Metropolitan Portland Health Information Exchange Requirements Definition 2.0

Results and Reports Retrieval System

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Section I. Introduction

1. Program Overview

In 2006, the Oregon Business Council's Leadership Group on Data Exchange (OBC) defined a vision for health information in the region:

> *"Meaningful health information is widely and securely available among authorized persons in a usable form anytime and anywhere it is needed in order to improve the overall safety, effectiveness and efficiency of an individual's care and the public's health."*

The OBC commissioned a study team from among the regional stakeholder organizations, together with the Oregon Health Care Quality Corporation (QCorp), to evaluate options for starting to achieve this vision. Using experience from other communities, national experts, and multiple models, the Team recommended the best first step from among 19 options as the most practical strategy to begin building a financially sustainable approach to a community-wide health information exchange. The proposed first step is a **Results and Reports Viewing and Retrieval System**, which will make already-computerized information from laboratories, hospitals and imaging centers available for viewing and retrieval by all of a patient's providers.

Lab results, imaging reports, and dictated emergency department and hospital discharge summaries provide essential information for the diagnosis and management of acute and chronic conditions. However, these results, reports, and dictations are generally not available to other "non-ordering" community providers who might need them to make decisions about patient care outside the originating care setting or health system. As a result, care is suboptimal and providers often order unnecessary tests or admit patients to the hospital. Physicians are either not aware of or do not have access to previous lab and radiology results and other key information about the patient.

The ideal solution will offer an online, standardized, widely available and secure means for accessing recent and historical laboratory results, imaging reports, discharge summaries, and emergency department summaries by authorized parties. Results and dictations will be aggregated for the patient, regardless of ordering provider or which medical laboratory was used. Results and dictations will be available across different care settings. The platform will be readily expandable for additional types of information.

The OBC has chartered the Team and QCorp to provide a six-month mobilization plan. This will consist of a complete set of functional requirements and a business plan for meeting those requirements. At the completion of the mobilization phase, the leadership group that represents the potential funders of the work will have complete information for making a decision whether to finance and launch implementation of the project.

For more information, please visit http://www.q-corp.org.

2. Purpose and Scope of this Document

The purpose of this Requirements Definition is:

- To provide statements and diagrams of the services or functions to be provided by the Portland HIE system. It should convey a sense of what the community must be able to do or accomplish with the system.
- At a high level, this document also references non-functional requirements and constraints such as Performance, Scalability & Availability, Privacy & Security, Healthcare Standards, Interoperability, Usability, Implementation, Business needs and “Political” (community trust & collaboration) constraints that are likely to have an impact on the technical implementation.

This document will have two forms, Version 1.0 (this version) and Version 2.0. Version 1.0 of this document will document current known requirements for the Portland HIE Mobilization effort. This first version is intended to be completed by the end of December 2006 as part of the “early deliverables” for the mobilization phase. Version 2.0 will more fully reflect stakeholder input as well as describing the proposed solutions based on validated requirements. Version 2.0 is intended to be completed by the end of April, 2007.

3. High-Level Use Case

Good clinical decisions depend on providers knowing specifics about the patient’s history and possible chronic conditions. Lab results, imaging reports, and dictations (including discharge summaries and emergency department summaries) are key components of the patient’s history, in addition to providing essential information for the diagnosis and management of acute and chronic conditions. However, historical lab results, imaging reports, and dictations for a patient are generally not available to other “non-ordering” community providers, who might need them to make decisions about patient care outside the originating care setting or health system. Fundamentally, patient care occurs today with incomplete information available to non-ordering providers in the community or in the ED. Also, providers often order unnecessary tests because they are either not aware of or do not have access to previous lab results and other key information about the patient.

Today, many providers can place orders to regional or reference labs using online tools, dedicated terminals, or by fax. (This effort does not attempt to address the lab ordering process, but rather is confined to viewing historical results.) Lab results are delivered to providers in a variety of ways by the labs. Most labs offer at least some online tools, but also employ remote terminals, remote printer/modems, and fax delivery. In some cases providers may still receive results on paper by courier. In general it falls to the provider to manage the workflow related to results triage, viewing, and decision-making. Trending information is rarely available for a patient unless the provider has an automatic import into EMR or other way of creating “flowsheets.” The same is true for imaging reports.

Hospital discharge or ED summaries are clinical documents which often serve a dual purpose of documenting an encounter, and communicating information relevant to the subsequent provision of care to a community provider. In general a copy of this record is sent to the community primary care provider (PCP) as well as other specialist providers that will have ambulatory follow-up care. This process may be complicated by the following conditions:

1. The PCP may be unknown to the hospital or ED.
2. The patient may have no PCP.
3. The patient may switch PCPs prior to follow-up.

Data flow directly from the lab, hospital or imaging center to the ordering provider, and generally are not distributed anywhere else. Results for a single patient from different sources are not aggregated for that patient. Labs in particular have to support a variety of electronic interfaces with all of the parties that receive results – health systems, other labs, medical groups, and individual providers. However, the majority of results delivery is done either within mostly closed systems, or using point-to-point interfaces with providers. There is a trend toward labs creating/purchasing their own electronic portals for results delivery. Most labs now see online result delivery as a distinguishing service, and IT services are becoming part of their "core business." As a result, labs are duplicating efforts, by building interfaces to new clinics as they implement EMRs.

At the end of year 1, the ideal solution will offer an online, standardized, widely available and secure means for accessing recent and historical laboratory results, imaging reports, discharge summaries, and emergency department summaries by authorized parties. Results and dictations will be aggregated for the patient, regardless of ordering provider or which medical laboratory was used. Results and dictations will be available across different care settings. Lab and imaging orders will be placed with an online tool or other method. This solution does not attempt to modify the ordering process. Providers will be able to manage their result document viewing workflows with task lists and other organizing functions in the user interface, and print lab results. At the end of 5 years, the system will allow providers to import structured lab information and unstructured reports directly into the EMR. See Appendix A for Use Case diagrams.

4. Business Case

4.1 Review of the Literature & National Examples

The Center for Information Technology Leadership (Harvard University and Partners Health Care) has estimated net annual national savings from HIT of about 8% of total health care costs, including $44 billion for widespread use of sophisticated electronic health records (EHRs)[1] and an additional $78 billion from exchange of electronic health information in communities.[2] Sources of these efficiencies include reductions in medical errors that lead to expensive and unnecessary care, elimination of duplicate laboratory and imaging procedures that are ordered when prior information is unavailable, and relieving busy medical professionals from the time-wasting burdens of tracking down

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[1] Johnston D, Pan E, Middleton B, et al. *The Value of Computerized Provider Order Entry in Ambulatory Settings*. Center for Information Technology Leadership, 2003. Executive preview available at http://www.citl.org/research/ACPOE_Executive_Preview.pdf

[2] Walker J, Pan E, Johnston D, et al. The Value of Health Information Exchange and Interoperability. *Health Affairs* 19 January 2005:W5 10-18. Available at http://content.healthaffairs.org/cgi/reprint/hlthaff.w5.10v1

needed information. HIT also has numerous benefits that are difficult to quantify, both in terms of efficiency and quality of care. Examples include improved adherence to recommended care protocols, decreased waiting times, reduced personnel turnover, increased patient satisfaction, and fewer liability claims related to medical errors.

However, realizing these benefits in communities has been challenging. While anecdotal reports of substantial savings from communities with advanced health information infrastructures (HIIs), such as Indianapolis, IN, and Spokane, WA, are encouraging, there is a notable lack of rigorous economic evaluations that clearly demonstrate positive ROI for health information exchange. Three recent independent reports from First Consulting Group,[3] the American Hospital Association,[4] and the Agency for Healthcare Research and Quality,[5] have emphasized this point. All three recommended that community stakeholders carefully evaluate the business case for specific HII initiatives to ensure that the proposed project is highly likely to generate a substantial ROI. In addition, they recommended that performance metrics be established from the outset to monitor the progress toward attaining the expected financial results.

