Attachment A

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Public Health
Seattle & King County
HEALTHY PEOPLE. HEALTHY COMMUNITIES.
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Jail Health Services

Electronic Health Record System

Business Case

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(Narrative without Attachments)

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EXECUTIVE SUMMARY

The case for implementing an electronic health record in Jail Health Services (JHS) was first established through the Wellcon Report[1] presented to the JHS Proviso Work Group in June 2003. Jail Health's Strategic Business Plan[2] framed the Electronic Health Record System project as key within JHS' strategic direction and outlined a series of workflow and business process redesigns aimed at delivering the expected outcomes as recommended in the Wellcon Report. JHS expects that improving the management of health care information through implementation of an electronic health record will streamline work processes; improve the quality, timeliness, and appropriateness of care; reduce duplication; lower the overall cost of care; and, reduce risk of adverse clinical outcomes and litigation. During the presentation of the Wellcon report it was established that JHS could, with full implementation of the cost saving and risk reducing recommendations in the Wellcon Report, realize a 20% reduction in the annual operating budget. The Electronic Health Record is just one of the recommendations in the report. It is, however, viewed as a critical tool that will enable Jail Health Services to implement other risk reducing and cost saving recommendations.

The approach to the Electronic Health Records System project is to select a software solution with a robust and tested electronic health record application that can meet at least 80% of Jail Health Services business requirements; assist in achieving JHS objectives; meet company viability threshold; meet King County and Public Health Information System Technical requirements; and provide a sufficient return on investment within 7 years.

There are three electronic health record options, based on a response to the County's Request for Proposal that would meet the technical requirements. An analysis indicates that there is a significant cost differential between Option 1 and Option 2 in both the one-time expense and in the annual on-going expenses. Option 3 is considered high risk because of the immaturity of the health care product. This developer has a scheduled release of key modules in the spring of 2005, which may bring it to the 80% threshold for meeting business requirements. The preferred vendor, Option 1, has a strong history and experience working in correctional settings. The application[3] offers a superior set of benefits and the preliminary cost estimates fall within defined financial parameters.

The preliminary estimates of the cost of implementing the solution with the preferred vendor are $1,965,000 with an on-going annual expense of approximately $504,000. Looking at the overall summary of expected benefits the Steering Committee concluded that Option 1 met all of its criteria outlined in their approach and that it represented a solid investment. By 2009 (year 3 of implementation) JHS expects an annual net savings of $706,000 per year. The Executive Steering Committee considered it "sufficient" that the project, by year 7, will have re-paid the $2,000,000 investment and have provided an additional accumulated savings of $1,029,000.

As a result of the analysis underlying the Business Case, the Executive Steering Committee recommends a rigorous and detailed evaluation of the preferred vendor (Option 1) and its application. This detailed evaluation is to be conducted in a series of steps including scripted

product demonstrations, customer visits, and corporate visits to assure that the application can meet Jail Health Services' requirements and that the company can deliver on its promises. Additionally, during the evaluation the implementation and on-going costs will be refined through detailed discussions with the preferred vendor, the Department of Adult and Juvenile Detention, and other potential partners[4].

If the detailed evaluation improves or continues to validate the cost/benefit assessment contained in the Business Case, contract negotiations would lead to the signing of a contract. Implementation planning with the vendor, assuming expedited contract negotiations, would begin in the Fall of 2005 with a go-live date of no later then January 2007.

There are two potential drawbacks to this recommendation. The first scenario is that the preferred vendor and the application are not able, under further evaluation, to deliver the benefits as expected. A second scenario is that the cost to implement and/or the time to implement has been underestimated therefore changing the factors in the cost benefit analysis and resulting in insufficient return on investment within the expected 7 year period.

A fall back position would be to conduct the same rigorous review with Option 3 assuming that they have met their projected release schedule. The second fall back is to issue a second Request for Proposal to determine if there is another vendor in the market who can meet the business requirements at the established price point.

The Steering Committee believes that Jail Health Services' Electronic Health Record System Business Case clearly documents the benefits of investing in an Electronic Health Record; offers a solid comparison of the different market offerings; reports fairly on the expected costs and return on investment; and results in an accurate and thorough review of the vendor options.

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INTRODUCTION

In 1991, the Institute of Medicine (IOM) issued a report[5] concluding that computer-based patient records are an "essential technology" for health care and that electronic records[6] should be the standard for medical and all other records related to health care. Since that report numerous healthcare associations, societies, the federal government, and private industry have hosted initiatives to advance the standards and the technology related to Electronic Health Records. The promise that has spurred this work on is that of increased quality; improved care continuity and coordination; reduction of errors; and improved efficiency (with the hope of lower cost) throughout the health care delivery system. Experience and studies are now revealing that electronic health records and even components of electronic health records can improve care and reduce costs.

