U.S. Department of Health and Human Services

Nationwide Health Information Network: Trial Implementation

NHIN Business Plan Deliverable #9

Date: 11/14/08

Submitted to:

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Program Support Center
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MedVirginia

Strategic Business Plan

November 14, 2008

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Board of Managers:	James E. Ratliff, MD, Chair John D. Bowman, MD, Vice Chair Jeffrey Burke, Treasurer William Moore, MD Eric Cote, MD
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Statement of Need and Opportunity

Compared to the understanding of the benefits of health information technology (HIT) and community health information exchange (HIE) a decade ago, there is now widespread acceptance that HIT and HIE bring value to health care, in the forms of quality, safety and efficiency. The Institute of Medicine, in its report, **Crossing the Quality Chasm**, identified HIT as a critical environmental force that could significantly improve healthcare quality. Benefits have been identified for a variety of stakeholders, including patients, providers, hospitals, payers, employers, and the community.

Despite the benefits of HIT, adoption rates remain disappointingly low. In 2005, only 11.2% of physicians reported using a "full EMR". Barriers to adoption have been cited and well-documented, including cost, technical support, selection of system, and general resistance to change in administrative and clinical processes.

The exchange of clinical data across provider entities is even less common than adoption of HIT. While some 400 communities across the U.S. are actively discussing or planning for a mechanism to exchange data, fewer than 20 are estimated to have such a capability today.

From its inception, MedVirginia recognized the tremendous value in organizing a community-wide approach to fostering adoption of health information technology and health information exchange. An organized and collective approach would allow costs to be spread over a larger base of stakeholders; data to be aggregated regardless of source; barriers to be addressed in an efficient and systematic method; and measures of impact to be implemented.

Industry leader, Blackford Middleton, MD, states that "To benefit the community as a whole, a successful HIE must be constructed in a manner that accounts for and serves the needs of each stakeholder group individually and allows all, collectively, to share in the benefit. As a result, the success of a community-based HIE is as much a feat of cooperation as it is one of organization."

MedVirginia also recognizes the challenge of "monetizing" the benefits of HIE. That is, while research shows an impact on quality of care, the economic impact of such quality enhancement is much less clear. Further, the beneficiaries of HIE and HIT are often realized by those not making the actual investment. For example, it has been estimated that only 11% of the economic benefit of computerized physician order entry for medications accrue to the benefit of the physicians paying for the implementation of such systems.

MedVirginia recognized the opportunity for an organization that could: (1) assist physicians in overcoming the barriers to HIT adoption; (2) aggregate clinical data into a secure, patient-centric database accessible to authorized users; (3) implement clinical decision support to enhance safety and quality; and (4) derive economic benefit for all stakeholders.

Much progress has been in achieving these objectives. This progress is documented in this current business plan, along with strategies for building upon this progress to achieve even greater success in the future.

Organization

History and Overview

MedVirginia, a provider-owned organization based in Richmond, Virginia, was founded in 2000 to advance the adoption and use of health IT for the enhancement of quality, patient safety, and efficiency. Since its inception, MedVirginia's vision has been the creation of the most electronically connected medical community in the United States. It took a tremendous stride toward that vision with the January 2006 launch of MedVirginia *Solution*[sm], a secure HIE providing online access to patient-centric, integrated clinical data from hospitals, labs, pharmacies, and physician practices. This milestone places MedVirginia on a short list of community-based health information exchanges (HIEs) that are operationally "live" within the United States.

MedVirginia is an affiliate of CenVaNet, a physician-hospital organization also based in Richmond. In 1999, CenVaNet was requested by its provider membership to develop a secure platform across which authorized physicians could share clinical results. After extensive review and planning, leaders of CenVaNet concluded that (a) there was a definite need for such an infrastructure and (b) such an infrastructure should be housed in a community "utility" that was open to participation by all physicians and all potential data suppliers (such as hospitals and labs). This was the basis for the creation of a separate organizational entity, which became known as MedVirginia. In the years since its formation, MedVirginia has grown to a fully operational enterprise.

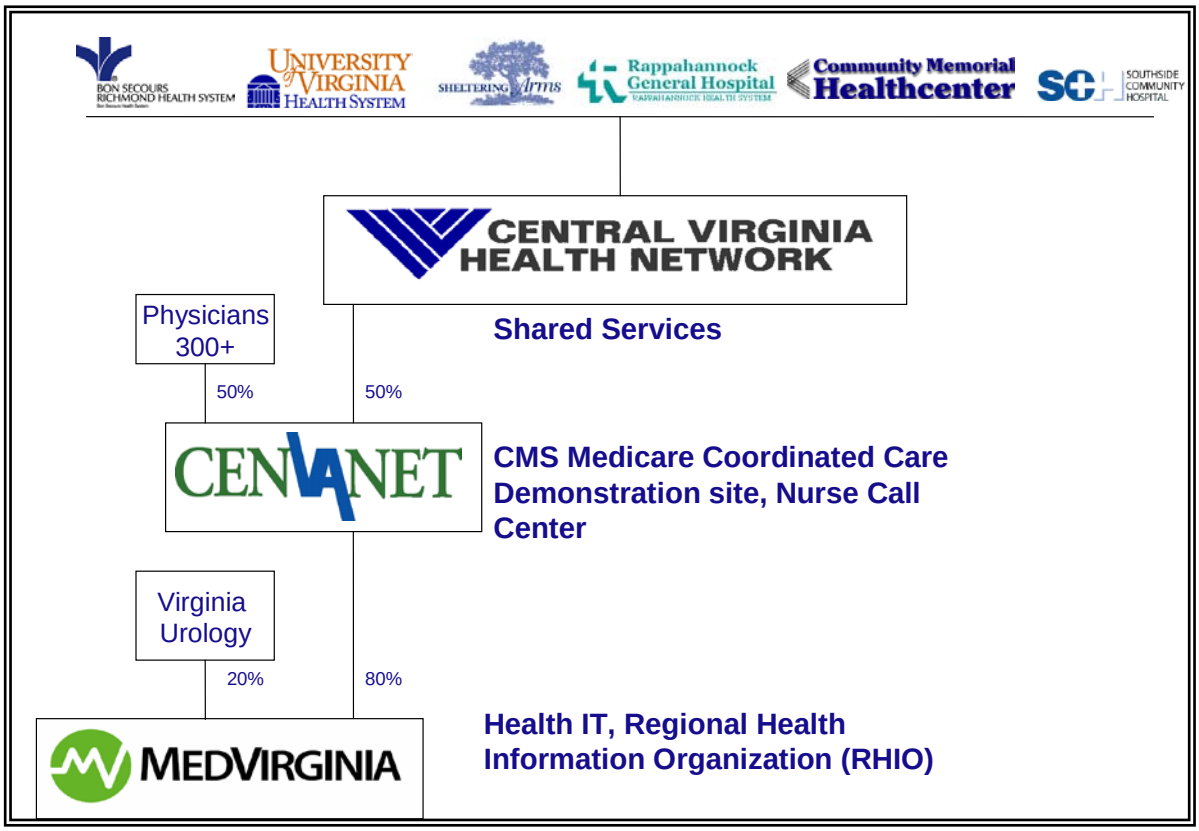
MedVirginia is uniquely positioned to add value to healthcare delivery. We know of no other organization that has a demonstrated multi-provider track record that includes HIT, care coordination, and physician engagement. The intersection of these three areas of expertise results in a variety of opportunities for clinical process improvement, as evidenced by our work in chronic disease management and managed care.

