

Statement of Current Longitudinal Database Capacity

The State of North Dakota has taken a coordinated, multi-agency approach to establishing longitudinal workforce and education databases. Record matching between education, training and workforce data to report on program outcomes and accountability measures has been underway for over fifteen years. However, many of the components of these systems are rudimentary or aging and in need of improvements and enhancements and so would be considered a “partial” system. Below is a description of the entities involved, along with the systems, capacity, and data linkages currently in place.

Job Service North Dakota (JSND), the applicant for this grant, is responsible for administering many State and federal employment programs; providing labor market information; delivering workforce training and reemployment programs and providing specific services to targeted workforce sectors. Programs administered by JSND include Unemployment Insurance (UI), Workforce Investment Act (WIA), Wagner-Peyser, Job Opportunities and Basic Skills (JOBS) and Trade Adjustment Assistance (TAA). JSND matches UI wage records to UI claimant data, and WIA, Wagner-Peyser, and TAA client data to report wages before and after receiving services. Other data sources used by JSND research analysts include Longitudinal Employer - Household Dynamics (LEHD), Business Employment Dynamics (BED), Mass Layoff Statistics, Occupational Employment Statistics (OES), Current Employment Statistics, Quarterly Census of Employment and Wages (QCEW), Job Openings and Labor Turnover Survey (JOLTS), Employment Projections (EPP) and the Federal Employment Data Exchange System (FEDES). Record matching is accomplished by extracting data into FoxPro or Access databases for manipulation by JSND research analysts. JSND supplies data to other education and training program providers through the FINDET system described below. The legislation and data sharing agreement covering UI and FINDET are found in the attachments beginning on page two. Wage data records are keyed by SSN but demographic data such as name, gender, birth date, etc. are not collected on a consistent basis, making linkage to K-12 records difficult. With this grant, these issues will be addressed so that JSND can continue as a major provider of workforce data for the enhanced longitudinal system.

The State of North Dakota has established a multi-agency Statewide Longitudinal Data System (SLDS) Committee that is responsible for overseeing the planning and operation of educational and

workforce longitudinal systems. This legislatively mandated committee is comprised of representatives of key stakeholder organizations including Director of the North Dakota Workforce Development, Department of Public Instruction (DPI), Information Technology Department (ITD), Job Service North Dakota (JSND), North Dakota University System (NDUS), the Commerce Department, Education Technology Council (ETC), Career and Technical Education (CTE), Department of Human Services (DHS), North Dakota Council of Educational Leaders (NDCEL) and two State legislators. The legislation regarding the SLDS Committee and its membership is found in the attachments on page two.

The SLDS Committee plays a key role in establishing standards for data sharing, privacy and security as well as developing inter-agency agreements for the terms of data sharing. This is an important role in gaining the requisite participation of State agencies, establishing priorities and setting direction so that the SLDS goals can be successfully attained. The Privacy Subcommittee of the SLDS Committee has done extensive work researching federal and State privacy laws and proposing data sharing solutions.

In the 2007 session, the legislature asked the SLDS Committee to develop a plan for an SLDS incorporating educational and workforce longitudinal data and to create a recommendation regarding the long term role of FINDET, the State's current system for reporting longitudinal data. The State hired Claraview to develop a roadmap which has become the basis for moving forward. Claraview recommended enhancing FINDET technologies by implementing a robust SLDS system. The SLDS Committee recognized that getting a K-12 longitudinal system in place and developing an NDUS data warehouse were necessary first steps in evolving from FINDET into a more robust system. The State began working toward implementing a K-12 SLDS system (the ndSLEDS project) with 2009 Institute of Education Sciences (IES) SLDS grant funds and used State resources to deploy the NDUS data warehouse.

FINDET, or Follow-up Information on North Dakota Education and Training, is the current system for exchanging data across agencies. FINDET, administered by NDUS through a multi-agency steering committee, was formed to provide information regarding the status of graduates and program completers of North Dakota educational programs. FINDET Steering Committee members include representatives from the CTE, JSND, NDUS, DPI, the Commerce Department, DHS, and the North Dakota Workforce Development Council.

