

Health Information Exchange Challenge Program

Funding Opportunity Announcement Response

January 2011

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Notice of Intent

Funding Opportunity Title: American Recovering and Reinvestment Act of 2009,
State Grants to Promote Health Information Technology
(Health Information Exchange Challenge Program)

Funding Opportunity Number: EP-HIT-10-002

December 9, 2010

David Blumenthal, MD, MPP
National Coordinator for Health Information Technology
Department of Health and Human Services
200 Independence Avenue, S.W.
Washington, DC 20201

RE: Letter of Intent to Apply for Funding – Maryland Health Information Exchange Challenge Program

Dear Dr. Blumenthal,

The Maryland Health Care Commission (MHCC) is the recipient of the State Health Information Exchange Cooperative Agreement Program award. The MHCC has reviewed the Health Information Exchange Challenge Program and is planning to respond to the funding opportunity announcement. Please consider this e-mail as notification of our intent to submit an application for each of the five Challenge Themes.

Please feel free to contact me with any questions.

Regards,
David Sharp, Ph.D.
Director
Center for Health Information Technology
Maryland Health Care Commission

Project Abstract Summary

Project title: Facilitating Effective Transitions of Care between Long-Term Care Facilities and Hospital Emergency Departments

Challenge theme addressed: Challenge Theme Two

State/territory, geographic area and target population for the effort: State of Maryland, Entire State, Target Population of All Residents of Long-Term Care Facilities in the State and their Treating Providers

Applicant name: Maryland Health Care Commission

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Congressional districts within the target area: Maryland Congressional Districts 1-8

The Maryland Health Care Commission (MHCC) is the state agency designated by the Honorable Governor Martin O'Malley to advance health information technology (HIT) in the state. Legislation was passed in 2009 that required the MHCC to designate a multi-stakeholder group to implement a statewide Health Information Exchange (HIE). The MHCC selected a non-profit organization, Chesapeake Regional Information System for our Patients (CRISP), which includes Johns Hopkins Medicine, MedStar Health, University of Maryland Medical System, Erickson Retirement Communities, and more than two dozen other groups, as the state designated entity to implement the HIE. Exchange activities are funded through Maryland's unique all-payor rate setting system and federally through the *State Health Information Exchange Cooperative Agreement Program*. In 2010, CRISP was also awarded a *Health Information Technology Extension Program Cooperative Agreement (REC)*.

Maryland's HIE went live in September of 2010; five hospitals as well as national laboratories and regional radiology centers are contributing clinical data, with all 46 acute care hospitals in the state having signed formal Letters of Intent to connect within two years and nearly half have begun the connection process to CRISP. In addition, CRISP is also working with a range of data consumers, including priority primary care providers participating in the REC program, to join the exchange. Connecting with long-term care (LTC) centers, including skilled nursing facilities, poses unique challenges because of the lower level of current HIT adoption among such facilities and funding challenges—in spite of the fact that information exchange supporting the transition of care between acute

care hospitals and LTC centers can have substantial impacts on the quality and efficiency of emergent and post-acute care.

The goal of this project, which addresses Challenge Theme Two, is to pilot the electronic exchange of clinical documents between pairs of LTC centers and proximate hospital emergency departments (EDs). The pilot will center on six large LTC facilities across Maryland, with some services being offered to every facility in the state. Erickson Retirement Communities, Lorien Health Systems and Genesis Healthcare, three leading operators of LTC facilities in the state, have committed to this project. Each participating facility is paired with a hospital in its immediate medical service area. New scalable technology will be implemented to enable and measure the exchange. The targeted outcomes include:

1. An increase in the number of transitions of care within the pilot populations that are accompanied by electronic summary of care information compared to a baseline;
2. A reduction in the average time to transmit such information compared to the status quo; and
3. A measurable effect on hospital readmission rates for patients participating in the pilot versus a control group.

In coordination with the state's Medical Orders for Life-Sustaining Treatments (MOLST) initiative, the project will work to ensure that advance directives are a component of the electronic summary of care by developing the required framework for storing and exchanging advance directives electronically in Maryland. The MHCC expects to accomplish the aforementioned outcomes within the 36 month duration of the project.

Project Narrative

Understanding of Project Purpose

Maryland is home to roughly 235 nursing homes, with more than 77 percent affiliated with either a group, hospital, integrated system, or a regional chain. To date, long term care (LTC) facilities across the country—including assisted living facilities, nursing homes, and continuing-care retirement communities—have not been deeply involved in the efforts to broaden electronic health record (EHR) adoption. Many reasons hinder the efforts to establish EHRs in the long term care environment, including meeting the needs of multiple providers in a nursing home, the physical structure of a facility, and a lack of financial resources. While evidence suggests that in general EHR planning and adoption activity among LTC facilities in Maryland is fairly consistent with the level of activity in other states, Maryland has proven itself as a thought-leader in developing approaches for using health information technology (HIT) to improve transitions of care between LTC facilities and acute-care hospitals. In 2007, a Maryland continuing care retirement community and an acute-care hospital went live with an HIE, the first such exchange in the nation. It remains in production today, delivering care summaries from one setting to the other for multiple patients on a daily basis.

The frail elderly and disabled frequently move from LTC facilities to acute care hospital settings and back, receiving care from an array of providers with different objectives and access to oftentimes incomplete information. Medical records may be exchanged by delivery of paper records or via fax, which may cause delays, errors, or confusion among providers. This can result in duplicative tests and procedures, frequent dosage modification, or adverse drug interactions. Further, in this fragmentary and uncertain information environment, it is often impossible for treating providers to align care with a patient's long-term treatment goals or even the patient's stated wishes. Based on a preliminary environmental scan of Maryland's LTC facilities and hospitals, the vast majority of patient care transfers is accompanied by paper or faxed records. Anecdotally, geriatricians and other clinicians in LTC settings in Maryland indicate that a great opportunity exists to provide more seamless, safer, effective, and efficient care across the multiple settings where their patients receive care.

In addition to this clinical urgency, integrating LTC facilities with the statewide health information exchange (HIE) and implementing services that address the needs of these facilities is a priority outlined in the ONC approved State Health IT Plan that will be implemented by the state designated HIE, the Chesapeake Regional Information System for our Patients or CRISP. Maryland also has established an independent Policy Board, represented by more than 30 consumer-focused stakeholders, that develops policies around the exchange of electronic health information. According to a recent MHCC assessment of Maryland nursing homes, there is room to improve the level of technology and interoperability among LTC facilities. These facilities identify the leading barriers to adoption as being the cost of technology, lack of technical staff, problems integrating EHRs with existing legacy systems, and difficulty in training qualified staff. Findings from the assessment indicate that almost all independent nursing homes use technology to support activities related to billing. Nearly half use technology for limited clinical purposes, such as resident assessments, progress notes, and care planning. Almost one-third have taken steps to assess how they can increase efficiencies in their facility and improve clinical care through EHRs. The majority of the independent nursing homes who responded to the assessment consider EHRs an important technology to adopt.

The purpose of the proposed project, *Facilitating Effective Transitions of Care between Long-Term Care Facilities and Hospital Emergency Departments*—which addresses Challenge Theme Two – Improving Long-Term and Post-Acute Care Transitions—is to leverage Maryland's operational statewide HIE to electronically share critical pieces of clinical information, including information on advance directives, where they exist, in real-time as residents of the state's LTC facilities transition from one care setting to another. The LTC facility operators that have committed to participate care for more than

11,000 Maryland seniors. Specifically, the project will facilitate the sharing of data among six pairs of large LTC facilities and geographically proximate hospital EDs, serving patients across approximately 1,041 skilled nursing and acute care beds:

LTC Facility	Hospital (System If Any)	County
Erickson Oak Crest	Franklin Square Hospital (MedStar Health)	Baltimore County
Erickson Riderwood	Holy Cross Hospital (Trinity Health)	Prince George's County
Lorien Encore at Turf Valley	Howard County Hospital (Johns Hopkins Healthcare)	Howard County
Lorien Columbia	Howard County Hospital (Johns Hopkins Healthcare)	Howard County
Genesis Salisbury Center	Peninsula Regional Medical Center	Wicomico County
Genesis Woodside Center	Holy Cross Hospital (Trinity Health)	Montgomery County

The pairs will be brought live with the pilot services as each hospital goes live with its statewide HIE connectivity. (Holy Cross is currently live, with the other hospitals having signed Letters of Intent to go live during the first quarter of calendar year 2011.) The discrete data elements shared will include allergy lists, problems lists, medication lists, clinical notes and functional status content, hospital discharge summaries, as well as content related to advance directives.

Additionally, clinical discharge data will be made available to all facilities that currently lack an EHR system, using a portal developed by the HIE's core technology provider, Axolotl Corporation. Facilities may also elect to receive the data via fax or printer. Using an LTC facility address cross-reference service, which will be developed as part of the project, ED patients may be identified as residents of any facility and discharge data will be pushed automatically. The data will be delivered in a format that is most easily consumable and clinically useful at the point of care.

Finally, the project will build on current momentum that already exists in Maryland to promote the broader use of advance directives. In the short-term, metadata on the existence of advance directives will be delivered to EDs from the two participating Erickson communities. At the same time, a single source-of-truth repository for current advance directives (and other associated documents such as medical orders) will be developed for the state. This repository will be connected to the statewide HIE and will include a web-based portal for patients, caregivers, and providers to view and update appropriate documents.