Governance

Since its inception, MedVirginia has utilized an open and participatory governance process to support its community-based health information exchange (MedVirginia *Solution*[sm]) by including a broad range of stakeholders from across the healthcare community in its decision-making processes. MedVirginia's ability to bring all of these important healthcare representatives to a common table to discuss and create a functional HIE has been one of the keys to its success.

When MedAtlantic, CenVaNet, and Central Virginia Health Network (through its ownership of CenVaNet) initially partnered in the late 1990s to begin discussing the need to bring a functional HIE to Richmond, they discussed the various corporate structures

and governance models that could be used to accomplish this. After evaluating numerous models, they decided that instead of using an existing company as the vehicle for creation of an HIE, they should form a subsidiary company whose sole mission would be to support the development, operation and long-term sustainability of an HIE technology platform. This led to the formation of MedVirginia.



As a private enterprise, MedVirginia has approached HIE development in a disciplined, results oriented fashion placing a premium on real world solutions that will enhance the exchange of relevant clinical information. As MedVirginia is a closely held company rather than a publicly traded corporation, it can focus on intermediate term development and is not hostage to the pressure of providing a "profit" to satisfy invest Label1 ors. This combination of entrepreneurial discipline and the ability to invest in systems development has allowed MedVirginia to succeed where many other well-intentioned initiatives have failed.

MedVirginia is directly accountable to its members to demonstrate tangible success in implementing the HIE. This accountability is monitored through traditional business

governance mechanisms like member and manager meetings, and quorum and voting requirements.

In addition to traditional business governance, which is by necessity a proprietary function, the Members also thought it important to have an open, transparent and participatory governance process that would make MedVirginia accountable to the community because the HIE is a community utility. MedVirginia's community governance mechanisms include the use of advisory boards, councils, work groups, teams, and committees.

MedVirginia's members have elected a five-person Management Board to represent their interests, act on behalf of the company (except for those actions specifically reserved to the members), and oversee the activities of the officers who manage MedVirginia's daily operations. The Management Board is composed of five individuals, four of whom are elected by CenVaNet and one of whom is elected by MedAtlantic. Pursuant to MedVirginia's Operating Agreement, the Management Board is required to meet once each calendar quarter and to hold an annual meeting. The MedVirginia Operating Agreement provides that the presence of a majority of the members of the Management Board at a meeting constitutes a quorum and a majority vote of the members present is sufficient to carry a motion.

Before engaging in any vote, the Management Board has adopted a policy requiring each voting member to declare any conflict of interest that exists for a motion under consideration. The Management Board's conflict of interest policy extends to Member votes as well as to officers, employees, and members of any committee with powers delegated to it by the Management Board.

In addition to Management Board meetings and actions, the Members of MedVirginia hold annual meetings at which the Members consider any amendments to the Operating Agreement, the election of the Management Board and any other decisions affecting the business of MedVirginia that may be raised by a Member. At these meetings and any other meetings of the Members which may be held during the year, an affirmative vote of the majority interest is sufficient to carry an action. While the members are only required to meet annually, they exercise continuous oversight of MedVirginia through the receipt of reports about the Company's operations from its Chief Executive Office at their respective quarterly meetings.

Community Advisory Board

In addition to representing the interests of more than 300 physicians and 6 hospitals and health systems in the greater Richmond area through their derivative ownership interests in MedVirginia, MedVirginia also represents the interests of various healthcare participants through its advisory boards, councils, work groups, teams, and committees. It is through these groups that MedVirginia truly demonstrates its open and participatory

process, and allows for transparency of the development and implementation of MedVirginia *Solution*[sm].

MedVirginia recognized that there are many other healthcare participants whose opinion, guidance, and expertise would be necessary to develop a successful community HIE. To obtain input from these important stakeholders, MedVirginia created the Community Advisory Board. The twenty-four members of the Advisory Board represent a wide array of healthcare participants. While all are important contributors to the recommendations of the Advisory Board, there are a few who deserve special mention. The Chair of the Advisory Board is Michael Matthews, CEO of MedVirginia. The Advisory Board is also fortunate to have the Honorable Louis W. Sullivan, M.D., as a member. Dr. Sullivan is the former U.S. Secretary of Health and Human Services whose early push for interoperability led to the creation of the Workgroup for Electronic Data Interchange (WEDI). The Advisory Board has representatives from the Virginia Department of Health and the statewide Quality Improvement Organization (QIO). Other providers represented on the Advisory Board include pharmacists, physicians, and safety net providers. In addition to representing providers, the Advisory Board also has payer representation from both local employers and Virginia's largest health insurer, Anthem BCBS.

The Advisory Board meets quarterly to consider issues brought to it by the MedVirginia Members or Management Board and any other issues that it believes are relevant to the development, use, operation and success of the community HIE. A simple majority of Advisory Board members constitute a quorum and a majority vote of Advisory Board members shall constitute an action by the Board. Minutes for each Advisory Board meeting are prepared and distributed to all participants for review prior to forwarding to the Management Board and MedVirginia executive staff.

The Management Board and the Members take the recommendations from the Advisory Board into consideration when making decisions for MedVirginia. Their feedback regarding expanded use of *Solution*[sm] for quality improvement and public health purposes is particularly valuable. For example, in 2006, the Advisory Board recommended that the free clinics and safety net providers be an area of focus for MedVirginia. This recommendation led to the development of an "IT roadmap" for this important group of community providers. This "roadmap" has served as a catalyst to rapid deployment of IT capabilities, including the implementation of new practice management systems, participation in MedVirginia's secure message and results reporting functionality, and the commitment to a pilot in e-prescribing.

Subsequent to the selection of MedVirginia for participation in the Nationwide Health Information Network (NHIN) Trial Implementation, MedVirginia reviewed the contract deliverables with the Advisory Board to gain their input. The quality of engagement was such that the duties of the Advisory Board were expanded to include input to NHIN and service as the NHIN Steering Committee. This additional responsibility was unanimously approved by the Advisory Board in February 2008.

Management

MedVirginia's senior management team brings an unparalleled depth and breadth of experience to this initiative. An organizational chart is included below. A partial list of key executives and board members include:

- James Ratliff, MD, Chairman of the Board, MedVirginia and practicing physician, Virginia Urology. Dr. Ratliff is widely recognized as a true physician "IT champion" and has brought his group's 16 years of practical EMR experience to MedVirginia's strategy and product development activities.

- Michael Matthews, Chief Executive Office, MedVirginia. Mr. Matthews is also the Chief Executive Officer of the Central Virginia Health Network, Inc. (CVHN), CenVaNet and Community Health Alliance (CHA), companies affiliated with MedVirginia. Mr. Matthews received both his Bachelor of Science in Mathematics and his Master of Science in Public Health, Biostatistics (concentration in Data Management) from the University of North Carolina. He has been active in a wide variety of community initiatives, serving as Chair of the Board of CrossOver Ministry (the largest free clinic in Virginia), and Vice Chair of the Board of the Urban League of Greater Richmond.

