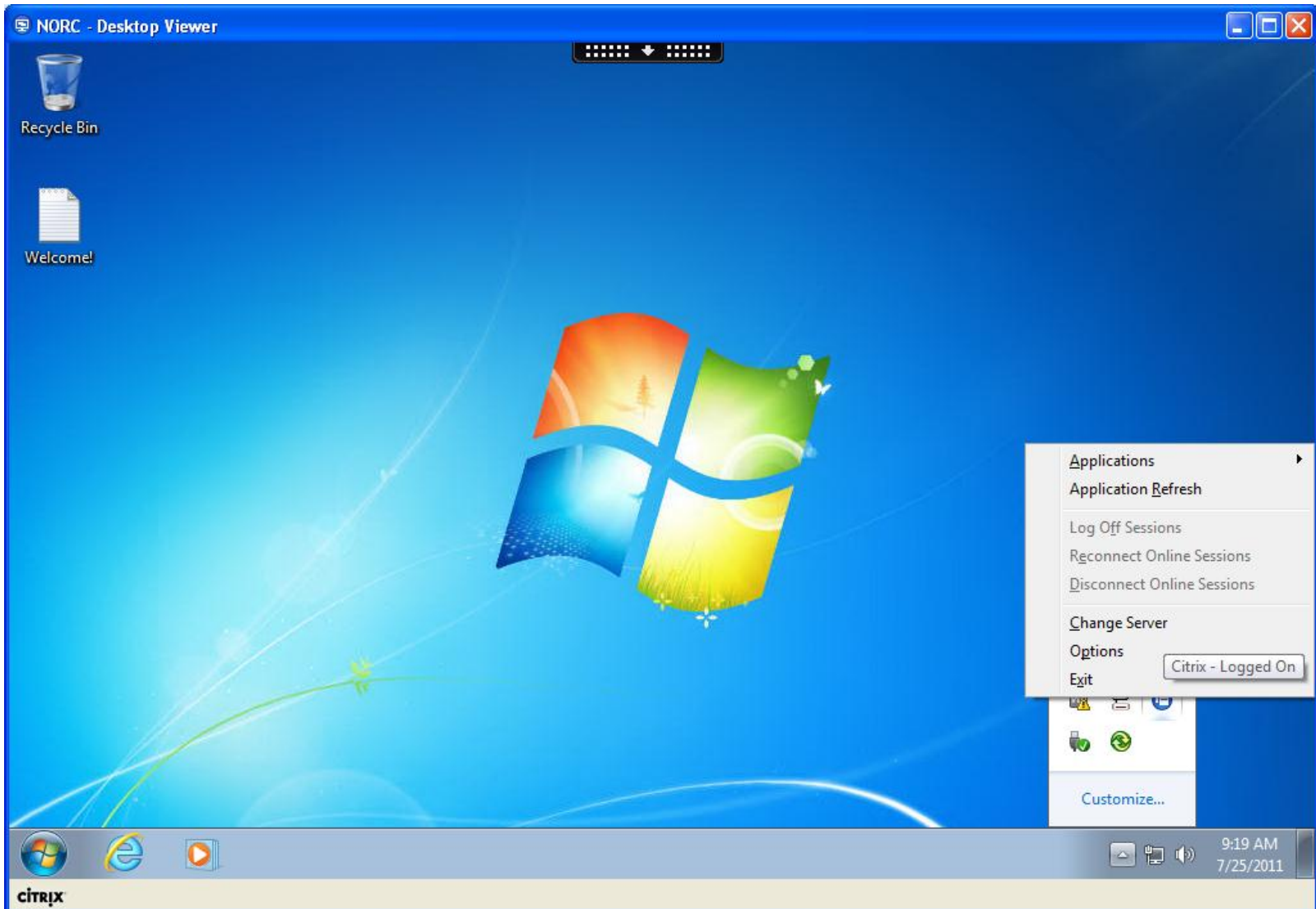
# Available Applications



# “Computer” (Mapped Drives)



# Refreshing Streamed Applications



# **Mental Health Jail Diversion Resource Allocation Program (JDRAP)**

## **User Manual**

**Prepared by:**

**Human Services Research Institute  
2336 Massachusetts Ave.  
Cambridge, MA 02140**

**April 30, 2002**

## **Criminal Justice and Mental Health Resource Simulation Model**

The model is a computerized budget simulation and resource allocation model for projecting the effectiveness, costs, and potential cost offsets of implementing jail or prison diversion programs for offenders with mental illness. It is intended to provide policy makers and public officials with information for planning and evaluating service and resource allocation strategies.

The inputs to the model are numbers of persons in need of service, specific service needs, service options, unit costs for mental health and criminal justice services, and probable service impacts. The data to run the model can be obtained from published reports and State and local mental health system and criminal justice databases. The time it takes to prepare the inputs will depend upon data availability. It is estimated that preparation time will average approximately four months.

The model will produce for different diversion strategies estimates of consumer and community outcomes and mental health and criminal justice system costs that can be used to compute the fiscal implications of implementing jail diversion programs. The model provides an opportunity for different stakeholder groups (e.g. consumers, planners, advocates, budget analysts) to explore data and share assumptions. As new evidence and new data are available the model will be adapted to the new knowledge.

## **JDRAP Help File**

- 1) Installation instructions
- 2) Description of the menu items used in the JDRAP program
- 3) Steps in running the model
- 4) Example with screen shots showing how to enter the information.

### Part I Installation

#### Installation Steps:

- 1) Insert the JDRAP CD
- 2) Double click on the “my computer” icon on your desktop
- 3) Double click on the CD drive for your computer
- 4) Double click the “setup” icon
- 5) You can choose where to install the program on your computer (or you can use the default location).
- 6) The program will then install on your computer.

### PART I: Description of the features of the JDRAP program

Items under the “Model” menu bar:

#### **Scenario Description**

This feature of the program just lets you give a name and a description to the particular model that you are running. In some instances you may want to run various models with different service package configurations etc. This feature allows you to describe what is unique to the particular model that you are using at the time.

#### **Periods**

This feature specifies the time parameters that will be used in the model. There are two columns, one that specifies the number of time periods used in the model and the other specifying those time periods (ie, months, etc.).

#### **Functional Levels**

In the JDRAP model, there are two sets of functional levels. One set of functional levels deal with the justice system, and the other type of functional levels deal with the mental health system. There are two columns of information for each functional level type. The first just names what functional levels are you are using and specifies the number of levels. The second column is used to describe what that particular functional level means. Here is a listing of the functional level definitions:



1. **Needs Supervision, Structure and Intensive Treatment:** which results in intervention by the mental health and/or judicial system: The consumer damages or destroys property, is physically assaultive, threatens physical violence, is self-injurious, and/or creates public disturbances that result in arrest or involuntary commitment. This person may be homeless or at risk of homelessness (i.e., is highly transient or has experienced one or more episodes of homelessness in the last 12 months, and/or is living in a shared, temporary setting). This person is unable or unwilling to control their own behavior.
2. **Needs Structure and Intensive Treatment:** This is a person who has severe symptoms, may be unable to function, or might hurt himself or others. This person may be homeless or at risk of homelessness (i.e., is highly transient or has experienced one or more episodes of homelessness in the last 12 months, and/or is living in a shared, temporary setting). This person is willing and able to control their own behavior, but is vulnerable to the stresses of everyday life and needs support from mental health caregivers when everyday things go wrong – for example – having an argument, running out of money, missing a bus
3. **Needs Treatment and Rehabilitation:** This is a person who has ADL skills, but lacks community living skills. The consumer is unable to hold a job, or is only able to work part-time for reasons that are specifically related to his/her mental illness (i.e., the reasons do not involve some other role responsibility, such as being a student or parent, or a physical disability that makes it impossible to work) and has difficulty
4. **Needs Support for Role Functioning:** This is a person who, although not without problems, needs support for role functioning and can obtain help from generic health and human services.

## **JS Population**

This feature is used to enter the total number of people in the justice system who are at each of the previously defined functional levels at each particular time period. Here, there are three columns of information; the time period, the functional level, and the total population. For example, in time period number 1, for people who have a functional level of 1, the total population might be 50 for that particular site.

## **JS Resources**

The JS Resources function is used to predict service use cost per functional level. For this purpose, there are three subcategories that make up the JS Resources information field. These are description, availability and unitary cost.

### *Description*

The “description” field is used to describe all available service resources. There are two columns, one that gives an ID to the particular service type, and another that describes what exactly that service entails. For example, if case management is one of the services available, then “casem” could be used as an ID to name that particular service, while

“case management” would be used to describe what is being specified. In this example, the ID field is a three digit number, and the services corresponding to that ID field are described.

<b>ID</b>	<b>Description</b>
001	Intensive Staff/ Supervision
002	Moderate Staff/ Supervision
003	Minimum Staff/ Supervision
004	Indep. Living w/ Subsidized Housing
005	Indep. Living w/o Subsidized Housing
006	Specialized Residential
007	Crisis Outreach
008	Crisis Emergency Walk-In
009	Crisis Residential
010	Respite Care
011	Inpatient - Specialty/State
012	Inpatient - General
013	Inpatient - Forensic
014	Inpatient - Detox
015	Evaluation (Diagnosis)
016	Court Ordered Evaluation
017	Individual Psycho-Therapy
018	Group Psycho-Therapy
019	Family Psycho-Therapy
020	Therapeutic Supervision
021	Outpatient Detox.
022	Substance Abuse Counseling
023	Methadone Maintenance Clinic
024	Psychosocial Rehabilitation
025	Consumer Operated Services
026	Vocational Assessment
027	Supported Employment
028	Support Ed. & Othr Ed Services
029	ACT
030	Clinical Team/Case Management
031	Case Coordination
032	Protection & Advocacy
033	Client Transportation
034	Family Psychoed
035	Friend Advocacy
036	Jail Diversion Program
037	Total CJ costs investigation arraignment and pretrial detention (when units and costs unavailable services below)
038	Investigation (Police time)

<b>039</b>	Arrest / Pretrial release / detention hearing
<b>040</b>	Pretrial detention
<b>041</b>	Community Supervision
<b>042</b>	Trial
<b>043</b>	Probation
<b>044</b>	Incarceration - Jail
<b>045</b>	Incarceration - Prison
<b>046</b>	Parole - Post release supervision

### *Availability*

The “availability” field is used to place service costs limits on each of the services that have been previously specified. Here, you can specify what is the maximum amount of money that could be allocated to a particular service per time period (across functional levels). If you do not want to place cost limitations on services during the specified time period, then you can specify an extremely high value for this particular field.

### *Unitary Cost*

The “unitary cost” field is used to describe the average cost per unit of service for each of the particular services that have been previously specified. There are three fields, the service id, a “unit” field, and a costs field. For each service ID, the “unit” field has to be specified. For example, if inpatient services, the unit field would most likely be days. If the service being described is outpatient counseling, the unit field would most likely be hours. The costs field is the average costs per unit of service for that particular service type. As an example, the table below shows each service ID, the units associated with that service, as well as the average cost per unit of service. The shaded area is the unitary cost field that will be used in the JDRAP model.

Service	Unit	Cost Per Unit
JSR001	days	250.00
JSR002	days	200.00
JSR003	days	90.00
JSR004	days	11.51
JSR005	days	0.00
JSR006	days	275.00
JSR007	hours	115.00
JSR008	hours	166.00
JSR009	days	285.00
JSR010	days	132.00
JSR011	days	285.00
JSR012	days	440.00
JSR013	days	285.00
JSR014	days	150.00
JSR015	hours	110.00
JSR016	hours	110.00
JSR017	hours	85.00

JSR018	hours	20.00
JSR019	hours	80.00
JSR020	hours	25.00
JSR021	hours	75.00
JSR022	hours	75.00
JSR023	week	75.00
JSR024	hours	11.00
JSR025	hours	5.00
JSR026	hours	60.00
JSR027	hours	60.00
JSR028	hours	50.00
JSR029	hours	123.00
JSR030	hours	90.00
JSR031	hours	64.00
JSR032	hours	22.50
JSR033	hours	10.00
JSR034	hours	60.00
JSR035	hours	83.00
JSR036	per case	351.00
JSR037	hours	0.00
JSR038	event	48.00
JSR039	hours	0.00
JSR040	per case	198.00
JSR041	hours	0.00
JSR042	days	0.00
JSR043	hours	6.63
JSR044	days	81.00
JSR045	days	81.00
JSR046	hours	6.63

### **MH Resources**

This field is the exact same as the JS resources except that it deals with mental health services and costs.

### **Service Packages**

The service package feature is designed to allow for different service delivery patterns to different groups of people. With this feature, you can create service delivery packages that could correspond to the “ideal” scenario as well as those that just maintain services as usual. There are four subcategories within the service packages field. These categories are “description”, “applicability”, “resource utilization”, and “SP cost”. Under the description subcategory, a service package id field as well as a description field will appear on the screen. If only one type of service package will be used, then only one service package ID would need to be entered. The “applicability” subcategory is used to choose which functional levels will correspond to each of the service packages that had been previously specified. You can apply the service package to each functional

level, or decide that certain functional levels need specific service packages. The “resource utilization” feature uses the information calculated from the spreadsheet program. The information entered here is the resources needed for each functional level, service type, and service package type. The final subcategory in the service packages field is “SP cost”. Here, the cost per unit of service will be entered for each type of service and service package type.

