The North Dakota Health Information Network Business Plan

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Executive Summary

The North Dakota Health Information Network (NDHIN) has had a successful three-year initial deployment and has provided a secure, stable health information exchange (HIE) platform. This platform has been consistent with national standards and with advanced applications such as image exchange, self-subscribing alerting, and single sign-on. The NDHIN has secure and stable operations, with data exchange available to providers at most of the major hospitals and larger clinics across North Dakota. Usage of the network has increased monthly over the last six months.

The Centers for Medicare and Medicaid Services (CMS) will provide time-limited funding (through September, 2021) to state Medicaid agencies, in order to further develop a supportive health IT infrastructure for Medicaid providers and hospitals, in order to better coordinate patient care and participate in new value-based payment models. This funding opportunity, known as HITECH funding (part of the American Reinvestment and Recovery Act)[1], requires a state-provided 10% investment for a 90% federal contribution, and is available to exponentially grow the NDHIN HIE services in virtually all areas of operations over the next five years. Securing the federal investment in North Dakota will require a relatively small shared investment to be made by stakeholders across the state.

This five-year business plan outlines a strategy to capitalize on the federal funding opportunity and will move the NDHIN closer to its goal of providing one of the most comprehensive data stores of patient health information in the country. With an additional investment of approximately $47 million dollars over the next five years (approximately $7 million of which will come from the State and stakeholders), nearly every healthcare provider across all sectors in North Dakota will be fully participating in data and image exchange, and will benefit from statewide analytics, care coordination, centralized credentialing, notifications and alerts, and an advance directives registry. In addition to Medicaid providers, patients, health plans and other healthcare purchasers in North Dakota will all be able to use the NDHIN services in a variety of ways. Each of these groups will see value added from improved quality of care and reduced costs across the state.

The five-year business plan is aggressive but obtainable. With the majority of funding available from CMS, there is a unique opportunity for the NDHIN to rapidly grow its participant base as well as expand its service offerings. Most importantly, the execution of this plan will position healthcare organizations in the state to successfully participate in value-based payment models and transform healthcare delivery to benefit all North Dakota residents with better care at lower costs, ultimately improving population health across North Dakota.

[1] https://www.healthit.gov/policy-researchers-implementers/health-it-legislation

General Company Description

Mission Statement: To advance the adoption and use of technology to exchange health information and improve healthcare quality, patient safety, and overall efficiency of healthcare and public health services in North Dakota.

Vision Statement: Quality healthcare for all North Dakotans anywhere, anytime.

Adopted Principles: The NDHIN's adopted principles are summarized in Table 1 below.

Operate with Transparency & Openness	All HIE governance activities should meet the highest standards of an open and transparent organization that strives to keep consumers and stakeholders informed.
Build Stakeholder Trust	Create and foster trust by and between healthcare stakeholders to further the willingness to exchange healthcare information and data.
Maintain Neutrality	Ensure the statewide HIE remains neutral in the competitive marketplace in North Dakota and delivers a high quality exchange service that meets the needs of all stakeholders without giving an advantage to any particular stakeholder(s).
Stakeholder Investment	All stakeholders should contribute financially to the formation and ongoing operation of the statewide HIE.
Offer Personal Choice	The patient is the center of the healthcare universe and as such is entitled to have their personal electronic health records available when they need them to assist in the continuity of care.
Foster a Culture of Innovation	The HIE should take advantage of the creative nature of the market in North Dakota and develop an organizational culture that taps into and benefits from the innovative ideas of its citizens.
Engage Stakeholders	Efforts must create value for all participants statewide, regionally, and for each stakeholder interest. To promote acceptance and adoption, it is important to communicate with and educate all participants early and often regarding the value and benefits of health information exchange.
Promote Statewide HIE Solutions	Every region of North Dakota is unique and should be given the flexibility and option to fit into the emerging HIE infrastructure in the way that appropriately serves patients and protects patient health data.
Leverage Existing HIT Initiatives & Resources	A coordinated effort, leveraging existing initiatives and resources, provides the greatest potential for improving HIT adoption rates and HIE success.
Be Inclusive	Sensitivity to culturally diverse populations must be considered as part of the design, development, and implementation of all HIE activities.
Focus on the Primary Purpose	HIT / HIE are only two of the tools used to accomplish the broader goal of improved healthcare outcomes for North Dakotans. Always remember it is about the patients, not the technology.
Build a Learning Health System	As defined by the Office of the National Coordinator for Health Information Technology (ONC), a Learning Health System is designed to generate and apply the best evidence for the collaborative care choices of each patient and provider; to drive the process of new discovery as a natural outgrowth of patient care; and to ensure innovation, quality, safety, and value in healthcare.

Table 1

Company Description: The NDHIN is a statewide HIE and healthcare application hosting service. The NDHIN provides electronic access to patients' longitudinal medical records produced from a wide range of data contributors, including payers, providers, and state agencies. Data is transferred to the NDHIN via connections made with providers' electronic health record (EHR) systems. The NDHIN provides access to and exchange of medical diagnostic images, and can also provide alerts to authorized users when significant events are logged into patient records. In addition, the NDHIN provides a DIRECT secure messaging service to its members, as well as access to state systems such as the North Dakota Immunization Information System (NDIIS), electronically reportable labs, syndromic surveillance, and the North Dakota Prescription Drug Monitoring Program (PDMP).

The NDHIN serves providers, payers, and patients within the state of North Dakota, and also allows providers located in other states to have access to NDHIN patient records through the legal and technical infrastructure of the eHealth Exchange, operated by The Sequoia Project[2]. The connection through eHealth Exchange is particularly valuable for providers practicing in North Dakota's border states. The four main user groups of providers, payers, state agencies, and patients represent the target market for the NDHIN, each of which possess their own unique drivers and use cases for accessing the system.

Federal regulations and standards for the exchange of health information are still being defined and fee-for-service healthcare payments are still predominant in many parts of the country; these factors have made sustainability a challenge for HIE organizations. Although the total number of operational statewide HIEs has been declining slowly across the country, the actual rate of electronic data exchange is increasing dramatically, and collaboration between organizations to meet the requirements of new, value-based alternative payment models (APMs) has also been on the rise. It is clear that any organization that can provide the tools to easily and securely exchange electronic health data, such as trusted HIEs, will be invaluable in the success of these new payment models, as well as care coordination and programs that rely on robust data analytics and quality reporting capabilities.

Technology that is designed to improve connectivity, interoperability, analytics, and care coordination is developing and evolving rapidly as a result of incentives and market forces including, but not limited to, the payment models mentioned above. The NDHIN is well positioned to take advantage of these new and changing technologies as a result of its knowledgeable and skilled internal staff and its market-leading vendor platform provided by Orion Health.

Company History: In 2008, the Governor of North Dakota, John Hoeven, instructed the members of the Health Information Technology Advisory Committee (HITAC) to perform the first environmental scan of North Dakota concerning EHR adoption, telehealth, and HIT

[2] http://sequoiaproject.org/ehealth-exchange/

workforce. In 2009, the North Dakota legislature appropriated up to $8 million to augment the $5.3 million State Health Information Technology Cooperative Agreement awarded by ONC to develop a strategic and operational plan for statewide HIE, and ultimately, to develop HIE services. The NDHIN is a public/private partnership created by an Executive Order (2011-20) of the Governor of North Dakota with the HITAC serving as the governance entity, to use the allocated funds to build the NDHIN's services across the state. Additionally, in the 2009 and 2011 sessions, a total of $10 million was allocated for the State of North Dakota Bank Loan Fund to offer low interest loans to healthcare providers across the state to incentivize the purchase of EHR systems.

The NDHIN completed a comprehensive vendor selection process and a contract was executed in December 2011. In February 2013, that contract was mutually terminated. In April 2013, following a request for proposal (RFP) process, a new vendor, Orion Health, was procured and became operational in September 2013.

Today, more than 200 healthcare entities have signed the NDHIN Participation Agreements and hundreds of individual providers are sending DIRECT secure messages via the NDHIN web-portal client or through capabilities within their own EHR systems. While the use of DIRECT has been slow to take off across the country, the NDHIN user adoption of this nationally endorsed standard is ahead of many other regions, with accelerated growth in the past six months. With a core Orion Health technical infrastructure solidly in place, the NDHIN is well positioned to accelerate connectivity for additional provider types, adding necessary patient healthcare data to the NDHIN, increasing the volume of exchange transactions, and evaluating additional applications and services that will provide value to the NDHIN's stakeholders.

As documented in the Center for Rural Health's 2014 Evaluation of the NDHIN, stakeholders are, "very optimistic and continue to think the [NDHIN] project is critical to the state's well-being. The NDHIN has an excellent reputation in the state and is poised to deliver additional high-value services when infused with the HITECH capital investments."

Core Competencies and Strengths: Perhaps the most important strength of the NDHIN network is the support of its stakeholder group. To date, the NDHIN's stakeholders have exhibited a willingness to contribute data and work together for the success of the network. In today's healthcare landscape, a willingness of providers and payers to share data and avoid information blocking is a strong indication for sustained success. Additionally, the NDHIN has shown good stewardship through the efficient use of its funding to develop services, avoidance of charging up-front membership fees while base functionality was being implemented, and achieving high-quality results on a large set of projects. With only three years of operational experience, the NDHIN's base infrastructure, increasing system usage, and volume of connected providers, systems, and data contributors is impressive in comparison to other industry examples.

Continued stakeholder support will be the key to future success and sustainability for the NDHIN. Financial support from stakeholders will be required moving forward in order to take

advantage of available federal funding and build a viable long term sustainability model. Participating stakeholders will also need to actively take part in governance discussions, defining requirements and standards, addressing technical challenges, and planning for the deployment of new applications, with strong marketing campaigns and education strategies for end-users.

The NDHIN is the only organization in the state that offers a true, comprehensive HIE to patients, payers, providers, and state agencies. It has strategically positioned itself in the state by demonstrating tangible value to stakeholders and by developing plans to utilize its unique position and robust data set in order to deliver additional value in the near future. Additionally, the NDHIN has a proven track record of operational success led by knowledgeable staff and committed leadership. The NDHIN is a natural hub for the North Dakota healthcare community to rally around, united by the ever-growing market driver of expanded HIE and robust data analytics.

Perceived Challenges (Current and Future): The most significant challenge that the NDHIN faces today is the transition from a government-funded organization to a sustainable entity funded by stakeholder subscription fees. In order for subscription fees to be viable, all participating stakeholders must clearly understand the value proposition that the NDHIN represents for their organization.

The NDHIN's growth plan over the next five years will bring organizational and technical challenges that will need to be addressed to enable established goals and objectives. This will include scaling the NDHIN's internal staff to support initial provider onboarding and the expansion of system capabilities, followed by the transition to day-to-day operations. Additional funding will be required to add the necessary staff, resources, and infrastructure for member outreach, contracting, training, technical support, and the technical implementation of new or expanded functionality. In some cases, connecting and onboarding new provider types, such as chiropractors, dentists, and optometrists, may require technical customization.

Long Term Vision: During the next five years, the NDHIN is expecting significant growth in the applications and functionality that it offers, as well as overall user participation. The NDHIN is currently investigating an investment of $47 million to expand its technical infrastructure, hire additional staff, and conduct broad stakeholder outreach to connect all healthcare organizations and provider types in North Dakota. As part of this investment, the NDHIN is planning on a substantial patient engagement initiative to get more patients engaged in managing their own health better through the use of the HIE. The majority of funding for this investment is available through the HITECH Act (administered by CMS) to state Medicaid agencies at a 90% federal/10% state match rate. NDHIN's strategic and operational plan should be revisited near the end of this five-year period, to ensure a stable management plan is in place for ongoing operations, following this significant building phase.