In looking at the ROI for health information exchange, both the initial costs to establish the system and the ongoing operational costs must of course be considered. However, it is primarily the relationship of the operational costs to the anticipated benefits that will determine the feasibility and desirability of the project. As long as the ongoing savings are real and substantial, it should be possible to amortize reasonable start-up investments.

At this relatively early stage in the development of community HII systems, the prudent approach to financial estimates is to consistently apply a highly conservative view. This includes both overestimating costs and underestimating benefits. By choosing the most conservative assumptions at each point, the overall financial model is close to a "worst case scenario." This approach helps to reduce risk and provide a realistic basis for stakeholder decisions.

4.2 Results from an Initial Study of the Metro Portland Area

Result and report viewing was the most promising of several major options which were evaluated as first steps toward health information exchange. Among other strengths, results and reports are often already in electronic form. By integrating all the results for a given patient and making the information readily available for care, substantial benefits can be anticipated in both quality and efficiency. The major category of savings for the results reporting option is avoiding duplicate testing; this would include both for lab tests and imaging studies.

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[3] First Consulting Group: The Myths and Realities of RHIOs: Executive Insights. April, 2006. Available at http://www.fcg.com/research/login-required.aspx?rid=290 [free registration required]

[4] American Hospital Association: Health Information Exchange Projects: What Hospitals and Health Systems Need to Know. April, 2006. Available at http://www.aha.org/aha/key_issues/hit/include/AHARHIOfinal.pdf

[5] Agency for Healthcare Research and Quality: *Evolution of State Health Information Exchange: A Study of Vision, Strategy, and Progress*. January, 2006. Available at http://www.avalerehealth.net/research/docs/State_based_Health_Information_Exchange_Final_Report.pdf

Once the infrastructure for results and reports is established, implementing other options (such as medication profiles) can be accomplished with substantially less investment. We can reasonably expect that the same initial technical and organizational infrastructure will be expanded to accommodate new applications.

The business cases are based in part on eHealth Initiative's *Model for Estimating the Cost of Health Information Exchanges in a Community*[6] and the Health Affairs article *The Value Of Health Care Information Exchange and Interoperability*.[7] These were significantly modified based on information from other communities and tailored to the Oregon market and proposed use case. Using a very conservative approach:

> In the Metropolitan Portland area, it is highly probable that there is a favorable benefit-to-cost ratio for results and reports viewing and retrieval. Benefits accrue from processing savings and from avoided services. In year three the return on investment ratio (ROI) is $2.09 of benefit to $1.00 of cost, and cumulative break even point occurs in year four.

The benefits to Portland come from cost avoidance for services, which rules out a transactions approach to financing. Though benefits certainly are passed on to purchasers through premiums, engaging the purchasers in financing is not practical except through donations for start-up. Physicians will also gain some efficiency from systems, but are not likely to have savings that can be captured as a practical source of revenue. After appropriately allocating benefits from improved efficiencies for the uninsured, the results and report viewing option will accrue approximately 47% to hospitals and 53% to plans.

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[6] eHealth Initiative. HIE Initiative Cost Model, beta version, January 31, 2006. HIE Initiative Cost Model, version 2 is available at http://ehr.medigent.com/assets/collaborate/2006/04/21/HIE%20Cost%20Model%20v2%2004%2020%2006.xls

[7] Walker J, Pan E, Johnston D, Adler-Milstein J, Bate DWs, Middleton B. "The Value of Health Information Exchange and Interoperability." Health Affairs 24:Supplement 1 January 19, 2005. W5-10-18. Available at http://content.healthaffairs.org/cgi/reprint/hlthaff.w5.10v1

6. Acronyms & Glossary

HIE	Health Information Exchange, a Portland metro area initiative
OBC	Oregon Business Coalition
QCorp	Oregon Healthcare Quality Corporation
Tiger Team	The study team commissioned by OBC from among the regional stakeholder organizations

Section II. User & Stakeholder Descriptions

1. Stakeholder Demographics

Clinicians need to be able to quickly access data about patients, sometimes in real-time. Currently, each provider has its own medical record systems – electronic or paper -- which do not allow clinical data to be viewed easily by individual clinicians. **Health systems** and **physician offices** are facing escalating costs and lower reimbursement, requiring them to find efficiencies in the delivery of care. **Healthcare consumers** are increasingly demanding satisfaction with the health care process and more quality for their increasing share of the payment. **Health plans** seek to avoid duplicate testing and for clinicians to do better prevention in order to lower the costs of chronic disease in the long run. **Patients** need to have access to their health records and to be able to help ensure access by the appropriate clinicians.

Note: A detailed regional profile and environmental summary of the Portland metropolitan area is available on the Q-Corp Website (http://www.q-corp.org/q-corp/default.asp?id=13).

User Organizations:

- Hospital lab
- Hospital emergency department
- Hospital acute care department
- Hospital imaging department
- Independent imaging department
- Independent lab
- Community Physician Office
- Safety net clinics
- Urgent care clinics
- Pharmacies
- Non-traditional providers (naturopath, chiropractor)

User Types:

- Ordering provider: HIGH PRIORITY
- Non-ordering or "other" community provider: HIGH PRIORITY
- ED provider: HIGH PRIORITY
- Patients
- Provider staff – medical assistant
- Provider staff – nurse or other provider
- Provider staff – office worker
- Radiologist
- Radiology staff
- ED staff – nurse or other provider
- ED staff – administrative worker
- Case managers (health plans)

- Disease managers (health plans)
- Pharmacist

2. User Profiles

2.1 Health Care Clinicians

Clinicians need to be able to quickly access data about individual patients, frequently in real time. Currently, this is accomplished by looking at the individual's chart as maintained by the physician office or delivery system. Often clinicians must work with limited information, especially since patients have sought care at other locations. In addition to making care decisions about acute problems or the patient's chief complaint, clinicians may access patient data in order to perform routine activities such as to ensure that the proper prevention and management is administered to the patient. At the point of care, patient data aids decision support and may facilitate adherence to guidelines.

Detailed stakeholder profile for ***Clinicians****:*

- Clinicians' primary activity is caring for patients. Computer skills may range from the accomplished physician programmer, to a seasoned user of electronic systems, to the minimally tech-savvy clinician, to the technologically hostile.
- Seek to provide effective patient care, prevention and/or treatment of disease with the necessary knowledge of the patient's history and current health status including laboratory data, imaging results, and recent hospitalizations.
- Clinicians' jobs are made easier by having access to all necessary information about the patient's history and current health status. Clinicians need the ability to review and analyze recent and historical information about the patient's condition. Clinicians also benefit from alerts of non-compliance with prevention and management protocols, based on complete data.
- A provider's job is made easier by rapid availability of information stored in the chart and carried forward to the encounter. Clinicians need the ability to access integrated patient records and summary data from multiple care locations.
- Clinicians may not have extensive technology skills. Even if the provider is technically astute, the time required to access information from multiple locations makes it difficult to obtain desired data during the encounter with the patient. In addition to the challenges around *accessing* information, it may not fit the provider's workflow to *upload* or distribute individual patient data electronically.
- Success for clinicians is defined by more effective outcomes, better reimbursements, increased quality of the patient encounter, less time spent on seeking relevant information, less time spent on high-quality documentation, and more accurate and complete information from which to make good medical decisions. Physicians are rewarded based on productivity and increasingly on quality via pay-for-performance measurement.

2.2 Provider staff

Provider staff are responsible for much of the quality of the patient care experience. They are often tasked with ensuring smooth workflow in the office, booking, registering and rooming patients, and ensuring that complete chart information is available during the encounter. Currently there are many models for staff support of the patient visit, however the patient chart is almost always maintained locally by the office -- either in paper or electronically. The challenges and limitations of current systems for the staff include locating, obtaining and accessing data for thee patient that is *not* contained in the patient chart, especially recent data relevant to the current visit. The benefit of improved data accessibility to provider staff is they will be more efficient, spend less time obtaining data about the patient, and increase overall satisfaction with the encounter by both the patient and provider.