  Mr. Matthews also is the Principal Investigator for an AHRQ-funded grant, the Rural Virginia E-Health Collaborative. This initiative is bringing e-prescribing, e-results delivery and e-referrals to the rural Northern Neck of Virginia through collaboration between Rappahannock General Hospital and local physicians and pharmacists.

  Recognized as an industry leader in health information exchange, Mr. Matthews has been invited to speak at several prominent conferences in 2006 including: representing Virginia in the *Inaugural National Assembly of State, Regional and Community Leaders Focused on Improving Health and Healthcare through Health Information Exchange* at the Third National Health Information Technology Summit, Wash. DC, September, 2006; The Quality Colloquium, Harvard University, Cambridge, MA, August 2006; keynote panel at the E-Health Initiative Southern Region Conference, Tampa, FL, January, 2006; and the HIMSS Annual Meeting in 2008.

- Jean McGraw Chief Operating Officer. Twenty two (22) years of health experience including twenty (20) at CIGNA in IT and health informatics. Ms. McGraw has spoken at numerous HIT conferences, including the World Research Group's Launching and Managing RHIOs Conference, December, 2005 and the Virginia HIMSS Annual Meeting.

- Jeff Odell, Senior Vice President, Marketing & Business Development. Fifteen (15) years of health experience including disease management, care coordination at

Anthem BCBS. Mr. Odell spoke at the National Long Term Care HIT Summit in Baltimore, MD, June, 2006.

- Julie LaPrade, RN, BSN, Vice President, Medical Management, sixteen (16) years clinical and management experience. She has been a leader in the use of health information technology for managing chronic disease.

- Joelle Buckner, Director, Information Technology. Fourteen (14) years in health IT including Univ. of Rochester Medical Center and CIGNA. Ms. Buckner is a Certified Professional in Electronic Health Records (CPEHR) and Certified Professional in Health Information Technology (CPHIT).

- Gerard Filicko, Director, Physician Management Services, MedVirginia, and Certified Medical Practice Executive. Mr. Filicko is also board member/Secretary of Richmond Medical Group Management Association and has nineteen (19) years of health administration experience including HCA and Hanover Family Practice.

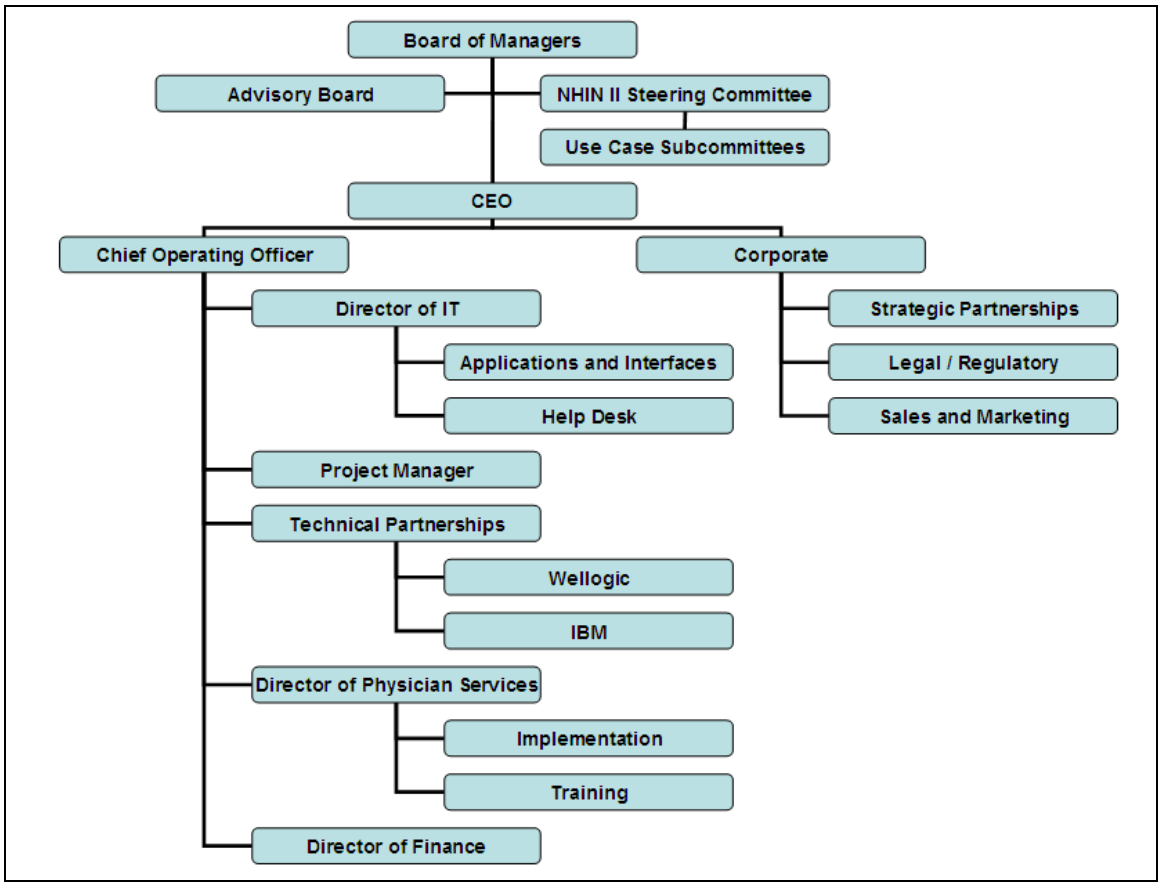
- Sandy McCleaf, Project Manager. Ms. McCleaf has over twenty years experience in health information technology and project management. She serves as Project Manager for MedVirginia's NHIN Trial Implementation initiative.

- Carol Duckworth, Vice President, Sales and Marketing. Ms. Duckworth brings extensive experience in provider relations to her current position and is a Certified Professional in Electronic Health Records (CPEHR) and Certified Professional in Health Information Technology (CPHIT).

- Steve Gravely, MHA, JD, Legal Counsel, partner with Troutman Sanders. Mr. Gravely is widely recognized as one of the most experienced attorneys in healthcare law and privacy issues. A profile of Troutman Sanders capabilities in health law and RHIO legal issues is included in the Appendix 2. Also included is MedVirginia's Statement on HIPAA compliance, privacy and security that was prepared by Mr. Gravely.

- Jay McCutcheon, Director of Strategic Planning and Technical Partnerships, MedVirginia. Mr. McCutcheon is one of the most experienced HIE executives in the U.S. and has been engaged in strategic and operational support for MedVirginia since its inception. Mr. McCutcheon has worked in healthcare information systems for more than 25 years, with his primary focus being the planning, formation, management and growth of health information exchange (HIE) utilities that connect providers throughout a community and supply them with integrated, patient-centric clinical information.

The organizational chart below displays the structure and organization of MedVirginia's management team.



MedVirginia Organizational Chart

Services

Basic Services

The core purpose of the MedVirginia health information exchange, or MedVirginia *Solution*[sm], is the secure exchange of clinical data to authorized users to advance the quality, safety and efficiency of health care delivery. *Solution*[sm] has been designed to fit into the physician practice workflow, with a great deal of flexibility given that workflows will vary within a practice by user, and across practices as well.