Governance, Management, & Organization

The State of North Dakota's HITAC provides oversight and governance to the NDHIN and anchors the public/private partnership organizational structure. Membership of the HITAC is comprised of state employees, state legislators, and representatives from both public and private sectors. Members are appointed directly by the Governor of North Dakota. The HITAC collaborates with and makes recommendations to the North Dakota Information Technology Department (ITD). Members of the HITAC currently include:

Name	HITAC Role	Other Positions	Role & Organizational Affiliation
Lynette Dickson, MS, LRD	Chair (HITAC)	Chair (Clinical Domain Workgroup)	Associate Director of Community Outreach and Engagement - *Center for Rural Health, University of North Dakota School of Medicine and Health Sciences*
Dan Kelly	Vice-Chair (HITAC)		CEO - *McKenzie County Healthcare System*
Lisa Clute	Member		Executive Officer - *First District Health*
Jennifer Witham	Member	Co-Chair (Legal & Policy Domain Workgroup)	Information Technology Services Director - *North Dakota Department of Human Services*
Neil Frame	Member		Operations Director - *Metro Area Ambulance*
Lisa Feldner	Member		Chief of Staff and Vice Chancellor for IT and Institutional Research - *North Dakota University System*
Dave Molmen	Member	Chair (North Dakota Hospital Association)	CEO - *Altru Health System*
Sharon German	Member		Enterprise Director of IT Applications & Bismarck Site Lead - *Sanford Health*
Courtney Koebele, JD	Member		Executive Director - *North Dakota Medical Association*
Barbara Groutt, MSA	Member		CEO - *Quality Health Associates of North Dakota*
Senator Judy Lee	Member		*North Dakota Legislature (District 13)*
Jerry Jurena	Member		President - *North Dakota Hospital Association*
Matt Shahan	Member		CEO - *West River Health Systems*
Shelly Peterson	Member		President - *North Dakota Long Term Care Association*
Darin Meschke	Member		Director, Division of Vital Records - *North Dakota Department of Health*
Mike Ressler	Member		CIO - *North Dakota Information Technology Department*
Representative Robin Weisz	Member		*North Dakota Legislature (District 14)*

Table 2

The HITAC is supported by Domain Workgroups, comprised of public and private stakeholders to make recommendations on the technical services of NDHIN, its sustainability, and on the policies and operating procedures of the NDHIN. Current Domain Workgroups include:

- Finance
- Legal & Policy
- Communication & Education
- Technical Infrastructure
- Clinical
- Data Use
- Health Provider Directory (HPD)

Since September of 2009, Sheldon Wolf has been the Health Information Technology Director and leads the daily management and operations of the NDHIN. By law, he serves at the pleasure of, and under the direct supervision of the HITAC. Sheldon has a Master's Degree in Management and a Bachelor's Degree in Accounting and Business Administration from the University of Mary. As Health Information Technology Director, Sheldon is responsible for overseeing the Health Information Technology Office. Sheldon spent several years working in the private sector, and sixteen years working as the Assistant Medicaid Director, Auditor, and Accountant for the North Dakota Department of Human Services. His experience in these roles has given him a wealth of relevant knowledge and experience working with stakeholders and CMS, which has proven invaluable in his current position.

Staffing: In addition to Sheldon Wolf, Health IT Director, there are currently three full time employees (FTEs) working at the NDHIN who are engaged in a variety of operational, outreach, training, and support responsibilities. In addition, many of the day-to-day operational and administrative functions of the NDHIN are provided by the State of North Dakota, including, but not limited to, contracting, procurement, project management, and accounting. The NDHIN's full time employees are as follows:

- Eric Hieb – Technology & Operations Manager
- Robin Hirsch – Education & Support Specialist
- Tina Gagner, BSN, RN – Clinical Application Analyst

More information about these roles and responsibilities can be found in the Operational Plan section.

Professional and Advisory Support:

- **Legal Counsel** – Michael J. Mullen spent many years as the Special Assistant Attorney General to the North Dakota ITD and is currently contracted as legal counsel for the NDHIN.
- **Consultants** – Occasionally, the NDHIN has utilized consultants to aid the organization as subject matter experts in certain areas, including:

- The Koble Group (Grand Forks, North Dakota) is currently under contract with the NDHIN to provide help desk services (www.koblegroup.com).
- CedarBridge Group (Portland, Oregon) is currently under contract with the NDHIN to provide consulting on the development of a five-year strategic plan (www.cedarbridgegroup.com).

Operational Plan

The NDHIN is dedicated to improving healthcare by creating a secure network for providers and consumers to share medical records. They aim to empower patients by ensuring that medical data remains safe and private through adherence to all applicable regulations and best practices. The NDHIN promotes the proper handling of patient data by training the personnel of its members and improving the record sharing process. The North Dakota ITD, on behalf of the HITAC, is responsible for implementing the health information network for the state of North Dakota.

The NDHIN's day-to-day operations are conducted from the North Dakota ITD offices at the following address:

The North Dakota Information Technology Department
4201 Normandy Street
Bismarck, North Dakota 58503

The NDHIN's four full time staff members are responsible for daily operations of the organization. The current staff members have proven to be highly capable in handling the necessary operational responsibilities and have a documented record of producing high-quality work. Expansion of the network beyond current operations, as part of the five-year strategic growth plan, will require the hiring of additional staff members and contracting for temporary staff augmentation. The responsibilities of the NDHIN's current staff members are provided below.

Current Staffing:

North Dakota Health Information Technology Director (Sheldon Wolf): The North Dakota Health Information Technology Director serves at the pleasure, and under the direct supervision, of the HITAC and is responsible for oversight and management of the daily and long term operational and administrative activities of the NDHIN and the Health IT office. This position oversees the management of operations, personnel, the HITAC relationship, stakeholder engagement, and strategic planning.

As the operational leader of the NDHIN, the Director is responsible for financial planning and financial oversight. The Director works to ensure NDHIN executes its overall mission of advancing the adoption and use of technology to exchange health information and improve healthcare quality, patient safety, and overall efficiency of healthcare and public health services in North Dakota. The Director, in collaboration with the HITAC, establishes policies and procedures for the NDHIN. This position also guides vendor contracting and management. The Director engages in the oversight of legal and policy development and compliance, ensuring compliance with the established governance structure of the NDHIN. As the personnel manager this position is responsible for curating a highly effective team able to administer all of the NDHIN's responsibilities.

The NDHIN Director acts as liaison to the HITAC and state leadership. Likewise, they must engage with the organization's Domain Workgroups. Relationship building is an important component of the Director's responsibilities and this individual plays a key role in stakeholder engagement. This requires nuanced leadership with a deep understanding of the multifaceted perspectives of the HITAC members and stakeholders. Throughout the years this position has made stakeholder engagement a priority. With this aim, the Director speaks and participates at healthcare association's annual meetings, conventions, and conferences throughout the state.

Finally, this position is responsible for strategic planning. This requires a clear understanding of the current state of operations of the NDHIN, the vision for the future state, and the ability to build consensus in order to move toward that vision. The Director is engaged in the federal momentum and conversations around health information exchange. This means attending the annual meetings of the ONC and CMS, working toward connecting federal providers like the Department of Veterans Affairs (VA), Indian Health Services (IHS), and the Department of Defense (DoD), and partnering with other entities working on HIE such as the Strategic Health Information Exchange Collaborative (SHIEC), the National Association for Trusted Exchange (NATE), and the Mid-States Consortium of Health Information Organizations.

Clinical Application Analyst (Tina Gagner, BSN, RN): A primary responsibility of the Clinical Application Analyst is to assist with the validation of incoming data feeds that require specific data mapping configurations. Clinical knowledge is often necessary for validating these data feeds to ensure that information is being mapped correctly between the applicable data fields within a provider organization's EHR system to the user interface display within the NDHIN. As a provider organization nears validation testing during the onboarding process a subject matter expert (SME) is identified who will work with their EHR system vendor, the Clinical Applications Analyst, and the NDHIN's vendor, Orion Health to test and validate the data feeds. Once testing has been completed and the data feed is validated the feed is moved into production. The validation testing process is again repeated in production with final sign off approval by the provider organization.

Another primary responsibility of the Clinical Application Analyst is to conduct utilization reviews and audits. The Clinical Application Analyst assists in creating user accounts and works with Orion Health to manage high volume user onboarding from provider organizations and monitors user access to ensure appropriate use of the system by the NDHIN's members. Bi-annual reports are distributed to members of the NDHIN detailing all of the member's personnel that have access to the system and what level of access has been granted. This report ensures that all user credentials are revoked appropriately when an individual leaves a member organization. Additionally, monthly audits are also used to verify that health information is not accessible through the system for patients who have decided to opt-out. The Clinical Application Analyst also runs weekly reports to identify any patient records that have been duplicated within the system. When duplicate records are identified, the relevant provider organizations are alerted and consulted to validate the duplication, at which point the records are merged to create a single patient record.

The Clinical Application Analyst works to ensure the NDHIN's security and privacy policies meet any state and federal regulations. As part of this responsibility, they participate in the Legal & Policy Domain Workgroup and work closely with the NDHIN's legal counsel and the ITD security team. As part of this collaboration, an annual review of the NDHIN's security and privacy policies is conducted and an annual risk assessment for privacy and security is produced. As new functionality is added to the NDHIN's system, additional security and privacy assessments are performed to ensure compliance with the privacy and security policies of NDHIN and all applicable state and federal regulations.

Finally, the Clinical Application Analyst is the administrator for the NDHIN's DIRECT secure messaging system. This responsibility includes all provisioning and de-provisioning of user credentials, and managing DIRECT certifications.

As an ancillary responsibility, the Clinical Application Analyst serves as back-up for the Education & Support Specialist's end user training activities.

Education & Support Specialist (Robin Hirsch): A primary responsibility of the Education & Support Specialist is to set up and conduct end user training activities once an organization joins the NDHIN. As part of this process, a kick-off meeting is conducted, system access levels are determined, authorized user forms are collected and user accounts are created. For high volume user onboarding, the Specialist works with Orion Health to create provider sign-on credentials. Once this is complete, training is provided. An organization's training needs vary greatly depending on a number of factors, including the number of staff employed, the range of services provided, and the existing information technology that is utilized. Often times the end-user training can be delivered remotely via webinar and teleconferences, however on-site and one-on-one training is required in some cases. For large organizations, the Education & Support Specialist will train targeted staff members who will then disseminate trainings to other end-users. This model is called train-the-trainer. Trainings are also customized for specific roles within an organization as physicians, nurses, and administrative staff will all have different use cases for the NDHIN services.

The Education & Support Specialist is responsible for managing communication and marketing efforts throughout the year. These communication efforts include demonstrations and vendor booths which are often paired with healthcare-related conferences or the roll out of new features and functionality. One example of an annual communication effort is the development of materials and messaging for the eHealth/ND HIMSS Chapter Summit. In addition to the event-specific communications, the Education & Support Specialist is responsible for maintaining the NDHIN website, and for the design and development of promotional and educational materials targeted both at providers as well as consumers.

The person in this position has several ancillary responsibilities, including managing a toll-free number for questions, managing the patient consent forms, the management and retention of HITAC records, and serving as back-up for the Clinical Application Analyst.

Technology & Operations Manager (Eric Hieb): A primary responsibility of the Technology & Operations Manager is to oversee and project manage the onboarding of participants. This includes leading weekly onboarding calls, explaining functionality and system structure, and managing contact information of participating staff members. Project management of this process requires documenting and managing all tasks and processes, recording and distributing notes from each onboarding call to relevant stakeholders, and participating in meetings with necessary stakeholders to resolve issues. An additional responsibility of this role is to participate in the contract negotiation and scoping design process with vendors.