Detailed stakeholder profile for ***Provider Staff****:*

- Provider staff are non-clinicians and whose primary activity is to support the provider as a medical assistant or administrative worker.
- Seek to ensure smooth workflow, help maximize provider productivity, and ensure the overall efficiency, effectiveness, and quality of the patient encounter. May also perform basic clinical tasks as delegated by the provider.
- Jobs are made easier by easily locating additional relevant information (in combination with the office record) for the patient encounter and making it available for the provider.
- Provider staff may not have extensive technology skills. Even if the provider is technically astute, the time required to access information from multiple locations makes it difficult to obtain desired data during the encounter with the patient.
- Provider staff are usually salaried employees, whose success may depend on how well they support the clinicians with whom they work. Increasingly, performance bonuses based on outcomes measures for the physician/practice are also distributed to provider staff.

3. User Environment

3.1 Review of the Literature

Is there a clear clinical need that can focus the initial development of a results and reports system? There is increasing evidence that poor information exchange between care providers and patients is a cause of error in the outpatient setting. In particular, the lack of availability of the discharge summary, and even the inability to determine whether follow-up occurred[8] are commonplace and result in worse outcomes. Historical lab results, imaging reports, and dictations for a patient are generally not available to other "non-ordering" community providers, who might need them to make decisions about patient care outside the originating care setting or health system. Fundamentally, patient

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[8] Wheeler, K., et al., Inpatient to outpatient transfer of care in urban patients with diabetes. Archives of Internal Medicine, 2004. 164: p. 447-453.

care occurs today with incomplete information available to non-ordering providers in the community or in the ED.

Haggerty et al[9] defined informational continuity as "Documented information (that provides) the common thread linking care between different providers and different contexts." There is evidence in the literature of several types of information continuity lapses:

1) Inpatient-to-outpatient discharge continuity[10] including
    - Inpatient to specialty clinic
    - Inpatient to primary provider
    - Inpatient to acute care (ED)
    - Inpatient to "other" such as skilled nursing facility, or extended care

2) Outpatient continuity, such as
    - Referring to consulting MD[11]
    - Previous primary physician to new primary physician
    - Primary to covering physician
    - Outpatient to inpatient.

All of these discontinuities result from the inability to track patient movement through the health system, and more fundamentally, lack of portability or ability to exchange the patient's key clinical information. Something as simple and important as the availability of a hospital discharge summary to subsequent care providers is nearly impossible to guarantee without a meaningful health information exchange. Evidence shows that if the discharge summary was available to following physician, patients were much less likely to be re-hospitalized in the succeeding 90 days after discharge[2]. In general, a lack of informational continuity results in fragmented care, poor ability to measure and improve quality and safety, and higher costs.

There are several known safety and quality issues in the outpatient setting. Medication errors, including inappropriate prescriptions, occur in outpatient care[12]. Moore[13] determined that medication continuity errors often occur between inpatient and outpatient settings when the discharge summary is not available to the following physician. Other avoidable errors include:

- The patient becoming lost to follow-up
- Test follow-up errors

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[9] Haggerty, J., et al., Continuity of care: a multidisciplinary review. British Medical Journal, 2003. 327(7425): p. 1219-21.

[10] vanWalraven, C., et al., Effect of discharge summary availability during post-discharge visits on hospital readmission. Journal of General Internal Medicine, 2002. 17(3): p. 186-92.

[11] Hammons, T., et al., Ambulatory Patient Safety: What We Know and Need to Know. Journal of Ambulatory Care Management, 2003. 26(1): p. 63-82.

[12] Kohn, L., J. Corrigan, and M. Donaldson, eds. To err is human: Building a safer health system. 2000, National Academy Press: Washington, DC.

[13] Moore, C., et al., Medical errors related to discontinuity of care from an inpatient to an outpatient setting. Journal of General Internal Medicine, 2003. 18: p. 646-651.

- Test results not being reviewed
- Workup errors traceable to lack of complete information
- Failures to diagnose (lost, missed, or delayed diagnoses)
- Screening errors such as failures to test, and ordering unnecessary tests or procedures (eg. lack of access to comparison film or EKG, repeat labs)[14].

3.2 Evidence Gathered from Portland Metro Stakeholders

Is continuity of care across settings a likely source of medical errors in the Portland metropolitan area? Today, many providers can place orders to regional or reference labs using online tools, dedicated terminals, or by fax. (This effort does not attempt to address the lab ordering process, but rather is confined to viewing historical results.) Lab results are delivered to providers in a variety of ways by the labs. Most labs offer at least some online tools, but also employ remote terminals, remote printer/modems, and fax delivery. In some cases providers may still receive results on paper by courier. In general it falls to the provider to manage the workflow related to results triage, viewing, and decision-making. Trending information is rarely available for a patient unless the provider has an automatic import into EMR or other way of creating “flowsheets.” The same is true for imaging reports.

Hospital discharge or ED summaries are clinical documents which often serve a dual purpose of documenting an encounter, and communicating information relevant to the subsequent provision of care to a community provider. In general a copy of this record is sent to the community primary care provider (PCP) as well as other specialist providers that will have ambulatory follow-up care. This process may be complicated by the following conditions:

1. The PCP may be unknown to the hospital or ED.
2. The patient may have no PCP.
3. The patient may switch PCPs prior to followup.

Data flow directly from the lab, hospital or imaging center to the ordering provider, and generally are not distributed anywhere else. Results for a single patient from different sources are not aggregated for that patient. Labs in particular have to support a variety of electronic interfaces with all of the parties that receive results – health systems, other labs, medical groups, and individual providers. However, the majority of results delivery is done either within mostly closed systems, or using point-to-point interfaces with providers. There is a trend toward labs creating/purchasing their own electronic portals for results delivery. Most labs now see online result delivery as a distinguishing service, and IT services are becoming part of their “core business.” As a result, labs are duplicating efforts, by building interfaces to new clinics as they implement EMRs.

To assess this potential risk to patients in our area, we will interview representatives of each of the major stakeholders to determine the parameters of the current environment. For use cases 1-4 described in Appendix A, we will assess the following:

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[14] Richardson, W., ed. Crossing the quality chasm: A new health system for the 21st century. 2001, National Academy Press: Washington DC.

- Current workflow process
- Required tasks
- Number & type of staff required to complete the tasks
- Duration of the task cycle
- Applications and manual systems currently in use
- Potential sources of discontinuity or errors in communication

The list of interviewees we contacted for this section are contained in Appendix B.

4. Key Stakeholder Needs & Perspectives

This section will describe the various needs, interim workarounds, and characteristics of the desired solution for each need. Because no project is able to address every conceivable user need, the **key needs** are intended to marry the **stakeholder profiles** described above with the **business case** outlined in Section I.4.

Summary: As a community, the Portland metropolitan area needs healthcare stakeholders to be able to communicate patient data between in a more seamless, automated, and comprehensive way in order to recognize the majority of the projected benefits outlined in the business case. The current methods – communicating by paper, fax, phone, or point-to-point electronic processes – do not provide the full clinical and financial gains that could be obtained from a regional health information exchange. The desired solution would allow a patient's results and reports to be available automatically and securely to the authorized clinicians who provide care to the patient.

Statement of Need #1: Improve Quality of Healthcare

- Because the patient's data does not easily follow the patient from one care setting to another, prior information about a patient's history is often not available to the clinician during the initial stages of an encounter. Overall compliance with commonly accepted guidelines for prevention and management of chronic disease is lower than it should be.
- Clinicians must often rely on their patients to obtain and report their own histories if they are competent to do so, or else proceed with the best available information even if gaps are suspected. Often clinicians make "best-guess" decisions about whether a patient needs additional intervention in order to comply with evidence-based guidelines for treatment and prevention.
- The desired solution would make information available about all patient tests, imaging procedures, and hospitalizations during the encounter so that the authorized clinician may incorporate the information into the patient's history. Complete information would be available when it is needed to make decisions relevant to chronic disease prevention and management.