The basic services currently available, at no cost to the physician, are as follows:

- Clinical "inbox", with flags for abnormal results

- Secure clinical messaging and referral management
- Access to community-based, patient-centric electronic chart
- Demographic summary
- Clinical documentation of medications, allergies, problem lists, and vitals
- Clinical summary of medications, allergies, problem lists, and vitals

Additional basic services to be provided by 2Q08 include:

- Image viewing through PACS interface
- Rounds list
- Electronic signature for transcribed documents

These capabilities allow results to be "pushed" to individual providers, as well as, "pulled" from the clinical data base via patient queries. In addition, progress is also made in achieving an integrated workflow for processes that cross hospital and physician office settings. For example, e-signatures are for hospital-based reports, allowing the physician to stay within MedVirginia *Solution*[sm] rather than having to utilize multiple systems for individual tasks.

Subscription Services

MedVirginia also provides subscription services designed to further enhance the value derived from *Solution*[sm]. These services enable the physician to move through clinical and administrative adoption in an incremental fashion. In providing these services, it is critical to note that MedVirginia has no plans to become "just another EMR vendor". Its core purpose is clinical data exchange. As a byproduct of the infrastructure required for clinical data exchange, however, certain applications can also be utilized to meet a physician practice's internal HIT needs. MedVirginia has steadfastly maintained a "EMR agnostic" position, meaning that MedVirginia supports any physician's move to clinical and administrative automation, regardless of the particular EMR or practice management system chosen. To the extent that MedVirginia's "toolbox" meets the physician's clinical automation needs, then MedVirginia will provide those services in the most cost-effective and quality manner possible. Whenever physicians need different capabilities, MedVirginia will assist the practice in deriving even further value from their investment by supporting the integration of clinical and demographic data into their chosen EHR.

Subscription services currently available from MedVirginia include the list, descriptions and prices below:

> *Practice Management Interface* – MedVirginia supports interfaces with six market-leading practice management systems. These interfaces significantly enhance the functionality and value derived from MedVirginia *Solution*[sm]. The critical pieces of data brought from the practice management system into *Solution*[sm] are the physician's schedule and patient list. With the interface, the physician can view his/her schedule on the physician home page, along with the clinical inbox. Each patient displayed in the schedule is hyper-linked to the e-

chart for clinical and demographic data. In addition, the patient list import allows *Solution*[sm] to identify the physician as an authorized user for all his/her patients, avoiding the necessity to "self-declare" an association.

E-prescribing – MedVirginia offers a robust electronic prescribing application that is fully integrated into *Solution*[sm]. This integrated e-prescribing tool offers the physician the ability to gain efficiency in the prescription-writing process; reduce the need for pharmacy call backs; and applies clinical decision support to detect drug-drug / drug-allergy contraindications. In addition, the use of this tool enables the physician to participate in certain pay-for-performance programs designed to impact medication management and formulary usage.

Practice Notes – Physicians are able to incorporate practice notes into MedVirginia's e-chart through any of three options: an interface with Dictaphone; input through voice recognition utilizing Dragon; and direct key entry. Practice notes are accessible only to the practice, except when the physician authorizes others in the care process to view a particular patient's notes.

Additional Services – Consumers

Over the past few years, consumer empowerment has been emerging as a key area of dialogue within the national health information and healthcare delivery communities. These discussions have led to detailed descriptions of two aspects of consumer empowerment. The first is the interchange of patient information. The second is the use of a personal health record (PHR) by the patient and others designated by the patient.

MedVirginia has focused its initial capabilities development on services targeting physicians. This effort had two principal purposes. First was to achieve near-term improvements in quality, safety and efficiency that would support patient care and encourage physicians to continue the path of IT adoption. The second purpose was to ensure that physicians were fully engaged and informed when patients came to them with questions about the need, use, and value of such systems.

Our approach to consumer engagement addresses the use of interoperability and information flows that would provide consumer access to critical clinical data. Our approach also involves work with providers, both with and without EHRs, thus increasing the opportunity for participation and accelerating early adoption. Importantly, MedVirginia's approach does *not* interfere with the direct relationship between the consumer (patient) and their personal physician. Indeed, MedVirginia views the PHR as an important tool supporting the patient-physician relationship.

Just as MedVirginia is "EMR agnostic", so too is it "PHR agnostic". MedVirginia does not intend to be the primary sponsor of its own PHR application. Consistent with this

intent, its sales focus remains B2B, and MedVirginia does not, over the next three years, intend to establish brand recognition among consumers/patients. However, given the benefits associated with consumer engagement (including convenience, enhanced education and compliance, safety, and quality), MedVirginia will work with its provider partners to provide critical support to legitimate PHR applications of interest and use by our stakeholders.

Services provided to PHR initiatives include the provision of medications and other clinical data to the PHR, and serving as a secure platform for communication with their providers. Pricing considerations are discussed in Section 9.

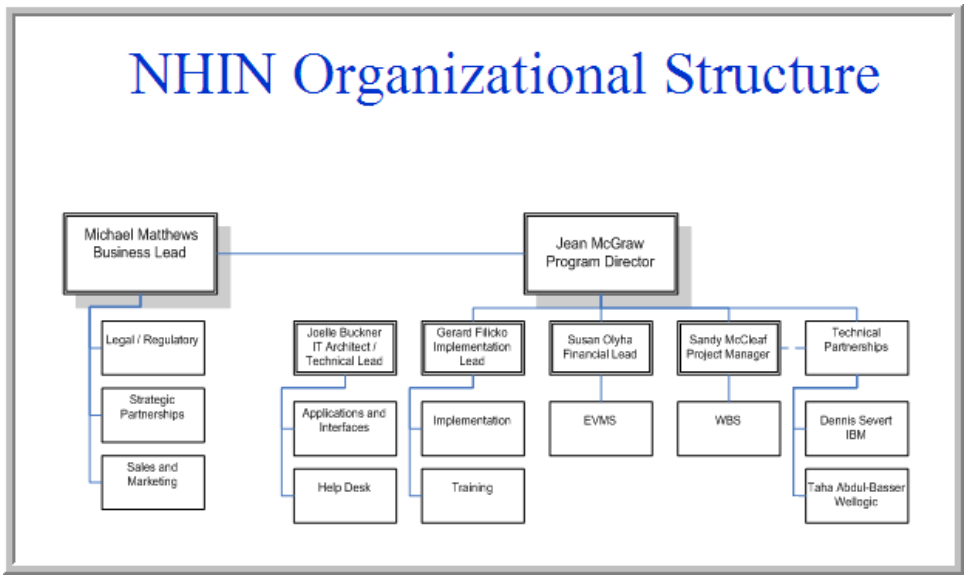
Additional Services – Nationwide Health Information Network Trial Implementation

MedVirginia has been selected by the U.S. Department of Health and Human Services, Office of the National Coordinator for Health Information Technology, as a participant in the Nationwide Health Information Network Trial Implementation (NHIN II). The contract year runs from October 1, 2007 through January 26, 2009, with the possibility of funding for two additional years.

MedVirginia is fully committed to the core principles of the NHIN agenda and has the necessary qualifications to assume the responsibilities for the NHIN Trial Implementation. Participation in the NHIN initiative provides the opportunity for MedVirginia to build upon its successful 28 month track record as an operational HIE and demonstrate the full potential of HIE to transform healthcare in central Virginia. Our approach includes a strong quality framework coupled with an equally strong emphasis on the integration of medication history and lab results as building blocks for enhanced clinical decision support and consumer engagement.