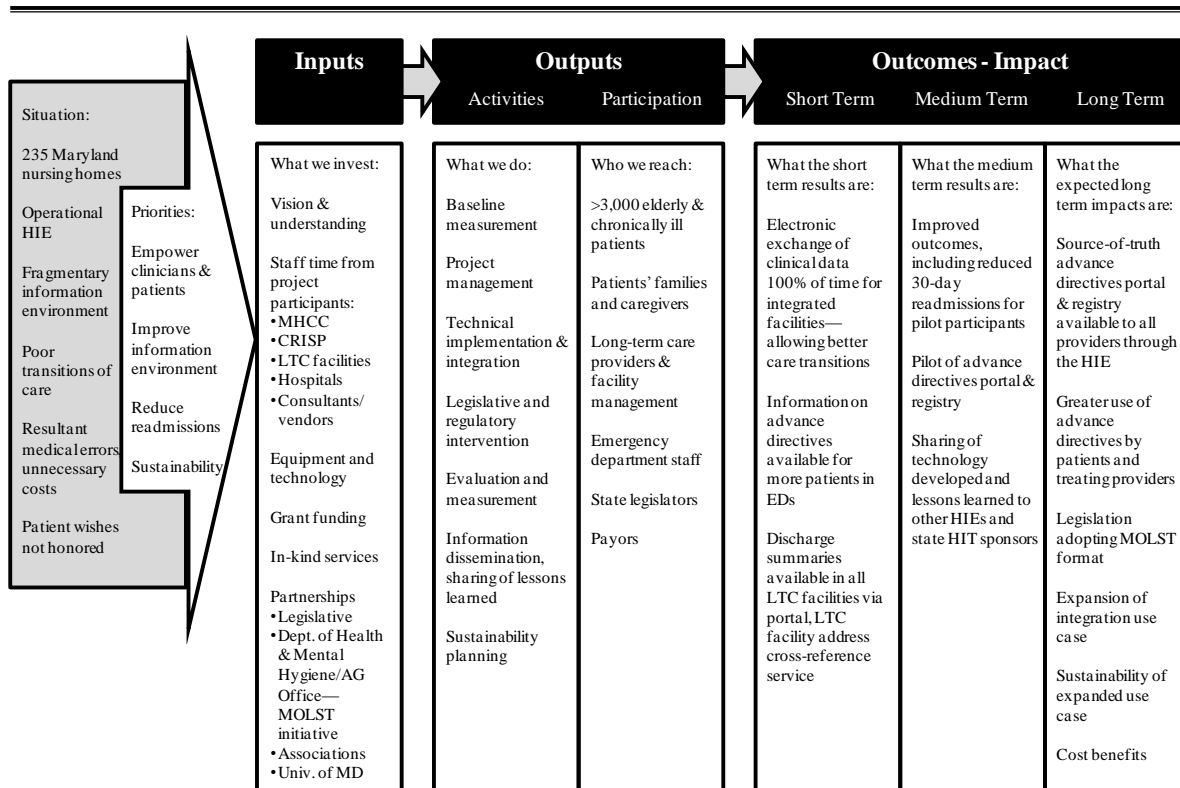
A number of the breakthrough solutions developed during the proposed pilot will be scalable or ready for use elsewhere. The LTC facility address cross-reference service that will be developed as a set of rules and cross-reference table within the HIE's core infrastructure and will be directly applicable to other HIEs using technology from Axolotl Corporation and Initiate Systems, the core infrastructure providers for Maryland's statewide HIE. Further, the framework for this service may be utilized by HIEs and LTC facility associations in other states to implement a similar solution using other technology. Developing an electronic repository of advance directives and electronic Medical Orders for Life Sustaining Treatment (MOLST) orders using an innovative approach will result in a valuable resource for other states seeking to solve the same challenges. Within Maryland, the scaled approach to making data available during transitions of care—with data being available for users with different technological capabilities via direct integration, portal, fax or printer—strikes the right balance between maximizing the immediate clinical impact of the project with long-term scalability. As more facilities advance their EHR capabilities, a clear pathway will exist to migrate to the direct integration approach.

Approach, Work Plan & Activities

The project team will take a phased, multi-pronged approach to addressing the challenges associated with transitions of care between LTC facilities and hospital EDs. In the short term, emphasis will be placed on working with LTC facilities that a) share patients with hospitals that are already in the process of going live on the statewide HIE and b) currently possess an EHR system that makes direct data exchange via the HIE possible. The HIE Policy Board will expedite the development of policies to support the framework for this use case. At the same time, acknowledging that many LTC facilities do not currently enjoy an advanced state of HIT adoption and may lack the funding or human resources to achieve it in the near future, a universal solution for pushing discharge data back to a patient's "home" LTC facility will be developed and made available to all other facilities in the state (with a number of facilities selected to be observed for tracking and measurement purposes). Over the longer term, as valuable lessons are learned about the direct integration use case from the pilot participants, the approach can be expanded to meet the needs of other LTC facilities in Maryland and elsewhere that have adopted fully interoperable EHR systems. Similarly, short- and long-term approaches will be pursued for making advance directive information more ubiquitous and available at the point of care. In the short term, the project will support existing advance directive content held by pilot participants by making metadata on those documents available for electronic exchange. Knowing at the time of care that an advance directive exists, and being provided with information on how to obtain it and what makes it active, will help treating providers more consistently and accurately provide care that coincides with a patient's wishes. At the same time, it is recognized that there is huge value in a single, statewide electronic repository of advance directive documents. This repository will be developed and tested so that it can be implemented in the longer term.

The activities proposed in this application can be described using the following logic model:

Facilitating Effective Transitions of Care between Long-Term Care Facilities and Hospital Emergency Departments: *Logic Model*



The pilot is comprised of three major components:

- 1) *Direct integration* – The two Erickson facilities currently use, and its staff has deep experience with, the GE Centricity EHR system; Erickson also holds strong expertise with HIT systems interoperability including an active, freestanding direct integration between its other Maryland facility, Charlestown, and a nearby hospital ED. Erickson and its residents have seen the clinical benefits that come from just this sort of care coordination initiative. For the two Erickson facilities and their partner hospitals, data can be delivered directly to the treating provider's computer screen, using a pull or query model of exchange. Similarly, a direct integration strategy will be pursued using Lorien Health's and Genesis Healthcare's Point-Click-Care EHR system. Currently, the approved policy framework for the statewide HIE supports only a "push" model of exchange. As part of this project, the MHCC will facilitate the work effort with the support of CRISP and the Policy Board, to develop the appropriate policy framework for enabling the direct integration use case. Issues to be addressed include a) under what circumstances a treating provider can query for records from a LTC facility, b) if and how emergency access to the HIE should be granted, c) the policy and process for allowing seniors or their care takers to view what providers have viewed their information, d) how to effectively delineate between various types of sensitive health information in the absence of highly structure / coded clinical information, and e) what level of authentication and access control is required of LTC facilities.
- 2) *Portal-based integration* – Other LTC facilities across Maryland will have access to the Axolotl Elysium Express portal built into the statewide HIE's core infrastructure. When patients from these facilities arrive at the participating hospital ED, medication reconciliation can be conducted using other available data on the exchange. The patient will be identified as a resident of a long-term care facility (if this information is not otherwise known) using a long-term care facility address cross-reference service that will be developed within the HIE in partnership with LifeSpan Network and the Health Facilities Association of Maryland (HFAM), two associations of long-term care facilities in the state. At the end of the hospitalization for a patient who has been identified as a LTC facility resident, discharge summary data will be pushed to the home LTC facility. Facilities may register to receive discharge information either via the portal, via fax, or via a remote printer, maximizing its impact on the care the state's seniors receive.
- 3) *Advance directives* – Among the most challenging types of data to share across the continuity of care, while ensuring it remains accurate and actionable, are advance directives. Erickson maintains a current repository of advance directive documentation, including original legal documents and orders, with descriptive metadata about the existence of the advance directive, the key contact people, and a description of the circumstances under which it is activated, within the Centricity EHR. As part of the pilot, some of this data will be shared with treating providers during a hospital encounter as part of the CCD C32 transmission. It is anticipated that this component of the pilot will show an immediate impact. At the same time, for over a year, the State Advisory Council on Quality Care at the End of Life, the Maryland Attorney General's Office, the Office of Health Care Quality, the Maryland Institute for Emergency Medical Services Systems (MIEMSS), and the Maryland Board of Physicians have been working towards a framework for standardized advance directives modeled on Physician Orders for Life-Sustaining Treatment Paradigm (POLST). This form, the MOLST form, includes medical orders regarding resuscitation (Cardio Pulmonary Resuscitation) status as well as other life sustaining treatments. A public comment period recently ended and legislation has been drafted for consideration during the 2011 General Assembly to adopt MOLST as a statewide standard. When it is implemented, MOLST will combine and replace the current "EMS DNR" form and the "Instructions on Current Life Sustaining Treatment Options" form. As part of the project, in conjunction with the multi-stakeholder group that has developed MOLST, a single and authoritative statewide registry of electronic advance directive information will be developed. The repository will be capable of housing documents of all types, including the Emergency Medical Services/Do Not Resuscitate form, legal documents, and MOLST forms should they be approved by the legislature. The

repository will be accompanied by a web portal through which providers and patients can view and add documents. The development of this repository will take into consideration not only the requirements of the Maryland LTC community but also successful initiatives in other states, including Oregon and New York. Development of a single “source of truth” for advance directives will alleviate challenges with the current model, which requires carrying original signed documents and may result in patients’ wishes being misinterpreted or not being followed.