Enhancements to the NDHIN's provider directory required the establishment of a Health Provider Directory (HPD) Domain Workgroup consisting of 26 members. The Technology & Operations Manager is the Chair for this workgroup and manages monthly calls, creates and distributes agendas, meeting materials, and meeting minutes to Workgroup members. The Technology & Operations Manager conducts all the necessary data transformation associated with the NDHIN's provider directory.

This position manages the data exchange between providers and the NDHIN, including state agencies' registries. Currently, this individual works with the NDIIS, syndromic surveillance, and electronic lab reporting (ELR) for the North Dakota Department of Health (NDDoH). Additional work has started to connect the cancer registry and Emergency Medical Systems for bi-directional data exchange with EMS providers. Additionally, the Manager handles the interface work which includes admission, discharge, transfer (ADT), observation results (ORU), medical document management (MDM), and Continuity of Care Document (CCD) / Consolidated-Clinical Document Architecture (C-CDA) exchanges.

The Technology & Operations Manager is responsible for day-to-day system oversight and vendor management. This includes monitoring the Rhapsody Interface Engine for performance and uptime, and to troubleshoot connectivity and data issues, as well as managing and establishing VPN connections between Orion Health and NDHIN members, vendor hubs or cloud environments, and Secure File Transfer Protocols (SFTP) locations. Current vendor management with Orion Health requires developing task orders, reviewing patient care reports (PCRs) for accuracy, and assisting with invoice evaluations.

Ancillary responsibilities of this position include troubleshooting system issues, tracking support, managing the error queue, researching solutions, assisting with DSM XDR implementations and peer-to-peer testing, and developing requirements for potential future applications. One example of research and requirement documentation is the rollout of the Advance Directive Registry.

Policies and Procedures: The NDHIN employs a robust set of policies and procedures that govern the organization and ensure the privacy and security of protected health information (PHI) while facilitating the sharing of health information to provide a better quality of care. Below is a partial list of the NDHIN's policies and procedures, to illustrate the areas of importance and comprehensiveness of the policies. A complete list of the NDHIN's policies can be found at: https://www.nd.gov/itd/sites/itd/files/NDHIN/policies/NDHIN Policies Combined.pdf

Privacy: The NDHIN complies with patient privacy rights in accordance with state law and the Privacy and Security Regulations enacted under the Health Insurance Portability and Accountability Act of 1996 (HIPAA). If substance abuse and addiction treatment information is protected pursuant to 42 CFR Part 2, the information is not available to any other healthcare provider unless express written consent is received from the patient, or in the case of a medical emergency. The NDHIN's privacy practices include, but are not limited to, the following:

- *Opt-Out* – An individual has the right to opt-out of participation in the NDHIN. This means that an individual's written decision prevents the NDHIN from allowing their health information to be searched for throughout the network, except as required by law or as authorized in the case of an emergency.
- *Care and Benefits* – A healthcare provider, health insurer, or government health plan may not withhold coverage or care, nor may a health insurer deny a health insurance benefit, based solely on an individual's choice to opt-out of the NDHIN.
- *Requesting Restrictions on Certain Uses and Disclosures* – An individual has the right to object to, and ask for restrictions on, how their health information is used or to whom the information is disclosed. An individual has the right to restrict disclosures of health information to health plans for products or services paid for in full out-of-pocket.
- *Sale of Protected Health Information* – An individual's health information may not be sold without their consent and the NDHIN will not sell the health information to any third party.
- *Marketing and Fundraising* – The NDHIN must have an individual's written authorization before sending marketing communications, and they have the right to opt-out of receiving future fundraising communications.
- *Requesting Amendments to Health Information* – An individual has the right to request an amendment of incorrect Individually Identifiable Health Information available through the NDHIN.
- *Receiving an Accounting of Disclosures of Health Information* – An individual has the right to request an Accounting of Disclosures as defined by HIPAA Privacy Rules.
- *Access, Inspection, and Copying of Health Information* – An individual, or their designee, has the right to request an electronic copy of their Individually Identifiable Health Information that is available through the NDHIN. The NDHIN may provide the health information directly to the individual or may require healthcare providers participating in the NDHIN to provide access or an electronic copy to the individual.

- *Notification of a Breach* – An individual has the right to be notified, pursuant to 45 CFR Part 164, Subpart D of a breach that affected your Individually Identifiable Health Information.
- *Complaints* – An individual has the right to file a complaint as defined by the NDHIN's policies and procedures. The complaint must be in writing and may be filed with a participant or directly with the NDHIN.
- *Availability of the NDHIN's Notice of Data Practices* – An individual has the right to receive the notice of privacy and data practices in a timely manner. Upon request, an individual may at any time receive a paper copy of the notice, even if they earlier agreed to receive the notice electronically.

Security: The NDHIN, vendors, and each participant (member organization and staff) shall be responsible for maintaining a secure environment that supports access to, use of, and the continued development of the NDHIN.

- *Safeguards* – Includes appropriate administrative, physical, and technical safeguards (as identified in the HIPAA rules and other standards and requirements) that protect the confidentiality, integrity and availability of PHI through the NDHIN.
    - All authorized access will use the principle of "least privilege," that is, granting access to the minimal amount of resources required for the function that the user performs.
    - A list of authorized users is maintained in the NDHIN Clinical Portal and participants shall notify the NDHIN within 24 hours of a user's termination of employment or affiliation with the participation.
- *Reporting Security Incidents* – The NDHIN will report to a participant and ITD any successful impermissible access, use, disclosure, modification, or destruction of electronic PHI or interference with system operations in an information system containing electronic PHI.
- *Malicious Software* – The NDHIN, vendors, and each participant shall ensure that it employs security controls that meet applicable industry or federal standards, so that the information being transmitted and any method of transmitting any such information, will not introduce any malware or other program designed to disrupt the proper operation of the system, the network, or any hardware or software.
- *Encryption* – The NDHIN's vendor system shall employ cryptography and cryptographic modules that are compliant with FIPS 140-2.

Participant and Authorized User Authentication: The NDHIN shall verify the identity of participants and their authorized users before access to the NDHIN is granted. Health information available through the NDHIN shall be accessed only by authorized users who have a legitimate need to access the information.

- *Authentication* – An authorized user who is seeking to access information must engage in a process that verifies that they are who they claim to be.
- *Participant Authentication* – Each participant must demonstrate that it is a legitimate business by completing an application and providing the requested information, ensuring

that it participates in the types of healthcare transactions required of a Covered Entity or its Business Associate.
    - The Director or designee, in collaboration with the vendor, shall determine whether the entities meet technical and operational requirements and pass the readiness assessment.
    - Participant identity shall be authenticated and unique user names and passwords shall be assigned by the NDHIN to authorized users.
    - Each participant shall designate a responsible contact person who shall be initially responsible on behalf of the participant for compliance with the NDHIN policies.
    - The Director or designee and each participant shall execute a written and signed Participation Agreement prior to gaining access to the NDHIN.
    - Participants shall notify the NDHIN within 5 days if there is a material change in status, such as a change in ownership, or within 30 days if the participant ceases to engage in healthcare transactions.
- *Authorized Users Authentication* – Participants shall develop and implement policies to assure proper identification of each authorized user. Authorized users shall be required to execute a user agreement prior to gaining access to the NDHIN.
    - Access of health information shall be based on the authorized user's job function and relationship to the patient. Categories include:
        - Practitioner with access to clinical information and Break the Glass authority
        - Practitioner with access to clinical information, but no Break the Glass authority
        - Non-practitioner with access to clinical information
        - Non-practitioner with access to non-clinical information
    - Administrative authorized user categories include:
        - Administrative authorized user with access to non-clinical information
        - Administrative authorized user with access to clinical information to resolve technical issues
        - Administrative authorized user with access to clinical information for audit purposes
- *Passwords* – Each authorized user shall be assigned a unique user name and password by the NDHIN. Passwords shall meet strength requirements and will be required to change at least every 90 calendar days. Passwords shall be prohibited from reuse. The NDHIN shall encrypt user authentication data stored in the network.
- *Failed Access Attempts* – The NDHIN shall enforce a limit of consecutive access attempts and will disable access upon the fifth failed attempt. Access will be reestablished using appropriate identification and authentication procedures established by the participant.
- *Periods of Inactivity* – The NDHIN will have an automatic log-off and will terminate an electronic session after a minimum of 30 minutes of inactivity.
- *Training* – Participants shall provide training for all of its authorized users consistent with the participant's and NDHIN policies, including privacy and security requirements.

- *Participant Policies / Remote Access* – Each participant shall establish and enforce policies and procedures regarding authorized access to patient data (including remote access), including the conditions that must be met and documentation that must be obtained prior to allowing access to patient data.
    - Policies shall include procedures for taking disciplinary actions for its authorized users or members of its workforce in the event of a breach or non-compliance with the policies.
- *NDHIN Authentication* – The NDHIN shall authenticate users accessing the NDHIN at each attempt.

Products & Services

Overview: Over the last three years, the NDHIN has worked with its vendor, Orion Health, to implement a market-leading interface engine and HIE core technology suite. This technology suite includes an enterprise master patient index (eMPI), a statewide provider directory, a record locator service, health information services provider (HISP) services, and web-based DIRECT secure messaging services. The NDHIN also facilitates the exchange of diagnostic images between providers by associating them with specific patient reports. Images are stored for 30 days in participating hospital edge servers, making them easily retrievable when requests are facilitated by the NDHIN, with older records accessible through the portal.

When authorized users want to retrieve patient data from the NDHIN, they initiate a query to the system, which in turn displays the patient's longitudinal health record (based on all available data sources). For many users, this workflow requires providers to access the NDHIN outside their organization's native EHR system. However, at some organizations the NDHIN is accessible directly from users' EHR systems via single sign-on (SSO), while still maintaining patient context. Establishing the compatibility of this SSO functionality with additional EHR vendors is a current priority of the NDHIN. In addition to the traditional data sources, public health systems such as the NDIIS, electronic reportable labs, syndromic surveillance, and the state's PDMP have all been integrated with the NDHIN, and are available to users. The NDHIN is working to expand the number of these connections by integrating with the state cancer registry and the newly formed statewide Advance Directives Registry. The NDHIN is also connected with The Sequoia Project's eHealth Exchange, which allows providers to access data from over 24 different HIEs located across the country.

Today, more than 200 organizations across North Dakota are contracted to participate with the NDHIN, and nearly every hospital in the state is actively contributing data. The number of contracted organizations continues to steadily grow, as the NDHIN's outreach spreads to smaller, independent providers and facilities. Additionally, approximately half of the local public health departments in North Dakota are connected and sending data into the NDHIN's system. The NDHIN currently handles provider outreach, technical assistance, and training services for all participating organizations.

The NDHIN also provides the people of North Dakota with access to a personal health record (PHR). A PHR is an electronic resource that allows for individuals to own, participate in, and manage the distribution of their health information. Three critical access hospitals (CAHs) currently offer the PHR functionality to their patients as a way of satisfying the associated Meaningful Use requirement.