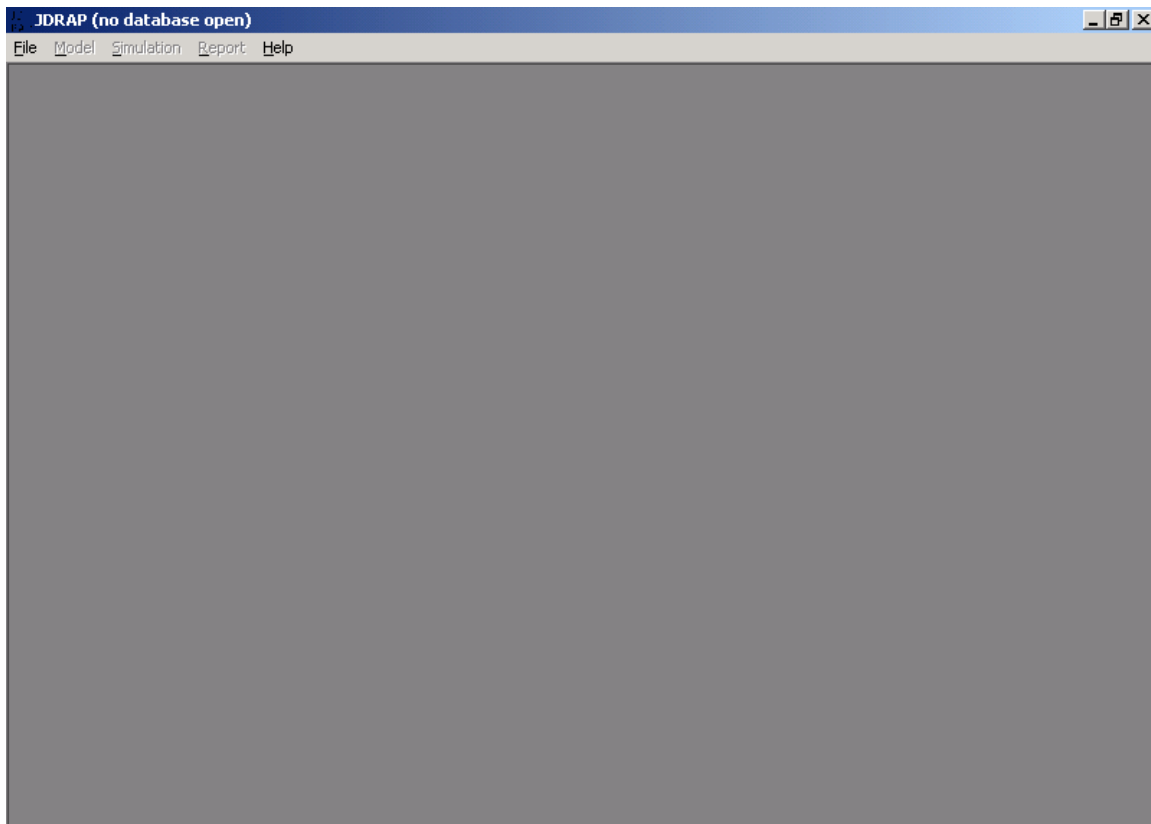
### **Transitional Probabilities**

The transitional probabilities field is a matrix listing the functional levels for the mental health and justice system across the column and row. The diagonal is the probability of staying in the same functional level throughout the time period. In the cells, are the probabilities associated with either moving up in functional level (ie, making a “forward step” or moving back in functional level, a “backward step”). These probabilities are used in calculating cost projections as well as resource allocations.

Part III Using the JDRAP program:

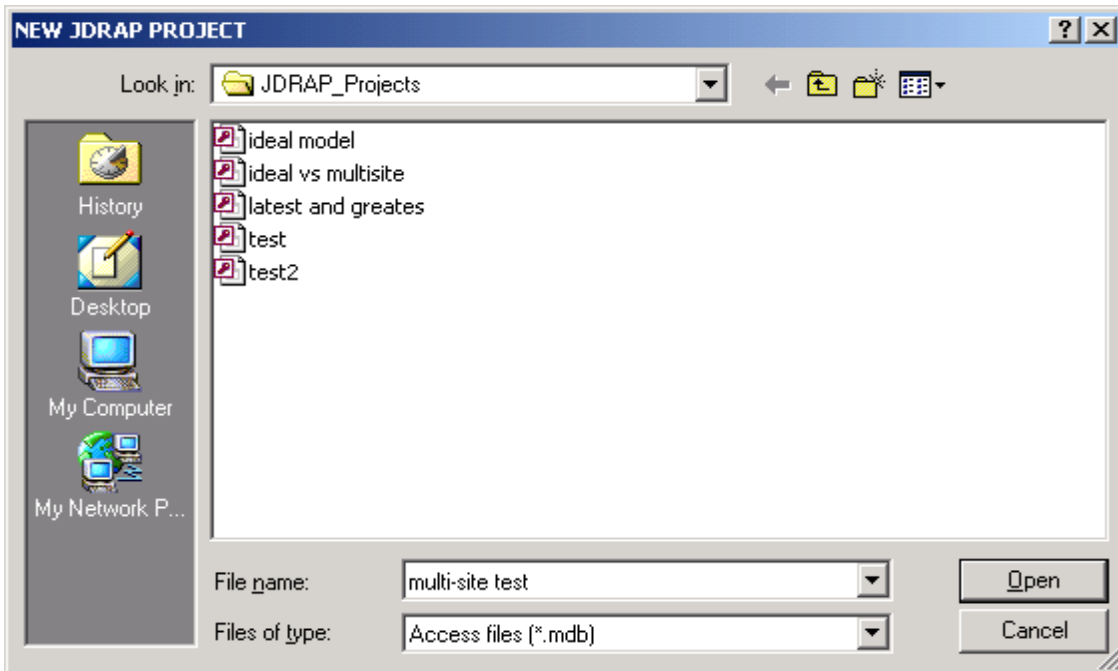
In this section we will begin to go through using the JDRAP program showing the various steps in creating the dataset and in running a model. A test database will be created for explanatory purposes.

Figure 1 Opening JDRAP Screen



To begin using the JDRAP program, you will have to either open an existing database or create a new one. Both of these options are under the “file” menu toolbar. To begin, we will create a new database and name it “multi-site test” (Figure 2).

Figure 2: New Database Screen



When you click on open, a windows box will open that tells you that this file has not been created and asks you if you want to create this file. When you click ‘yes’, an initialization screen opens up that allows you to specify the particular features of the database that you wish to open. This initialization screen will be shown in Figure 3.

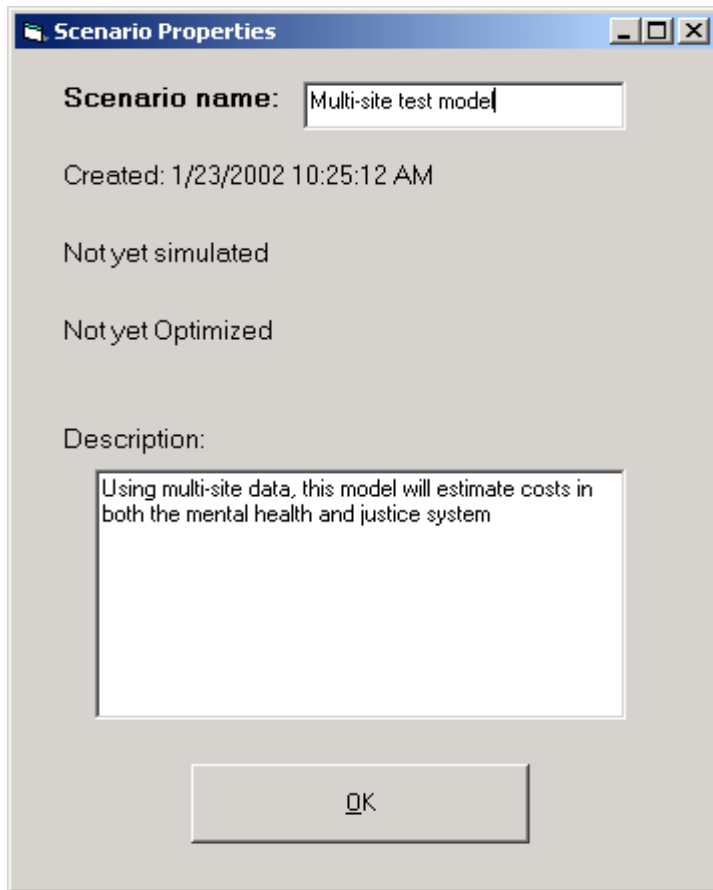
Figure 3: Initialization Screen

Section	Parameter	Value
General	Periods:	12
	Service Packages:	1
Justice System	JS Levels:	6
	Resources:	46
Mental Health	MH levels:	5
	Resources:	46

In Figure 3 we have specified a model with twelve time periods, one service package, six justice system functional levels, five mental health functional levels, and 46 service resources for each system. If you wish to change these options at a later time, you will be able to do that once the database has been created. There are edit functions built within the dataset that allow for changes to this initial design. It is important to point out, however, that many of the later data input screens rely on previously entered information. This makes making changes at a late stage difficult (such as adding an additional functional level after services have been entered). To do this, you will have to go back and update the earlier information.

Now that the model specifications have been made, you will be shown a screen in which you can name and describe the model you are running.

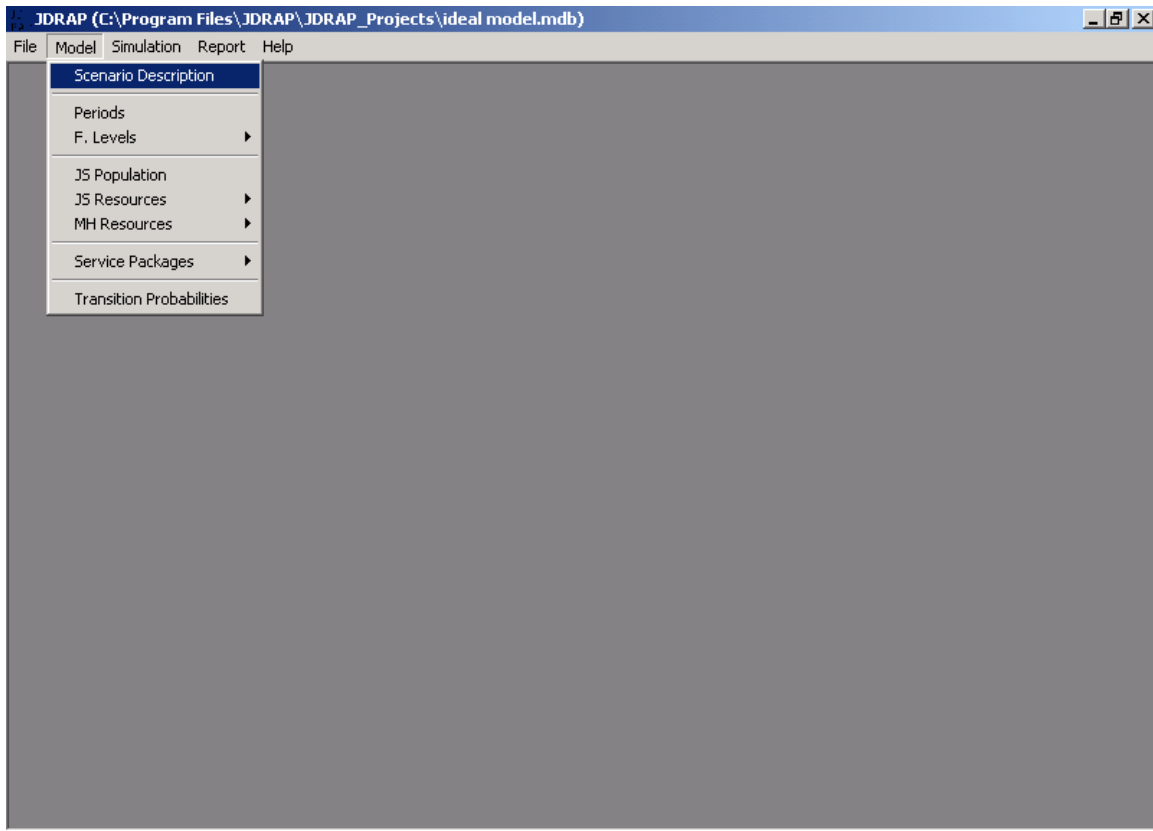
Figure 4: Scenario Properties Screen



One that you click 'OK' you will be taken back to the opening JDRAP screen. When you click on "model", you have various options to enter data.

Figure 5: Model Options





Under the scenario description, you can edit or change the information that was previously entered when the dataset was first created.

The next step is checking the “periods” feature in the JDRAP program (Figure 6). Here you can edit the number of periods by either adding or subtracting them (there is an option to add or delete lines through the edit toolbar). There is a column to enter descriptions for each of the time periods, although this is not necessary for running the model. Again, later screen will use the information for organizing the data, so if you need to make changes at a later time to the number of time periods, it will become necessary to change all of the intervening data screens. In the model that we are creating we have labeled the time periods as months.

Figure 6: Time Periods Screen

	Period	Description
1	1	Month 1
2	2	Month 2
3	3	Month 3
4	4	Month 4
5	5	Month 5
6	6	Month 6
7	7	Month 7
8	8	Month 8
9	9	Month 9
10	10	Month 10
11	11	Month 11
12	12	Month 12

Once that the time periods have been specified, we can move on to the mental health functional levels screen. Under the “F. levels” feature, there are two subcategories. One of these categories corresponds to the mental health system and the other refers to the justice system. If you click on “mental health”, a window opens up with two columns (Figure 7). One column is the functional levels ID field (FL ID) and the other is a description field for those particular functional levels. You will notice that the first two lines of the functional levels field for mental health includes “death” and “disappearance”. Again, you can edit the functional level id names and add or subtract functional levels through the “edit” toolbar.

Figure 7: Mental Health Functional Levels Screen

	FL ID	Description
1	Death	Death
2	Dissap.	Disappearance
3	MH1	Needs supervision, structure, and intensive treatment
4	MH2	Needs structure and intensive treatment
5	MH3	Needs treatment and rehabilitation
6	MH4	Needs support for role functioning
7	MH5	Does not need services

After the mental health functional levels have been assigned, we need to specify the JS functional levels (Figure 8). This will be exactly like the MH screen, except that we need to create another functional level category (the JSA level, see the description of the JS population below).

Figure 8: Justice System Functional Levels Screen

The screenshot shows a Microsoft Access window titled "JDRAP (C:\Program Files\JDRAP\JDRAP\_Projects\multi-site test.mdb) - [Enter Functional Levels for the Justice System]". The window displays a table with two columns: "FL ID" and "Description". The table contains six rows of data:

	FL ID	Description
1	JS1	Needs supervision, structure, and intensive treatment
2	JS2	Needs structure and intensive treatment
3	JS3	Needs treatment and rehabilitation
4	JS4	Needs support for role functioning
5	JS5	Does not need services
6	JSA	Justice system arrival category

The next step is entering in the population estimates for the JS population. In our example, we created a separate functional level called “JSA” (this will be a our starting, or “arrival” category). We have used the JDRAP spreadsheet to estimate this arrival population. In the spreadsheet, there is a worksheet named “JS Population”. In the spreadsheet, the cell with the population estimate will be highlighted (see Figure 9). The JDRAP program enables you to enter values for each functional level, but for this example, only the “arrival” or JSA category will be used. The JSA category is the initial starting point from which individuals are assigned to the various functional levels. In the JDRAP program, there are two small pull-down windows that allow you to view only the information that you wish to see. The first one (on the top left hand side) is used to view the time periods (an asterisk is used to view all of the information controlled by that window). The other window (on the top right) is used to view the functional levels. In Figure 10, the view shown includes all time periods but only functional level JSA can be seen (it is the only one with information). The JDRAP program does not work properly when items are left blank. Therefore, you will have to specify the population for each time period and functional level as being “0” (except the JSA category). An easy way to fill in repeated values is to highlight the cells you wish to fill, then right click your mouse and use the “fill” function (a dialog box opens up in which you write the value to be repeated).