FINDET uses two primary sources of data to “find” students. The first is the PeopleSoft student information system used by all eleven institutions of NDUS. Enrollment and graduation data is extracted for each fall and spring semester. The other primary data source is the Unemployment Insurance (UI) information from JSND. This data is used to match students and training recipients to employment and wages in North Dakota

FINDET has been in existence for 15 years as a response to meeting State and federal mandated reporting requirements. In traditional fashion, files are sent by member agencies and researchers match data sets to produce the mandated reports. FINDET contains no infrastructure that would allow storing longitudinal data and making it available to its member agencies through online reports. While FINDET has met the mandated reporting needs of its member agencies, it has no capacity to expand to meet the growing demands for longitudinal research, secure online reports, public reports or ad-hoc analysis by its member agencies. The State plans to evolve the FINDET system using new technology to create a more robust workforce and educational longitudinal data system.

NDUS uses the data provided by FINDET and surveys of students and employers to produce a number of accountability measures required by North Dakota Century Code 15-10-14.2 including statistics about the employment of graduates and responsiveness to workforce training needs. Another major participant, CTE, uses FINDET to report information required by the Carl Perkins program. FINDET is also used by DPI to follow up on students who participate in Adult Education programs; by JSND to follow up on WIA participants; and by DHS to follow up on participants of Vocational Rehabilitation and TANF training programs.

The Workforce Development Council serves as both the State and local Workforce Investment Board as outlined in the Workforce Investment Act and is administered through the Workforce Division of the Commerce Department. The Division coordinates and participates in a number of committees, including the SLDS Committee, to build partnerships to achieve its mission. In addition, the Workforce Development Division coordinates the reporting of legislatively mandated workforce “Common Accountability Measures” as seen in the attachments on page nine. The Workforce Intelligence Council (WIC) was established by the Planning Committee of the North Dakota Workforce Development Council to

meet the workforce intelligence needs of numerous stakeholders and will play a key role by defining the reporting needs and analytic requirements for the longitudinal system.

The North Dakota Statewide Educational Longitudinal Data System (ndSLEDS) project is focused on building a State K-12 data warehouse and reporting system. The ndSLEDS project was initiated in 2009, following the award of a \$6.7 million grant to improve K-12 longitudinal reporting. It provides for the collection of student level test scores and assessment data, linking students to teachers, and the collection of identifying information to link K-12 information to postsecondary. The ndSLEDS data warehouse will serve as the primary K-12 data source for linkages with postsecondary, workforce and Pre-K data.

In terms of postsecondary systems, NDUS has implemented a common student information system (Oracle's PeopleSoft Campus Solutions application) and data warehouse for its eleven institutions. These systems, managed by System Information Technology Services (SITS), will serve as the primary postsecondary data source for linking with other education and workforce data sources. Having a common system has enabled NDUS to assign and manage unique IDs for students system-wide. Under a data sharing agreement with DPI, NDUS has successfully completed a pilot to match K-12 data with student data from NDUS' student information system. Work will continue to improve upon the approximately 80% initial success rate. Because NDUS captures SSN as part of the student profile data, it is able to provide the means of linking students at the secondary and postsecondary levels with workforce.

ITD, as the State's information technology service provider, is managing the technical aspects and hosting the State educational longitudinal data system and will be playing a similar role for the workforce longitudinal data system. ITD coordinates the deployment of information technology in State government by developing technology standards, setting guidelines for technology planning and providing oversight on large information technology projects. ITD provides a secure, state-of-the-art data center and an off-site back-up and recovery facility.

While North Dakota has developed some capability for linking data via the FINDET system, it is cumbersome and not robust enough to handle a higher volume of queries. The State has plans to build a

comprehensive, education and workforce longitudinal data system and has already taken steps to create it by implementing data warehouses for K-12 and postsecondary educational data.