Development: The NDHIN has designed an aggressive growth plan spanning the next five years. In addition to building connections with the remaining hospitals, clinics, and local public health departments in the state, the NDHIN plans on connecting with all of the provider types,

organizations, and federal or state agencies listed below in Table 3:

U.S. Department of Veterans Affairs (VA)
U.S. Department of Defense (DoD)
Indian Health Services (IHS)
Social Security Administration (SSA) for eligibility determinations
Statewide and private HIEs that are not connected to the Sequoia Project
North Dakota Department of Corrections and Rehabilitation
North Dakota Department of Human Services' (DHS) Behavioral Health Division
DHS' Developmental Disabilities Division
DHS' Division of Vocational Rehabilitation
North Dakota Veterans Home
North Dakota Public Employee Retirement System (NDPERS)
K-12 school healthcare providers
North Dakota University System healthcare providers
National and regional reference laboratories
Optometrists
Chiropractors
Dentists
Pharmacies
Podiatrists
Audiologists
Private behavioral health providers / organizations
Residential treatment centers
Long term care facilities
Assisted living / basic care facilities
Home health care agencies
Emergency medical services (EMS) professionals / organizations
Providers of durable and medical equipment (DME)
Providers of prosthetics and orthotics

Table 3

As part of the future state development, the NDHIN will upgrade its Orion Health platform to the Amadeus platform which will expand the data repository capability to allow for the storage of two additional significant data elements: medications (both prescribed and filled) and genomic data. This platform upgrade will also allow for the robust participation of behavioral health providers, payers, and ancillary healthcare providers (e.g., chiropractors, dentists, and home

health workers). The new PHR available through the Amadeus platform will allow patient reportable data from wearable and in-home telehealth devices to be contributed to the NDHIN. The provider directory will also be enhanced by the upgrade.

Finally, the NDHIN's future development will include the implementation of several new statewide applications that will provide stakeholders with significant value. These applications will greatly enhance an organization's ability to meet expanded quality reporting requirements and participate in value-based or alternative payment models. These applications will be uniquely valuable when provided by an organization such as the NDHIN, as the data set will be more robust than any individual organization could provide. All participating providers and organizations in the NDHIN will be able to utilize the following applications:

- Population health analytics system
- Care coordination and referrals system
- Provider credentialing system

The sheer number of collaboration and care coordination opportunities between North Dakota providers, patients, and the payer community will uniquely define the NDHIN as one of the most advanced, state-of-the-art HIEs in the country.

For a breakdown of the projected the NDHIN's projected stakeholder contributions, please see the Financial Plan section.

Development Plan

The NDHIN's extensive five-year future state development plan will impact a wide range of the organization's operational and technical components. All of the elements of the development plan can be categorized into four main initiatives:

1. Administration – Adding employees and augmenting short-term staff to support all aspects of the development plan
2. Infrastructure – Upgrading the NDHIN's current HIE system to Orion Health's Amadeus platform
3. Growth of Footprint – Building connections with and onboarding new providers and provider types
4. Expansion of Services – Selecting and implementing statewide strategic applications

The major developments associated with the above initiatives will be described throughout this section. As described in the Financial Plan section, a primary priority of the NDHIN is to finalize the framework for the five-year sustainability plan and to receive commitments from stakeholders for 2017 subscription fees. These commitments and the subsequent finalization of the sustainability plan are critical to securing 90/10 HITECH funding from CMS. Appendix A contains a visual representation of the NDHIN's current state versus the desired future state upon completion of the development plan.

Administration: Significant increases to the NDHIN's staffing model through direct hires and staff augmentation will be required during the NDHIN's five-year future state development. It is estimated that required staff augmentation will be composed of three distinct engagements. These engagements will be temporary, and the majority of additional staff will not be remained beyond the planned five-year schedule.

The first engagement will seek approximately 12 FTEs provided by a consulting or staff augmentation firm who will be selected through a RFP process. This group will be responsible for conducting provider outreach, technical assessments, and onboarding. These temporary FTEs will identify and document all providers and provider groups within North Dakota, perform an in-depth environmental scan of the EHRs and information systems utilized by these providers, educate providers about the value of the NDHIN, complete the contracting process for prospective members, and facilitate the onboarding process (including training). In addition, this group will partner with the state's healthcare professional associations to conduct and execute communication and marketing campaigns around the NDHIN.

A second engagement, which will also be decided through an RFP process, will seek a consulting firm to provide broad subject matter expertise in health IT and HIE to inform, guide, and project manage the deployment of the five-year development plan. The selected consulting firm will be required to bring in subject matter experts with extensive expertise in specific healthcare provider market segments (such as long-term care and behavioral health), defining

operational and technology requirements, evaluating and identifying technology solutions, building and maintaining interoperability, and managing implementations.

A number of temporary direct hires will also need to be made by the NDHIN during this development. The additional staff members will be needed to supplement the day-to-day operational requirements of the NDHIN. Daily operational tasks will increase due to the increased volume of member onboarding and system support, and the additional management associated with the contracted consulting and/or staff augmentation firms. After the initial development of system infrastructure and member onboarding is completed, many of these temporary employees will no longer be required. However, it is expected that the ongoing permanent staffing level at NDHIN will need to be higher than the current level to support ongoing training and support of NDHIN participants, system upgrades, vendor management and other operational functions.

Infrastructure: The NDHIN's current HIE platform, provided by Orion Health, has proven to be reliable, stable, and scalable for their business needs to-date. The NDHIN's satisfaction with the services and support provided by Orion Health is rated as above average. Currently, there are two planned enhancements to the NDHIN's current system. One is the population of the statewide provider directory, and synching it to its data sources. The second enhancement is the continued deployment of recently-added functionality, such as image exchange, self-subscribed alerting, and SSO technology.

The largest and highest-priority infrastructure initiative will be upgrading the entire HIE platform to Orion's new Amadeus platform. The functionality provided by the Amadeus platform is a prerequisite for many of the development initiatives planned by the NDHIN. Among the many enhancements that Amadeus offers, a particularly valuable improvement is the ability to accept and store health data from behavioral health providers, payers, and ancillary providers, such as chiropractors and dentists. In addition, Amadeus provides an enhancement to the patient portal functionality, allowing for the capture of remote-monitoring telemedicine and patient reportable data. The platform also allows for the storage of genomic data and information regarding the social determinants of health. It is important to note that the Amadeus platform is also a prerequisite for the Orion Health Coordinate (care coordination) module.

Another high-priority infrastructure initiative is to add patient medication information (both prescribed and filled) into the NDHIN's system. Medication information can be particularly challenging and costly to incorporate into an HIE given the wide variety of contributing data sources.

Growth of Footprint: A central component of the NDHIN's five-year development plan is to grow its footprint of healthcare providers, organizations, state agencies, and payers who are contributing and accessing information from the system. Having a data set that is as diverse and comprehensive as possible increases the value proposition to all existing and potential

stakeholders, while providing members with the information they need to improve the health of North Dakotans.

State Systems: Currently, the NDHIN is planning to build a bi-directional connection with the NDIIS, as well as the ability for members to contribute data into the North Dakota Statewide Cancer Registry. This information will be vital to a wide range of providers throughout the state, and will bolster the data set received by these crucial registries. Additionally, enhancements are planned for the existing connection to the state PDMP. These enhancements include allowing providers to access information from the PDMP in bordering states, and allowing providers to grant delegate access to nurses and other staff members who require access to the PDMP as part of their daily workflow.

The NDHIN also plans on building new connections with several state-operated EHR systems to enable expanded data accessibility regarding this crucial state-served population. These state systems include the Behavioral Health Division, the North Dakota Department of Corrections and Rehabilitation, the Developmental Disabilities Division, the North Dakota Veterans Home, and the North Dakota University System.

Federal Systems: Currently, the NDHIN is connected to The Sequoia Project's eHealth Exchange, which is a national network connecting various state, regional, and private HIEs, large provider organizations, and federal provider organizations. Through The Sequoia Project, users of the NDHIN can access information contained within any participating organization's system, including more than two dozen different HIEs across the country. Expansion of this access to additional HIEs, especially those operated within North Dakota's border states and "snow bird" states (where North Dakota residents spend winter months), is planned during the five-year development period.

The NDHIN is also planning to establish direct connections with crucial federal partners such as the VA, the IHS, the DoD, and the SSA for expedited disability determinations.

Other HIEs: The NDHIN will evaluate new connection opportunities as they become available. One such opportunity is the SHIEC's patient-centered data home (PCDH) initiative. The PCDH initiative is a cost-effective, scalable method for exchanging patient data among HIEs. The PCDH initiative puts into practice the vision that clinical data should be available whenever and wherever care occurs and centered around the patient to improve care. In this model, all clinical data becomes part of the comprehensive longitudinal patient record in the patient's "home" HIE, called the patient-centered data home. PCDH is based on triggering episode alerts, which notify providers when a care event occurs outside of the patient's patient-centered data home, and confirms the availability and the specific location of the clinical data. This enables providers to initiate a simple query to access real-time information across state and regional lines and the care continuum.

Meaningful Use Providers: Over the past few years, CMS has provided financial incentives through the Meaningful Use incentive program for many healthcare providers to purchase and implement EHRs within their organizations. As part of Meaningful Use, organizations receiving incentives must demonstrate that they are effectively using key features and functions of their EHR systems. For the NDHIN, building connections to organizations that utilize EHR systems is a more efficient, routine process. The organization and provider types that qualified for these financial incentives included:

- Hospitals (including acute care, critical access, children's, cancer, and Medicaid Advantage hospitals)
- Doctors of medicine or osteopathy
- Nurse practitioners
- Certified nurse-midwifes
- Physician assistants (at Federally Qualified Health Centers (FQHCs) and Rural Health Clinics)
- Doctors of dental surgery or dental medicine
- Doctors of podiatry
- Doctors of optometry
- Chiropractors
- Dentists

The majority of hospitals in North Dakota are currently connected with the NDHIN and are actively accessing and contributing patient data. As part of the development plan, the NDHIN plans on completing unfinished interfaces between hospitals and the network. These interfaces have not been competed due to either general technical issues or recent EHR implementations that have not reached maturity. Additionally, the NDHIN will complete a full review of existing interfaces to ensure that all of the intended data is being exchanged effectively.

Many of the clinics within the state are also connected with the NDHIN, the majority of which are associated with Integrated Delivery Networks (IDNs) or the large hospital systems. Establishing connections with the independent clinics, smaller clinic networks and partnership organizations, urgent care facilities, and mini-clinics across the state that are not participating in the NDHIN is a priority of the five-year development plan.

Establishing connections with Meaningful Use-eligible ancillary providers is also a priority for the NDHIN. Approximately 80% of the chiropractors and optometrists in North Dakota are currently utilizing EHR systems and the NDHIN has budgeted for establishing as many as 250 connections with these two provider types over the next five years. Additional providers and practices can be added as time and demand permits. The NDHIN is also proposing a pilot of connecting approximately 25 of the larger dental practices to the network during the development period, with plans to add more if the pilot is successful and funding is available.

In addition to the above provider groups, connections are planned between the NDHIN and reference laboratories (both national and regional). According to the NDDoH, the top contributors of reportable lab information are the Mayo Clinic, ARUP Laboratories, and LabCorp. Quest Diagnostics has a smaller market share in North Dakota than it does in other states, but still has valuable data to contribute to the network, particularly regarding new and seasonal residents. Establishing connections with these large reference laboratories is a routine process, as they are connected with many other HIEs around the country. The regional reference laboratory, Northern Plains Laboratory located in Bismarck, also has a large and valuable data set to contribute to the NDHIN.

When possible, NDHIN will seek to have EHR vendors include as many instances of their hub and cloud-based platforms during the implementation of connections. It will be important to have as many provider organizations who utilize the same EHR platform as possible involved in the establishment of initial connections in order to gain a more competitive price and simplify the technical connectivity challenges. Many of today's EHR systems are offered in Software as a Service (SaaS) models where system management is handled centrally with the vendor. In these cases, there typically only needs to be a single interface developed between the vendor's central hub and the NDHIN.

Non-Meaningful Use Providers: Many provider groups were not included as eligible professionals in the CMS Meaningful Use incentive program, and therefore have a lower rate of EHR adoption in today's market. Some of the ineligible provider groups included behavioral health and substance abuse providers, long-term care and post-acute care providers, EMS professionals, local public health departments, and pharmacists. These provider groups all play a vital role in the delivery of patient healthcare and hold valuable data sets that can help to facilitate the delivery of better quality, less expensive care. Despite the absence of incentive dollars, initial market assessments have indicated that in some cases, more than half of these healthcare providers in North Dakota are utilizing EHR systems.