Figure 9: JS Population Spreadsheet

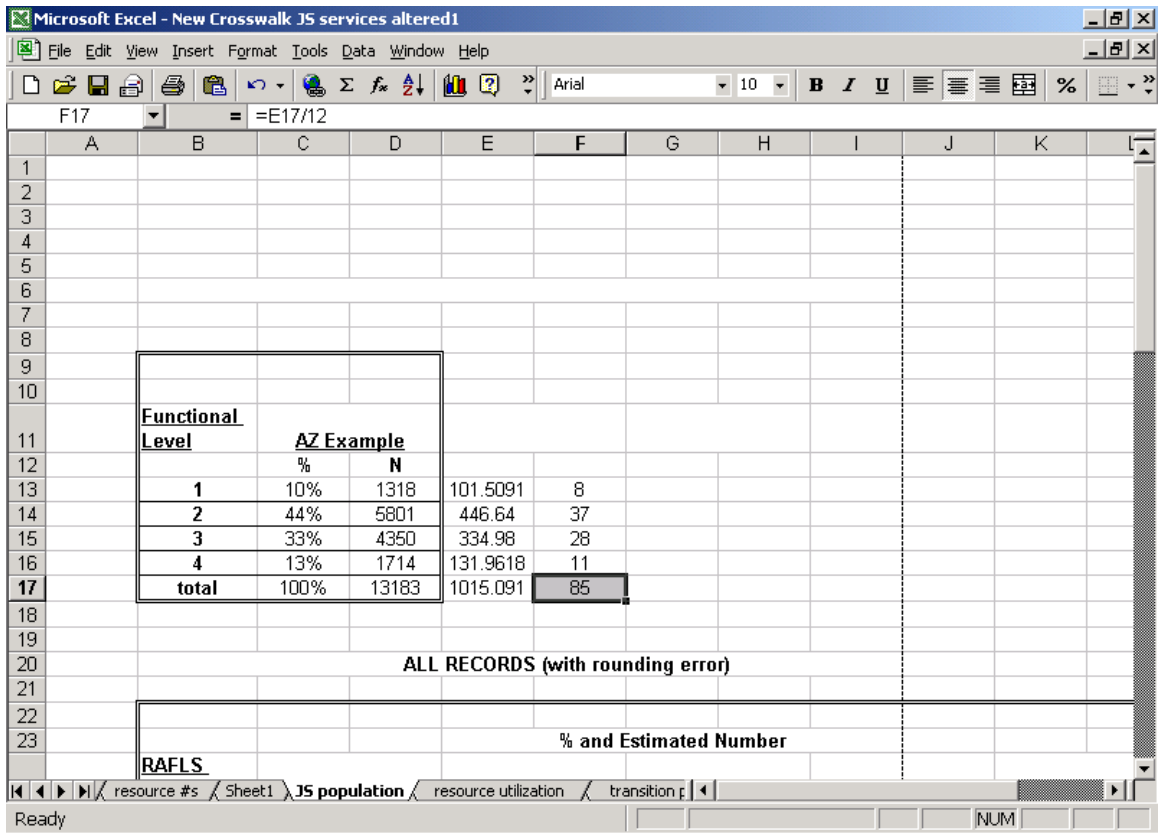


Figure 10: JS Population Screen Showing the JSA Category

The screenshot shows a software window titled "JDRAP (C:\Program Files\JDRAP\JDRAP\_Projects\ideal model.mdb) - [Enter New Population]". Below the title bar is a menu bar with "File" and "Edit". There are two dropdown menus: "Time\_Periods:" with a value of "x" and "JSLevels:" with a value of "JSA". Below these is a table with the following data:

	Period	FL ID	Value
1	1	JSA	85
2	2	JSA	85
3	3	JSA	85
4	4	JSA	85
5	5	JSA	85
6	6	JSA	85
7	7	JSA	85
8	8	JSA	85
9	9	JSA	85
10	10	JSA	85
11	11	JSA	85
12	12	JSA	85

Once that the population estimates have been entered into the model (in our case, only the JSA was entered with non-zero values) then, we can move onto specifying the JS resources. Under the JS resources category is the field of “description”. Here, is where you specify the ID accompanying each service. Additionally, there is a field used to give more meaningful descriptions to the services. However, this secondary field is not necessary to run the model. An example of this screen is shown in Figure 11.

Figure 11: JS Description Field

The screenshot shows a window titled "JDRAP (C:\Program Files\JDRAP\JDRAP\_Projects\multi-site test.mdb) - [Enter Resources]". The window contains a table with two columns: "RS ID" and "Description". The table lists 32 resources, each with a unique ID and a specific service description.

RS ID	Description
1 JSR001	JS - Intensive Staff/ Supervision
2 JSR002	JS - Moderate Staff/ Supervision
3 JSR003	JS - Minimum Staff/ Supervision
4 JSR004	JS - Indep. Living w/ Subsidized Housing
5 JSR005	JS - Indep. Living w/o Subsidized Housing
6 JSR006	JS - Specialized Residential
7 JSR007	JS - Crisis Outreach
8 JSR008	JS - Crisis Emergency Walk-In
9 JSR009	JS - Crisis Residential
10 JSR010	JS - Respite Care
11 JSR011	JS - Inpatient - Specialty/State
12 JSR012	JS - Inpatient - General
13 JSR013	JS - Inpatient - Forensic
14 JSR014	JS - Inpatient - Detox
15 JSR015	JS - Evaluation (Diagnosis)
16 JSR016	JS - Court Ordered Evaluation
17 JSR017	JS - Individual Psycho-Therapy
18 JSR018	JS - Group Psycho-Therapy
19 JSR019	JS - Family Psycho-Therapy
20 JSR020	JS - Therapeutic Supervision
21 JSR021	JS - Outpatient Detox.
22 JSR022	JS - Substance Abuse Counseling
23 JSR023	JS - Methadone Maintenance Clinic
24 JSR024	JS - Psychosocial Rehabilitation
25 JSR025	JS - Consumer Operated Services
26 JSR026	JS - Vocational Assessment
27 JSR027	JS - Supported Employment
28 JSR028	JS - Support Ed. & Othr Ed Services
29 JSR029	JS - ACT
30 JSR030	JS - Clinical Team/Case Management
31 JSR031	JS - Case Coordination
32 JSR032	JS - Protection & Advocacy
33 JSR033	JS - Client Transportation

The next step is assigning any resource limits that you wish to impose on the separate services. This can be done using the “availability” field. Here, you can enter the total amount of money that you wish to make available for service planning. If you wish to make no such limits on resources, then you can enter a high value for this field. In our example, we specify an extreme value for each resource because we are not making any a priori limits (we specified 999999 for each service and time period). This screen will be shown in Figure 12. Once again, there are separate small windows on the top of the screen that allow you to view only specified values. In the example we present, we have selected to view all of the services for all time periods.

Figure 12: JS Resource Availability Screen

JDRAP (C:\Program Files\JDRAP\JDRAP\_Projects\multi-site test.mdb) - [Enter Resource Availability]

Time\_Periods: \* JSResources: \*

	Period	RS_ID	Value
1	1	JSR001	999999
2	1	JSR002	999999
3	1	JSR003	999999
4	1	JSR004	999999
5	1	JSR005	999999
6	1	JSR006	999999
7	1	JSR007	999999
8	1	JSR008	999999
9	1	JSR009	999999
10	1	JSR010	999999
11	1	JSR011	999999
12	1	JSR012	999999
13	1	JSR013	999999
14	1	JSR014	999999
15	1	JSR015	999999
16	1	JSR016	999999
17	1	JSR017	999999
18	1	JSR018	999999
19	1	JSR019	999999
20	1	JSR020	999999
21	1	JSR021	999999
22	1	JSR022	999999
23	1	JSR023	999999
24	1	JSR024	999999
25	1	JSR025	999999
26	1	JSR026	999999
27	1	JSR027	999999
28	1	JSR028	999999
29	1	JSR029	999999
30	1	JSR030	999999
31	1	JSR031	999999

Once that the resource availability screen has been entered, we move onto unit costs. In this screen, each service is specified according to the units of service as well as the cost per unit. For the JS population, this screen is shown in the Figure 13.

Figure 13: JS Population Unit Cost Screen



	RS ID	Unit	Cost per unit
1	JSR001	days	250.00
2	JSR002	days	200.00
3	JSR003	days	90.00
4	JSR004	days	11.51
5	JSR005	days	0.00
6	JSR006	days	275.00
7	JSR007	hours	115.00
8	JSR008	hours	166.00
9	JSR009	days	285.00
10	JSR010	days	132.00
11	JSR011	days	285.00
12	JSR012	days	440.00
13	JSR013	days	285.00
14	JSR014	days	150.00
15	JSR015	hours	110.00
16	JSR016	hours	110.00
17	JSR017	hours	85.00
18	JSR018	hours	20.00
19	JSR019	hours	80.00
20	JSR020	hours	25.00
21	JSR021	hours	75.00
22	JSR022	hours	75.00
23	JSR023	week	75.00
24	JSR024	hours	11.00
25	JSR025	hours	5.00
26	JSR026	hours	60.00
27	JSR027	hours	60.00
28	JSR028	hours	50.00
29	JSR029	hours	123.00
30	JSR030	hours	90.00
31	JSR031	hours	64.00
32	JSR032	hours	22.50

After the JS resources have been completed, the same process repeats for the MH resources. The exact same type of input screens appears in each type. As you enter the MH resources, you should be careful not to use the same ID as you did for the JS resources. Since the same steps are involved in entering both the JS and MH resources, we will next move on to the service package input screens.

The next section of inputs has to do with the service package options that you wish to include in the model. Under this general heading are four subcategories; description, applicability, resource utilization, and service package costs. The “description” field is used to give ID’s to the various service package arrangements that you might want to include in the model. For example, you can specify three or four different packages (each with their own transitional probabilities and service arrangements). In the example that we use, there is only one service package which is being defined. Figure 14 shows the description screen. In the example, the ID field contains “SP1”, the identification for our service arrangement. In the description field, we specify that this is a “standard” package.

Figure 14: Service Package Description Screen

	SP ID	Description
1	SP1	Standard

The next subcategory in the service package options is the “applicability” screen. The purpose of this feature is to decide which functional levels you want the model to apply. In our example, we have decided to not leave any of the levels out, and to have the model apply across population. The screen will be shown in the Figure 15. Since we only have one service package, only one set of functional levels will be shown. Here, you can simply check the icon in the value field to apply the model to that functional level.

Figure 15: Applicability Field

The screenshot shows a window titled "JDRAP (C:\Program Files\JDRAP\JDRAP\_Projects\multi-site test.mdb) - [Enter Service Packages To Functional Levels Relations]". Below the title bar are "File" and "Edit" menus. There are two dropdown menus: "S\_Packs:" with a selected value of "\*" and "JOIN\_LEVELS:" with a selected value of "\*". Below these is a table with the following data:

	SP ID	FL ID	Value
1	SP1	Death	✓
2	SP1	Dissap.	✓
3	SP1	JS1	✓
4	SP1	JS2	✓
5	SP1	JS3	✓
6	SP1	JS4	✓
7	SP1	JS5	✓
8	SP1	JSA	✓
9	SP1	MH1	✓
10	SP1	MH2	✓
11	SP1	MH3	✓
12	SP1	MH4	✓
13	SP1	MH5	✓

The next step is running the resource utilization feature of the model. Here, you will need to enter some information that will be obtained from the excel spreadsheet. Once that you click on resource utilization, a window will open up saying “reading resources” which will take a few seconds to process. After this, a screen will open which will contain four columns. A service package ID field (SP ID) a functional level ID field (FL ID), a resource ID field (RS ID) and a value field (see Figure 16). The first three columns will contain information that you have previously entered into the model at the earlier steps. To complete the value field, you will need to use the excel spreadsheet that is entitled “resource utilization”. In this worksheet, there are two columns that will need to be pasted into the model. One for all of the Mental Health resources and the other column is for all of the Justice System resources. Note that in the model, there is only one column, so you will need to paste the Justice System resources in first and then move on to the Mental Health resources. Figure 17 shows the part of the excel screen which pulls together the calculated values for each functional level and service. On the same worksheet, there are two columns in which the same information has been placed to easily paste the information into the JDRAP program (see Figure18 for a view of these columns). Note, that because we used JS5 and JSA as functional levels, we have to create spaces to add zeros into the JDRAP program.

Figure 16: Resource Utilization Screen.

	SP ID	FL ID	RS ID	Value
1	SP1	JS1	JSR001	15.21
2	SP1	JS1	JSR002	0
3	SP1	JS1	JSR003	0
4	SP1	JS1	JSR004	7.605
5	SP1	JS1	JSR005	0
6	SP1	JS1	JSR006	7.605
7	SP1	JS1	JSR007	1
8	SP1	JS1	JSR008	3.75
9	SP1	JS1	JSR009	0.5
10	SP1	JS1	JSR010	0
11	SP1	JS1	JSR011	3.75
12	SP1	JS1	JSR012	1.05
13	SP1	JS1	JSR013	1.25
14	SP1	JS1	JSR014	0.5
15	SP1	JS1	JSR015	0
16	SP1	JS1	JSR016	0
17	SP1	JS1	JSR017	0.15
18	SP1	JS1	JSR018	0
19	SP1	JS1	JSR019	0
20	SP1	JS1	JSR020	2
21	SP1	JS1	JSR021	0
22	SP1	JS1	JSR022	1.5
23	SP1	JS1	JSR023	0
24	SP1	JS1	JSR024	24
25	SP1	JS1	JSR025	12
26	SP1	JS1	JSR026	0
27	SP1	JS1	JSR027	0

Figure 17: Resource Utilization Worksheet Part 1

The screenshot shows a Microsoft Excel spreadsheet titled "Information used for JDRAP Modeling". The worksheet displays a table of resource utilization data. The columns are labeled B, C, D, E, F, G, H, I, J, K. The rows are numbered 10 through 36. The data is organized into columns JS1, JS2, JS3, JS4, MH1, MH2, MH3, and MH4. The services listed include Intensive Staff/ Supervision, Moderate Staff/ Supervision, Minimum Staff/ Supervision, Indep. Living w/ Subsidized Housing, Indep. Living w/o Subsidized Housing, Specialized Residential, Crisis Outreach, Crisis Emergency Walk-In, Crisis Residential, Respite Care, Inpatient - Specialty/State, Inpatient - General, Inpatient - Forensic, Inpatient - Detox, Evaluation (Diagnosis), Court Ordered Evaluation, Individual Psycho-Therapy, Group Psycho-Therapy, Family Psycho-Therapy, Therapeutic Supervision, Outpatient Detox., Substance Abuse Counseling, Methadone Maintenance Clinic, Psychosocial Rehabilitation, and Consumer Operated Services.