Several known challenges with the planned project have been identified and must be mitigated. First, as described above, LTC facilities in Maryland report a relatively low level of current HIT adoption, with reasons including the challenge of meeting the needs of multiple providers in a nursing home, the physical structure of a facility, and a lack of financial resources. The phased, multi-pronged approach will allow facilities without EHRs to benefit from receiving clinical discharge data with minimal training or investment. The web-based portal, which serves as an EHR, is designed to be usable with nothing more than a computer and Internet connection. At the same time, the project will empower those facilities that have implemented EHRs to exchange data directly, in a bi-directional manner, with the hospital EDs with which they share patients. As other facilities adopt EHRs, they may be migrated from the first approach to the second. Other known challenges relate to advance directives. In the current, paper-based environment, it is extremely difficult for treating providers to know a) whether an advance directive exists for the current patient when it is not immediately available in hard copy, and b) if, when a hard copy is present, even if it is signed and executed, whether it is the most up-to-date version and reflects the patient’s current wishes—as anecdotally reported by providers, this often leads to advance directives being disregarded or misinterpreted even when they exist. In the short term, directly integrated LTC facilities can provide hospital EDs with action-oriented metadata on advance directive documentation which may be stored at the facility, or even the documents themselves if they exist in electronic format—ensuring that the existence of the documentation is known at the point of care. In the long term, a single repository will absolve providers of some need to verify that documentation in hand is current and appropriately authorized. They will be less likely to practice defensive medicine with regard to advance directives because data stored in the repository will be trusted as the most current information.

Other barriers to the timely electronic exchange of care summary information may arise that cannot be known at the current time. Systems thinking will be used to anticipate, identify, and mitigate unanticipated risks to the stated outcomes as the project unfolds. As a strategic simulation tool, systems thinking evolved from a variety of tools aimed at mapping and modeling the global interaction of processes, information feedback, and policies across sectors. Viewing the project, and, overall, the statewide HIE implementation and operation from a very broad perspective that includes structures, patterns, and events, rather than limiting the assessment to just the events, allows for rapid detection and identification on the true cause of any issue and helps in determining specific areas that need attention to address these issues. The statewide HIE working under the guidance of the MHCC will dedicate staff to completing the evaluation process. The resource hours are expected to reach about 25 percent of an FTE. The evaluation process will focus on input, processes, outputs, and outcomes pertaining to the project. Ongoing assessments will delineate how events unique to one component of the effort affect the others as well as the project as a whole. The data will be used to balance the processes that control change and help maintain stability. The MHCC already uses a number of systems thinking design tools in conducting ongoing evaluations of the HIE. These tools will increase the understanding and analyses of the project and the conditions that create or affect the interdependencies. Key assessment tools include causal loop diagrams, behavior-over-time graphs, systems archetypes and flow diagrams. Systems thinking will encourage project stakeholders to look at any issues through a broad range of evaluation tools that provide a realistic measurement of performance, and to identify changes necessary to deliver sustainable and comprehensive process improvements. The evaluation process focuses on the treatment group; however, the analysis of data will be compared against a control group. Data for the control group currently exists.

The MHCC convened an independent Policy Board and tasked them with providing the MHCC with recommendations on the policy framework that should govern the operation of the HIE. The Policy

Board has been meeting for the past year identifying, prioritizing and addressing policies necessary to effectively and safely operate the HIE. A collective goal of the MHCC, the Policy Board, and CRISP is to maintain the confidence of the public and of the HIE participants through a demonstrated commitment to sound policy development, implementation, and adherence to established policies. The Policy Board has developed a schedule that defines the deliberation period and schedules for policies to be voted on as recommendations to the MHCC for review and vetting. Once a policy has been recommended by the Policy Board and approved by MHCC, CRISP will develop procedures and implement the policy. CRISP has already developed a framework for defining procedures and is currently operating off of a preliminary policies and procedures model that is being refined and updated through the Policy Board process. Key issues identified in this proposal, and those that are raised during program execution, will be vetted through the Policy Board process. The MHCC possesses the regulatory and other authority necessary to implement, across the state of Maryland, all aspects of the scope of work described in this application.

The following initial project plan and timeline encompass the technology, care delivery, and policy interventions that are proposed. It makes note of resource requirements, partners, and major milestones that align with the included budget:

ID	Task Name	Days	Start	End	Resource Names
1	1 Project Management	526 days?	Tue 3/1/11	Tue 3/5/13	
2	1.1 Project kickoff	1 day?	Tue 3/1/11	Tue 3/1/11	
3	1.2 Weekly status calls	525 days	Wed 3/2/11	Tue 3/5/13	MHCC, CRISP
4	1.3 Monthly program meetings	525 days	Wed 3/2/11	Tue 3/5/13	MHCC, CRISP
5	1.4 Grants administration	525 days	Wed 3/2/11	Tue 3/5/13	MHCC, CRISP
6	1.5 Outreach to LTC facilities to utilize portal	525 days	Wed 3/2/11	Tue 3/5/13	MHCC, CRISP
7	1.6 Outreach for results dissemination	404 days	Thu 8/18/11	Tue 3/5/13	MHCC, CRISP
8	2 Direct LTC Facility Integration	428 days?	Mon 12/28/09	Wed 8/17/11	
9	2.1 Planning Phase	20 days	Wed 3/2/11	Tue 3/29/11	
10	2.1.1 Define project scope	10 days	Wed 3/2/11	Tue 3/15/11	CRISP, Erickson, Axolotl, Lorian, MHCC
11	2.1.2 Identify project team	10 days	Wed 3/2/11	Tue 3/15/11	CRISP, Erickson, Axolotl, Lorian, MHCC
12	2.1.3 Formalize Project Charter	10 days	Wed 3/16/11	Tue 3/29/11	CRISP, Erickson, Axolotl, Lorian, MHCC
13	2.2 Test Environment Installation	406 days?	Mon 12/28/09	Mon 7/18/11	
14	2.2.1 Conduct kickoff meeting	5 days	Wed 3/30/11	Tue 4/5/11	CRISP, Erickson, Axolotl, Lorian
15	2.2.2 Define technical interface / trigger requirements	10 days	Wed 4/6/11	Tue 4/19/11	CRISP, Erickson, Axolotl, Lorian
16	2.2.3 Prepare project work plan	5 days	Wed 4/20/11	Tue 4/26/11	CRISP, MHCC
17	2.2.4 Establish VPN connectivity	10 days	Wed 4/27/11	Tue 5/10/11	
18	2.2.4.1 Conduct Connectivity Requirements Gathering	5 days	Wed 4/27/11	Tue 5/3/11	CRISP, Erickson, Axolotl, Lorian
19	2.2.4.2 Establish technical connectivity	5 days	Wed 5/4/11	Tue 5/10/11	CRISP, Erickson, Axolotl, Lorian
20	2.2.5 Install OUTBOUND ADT interface	10 days	Wed 5/11/11	Tue 5/24/11	
21	2.2.5.1 Load all Erickson, Lorian patients to CRISP MPI	5 days	Wed 5/11/11	Tue 5/17/11	Erickson, Lorian
22	2.2.5.2 Configure on-going ADT feed	5 days	Wed 5/18/11	Tue 5/24/11	Erickson, Lorian
23	2.2.6 Install OUTBOUND CCD Interface to test environment	1 day?	Mon 12/28/09	Mon 12/28/09	
24	2.2.7 Deploy and Configure Erickson, Lorian Edge Servers in CRISP Environment	10 days	Wed 5/25/11	Tue 6/7/11	Axolotl
25	2.2.8 Install OUTBOUND CCD Interface to test environment	16 days	Wed 6/8/11	Wed 6/29/11	
26	2.2.8.1 Configure Centricity, Point-Click-Care to publish to CRISP edge servers	10 days	Wed 6/8/11	Tue 6/21/11	Erickson, Lorian
27	2.2.8.2 Send CCD to CRISP test servers	3 days	Wed 6/22/11	Fri 6/24/11	Erickson, Lorian
28	2.2.8.3 Validate CCD arrival at Edge Servers	3 days	Mon 6/27/11	Wed 6/29/11	Erickson, Lorian
29	2.2.9 Configure Inbound Document Interface	11 days	Thu 6/30/11	Thu 7/14/11	
30	2.2.9.1 Configure Centricity, Point-Click-Care to receive Discharge Summaries from external source	5 days	Thu 6/30/11	Wed 7/6/11	Erickson, Lorian
31	2.2.9.2 Testing inbound document interface from Axolotl	3 days	Thu 7/7/11	Mon 7/11/11	Erickson, Lorian
32	2.2.9.3 Validate Discharge Summary arrival at Erickson, Lorian	3 days	Tue 7/12/11	Thu 7/14/11	Erickson, Lorian
33	2.2.10 Erickson, Lorian Physician and Staff Training	2 days	Fri 7/15/11	Mon 7/18/11	
34	2.2.11 Clinical Workflow Analysis and Redesign	2 days	Fri 7/15/11	Mon 7/18/11	
35	2.3 Production Environment Installation	22 days?	Tue 7/19/11	Wed 8/17/11	
36	2.3.1 Document ongoing support and maintenance process	9 days	Tue 7/19/11	Fri 7/29/11	
37	2.3.2 Upload Physician Address Book (PAB)	9 days	Mon 8/1/11	Thu 8/11/11	
38	2.3.2.1 Provide PAB spreadsheet	1 day	Mon 8/1/11	Mon 8/1/11	Erickson, Lorian
39	2.3.2.2 Complete PAB spreadsheet	5 days	Tue 8/2/11	Mon 8/8/11	Erickson, Lorian
40	2.3.2.3 Upload PAB to production environment	3 days	Tue 8/9/11	Thu 8/11/11	Erickson, Lorian
41	2.3.3 Outbound ADT Go-Live	2 days?	Fri 8/12/11	Mon 8/15/11	
42	2.3.3.1 Move ADT interface into production	1 day?	Fri 8/12/11	Fri 8/12/11	Erickson, Lorian
43	2.3.3.2 Verify ADT feed	1 day?	Mon 8/15/11	Mon 8/15/11	Erickson, Lorian
44	2.3.4 Outbound CCD Go-Live	2 days	Tue 8/16/11	Wed 8/17/11	
45	2.3.4.1 Move outbound CCD interface into production	1 day	Tue 8/16/11	Tue 8/16/11	Erickson, Lorian
46	2.3.4.2 Verify CCD publishing correctly	1 day	Wed 8/17/11	Wed 8/17/11	Erickson, Lorian
47	2.3.5 Inbound Discharge Summary Go-Live	2 days?	Tue 8/16/11	Wed 8/17/11	