Behavioral health providers and their clinical care colleagues need to be able to work in close partnership to provide the highest quality, whole-person healthcare to their patients. A key component of this partnership is the ability to efficiently transfer patient health information in a secure manner that complies with all applicable privacy and consent requirements. The NDHIN five-year development plan prioritizes the connection of both private and public behavioral health facilities and residential treatment centers across the state. The integration of behavioral health data, particularly information pertaining to substance abuse, is complicated by strict federal privacy laws under 42 CFR Part 2. The NDHIN will implement role-based security and consent management policies that allow for the compliant storage and transmission of this data.

Long-term care, assisted living, and skilled nursing facilities have an acute need to exchange data with hospitals and other providers in order to coordinate patient care and reduce hospitalizations. The NDHIN is planning to build connections with more than 100 of these facilities as part of the development plan. Many of these facilities are currently utilizing the same specialized EHR

system for their clinical documentation requirements, which will expedite the connection process. In addition to these long term post-acute facilities, the NDHIN will allocate financial and technical resources to connect independent home healthcare agencies and hospital systems' home health care providers as part of the development plan.

EMS professionals provide important patient data to hospitals via their run reports, but due to the time-sensitive workflow and setting of patient care, electronic transmission of this report is difficult. As part of the development plan, the NDHIN will be working with both EMS agencies and hospitals to establish a process that utilizes the network to distribute ambulance run reports to hospital information systems in a timely manner.

Pharmacists have numerous use cases for accessing and contributing data to the NDHIN. In addition to medication information, pharmacies are evolving into a more expansive care delivery setting, providing immunizations and routine preventative care. The NDHIN aims to establish connections with as many pharmacies in the state as possible

Nursing services are delivered in the K-12 school setting by a variety of organizations throughout the state. Granting access to the NDHIN for these providers and allowing for the contribution of screening results and other performed activities is an important segment of the NDHIN planned development.

Half of the local public health departments in North Dakota are connected to the NDHIN today. As part of the five-year development plan, the NDHIN plans to establish connections with the remaining public health departments that do not utilize an EHR system.

Nearly all hospice and palliative care programs across the state, as well as some providers in other segments, are still maintaining a paper-based clinical documentation process. For these organizations, the NDHIN is proposing to develop a process to facilitate data capture for these providers that will allow them to access and contribute to the NDHIN data set.

There are a number of additional ancillary healthcare organizations and provider groups that the NDHIN seeks to establish connections with as part of the five-year development plan. These providers include durable medical equipment (DME) companies, doctors of podiatry, doctors of audiology, providers of prosthetics and orthotics, and providers of newborn screenings. Due to the specialized services of these providers, an environmental scan will be necessary to understand the technical capabilities and develop requirements for connections. Some of these providers will require custom interfaces and data field development within the NDHIN.

Payer Systems: Payer organizations play a key role in the continuum of healthcare delivered to patients in this country. Their involvement extends far beyond the payment of medical services. They are key partners in care coordination activities and population health management, and they possess a robust data set that can be valuable in facilitating treatment, reports, and analytics. By partnering with payer organizations for bi-directional data exchange, the NDHIN greatly

increases the value it offers to stakeholders and the ability for their data set to contribute to improving healthcare quality and cost in North Dakota. This partnership will require that access restrictions and new data governance models be developed.

Patient Engagement: Putting patients at the center of their healthcare delivery and empowering them with true ownership over their health information is a central tenant of the NDHIN. Effectively engaging patients in their healthcare is essential to controlling costs and improving quality. The NDHIN will be providing an enhanced PHR and patient portal system with the upgrade to the new Amadeus platform. The new system is integrated with the Orion Health Coordination module and is capable of collecting patient reportable data from wearable and remote monitoring telemedicine devices located in the home, such as glucose monitors, oximeters, scales, and blood pressure cuffs.

The NDHIN also anticipates partnering with patient assistance organizations such as home health care agencies, sitters, and transportation companies to expand the traditional patient care team, enabling their engagement with DIRECT messaging, patient portal, and care coordination functionality.

Expansion of Services: The NDHIN's five-year future state development plan includes the expansion of existing services in order to provide additional value to members and facilitate their ability to improve care delivery and control the cost of care in North Dakota. Three statewide applications and a statewide Advance Directive Registry were identified as priorities by the NDHIN for their ability to provide stakeholders with functionality that can only be achieved by leveraging the robust data set contained within the network. The expansion of services will include an Advance Directive Registry, a care coordination platform, a data analytics platform, and a centralized provider credentialing system.

A statewide Advance Directives Registry has been in development for the past year and will begin initial pilot testing. A shared, central repository for advance directives, Medical Orders for Life-Sustaining Treatment (MOLST), Physician Orders for Life-Sustaining Treatment (POLST), and other similar patient documents would eliminate the cumbersome task of managing these documents by individual healthcare providers. As a citizen-run registry, the patient is the responsible party for ensuring that the most up-to-date information is stored within the system. The NDHIN anticipates that the following activities will be necessary during the five-year development period: launching an awareness campaign of the system to providers and patients, updating and transferring documents from provider offices into the registry, and adapting current provider document management workflows.

The effective coordination of care activities for high risk and chronically ill patient populations reduces overall costs and improves patients' quality of life. In order to enable effective coordination, the patient's entire care team needs central access to longitudinal patient health information, a single shared care plan, and the ability to communicate and share information seamlessly. A patient's care team is no longer limited to traditional healthcare providers.

Effective coordination requires the inclusion of all care team members, including the patient themselves, ancillary healthcare providers, family or other caregivers, and those providing patient assistance services. Additionally, as provider reimbursement shifts to value-based and alternative payment models, the financial incentives for effective coordination continue to grow. The NDHIN is uniquely positioned to host a statewide care coordination platform due to their robust data set and ability to extend their system to every member of a patient's care team. Providers will have the ability to collaborate with care team members beyond the walls of their organization. Care coordination is a pivotal application for both providers and payers that needs to be in place before successful transition to value-based payment models can be achieved. The implementation of a care coordination platform has been identified as a main priority of the NDHIN's five-year development plan.

A statewide data analytics platform will provide significant value to participating members of the NDHIN. Members will be able to utilize the NDHIN's robust data set to support reporting requirements, population health management, research engagements, and help facilitate the effective transition to value-based payment models. The NDHIN will need to develop policies for the effective and appropriate use of this tool, as well as the care coordination platform. These tools have great potential to positively impact patient health outcomes in North Dakota.

The final application identified by the NDHIN is a statewide provider credentialing system. During an environmental scan conducted in May and June, 2016, the overwhelming majority of stakeholders identified a statewide credentialing system as a high-value addition to the NDHIN's offered services. The NDHIN will need to explore the best model for this tool that is based on the credentialing requirements of North Dakota and aimed at reducing redundant activities for organizations and their providers. One place to start this research is with the state of Oregon's common credentialing legislation and the planning underway by the Oregon Health Authority to develop a shared resource for provider credentialing.

Sales & Marketing

General Market Analysis:

Industry Overview: The industry of health information exchange in the United States has seen both successes and failures over the past decade, with success often being achieved through the fragmented, narrow inclusion of a subset of healthcare organizations and providers. The market has experienced confusion from evolving technology, overlapping state or federal initiatives, and competing HIE interests in many states. Despite some high visibility setbacks and sporadic confusion, the interoperability of health IT remains a well-supported mission and is generally accepted as being a key component of improving quality of care, reducing costs, and meeting the needs of emerging value-based payment models.

These new value-based payment models are only beginning to spread throughout the industry, beginning primarily with Medicare and Medicaid. Medicare and Medicaid have both announced plans to transition to value-based payment models. Medicare plans on having 90% of all traditional payments tied to quality or value by 2018. In today's market, fee-for-service is still a common reimbursement model. As a result, the competition of services can trump the collaboration to deliver quality healthcare. Through extensive market analysis and a recent environmental scan, the NDHIN has determined that the majority of providers and payers in North Dakota understand that this shift in payment models is inevitable and the development of the infrastructure needed to effectively participate must be a priority.

Market Size: The business model of the NDHIN is based on the ability to provide value through a robust patient data set and the volume of connections relative to the overall number of providers in the state. Therefore, as a statewide HIE operating in a state with a relatively small population, the NDHIN has an advantage in that it does not face a significant lift in completing outreach to all relevant stakeholders. The makeup and distribution of providers throughout the state has been well documented by the NDHIN, allowing for targeted marketing and outreach. The NDHIN has an excellent opportunity to onboard and connect a large percentage of the unconnected stakeholders in the state quickly with a minimal commitment of resources.

Market Share: Due to the successful initial rollout of the NDHIN, a large portion of the hospitals and IDN-affiliated clinics in the state are actively accessing/contributing patient health information. More work is needed in order to establish connections with providers who were not eligible for Meaningful Use incentive payments, as well as independent clinics and some critical access hospitals. Despite these gaps, the NDHIN's master patient index (MPI) is well-populated based on the data received from existing members (see Figure 1). Therefore, when connections are established with new members, there is a high likelihood that there will be valuable data immediately available on current patients.

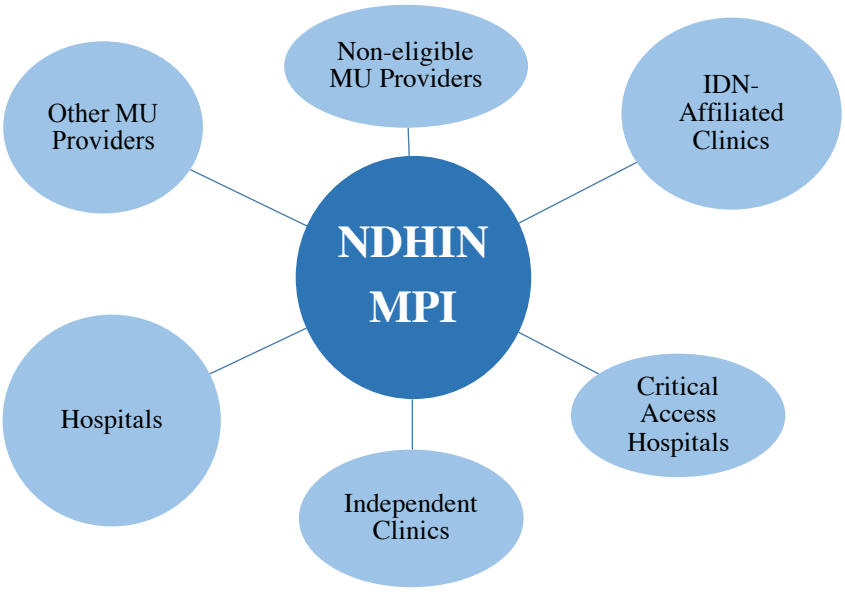

Figure 1

Market Demand: As discussed, due to shifts in reimbursement models and other factors, both the demand and interest in collaboration via HIE between providers is at an all-time high. Regardless of the type of provider or organization, the NDHIN's environmental scan revealed an eagerness for providers to become contributing, collaborative members of the network. Usage statistics by existing members have been growing steadily since the NDHIN's inception, and information suggests that these numbers would grow more rapidly with the additional outreach, support, and functionality outlined in the NDHIN's five-year development plan.

Market Trends: As a result of financial incentives and competitive forces in the marketplace, there are numerous existing and evolving methods for exchanging patient health information between healthcare providers. Not all of these methods have demonstrated their value and usability in the market. In addition, providers' health IT needs have expanded beyond the basic exchange and query of information. Providers and organizations now need the ability to use health information in a more actionable way through applications such as care coordination and advanced analytics. Activities such as population health management, precision medicine, and quality reporting requires the aggregation and management of data for these specific purposes, in addition to more robust data transfer and communication capabilities. HIEs are well-positioned to host these services because of their comprehensive, multi-organizational data set.