Statement of Need #2: Increase Patient Safety

- Because clinicians lack complete information about the patient's prior history at the point and time of care, there are a large number of medical errors made during the care delivery process.

- Clinicians are making decisions with incomplete information. Currently most clinics work under paper processes and rely heavily on mail, fax, courier, or other labor-intensive means of obtaining information
- The desired solution would reduce medical errors by enabling ready access to critical patient information for authorized clinicians during the care process.

Statement of Need #3: Reduce Cost of Healthcare

- Because lab tests, discharge summaries and imaging reports often do not arrive in a timely fashion when the patient moves from one care setting to another, clinic operations efficiency, the cost of providing care, staff availability, and access to care are less than optimal for the providers and patients in the region. In the course of providing care, clinicians must often make defensive decisions to hospitalize patients or repeat tests because required information is not available. Clinicians and staff spend additional time phoning and faxing other care settings on the "hunch" that there might be more information available, asking the patient for the best recollection of what tests were done and what the results were, or proceeding with incomplete information.
- Currently most clinics work under paper processes and rely heavily on mail, fax, courier, or other labor-intensive means of obtaining information. Clinicians frequently order a repeat test or diagnostic procedure, even with full knowledge that a previous result exists and is valid, due to the difficulty in obtaining the results from another care setting. Patients are subjected to unnecessary hospitalizations, tests, and procedures that result from lack of complete and timely information during the care delivery process. Clinicians bear increased medical liability, in part to compensate for the lack of information.
- The desired solution would dramatically reduce the need for defensive hospitalizations, tests and procedures by making all the required information available during the clinician's decision-making process. The clinician should be able to review the patient's results and reports from other care settings with minimal effort and time cost, so as to obtain the required information and not be forced to repeat the test for procedures. The desired solution would offer a rapid system to obtain prior information available about a patient within a convenient workflow. The system should provide the clinician with reasonable certainty that s/he has access to all the needed information during the encounter or decision-making process. The desired solution would reduce overall workload for clinicians and staff, increase capacity of care delivery systems, and improve patient access to providers. The system should reduce the amount of time spent by providers and patients waiting for needed information, and increase satisfaction for healthcare workers.

5. Alternatives & Competitive Solutions

Alternative #1: Do Nothing – Status Quo

- Description: Allow the current fragmented and siloed system to persist. Conduct the majority of clinical processes between systems using regular mail, paper, fax, and telephone.

- Strength: Does not require and additional effort, cost, or difficult decision making in the short term. Does not require re-engineering of work processes for health systems.
- Weakness: Economically unsustainable. Makes no progress toward leveraging information technology to improve the quality of care or health of individuals or populations in the Portland Metro Area. Extremely costly in the long run. Portland falls behind the nation in vision and leadership to transform healthcare. Physician and patient dissatisfaction continues to increase.

Alternative #2: Health Systems Continue to Pursue Separate Strategies for Connecting with their Community Physicians, without Health Information Exchange

- Currently the large health systems are pursuing their own strategies to connect to their affiliates and other referring physicians as part of their efforts to digitize their enterprises. The large health systems have developed portals for physician access, and point-to-point interfaces for results exchange with large clinics. The health systems are implementing or considering direct access to enterprise EHRs for community physicians.
- Strength: The health systems can selectively implement a sort of data exchange with partners in the community with whom they conduct most business. The large health systems can directly track the ROI of these systems in the form of efficiency and referral business.
- Weakness: The patients in the community frequently obtain care outside these organic micro-networks; this type of data exchange may partially serve the needs of the large health care enterprise but it does not meet the needs of the patient and community as a whole. A great deal of cost is incurred due to lack of efficient information flow outside the large enterprises and their close affiliates.

Alternative #3: Health Plans and/or Purchasers Pursue Separate and Competing Strategies to Create Personal Health Records, without Health Information Exchange

- Health plans have begun to make their claims and administrative data available to patients via a portals or personal health records.
- Strength: Health plans may have their own sets of detailed information about benefits and services rendered, which they are beginning to make available electronically. The patient can have a view of their own health plan data. The data could be used to approximate a patient record, or to “seed” the development of a community record for the patient.
- Weakness: The data in health plans is primarily administrative rather than clinical; it may be difficult to use for clinical purposes. Health plans only have the data for which the patient has received benefits; pharmacy, dental, mental health and other types of services may not be available.

Alternative #4: Health Systems Pursue Separate and Competing Strategies to Create Personal Health Records, without Health Information Exchange

- Health systems have begun to make their EMR data available to patients via a portals or personal health records.
- Strength: Clinical data relating to the care received in a particular health system may be available electronically. The patient can have a view of their own electronic health record within a health system. The data can be used to inform clinical decision making and empower patients to enable their own care.
- Weakness: The data in health systems may relate only to the care received in that system; in all likelihood it represents a partial record. Not all the data for care received may be included in the patient's health record, if the enterprise has not completed full interfaces between the major diagnostic, departmental, and pharmacy systems to the EMR.

Section III. Problem Statements

1. Problem #1: The Portland metro region lacks efficient communications for health information between stakeholders.

Problem #1	Regional healthcare stakeholders are not able to communicate patient data between in a seamless, automated, and comprehensive way.
Which impacts:	The Portland metropolitan area community.
Resulting in:	Decreased safety and quality, and increased costs of healthcare delivered in the region.
An effective solution would:	Reduce the need to communicate manually between stakeholders by paper, fax, phone, or point-to-point electronic processes. Allow a patient's results and reports to be available automatically and securely to the authorized clinicians who provide care to the patient. Enable an increase in quality and safety of healthcare, while reducing costs, and obtain better clinical and financial value in healthcare.

2. Problem #2: Medical errors occur due to lack of efficient communications during the care process.

Problem #2	Clinicians lack complete information about the patient at the point and time of care, there are a large number of medical errors made during the care delivery process.
Which impacts:	Clinicians and patients.
Resulting in:	Clinicians are making decisions with incomplete information or by repeating tests and procedures to obtain data that should have been communicated to them. Clinicians bear increased medical liability, in part to compensate for the lack of information. Repeated manual transcription/transmission of information.
An effective solution would:	Reduce medical errors by enabling ready access to critical patient information to authorized clinicians during the care process.

3. Problem #3: Current systems for the communication of health information contribute to more expensive, unnecessary care.

Problem #3	Lack of complete and timely information during the care delivery process.
Which impacts:	Patients, providers, and health plans.
Resulting in:	Clinicians must often make defensive decisions to

	hospitalize patients or repeat tests because required information is not available. Higher costs of healthcare delivered.
An effective solution would:	Reduce the need for defensive hospitalizations, tests and procedures by making all the required information available during the clinician's decision-making process.

4. Problem #4: Clinicians order unnecessary duplicate lab tests and imaging procedures.

Problem #4	Lab tests and imaging reports from one care setting often do not arrive in a timely fashion when the patient moves from one care setting to another.
Which impacts:	Clinicians and patients.
Resulting in:	Orders for repeat tests or diagnostic procedures, even with full knowledge that previous results exists and are valid, due to the difficulty in obtaining the results from another care setting.
An effective solution would:	Allow the clinician to review the patient's results and reports from other care settings with minimal effort and time cost, so as to obtain the required information and not be forced to repeat the test for procedures.

5. Problem #5: Prior historical information is not available to the clinician.

Problem #5	Patient data does not easily follow the patient from one care setting to another.
Which impacts:	Clinicians and patients.
Resulting in:	Prior information about a patient's history is often not available to the clinician during the initial stages of an encounter. Clinicians must often rely on their patients to obtain and report their own histories if they are competent to do so, or else proceed with the best available information even if gaps are suspected.
An effective solution would:	Make information available about all patient tests, imaging procedures, and hospitalizations during the encounter so that the authorized clinician may incorporate the information into the patient's history.