Jail Health Services (JHS), a section of Public Health Seattle & King County, provides a full continuum of health care services[7] to inmates housed in King County's correctional facilities[8]. Among these services are health assessment, preventative care, acute/episodic ambulatory care, specialty referrals, infirmary level care, psychiatric care, and chronic care management. The inmates bring into jail a complex set of medical and psychiatric health care needs, which require both 24/7 emergency and scheduled medical response within the facilities. This set of health care delivery requirements looks very similar to community based systems for managing the care of complex large populations. Like its community counterparts this health care delivery system faces many of the same problems and risks in delivering care.

Contributing to the complexity of the Jail Health Services health care system is rapid inmate turnover, the transfer of inmates from one facility to another, and delivery of health care services within a correctional environment. Services are provided by a FTE complement of 158 medical and administrative staff that provide or support an average of 139,000 medical encounters[9] a year. The jail admits about 55,000 arrestees each year, with an average daily population of 2,200, and an average length of stay of 18 days.

The Jail Health delivery system, like a number of community-based delivery systems, suffers from the inefficiencies and deficiencies of a paper-based medical record system, which impacts the quality of care, cost, and jail operations. The Wellcon Report[10], commissioned by the King County Council under a 2003 Proviso to improve JHS operations and delivery of constitutionally mandated care, made a series of recommendations addressing problems that represented a risk or liability to Jail Health Services, Public Health, and King County. A key recommendation within this report was that Jail Health Services implement an Electronic Health Record System to provide pertinent healthcare management data; improve efficiency of multitudes of internal processes; automate many healthcare functions thereby reducing staffing needs; increase productivity of all staff; and, eliminate duplication of effort. Sixty-four percent of the identified areas for improvements recommended in the Wellcon report would be enabled, to some degree, by the implementation of the Electronic Health Record[11]. This implementation would significantly improve JHS success in achieving the savings suggested by the Wellcon report.

The Wellcon recommendations were used to develop JHS's three year Strategic Business Plan that identifies practice improvements and infrastructure changes. This Plan - Positioning Ourselves for the Future[12] establishes the goal of acquiring and implementing an Electronic Health Record.

As a provider in a jail environment, JHS is working closely with Department of Adult and Juvenile Detention (DAJD) on all relevant aspects of its Strategic Business Plan. This partnership extends to the Electronic Health Record to ensure that overlapping business processes maximize the benefit of the implementation for both agencies.

The purpose of this Business Case is to:

- Document the benefits of investing in an EHR;
- Compare and contrast electronic health record options currently available in the market;
- Report on the costs and demonstrate the return on investment; and,
- Determine if there is a preferred vendor(s) and outline the steps for further detailed evaluation

SECTION I: JAIL HEALTH SERVICES VISION FOR HEALTH INFORMATION MANAGEMENT

Strategically, the Electronic Health Record is an essential enabler for Jail Health Services to achieve its vision of health information management. Within this vision Jail Health Services manages health information as a mission-critical function through a system that maintains a high level of integrity for business and legal purposes.

Jail Health Services health information management[13] system ensures the availability of clinical, demographic, financial, and administrative data to facilitate real-time health care delivery and critical health and business related decision making for multiple purposes across diverse organizations, settings, and disciplines.

To achieve this vision Jail Health Services will move from its paper-based medical record model to an electronic health record that will improve the quality and safety of inmate care and achieve efficiencies in the healthcare delivery system.

It is with this vision and expectation that Jail Health Services reviewed five critical problems areas within Jail Health Services and explored opportunities for improvements that would result with the implementation of an Electronic Health Record.

SECTION II: DESCRIPTION OF PROBLEMS AND IMPROVEMENTS

This section of the Business Case explores in more detail five critical problem areas that Jail Health Services' face with its current paper-based medical record and the manual processes currently used for managing health care information. The five critical problem areas are: managing the paper medical record; pharmacy and medication administration; charting and documentation; results reporting; and staff assessment of current health care information management.

The first four critical problem areas are presented in a "From→To" format identifying the situation in the current environment and imagining how this problem would be addressed in an environment using an electronic health record. Where appropriate, the "From→To" is supported with data and references from the current literature on Electronic Health Records. The fifth critical problem area addresses staff satisfaction with the current environment and provides a baseline as the Steering Committee targets improvements in staff satisfaction. Each problem area concludes with a list of objectives the Steering Committee expects to achieve as a result of implementing an Electronic Health Record.