	JS1	JS2	JS3	JS4	MH1	MH2	MH3	MH4
12 Intensive Staff/ Supervision	15.21	8.3655	0.3042	0	15.21	8.3655	0.3042	0
13 Moderate Staff/ Supervision	0	5.3235	3.9546	0	0	5.3235	3.9546	0
14 Minimum Staff/ Supervision	0	5.3235	10.9512	0	0	5.3235	10.9512	0
15 Indep. Living w/ Subsidized Housing	7.605	6.084	19.773	13.689	7.605	6.084	19.773	13.689
16 Indep. Living w/o Subsidized Housing	0	0.38025	14.9058	16.731	0	0.38025	14.9058	16.731
17 Specialized Residential	7.605	6.084	10.647	0	7.605	6.084	10.647	0
18 Crisis Outreach	1	0.6	0.6	0.02	1	0.6	0.6	0.02
19 Crisis Emergency Walk-In	3.75	0.5	0.45	0.15	3.75	0.5	0.45	0.15
20 Crisis Residential	0.5	0.375	0.24	0	0.5	0.375	0.24	0
21 Respite Care	0	0.5	0.18	0	0	0.5	0.18	0
22 Inpatient - Specialty/State	3.75	0.55	0.2	0	3.75	0.55	0.2	0
23 Inpatient - General	1.05	0.33	0.025	0	1.05	0.33	0.025	0
24 Inpatient - Forensic	1.25	0.0125	0	0	1.25	0.0125	0	0
25 Inpatient - Detox	0.5	0.075	0.1	0	0.5	0.075	0.1	0
26 Evaluation (Diagnosis)	0	0.07	0.25	0.06	0	0.07	0.25	0.06
27 Court Ordered Evaluation	0	0.03	0.04	0	0	0.03	0.04	0
28 Individual Psycho-Therapy	0.15	0.3	1.65	0.5	0.15	0.3	1.65	0.5
29 Group Psycho-Therapy	0	0.4	2.2	0.4	0	0.4	2.2	0.4
30 Family Psycho-Therapy	0	0.2625	0.6	0.3	0	0.2625	0.6	0.3
31 Therapeutic Supervision	2	1.5	0.9	0	2	1.5	0.9	0
32 Outpatient Detox.	0	0.7	0.4	0	0	0.7	0.4	0
33 Substance Abuse Counseling	1.5	0.875	2	1	1.5	0.875	2	1
34 Methadone Maintenance Clinic	0	0	0.01	0	0	0	0.01	0
35 Psychosocial Rehabilitation	24	20	22	8	24	20	22	8
36 Consumer Operated Services	12	22.5	15	3	12	22.5	15	3

Figure 18: Resource Utilization Worksheet Part 2.

	L	M	N	O	P	Q	R	S	T	U	V	W
10			Paste this column JS			Paste this column MH						
11		Service ID			Service ID							
12		001	15.21		001	15.21						
13		002	0		002	0						
14		003	0		003	0						
15		004	7.605		004	7.605						
16		005	0		005	0						
17		006	7.605		006	7.605						
18		007	1		007	1						
19		008	3.75		008	3.75						
20		009	0.5		009	0.5						
21		010	0		010	0						
22		011	3.75		011	3.75						
23		012	1.05		012	1.05						
24		013	1.25		013	1.25						
25		014	0.5		014	0.5						
26		015	0		015	0						
27		016	0		016	0						
28		017	0.15		017	0.15						
29		018	0		018	0						
30		019	0		019	0						
31		020	2		020	2						
32		021	0		021	0						
33		022	1.5		022	1.5						
34		023	0		023	0						
35		024	24		024	24						
36		025	12		025	12						

After these columns have been entered into the JDRAP program, the next step is check the SP costs screen. This screen shows you the cost per unit for each of the functional levels (for both the MH and JS components of the model). If you have more than one service package specified, then the information will be repeated. Note that you will not have to enter any new information for this screen, only check to see if you have valid values for those functional levels that you have specified as receiving services. A picture of this screen reflecting the information that we have entered will be shown in Figure 19.

For the model that we have specified, the cost per unit is zero for death, disappearance, JS5, JSA, and MH5. All of these are functional levels in which no costs have previously been assigned to services. There are valid values for those functional levels that we have specified as receiving services. You can use this screen as a way to check for possible data entry mistakes in the model.

Figure 19: Service Package Costs Screen

	SP ID	FL ID	Cost per Unit
1	SP1	Death	0.00
2	SP1	Dissap.	0.00
3	SP1	JS1	11,316.29
4	SP1	JS2	8,376.82
5	SP1	JS3	8,653.78
6	SP1	JS4	779.49
7	SP1	JS5	0.00
8	SP1	JSA	0.00
9	SP1	MH1	11,349.54
10	SP1	MH2	8,410.07
11	SP1	MH3	8,687.03
12	SP1	MH4	812.74
13	SP1	MH5	0.00

The next step is entering the transitional probabilities for the model. Here, we will also need to refer to the spreadsheet program in which these values are calculated. Figure 20 shows the final transitional probabilities that will be entered into the JDRAP program. The excel worksheet showing the transitional probabilities has three parts. The first section shows the original transitional probabilities before anything has been altered. The next section shows how to normalize the rows to get the probabilities to sum to 1. Finally, the last section is the revised transitional probabilities that will be entered into the JDRAP program. Figure 21 shows the original transitional probability rates, and Figure 22 shows how to normalize the rows to eliminate the influence of death and disappearance. You can easily cut and paste the transitional probabilities into the JDRAP model. A view of the transitional probabilities screen from the JDRAP model will be shown in Figure 23.

Figure 20: Transitional Probability Rates From Excel Worksheet

Microsoft Excel - New Crosswalk JS services altered1

File Edit View Insert Format Tools Data Window Help

J21 =H21/30

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	<b>Transitional Probability Rates</b>														
2															
3															
4		<b>Death</b>	<b>Diss.</b>	<b>JS1</b>	<b>JS2</b>	<b>JS3</b>	<b>JS4</b>	<b>JS5</b>	<b>JSA</b>	<b>MH1</b>	<b>MH2</b>	<b>MH3</b>	<b>MH4</b>	<b>MH5</b>	<b>Total</b>
5	<b>Death</b>	1	0	0	0	0	0	0	0	0	0	0	0	0	1.0000
6	<b>Diss.</b>	0	1	0	0	0	0	0	0	0	0	0	0	0	1.0000
7	<b>JS1</b>	0.005	0.037	0.6991	0.1649	0.0913	0.005	0	0	0	0	0	0	0	1.0022
8	<b>JS2</b>	0.0035	0.037	0.0526	0.6842	0.1857	0.0355	0	0	0	0	0	0	0	0.9985
9	<b>JS3</b>	0.0025	0.037	0.0089	0.0205	0.866	0.0578	0.006	0	0	0	0	0	0	0.9990
10	<b>JS4</b>	0.001	0.037	0	0.0081	0.0578	0.8776	0.017	0	0	0	0	0	0	0.9985
11	<b>JS5</b>	0	0	0	0	0	0	1	0	0	0	0	0	0	1.0000
12	<b>JSA</b>	0	0	0.1	0.2	0.15	0.05	0	0	0.1	0.2	0.15	0.05	0	1.0000
13	<b>MH1</b>	0.005	0.037	0	0	0	0	0	0	0.624	0.17	0.1611	0.00498	0	1.0000
14	<b>MH2</b>	0.0035	0.037	0	0	0	0	0	0	0.053	0.68	0.1857	0.03554	0	0.9985
15	<b>MH3</b>	0.0025	0.037	0	0	0	0	0	0	0.009	0.02	0.8647	0.05767	0.006	0.9975
16	<b>MH4</b>	0.001	0.037	0	0	0	0	0	0	0	0.01	0.0577	0.87532	0.017	0.9960
17	<b>MH5</b>	0	0	0	0	0	0	0	0	0	0	0	0	1	1.0000
18															
19	<b>Instructions</b>														
20									Number	Percent					
21	Average number of jail days per month for non-diverted individual:								12.2	40.7%					
22	Add friction factor for increased problems accessing services (eligibility, trauma c								10.0%						
23	Factor to adjust JS transtion probabilities (probability of moving forward or backw								44.7%						
25	Copy shaded area and paste into model under model, transitional probabilities														

Ready NUM

Figure 21: Original Transitional Probability Rates



	A	B	C	D	E	F	G	H	I	J	K
27	<b>Original Mental Health Transitional Probabilities to Compute Adjusted Probabilities Above</b>										
28											
29		JS1	JS2	JS3	JS4	JS5					JS FL 1
30	JS1	0.6513	0.1753	0.1682	0.0052	0					JS FL 2
31	JS2	0.0549	0.7142	0.1938	0.0371	0					JS FL 3
32	JS3	0.0093	0.0214	0.9026	0.0602	0.0065					JS FL 4
33	JS4	0	0.0084	0.0602	0.9137	0.0177					JS FL 5
34	JS5	0	0	0	0	1					
35											
36											
37											
38											MH FL 1
39											MH FL 2
40											MH FL 3
41											MH FL 4
42											MH FL 5
43											
44											
45											
46											
47											
48											
49											
50											
51											
52											
53											

Figure 22: Normalizing the Rows

The screenshot shows an Excel spreadsheet with the following data:

	J	K	L	M	N	O	P	Q	R	S	T
27			To Normalize rows above taking out death and diss. From each FL (based on %)								
28			<b>JS FL 1</b>	<b>JS FL 2</b>	<b>JS FL 3</b>	<b>JS FL 4</b>	<b>JS FL 5</b>				
29		<b>JS FL 1</b>	0.7297	0.1721246	0.095301		0.0052	0			
30		<b>JS FL 2</b>	0.0549	0.7142	0.1938		0.0371	0			
31		<b>JS FL 3</b>	0.0093	0.0214	0.9026		0.0602	0.0065			
32		<b>JS FL 4</b>	0	0.0084	0.0602		0.9137	0.0177			
33		<b>JS FL 5</b>	0	0	0		0	1			
34			0.1	0.2	0.15		0.05	0			
35											
36											
37			<b>MH FL 1</b>	<b>MH FL 2</b>	<b>MH FL 3</b>	<b>MH FL 4</b>	<b>MH FL 5</b>				
38		<b>MH FL 1</b>	0.6513	0.1753	0.1682		0.0052	0			
39		<b>MH FL 2</b>	0.0549	0.7142	0.1938		0.0371	0			
40		<b>MH FL 3</b>	0.0093	0.0214	0.9026		0.0602	0.0065			
41		<b>MH FL 4</b>	0	0.0084	0.0602		0.9137	0.0177			
42		<b>MH FL 5</b>	0	0	0		0	1			
43											
44											
45											
46											
47											
48											
49											
50											
51											

Figure 23: Transitional Probabilities Screen in the JDRAP Model

	Death	Dissap.	JS1	JS2	JS3	JS4	JS5	JSA	MH1	MH2	MH3	MH4	MH5
Deat	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Dissa	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
JS1	0.0050	0.0369	0.6976	0.1645	0.0911	0.0050	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
JS2	0.0035	0.0371	0.0527	0.6852	0.1860	0.0356	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
JS3	0.0025	0.0370	0.0089	0.0205	0.8670	0.0579	0.0062	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
JS4	0.0010	0.0371	0.0000	0.0081	0.0579	0.8789	0.0170	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
JS5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
JSA	0.0000	0.0000	0.1000	0.2000	0.1500	0.0500	0.0000	0.0000	0.1000	0.2000	0.1500	0.0000	0.0000
MH1	0.0050	0.0370	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.6239	0.1679	0.1611	0.0000	0.0000
MH2	0.0035	0.0371	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0527	0.6852	0.1860	0.0000	0.0000
MH3	0.0025	0.0371	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0089	0.0206	0.8669	0.0000	0.0000
MH4	0.0010	0.0371	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0080	0.0579	0.0000	0.0000
MH5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

The final step before running the model simulation is to check the service mixture function under the “simulation” section on the menu toolbar. With only one service package, all functional levels should sum to 1. An example of this screen will be shown in Figure 24.