Growth History: As discussed, the NDHIN spent the first few months of its existence establishing a governance model, developing policies and processes for participation, and implementing the Orion Health HIE platform. Once the NDHIN had completed these initial tasks, they saw great success in establishing connections and onboarding the initial key clinical and state participants. The successful and efficient rollout throughout the state has allowed the

NDHIN to operate as a well-known organization with recognized value amongst stakeholders, positioning them for continued success and growth.

Growth Potential: The Development Plan section outlines the five-year strategic growth plan the NDHIN has developed in order to achieve its desired future state. The current membership of the NDHIN needs to be broadened so that the data set represents the entire continuum of care for patients. Long term care providers, behavioral health and substance abuse professionals, chiropractors, optometrists, dentists, EMS agencies, pharmacies, reference laboratories, and other providers still present a significant number of provider groups that need to be include in the NDHIN to increase value for members and facilitate the delivery of quality care. In addition, the NDHIN is uniquely positioned to expand available services and host several statewide applications, including care coordination, data analytics, and centralized provider credentialing.

Effects of External Forces: External forces, such as state and federal government policy changes or developments and maturation of technology, have the potential to impact an organization positively or negatively. The NDHIN's close analysis of market trends and policy development allows them to respond strategically to any external forces.

Products and Services: The NDHIN's current and planned services are listed in Figure 2. These products and services are a unique offering in the state of North Dakota. They offer members more comprehensive patient data than has ever been available previously, and continue to develop the ability to leverage that data in meaningful ways. For example, through the NDHIN, payers can ensure the highest quality care is performed while eliminating redundant costs; patients can become more engaged in their healthcare delivery and coordination through access and communication; and state registries can access a more complete data set for research and disease management. A more complete description of the NDHIN's products and services can be found in the Products and Services section.

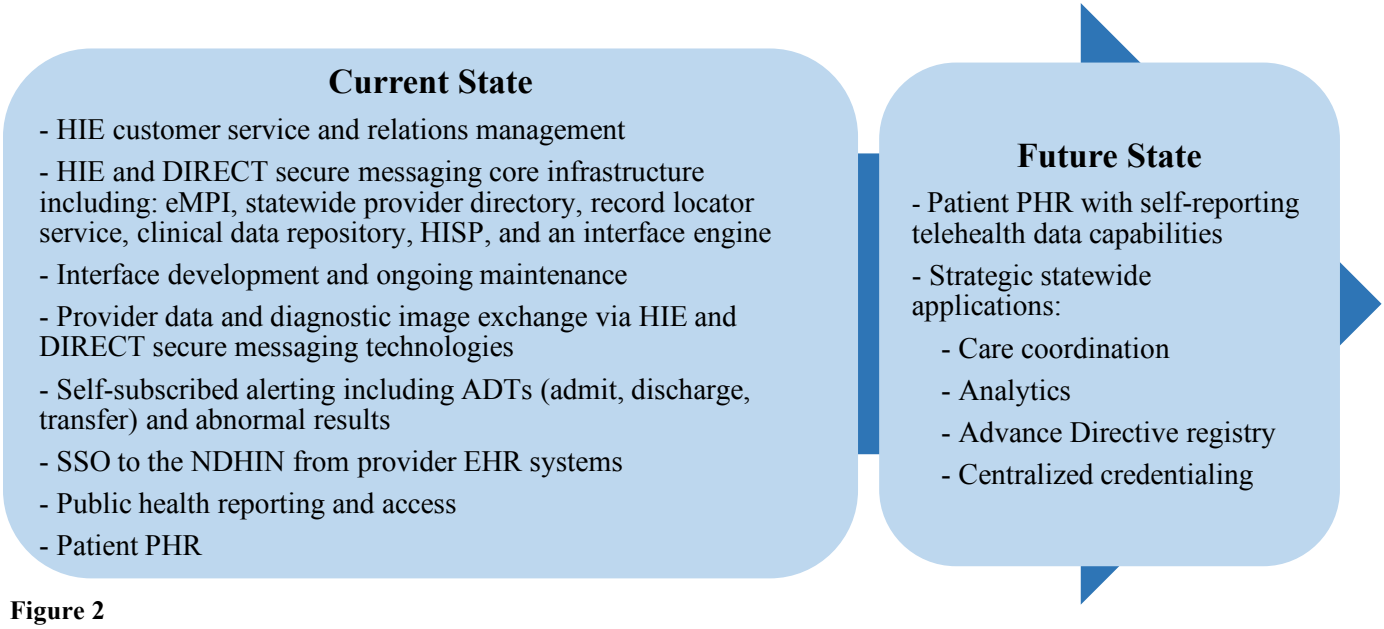

Figure 2

Customers: The NDHIN's stakeholders currently fall into five distinct groups, as can be seen in Table 4 below.

Healthcare Delivery Organizations/Providers	Any organization or provider that provides healthcare services within the State of North Dakota
Payers	Any organization that contracts for payment of healthcare services within North Dakota
Patients	Any citizen of the State of North Dakota that has data contained within the NDHIN's system
State of North Dakota	Any state-run systems or registries that benefit from uni-directional or bi-directional data exchange with the NDHIN
Other Government Entities	Federal, state, and private providers of healthcare located outside of North Dakota who need to access and/or contribute information from the NDHIN's dataset for patient treatment purposes

Table 4

Competition: In North Dakota, the NDHIN is unique in its ability to offer comprehensive, aggregated views of patient data, instead of datasets limited to individual organizations or vendor systems. The NDHIN is also the only entity that is able to provide a cost-sharing model for the purchase and utilization of necessary applications, such as care coordination and data analytics. Finally, the NDHIN's contributions to state registries, and ability to manage proposed registries, is unique to the NDHIN within North Dakota.

Private, regional, organizational, or vendor-based exchange solutions do offer some value to the entities utilizing such systems in the marketplace, and these systems should not be displaced by the NDHIN's offerings. These solutions are primarily limited to the exchange of individual patient medical records between organizations. National interoperability initiatives such as Care*e*Quality, the CommonWell Health Alliance, and vendor-centric solutions, including Epic, fall into this category. To date, these solutions do not address the need for applications required for population health initiatives, or that require patient data aggregation by a neutral entity. Hosting these crucial applications within the NDHIN also provides stakeholders with a cost-sharing model where implementation and maintenance costs are split amongst all participating members.

Marketing Strategy: A detailed comparison of several existing HIEs can be found in Appendix B. The states included in this comparison are Maine, Utah, Kansas, and Vermont.

Staffing and Support: The NDHIN's marketing strategy, as part of the five-year development plan, will engage a consulting or staff augmentation firm (via RFP) to provide 12 FTEs who will be responsible for the outreach, education, and onboarding of new members. This team would engage all provider groups across the state in a marketing, promotion, and direct sales engagement to recruit new members of the NDHIN. This firm would also be responsible for the

initial marketing, onboarding, and training for new strategic statewide application solutions. The NDHIN will also contract with a second consulting firm to provide subject matter expertise around HIE broadly, as well as assisting in vendor negotiations and procurement, and implementation planning. In order to support the outreach and marketing campaign, and the management of new application implementations, the NDHIN will directly hire a limited number of additional, temporary FTEs.

Advertising and Promotion: A separate promotional budget would be included in the contract for the 12 FTEs who are responsible for outreach and onboarding. These consultants will develop marketing materials and participate in marketing opportunities throughout the state, including conferences. Additionally, social media management and close coordination with the state professional healthcare associations will be a primary strategy in promotional activities for the NDHIN. Consultants submitting a proposal to this RFP will be required to provide a sample in-depth marketing and promotion proposal to demonstrate their proficiency in these areas. As a result of the target market being comprised of a relatively small number of providers, traditional advertising costs and activities will be minimal, as opposed to direct sales.

Funding is allocated for the onboarding, promotion, and advertising components of the five-year development plan. This allocated amount of the budget is subject to additional review as the project and contracting process develops.

Pricing: Specific pricing for the NDHIN's services can be found in the Financial Plan section of this document. Relative to other State and Regional HIE systems, the NDHIN's subscription fees are far below the national average. For a breakdown of different mature HIE pricing models, please see Appendix B.

Locations: Ideally, the outreach and onboarding consultant FTEs will maintain part-time remote offices within each of North Dakota's four major cities (Bismarck, Fargo, Minot, and Grand Forks) in order to effectively meet with the providers of each city and region. However, the NDHIN will work with the contracted firm to best determine the most economic coverage plan for outreach and onboarding. Teleconferencing and remote workforce technologies will be heavily utilized to supplement any meetings that can be conducted in person. The central operational location of the NDHIN will continue to be within the Information Technology Department building in Bismarck.

Distribution Channels: It is possible that some of the contracted consultants will need to bring on subcontractors in order to effectively meet the needs of the NDHIN. These subcontracting arrangements would be negotiated and coordinated with the NDHIN administrative team on an individual basis, however no increase to budget is expected as a result.

Sales Forecast: An initial forecast of the onboarding activities for the NDHIN network over the next five years (2017-2021) can be found in Table 5. This forecast will be updated as the NDHIN gathers more information on specific provider groups and is able to determine technical

readiness of certain provider organizations. Figures 3 and 4 illustrate the multiple phases of Meaningful Use and non-Meaningful Use Provider adoption.

Onboarding Activities

2017	2018	2019	2020	2021
State Systems				
Federal Systems: VA, DoD, IHS, SSA, Other HIEs				
		Federal Systems: Other HIEs		
MU Providers: Phase 1*				
	MU Providers: Phase 2*			
				MU Providers: Phase 2*
Non-MU Providers: Phase 1*				
		Non-MU Providers: Phase 2*		
				Non-MU Providers: Phase 3*
Payers				
Patients				
Strategic Statewide Applications				