Plan Outline

As noted in the previous section, in 2007, North Dakota developed a roadmap for a State longitudinal data system for educational and workforce data. A conceptual diagram of the system is included in the attachments on page ten. In addition to implementing longitudinal education data warehouses for K-12 and NDUS, the State has set aside \$2.2 million for a project to extend the education longitudinal system with workforce data. The longitudinal data system will rely on agency specific data warehouses that will provide individual data for linking.

Project Objectives

With projects underway to begin creation of the comprehensive education and workforce longitudinal system, the WDQI grant will allow North Dakota to focus on three critical objectives: 1) expanding the capacity to deliver longitudinal data by creating a data warehouse and upgrading the reporting technologies at JSND. 2) improving the quality of workforce data and expanding the capacity to link workforce and education data to fully analyze supply/demand linkages and 3) demonstrating the value of longitudinal data by generating important research.

Key elements necessary to accomplish the outcomes of the project funded by this grant:

- The development of a JSND data warehouse and implementation of a reporting tool;
- The inclusion of key information from JSND data sources in the Master Index system to link with educational data sources and development of corresponding data sharing agreements;
- The implementation of a linkage with driver's license data to enhance the quality of UI data;
- The development of data quality procedures and data quality improvement reports;
- The development of research analyses demonstrating the power of the longitudinal system.

Within 60 days of receiving the grant, the State will develop a detailed project plan and schedule. The WDQI project will be completed within the three year time frame with requirements gathering and design activities occurring in the first six months, followed by implementation. Research activities and

report development will occur in the final year of the grant after the technologies are in place and the data are available.

JSND Data Warehouse and Reporting Tool

A major component of the WDQI project will be the development of a JSND data warehouse. This data warehouse will contain longitudinal wage records, employer records and program completer data. Individual records will be identified with the owning agency (JSND) who will have control over the sharing of the data. Individual privacy will be enforced through business rules programmed into the system. This will allow the sharing of aggregate, non-confidential data with the public as well as limiting access to confidential, individual data to authorized agency staff or researchers authorized by data sharing agreements. Activities involved in deploying the JSND data warehouse will be the design of the data warehouse, including privacy and confidentiality requirements, the development of the data warehouse, data conversion, testing, implementing, and training users.

Another component of this project is the expanded use of a Business Intelligence (BI) reporting tool to deliver reports. In addition to generating fixed format reports, the BI tool will give authorized users, within their security limitations, increased ability to generate ad hoc reports, create charts, and further analyze the data. Role based security will be implemented to ensure that all State and federal privacy and confidentiality regulations are followed.

Activities necessary to deploy a business intelligence system include identifying the tool, implementing, and testing the system, developing the reports, as well as training users. At a minimum, this project will include activities to reproduce reports currently generated by JSND in a more flexible format.

Populating the Master Index

To enable the linking of workforce data and education data, key information from the JSND data warehouse will be indexed in the Master Index system. Processes will be established whereby individual data, which may include SSN name and date of birth, from JSND programs (UI, Wagner Peyser, WIA, Workforce 2020, and North Dakota New Jobs Training) are regularly included in the Master Index system to establish linkage with K-12, postsecondary, and other workforce programs administered by DHS, CTE,

the Commerce Department or NDUS. By enumerating the workforce data into the Master Index, through the data warehouse, JSND will also be able to obtain metrics and demographic data from the longitudinal education data systems and other workforce programs where authorized by data sharing agreements.

For these linkages to be built, it will be critical that data sharing agreements be developed between the agencies involved. The SLDS Committee will oversee the development and ongoing maintenance of all multi-agency data sharing agreements. These agreements will outline the data to be shared, the approved use of the data and time period of the agreement. Where possible, the business rules governing the data sharing agreements will be programmed into the security systems involved.

Where confidential information is shared between agencies, data sharing agreements will be created between the respective agencies. In other cases, the individual data matching provided by the Master Index will be managed by ITD in a secure environment and only non-confidential data will be provided to other agencies. In this case, the data owner will enter an agreement with ITD outlining the rules for the use of the data. Where specific research projects are authorized, the agencies involved will enter into contractual agreements covering the data sharing arrangement with the research entity.