6. Problem #6: Clinicians waste time to track down information.

Problem #6	Clinicians and staff waste time identifying and obtaining needed information about a patient, while

	tracking down the chart and/or communicating with the patient repeatedly, as well as querying other care settings to obtain basic information.
Which impacts:	Clinicians, staff, and patients.
Resulting in:	Clinicians and staff spend additional time phoning and faxing other care settings on the "hunch" that there might be more information available, asking the patient for the best recollection of what tests were done and what the results were, or proceeding with incomplete information.
An effective solution would:	Offer a rapid system to obtain prior information available about a patient within a convenient workflow. The system should provide the clinician with reasonable certainty that s/he has access to all the needed information during the encounter or decision-making process.

7. Problem #7: Healthcare is inefficient.

Problem #7	Current methods to communicate medical information increases the overall workload for clinicians and staff, increases the time spent by clinicians and patients waiting for needed information, and decreases satisfaction for healthcare workers and patients.
Which impacts:	Clinicians, staff, patients, health systems, health plans.
Resulting in:	Decreased clinic operations efficiency, increased cost of providing care, lower staff availability, and less than optimal access to care for patients in the region.
An effective solution would:	Reduce or eliminate many paper-based communications processes, reliance on mail, fax, courier, or other labor-intensive means of obtaining information.

8. Problem #8: Healthcare quality is lower than it should be, due to incomplete information about prevention & management.

Problem #8	Good historical information about a patient's health status and recent results are often not available.
Which impacts:	Clinicians, patients, and health plans.
Resulting in:	Overall compliance with commonly accepted guidelines for prevention and management of chronic disease is lower than it should be. Often clinicians make "best-guess" decisions about whether a patient needs additional intervention in

	order to comply with evidence-based guidelines for treatment and prevention.
An effective solution would:	Put complete information about the patient in front of the clinician, at the time when it is needed to make decisions relevant to chronic disease prevention and management.

Section IV. Requirement Summary

Overall Requirements

The system will make lab results, imaging reports, and ED and hospital discharge dictations securely available to authorized clinicians. These are critical requirements of the system. The system must be able to accept one or more of the desired types of information in the first phase of development.

1. Requirement #1: Make results & reports available electronically to authorized clinicians for patient care.

Priority: Critical
Phasing: First phase.

2. Requirement #2: Decrease manual transcription and transmission of information.

Priority: Critical
Phasing: First phase.

3. Requirement #3: Make required patient information available during the decision-making process.

Priority: Critical
Phasing: First phase.

4. Requirement #4: Allow the clinician to review the patient's results and reports from other care settings with minimal effort and time cost.

Priority: Critical
Phasing: First phase.

5. Requirement #5: Make information about patient tests, imaging procedures, and hospitalizations available during the encounter.

Priority: Useful
Phasing: Later phase.

6. Requirement #6: Provide a rapid system to obtain prior information available about a patient within a convenient workflow.

Priority: Important
Phasing: Later phase.

7. Requirement #7: Reduce or eliminate paper processes and rely heavily on mail, fax, courier, or other labor-intensive means of obtaining information.

Priority: Important
Phasing: Later phase.

8. Requirement #8: Put complete information about the patient's prior care in front of the clinician, at the time when it is needed to make decisions relevant to chronic disease prevention and management.

Priority: Important
Phasing: Later phase.

High-level Requirements by Stakeholder

P = Patient; C = Clinician; HS = Hospital/Health System; HP = Health Plan; S = Staff; L = Laboratory; R= Radiology; ED = Emergency Department

Requirement #	Description	P	C	HS	HP	S	L	R	ED
1	Health Information Exchange	X	X	X	X	X	X	X	X
2	Reduction in medical errors	X	X	X	X		X	X	X
3	Reduction in expensive and unnecessary care	X		X	X				
4	Elimination of unnecessary duplicate lab tests and imaging procedures	X		X	X		X	X	
5	Make prior information available to the clinician	X	X	X	X	X			
6	Reduce time to track down information	X	X	X	X	X			
7	Increase the efficiency of care	X	X	X	X	X	X	X	X
8	Increase quality of care	X	X	X	X				

Section V. Detailed Functional Requirements

ID	Requirement	Phasing
1.	Upload or register patient records:	
1.1.	Allow laboratory to upload or register patient lab results	
1.2.	Allow hospital to upload or register discharge summary reports	
1.3.	Allow ED to upload or register summary reports	
1.4.	Allow radiology service to upload or register imaging reports	
2.	Aggregate results and reports correctly from different sources about the patient	
3.	Allow users to log into the system with username and password	
4.	Provide functionality for the user to query and identify the correct patient	
5.	Provide functionality to assist the user to query and sort records about the patient	
6.	Allow the user to view records about the patient	
7.	Allow the user to print selected records	
8.	Allow the user to save selected records for a patient to disk or other media	
8.1.	Create a local, standard format CCR/CDA representation of selected records for a patient from the health information exchange	
8.2.	Save the standard format representation of the patient record in encrypted form on disk or other media	
9.	Support creation of user roles, at a minimum to include:	
9.1.	Clinicians	
9.2.	Clinician Proxy	
9.3.	Patients	
9.4.	Patient Proxy	
9.5.	“Other User” involved in PTO for the patient	
9.6.	Health information exchange administrator	

10.	Manage the identity and registration of users	
10.1.	Manage Patient identity and registration	
10.2.	Manage Patient Proxy identity and registration	
10.3.	Manage Clinician identity and registration	
10.4.	Manage Clinician Proxy identity and registration	
10.5.	Manage Other User identity and registration	
10.6.	Manage health information exchange administrator identity and registration	
11.	Allow Clinicians to designate specific individuals as Clinician Proxy users to obtain results and reports about the patient	
12.	Allow Patients to designate specific individuals as Patient Proxy users to view their records and audit trails	
13.	Allow the Patient to opt in or out of the health information exchange	
13.1.	Allow the patient to authorize provision of their demographic and registration data to the health information exchange	
13.2.	Allow the patient to order the removal of their demographic and registration data from the health information exchange	
13.3.	Allow the patient to authorize the inclusion of specific records from a participating source to the health information exchange	
13.4.	Allow the patient to order the removal of all existing records from the health information exchange	
14.	Allow the patient to designate authorized users to access their records	
15.	Create audit trails, at a minimum to include:	
15.1.	Audit each User logon to system	
15.2.	Audit each User query of patient identity	
15.3.	Audit each User query of patient records	
15.4.	Audit each User viewing of patient records	
15.5.	Audit each registration or upload of patient records to the system	
16.	Allow the Patient to view audit trails of query, viewing, and registration/upload of their records	
17.	Allow the Patient to view their records in the health information exchange	

Section VI. Detailed Non-Functional Requirements

1. Data Requirements

ID	Requirement	Phasing
1.	Support Lab results data	
1.1.	Ensure lab data integrity, informed by CLIA and Oregon law pertaining to lab data	
2.	Support imaging report data	
3.	Support hospital discharge summary report data	
3.1	(Support surgery reports)	
3.2	(Support Pathology reports)	
4.	Support ED summary report data	
5.	Support other data types in the future	Late
5.1.	Medication data	
5.2.	Vital signs and clinical observations	
5.3.	Physician notes and chart summaries	
5.4.	Images	
5.5.	Tracings and other time series data such as EKG	