Table 5

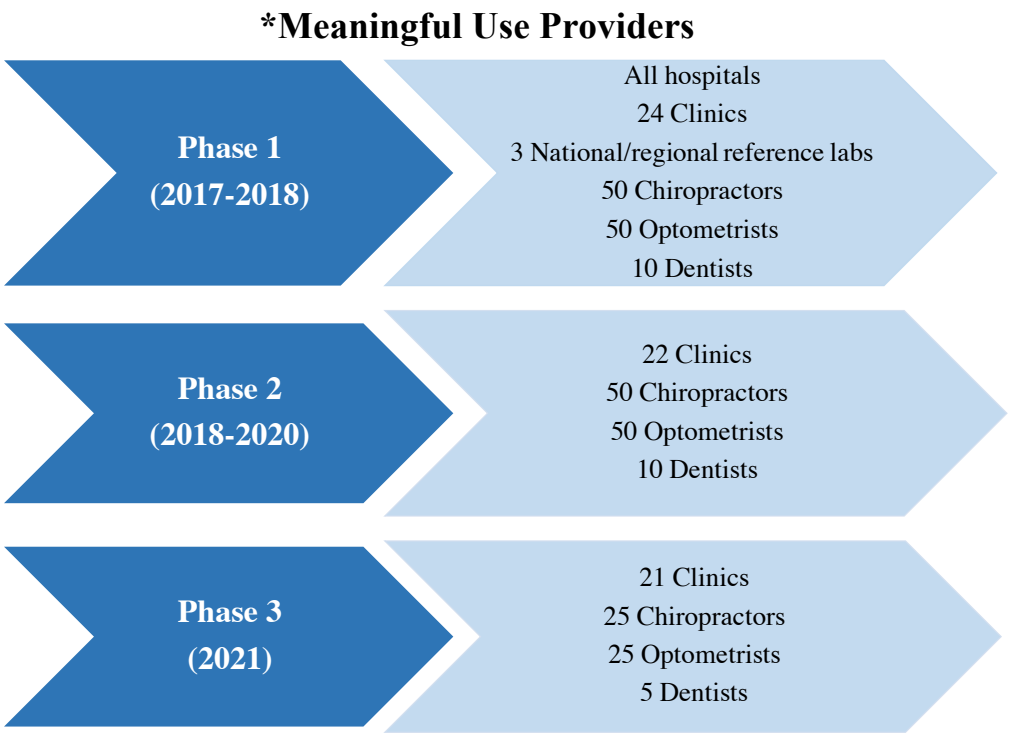

Figure 3

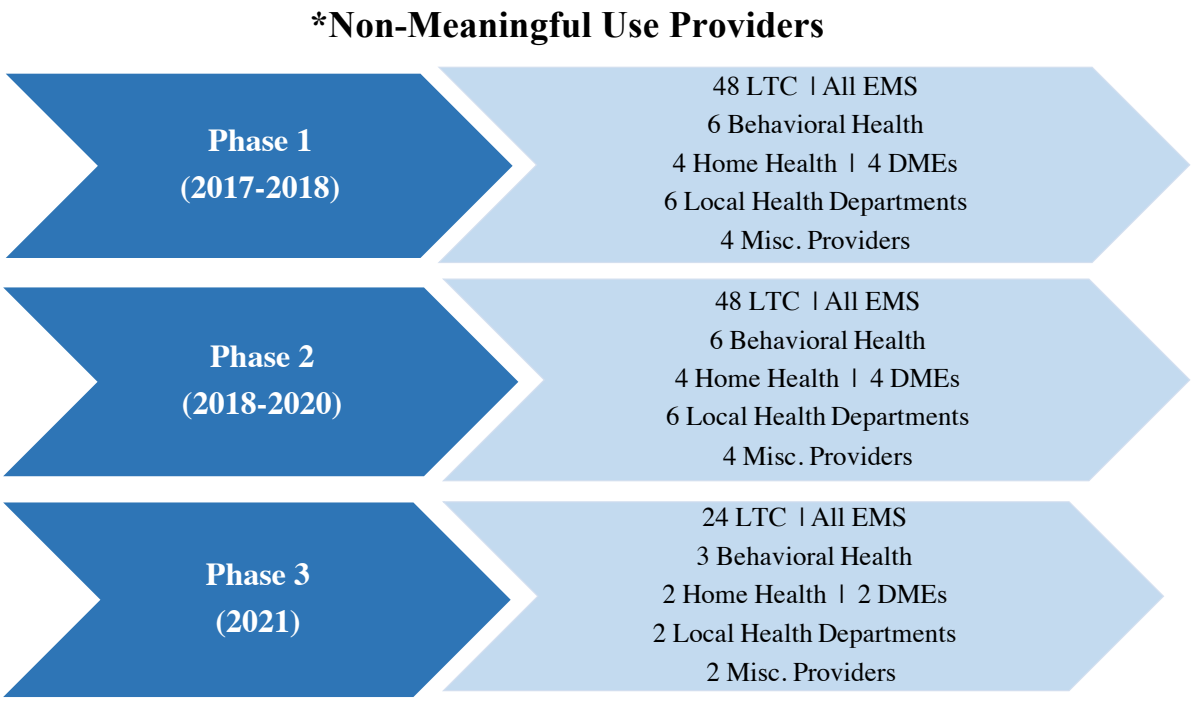
*Non-Meaningful Use Providers
Phase 1
(2017-2018)
48 LTC | All EMS
6 Behavioral Health
4 Home Health | 4 DMEs
6 Local Health Departments
4 Misc. Providers
Phase 2
(2018-2020)
48 LTC | All EMS
6 Behavioral Health
4 Home Health | 4 DMEs
6 Local Health Departments
4 Misc. Providers
Phase 3
(2021)
24 LTC | All EMS
3 Behavioral Health
2 Home Health | 2 DMEs
2 Local Health Departments
2 Misc. Providers

Figure 4

Financial History & Analysis

Overview: To date, the NDHIN has been funded exclusively through federal grants and state appropriations. In 2010, the ONC granted the HITAC $5.3 million to develop and implement a statewide plan for the HIE in North Dakota through the HITECH Act. That same year the state legislature made a one-time appropriation of $8 million to provide the required matching funds for additional federal investment in health IT infrastructure.

These funds have been spent conservatively over the past five years and have yielded a successful development of initial infrastructure, laying the ground work for strategic expansion. The NDHIN has been a responsible steward of the funding entrusted to them and have accomplished a high level of connectivity and interoperability while expending minimal resources. As of August 31, 2016, approximately $8.8 million of the initial funding has been spent on infrastructure development, including the establishment of connections and providing services for eligible professional and hospitals receiving Meaningful Use incentives from CMS. In addition, approximately $1.3 million has been spent running the HIT office.

From the establishment of the NDHIN, it has been understood by all stakeholders that the initial federal and state funding to develop and deploy the HIE would eventually end, and that the stakeholders would be responsible for the continued growth, operations, and maintenance of the network. In March 2015, the HITAC's Finance Domain Workgroup developed a sustainability model for the NDHIN in which provider organizations, payer organizations, and the State of North Dakota would each have an equal responsibility of the ongoing funding needed to sustain the continued operations of the HIE. Table 6 shows the proposed sustainability model for the NDHIN proposed to the HITAC board by the NDHIN Finance Domain Workgroup.

NDHIN Proposed Sustainability Model (3/31/2015)

Revenue	Year Cost	QTY	2015 Revenue
Hospitals Net Revenue Range			
0 -10,000,000	$ 2,000	27	$ 54,000
10,000,001-25,000,000	$ 2,000	6	$ 12,000
25,000,001-100,000,000	$ 6,000	3	$ 18,000
100,000,001- 650,000,000	$ 36,000	5	$ 180,000
650,000,001+	$ 72,000	1	$ 72,000
		Subtotal	**$ 336,000**
Other Providers			
Doctors/Prescribers	$ 300	110	$ 33,000
Long term care (LTC)	$ 375	36	$ 13,500
Other	$ 200	48	$ 9,600
		Subtotal	**$ 56,100**
TOTAL PROVIDERS			**$ 392,100**

TABLE CONTINUED FROM PREVIOUS PAGE			
Payers and State Government			
Payers (PMPY):	$ 1.20	332,000	$ 398,400
ND State (1/3 budget):	$ 400,000	1	$ 400,000
		Subtotal	**$ 798,400**
TOTAL OTHER REVENUE			**$ 798,400**
TOTAL REVENUE			**$ 1,190,500**
		ANTICIPATED EXPENDITURES	**$ 1,165,368**
		BALANCE	**$ 25,132**

Table 6

The sustainability model provided for an equal division of the projected annual budget of $1,190,500 between the participating providers and hospitals, payers, and the State of North Dakota with the explicit understanding that the NDHIN's services would benefit all stakeholders. The revenue calculations in this initial model are considered conservative because they did not account for increased membership as the NDHIN continued to grow.

Funding Breakdown:

Providers – Hospital and IDN annual subscription fees were calculated based upon their net revenue as reported in their Medicare cost report. IDN subscriptions would include all long-term care, clinics, home health agencies, pharmacies, and other affiliated healthcare delivery sites. However, an IDN's subscription would not include any affiliated CAHs or prospective payment system hospitals. These hospitals would be calculated separately from the IDN subscription fees. Independent physicians and other types of providers that write prescriptions (e.g., Nurse Practitioners) were to be charged $300 per physician/prescriber per year, while skilled nursing facilities were to be charged $375 per year, and all other healthcare providers were to be charged $200 per year.

Payers – Payer organizations were to be charged $1.20 per member per year (PMPY) for each covered life across every health plan that they offered including commercial; Medicare Advantage; Medicaid managed-care populations; and third-party administered, self-insured employer plans.

State – The State of North Dakota agreed to pay one-third of the NDHIN's total budget, and also contribute a number of state resources to the NDHIN public/private partnership, including office space, furnishings, utilities, procurement, accounting, federal grant preparation, and IT security assessments. These additional state-provided services are just a few of many examples of which the current governance model benefits the NDHIN organization, allowing it to keep stakeholder subscription fees much lower than fees from similar entities in other states.

Financial Plan

Overview: State Medicaid Letter #16-003, published on February 29, 2016, extends the HITECH 90/10 funding opportunity for expenditures related to connecting Meaningful Use eligible professionals to other Medicaid providers, including behavioral health providers, substance abuse treatment providers, long-term care providers (including nursing facilities), home health providers, pharmacies, laboratories, correctional health providers, EMS agencies, and public health providers. This extension of funding for state HIEs to extend their services more broadly provides a unique and exciting prospect for the NDHIN to greatly expand the connectivity and shared statewide application offerings across the state. The 90/10 funding can be used to pay for many of the services on the NDHIN five-year development plan, in which CMS will pay for 90% of the allowable expenses as long as a state match can provide for the remaining 10%.

The Development Plan section of this document provides the details for an estimated $47 million budget over the next five years. This Financial Plan takes a conservative approach for the use of that budget by assuming a 15% state match with the understanding that not all planned expenditures may qualify for CMS' 90/10 funding match. Therefore, based on a $1.4 million annual budget, the financial plan provides for approximately $40 million to come from the CMS 90/10 federal funding program and $7 million from the NDHIN stakeholders over this five-year period. This is a slight increase over the 2015 projected annual budget of $1.2 million, however with the injection of additional federal funds, the network is expected to grow at a faster rate. Table 7 outlines the projected spending on development plan initiatives over the five-year period that will result in a fully operational and robust complement of exchange services.

Five-Year Development Expenses

Expense Categories	2017	2018	2019	2020	2021	Total 2017-21
Back Office Administration	$4,300,000	$4,300,000	$4,300,000	$4,300,000	$4,300,000	$21,500,000
HIE Infrastructure	$1,775,000	$1,775,000	$1,285,000	$1,285,000	$1,285,000	$ 7,405,000
State Systems	$105,000	$105,000				$210,000
Federal Systems	$58,000	$58,000	$38,000	$38,000		$192,000
MU Providers	$1,815,000	$1,815,000	$1,650,000	$1,650,000	$2,150,000	$ 9,080,000
Non-MU Providers	$890,000	$890,000	$840,000	$840,000	$810,000	$4,270,000
Payment Models	$300,000	$300,000	$300,000	$300,000	$300,000	$1,500,000
Payer Access & Feeds	$93,000	$93,000				$186,000
Patient Engagement	$90,000	$90,000	$90,000	$90,000	$90,000	$450,000
Applications	$450,000	$450,000	$400,000	$400,000	$400,000	$2,100,000
PROJECT TOTAL	$9,876,000	$9,876,000	$8,903,000	$8,903,000	$9,335,000	$46,893,000
FEDERAL FUNDING (85%)	$8,394,600	$8,394,600	$7,567,550	$7,567,550	$7,934,750	$39,859,050
STATE MATCH (15%)	**$1,481,400**	**$1,481,400**	**$1,335,450**	**$1,335,450**	**$1,400,250**	**$7,033,950**

Table 7

The expense categories listed in Table 7 represent the main development plan initiatives. A 12-month breakdown of 2017 expense details for each category can be found in Appendix C. The state match has been conservatively set at 15% of the total budget for each year, and will be achieved as set forth in the revised sustainability plan proposed to begin in January of 2017. Table 8 illustrates how the NDHIN's breakdown of stakeholder contributions will account for the annual state match, and also demonstrate how the projected increase in maintenance and operational fees will be funded through the end of the program in 2022.