Figure 24: Service Mixture Screen

JDRAP (C:\Program Files\JDRAP\JDRAP\_Projects\multi-site test.mdb) - [Enter service pack mixture for each time period]

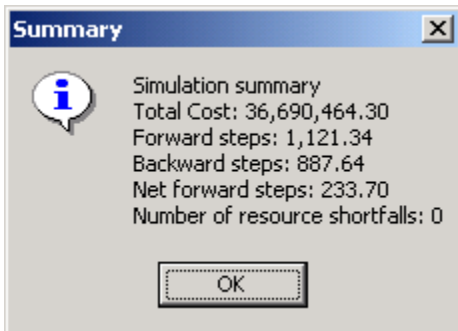
File Editor Utilities

Index  
Period: 1

	SP1	SUM
Deat	1.0000	1.0000
Dissa	1.0000	1.0000
JS1	1.0000	1.0000
JS2	1.0000	1.0000
JS3	1.0000	1.0000
JS4	1.0000	1.0000
JS5	1.0000	1.0000
JSA	1.0000	1.0000
MH1	1.0000	1.0000
MH2	1.0000	1.0000
MH3	1.0000	1.0000
MH4	1.0000	1.0000
MH5	1.0000	1.0000

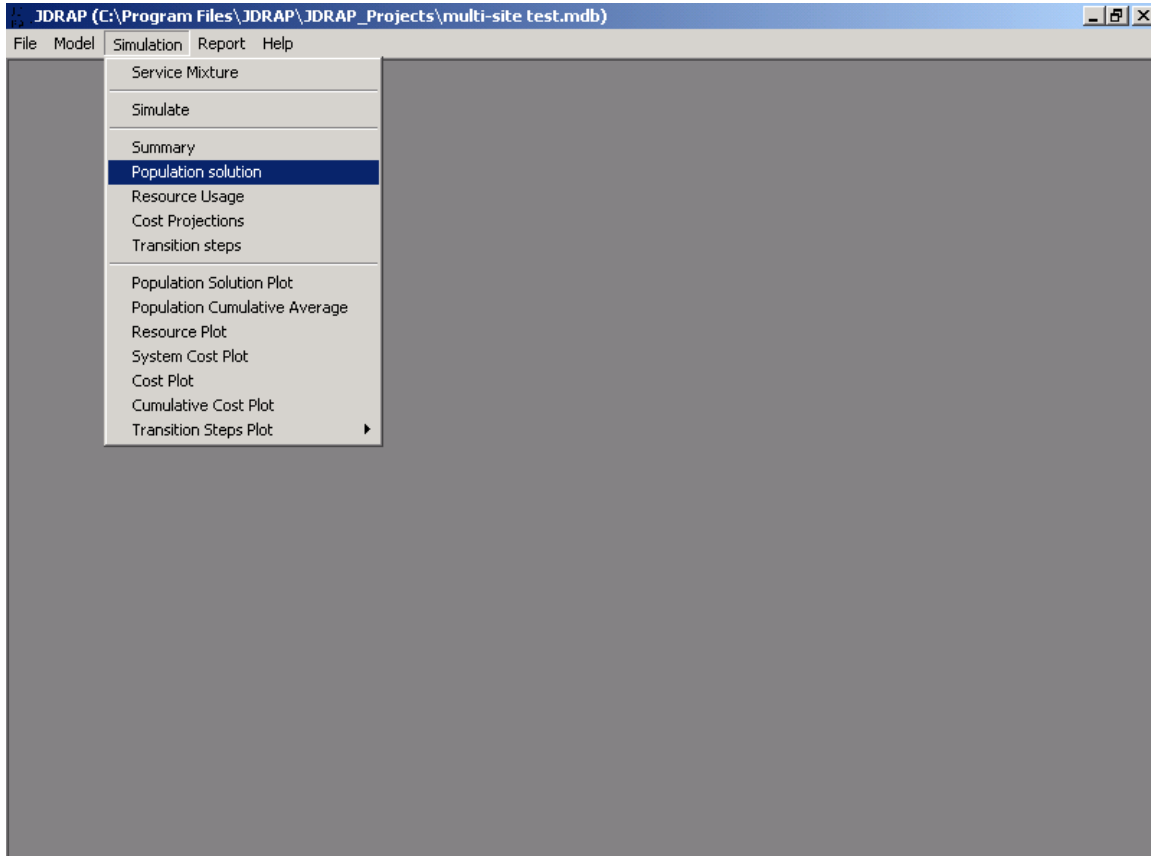
After the service mixture function has been checked, we can run the simulation. The simulation feature gives you the total costs, number of forward steps, number of backward steps, the net forward steps, as well as the number of resource shortfalls. An example of the “summary” will be shown in Figure 25.

Figure 25: Simulation Summary



Within the JDRAP program, there are summary tables, reports, and graphs that allow you to get a better understanding of the findings. Under the simulation pull-down toolbar, you can see several of these options (See Figure 26).

Figure 26: Simulation Options



The population solution screen shows the population estimates for each of the time periods and functional levels. This screen will be shown in Figure 27. This screen is particularly useful understanding how the transitional probabilities influence the movement of individuals through the functional levels over time. There are three index pull-down windows to have various data views. The first of these allow you to see only particular time periods. The middle pull-down window allows you to view only specific functional levels. The final one of these allows you to view various service packages (if you have specified more than one).

Figure 27: Population Estimates

	Period	FL ID	SP ID	Solution
32	3	JS4	SP1	9.37125
33	3	JS5	SP1	0.1513
34	3	JSA	SP1	85
35	3	MH1	SP1	14.812525
36	3	MH2	SP1	30.3722
37	3	MH3	SP1	28.5804
38	3	MH4	SP1	9.36955
39	3	MH5	SP1	0.151725
40	4	Death	SP1	0.8001672625
41	4	Dissap.	SP1	9.3110736125
42	4	JS1	SP1	21.1183574825
43	4	JS2	SP1	40.97999209
44	4	JS3	SP1	44.6072289225
45	4	JS4	SP1	15.2642062025
46	4	JS5	SP1	0.484128635
47	4	JSA	SP1	85
48	4	MH1	SP1	19.5965148475
49	4	MH2	SP1	40.9617670275
50	4	MH3	SP1	46.1043726825
51	4	MH4	SP1	15.291220605
52	4	MH5	SP1	0.489142785
53	5	Death	SP1	1.54787221188125
54	5	Dissap.	SP1	18.3499973474325
55	5	JS1	SP1	25.7888161003453
56	5	JS2	SP1	49.5915486490908
57	5	JS3	SP1	61.854425910328
58	5	JS4	SP1	21.8129488918065
59	5	JS5	SP1	1.0271184959762

The JDRAP program also shows the amount of resources used at each time period as compared to the availability of resources that were specified. In this table, you can quickly see what services were causing resource shortfalls, or what periods of time required more resources than others. You have several views of this information as well, you can either see all services for all time periods or you can specify specific times periods and/ or services. In the view below, we are just looking at period 12, with all services viewed (Figure 28). Because we set the resource availability extremely high, we have no resource pitfalls.

Figure 28: Resource Usage Summary Screen

	Period	RS ID	Usage	Available	Difference
1	12	JRSR001	1390.57995173438	999999	998608.420048266
2	12	JRSR002	1119.42161976853	999999	998879.578380232
3	12	JRSR003	2331.21926921119	999999	997667.780730789
4	12	JRSR004	5299.38149910697	999999	994699.618500893
5	12	JRSR005	3896.77423454519	999999	996102.225765455
6	12	JRSR006	2668.16234773183	999999	997330.837652268
7	12	JRSR007	197.496124480409	999999	999801.50387552
8	12	JRSR008	291.778886911536	999999	999707.221113088
9	12	JRSR009	93.7100275311661	999999	999905.289972469
10	12	JRSR010	71.9845680285948	999999	999927.015431971
11	12	JRSR011	241.047948477881	999999	999757.952051522
12	12	JRSR012	76.4890231912253	999999	999922.510976809
13	12	JRSR013	54.8597320302429	999999	999944.14026797
14	12	JRSR014	44.9769483236245	999999	999954.023051676
15	12	JRSR015	53.6176912032726	999999	999945.382308797
16	12	JRSR016	9.37645786294168	999999	999989.623542137
17	12	JRSR017	355.097283827174	999999	999643.902716173
18	12	JRSR018	444.38239258387	999999	999554.617607416
19	12	JRSR019	148.368147409705	999999	999850.63185259
20	12	JRSR020	364.448225642693	999999	999634.551774357
21	12	JRSR021	126.411710295562	999999	999872.588289704
22	12	JRSR022	559.167902364495	999999	999439.832097635
23	12	JRSR023	1.7319807469952	999999	999997.268019253
24	12	JRSR024	7090.42273425328	999999	992908.577265747
25	12	JRSR025	5181.4777890448	999999	994817.522210955
26	12	JRSR026	289.164101963491	999999	999709.835898036
27	12	JRSR027	4068.62340045403	999999	995930.376599546
28	12	JRSR028	720.021958762548	999999	999278.978041237
29	12	JRSR029	474.254831985854	999999	999524.745168014
30	12	JRSR030	2734.8498181626	999999	997264.150181837

Besides seeing the resource usage at each service category, we can see the cost projections for each functional level across the time periods. Here, the influence of the transitional probabilities plays a strong role in the cost of services (Figure 29). Below, you can see that there are no costs associated with death and disappearance, JSA, JS5 as well as MH5. The view selected is just the last time period (12).

Figure 29: Cost Projections Screen

	Period	FL ID	Value
1	12	Death	0
2	12	Dissap.	0
3	12	JS1	487410.736887326
4	12	JS2	683698.013885796
5	12	JS3	1498818.07470877
6	12	JS4	59824.9064024935
7	12	JS5	0
8	12	JSA	0
9	12	MH1	404317.535382083
10	12	MH2	668415.194436442
11	12	MH3	1573716.93203531
12	12	MH4	63377.0318590653
13	12	MH5	0

Another very useful summary screen involves the influence of the transitional probabilities in terms of moving from one functional level to another (a transitional step). The summary screen entitled “transition steps” shows summarizes this information for each time period, functional level, and service package (Figure 30). This screen provides the number of forward steps (when an individual moves from a lower functioning level to a higher one), backward steps (moving from higher to lower) and the net number of steps (forward steps minus the backward steps). This screen also gives you several different ways of viewing the data; by time period, by functional level, and by service package.



Figure 30: Transition Steps Screen

The screenshot shows a software window titled "JDRAP (C:\Program Files\JDRAP\JDRAP\_Projects\multi-site test.mdb) - [Simulation Transition steps]". The window contains a menu bar with "File" and "Edit", and a toolbar with "Indexes". Below the toolbar is a table with the following data:

	Period	FL ID	SP ID	Forward	Backward	Net
1	12	Death	SP1	0	0	0
2	12	Dissap.	SP1	0	0	0
3	12	JS1	SP1	11.2244608708601	1.80470034723345	9.41976052362665
4	12	JS2	SP1	18.0865109430443	7.6149434611283	10.471567481916
5	12	JS3	SP1	11.1019965882393	11.933347346797	-0.83135075855769
6	12	JS4	SP1	1.30472860459818	7.98954398462766	-6.68481538002948
7	12	JS5	SP1	0	0	0
8	12	JSA	SP1	42.5	42.5	0
9	12	MH1	SP1	11.8984623228755	1.49621382503225	10.4022484978433
10	12	MH2	SP1	17.612311750414	7.41529190574741	10.1970198446666
11	12	MH3	SP1	11.5940523959477	12.5179534462498	-0.92390105030208
12	12	MH4	SP1	1.33344824288524	8.10986065848333	-6.77641241559809
13	12	MH5	SP1	0	0	0

In addition to the summary information tables that are provided in the JDRAP program, there are several graphs that can be generated as well. One of these graphs shows the population changes over time per functional level. This is essentially a graphic representation of Figure 27. Since there are many functional levels represented at one time, it can sometimes be confusing to get a picture of what is happening for only a certain level. To see the line for a particular level, all you have to do is click on the color of the line to the right of the actual picture. This will highlight that particular line on the graph. There are also three ways to sum the information as well. One way is what we have seen (across service packages, although we only have one service package represented). Another way to view the graph is to sum across functional levels. And finally, you can sum across time periods (this option will be shown in Figure 32). In addition, you can see each of these options in either 2 dimensional views or 3 dimensional views. Also, by clicking on “graph” you can switch the view to area graphs. These graphs are also easily imported into a word document by clicking on “copy” from the edit menu toolbar. In the word document you would click edit, then “paste special”. You can then select “picture” from the options to paste it into the word document.