Problem Area #1: Managing the Medical Record

Overview

All care delivered to an inmate by Jail Health Services is documented in that individual's paper medical record. This record is held to privacy and security standards set forth by HIPAA[14] and

the health care industry. Each request for service and the resulting encounter is documented in the paper chart and noted in the progress notes. The medical record contains all the information related to the medical care requested, ordered, and received by each inmate. Diagnosis and medical plans for treatment are also included.

FROM managing the medical record in the Current Environment TO managing health care information with an Electronic Health Record System

Issue	Current Environment	Electronic Health Record
Record Availability	**From** the paper record not always being available for a clinical encounter or an encounter being delayed while the chart is being located. **From** struggling to meet the standard on availability and use of health records[15] set forth by the National Commission on Correctional Health Care (NCCHC). **From** only one person having access at a time with clinical information and clinical decision-making managed in a liner fashion.	**To** records consistently available for any authorized purpose and clinicians having the information they need organized in a manner consistent with the workflow of their practice. **To** meeting NCCHC standard on availability of health records through secure information access to the electronic record from all points of care and at the time of clinical decision-making. **To** the medical record being accessed by multiple people simultaneously allowing for more timely chart completion and more timely availability of key information.
Record Accessibility (time to find)	**From** the search for a chart taking up significant amount of Medical Records staff time and delaying patient care.	**To** the time it takes for a clinician to look up a patient in the system.

	From experiencing, as others in the community experience, delays in the delivery of care as personnel search the facility for the complete record. [16] Note: A recent JHS study on the time spent to locate the chart[17] indicates that Medical Records staff spend over 5,000 hours annually searching for charts at an annual cost of approximately $117,000.	**To** managing a system that supports the concept that health care information is essential element of providing quality care and assuring continuity in that care. Note: Data from implementation of the EMR in Salt Lake County indicates that time to find a chart before the EMR = 21.3 minutes to after the EMR = 2 seconds[18]
Transportability	**From** difficulty in moving a record from one location to another. **From** risking the negative effects or bad outcomes related to missing critical medications or treatments when an inmate is transferred between the two facilities in King County. **From** summaries of care being manually transcribed for inmates transferred to Yakima and from the copying of charts for those inmates transferred to prisons. Note: Jail Health records indicate that in 2004 9,800 inmates were transferred from Seattle	**To** easily accessing clinical information from multiple locations without having to transport a physical record. **To** having the medication and treatment information immediately available to the staff on the receiving end of a transfer to ensure continuity of care. **To** summaries of care and/or portions of the medical record being printed on laser-generated forms leading to more complete and legible documents that improve the continuity of care and allow for tracking that documents have been transmitted.

	(KCCF) to Kent (RJC) and it is estimated that complete records arrived for only 10% of these in time for the 12 hour review window established by NCCHC standard on Transfer Screening[19].	
Completeness & Organization	**From** data coming into the paper medical record from many sources, locations and in many formats. **From** experiencing large stacks of back filing and risking that critical clinical information will not be in the medical record at the time a clinician needs it for a clinical decision. **From** manually checking each chart to find documents that are missing (e.g. History and Physical Exams, Operative Notes, Discharge Summaries) or documents that are not signed by the attending physician. Note: NCCHC holds JHS accountable to standards related to complete records and standards of chart completion.	**To** a system that has the capability to link to multiple data sources under one look up function. **To** improving the timeliness of all the relevant information being in the right place at the right time for the right patient with direct data entry and/or scanned documents. **To** conducting an automated chart review by establishing certain standard parameters within the system. Identifying the data that must be completed within a specific time frame, including availability in the record and signature by the physician. The unsigned documents are noted for further attention and placed on a work list. Note: Data from implementation of the EMR in Salt Lake County indicates a change in the filing lag time from 13 days