2. User Technology

ID	Requirement	Phasing
1.	Provide the capability for users to interact with the system via a web browser interface	
2.	Provide the ability to integrate with existing and future web portals in the community	Late
2.1.	Integrate with Health System physician and patient portals	
2.2.	Integrate with Health Plan patient portals	
2.3.	Integrate with Portals for Other Users involved in PTO for the patient	
3.	Support the capability to interact with the system via other certified clinical or patient systems in the future	Late
3.1.	Support direct integration with EMRs in the future	
3.1.1	Support ability for the Clinician or Clinician Proxy to query patient records in the health information exchange from directly within the EMR	
3.1.2	Support ability for the Clinician or Clinician Proxy to export and upload/register records to the health information exchange from within the EMR	
3.2.	Support direct integration with certified PHRs in the future	
3.2.1	Support ability to query patient records in the health information exchange from directly within the PHR	
3.2.2	Support ability for the patient to export and upload/register personal records from within the PHR	
3.2.3	Support ability for the patient to view audit trails from within the PHR	
3.2.4	Support the ability for the patient to opt in/out from within the PHR	
3.2.5	Support the ability for the patient to designate authorized clinicians from within the PHR	
3.2.6	Support the ability for the patient to designate Patient Proxies from within the PHR	

3. Privacy & Security Requirements

Note: The following requirements are linked to the document, "MPHIE Security Plan_20_03142007"

ID	Requirement	Phasing
1.	Comply with HIPAA – the HIE may operate as a "non-covered" entity, however information will be managed according to the rules applying to covered entities.	
2.	Comply with all Oregon patient privacy laws	
2.1.	Manage specially protected data according to Oregon law	
3.	Comply with a minimum agreed-upon set of privacy & security standards established by the participating/governing stakeholders.	
3.1	Create or adopt a definition of security and privacy standards that may be used to certify organizations with respect to their "fitness" top participate in the exchange.	
4.	Comply with all regulations and best practices for physical and network security of health information	
4.1	Ensure data encryption in transit	
4.2	Assess integrity (completeness and correctness) of rendered data	
5.	Implement robust methods for patient consent processes to participate and manage data in the exchange.	
5.1.	Allow patient to receive notification that their data may be included in a data exchange	
5.2.	Allow patient to opt out of the data exchange	
5.3.	Allow patient to view their own data in the exchange	
6.	Audit trails - Patients must be able to obtain information about how their data has been accessed via the exchange (audit trail), to guard against inappropriate disclosure.	
6.1	Patient may view a report of who accessed data, when, and from what location.	
6.2	The exchange will audit all connections/disconnections to the services.	
6.3	Hold individual users accountable for inappropriate use or disclosure of patient information	

6.4	Protect individual users against excessive liability for disclosure	
7	Patient authorization of providers	
7.1	Patient authorization of specific providers or entities. Allow patients to control who can access their data via the exchange.	
7.2	Add/amend/annotate/dispute data in the exchange	
8.	Permit advanced patient control over data inclusion & access	
8.1	Allow the patient to selectively prohibit specially-protected or sensitive data from inclusion in the exchange.	
8.2	Allow the patient to selectively prohibit “other” (not specially-protected) data from inclusion in the exchange.	
8.3	Allow the patient to authorize only specific providers or entities to view sensitive or “other” data from within the exchange.	
9.	Enable role-based authorization of providers and other users of data	
9.1	Role-based authorization may be managed centrally or in a federated manner or both	
10.	Provide for robust authentication mechanisms of providers and other users of data	
10.1	If accessing the HIE from within a trusted domain/node, one-factor authentication is permitted	
10.2	If accessing the HIE from outside a trusted domain/node, require 2-factor authentication	
10.3	Utilize a Single Sign-On for users	
11.	Identity Management	
11.1	Provide a mechanism to uniquely identify all providers/users of the exchange	
11.2	Provide a mechanism to reliably identify an individual whose health information is part of the exchange.	
12.	Secondary Uses	
12.1	Permit secondary uses of de-identified or pseudonymized patient information for research, public	

	health, and quality improvement	
12.1	Permit re-identification of patients in emergency cases only related to public health or community safety	

4. Requirements for Information Technology Services & Implementation, Interoperability, and Healthcare Information Standards

ID	Requirement	Phasing
1.	Upload/register patient records from data source systems in the community, using currently-available standard interfaces, message formats, and communications protocols over public networks	
1.1.	Support commercially-available interface engines and other interface engines currently installed in the community	
1.2.	Secure transmission protocol such as 128-bit HTTPS	
1.3.	The exchange will operate with HL7 v 2.5 message format	
1.4.	The exchange will standardize on CCR and CDA document formats	
2.	Lightweight impact on existing IT services for all stakeholders	
2.1.	One-time effort to develop interfaces from the health system/clinical provider to the exchange.	
2.2.	Minimal cost and effort to maintain the interface to the exchange.	
2.3.	Provide lightweight, low maintenance “appliance” mechanism to data contributors	
2.4	Provide assistance with interface management and minimizing the number of interfaces	
3.	Offer centralized core support services together with localized support for stakeholders	
3.1.	First-line support & triage at the health system or plan.	
3.2.	Training of health system help desk.	
3.3.	Second-line support at the MPHIE	
4.	Ensure data integrity for all data types	
4.1.	Verify transmitted data in the exchange	
4.2.	Provide the ability to easily reconcile results in the exchange with the source systems	
4.3.	All data must be tagged with its source	
5.	System must be forward compatible with future healthcare IT trends such as Integrating the Health	

	Care Enterprise, HL7 v 3, etc.	

5. Architecture Requirements

ID	Requirement	Phasing
1.	Provide centralized services for patient identity	
2.	Provide centralized services for authentication/audit/access control	
3.	Provide centralized services for record location	
4.	Permit access to source systems housing the patient data or “edge systems” located in a DMZ behind the data provider’s firewall.	
5.	Host centralized repositories of summary information (metadata), for example in support of a record locator service or an XDS document registry.	
6.	Host centralized repositories of patient data, for example in support of an XDS document repository, according to the preference of data providers.	

6. Performance, Scalability, & Availability Requirements

ID	Requirement	Phasing
1.	The system must have a fast subjective response time	
1.1.	Query transactions by the clinical user should execute in less than 5 seconds	
2.	The system must have high availability	
2.1.	All data must be 99.5% available	
3.	The system must scale to meet the needs of the Metro Portland Community	

3.1.	Support 1.6 million unique patients in year 1, 1.8 million in year 5	
3.2.	Store 29 million data items in year 1, 107 million in year 5	

7. Usability Requirements

ID	Requirement	Phasing
1.	System must initially fit within existing office workflows and require minimal re-design to take advantage of the benefits.	
2.	System should provide convenient access to the care team in the office and ED environment.	
3.	System should help the care team to better meet patient expectations.	
4.	System should expedite tedious work processes.	
5.	System will connect to and integrate with other systems such as EMR and PHR.	
5.1.	EMR and PHR may “pull” data from the exchange under the user’s control	
6.	Technical support and training will be made available to offices.	
6.1.	System will result in net benefit of time for the clinician after implementation and training.	
6.2.	Minimal training or loss of productivity to start	
7.	System will offer a high degree of usability	
7.1.	Provide intuitive user interface	
7.2.	Escape routes to the user	
7.3.	Information is well organized	
7.4.	Data presented at the right time & place	
8.	System will provide fast response times	

8. Business/Financial Requirements

ID	Requirement	Phasing
1.	Operate at a relatively low cost with net financial benefit to the community	
1.1.	Take advantage of existing infrastructure where possible	
1.2.	Limit operations overhead by fostering collaboration between existing technology units of the various stakeholder organizations	
1.3.	No single stakeholder or stakeholder type will incur a significant financial net loss due to participation	
2.	Universally provide clinical and other qualitative benefits to all participants	

9. “Political” (community trust & collaboration) Constraints

ID	Requirement	Phasing
1.	The entity must be trusted and widely represent the delivery systems, plans, and other data providers & consumers – between institutions.	
2.	The governance must not be too big & bureaucratic. It should be entrepreneurial, lean & mean.	
3.	There must be a forum to work out issues in sharing data, and establish the criteria which must be met in order to share patient data.	
4.	Public scrutiny must yield a positive perception of the exchange and all stakeholders	

Section VII. Solution Overview

1. Solution Perspective

The ideal solution will offer an online, standardized, widely available and secure means for accessing recent and historical laboratory results, imaging reports, discharge summaries, and emergency department summaries by authorized parties. Results and dictations will be aggregated for the patient, regardless of ordering provider or which medical laboratory was used. Results and dictations will be available across different care settings. Lab and imaging orders will be placed with an online tool or other method. This solution does not attempt to modify the ordering process. Providers will be able to manage their result document viewing workflows with task lists and other organizing functions in the user interface, and print lab results. At the end of 5 years, the system will allow providers to import structured lab information and unstructured reports directly into the EMR. See Appendix A for Use Case diagrams.