To address the scope of this proposal, MedVirginia has assembled a strong and experienced team to add the depth and breadth of expertise in certain technical and functional areas. Several of our team members have experience with the NHIN Prototype initiative, as well as other facets of health information exchange.

A comprehensive Project Management Plan, budget and Work Breakdown Structure are in place to ensure the successful completion of MedVirginia's NHIN II contractual obligations. For purposes of this discussion, MedVirginia views the inter-HIE exchange of clinical data as a distinct service. The architecture enabling the secure exchange of clinical data with authorized users participating in other HIEs is being constructed through NHIN II and our technical partners. The financial analysis section of this business plan reviews the ongoing costs of maintaining this architecture, and the variable costs associated with each transaction. Assumptions are made with respect to volume of clinical messages. The chart below shows the management structure overseeing project implementation.



Additional Services – Safety Net Providers

MedVirginia is committed to realizing the benefits of HIT and HIE for all providers and patients in the region. Importantly, this includes vulnerable populations such as the poor and uninsured. Safety net providers, such as free clinics, operate in a very different environment than the typical private practice, yet their needs for clinical and administrative automation are just as great.

MedVirginia leverages its infrastructure and technical resources to provide HIT support to safety net providers. This includes the provision of practice management systems support, clinical documentation and referral management. Funding for these activities principally comes in the form of private or public grants, or through service fees paid by the clinics themselves. Utilizing MedVirginia's HIT Council as a reference, projections are made in the financial section regarding future activities in support of safety net providers.

Additional Services – HIE Operations and Management Services

In addition to the implementation of the technical architecture supporting HIT and HIE, MedVirginia has established a broad and deep operations infrastructure that is critical to the success of any such initiative. Several factors drive the opportunity to leverage this infrastructure to support other RHIOs and HIEs. First, the operations infrastructure is reasonably easy to scale. Second, the need for such support is present for every HIE, yet few have the resources – especially in start-up – to fully fund their own operations center. Finally, most of the operations infrastructure support is not geographically bound, meaning that it is as straightforward to run a help desk across the country as it is across the street.

Support available other HIT and HIE initiatives include the following:

RHIO Lab - The RHIO Lab is designed for leaders engaged in, or seeking to start, a collaborative health information project, such as a regional health information organization. The information provided will be of interest to physicians, administrators and community stakeholders. Most Lab workshops will have 10-15 participants, representing multiple communities. Upon request, the RHIO Lab can also be made available to a single organization or community.

The RHIO Lab consists of a one-day intensive workshop. MedVirginia executives will lead participants through an interactive discussion of the following areas: organizational history and vision; structure and governance; technology; operations; legal and regulatory; business model / finance; and sales and marketing. Participants leave with a thorough understanding of practical, real life issues confronting organizations entering the "RHIO space", while offering insights as to how these issues can be addressed. Participants will be provided with a variety of support materials and reference documents, including a RHIO start-up checklist; financial planning template; overview of legal and regulatory considerations for RHIOs; and a copy of the MedVirginia sales kit. Volume and financial projections for these services are included in the financial analysis section of this plan.

Help Desk – MedVirginia's HIE is currently available 24x7. Help Desk support for critical system alerts, creation of Help Desk tickets, voice mail messaging, and structured online feedback are available 24x7. Future plans call for expansion of help desk hours, eventually to 24x7 as functionality and volume dictate.

Service Center – A variety of support functions are necessary to ensure the technical infrastructure of MedVirginia *Solution*[sm] operates in an efficient and secure manner. The following are core areas of operational support that are available to support other RHIO and HIE initiatives:

- Codeset and nomenclature review and updates
- Rejection reporting and research
- Rejection corrections
- Counts of transactions by source and rejection
- Administration of user accounts
- Time testing of the application
- Processed and receive queue checking
- Reporting

Implementation –

Training –

Sales and Marketing - Gaining adoption of the HIE within physician practices is a critical step in the evolution of an HIE. MedVirginia has developed a very successful approach to marketing HIE services within the medical community as evidenced by its enrollment of 110+ physician practices and 1,100+ total users of the HIE within the first two years of operation. Assistance can be provided by MedVirginia to expedite the development of an actionable marketing plan that includes:

- Communication plan from pre-launch through major "live" milestones
- Pricing of services
- Sales strategies for penetrating the marketplace
- Assistance with development of collateral materials
- Anticipating and responding to physician questions

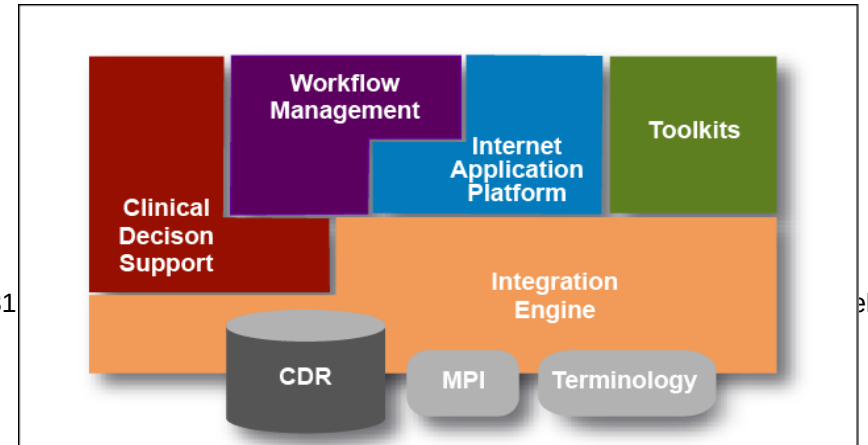
Technology Overview

Platform

MedVirginia has a long standing partnership with Wellogic for its HIT platform and application development services. Founded in 1992, Wellogic is a leading provider of clinical applications, application platforms, and development consulting services to healthcare organizations. It is a minority-owned business, headquartered in Cambridge, MA and Sumit Nagpal is its founder and CEO. Wellogic clients and business partners include hospitals and IDNs, Regional Health Information Organizations (RHIOs) and other e-healthcare and clinical service providers and healthcare information systems and services vendors. Wellogic's unique combination of deep healthcare expertise, technical excellence, and award winning clinical applications and software toolkits delivers practical, robust, and innovative solutions in record time.

The architecture for the MedVirginia health information exchange (or MedVirginia *Solution*[sm]) is robust, modular and flexible, providing immediate value and functionality, while allowing for continued growth and development. The underlying core community portal serves as the secure access control and integration hub for multiple applications across the community, as well as the centralized data store for patient information.

The application components employed by Wellogic for MedVirginia *Solution*[sm] and community provider portal are depicted in the following diagram and described below:



- The *Internet Application Platform* provides the open framework for building scalable Web and mobile healthcare applications that integrate with third-party applications and content. The platform also supports user management capabilities including login, authentication, role-based access control, and error/exception reporting.
- The *Toolkits* represent a collection of modular, standards-based components that allow integration of complex features such as clinical image viewers, intuitive device interfaces, decision-tree questionnaires, and personalized multimedia content into clinical applications.
- The *Integration Engine* is an open, Web standards-based tool that connects disparate third-party systems and transfers data and images among them. It communicates with third-party systems via native, screen-scraping, secure file transfer, and hardware-specific interfaces that leverage data interchange standards such as XML, HL7, ASTM, X.12 and NCPDP. It also supports the core clinical data repository (CDR); provides master entity/patient index (MPI) capabilities to manage identity reconciliation of people and organizations; and aligns terminology across disparate data sets.
- The *Workflow Management* component aggregates patient information across practice, hospital and pharmacy information systems, using this information to provide clinical decision support at the point of care. It enables communication among physicians and their staff, other healthcare providers, and patients – within and between organizations – to support clinical practice workflows.
- The *Clinical Decision Support* module provides medical vocabulary-driven rules authoring and management capabilities that support all of the workflow components of the application, including messaging, orders and results management.