As the owner, JSND will control access to the data in the JSND data warehouse. Data sharing agreements will be created with NDUS and DPI to cover the sharing of educational longitudinal data. Agreements will be created with the Commerce Department, DHS and NDUS to govern the sharing of workforce program data. An agreement with DOT is currently being negotiated to govern access to driver license information by JSND. Additional data sharing agreements with other agencies may be developed over time.

Drivers' License Linkage

Because the demographic information included within UI wage records does not always include data such as address and birth date, the State has been pursuing solutions that would enhance the quality of the existing data. In support of this enhancement effort, the State plans to create a linkage with drivers' license (DL) data from the DOT. A data sharing agreement under development between JSND and DOT will outline the specific terms surrounding the data linkage. Linking to DL data by SSN will allow the capture of updated address and DOB information for JSND records already containing name and SSN data.

By ensuring the most up-to-date information possible, the data quality and accuracy of JSND wage records will be improved, providing a more accurate demographic snapshot when linked with education and training data. The enhanced data quality will also allow for better auditing of the quality of key data fields.

Data Quality

The FINDET system does not have a mechanism for providing stakeholders information about the quality of their data or the match rate. For the longitudinal data system to become a trusted tool for making program improvement decisions, the information provided must be reliable, consistent and verifiable. North Dakota will develop a data validation process and put it into operation on an ongoing basis. Missing field data, data that do not comply with field definitions and other issues are difficult to correct except on individual records. A key feature of this process will be exception reports to give feedback to source data providers so that they can improve their own processes.

As part of this project, reports will be developed to identify data quality issues. For example, records with the same SSN but different names could point to a data problem. Initially, data validation will be conducted on existing data to identify improvement areas to be addressed before records are loaded into the JSND data warehouse. This information will be used to clean up source data that may be converted as the data warehouse is built. It will also be used to improve processes for capturing the data. The data quality reports will be run on a regular basis so that data quality can be maintained and improved.

Research

With the improved linking of education, training and workforce data in place, North Dakota will undertake four research projects to demonstrate how longitudinal data can be used to improve workforce and training programs. The State will create an evaluation of the outcomes of workforce programs, analyze the effectiveness of education and training programs used by UI claimants and also supply/demand analyses related the ability of job seekers to find employment. Because comprehensive K-12 data have not been linked to workforce data in the past, an additional research focus will be on analyzing the ability of high school dropouts and graduates to find employment.

Collaboration With Other States

While North Dakota does not plan to partner with any other states for the purposes of this grant, it does see value in preparing for future partnership opportunities with neighboring states. As part of this project, North Dakota will adopt suitable national standards that exist for data interchange, preparing its systems to share data with other states. North Dakota supports collaboration with other states and has a number of efforts currently underway in this regard.

North Dakota, along with Minnesota and South Dakota, are participating in an initiative sponsored by the August Bush Foundation to increase student achievement. One of the Foundation's strategies is to develop effectiveness measures. The Foundation is working with State agencies and education researchers to develop new tools to analyze existing data to measure teacher effectiveness. North Dakota is actively engaged in this project and will include the data and required measures in the longitudinal data system.

DPI also participates in the Midwest Education Information Consortium (MEIC). This group of states from the Midwest, including Missouri, Kansas, Iowa, Minnesota, Nebraska, and North and South Dakota, meets as needed to discuss issues related to education data collection, use, and reporting.

NDUS participates in the Midwest Higher Education Compact (MHEC), a cooperative effort by twelve states to provide cost savings, student access and policy research. Last year, the MHEC was chaired by William Goetz, the Chancellor for NDUS. Current initiatives of MHEC revolve around e-transcripts, student retention and education to workforce (E2W).

Sustainability

North Dakota realizes that maintaining the longitudinal data system and using it to improve our educational and workforce training systems will require ongoing support in terms of resources and leadership. The SLDS Committee will be developing a budget request for State funds to sustain the system after the project is implemented. Individual agencies will be responsible for maintaining their operational systems and ensuring data quality processes are followed. While there is no guarantee of future State funding, the concept of the SLDS has received broad executive and legislative support as evidenced by the enabling legislation and \$2.2 million in State funding for components of the longitudinal data system

project. The agencies involved are committing their resources and expertise to make this project successful not just during the three year grant period but over the long term.