(Continued on the following page)

ID	Task Name	Days	Start	End	Resource Names
48	2.3.5.1 Move inbound document interface into production	1 day?	Tue 8/16/11	Tue 8/16/11	Erickson,Lorien
49	2.3.5.2 Verify document arriving correctly	1 day?	Wed 8/17/11	Wed 8/17/11	Erickson,Lorien
50	3 Portal-Based Integration	89 days?	Wed 3/2/11	Mon 7/4/11	
51	3.1 LTC Facility Address Cross-Reference Service	88 days?	Wed 3/2/11	Fri 7/1/11	
52	3.1.1 Planning Phase	50 days	Wed 3/2/11	Tue 5/10/11	
53	3.1.1.1 Define project scope	10 days	Wed 3/2/11	Tue 3/15/11	CRISP,LifeSpan,Axolotti,HFAM,MHCC
54	3.1.1.2 Identify project team	10 days	Wed 3/16/11	Tue 3/29/11	CRISP,HFAM,Axolotti,LifeSpan,MHCC
55	3.1.1.3 Formalize Project Charter	30 days	Wed 3/30/11	Tue 5/10/11	CRISP,HFAM,Axolotti,LifeSpan,MHCC
56	3.1.2 Environment Installation	20 days	Wed 5/11/11	Tue 6/7/11	
57	3.1.2.1 Conduct kickoff meeting	5 days	Wed 5/11/11	Tue 5/17/11	CRISP,HFAM,Axolotti,LifeSpan,MHCC
58	3.1.2.2 Define technical interface / trigger requirements	10 days	Wed 5/18/11	Tue 5/31/11	CRISP,HFAM,Axolotti,LifeSpan,MHCC
59	3.1.2.3 Prepare project work plan	5 days	Wed 6/1/11	Tue 6/7/11	CRISP,MHCC
60	3.1.3 Establish node connectivity	15 days	Wed 6/8/11	Tue 6/28/11	
61	3.1.3.1 Conduct Connectivity Requirements Gathering	5 days	Wed 6/8/11	Tue 6/14/11	CRISP,MHCC
62	3.1.3.2 Establish technical connectivity	10 days	Wed 6/15/11	Tue 6/28/11	CRISP,MHCC
63	3.1.4 Go-live	3 days?	Wed 6/29/11	Fri 7/1/11	
64	3.1.4.1 Document ongoing support and maintenance process	1 day?	Wed 6/29/11	Wed 6/29/11	CRISP,MHCC
65	3.1.4.2 Testing	1 day?	Thu 6/30/11	Thu 6/30/11	CRISP,MHCC
66	3.1.4.3 Go-live	1 day?	Fri 7/1/11	Fri 7/1/11	CRISP,MHCC
67	3.2 Pilot Portal Facilities	1 day?	Mon 7/4/11	Mon 7/4/11	
68	3.2.1 Genesis Physician and Staff Training	1 day?	Mon 7/4/11	Mon 7/4/11	CRISP,Genesis
69	3.2.2 Clinical Workflow Analysis and Redesign	1 day?	Mon 7/4/11	Mon 7/4/11	CRISP,Genesis
70	4 Advance Directives Registry	175 days	Wed 3/2/11	Tue 11/1/11	
71	4.1 Requirements definition	40 days	Wed 3/2/11	Tue 4/26/11	MHCC,CRISP
72	4.2 Design	55 days	Wed 4/27/11	Tue 7/12/11	
73	4.2.1 Application functional spec	30 days	Wed 4/27/11	Tue 6/7/11	CRISP
74	4.2.2 Application technical architecture	20 days	Wed 6/8/11	Tue 7/5/11	CRISP
75	4.2.3 Deployment/integration plan	5 days	Wed 7/6/11	Tue 7/12/11	CRISP
76	4.3 Development	60 days	Wed 7/13/11	Tue 10/4/11	CRISP
77	4.4 Testing	20 days	Wed 10/5/11	Tue 11/1/11	CRISP
78	4.5 User manual	4 days	Wed 10/5/11	Mon 10/10/11	CRISP
79	4.6 Go-Live, Proof of Concept	1 day	Tue 10/11/11	Tue 10/11/11	MHCC,CRISP
80	5 Policy Intervention	37 days?	Wed 3/2/11	Thu 4/21/11	
81	5.1 HIE Policy Board initial briefing on use case, draft policies presented	1 day?	Wed 3/2/11	Wed 3/2/11	MHCC,CRISP
82	5.2 Second discussion/clarification/new policies proposed	18 days	Thu 3/3/11	Mon 3/28/11	MHCC,CRISP
83	5.3 HIE Policy Board vote on policy framework	18 days	Tue 3/29/11	Thu 4/21/11	MHCC,CRISP
84	6 Measurement	525 days?	Wed 3/2/11	Tue 3/5/13	
85	6.1 Draft evaluation plan	20 days	Wed 3/2/11	Tue 3/29/11	MHCC,CRISP
86	6.2 Establish baseline for key measures	10 days	Wed 3/30/11	Tue 4/12/11	MHCC,CRISP
87	6.3 Compile monthly reports	1 day?	Wed 3/2/11	Wed 3/2/11	MHCC,CRISP
88	6.4 Results dissemination	488 days	Fri 4/22/11	Tue 3/5/13	MHCC,CRISP

Measurement and evaluation will be structured and iterative. The project team will work with the Health Facilities of Maryland and use data collected and published by the MHCC to establish a suitable control group against which to measure the impact of the direct integration service. This cohort of patients will be selected from among LTC facilities that do not possess an EHR and are not participating in the project either through direct integration with the HIE or via receiving discharge data through the portal, fax or printer. Compared to the control group, the direct integration pilot will be measured against the following data points:

- Percentage of care transitions to and from LTC facilities and proximate hospital EDs for which there is a summary of care document exchanged;
 - Medication reconciliation, including discontinued, new medications and rationale;
- Percentage of care transitions to and from LTC facilities and proximate hospital EDs for which the summary of care document includes action-oriented information on the existence of an advance directive;
- Average time to transmit electronic care summary information from date of discharge/transfer (this data will be measured for both the direct integration pilot and those LTC facilities receiving discharge summaries via portal, fax or printer);
- Percent change in hospital readmission rates for patients discharged from targeted acute care hospitals to pilot LTC facilities; and
- Percentage change of testing needed in the acute care hospital, along with pending results and the time needed to treat.

Additionally, the project's outreach activities to LTC facilities without EHRs will be measured by:

- Number of LTC facilities without EHRs receiving hospital discharge summaries via each of the following: web portal, fax, or printer.

The University of Maryland Robert H. Smith School of Business's Center for Health Information and Decision Systems has agreed to assist with the evaluation design, project measurement and results

dissemination. The scholars of the Center for Health Information and Decision Systems have deep experience in conducting peer-reviewed research of comparable programs.

According to research published by the Hilltop Institute and sponsored by the Maryland Department of Health and Mental Hygiene, 21,432 patients reside in Maryland nursing homes as of 2010. These patients live in approximately 235 nursing homes in every geographic region of the state. Component 2 of the proposed project, *Portal-Based Integration*, presents the opportunity to provide a service to all of them, by offering their home facilities the opportunity to receive discharge information electronically for any patient hospitalization. Similarly, the advance directives repository that will be developed as part of Component 3, when live, will serve all of those patients as well as their caregivers and families. Component 1, *Direct Integration*, will serve more targeted and geographically localized populations with a larger number of services. As confirmed by data collected by the MHCC's Center for Long-Term and Community-Based Care, the six LTC facilities participating in the direct integration pilot possess the following number of skilled nursing beds:

LTC Facility	# Skilled Nursing Beds	County
Erickson – Oakcrest	240	Baltimore County
Erickson – Riderwood	132	Prince George's County
Lorien Encore at Turf Valley	63	Howard County
Lorien Columbia	209	Howard County
Genesis Salisbury Center	305	Wicomico County
Genesis Woodside Center	92	Montgomery County
TOTAL	1,041	5 counties

Additionally, each facility employs more than a dozen licensed providers who will be impacted by the project. Further, the participating ED medical staff at six hospitals will be impacted by the project. The project will serve a geographic cross-section of Maryland, including both the Baltimore and Washington, D.C., metropolitan areas.

Applicant Capabilities

The Maryland General Assembly created the MHCC in 1999 to “establish a streamlined health care regulatory system in this state in a manner such that a single state health policy can be better articulated, coordinated, and implemented.” As Maryland’s single, independent health care regulatory agency as well as the agency in charge of overseeing the implementation of the statewide HIE, the MHCC possesses the right capabilities for understanding Challenge Theme Two and executing on the proposed project. Within state government, the MHCC is leading initiatives to expand the use of EHRs among Maryland providers, roll out a secure, scalable HIE infrastructure, and plan for how these tools can benefit from Medicaid modernization. Even before the American Recovery and Reinvestment Act of 2009, the MHCC’s Center for Health Information Technology was conducting research and convening stakeholders to better understand the benefits and costs associated with HIE. The initial exploration of the topic involved the MHCC in 2005 providing leadership to the Task Force to Study Electronic Medical Records, as established by the General Assembly and appointed by Governor Martin O’Malley. Subsequently, the MHCC performed a study to identify the barriers to appropriate information exchange in Maryland and to develop strategies to address privacy and security. Concurrently, the MHCC has conducted in-depth research on the current state of HIT in Maryland; work products of this research include multiple policy reports such as *An Assessment of Health IT in Maryland Hospitals* and *An Assessment of EHR Use in Maryland Nursing Homes*. These analyses have helped shape the Maryland State Plan for Health IT (FY10-FY13) which was approved by the Office of the National Coordinator for

Health Information Technology (ONC) in the fall of 2010. The MHCC has developed a number of practical tools and resources for the provider community as they seek to select, implement and meaningfully use EHRs. These resources include an online EHR Product Portfolio for ambulatory practices and long term care and a distinctive State-Designated Management Services Organizations Program for hosted EHRs and other services to support meaningful use, which coordinates closely with the state's Regional Extension Center (REC).