Portal

The portal platform supports a full range of solutions, including:

- *Messaging:* Provides HIPAA-compliant creation, delivery, and review of messages via the Web and mobile devices, all within the context of message-specific workflows. This includes secure, physician-to-physician communication as well as delivery of relevant clinical information to the physician desktop.
- *Referral Management:* Supports electronic referral requests – including the transmission of selected patient information, documents and results – as well as the delivery of consultation reports to both internal and referring clinicians.
- *Order Creation and Results Review:* These services provide modules for ordering and reviewing results for tests, procedures and therapies, including medications, laboratory testing and imaging. This encompasses the e-prescribing capabilities of the application.

- *Alerting:* As results are received, clinical alerts may be generated through application of hospital, specialty, and industry-specific rules applied to the patient data from user input, repositories, and interfaces with third-party systems.
- *Content Delivery:* Allows clinicians and patients to access, in a patient and disease-centric manner, healthcare organization-sponsored resources and knowledge directories aimed at improving the delivery of care.

Infrastructure

Because the portal platform employs industry standards, integration with other standards-compliant applications becomes much easier. It also makes it unlikely that the application will become obsolete as the industry matures. Specific standards employed by the portal (including Microsoft's .NET and Pocket PC, and Sun's J2EE) also leverage tools that adjust to the performance, budgetary, and architectural needs of each organization, making this flexible approach for MedVirginia. The application and database server platforms are vendor-independent (i.e., they run on Windows, Sun Solaris or Red Hat Linux, leveraging an Oracle or Microsoft SQL relational database) also providing additional flexibility. Interfaces between the portal and other data sources employ real-time, standards-based HL7 messages typically transmitted via a virtual private network (VPN), thus ensuring the most up-to-date information is delivered securely. Desktop requirements include Windows and Microsoft Internet Explorer 6.0. The application can currently be accessed using a PC or tablet via Internet connection provided by a local cable or telecommunications provider.

Application Hosting

The application is currently being hosted remotely at the Wellogic's headquarters in Cambridge, Massachusetts), using the following hardware and software configuration:

Component	**Specifications**
Server Hardware:	ntel ® Xeon ™ MP CPU 3.00GHz 2.99GHz 9.50 GB of RAM
Application and Database Server Operating System:	Microsoft Windows Server 2003 Enterprise Edition
Database Management System:	Oracle 9i

Privacy and Security

As everyone in the healthcare industry is aware, the Health Insurance Portability and Accountability Act of 1996 (HIPAA) requires covered entities to protect the privacy and security of protected health information (PHI). While MedVirginia is not a covered entity, it is a business associate of its client medical practices. It is through this business associate relationship with its clients that HIPAA becomes applicable to MedVirginia and *Solution*sm. To fulfill its commitments as a business associate and recognizing that HIPAA compliance is of the utmost importance to its clients and the success of *Solution*sm, MedVirginia has implemented the following proactive, preventative privacy and security features:

- MedVirginia requires that all client medical practices (covered entities) enter into a Business Associate Agreement with MedVirginia (the business associate). This Agreement, which is incorporated into the standard MedVirginia *Solution*sm client agreement, outlines MedVirginia's responsibilities concerning the PHI contained in *Solution*sm and memorializes MedVirginia's commitment to HIPAA compliance.
- The central tenet of *Solution*sm is that a provider is able to render the best healthcare when the provider has access to all of a patient's health information. This core ideal has led MedVirginia to limit access to an individual's PHI to only those healthcare providers who have an established treatment relationship with that individual. Each user must sign a User Agreement in which the user agrees to only access an individual's PHI for treatment of that individual. Access is then technically limited by requiring a user to either declare a treatment relationship through *Solution*sm or establish a relationship through an interface with the provider's practice management system or upon receipt of test results or consult requests. Not only is it just good practice to ensure that only those providers with a bona fide treatment purpose view an individual's PHI, it is also important for HIPAA compliance. Under HIPAA, patient consent is not needed before a covered entity uses or discloses PHI for treatment purposes. Because clients and users who input PHI into *Solution*sm are sharing PHI for treatment purposes and those who access the information within it do so only when rendering patient care, MedVirginia has determined that use of Solution is HIPAA compliant without additional patient consent.
- MedVirginia recognizes that not all PHI is created equal. There are some types of PHI that are so sensitive that an additional layer of security is needed. Examples of such information include HIV test results, HIV status and the use of prescription medications that are exclusively used to treat HIV. These items, along with other highly sensitive information, will not be readily viewable in the standard electronic chart. Instead, the chart will contain a symbol that indicates the presence of highly sensitive information without disclosing any specifics. If the provider believes that knowledge of that highly sensitive information is critical to his ability to properly treat the patient, the provider can "break the glass" by declaring his reasons for viewing the sensitive information. In this way, *Solution*sm is ensuring that highly sensitive information is only viewed when absolutely necessary. Furthermore, Solution records each instance of "glass breaking" therefore deterring any improper

use. (A more complete list of those items qualifying as highly sensitive is available upon request.)

- *Solution*[sm] complies not only with HIPAA, but also Virginia law under which there are two types of PHI that are more protected than all the rest: HIV test results and psychotherapy notes.
    - HIV test results can only be disclosed to "[h]ealth care providers for purposes of consultation or providing care and treatment to the person who was the subject of the test or providing care and treatment to a child of a woman who, at the time of such child's birth, was known to be infected with human immunodeficiency virus." Va. Code. Ann. § 32.1-36.1(A)(4). Access to HIV test results through *Solution*[sm] will be compliant with this statute as a treatment relationship must exist between the provider and the patient before the provider can access the results. Additionally, HIV test results are a break the glass item; therefore, a user will have to declare that knowledge of the results is necessary to properly treat the patient.
    - Pursuant to the Virginia Health Records Privacy Act (Va. Code. Ann. § 32.1-127.1:03), an individual's psychotherapy notes cannot be disclosed without the written authorization of that individual. The Code defines "psychotherapy notes" as "comments, recorded in any medium by a healthcare provider who is a mental health professional, documenting or analyzing the contents of conversation during a private counseling session with an individual or a group, joint, or family counseling session that are separated from the rest of the individual's health record." Psychotherapy notes' shall not include annotations relating to medication and prescription monitoring, counseling session start and stop times, treatment modalities and frequencies, clinical test results, or any summary of any symptoms, diagnosis, prognosis, functional status, treatment plan, or the individual's progress to date." MedVirginia is advising its clients that psychotherapy notes, as defined above, should not be shared through *Solution.*
- *Solution*[sm] is a subscription only service for healthcare providers. MedVirginia requires each client to provide information on its users to ensure that each user has the necessary credentials to access *Solution*[sm]. Once credentials are verified, each user is given a unique user identifier and password that is needed to logon to *Solution*[sm]. Because *Solution* employs a user identification password system, MedVirginia is able to audit individual user activity. Each user is assigned access rights based on role (e.g., physician, nurse, administrator). Each month and on an ad hoc basis, MedVirginia generates audit reports that detail the various ways in which users utilized *Solution*. For instance, MedVirginia is able to see the number of times any one user self-declared a relationship with a patient or a certain user "broke the glass". MedVirginia has created numerous policies that outline the ways in which these audit reports will be examined to detect potential improper uses of *Solution*[sm] and the ways in which such potential problems will be investigated and remedied. (Copies of these policies are available upon request.)
- One of the main goals of *Solution*[sm] is to improve upon the status quo with respect to the sharing of PHI between providers for treatment purposes. To that end,