Description of Partnership Strategies

North Dakota has taken a multi-layered approach with respect to partnership strategies. The top layer –the SLDS Committee – is comprised of executive leadership from State agencies and the legislature. It provides strategic direction, policy development and issue resolution at the highest level. The legislation governing the SLDS Committee directs it to manage a longitudinal data system which: a) provides for dissemination of management information to stakeholders and partners of State education, training, and employment systems; and b) uses data from educational and workforce systems as central sources of longitudinal data. Work groups formed by the SLDS committee work to develop privacy and security policies, model interagency agreements, enabling legislation and funding strategies.

ITD, as the agency providing the technology for the educational and workforce longitudinal data systems, provides a key link between the many partners at a more operational level. ITD is in the process of establishing a BI “Competency Center”. Staff working in the Competency Center will provide deep technical skills in data warehousing, reporting and analytics. In addition, they will facilitate the creation of a cross-agency team to improve workforce and educational longitudinal analysis. Research analyst positions exist in each of the agencies involved and these analysts generally produce reports and analyses required from the perspective of their individual agency. Creating a cross agency team will allow the analysts to develop a broader perspective and work together to provide analyses that correlate data from multiple sources. This team will develop standards so that workforce data is reported more consistently. The team will also provide data element descriptions for the data dictionary so that users of the data will better understand the meaning of the information. By meeting and regularly discussing data issues, individuals on the team will gain a better understanding of the data provided by the other agencies and how it might be used for research to improve programs within their own agency and across the State. Where needed, the team will make recommendations to the SLDS Committee for policy changes and potential areas of research.

The current data sharing handled by FINDET is governed by the FINDET Interagency Cooperative Agreement (included in the attachments on page five). As the new longitudinal data system is built, new data sharing agreements will be developed with the agencies involved. The new agreements will be more specific about the timeframe of the agreement, the data to be shared and the responsibility of each party to protect the data. A work group of the SLDS Committee will draft a model agreement for agencies to follow. The work group will research data sharing agreements used in other states as a basis for the model agreement.

North Dakota Century Code 52.01.03.3 (see page two of the attachments) governs the sharing of UI data. JSND also has agreements in place encompassing Labor Market Information, FEDES and the Wage Record Interchange System. In addition, a data sharing agreement has been established between NDUS and DPI to govern data shared as part of the educational longitudinal data system. ITD, as the technical service provider for the workforce longitudinal system, will provide service level agreements outlining the responsibilities for authorizing access to the data and providing security measures for the secure storage and transmission of the data. Examples of the general service levels provided by ITD can be found at <http://www.nd.gov/itd/service-level-agreements.html>.

In addition to the agreements above, new agreements will be developed between JSND and the Department of Transportation and the Department of Public Instruction. The Department of Public Instruction will be expanding longitudinal reporting to incorporate all K-12 students and not just Adult Education and Carl Perkins programs. This will greatly enhance the longitudinal view by providing data on individuals who are first entering the workforce. Currently DPI surveys students in special education programs to determine if they are employed after leaving high school. Using the longitudinal system to match with UI data will provide additional information, giving a more complete picture of student employment. The agreement with the Department of Transportation will allow the sharing of drivers' license data to enhance UI data with current demographic information.

To ensure the success of the project funded by this grant, the project team will be made up of individuals from each of the agencies involved. The Staffing Capacity section outlines the composition of the multi-agency project team. Project status reports will be provided regularly to the SLDS Committee

and its members. The SLDS Committee also receives regular reports on the status of the project to develop an educational longitudinal data system. Several key people involved in the educational longitudinal data system project will also be involved in the workforce longitudinal data system project to ensure close coordination of critical design elements. In particular, Tracy Korsmo, ITD's Information Technology Architect and Steve Snow, Director of Information Technology for DPI, both of whom were integral to the creation of the educational longitudinal data system, will play lead roles in the integration efforts. Letters of support from the key agencies are included in the attachments beginning on page twenty. These agencies have a long history of working together and are committed to realizing the benefits this grant can provide.