Another core responsibility of the MHCC within state government is understanding, planning, and paying for long-term care in the state of Maryland. The Center for Long-term and Community-based Care focuses on improving long-term and community-based care, bringing together planning and public reporting efforts. The Center is responsible for health planning regarding long-term and community-based care, including the policies guiding the determination of need in the Certificate of Need process for nursing homes, home health agencies, and hospices. The Center is also responsible for the Commission's study of long-term care vision and needs over the coming 25 years, required by legislation during the 2006 session of the General Assembly. The Center publishes the Nursing Home Guide for Marylanders, providing an easy way to locate and compare nursing homes on quality and outcomes measures. The Center is also pioneering the public reporting of resident and family satisfaction measures. Finally, the Center has responsibility for policies and information dissemination related to Maryland assisted living programs.

Several partners and collaborative relationships will be vital to the success of this project. These relationships are preexisting, with a demonstrated track record of collaborating on innovative and successful healthcare technology and policy initiatives. Key partners include:

1. *CRISP* is a not-for-profit membership corporation advised by a wide range of stakeholders responsible for the healthcare of Maryland's citizens. It receives input and advice from patients; hospital systems; physicians; insurance providers; technology providers; privacy advocates; public health officials; and advocates for seniors, the uninsured, and the medically underserved. CRISP is formally designated as Maryland's statewide HIE by the MHCC, as directed by the state's legislature and Gov. Martin O'Malley. CRISP has also been named Maryland's REC by the ONC, with an objective of assisting 1,000 priority primary care providers to deploy EHRs and achieve meaningful use by 2012.
2. *Erickson Living* – Erickson is a system of retirement communities with 16 campuses in nine states, including three located in Maryland. As the largest such group of campus-style, continuing care retirement communities in the United States, Erickson equips its locations with a number of wellness-related resources including on-site medical centers staffed with primary care physicians specializing in geriatrics.
3. *Lorien Health Systems* – Lorien is a comprehensive health care network with facilities throughout Central Maryland and the surrounding areas. Lorien offers nursing and sub-acute care in specialty areas such as rehabilitation therapy, dialysis, ventilator care, and others.
4. *Genesis Healthcare* – Genesis operates 200 skilled nursing centers and assisted living residences in 13 states, including 35 in Maryland. Genesis offers an array of short stay and long-term care services. More unique units include "progression" services (after leaving the hospital but before returning home), specialized care for Alzheimer's and dementia patients, ventilator and dialysis care.
5. *The Health Facilities Association of Maryland (HFAM)* – HFAM is a leader and advocate for Maryland's long-term care provider community. Over 150 providers, 19,000 employees and 25,000+ Marylanders in need have entrusted HFAM to be their partner in quality care. HFAM is the largest skilled nursing provider community in Maryland representing every type of provider: small, locally family-owned independent nursing facility, faith-based not-for-profit organizations and the state's and country's largest multi-national providers. Member facilities offer assisted living, sub-acute, rehabilitation and long-term care nursing services and are found in every community in every county and city across Maryland.

6. *LifeSpan Network* – LifeSpan is the largest senior care provider association in the Mid-Atlantic, representing more than 300 senior care provider organizations in Maryland and the District of Columbia. LifeSpan’s members include not-for-profit and for-profit facilities providing care and services to seniors across the continuum of care, including: independent living, assisted living, nursing facilities, continuing care retirement communities, subsidized senior housing, community-based and hospital-based programs.
7. *Holy Cross Hospital* – Holy Cross Hospital is one of the largest hospitals in Maryland. Founded in 1963 by the Congregation of the Sisters of the Holy Cross, today Holy Cross Hospital is a 448-bed, not-for-profit teaching hospital. Located in Silver Spring, Maryland, the hospital primarily serves residents of the state’s two largest jurisdictions, Montgomery and Prince George’s counties. In fiscal year 2010, Holy Cross had the second most patient admissions in the state. Holy Cross was the first hospital to go live on Maryland’s statewide HIE.
8. *MedStar Health* – MedStar is a not-for-profit, regional healthcare system with a network of nine hospitals and 20 other health-related businesses across Maryland and the Washington, D.C., region. As the area’s largest health system, MedStar has more than 166,000 inpatient admissions and more than 1.6 million outpatient visits each year. Franklin Square Hospital Center, a MedStar hospital, is a 380-bed, full-service, acute and subacute care community teaching hospital located in Eastern Baltimore County. It is one of the busiest hospitals in cardiology, emergency medicine, general medicine, obstetrics, and oncology. All of MedStar’s Maryland hospitals are scheduled to be live on the statewide HIE in 2011.
9. *Peninsula Regional Medical Center* – Peninsula Regional Medical Center, a non-profit, 362 bed component at the hub of the Peninsula Regional Health System, is a 113-year-old, fully Joint Commission accredited tertiary care facility featuring the Delmarva peninsula’s widest array of specialty and sub-specialty services. Over 330 physicians and 3,000 health care professionals and volunteers provide the care and compassion that nearly 500,000 patients rely on each year for inpatient, outpatient, diagnostic, sub-acute and emergency/trauma services.
10. *The University of Maryland Robert H. Smith School of Business, Center for Health Information and Decision Systems (CHIDS)* – CHIDS is an academic research center with collaboration from industry and government affiliates, and is designed to research, analyze, and recommend solutions to challenges surrounding the introduction and integration of information and decision technologies into the health care system. CHIDS offers the benefit of a world-class research staff and renowned scholars in technology implementation, adoption, assimilation, decision sciences and information technology. CHIDS serves as a focal point for thought leadership around the topic of health information and decision systems.

This team’s track record for success is further underscored by key staff members’ deep past involvement in initiatives involving health IT and long-term care. Current CRISP staff, including the president of the organization and the lead technical architect, worked directly with Erickson Living to integrate the medical facility at its Charlestown community with the ED at nearby St. Agnes Hospital in order to improve the quality of care delivered to patients transitioning between both facilities. This project was recognized as a finalist in the interoperability category for the prestigious 2007 Microsoft Healthcare User Group awards.

The MHCC has assembled a highly qualified, multi-stakeholder group of key individuals who will serve alongside of the MHCC on an executive steering committee for this project. Below is the list of representatives:

Team Member	Relevant Experience
David Horrocks President, CRISP	Has led the development of CRISP from conceptual stages through to strategic planning and currently deployment and implementation. Led effort to deploy EMRs to all Erickson Retirement Community primary care providers, skilled nursing facilities, and rehabilitation departments. Oversaw initiation of HIE between Erickson’s Charlestown Retirement Community and the St. Agnes Hospital Emergency Department.

<p>Scott Afzal</p> <p>Program Director, CRISP</p>	<p>Leads project management and systems integration efforts for the CRISP HIE. Co-authored the final statewide health information exchange plan for Maryland. Managed the design and development of a networked consumer personal health record application.</p>
<p>Mrinal Bhasker</p> <p>Chief Technical Architect, CRISP</p>	<p>Leads technical aspects of statewide HIE implementation. Previously served as the product lead and chief architect for a HIE infrastructure company.</p>
<p>Matthew Narrett, M.D.</p> <p>Chief Medical Officer, Erickson Living</p>	<p>Responsible for directing the provision of medical care across all Erickson communities. Over 25 years of practicing adult and geriatric medicine. Currently serves on the Clinical Practice and Models of Care Committee for the American Geriatric Society. Board member of CRISP.</p>
<p>Bill Russell, M.D.</p> <p>Vice President of Clinical Informatics, Erickson Living</p>	<p>Has helped move clinical informatics past the core functionality of individual applications to a functional health record that supports professional staff at the point of care and builds the data set necessary for decision support and analytics. Practicing physician.</p>
<p>John Loome, M.D.</p> <p>Senior VP of Medical Affairs, Genesis Healthcare</p>	<p>Has clinical oversight responsibility for about 70 skilled nursing facilities in 6 states for Genesis Physician Services. Held several appointments including Clinical Assistant Professor of Medicine at University of Maryland School of Medicine. Received his MD from Georgetown University School of Medicine in Washington, DC and Internship and Residency in Internal Medicine at Baylor College of Medicine in Houston, Texas. Also completed a Fellowship in Geriatric Medicine/Gerontology from Johns Hopkins University School of Medicine. A member of various organizations including the American College of Physicians, The American Medical Directors Association, and The American Geriatrics Society.</p>
<p>Lou Grimmell</p> <p>Chief Executive Officer, Lorien Health</p>	<p>A home grown product of the Lorien organization, he has worked his way up through the ranks while performing in every aspect of the healthcare industry since 1977. This experience has given a creative and insightful view of management of a senior-care organization. Under his leadership, the company has combined a very diverse and imaginative approach to blending technology, quality improvement measures and more efficient methods to maintain the philosophy of delivering quality care to residents. The combination of talented individuals coupled with extreme amounts of passion only equates to success.</p>
<p>Tricia Nay, M.D.</p> <p>Medical Director, Department of Health and Mental Hygiene Office of Health Care Quality</p>	<p>Oversees the licensing, certification, and regulation of Maryland state healthcare facilities. Practicing physician and owner of Rockville Geriatrics and Palliative Medicine, LLC.</p>
<p>Paul Ballard</p> <p>Assistant Attorney General, Office of the Attorney General of Maryland</p>	<p>Serves as Counsel for Health Decisions Policy. Counsel to the DHMH Office of Health Care Quality.</p>
<p>Kenyon Crowley, M.B.A., M.S., CPHIMS</p> <p>Associate Director, Center for Health Information and Decision Systems (CHIDS) at the Robert H. Smith School of Business, University</p>	<p>Manages programs to research, analyze, and recommend solutions to challenges surrounding the introduction and integration of information and decision technologies into the health care system. His research has explored HIE performance and sustainability, EHR design, health information system maturity models, EHRs to support clinical research, pay-for-performance schemes, health 2.0 technologies, economic models and innovative applications of health IT for consumer and clinical use. He has over 9 years experience managing multi-disciplinary projects for both commercial and government clients. His experience includes health IT strategy with Johnson & Johnson. Mentorship Co-Chair of the</p>