MedVirginia believes that it has created a PHI sharing system that is more capable of protecting the privacy of PHI then the current paper record systems maintained in the majority of medical practices. For instance, in the current system, when one provider wants to share test results with another provider, that information is typically faxed to the second provider's office. Any number of office staffers has access to that fax and there may be no record of who actually views it, reviews it or files it. In *Solution*, by contrast, the test results are sent directly to the provider's inbox where only designated individuals have the ability to view it. Further, *Solution*[sm] has the ability to track each person who views, reviews and files the results. In this way, *Solution*[sm] offers far greater privacy protections then the current system for sharing PHI.

- Clients and users have the ability to transcribe office notes through *Solution*[sm]. While this information is very important to the dictating provider, it is not necessarily helpful to other providers who are treating the same patient. Recognizing this, MedVirginia has chosen to limit access to transcribed practice notes to only that user (and the associated client) who dictated them. The user can, of course, send a copy of the office note to another provider at any time through *Solution*[sm]'s secure messaging system.
- The server that maintains all of the PHI in *Solution*[sm] is housed in a secure facility in Cambridge, Massachusetts. The facility is locked, giving only authorized personnel limited access. The facility also has all of the redundancies necessary to ensuring the survival of the PHI within *Solution* should the server experience problems.
- In addition to the various technical security mechanisms already discussed, *Solution*[sm] also contains the following security features:
    - Access to MedVirginia *Solution*[sm] through a secure web portal
    - Use of a dedicated, secure server
    - Use of unique, alphanumeric user identifiers and passwords
    - Role-based access control
    - Automatic logout after 30 minutes
    - Inability to logon to *Solution*[sm] after three consecutive failed attempts
    - Ability to immediately deactivate a user identifier and password if improper use is suspected
    - Secure messaging to other *Solution*[sm] users
    - Inability to message non-*Solution*[sm] users

The HIPAA security rule requires that covered entities implement audit controls. Solution is designed and constructed in order to help its administrator to meet these requirements. Several components collaborate to allow user activity—e.g. login, logout, modification of user preferences, data viewed and actions taken—to be logged for auditing purposes. There are configurable trace logs for every user interface gesture, data aggregation operation and data access operation.

Our interface is configured to use the logging and other audit supporting features provided by the security and data interface components to record clinical and non-clinical events (such as failed logins, successful logins, logouts, lockouts, authorization failures,

clinical data accessed, self-declared relationships, "break the glass" instances, messages viewed, tasks completed, etc) in an audit repository. This repository is distributed across various log files, the user interface authentication store and the clinical repository. The level of logging is configurable. The retention period of the audit logs is also configurable. Clinical records are versioned in the clinical repository. Audit trials and activity reports can be constructed from the audit repository through the use of database reporting tools (such as Crystal Reports), application monitoring tools (such as Tivoli), XML processor tools (such as XML Spy) and our data interface event viewer, which is a web-based applet that allows administrators to view errors and events. Using these tools, the audit repository can be filtered by user identifier, patient identifier and activity date/time range.

The disclosure of all patient information is audited within MedVirginia Solution, including the date and time of the disclosure, the source system that provided the data, and the user to whom it was disclosed. This information is available for later review within a security log that provides for printing of use reports. Additionally, to the extent disclosures are necessary, MedVirginia Solution logs the appropriate information that allows them to provide disclosure reports if requested.

Operations

MedVirginia's highly experienced executive team has collectively more than 100 years of healthcare management experience. It is self-supportive in areas such as human resources, accounting, information technology, and other support services. It also has long-standing relationships with Cherry, Bekaert & Holland, L.L.P, a major CPA firm, and Troutman Sanders LLP, a prominent law firm with special expertise in healthcare law.

MedVirginia's HIE is currently available 24x7. Provided below are descriptions of areas of operations.

Help Desk – MedVirginia's HIE is currently available 24x7. Help Desk support for critical system alerts, creation of Help Desk tickets, voice mail messaging, and structured online feedback are available 24x7. Future plans call for expansion of help desk hours, eventually to 24x7 as functionality and volume dictate.

Service Center – A variety of support functions are necessary to ensure the technical infrastructure of MedVirginia *Solution*[sm] operates in an efficient and secure manner. The following are core areas of operational support that are available to support other RHIO and HIE initiatives:

- Codeset and nomenclature review and updates: MedVirginia receives additions and corrections to codesets such as lab, transcription, radiology codes and ensure that they are in the master maps.
- Rejection reporting and research: Today MedVirginia receives a report on a retrospective basis that gives us a week's snapshot of the rejections. We will then analyze each reject type and do one of three things: 1) escalate to 3rd tier

level support if we are unable to solve the issue, 2) go into the processing engine and reprocess the messages, or 3) work with our data supplier to understand any new codeset adds/updates that were not caught in the daily reports that they send us, update the table maps and then reprocess the fallout due to codeset values missing from our master tables. This information is valuable because it also gives us the opportunity look at our big rejects and find a potential system solution vs. manual process to fix the errors so that they don't continue.

- Rejection corrections: Our team will go into our processing engine, Synapse, and review the rejected HL7 messages from our data suppliers. Based on the rejection reason, we will take action on the messages. Most often we can correct the message and send it on for reprocessing. The reprocessing will often times make adjustments to the patient chart by updating or adding the demographic/insurance information (if it is an ADT rejection) or update/add clinical information and status for labs, radiology reports and transcription reports.
- Counts of transactions by source and rejection rate: On a daily basis, we look at the total number of transactions that have been processed and rejected based on the data source (ADT, Radiology, Transcriptions, Lab) so that we can determine if the numbers are within normal range for that data supplier for that type of day. We also use this as another gauge to track our rejection rate and look for opportunities to correct fallout.
- Administration of user accounts: We load practice information, sharing rights and users/roles and authorities for all individuals that use the Solution system. We not only track this information within the Solution system but also update the users in our Help Desk system so that if/when they do call into the help desk, we have their information right at hand.
- Time testing of the application: For our production and pilot environments, we will go through all of the system modules and track the response time two times throughout the day to ensure that our users are able to access the system within acceptable levels.
- Processed and Receive Queue Checking: Our team checks the processed and received hl7 queues, three times throughout the day, to ensure that messages are flowing from our data suppliers and being processed appropriately.
- Help Desk Support: Our team takes requests from users via phone, e-mail and a system feedback mechanism. These requests can be password resets, functionality questions and complaints (slowness of system, missing data).
- Reporting to Management:
    - Auditing information on a weekly and monthly basis
    - ACD reports
    - Help Desk reports

Training – MedVirginia provides practice-level and user level training. Based on an initial assessment of practice needs, training is tailored to meet the specific needs of each client. Follow-up is initiated at regular intervals post-implementation, and the

Help Desk is available for any immediate questions. A training manual is provided to each practice for on-site reference.