Description of Database Design, Data Quality Assurance and Proposed Uses

Personal Identifier

Because not every workforce and educational system collects a common identifier, the capacity to link records and build a longitudinal system depends on the ability to collect several key pieces of identifying information. Increasing the number of matches and the confidence in the accuracy of the matches depends on having more key fields available and high quality data in those fields. Record matching within the workforce education longitudinal data system will rely on several key identifiers including SSN, name, date of birth, K-12 student ID, and NDUS student ID. The Personal Identifier Table in the attachments on page eleven shows the key identifiers collected by each program that will be included in the longitudinal system.

As part of the WDQI project, personal identifying data will be loaded into the Master Index where identifiers from other education and training programs will exist. This component of the architecture will be used to track students entering and leaving the longitudinal data system through numerous feeder systems and applications. The Master Index components will be operated by ITD in a secure environment and data owned by DPI, NDUS, JSND, DHS, the Commerce Department and DOT contained in the Master Index will be governed by data sharing agreements coordinated by the SLDS Committee. Access to the individual data within the Master Index will be very tightly controlled.

The educational longitudinal data system will create a linkage between K-12 records and postsecondary records. NDUS will enter the K-12 student ID when students apply for college. Because SSN is collected for most postsecondary students, this will create a link between K-12 records, postsecondary records and SSN. In addition, ACT test records and North Dakota Scholarship applications, available for most K-12 graduates, contain SSN, creating another link to this key field.

UI wage records, a primary source for longitudinal follow-up data, are keyed by SSN but only about 60% of the records include name. Postsecondary data on individuals contains the SSN in the majority of cases. However, K-12 data on individuals generally does not contain SSN. Work presently underway on the educational longitudinal data systems will match individual records from K-12 and postsecondary using the State student identifier, name and other key information. The creation of the unified educational record will allow for greater correlation between K-12 and workforce data.

While the federal workforce training programs collect SSN, some State programs do not. The State will continue to work on improving the data quality for these programs. In the meantime, matching will be based on name only. For systems that collect maiden name and aliases, those fields will be used to determine matches in addition to the name of record.

Record matching and data sharing will only occur if data sharing agreements are in place or authorized by State or federal law.

Data Quality Measures

Each agency is responsible for maintaining the quality of the program data in the systems that it operates. Depending on the use of the data, the quality can vary greatly. For example, student transcript data tends to be accurate because it is seen by and important to the student. However, when data from these many disparate systems is merged, data quality issues become more apparent. To address this issue, North Dakota plans to develop data validation procedures and to create a number of data quality reports.

Participating agencies will receive reports summarizing the number of matches, records with missing data elements and other pertinent information. Reports from the system will also identify "near" matches or cases that may be matched if data is corrected. For example, if SSN

and birth date match not name, checking the name would be important. Other edit checks will be run as data is loaded to ensure data in the longitudinal system is of the highest quality.

Additional data quality reports will be developed that compare data loads of a source data set against defined periods. For example data sets that contain race will compare the percentages of races and report on changes of race counts that would indicate missing data or incorrect data. Number of recipients of workforce training will be compared to determine if enrollment has changed significantly. These reports and measures will continue to be refined as data quality issues are identified to provide an ongoing data quality effort that is automated and reduces human efforts to review data quality prior to submission.

As longitudinal reports are developed, metrics on match rates and missing data fields will be captured and reported to the SLDS Committee. Recommendations will be developed for additional data quality initiatives.

The State has already identified a need to standardize the collection of individual participant information for workforce programs. Standards will be developed by a multi-agency work group for providers to follow. For example, NDUS has already identified the need to improve the capture and consistency of participant information for the TrainND program.

Scope of the Longitudinal Data

The State has several closely related projects underway to develop longitudinal data systems. This grant will leverage the work of these other projects and position JSND as a major provider of data for the longitudinal data system. The workforce and educational longitudinal data system consists of a single data warehouse containing subject areas owned by various agencies which are dimensionally modeled and fine-tuned for reporting and analytic applications. These subject areas will be fed by agency owned operational data warehouses.