NDHIN Projected Stakeholder Contributions

NDHIN Stakeholders	QTY		2017 Subscription	2017 Revenue		2022 Subscription	2022 Revenue
Hospitals/IDNs (Net Revenue)							
0 -10,000,000	27		$3,600	$97,200		$6,480	$174,960
10,000,001-25,000,000	6		$3,600	$21,600		$6,480	$38,880
25,000,001-100,000,000	3		$7,500	$22,500		$13,500	$40,500
100,000,001-650,000,000	5		$39,000	$195,000		$70,200	$351,000
650,000,001 ->	1		$78,000	$78,000		$140,400	$140,400
	Subtotal			**$414,300**			**$745,740**
Other Providers							
Doctors/Prescribers	110		$360	$39,600		$648	$71,280
Skilled Nursing and Long Term Care	36		$400	$14,400		$720	$25,920
Other	48		$400	$19,200		$720	$34,560
	Subtotal			**$73,200**			**$131,760**
TOTAL PROVIDERS				**$487,500**			**$864,000**
Payers & State Government							
Cost for Payers (PMPY)	480,000		$1.00	$480,000		$1.80	$864,000
ND State Funding (1/3 total budget)	1		$480,000	$ 480,000		$ 864,000	$864,000
	Subtotal			**$960,000**			**$1,728,000**
TOTAL OTHER REVENUE				**$960,000**			**$1,728,000**
TOTAL REVENUE				**$1,447,500**			**$2,605,500**

Table 8

The revised stakeholder contribution model will continue to be based on an equal division of the annual budget between three main groups: participating provider organizations, payer organizations, and the State of North Dakota. It is also conservatively based on the NDHIN's current stakeholder membership without projecting any increases in future stakeholder participation (as seen in the QTY column of Table 8). The projected amount for the listed NDHIN stakeholder contributions over the five-year period could potentially decrease after final submission and approval by CMS of the formal funding request if the NDHIN is successful in its plans to grow its footprint within North Dakota by adding additional members. To provide for the $200,000 gap between the original $1.2 million annual budget of 2015 and the proposed $1.4 million annual budget of 2017, the following adjustments have been made:

Providers – Hospitals and IDN annual subscription fees have been increased by approximately 8% over the projected fees set in 2015. The proposed subscription fees for independent doctors/prescribers, skilled nursing facilities, and other healthcare providers have also been slightly increased to cover the higher costs of the 2017 budget.

Payers – It was determined that there are far more covered lives under payer health plans across the state than originally estimated in 2015, likely due to the Affordable Care Act mandate for individuals to maintain health insurance coverage. This increase allowed the payer subscription rate to be reduced to $1.00 PMPY, down from the $1.20 PMPY projected amount in the 2015 sustainability model. The payer organization portion of the budget still remains as an equal division with provider organizations and the State of North Dakota.

State – The total amount of the state contribution has increased slightly to account for the $200,000 increase in budget, however the state will still be paying a one-third portion.

Figure 5 is a pie chart illustrating the funding breakdown between providers, payers, and the State.

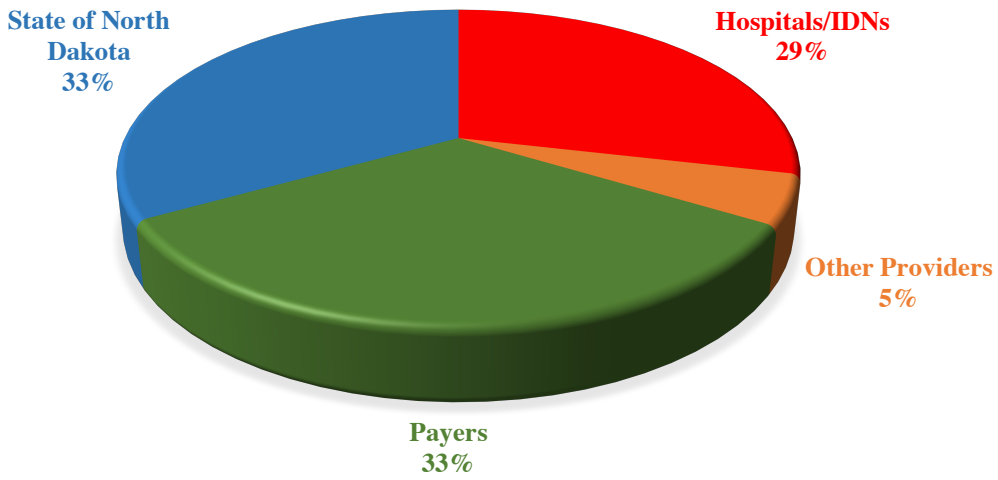

Figure 5

Expenses Beyond Five-Year Period: As the federal matching of funds expires at the end of the five-year development period, maintenance and operational expenses are currently projected to increase by 80% because many of these expenses are eligible for federal matching. However, it is expected that the increase in operational and maintenance expenses will be off-set by the expanded NDHIN membership base, preventing any significant increased financial burden on members. In addition, participating stakeholders will see additional value from the NDHIN as increased functionality is implemented and members are onboarded during the five-year development period.

Appendix A – The NDHIN Current State vs. Future State

Appendix B – HIE Comparison

State Specific Information:

Maine	
Population	1,329,328
Miles^2	30,842.92
Rural/Urban Population Mix	38.7% urban, 61% rural
Population Size of Largest Urban Areas:	Portland (66,881), Lewiston (36,202), Bangor (32,391), South Portland(25,556)
Number of Hospitals in State:	38

Utah	
Population	2,995,919
Miles^2	82,169.62
Rural/Urban Population Mix	90.6% Urban
Population Size of Largest Urban Areas:	Salt Lake City (192,672), West Valley City (136,208), Provo (115,264), West Jordan (111,946)
Number of Hospitals in State:	52 (including the VA hospital)

Kansas	
Population	2,911,641
Miles^2	81,758.72
Rural/Urban Population Mix	74.2 urban
Population Size of Largest Urban Areas:	Wichita (389,965), Overland Park (186,515), Kansas City (151,306), Olathe (134,305)
Number of Hospitals in State:	126 hospitals, 84 critical access hospitals

Vermont	
Population	626,042
Miles^2	9,216.66
Rural/Urban Population Mix	38.9 Urban
Population Size of Largest Urban Areas:	Burlington (42,417), South Burlington (17,904), Colchester (16,986), Rutland (16,495)
Number of Hospitals in State:	17

HIE Comparative Analysis:

	Maine	Utah	Kansas	Vermont
HIE	HealthInfoNet	Utah Health Information Network	Kansas Health Information Network	Vermont Information Technology Leaders
Staff Members (FTEs)	26	15.5	10	32
Total Annual Budget (2015)	$6,200,893	$6,421,774	$2,318,924	$7,615,872
Consultants	N/A	N/A	N/A	PT medical director and Medicity as their vendor
Total Stakeholders	571	180		182
Stakeholder Data Contribution	Active HIE Users: 4,661		Active HIE Users: 1457	2/3 of total are contributing, with one third of total receiving
Stakeholders as Hospitals	38	52	40	14
Stakeholders as Ambulatory Clinics	533	2 (More pending)	99	160
Stakeholders as FQHCs			11	8

Example Cost Structures:

Hospitals & CAA Hospitals:

Type of Organization	Kansas HIN	Maine HealthInfoNet
PPS Hospital	Varies by connection/ services	$1,000 / bed
Large Critical Access Hospital	$18,000	$1,000 / bed
Small Critical Access Hospital*	$12,000	$1,000 / bed

*Defined as having less than 10,000 hours of continuous care per year

Implementation Fee Schedule (Due at Data Testing):

HL7 integration – 1st Message Type	$6,000 per integration
Additional HL7 Message Types	$4,000 per message type
IHE integration: XCA	$10,000 per integration
IHE integration: XDR	$3,500 per integration
IHE integration: XDS.B	$6,000 per integration

Physicians and Eligible Providers:

Membership Option	Kansas HIN	Maine HealthInfoNet
Membership Option 1: *(Supports Meaningful Use Stage 1 Requirements)* Secure Clinical Messaging/DIRECT Provider Portal Personal Health Record	**Annual Fee:** **$200** per eligible provider includes licenses for three support staff* **DIRECT Only** ***Implementation Fee: $0**	
Membership Option 2: *(Supports Meaningful Use Stage 2 Requirements)* Secure Clinical Messaging/DIRECT Provider Portal Personal Health Record *and:* Health Information Exchange Immunization Registry Submissions Cancer Registry Infectious Disease Registry Birth Defects Registry	**Annual Fee:** **$250** per eligible provider includes licenses for three support staff **Implementation Fee Schedule:** • HL7 integration, up to 2 message types: **$5,000** • IHE/HL7 integration: XDS.B +1 HL7 message type: **$5,000** • Additional HL7 message types: **$2,000**	**Annual Fee:** **$350 - $500** per eligible provider

Personnel Interviewed:

Name	Affiliation
Shaun Alfreds	Maine HealthInfoNet
Matt Hoffman	Utah Health Information Network
Laura McCrary	Kansas Health Information Network
Robert Gibson	Vermont Information Technology Leaders

Appendix C – Sample of Annual Expenses (2017)

Expense Details		2017
Back Office Administration		
Provider/Patient/Subcontractor Onboarding	$	1,300,000
Subject Matter Expert Consulting (SME)	$	1,000,000
Current and Interim Staffing	$	2,000,000
Subtotal	**$**	**4,300,000**
HIE Infrastructure		
HIE Core	$	600,000
Amadeus	$	150,000
Single Sign-on (SSO)	$	60,000
Provider Directory	$	125,000
Medications	$	500,000
ENIAC Certification	$	20,000
Behavioral Health Spaces	$	75,000
Ancillary Provider Spaces	$	75,000
Immunization Exchange	$	170,000
Subtotal	**$**	**1,775,000**
State Systems		
Cancer Registry	$	5,000
PDMP	$	5,000
Department of Corrections (DOC)	$	25,000
Developmental Disabilities (DD)	$	10,000
Mental Health & Substance Abuse	$	25,000
North Dakota Veterans Home	$	10,000
University Health System	$	25,000
Subtotal	**$**	**105,000**
Federal Systems		
Social Security Administration (SSA)	$	2,000
Indian Health System (IHS)	$	2,000
Veterans Affairs (VA)	$	2,000
Department of Defense (DoD)	$	2,000
South Dakota HIE	$	2,000
Snowbird States HIEs	$	10,000
Other States & Regional HIEs	$	38,000
Subtotal	**$**	**58,000**
MU Providers		
Hospitals	$	100,000
Clinics	$	600,000

Large Reference Labs	$	15,000
Chiropractors	$	500,000
Optometrists	$	500,000
Dentists	$	100,000
Subtotal	**$**	**1,815,000**
Non-MU Providers		
Long Term Care & Assisted Living (LTC, AL)	$	480,000
Emergency Medical Services (EMS)	$	50,000
Behavioral Health Facilities (BH)	$	150,000
Home Health Care (HHC)	$	40,000
Durable Medical Equipment (DME)	$	40,000
County Health Departments	$	90,000
Misc. Providers	$	40,000
Subtotal	**$**	**890,000**
Payment Models		
Care Coordination	$	300,000
Social Services	$	-
Subtotal	**$**	**300,000**
Payer Access & Feeds		
Payer Spaces	$	75,000
Claims Data	$	6,000
Risk Scores	$	6,000
Gaps in Care	$	6,000
Subtotal	**$**	**93,000**
Patient Engagement		
Personal Health Record	$	45,000
Telehealth Patient Reportable	$	45,000
Subtotal	**$**	**90,000**
Applications		
Advance Directives Registry	$	50,000
Credentialing	$	200,000
Pop Health Analytics	$	200,000
Subtotal	**$**	**450,000**
PROJECT TOTAL	**$**	**9,876,000**

FEDERAL FUNDING (85%)	**$8,394,600**
STATE MATCH (15%)	**$1,481,400**