Figure 31: Population Results Table

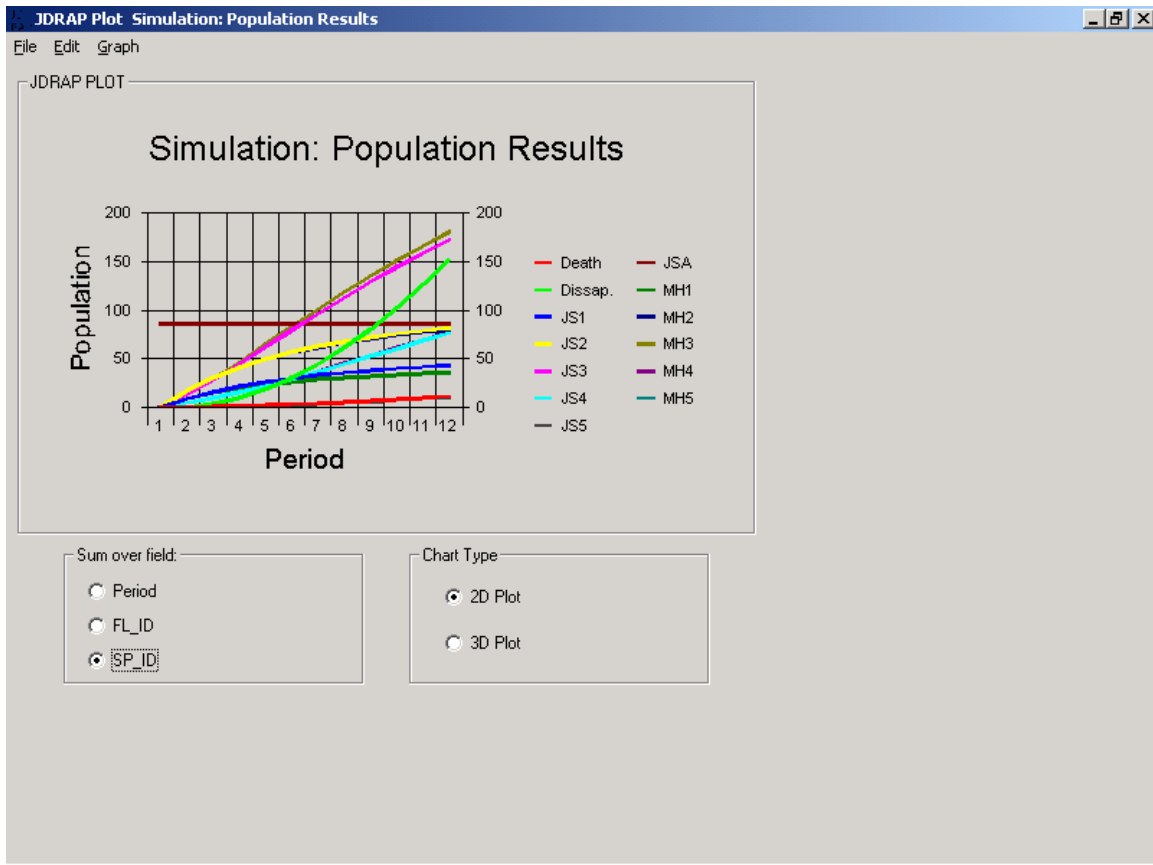
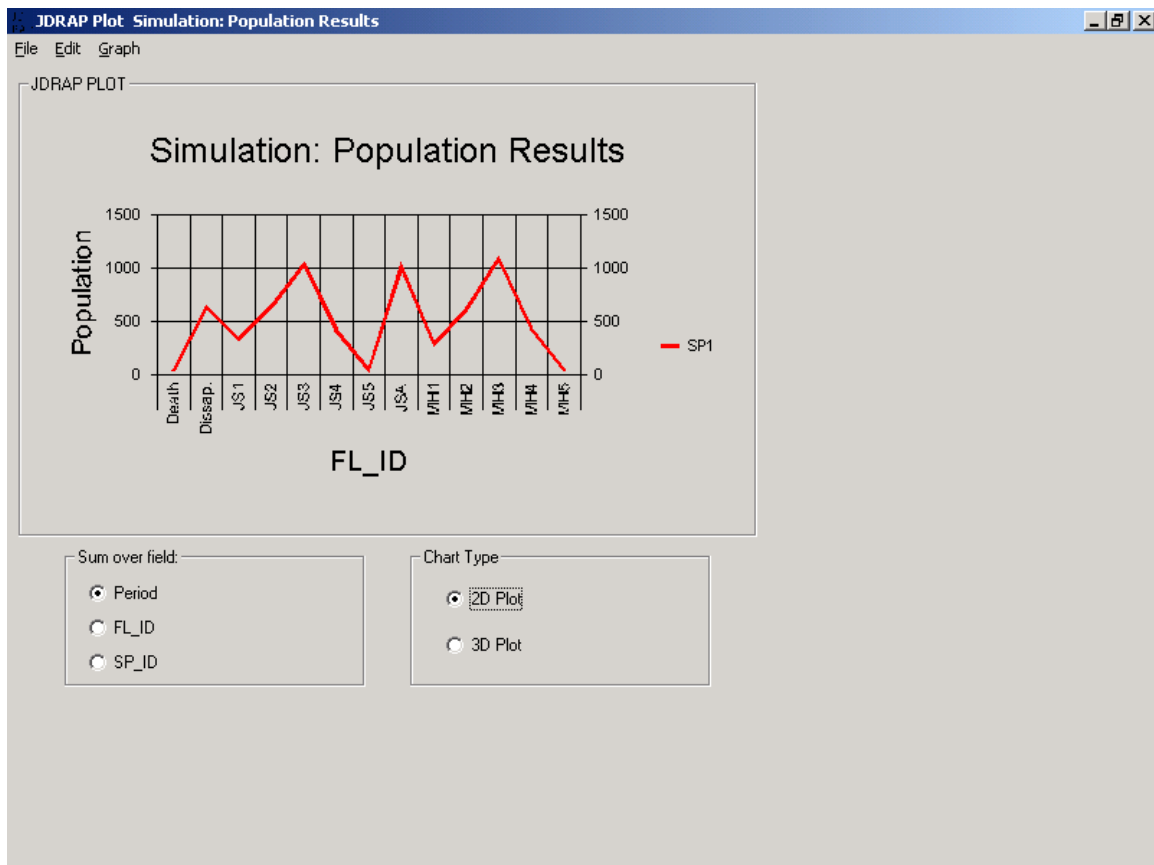
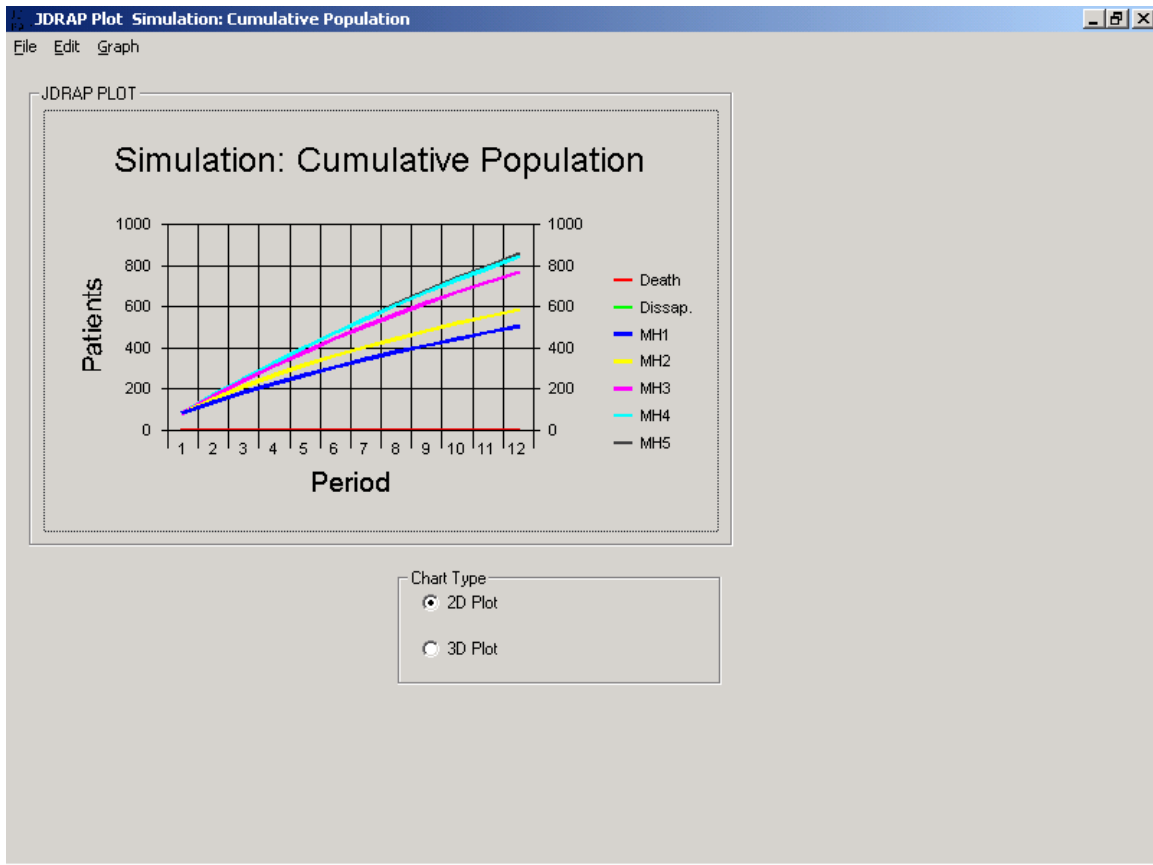


Figure 32: Population Graph Summed Over Time Periods



Another of the graphs available in the JDRAP program is the cumulative population summary. This table is only available for the mental health population. This table will be shown in Figure 33. In this table, you have the added feature of deleting out functional levels through “filtering”. When you click on “graph” you have the option to delete lines that you wish to clear from the table.

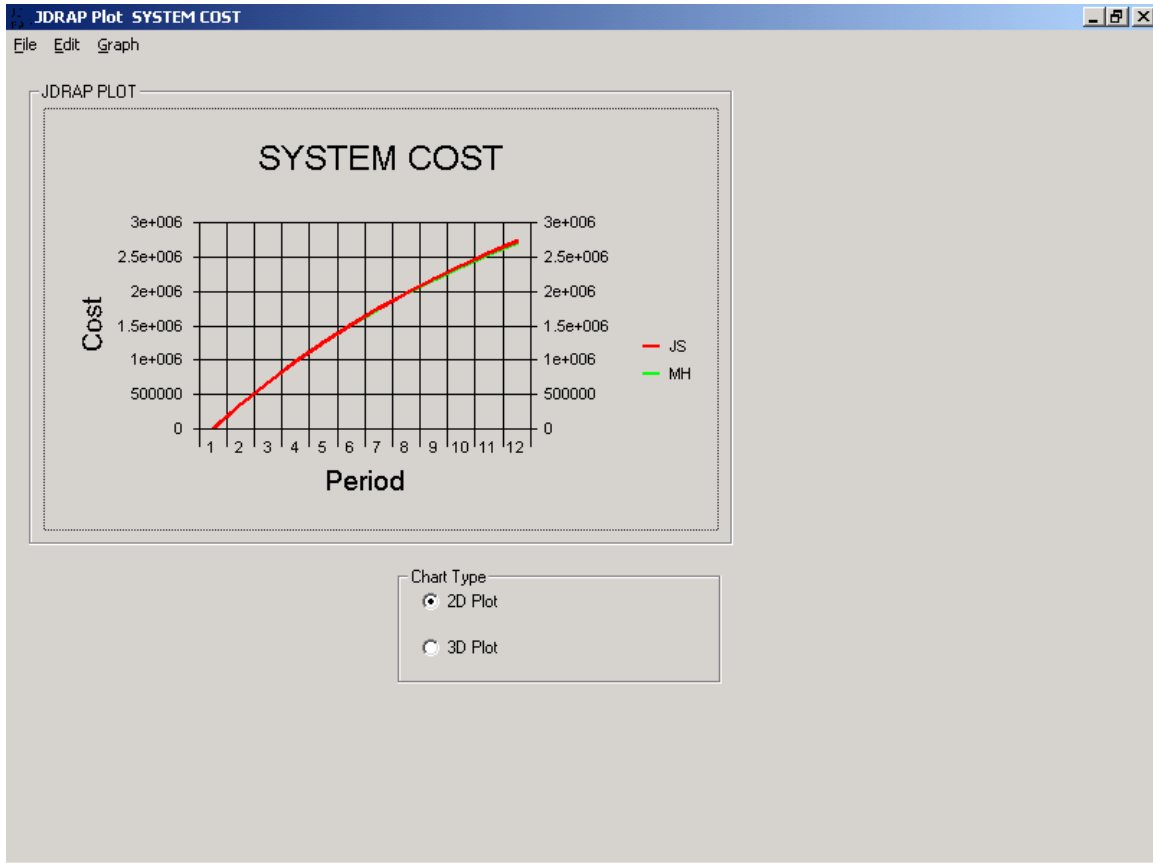
Figure 33: Cumulative Population Graph



[skip system resources until after checking the mhos]

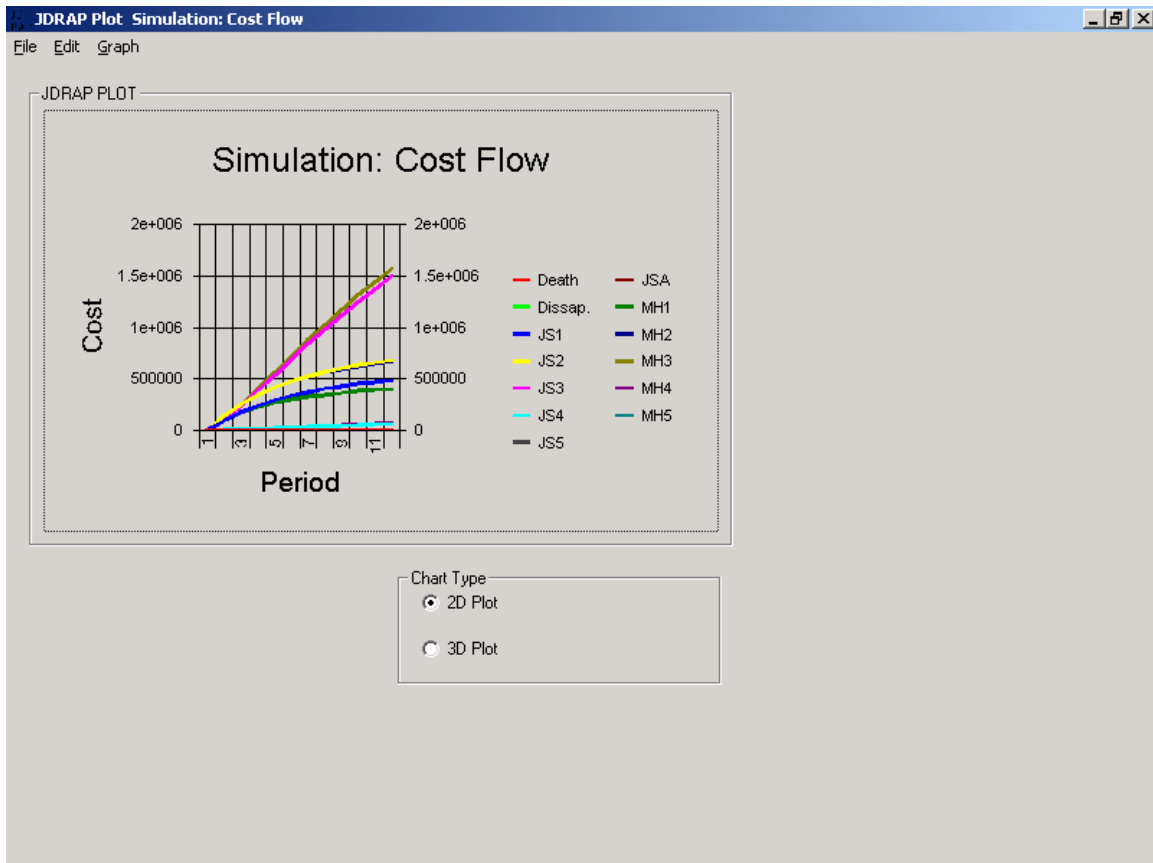
There is also a graph comparing the JS and MH total system costs (Figure 35). In our model, the system costs are nearly identical. Both lines slightly start to curve around the 5<sup>th</sup> time period.