2. Solution Position Statement

For	Portland metropolitan area healthcare stakeholders
Who	need to improve the quality of healthcare while having electronic access to current patient information,
HIE Results and Reports System	is a community-based solution consisting of new data services, common interfaces, and end user tools
that	will allow authorized care providers to have fast, intuitive access to clinical information under the patient's control.
Unlike	current manual processes and information silos using point-to point interfaces,
this solution	provides community-wide access to authorized providers and patients about lab results, discharge and ED summaries, and imaging reports.

3. Summary of Capabilities

< -- Description of Capabilities Here -- >

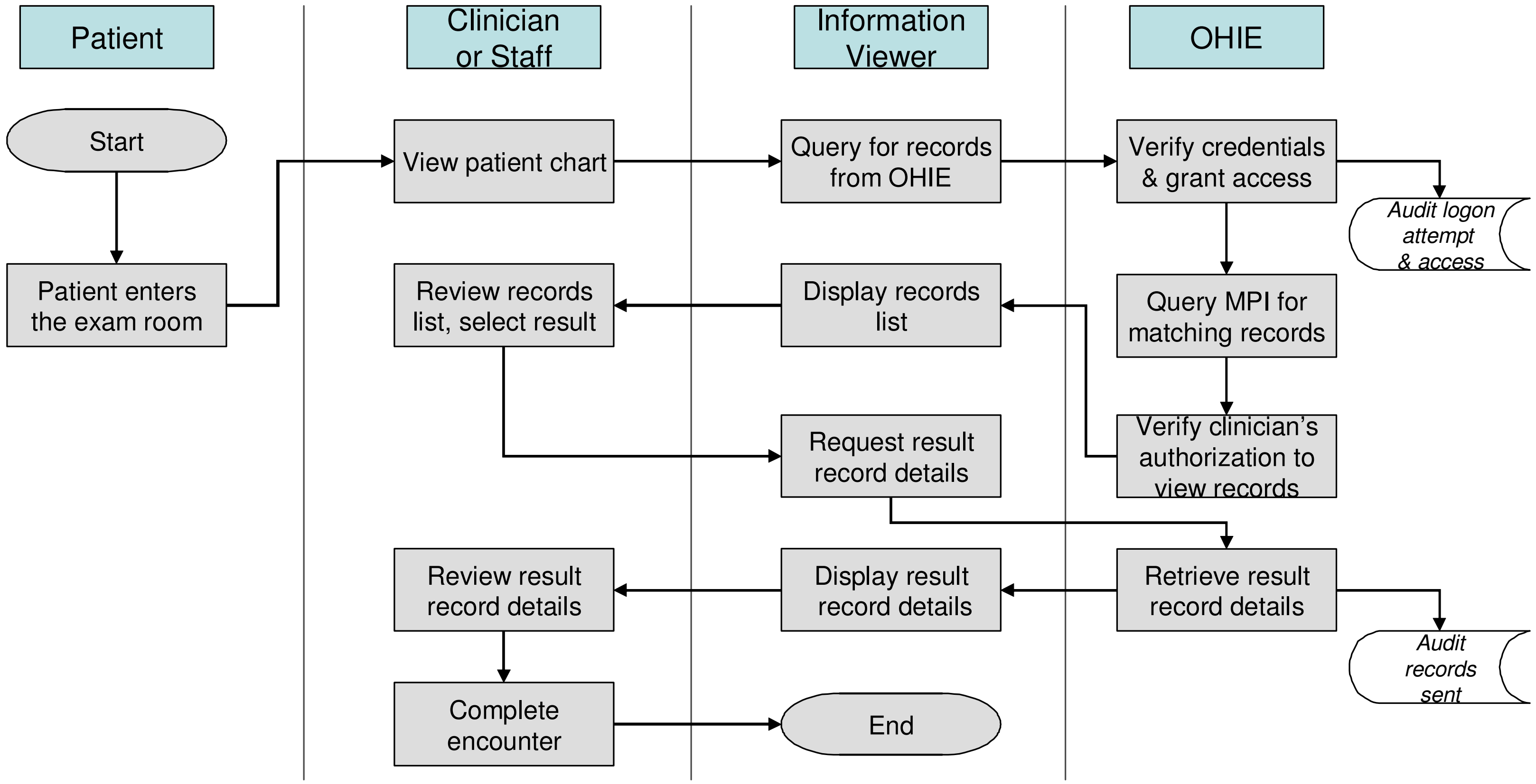
PORTLAND METRO AREA INFORMATION EXCHANGE

Stakeholder Benefit	**Supporting Features**

Appendix A – Use Case Diagrams

Generic Use Case

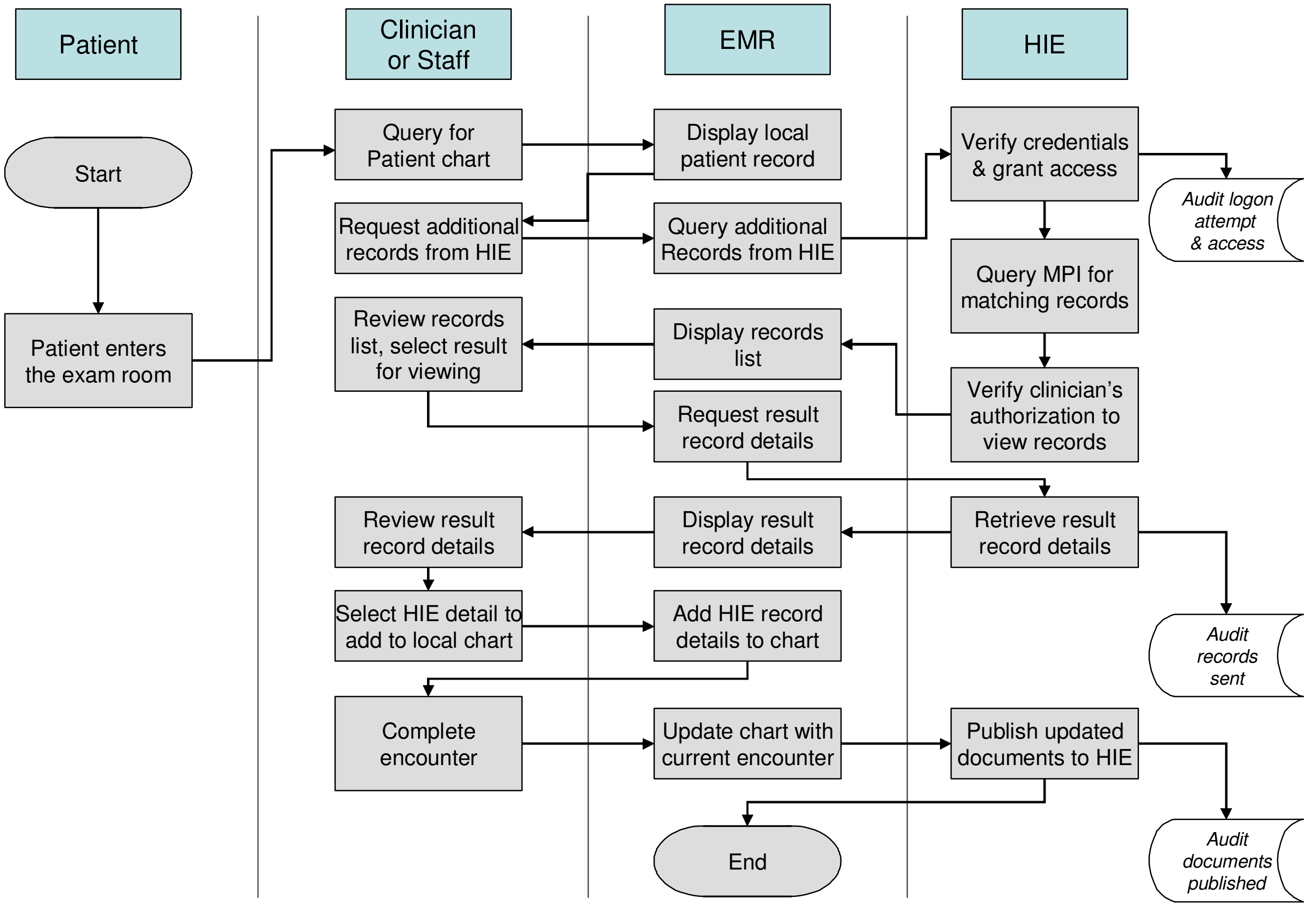
Generic Use Case: Clinician Views Result or Report via OHIE