of Maryland College Park	Health Information Management Systems Society National Capital Area chapter and former President of the Healthcare Business Association.
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The project will be developed using CRISP's core HIE infrastructure and will rely on the underlying sustainability plan of the statewide exchange for ongoing operations. CRISP sustainability modeling and planning has been a continuing priority for the MHCC, CRISP staff and the CRISP Finance Committee. While CRISP is currently financed by state and federal grant funding, the organization must generate enough value for its stakeholders to justify fees to support ongoing operations. Based on a recommendation from the Finance Committee and approved by the board of directors, CRISP has developed an MHCC-approved sustainability plan that relies largely on hospital fees. To date, CRISP has received eight signed hospital participation agreements that include the fee schedule. Beyond those executed agreements, CRISP has received letters of intent to participate from every acute care hospital in the state. The fees will be gradually implemented over the next four years, so as to best align the costs of participation with the increasing value of a maturing HIE. These fees would be sufficient to make the activities described in this pilot sustainable, even if scaled to broad statewide participation. However, CRISP will continue to evaluate how and to whom value inures and will update the sustainability plan over time to include additional stakeholders as fee-paying participants in the HIE.

For the proposed project, the majority of the costs are associated with one-time system development lifecycle costs; such costs will in the future need to be absorbed by new participating facilities, however it is expected that many of the costs will decline over time as the HIE matures. On-going costs include maintenance and licensing of edge servers which will be subsidized by overall revenue generated by CRISP fee schedules.

Due to the nature of this project and its planned linkage to CRISP's existing infrastructure, the need for new human resources or infrastructure (other than what is already required for scheduled go-lives on the Maryland HIE) will be very minimal. From a hardware standpoint, the LTC facilities participating in the direct integration pilot will require edge servers in order to store resident health information and make it accessible to the partner medical facilities via the HIE. The process of licensing, installing and configuring these devices will be facilitated by CRISP, as the edge devices will reside at the CRISP data center. No new workspaces or other facilities will be required. The MHCC believes that in leveraging pre-existing infrastructures and resources, the burden on participants will be minimized and the likelihood for project success will be greatly increased.

General Funding Requirements

Based on published research and firsthand experience of the project team, it is clear that other regions and states face comparably low levels of EHR adoption among LTC facilities and struggle with the challenge of coordinating care across multiple settings for the elderly and the chronically ill. By proving that care transitions between LTC facilities and hospital EDs can be improved by electronic transition of care summary information, both through direct integration via a statewide HIE and via a web portal for facilities without EHRs, the project will serve as a roadmap for other states to pursue this use case. Within Maryland alone, it is expected that as the results of the direct integration pilot with six pairs of LTC facilities and hospital EDs are measured and disseminated, other LTC facilities either with EHRs or with plans to implement one will seek to participate. Honoring each patient's documented wishes and providing him or her with the best care available across multiple settings is a goal in itself. However, it is also known that caring for the elderly and the chronically ill are among the most costly obligations of the nation's healthcare community as a whole; the fact that use cases such as the one that will be piloted in this project can help streamline care, reduce duplicative tests and procedures, and minimize medical errors and omissions makes the project highly worthwhile to pursue.

An open process will be employed to share progress of the project, relate challenges and lessons learned, and disseminate results. Many meetings are already public; for instance, minutes and agendas of meetings of the MHCC-convened HIE Policy Board, which will be charged with making

recommendations on key policy matters related to the project, are published on the MHCC website. In addition, the MHCC and CRISP websites will be used to disseminate to the public and other interested parties working papers, status updates, interim reports and other artifacts of the project. Members of the project team will also participate in all ONC-sponsored workgroups and communities of practice in addition to speaking at industry conferences and gatherings.

All of the intellectual property that is developed as a result of this cooperative agreement and directly related to the grant will be made public. That will include functional and technical specifications, as well as any source code that is developed for new tools. For example, specifications for the novel LTC facility address cross-reference service will be made available publicly, so that statewide HIEs elsewhere in the country may adapt them for their own needs. Other HIEs using, as Maryland is, Axolotl Corp.'s Elysium core infrastructure solution may be able to deploy the service without modification. Similarly, all designs, methods and approaches related to the statewide advance directives repository that are newly developed as part of this cooperative agreement will be made available publicly on the CRISP website. To date, the workgroup developing Maryland's MOLST form standard has published regular updates on its work to the Maryland Department of Health and Mental Hygiene website.

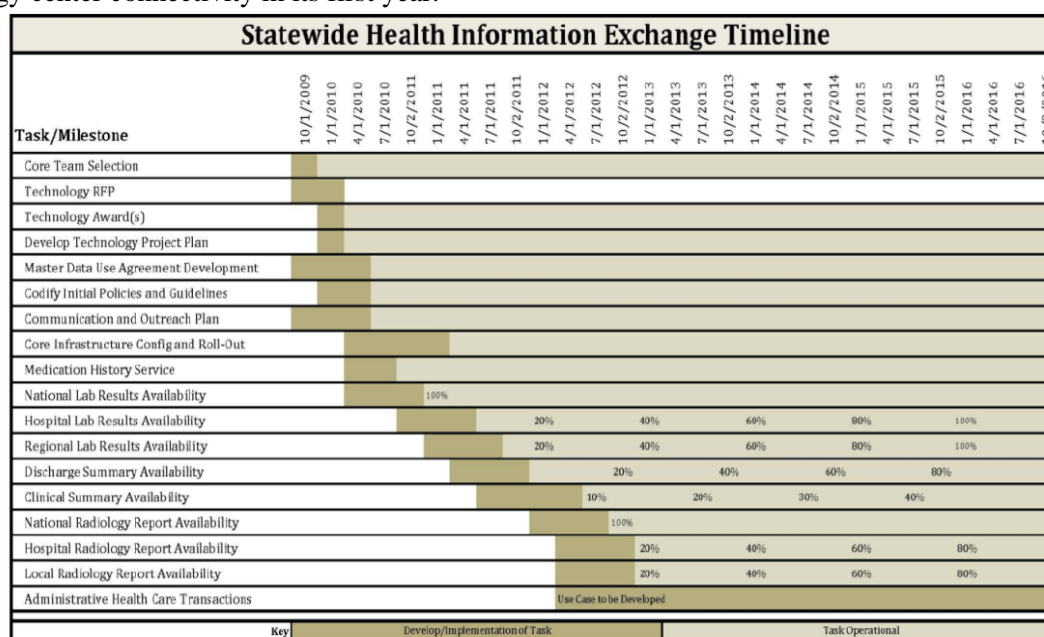
An ongoing measurement and evaluation program will be implemented that examines both process and outcome measures related to effective information flow in care hand-offs and that will provide the foundation for assessing the performance of the HIE. Data will be collected for a period of 24 months to provide a robust basis for evaluation. Data will be reviewed on a quarterly basis, with aggregate findings disseminated to participants, ONC and the public, as well as individual results delivered to respective participating facilities. Events will be measured at each stage of care progression intervention spanning admittance to discharge to post-discharge. In addition to outcomes, a variety of contextual and process factors will be studied. Studies of nationwide electronic health record systems indicate that organizational, social, and technical factors collectively constrain or enable the success of timely electronic information exchange between entities in the healthcare ecosystem (Robertson et al. 2010). Organizational factors include teamwork among care providers, perceived risks and benefits of the technological solution, and realistic expectations and timelines. The social dimension incorporates barriers caused by workflow changes and associated resistance by care providers, patient's views, and user engagement. Finally, the technical dimension identifies barriers and facilitators related to usability, data quality, etc.

To isolate specific socio-technical factors that are impediments to or facilitators of the timely electronic exchange of care summary documents a study design is proposed that utilizes the exemplar case approach. Specifically, a selection of care transition environments will be identified that are demonstrating success on the transition quality outcome measures identified, as well as a selection of others that are performing poorly on the same set of outcomes. An in-depth qualitative study will be conducted to understand a) what factors have contributed to the success of the first set of organizations, b) what factors have impeded the second set of organizations from achieving high performance, and c) what are the policies and regulations at the participating institutions and jurisdictions that may influence performance. Data will be collected through multiple methods including interviews and observation, and analyzed using recommended qualitative analysis methods to inductively isolate themes and data categories. A snowballing technique will be used to identify interview respondents, beginning with the head of the facility. A minimum of 10 interviews per site will be conducted that will include at least 6 providers. The project team will conduct participant observation of 10 care transition incidents. The interviews and observations will be conducted during the first six months after the initiation of the evaluation program. New interventions may be introduced into the three underperforming facilities at the end of the first six months of the evaluation period and their effectiveness monitored.

A final set of analyses the project team proposes to conduct are related to an economic assessment of electronically-enabled care coordination. The project team will evaluate whether there is a statistically significant change in hospital readmission rates (30, 90, 180 days) over the course of the study period, and how these rates compare with national norms. Using average costs of readmissions for different index conditions will allow us to quantify the value being generated by the pilot project.