Figure 35: System Cost Graph



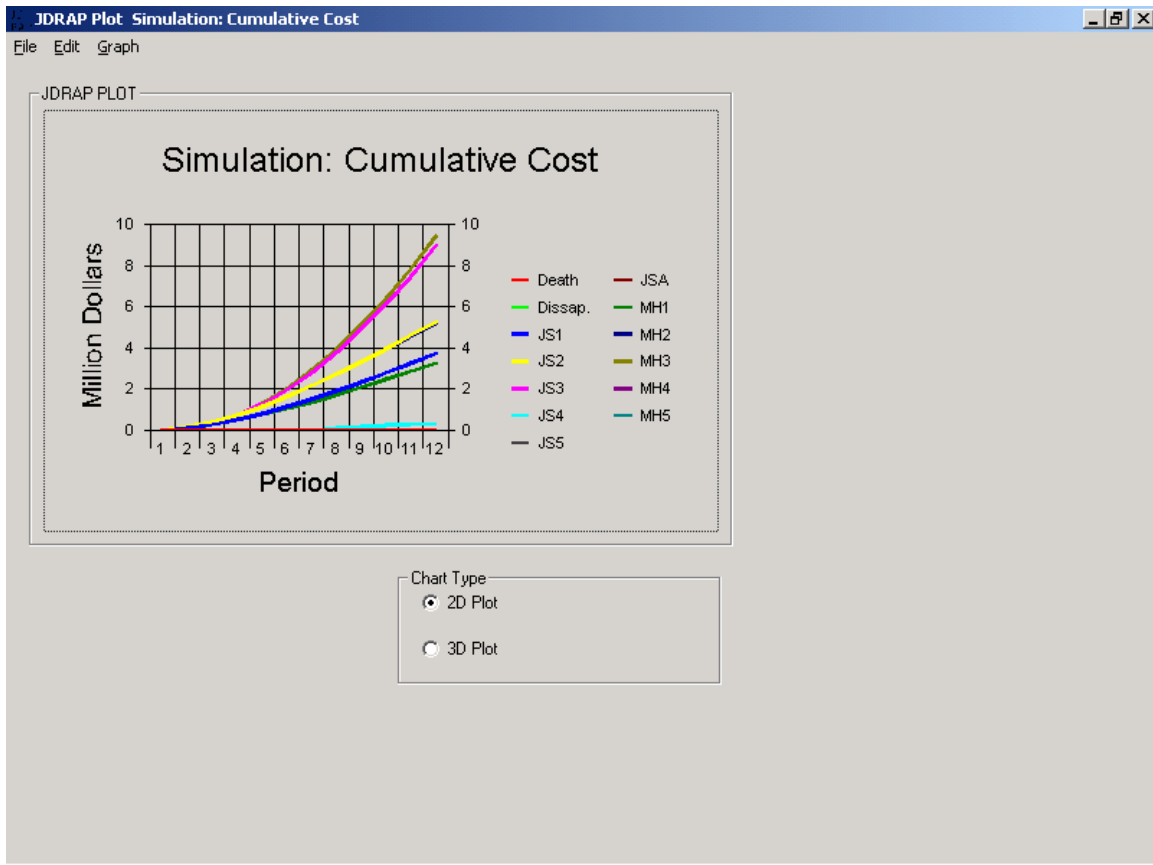
To look at the effect of each functional level on the overall flow of costs through the time periods, we can look at the cost flow graph (Figure 36). Here we see an interesting pattern emerging. For all of the functional levels, there appears to be a point of diminishing returns, except for the MH3 and JH3 functional levels. People in these functional levels reflect rapid increases in system costs over time.

Figure 36: Cost Flow Graph



The next type of graph that is offered through the JDRAP program is a cumulative cost graph (Figure 37). Here, our example shows us that the JS3 and MH3 functional levels show an exponential growth in costs over time.

Figure 37: Cumulative Cost Flow



The next set of graphs generated by the JDRAP program show the flow of transitional steps over time. The number of forward transitions per functional level is shown in Figure 38.

Figure 38: Forward Transitions

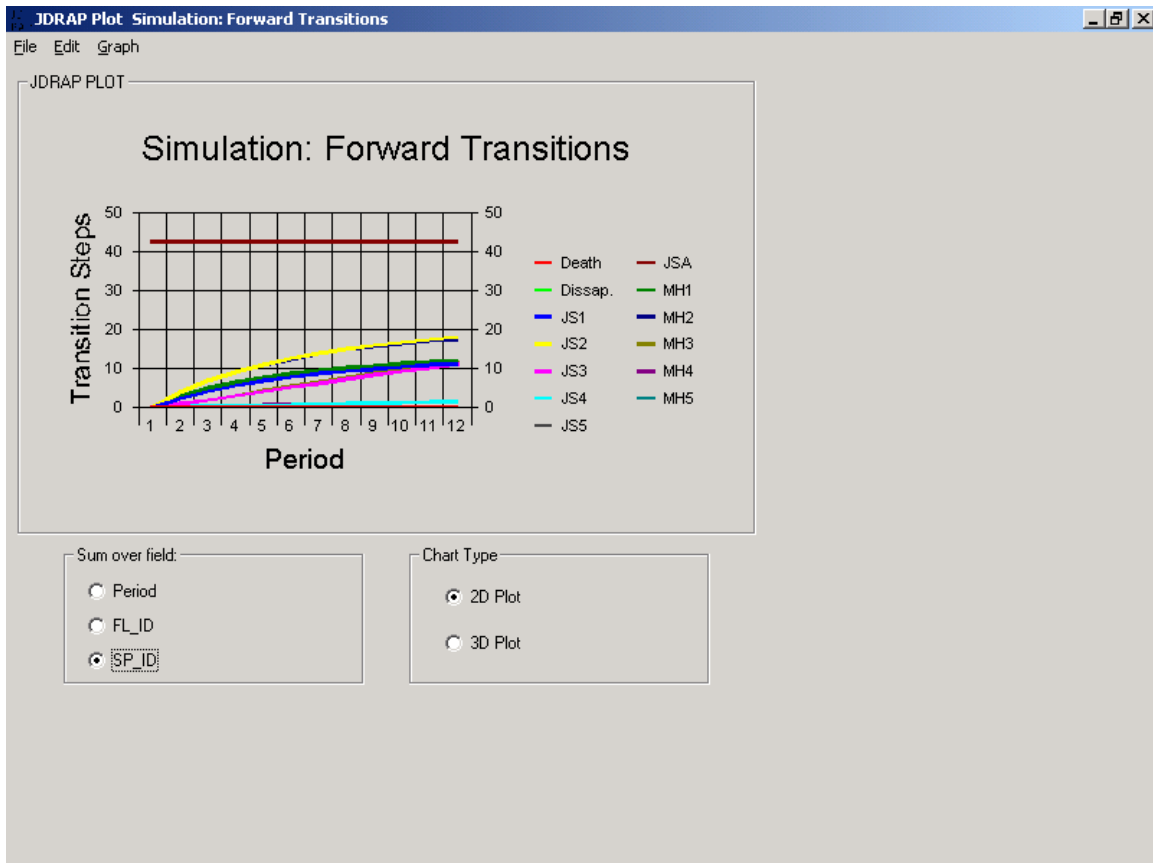




Figure 39: Number of Backward Transitions

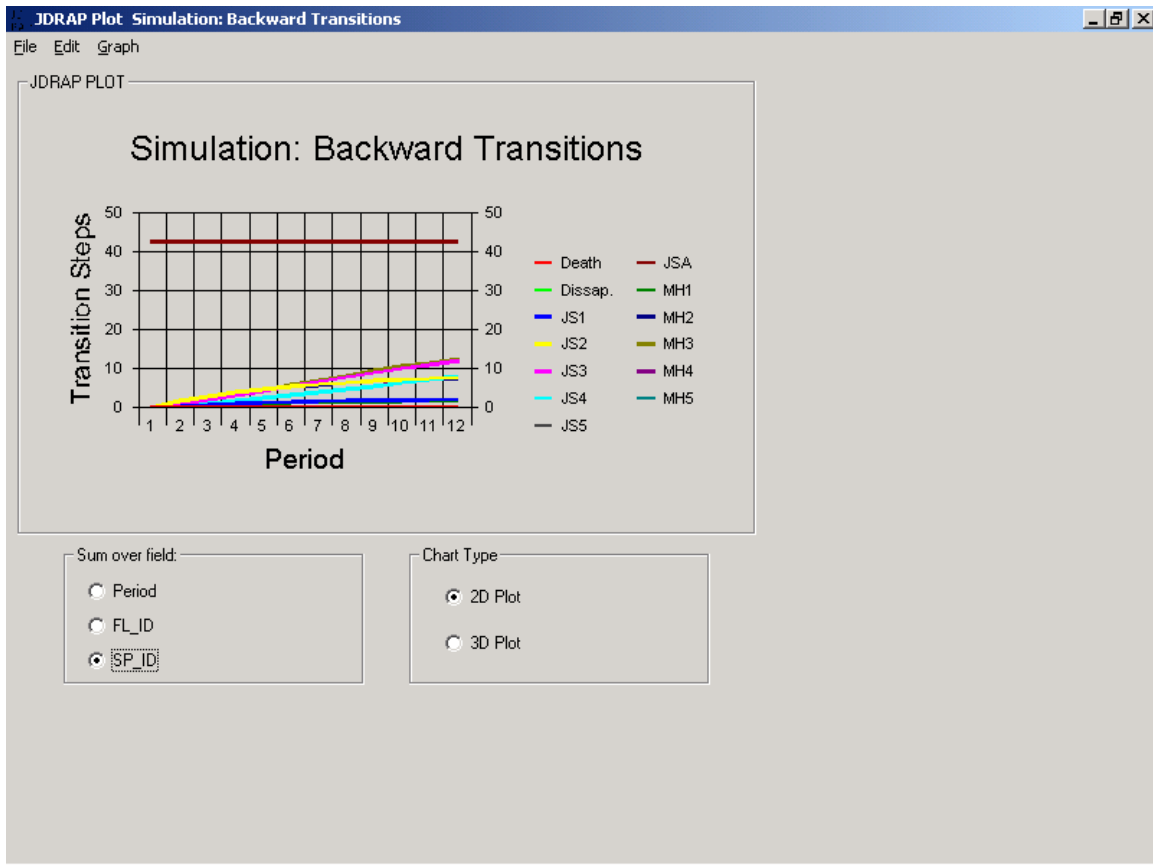
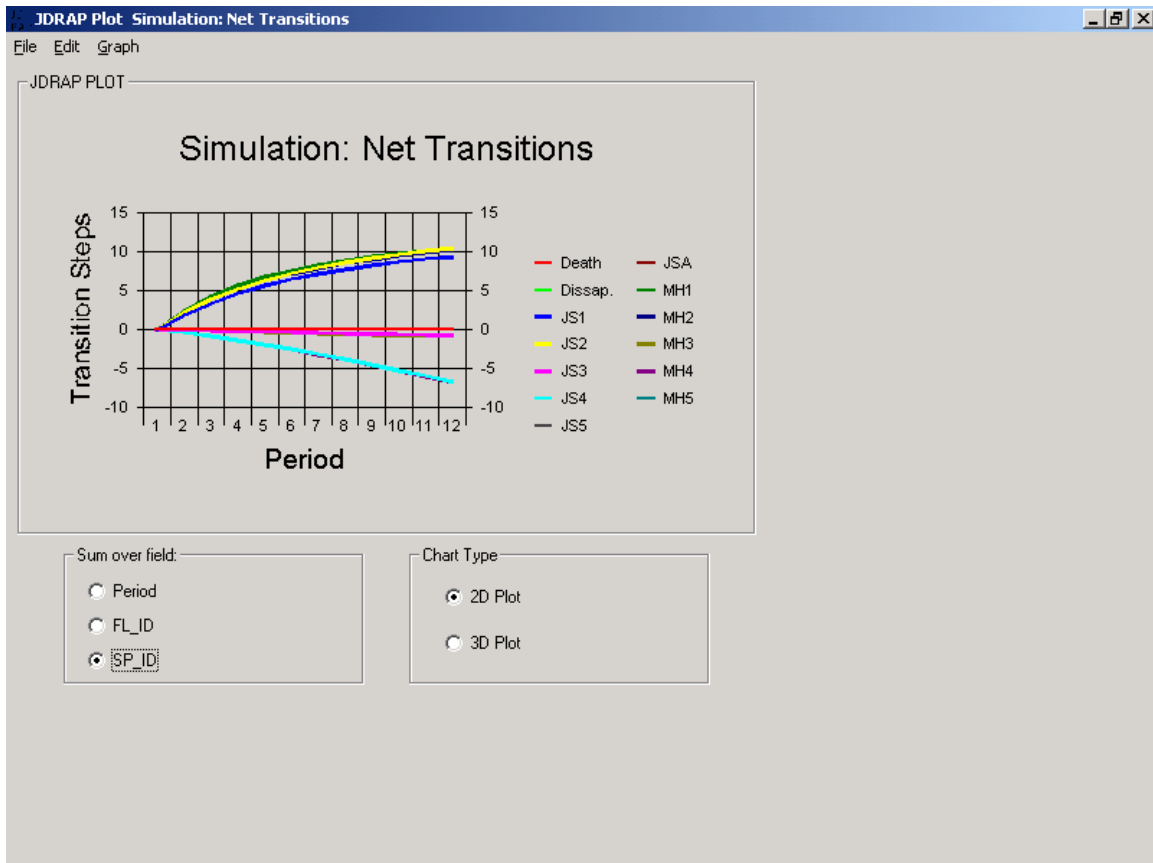


Figure 40: Number of Net Transitions



## **Appendix 1: Service Definitions**

### **SERVICE DEFINITIONS**

#### **Based on HSRI prescriptions**

#### **I. COMMUNITY LIVING ARRANGEMENTS (RESIDENTIAL)**

1. *Specialized Residential*

These programs provide intensive support and/or skills training usually for no more than four residents with specialized service needs. These programs are especially designed to meet the needs of the following individuals, among others: medically involved residents, geriatric residents requiring intensive support, residents who experience severe behavioral symptoms, and residents with physical disabilities. All programs are designed to be individualized, integrated into the community and the most normal and least restrictive possible, consistent with the individual's needs.

2. Intensive Staff/Supervision

These programs focus on functional education to develop daily living skills such as bathing, cleaning, cooking, and other self-care skills. They are designed to provide a high level of staff involvement for those individuals requiring substantial skill training and support in a structured environment. These programs usually serve no more than four persons in a single location. All programs are designed to be individualized, integrated into the community and the most normal and least restrictive possible, consistent with the individual's needs.

3. Moderate Staff/Supervision

These programs are designed for individuals who require structure or verbal support to accomplish daily living skills, but do not require one to one attention to accomplish those tasks. These programs also include persons with substance abuse issues. The goal is to engage individuals in developing their own internal structure and control to live in the community. These programs usually serve no more than four persons in a single location. All programs are designed to be individualized, integrated into the community and the most normal and least restrictive possible, consistent with the individual's needs.

4. Minimum Staff/Supervision

These programs serve individuals who are capable of handling non-crisis issues for a day or two until a scheduled staff visit. Staff visits include support and assistance, skills training, and consultation with individuals who are part of the resident's natural support network. These programs usually serve no more than four persons in a single location. All programs are designed to be individualized, integrated into the community and the most normal and least restrictive possible, consistent with the individual's needs.

5. Independent Living w/Housing Subsidy

A setting where an individual can live either alone, with a relative, or friends in a home or apartment without ongoing supervision from mental health staff. There must be a sufficient array of stable, affordable housing, with subsidies, to permit all individuals with serious mental illness to live safely and permanently in the community.

6. Independent Living w/o Housing Subsidy (see above description)

## II. EMERGENCY SERVICES

7. Crisis Outreach

A continuously available mental health service that provides short-term mental health services to individuals during an emergency or crisis situation. This service is not site based, but is provided to individuals in their homes, in shelters, on the street, or wherever the need arises.

8. Crisis Emergency Walk-In

This service provides immediate, short-term mental health services to individuals who are experiencing an emergency or crisis situation.