Current Utilization

MedVirginia *Solution*[sm] has 1,150 users, including 335 physicians from 115 practices. A variety of utilization measures are employed to track how often and in what ways the system is being accessed. These measures include: total users, by type of user; chart views; chart views per 100 users; logins; and logins per 100 users. In addition, detailed audit logs are kept for tracking self-declarations and "break the glass" events.

Over 50,000 charts were viewed in MedVirginia *Solution*[sm] in 2007.

Marketing and Sales

MedVirginia has a focused and targeted approach to sales and marketing. Primary efforts on focused on physician practices that represent potential clients of MedVirginia. General awareness of MedVirginia has been promoted through a host of initiatives, including:

- Sponsorship of CME programs related to health information technology;
- Exhibitor booths at professional conferences;
- Paid advertisements in professional journals;
- Public relations activities, leading to feature stories in regional and national publications;
- Informational mailings;

Sales efforts have targeted specialty and primary care physicians in the central Virginia region. These efforts are led by an experienced VP of Sales, and are supported by a variety of collateral materials, including a sales kit.

The VP of Sales contacts all potential clients by telephone subsequent to the general marketing and awareness activities above. At that time, an on-site demo of MedVirginia *Solution*[sm] is scheduled. During the demo, an information packet, including client services and user agreements, are provided to the practice for review and consideration. Any follow-up questions are then handled by phone or in-person (if necessary).

ACT is used as the customer management database for MedVirginia. This tool is used to track customer sales cycles, as well as, issues that are identified for follow-up by the training and implementation team.

By the end of 2008, physician users are projected to increase to 475 (from current 330), and practices to increase to 130 (from current 110). This will represent approximately 40% of the target market of 1,200.

These projections are considered conservative and are subject to positive impact by a number of market developments. Importantly, the addition of another hospital data supplier would add to the depth of clinical data and the breadth of patients in the MedVirginia database.

Financial

MedVirginia was organized in 2000 as a limited liability company, and its longevity is among the greatest of any RHIO or HIE in the U.S. Achieving financial sustainability is a challenge for any such organization, and MedVirginia's financial performance positions the organization well for the future.

By definition, a health information exchange requires technical and strategic partnerships with a vast array of stakeholders. The financial relationships are no less challenging than the technical and strategic. The following discussion points are intended to summarize the key economic drivers for MedVirginia and its partners.

Expenses are generally categorized as either developmental or operational. Developmental expenses include:

- Organizational – including the costs of establishing the corporation; D&O / E&O coverage
- Legal – including HIPAA compliance reviews; privacy and security policies and procedures; user agreements; data supplier agreements; vendor contracts
- Marketing – including corporate identity development; web site development; collateral materials; market analysis

Operational expenses include:

- Technical – including monitoring of system and interface performance
- Training and implementation
- Help desk and user support
- Sales and marketing

Given that the MedVirginia HIE has been in full production for almost three years, financial projections have a considerably greater confidence level that a start-up HIE organization might have. In addition, MedVirginia has a deep understanding of market opportunities and the likelihood of success with each. The five-year financial projections are based on a realistic set of assumptions for business growth and development. They are as follows:

Revenues

- Data suppliers - HIE Data Services consist primarily of fees charged to data suppliers based on activity levels (# active physicians, IP visits, discharges, days, etc) and secondarily of fees to build initial interfaces. The first year reflects one addition health system data supplier and the model assumes this grows to five suppliers by year 5.

- Subscription services - The revenue line "Subscription Services" includes a menu of view only, electronic prescribing, integration of practice notes, and interface with a freestanding EHR (and combinations thereof). Forecasts were made regarding overall HIE adoption rates, and within that, the percent of users who contract for revenue-generating subscription services.

- RHIO Lab – This is seen as an area of need and growth. Volume of RHIO Labs increases from three in Year 1 to thirteen by Year 5.

- Grants – No grant income is assumed for these projections.

- NHIN Services – For projection purposes, the most conservative approach was taken. That is, as seen below, the costs for maintaining the NHIN architecture have been included. Further, the incremental cost per NHIN transaction has also been included, with projected volumes as indicated. However, no incremental revenue has been included.

Expenses

- Compensation and Benefits include an IT Director, data analysts, programmers and trainers (7 FTEs in Year 1, 12 FTEs by Year 5).

- The HIE Maintenance Fee is the cost to maintain the interfaces.

- The Wellogic license fee is the annual fee for the software.

- Management Fee includes facility costs, management oversight and administrative (office items).

- Overhead includes accounting, legal, and insurance.

- The fee to maintain the NHIN Architecture is based on a discounted fee structure from what is currently in place. In addition, a per NHIN transaction cost of $10 is estimated, with transaction volumes increasing from 100 in Year 1 to 500 in Year 5.

Results

The proforma income statement below highlights the total revenues, expenses and net income that result from the set of assumptions above. Even with the assumption of no incremental NHIN services revenue, MedVirginia still achieves positive net income by Year 3.

MedVirginia, LLC
Pro-Forma Income Statement

	Year 1	Year 2	Year 3	Year 4	Year 5
REVENUE					
HIE Data Services	1,885,892	1,750,897	3,060,048	2,810,048	2,810,048
Subscription Services	117,172	205,050	263,636	274,182	274,182
RHIO Lab	57,000	56,437	169,311	188,123	244,560
Interest Income	5,000	10,000	15,000	15,001	15,002
Total Revenue	2,065,063	2,022,385	3,507,995	3,287,354	3,343,791
EXPENSES					
Compensation & Benefits	565,512	594,885	838,421	947,141	1,012,721
Management Fees (CVHN)	157,506	166,377	213,368	241,776	248,302
Overhead	171,460	180,566	248,365	280,785	297,266
HIE Maintenance	567,000	567,000	819,000	851,760	885,830
License Fees (Wellogic)	680,736	522,537	750,405	630,421	635,638
Server Rental	63,000	78,750	90,563	104,147	119,769
Total Expenses	2,205,214	2,110,115	2,960,122	3,056,030	3,199,527
Net Income	(140,150)	(87,730)	547,873	231,323	144,264
NHIN Architecture	131,972	139,171	146,578	154,201	162,049
Net Income after NHIN	(272,123)	(226,901)	401,295	77,122	(17,785)

Summary and Conclusions

The analyses and projections included in this Business Plan lead to a number of conclusions:

- As has been true throughout its history, MedVirginia operations are financially sustainable and projected to remain so.
- Maintaining and acquiring data suppliers is the key determinant in financial sustainability.
- Financial sustainability does not depend upon grant income.
- Even with maintaining NHIN architecture and its associated costs (but with no incremental revenue), MedVirginia will return to positive net income by Year 3.
- Any production related net income (such as SSA or VA/DoD) will contribute to earlier break-even. These opportunities will be incorporated into future projections once financial parameters have been defined.

- While not included in financial projections, there are a number of opportunities for business expansion that will yield positive financial return. The scalability of infrastructure, operations, and management infrastructure will be further assessed vis-à-vis these opportunities.