The WDQI grant will provide funding for the development of an operational data warehouse for JSND programs. This data warehouse will act as a data source to link with individual records from other programs in the educational and workforce longitudinal data system for analytic and reporting purposes. It will also act as a repository for outcome measures developed from linkages to other data sources. The

JSND data warehouse will include data captured from UI wage records, UI tax records, UI benefits records, Workforce 2020, North Dakota New Jobs Training, Trade Adjustment Assistance, Workforce Investment Act, and Wagner-Peyser Act. The data fields that will be included in the JSND data warehouse for these programs are shown in the attachments beginning on page twelve. For each workforce program, data will also be collected on cost of the program, number of completers and geographic location to determine effectiveness.

Today this information is replicated from the UI operational system and online Virtual One Stop (VOS) labor exchange system into FoxPro or Access for manipulation. This labor intensive process will be improved by automating the extractions from the operational system into the data warehouse and will speed up the query time needed to search UI data. The data warehouse will also provide better disaster recovery and help lessen the reliance on one or two individuals who maintain the data. Besides providing a source for JSND internal analysis, the warehouse will be the source of data for the workforce and education longitudinal data system. Data from the JSND data warehouse will be loaded into the comprehensive longitudinal data system and linked to data from K-12, postsecondary and other workforce data systems.

An educational data warehouse being developed using Department of Education grant funds will provide K-12 data to the longitudinal system. This system will be used to track outcomes for K-12 students such as success in postsecondary education and the workforce. A wide variety of data is available including student demographic data, special programs, free and reduced lunch, GPA, test scores, classes taken, school and district attended, and teacher data. Postsecondary and workforce data is currently being used to track students who graduate from technical tracks funded by the Carl Perkins program. This grant will improve data matching with UI wage records so that follow up analyses can be completed for all high school graduates.

NDUS has a project underway using State funding to develop a longitudinal data warehouse encompassing data for students from all eleven State postsecondary institutions. Comprehensive data will exist on student demographics, course of study, degree granted, classes taken, grades, length of study, high school attended, and institution attended. NDUS currently uses UI wage records to determine if

graduates found employment in North Dakota. They also conduct follow up surveys with graduates and employers to capture outcome measures that are used to develop improvement goals.

Additionally, State funding will be used to capture longitudinal information for workforce programs not included in the JSND data warehouse including: Operation Intern, AmeriCorps, Registered Apprenticeship, Senior Community Service Employment, Basic Employment Skills Training (BEST), TrainND and the Workforce Enhancement Grant Program. Data captured today across workforce programs include areas of training provided, cost of program, number of individuals trained and wages before and after training. Additional data will be captured so that analyses can be completed based on gender, geographic location, age, level of education and other factors.

Using the WDQI grant funds, the State will complete a number of analyses using the data from the longitudinal system including:

- An evaluation of the outcomes of JSND workforce training programs showing change in salary, change in employment status, and program cost per participant.
- An analysis of high school drop-outs and graduates who do not attend college and their ability to find employment in North Dakota. Wages and high school course taking will be included in the analysis.
- An analysis of the programs utilized by UI claimants and the effectiveness of the educational and training programs to facilitate rapid re-employment.
- A supply/demand analysis of job seekers and their ability to obtain employment in North Dakota, including an analysis of job seeker characteristics and industries with openings.

Security Measures

The State will be taking a multi-layered approach to security in order to meet State and federal requirements including CIPSEA and FERPA. Policies, procedures, and data sharing agreements, as well as the implementation of security technologies will be included.

The agency that “owns” the data has control over its use and dissemination. Through procedures already in place, the agency authorizes the type and level of access by individuals using role based security. ITD acts as an agent of the agency. The agency authorizes access by ITD staff to provide technical services but ITD has no authority to release information on its own. Even staff of the owning agency

would rarely if ever have access at the database level. Rather, they would gain access through the BI tool or another application.