Sample Use Case Diagram – Draft Only – Do Not Distribute

Generic Use Case with EMR

Generic Use Case: Clinician with EMR Views Result or Report via Portland HIE



Sample Use Case Diagram – Draft Only – Do Not Distribute

Use Case Variants

Notes:

- Consider both 1) browser-based access and 2) access directly from the clinician's EMR.
- Should distinguish between 1) New (unknown) patients and 2) established patient workflow.

Use Case #1: Provider Receives Lab Result (current workflow)
Use Case # 1a: Non-Ordering Clinician Views Lab Result (proposed workflow)

Use Case #2: Patient Discharged from Hospital, Discharge Summary Delivered to "Responsible" Provider (current workflow)
Use Case # 2a: Patient Discharged from Hospital, "Other" Clinician Views Discharge Summary (proposed workflow)

Use Case #3: Provider Orders Imaging Study and Receives Imaging Report (current workflow)
Use Case #3a: Non-Ordering Clinician Views Imaging Report (proposed workflow)

Use Case #4: Patient Discharged from Emergency Department, ED Summary Delivered to "Responsible" Provider (current workflow)
Use Case # 4a: Patient Discharged from Emergency Department, "Other" Clinician Views ED Summary (proposed workflow)

Appendix B – Stakeholder Participants

Feedback was gathered from the following stakeholder representatives. The participants to date are listed alphabetically by Organization. This does not imply that the following individuals or their organizations necessarily endorse or agree with the contents or details of the document. *(Update 3/16/2006).*

Organization	Name	Position
CareOregon	Pamela Mariea-Nason RN, MBA	Public Policy& Community Affairs Director
CareOregon	Rod Meyer	Chief Information Officer
CareOregon	Linda Blankenship	IT Strategy Consultant
Legacy Emanuel	Lee Domanico	President and CEO
Legacy Emanuel	Don Toussaint	Administrative Director of Laboratories
OHSU	John Kenagy	Chief Information Officer
OHSU	Ron Marcum, MD	Chief Privacy Officer, Chief Information Security Officer, Chief Medical Information Officer
OHSU	Brad King	Chief Financial Officer
OHSU	Joe Robertson MD	President
Providence	Russ Danielson	President and CEO
Providence	Laureen O’Brien	Chief Information Officer
Providence	Dick Gibson, MD	Chief Medical Information Officer
Regence BCBS	Ralph Prows MD	Chief Medical Officer and Vice President, Medical Services
Regence BCBS	Mark Ganz	President and CEO
Kaiser	Dean Sittig	Director of Informatics
Kaiser	Homer Chin MD	Chief Medical Information Officer
Kaiser	Kumar Chatani	Regional Information Officer

Additional content and feedback was obtained from the study team members.

Organization	Name	Position
Oregon Association of Hospitals and Health Systems	Andy Davidson	President and CEO
State of Oregon OHPR	Jody Pettit, MD	Health Information Technology Coordinator

Providence	Dick Gibson MD, PhD, MBA	Chief Medical Information Officer
Regence BCBS	Janice Forester, PhD	IT Performance Specialist

Additional content and feedback was obtained from the project staff and outside contributors.

Organization	**Name**	**Position**
Witter & Associates	David Witter	Contractor, project staff
State of Oregon OHPR	Summer Boslaugh	Health Information Security & Privacy Project Manager (outside contributor)
Oregon Healthcare Quality Corp	Nancy Clarke	Executive Director, project staff

Appendix C – Additional Considerations

The following items are not high-level requirements but rather questions that must be considered in implementation, service definition, and vendor selection.

1. Whether to batch process and pre-load patient demographics from some systems and create a de-duplicated master patient index, regardless of whether patients have opted in/out of the system.
2. How to register a new patient.
3. Whether to pre-load historical patient data from some systems for patients that have opted in.
4. What privacy and usage rules must be in place for research access? Will longitudinal searches be allowed and feasible?
5. What patient matching algorithms will be used? Will the system require 100% match on all items or something less? How will clinicians insure the patient is who they think they are?
6. What methods will be available to review the audit log?
7. Will there be a mechanism for physicians to state their relationship to patients (referred to me, my patient, etc.)? Will there be a way to automatically assign these patient relationships, e.g. from the health systems' primary care provider field?
8. Will there be a method to "merge" patients?
9. What terminology standards will be in place? Will the system initially use a common lab vocabulary such as LOINC?
10. What document types will be allowed, available, acceptable, PDF, DOC, RTF, TXT, XML, etc.?

Appendix D – Other Sources of Requirements

National Requirements:
NCVHS requirements website
Other NHIN Requirements websites

- AHIC Website
- ONC Website
- eHI Website

State/Regional Requirements
Florida Health Information Network
Taconic IPA (THINC, New York)
Healthbridge (Cincinnati)
CareSpark (Tennessee/Virginia)
MA-SHARE (Massachusetts)
CalRHIO (California)
NCHICA (North Carolina)
Arizona
Colorado
Delaware
Maine
Washington

Usability
Ash et al. 2005 papers
Baron et al. Ann Int Med 2005;143: 222-226

Appendix E – Background, Sources, Related Documents

The MPHIE Mobilization Planning effort was commissioned and financed by the Oregon Business Council's Health Information Exchange Leadership Group. The project leadership team (Tiger Team) provided oversight and leadership in guiding the development of the planning included:

- Andrew Davidson, Oregon Association of Hospital and Health Systems
- Janice Forrester, PhD, The Regence Group
- Dick Gibson, MD, PhD, MBA Providence Health Systems & Legacy Health Systems
- Jody Pettit, MD, Oregon Health Care Quality Corporation & Office for Oregon Health Policy and Research

The Mobilization Planning effort was staffed by Oregon Health Care Quality Corporation. Staff and sub-contractors who contributed to various portions of this report include:

- Nancy Clarke
- Jody Pettit, MD
- Tom Ricciardi, PhD
- David Witter, Witter & Associates

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The Mobilization Planning effort builds upon the report to the Oregon Business Council (OBC) Data Exchange Group titled "Oregon Health Information Exchange Options" dated May 15, 2006 available at http://www.q-corp.org/q-corp/images/public/pdfs/OR%20HIE%20Options.pdf.

The Mobilization Planning effort report relies on a number of sources of information including published studies, publications and reports of major organizations involved in health information exchange, and information collected from other regional health information organizations (RHIOs) and health information exchanges (HIEs) and interviews and discussion with clinicians and other stakeholders in the community.

Key Mobilization Planning documents include

- MPHIE Final Report
- Metropolitan Portland Area Health Care Environment.
- MPHIE Technology Plan.
- MPHIE Privacy and Security Assessment.
- MPHIE Governance Plan.
- MPHIE Business Plan.
- MPHIE Operations Plan.