9. Crisis Residential

These programs provide 24 hour supports for individuals who are in crisis. Crisis programs should be in a non-hospital setting which are integrated into the community, and consistent with client needs, as well as the program's purposes, including providing a stable and safe setting. The goal of this service is to assist individuals in crisis in the least restrictive environments while trying to maintain the person's linkages with his/her larger community support system. Services provided include continuous and close supervision, medical, nursing and psychiatric attention (including medical stabilization) support, relief from stress, and referral to community based services.

10. Respite Care

These programs provide short term, twenty-four hour supports for individuals who need to leave their primary residence for a limited period of time or who need additional supports in their own residence (in-home) for a limited period of time. Distinct respite settings must be home like and integrated into the community.

### **III. INPATIENT HOSPITAL**

11. Inpatient Specialty/State (ASH)

The provision of inpatient care within a unit designed to serve seriously mentally ill patients who are expected to be in the hospital beyond the acute phase of their illness but for whom discharge is a short-range goal. Primary services are oriented towards developing and implementing psychosocial rehabilitation programs and improving skills in activities of daily living (ADL) with the goal of maintaining the highest level of functioning in the community.

12. Inpatient General (Community Hospitals)

The provision of inpatient care within a unit designed to serve seriously mentally ill patients who have just been admitted or are experiencing an acute phase of their illness in the course of an extended hospitalization. Primary services are oriented toward developing a differential diagnosis, amending treatment plans to more fully respond to the acute needs of the stabilization of the patient's psychiatric condition and aggressive intervention.

13. Inpatient – Forensic

The provision of inpatient care within a unit designed to serve patients who are committed by a court to evaluate competency to stand trial, assess criminal responsibility, or provide recommendations for treatment. Services include clinical assessment, forensic evaluation, and short- or long-term treatment as appropriate based on the nature of the court commitment.

14. Inpatient – Detoxification

Treatment in which a person is monitored while withdrawing from a substance, as part of being treated for a substance abuse disorder.

#### IV. TREATMENT SERVICES

15. Evaluation/Diagnosis

An evaluation for the purposes of intake, treatment planning, eligibility determination or functional assessment by a qualified mental health professional. This includes psychiatric evaluation/mental status by a psychiatrist or other qualified mental health professional for diagnostic or disposition purposes, commitment evaluation, psychosocial evaluation and psychological evaluation with or without testing.

16. Court Ordered Evaluation (County)

An analysis of an individual's medical, psychological and social condition carried out by staff of a licensed mental health evaluation agency by order of the superior court of the county in which the persons resides, to determine whether the person is in need of court-ordered mental health treatment. These evaluations are the responsibility of county governments.

17. Individual Psychotherapy

Therapeutic interaction by a behavioral health practitioner to address the individual's therapeutic goals by providing emotional support, developing insight, producing cognitive/behavioral change, improving decision-making and/or reducing stress. May include education about management of a behavioral health disorder, including relapse prevention and recovery strategies.

18. Group Psychotherapy

Therapeutic interaction by a behavioral health practitioner to address the individual's therapeutic goals in a group of unrelated persons by providing emotional support, developing insight, producing cognitive/behavioral change, improving decision-making and/or reducing stress. May include education about management of a behavioral health disorder, including relapse prevention and recovery strategies.

19. Family Psychotherapy

Therapeutic interaction by a behavioral health practitioner with family members or significant others, with or without the presence of the individual to address the individual's therapeutic goals, by providing emotional support, developing insight, producing cognitive/behavioral change, improving decision-making and/or reducing stress. May include education about management of a behavioral health disorder, including relapse prevention and recovery strategies. May be provided to multiple families.

20. Therapeutic Supervision

a) Therapeutic supervision

Therapeutic supervision and direction to prevent placement in a more restrictive setting, which includes assistance with activities of daily living and household services incidental to, and consistent with, the behavioral health needs of the individual.

b) Personal Care

Personal care services include a range of assistance which enable persons with serious mental illness to accomplish tasks they would normally do for themselves if they did not have a disability. Assistance may be in the form of hands-on assistance, such as actually performing a personal care task for a person, or cueing so that the person performs the task by him/herself. The tasks which personal care can assist with include, but are not limited to: eating, bathing, dressing, toileting, transferring, maintaining continence, personal hygiene, light housework, laundry, meal preparation, transportation, grocery shopping, using the telephone, medication management, and money management.

21. Outpatient Detoxification

An outpatient, non-residential program to systematically reduce dependence on alcohol and other drugs. May require daily contact for administration of medications and monitoring of withdrawal symptoms.

22. Substance Abuse Counseling

A structured outpatient treatment program consisting of a minimum of three hours of group substance abuse treatment three times a week.

23. Methadone Maintenance Clinic

Social/medical services provided in conjunction with methadone treatment. Methadone is used as an oral substitute for opiates during the rehabilitative phase of treatment. This is not the pharmacy claim for Methadone. Only outpatient services will be included.

**V. REHABILITATION**

*A. Vocational Principles and Assumptions*

a. Vocational services should be provided through several supported employment program models. These models, as defined below, include individual supported employment, intensive supported employment, extended supported employment, and group supported employment.

- b. Although vocational services may be delivered through the group employment model, this model is not preferred and has not been used in the projection of needs or costs.
- c. Although new vocational services and resources, as projected in this plan, will be delivered through these four models, other models used for existing services would not be expanded through this plan but may be continued with current funding sources.
- d. All supported employment services should be individualized, adequate, integrated, and provided as long as necessary to ensure that the person continues to need them to retain their jobs.
- e. Supported employment services should be designed and delivered to ensure that individuals are paid at least the minimum wage and work at least fifteen hours a week.
- f. Community employment means work that is performed on a full-time or part-time basis in an integrated setting for which an individual is compensated at, or above, the federal minimum wage.
- g. Integrated settings mean training or work which is not a self-contained work environment.

*B. Definitions*

24. Psychosocial Rehabilitation

a) Social Rehabilitation

Services or activities providing opportunities to develop functional skills, foster social role integration and make informed life and work choices in a supportive and flexible atmosphere, including such activities as work exploration, volunteering, trying out work, or any activity that may lead toward more traditional vocational rehabilitation services or employment. Includes the development of individualized supports in individuals which are designed to facilitate more meaningful participation by individuals in their communities in order to increase their involvement in generic community activities such as clubs, churches, community organizations, etc.

b) Skills Training

An array of approaches to assist individuals to acquire basic vocational and educational skills in the program of their choice in the community.

c) Community Support Clubhouse/Transitional Employment Program



A community support clubhouse provides support services through a comprehensive self-help clubhouse. Staff and members work as teams to perform the tasks necessary for the operation of the clubhouse. Transitional Employment Programs are designed to provide employment experiences that prepare individuals for competitive employment.

25. Consumer Operated Services

A consumer operated drop-in center/social club provides an informal and welcoming environment for individuals to come for social/recreational activities and peer advocacy.

26. Vocational Assessment/Counseling

The comprehensive assessment of an individual's vocational skills, attitudes, behaviors and interests through a variety of formal and informal methods.

27. Supported Employment

Secures or works with employers to create a real job in the community paying a competitive wage with staff support on the job, including intensive on-the-job-skill training, job related social skills training, frequent follow-up services in order to reinforce and stabilize the job placement, facilitation of natural supports at the work site and other discrete services as necessary. Supports should be adequate to allow an individual to work a minimum of fifteen hours per week and earn at least a minimum wage.

a) Individual Supported Employment

These programs secure or work with employers to create a real job in the community paying a competitive wage with staff support on the job, including intensive on-the-job skill training, job related social skills training, frequent follow-up services in order to reinforce and stabilize the job placement, facilitation of natural supports at the work site and other discrete services as necessary. Supports should be adequate to allow an individual to work a minimum of fifteen hours per week and earn a minimum wage.

b) Extended Supported Employment

Extended Supported Employment provides long term, indefinite on-going support for an employed individual (including counseling, regular contacts with the individual and/or employer, job monitoring, finding a new job when necessary, maintaining established and on-going natural and peer supports) in order to assist individuals maintain employment in the community. Supports should be adequate to allow the individual to work a minimum of fifteen hours per week and earn minimum wage.

c) Intensive Supported Employment

These programs include all the services associated with Supported Employment. However, the supports and on-site supervision required by the consumer to obtain and maintain employment in the community are at a much more intensive level, up to at least daily on-site contact. Supports should be adequate to allow an individual to work a minimum of fifteen hours per week and earn a minimum wage.

d) Group Supported Employment

These programs secure or work with employers to create a real job in the community paying a competitive wage with staff support on the job, including intensive on-the-job skill training, job related social skills training, frequent follow-up services in order to reinforce and stabilize the job placement, facilitation of natural supports at the work site and other discrete services as necessary. Supports should be adequate to allow an individual to work a minimum of fifteen hours per week and earn minimum wage. Group Supported Employment utilizes group placement such as consumer-run businesses or enclaves.

28. Supported Education and Other Educational Services

a). Supported Education

These programs consist of higher education opportunities for persons with severe mental illness. It provides necessary supports such as study skills training and social skills training, etc. It may be an intensive college preparatory program designed specifically for persons with serious mental illness or a specialized vocation program. Services should be provided in the community, within the consumer's educational setting of choice, with the full range of educational facilities available to consumers.

b). Other Education

Assistance in locating or providing to people with severe mental illness a full range of educational services from basic literacy through GED (General Equivalency Diploma) and educational counseling for college, technical education, or other courses.

**VI. COMMUNITY SUPPORTS**

29. Assertive Community Treatment Teams (ACT)

An array of services that are provided by community-based, mobile mental health treatment teams to seriously mentally ill persons wherever they are found, seven days a week, 24-hours a day. Team composition consists of a psychiatrist, case managers, nurses, team rehabilitation specialist, employment specialists, housing specialist, independent living skills

specialist, and consumer case managers/counselors. In this model actual services, as well as person-centered learning and coordination of services, are provided at very low staff-to-client ratios that allow continuous contact with the individual. Average caseloads of case managers is 12, with additional specialists and representatives of other providers joining the team to meet specific needs of individuals.

30. Intensive Clinical Services

Refers to the interdisciplinary team of persons who are responsible for providing core treatment and support to a client and for locating, accessing and monitoring the provision of other behavioral health specialists, other involved service providers and other professionals, such as a psychologist, social worker, consumer case management aide, rehabilitation and housing specialists, as needed, based on the client's needs. Primary functions include: psychiatric services, assessment/evaluations, planning/coordination; linkage; contact with the consumer, advocacy; monitoring; resource development and outcome measurement. Typically in this model caseload averages are no larger than twelve for intensive and not to exceed thirty-five persons of lesser need.

31. Medication Management

Services provided by a physician to evaluate, prescribe, and monitor medications for the treatment of psychiatric disorders. Includes medication review and administration services provided by an RN under the supervision/order of a physician. Includes visits for the purpose of prescribing medication as well as for medication refills or dosage regulation. Medication service does not include methadone maintenance, etc. or detoxification.

32. Protection and Advocacy

Assisting consumers with legal matters related to their mental health service needs and rights.

33. Client Transportation

Transportation services to assist consumers in getting to services, employment, and other activities.

34. Family Psychoeducation

Consultation and education to families concerning the nature, consequences, and treatment of severe and chronic mental illness. This service is usually provided to groups of more than one family at a time. Note: this is not the same as family treatment. Units of service are measured in face-to-face hours.

35. Friend Advocacy

A program that recruits, trains, and supports volunteers who provide advocacy, friendship, and support to individuals with serious mental illness.

## Appendix 2: Steps in Running the JDRAP Simulation Program

JDRAP is a cost modeling program specifically designed to predict state justice system and mental health system expenditures. **This program automatically saves any changes so it is important to create both a working file and a backup file.** Here is a step-by-step description of how to run the JDRAP simulation program.

- 1). The first step in running the model is to specify the number of time periods that will be used in the model. Click on "model" from the windows toolbar and enter the time period number and a description of that time period (such as "1" and then " first month"). The model will track cost projections and population dynamics across these specified time periods.
- 2). The next step is entering the number of functional levels (such as "Rafls" scores) into the model. Click "model" from the main toolbar and then click "F Levels". Enter each functional level and a description of each level (the description is optional). Cost estimates and changes in costs will be calculated for each specified functional level.
- 3). The next step is entering the population estimates into the JDRAP model. These are the estimates broken down by functional level as well as by "snapshot" and "arrival" categories. Click on "model" from the windows toolbar and then click "population". The first two lines should be "death" and "disappearance". If you do not have information for these categories, or do not want to add this information into the model, then you should enter a zero into the value field (blank spaces need to be avoided in all value fields). The functional level fields for period one are the population estimates for the snapshot cohort (those who are in the mental health system at a particular time, ie, a cross-section of the mental health care population). These snapshot population estimates need to be broken down by functional level. For each of the other periods, you need to enter the population estimates for those entering the system (the "arrivals" cohort) broken down by functional level. The same population estimates for the arrivals need to be repeated for each of the subsequent time periods. If the time period is "months", then each of the arrival time periods would be the number of new clients who enter into the mental health care system.
- 4). The next set of data to be entered into the JDRAP model refer to the resources of the mental health system. From the "model" option on the toolbar, highlight the "resources" option and then click on "description". This will give you a screen where you list the service number followed by a description of that resource (such as services like inpatient treatment).
- 5). Now resource availability have to be entered into the model. Highlight "resources" from the model toolbar and click on "availability". For each time period and resource ID, enter the maximum value that is available for that service. If you do not want to set limits on how money can be allocated, then set this value to a very high number (such as 100 million for each service). Again, it is important that no blank spaces be left for any of the value fields.
- 6). The next step is entering the cost per unit for each of the resources that were listed. From the model toolbar highlight resources and select "unitary cost". For each of the

resource ID's, you need to enter the unit as well as the cost per unit for that resource. If the resource is measured in terms of cost per day, the unit will be day. For example, if the first resource listed was family therapy, and its cost was \$100 dollars per hour, then for that resource "hour" would go into the unit column and "100" would go into the cost per unit column.

7). The next steps have to do with the type of service packages that are entered into the model. From the model toolbar, highlight "service packages" and then click on "description". Enter here the service package ID as well as any description of that type of service package.

8). Now you have to enter the service applicability for each of the service packages. Click on "applicability" from the service package options. You will get a screen that has SP ID, FL ID (functional level) as well as a value column. In the value column, enter a check if for each SP ID and functional level if this applies to the model. If this does not apply to the specific model that you are running, then leave this information blank (not checked).

9). The next is running the resource utilization from the service package option. A window will open that says "reading resources" which will be followed by a data screen. In this document, you will need to enter the service package input for each functional level ("SPO input" from the spreadsheet program).