The organizations implementing and operating Maryland's statewide HIE have defined adherence to federally recognized standards as a key tenant of the organization and a requirement of the MHCC. The MHCC have stressed in planning documents, as well as in strategic and operational plans, the centrality of standards-based exchange in the HIE model. Yet, CRISP also recognizes that in some circumstances (not all), there are limitations to the progress Axolotl has made in adhering to constantly evolving standards and specifications. Many HIE organizations will emphasize the marketing materials that have been pitched to them by HIE vendors and integrators in terms of their adherence to most standards, but CRISP recognizes the true difference between "an ability" to integrate leveraging a specific standard and a "demonstrated production level instance" of that standard. In the HIE space, far more of the former is present with a frustrating lack of the latter. However, most vendors, including CRISP's, move in directions demanded by their clients, and adherence to NHIN standards and specifications is a requirement in CRISP's relationship with Axolotl. CRISP is deploying IHE-based transaction sets including the cross-enterprise document sharing profile (XDS.b) and the associated profiles related to identity management, auditing, security, and cross-community sharing (PIX, PDQ, ATNA, XCA). CRISP is also focusing on moving away from HL7-based clinical documents towards the CCD C32 specification. CRISP sees the rapid expansion of the capability for many EHR vendors to transact leveraging the IHE profiles and exchanging CCDs. CRISP will encourage use of IHE, CCD and other NHIN specifications as preferable transport, message and content standards.

Maryland's State Health IT Plan calls for the statewide HIE to seek connectivity from all provider organizations for whom exchange will provide a clinical value. Maryland has been able to make rapid progress with this task, but has primarily been focused on the 46 acute care hospitals, laboratory, and radiology center connectivity in its first year.



Additionally, large provider practices that would benefit from consuming data from those sources, as well as priority primary care providers working with Maryland's REC, are in the process of planning for connectivity. While there is clear value in connecting LTC facilities to the HIE, and the use case for their participation is clearly defined, because of challenges and concerns described elsewhere in this application, they have as of yet not been made a priority. This cooperative agreement will support that gap in the existing statewide HIE cooperative agreement. Novel solutions such as the LTC facility address cross-reference service and the statewide advance directives repository align clearly with and enhance the goals of the *State Health Information Exchange Cooperative Agreement Program*, but previous to this application have not been pursued in Maryland.

Budget, Level of Effort, & Justification

The proposed budget supports the project's needs by providing resources to the participating LTC facilities to implement the direct HIE integration use case. Hospital connectivity is not included in the budget because it will be paid for using other means, however the project leverages this connectivity to a great extent. The budget also funds conceptualization, development and testing of new technologies which will be made available on an open-source basis and can be used elsewhere, most notably the LTC facilities address cross-reference service and the advance directives repository. Oversight, administration and project management are as streamlined as feasible to ensure project success.

At a high level, the proposed budget is notable for the great level of effort expended during the first seven months of the project, during fiscal year 2011. This scheduling is intentional—the project team believes speed to market is important and rolling out the direct integration pilot immediately as hospitals go live on the HIE (as previously scheduled) will help ensure positive momentum. The budget is explained in greater detail below:

Fiscal Year 1 Budget

	Federal Funds	Non-Federal Cash	Non-Federal In-Kind	TOTAL	Supporting Detail/Justification
Personnel	\$ 22,500	\$ -	\$ -	\$ 22,500	A partial allocation of one MHCC FTE @ \$113,330 per year inflated by 3.5% providing project administrative support and reporting
Fringe Benefits	\$ 7,500	\$ -	\$ -	\$ 7,500	25% of salary, MHCC standard: payroll taxes (9.55%) and insurance (15.45%)
Travel	\$ -	\$ -	\$ -	\$ -	
Equipment	\$ 55,450	\$ -	\$ -	\$ 55,450	Hardware for three Axolotl edge devices in CRISP data center @ \$15,450, hardware and software for integrated facility address-cross reference service @ \$10,000, hardware and software for AD repository and edge device @ \$30,000
Supplies	\$ -	\$ -	\$ -	\$ -	
Contractual	\$ 1,366,086	\$ -	\$ 196,400	\$ 1,562,486	1. Direct integration pilot: a. <i>Erickson</i> : Technical integration services 250 hrs @ \$100/hr; operations activities (training, workflow redesign, patient education, consent work/opt-out,

					<p>document development, measurement & analytics) 750 hrs @ \$100/hr; legal and policy review 100 hrs @ \$100/hr</p> <p>b. <i>Lorien</i>: Technical integration services 250 hrs @ \$100/hr; operations activities (training, workflow redesign, patient education, consent work/opt-out, document development, measurement & analytics) 750 hrs @ \$100/hr; legal and policy review 100 hrs @ \$100/hr</p> <p>c. <i>Genesis</i>: Technical integration services 250 hrs @ \$100/hr; operations activities (training, workflow redesign, patient education, consent work/opt-out, document development, measurement & analytics) 750 hrs @ \$100/hr; legal and policy review 100 hrs @ \$100/hr</p> <p>d. <i>Axolotl</i>: 3 edge devices configuration and license \$169,086</p> <p>e. <i>CRISP & UM Smith School</i>: Project management, analysis and information sharing 665 hrs @ \$150/hr; support 70 hrs @ \$150/hr</p> <p>2. Portal based integration:</p> <p>a. <i>CRISP</i>: LTC facility outreach 170 hrs @</p>
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					<p>\$150/hr; pilot facilities training 200 hrs @ \$150/hr; facility address cross reference tech development 200 hrs @ \$150/hr, directory policies development 335 hrs @ \$150/hr; project management 665 hrs @ \$150/hr; support 35 hrs @ \$150/hr</p> <p>b. <i>Axolotl</i>: Integration services 100 hrs @ \$150/hr</p> <p>3. Advance directives:</p> <p>a. <i>CRISP & UM Smith School</i>: MOLST workgroup facilitation & staffing 130 hrs @ \$150/hr; legislative interventions 130 hrs @ \$150/hr; repository tech development & test 850 hrs @ \$150/hr; physician interface dev 665 hrs @ \$150/hr; consumer interface dev 500 hrs @ \$150/hr; project mgmt and analysis 500 hrs @ \$150/hr; support 100 hrs @ \$150/hr</p> <p>b. <i>Axolotl</i>: Repository HIE integration 330 hrs @ \$150/hr</p> <p>(In-kind explained below.)</p>
Other	\$ -	\$ -	\$ -	\$ -	
Indirect Charges	\$ -	\$ -	\$ -	\$ -	
TOTAL	\$ 1,451,536	\$ -	\$ 196,400	\$ 196,400	

Fiscal Year 2 Budget

	Federal Funds	Non-Federal Cash	Non-Federal In-Kind	TOTAL	Supporting Detail/ Justification
Personnel	\$ 11,250	\$ -	\$ -	\$ 11,250	A partial allocation of one MHCC FTE @ \$113,330

					per year inflated by 3.5% providing project administrative support and reporting
Fringe Benefits	\$ 3,750	\$ -	\$ -	\$ 3,750	25% of salary, MHCC standard: payroll taxes (9.55%) and insurance (15.45%)
Travel	\$ -	\$ -	\$ -	\$ -	
Equipment	\$ -	\$ -	\$ -	\$ -	
Supplies	\$ -	\$ -	\$ -	\$ -	
Contractual	\$ 491,680	\$ -	\$ 130,400	\$ 622,080	<ol style="list-style-type: none"> 1. Direct integration pilot: <ol style="list-style-type: none"> a. <i>Axolotl</i>: 3 edge devices license \$76,386 b. <i>CRISP & UM Smith School</i>: Project management, analysis and information sharing 500 hrs @ \$155.25/hr; support 100 hrs @ \$155.25/hr 2. Portal based integration: <ol style="list-style-type: none"> a. <i>CRISP</i>: Facility address cross reference tech dev & enhance 80 hrs @ \$155.25/hr, directory policies refinement 80 hrs @ \$155.25/hr; project management 500 hrs @ \$155.25/hr; support 100 hrs @ \$155.25/hr 3. Advance directives: <ol style="list-style-type: none"> a. <i>CRISP & UM Smith School</i>: MOLST workgroup facilitation & staffing 70 hrs @ \$155.25/hr; legislative interventions 70 hrs @ \$155.25/hr; repository tech development & test 300 hrs @ \$155.25/hr; physician interface dev 80 hrs @ \$155.25/hr; consumer interface dev 65 hrs @ \$155.25/hr; project

					mgmt and analysis 500 hrs @ \$155.25/hrs; support 180 hrs @ \$155.25/hr (In-kind explained below; all rates were inflated by 3.5% per year.)
Other	\$ -	\$ -	\$ -	\$ -	
Indirect Charges	\$ -	\$ -	\$ -	\$ -	
TOTAL	\$ 506,680	\$ -	\$ 130,400	\$ 637,080	

Fiscal Year 3 Budget

	Federal Funds	Non-Federal Cash	Non-Federal In-Kind	TOTAL	Supporting Detail/Justification
Personnel	\$ -	\$ -	\$ -	\$ -	
Fringe Benefits	\$ -	\$ -	\$ -	\$ -	
Travel	\$ -	\$ -	\$ -	\$ -	
Equipment	\$ -	\$ -	\$ -	\$ -	
Supplies	\$ -	\$ -	\$ -	\$ -	
Contractual	\$ -	\$ -	\$ 104,000	\$ 104,000	(In-kind explained below.)
Other	\$ -	\$ -	\$ -	\$ -	
Indirect Charges	\$ -	\$ -	\$ -	\$ -	
TOTAL	\$ -	\$ -	\$ 104,000	\$ 104,000	

The matching requirement will be met on an in-kind basis from a range of sources. These sources have committed to provide time and services to the project should it be awarded. The sources are:

- MOLST Advisory Working Group
 - FY2011 – 40 hours X 8 members @ \$200/hour = \$64,000
 - FY2012 – 40 hours X 8 members @ \$200/hour = \$64,000
 - FY2013 – 40 hours X 8 members @ \$200/hour = \$64,000
- Advisory Services from the Maryland Department of Mental Hygiene’s Office of Health Care Quality and the Maryland’s Attorney General’s Office
 - FY2011 – 100 hours x 2 resources @ \$200/hour = \$40,000
 - FY2012 – 100 hours x 2 resources @ \$200/hour = \$40,000
 - FY2013 – 100 hours x 2 resources @ \$200/hour = \$40,000
- CRISP Board of Directors—Time spent overseeing project
 - FY2011 – 12 hours x 11 members @ \$200/hour = \$26,400
 - FY2011 – 12 hours x 11 members @ \$200/hour = \$26,400
- MHCC-Convened HIE Policy Board—Developing policy framework for project
 - FY2011 – 10 hours x 33 members @ \$200/hour = \$66,000

Letters of Support



Genesis Physician Services

Dr. John Loomer
515 Fairmount Avenue
Towson, MD 21286
410-494-7671
610-347-6383 (fax)
John.Loomer@genesishcc.com

December 30, 2010

Kathleen Francis
Chief, Health Information Exchange
Maryland Health Care Commission
4160 Patterson Avenue
Baltimore, MD 21215

Dear Ms. Francis,

On behalf of the 4,000 Maryland seniors that call our facilities home, Genesis Healthcare is pleased to support the Maryland Health Care Commission (MHCC) in their grant application for the *Health Information Exchange Challenge Program* through the Office of the National Coordinator for Health Information Technology. The MHCC leads the state in long term care planning, promoting best practices, and providing consumers with high quality information about health care services. The MHCC also leads key stakeholders in developing Maryland's health information exchange and EHR adoption.

As the largest provider of integrated housing and healthcare for Maryland seniors, Genesis Healthcare understands the importance of a robust health information exchange infrastructure to improving the quality of long term care and managing chronic disease. Sharing patient data between hospitals and post acute settings is critical to reducing preventable readmissions, reducing medical complications, and promoting high quality care. We look forward working with the MHCC and other stakeholders to develop the infrastructure and best practices to promote the integration of acute and long term care services.

The MHCC, Genesis Healthcare, and our partners across Maryland are committed to improving information sharing between long term and post acute care. We look forward to being a model for collaborative efforts across the country. If you have any questions, please feel free to contact me at 410-494-7671.

Sincerely,

John F. Loomer, M.D.
Senior Vice President, Medical Affairs
Southern Area



Van Munching Hall
College Park, MD 20742
University of Maryland
www.smith.umd.edu/chids
chids@rhsmith.umd.edu

December 30, 2010

Kathleen Francis
Chief, Health Information Exchange
Maryland Health Care Commission
4160 Patterson Avenue
Baltimore, MD 21215

Subject: Letter of Commitment for Health Information Exchange Challenge Program

Dear Ms. Francis,

On behalf of The Center for Health Information and Decision Systems (CHIDS), University of Maryland, I am pleased to confirm our interest and commitment to partner with the Maryland Health Care Commission (MHCC) for the Office of the National Coordinator for Health Information Technology solicitation "*Health Information Exchange Challenge Program: Supplemental Funding Opportunity to the State Health Information Exchange Cooperative Agreement Program.*"

CHIDS is an academic research center with collaboration from industry and government affiliates designed to research, analyze, and recommend solutions to challenges surrounding the introduction and integration of information and decision technologies into the health care system. CHIDS world-class staff has deep expertise and significant prior experience in evaluating health information systems and a broad-based understanding of the needs of healthcare stakeholders related to the use, communication, storage and management of digital health information across the health ecosystem including long-term and post-acute care transitions.

The CHIDS team has conducted sponsored research to develop an HIE evaluation framework and assess the District of Columbia Health Regional Health Information Organization (DC RHIO), to study the impact of e-prescribing systems on physician practices, and a number of other germane studies. The CHIDS team has worked closely with the Children's National Medical Center to evaluate the implementation and

optimization of their Computerized Practitioner Order Entry (CPOE) system. CHIDS team members from the University of Maryland School of Medicine have executed significant research in gerontology and the long-term care environment. CHIDS is therefore well qualified to take a prominent role in the tasks of defining outcome measures for evaluation and mechanisms for the ongoing tracking, assessment, and system-feedback of these measures.

Our strengths complement those of MHCC and, together, we hope to contribute to advancing the improvement of long-term and post-acute care transitions. We look forward to working with you and the ONC if the project is awarded to MHCC.

Sincerely,

A handwritten signature in black ink that reads "Ritu Agarwal". The signature is written in a cursive, flowing style.

Ritu Agarwal, PhD
Professor and Dean's Chair of Information Systems
Director, Center for Health Information and Decision Systems



December 22, 2010

Kathleen Francis
Chief, Health Information Exchange
Maryland Health Care Commission
4160 Patterson Avenue
Baltimore, MD 21215

Dear Ms. Francis,

The Health Facilities Association of Maryland (HFAM) is pleased to support the Maryland Health Care Commission (MHCC) in their grant application for the *Health Information Exchange Challenge Program* through the Office of the National Coordinator for Health Information Technology. As an independent regulatory agency, the MHCC has been very successful in addressing health care quality, cost and access, and advancing health information technology. The MHCC is well positioned to meet the challenge of improving long-term and post-acute care transitions to and from acute care settings.

The grant offers to engage long-term and post-acute care providers in the electronic sharing of patient information, focusing on care summaries across all transitions of care. As you know HFAM has over the last four years developed a Universal Patient Assessment Tool (Tool) and we are in the process of converting version 1.5 of the Tool to a web based platform. As this grant request proceeds and is ultimately awarded HFAM would very much like to explore specific opportunities for our invested work to inform your work ahead.

As a long-term care association, we can attest to the importance and vital role electronic information exchange plays in continuity of care. As patients move to and from long-term care facilities and post acute care settings, it is critical to have complete, timely, accurate information about the patient.

I am confident the MHCC is well prepared to improve long-term and post-acute care transitions using the statewide health information exchange and look forward to working with them on this important challenge. If you have any questions, please feel free to contact me at 410-290-5132 ext. 114 or jdemattos@hfam.org

Be well,

Joseph DeMattos, Jr., MA
President

CC: U.S. Senator Ben Cardin
U.S. Senator Barbara Mikulski
HFAM Executive Committee
Rob Horst





Keeping You Connected . . . Expanding Your Potential . . .
in Senior Care and Services

December 20, 2010

Kathleen Francis
Chief, Health Information Exchange
Maryland Health Care Commission
4160 Patterson Avenue
Baltimore, MD 21215

Dear Ms. Francis,

LifeSpan is pleased to support the Maryland Health Care Commission (MHCC) in their grant application for the *Health Information Exchange Challenge Program* through the Office of the National Coordinator for Health Information Technology. As an independent regulatory agency, the MHCC has been very successful in addressing health care quality, cost and access, and advancing health information technology. The MHCC is well positioned to meet the challenge of improving long-term and post-acute care transitions to and from acute care settings.

The grant offers to engage long-term and post-acute care providers in the electronic sharing of patient information, focusing on care summaries across all transitions of care. As a long-term care association, we can attest to the importance and vital role electronic information exchange plays in continuity of care. As patients move to and from long-term care facilities and post acute care settings, it is critical to have complete, timely, accurate information about the patient.

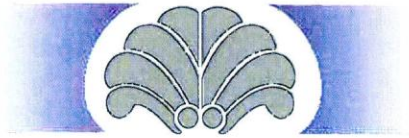
I am confident the MHCC is well prepared to improve long-term and post-acute care transitions using the statewide health information exchange and look forward to working with them on this important challenge. If you have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Isabella Firth".

Isabella Firth

President, LifeSpan



Lorien Health Systems

January 3, 2010

Kathleen Francis
Chief, Health Information Exchange
Maryland Health Care Commission
4160 Patterson Avenue
Baltimore, MD 21215

Dear Ms. Francis,

On behalf of the 965 Maryland seniors that call our facilities home, Lorien Health is pleased to support the Maryland Health Care Commission (MHCC) in their grant application for the *Health Information Exchange Challenge Program* through the Office of the National Coordinator for Health Information Technology. The MHCC leads the state in long term care planning, promoting best practices, and providing consumers with high quality information about health care services. The MHCC also leads key stakeholders in developing Maryland's health information exchange and EHR adoption.

As a leading provider of integrated housing and healthcare for Maryland seniors, Lorien understands the importance of a robust health information exchange infrastructure to improving the quality of long term care and managing chronic disease. Sharing patient data between hospitals and post acute settings is critical to reducing preventable readmissions, reducing medical complications, and promoting high quality care. We look forward working with the MHCC and other stakeholders to develop the infrastructure and best practices to promote the integration of acute and long term care services. Two of our facilities, Lorien Columbia and Encore at Turf Valley, located in Ellicott City, would be ideal locations to begin this work.

The MHCC, Lorien, and our partners across Maryland are committed to improving information sharing between long term and post acute care. We look forward to being a model for collaborative efforts across the country. If you have any questions, please feel free to contact me at 410-750-7500.

Sincerely,

Louis Grimmel, CEO

Maryland Health Enterprises, Inc. t/a Lorien Health Systems
3300 N. Ridge Road • Suite 390 • Ellicott City, Maryland 21043
Tel: (410) 750-7500 • Fax: (410) 750-7902 • TTY: (800) 735-2258
www.lorienhealth.com



David Sharp, Ph.D., Director
Center for Health Information Technology

4160 Patterson Avenue
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Tel: (410) 764-3460
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