ITD's Enterprise Information Technology Architect will play a key role by understanding the security requirements and data sharing agreements in place in order to design and maintain the workforce longitudinal data systems. A number of different technologies will be deployed to create a comprehensive security strategy. Physical access will be controlled by ITD and limited to staff who maintain the storage and server environments. Database security at the file, record, and field level will be implemented based on user requirements. Database level access is strictly limited to data warehouse architects and the owning agency's technical staff. Data masking, encryption and de-identification will be practiced at the database level as well as masking within the BI tools.

Security features of the BI tools will be used to limit access as required. Drill down capability, subject area access and ability to generate ad-hoc reports are all things that can be limited by the security features of the BI tool. Where data sharing agreements are in place, federated data marts will be created by ITD that will join data from multiple agencies or programs to produce longitudinal outcomes. This data will be joined at the individual level but the BI tools will enforce role based security, restricting access to the aggregate level and masking low cell counts on businesses and individuals. Business rules will be implemented within the BI tool to limit the lowest aggregate sample that can be viewed without compromising the privacy of the individual.

Where data sharing agreements are in place to allow access by researchers for specific projects, data masking will be implemented to obscure identifiable attributes such as SSN and name. Additionally de-identification of research data sets will be practiced when demanded in the data sharing agreement. Researchers will be required to sign confidentiality agreements and their access will be closely monitored.

Planned Reports / Deliverables

As part of this project, logical "views" of the combined workforce and educational data will be created and a BI tool will be implemented to develop analyses from this data. Reports on program outcomes and longitudinal analyses will be available to stakeholders. They will be able to sort, drill down and compare the aggregate information based on the data available and their level of security. The BI tool

will give agency research analysts additional capabilities to analyze the combined educational and workforce data without rerunning extracts.

One of the key reports that will be developed will be an evaluation of the outcomes of JSND workforce training programs. This report will show the success of participants in obtaining employment or higher wages over time for each program. Viewers will be able to evaluate program effectiveness against the program's mission. Program administrators will be able to analyze the data and develop improvement efforts by better targeting the constituents they serve. For example, by drilling into the data, a correlation with age or level of education may be discovered that could change the training services being offered.

Another deliverable will be an analysis of high school drop-outs and graduates who do not attend college and their ability to find employment in North Dakota. Data from cohort populations will be looked at over time to see changes in employment or wages. This data will be correlated with courses taken in high school and also metrics of student success such as GPA or test scores. This data will be beneficial in demonstrating the value of school-to-work programs and will provide school counselors and students information for career planning.

A third deliverable will be an analysis of the programs utilized by UI claimants and the effectiveness of the educational and training programs to facilitate rapid re-employment. This will build upon preliminary research currently taking place at JSND that has been somewhat limited due to the availability of only primary sources of data. The integrated database will allow ready access to secondary sources of information and will allow the research to be conducted longitudinally. The analysis will look at how long UI claimants are out of work and determine if there are differences in the effectiveness of various programs on re-employment. Other factors such as geographic location, industry, level of education will be examined. This information will be used to improve program effectiveness and get the unemployed back to work faster. A clearer understanding of the movement of laid off workers across occupation, industry, geographic lines and income levels, as well as the training programs and occupations involved, will result in more effective reemployment assistance. This information will be of use to policy makers, program administrators and career guidance personnel as they assist career explorers, individuals seeking career growth and laid off workers.

The final deliverable will be a supply/demand analysis examining attributes of job seekers and their ability to obtain employment in North Dakota. This analysis will utilize the fully integrated database to link demographic characteristics and skill attributes of job seekers registered on the State's online labor exchange system (VOS) with educational, wage record, industry data, and job opening requirements. This research will be timely and relevant as the State transitions from recent periods of labor shortage and a job seekers market, to more current economic times where competition is increasing for available positions. Information gathered from this research will aid in career guidance at all levels from youth through adult.

These deliverables demonstrate the potential for the longitudinal data system. Once the system is in place and stakeholders see the value of the data, many more reports will be requested. As some questions are answered, more questions will be generated. Having the data in a data warehouse and having a BI tool in place will make producing additional analyses on an ongoing basis much easier.