		before the EMR to < 24 hours after the EMR[20].
Stability	**From** experiencing lost or destroyed records which are impossible to replicate.	**To** having records electronically backed-up and all electronic components retrievable this meets HIPAA security requirements.
Record Linkage	**From** records being linked through various software systems that each recognizes different key elements within the record and therefore having no integration. **From** outside correspondence being filed in a tabbed section of the chart with an inability to cross reference it to physician notes or actions requested.	**To** having one comprehensive data source or limited data sources that are all linked under one look up function. **To** outside correspondence and miscellaneous forms scanned and indexed into the patient record.
Data Retrieval	**From** clinical data not being easily extracted nor being able to guarantee that you have a complete record. **From** not being able to easily track or document that appropriate actions have been taken and recorded in the patient's record.	**To** being able to access data in multiple queries and locating incomplete portions of the record. **To** having the system track events occurring within the facility and ensure the events are documented in the patient's chart according to protocol. An example is: A patient admission (based on Encounter Type, Admission Type, and Patient Type) is tied to a document (office visit note, release of information, etc.). The document must be

		sent to the chart within X hours and signed by the provider within X hours
	From a high degree of difficulty in extracting data from the paper records for Quality Assurance and Utilization Review.	**To** data easily available and routinely reported for Quality Assurance and Utilization Review audits.
Chart Pulls	**From** a large number of expensive chart pulls for daily clinics. Note: An analysis of the Medical Records Work Processes[21] estimates that in 2005 Jail Health Services will spend over $620,000 on chart pulls required for clinical visits or review of treatments.	**To** providers interacting with the inmate's medical record during the clinic visit and chart pulls for clinics significantly reduced over time as providers become more comfortable with new visit workflow. Note: In a study[22] conducted in Allina Health system chart pulls reduced by 65% in year 1 of implementation of an electronic health record.
Space and Chart/Forms	**From** dedicating significant amount of square footage in the Jail Health area to store paper records and chart supplies. **From** spending over $18,000 annually on materials used to assemble medical records.	**To** using some space to hold computer equipment necessary to convert documents to electronic format and shifting existing record storage space to staff areas. **To** computer generated forms and charts eliminating the purchase of pre-printed

		forms. Note: In the Integrated Security Project (jail remodel) Jail Health Services envisions better use of its space in the Downtown jail for staff areas instead of records storage.
	Note: Currently JHS has over 61,000 active medical records[23]. Approximately 55,000 of these records are stored on site and 6,000 active records are stored off site at US Archives because of limitations of onsite space.	
Safety and Security of Care	**From** risking the consequences of using incomplete data for clinical decision making as a result of inconsistent availability of the medical record. **From** manual system and procedures to secure the privacy of the medical record with no means of auditing.	**To** all information on an inmate available for all visits and clinical decision-making when data is entered and maintained on a timely basis. **To** full multi-level security (e.g., by Facility, Department, Section, Document, User, and User Type) and controlled confidentiality and information access with detailed audit reports.
Risk Management	**From** the current paper medical chart that is seen as both high risk and high cost. Note: The Wellcon Report[24] identified Jail Health Services' current paper medical chart as both high risk and high cost to Public Health and the County.	**To** an electric health record that establishes required fields leading to improvements in documentation for future reference. Note: The improved documentation helps deter and defend malpractice litigation. Research confirms that computer-based patient records improve documentation over

		hand-written records, both in volume and accuracy[25].

Conclusion

Envisioning this change from managing medical records in JHS current environment to managing health care information with an electronic health record the Steering Committee expects that implementing an electronic health record will result in:

1.1 Pertinent health care data being readily available to health care staff in a timely manner to optimize patient care and improve patient safety.

1.2 A reduction in the amount of time to locate health care information resulting in more efficient use of staff resources.

1.3 Improved efficiency in health care operations through decreased number of paper record chart pulls and a decrease in the time required to get information into the medical record.

1.4 Modifying risk of litigation through improved health care documentation and chart legibility.

Problem Area #2: Pharmacy and Medication Administration

Overview

A large part of the Jail Health Services' medical practice involves the verification of current medications at the time of booking, the ordering and filling of necessary prescriptions through the Jail Health Services' licensed pharmacies in both Kent and Seattle. While some medications are delivered to inmates according to procedures that allow self-administration (keep on Person – KOP) a large percentage are delivered to inmates in single doses by nursing staff when drugs have the potential for abuse or special housing restrictions preclude self-administration. The

pharmacy has a system in place for medication preparation, dispensing services, and quality assurance. However, the current system between the provider's orders, pharmacy dispensing, and medication administration introduces some risks and presents an opportunity for streamlining for improved cost, efficiency, and safety.

FROM managing pharmacy order and medication administration in the Current Environment TO managing these functions with an Electronic Health Record System

Issue	Current Environment	Electronic Health Record
Order Entry	**From** hand written orders with no immediate feedback to providers regarding their prescriptive choice related to allergies or contraindication.	**To** orders generated as a part of visit notes where providers are required to stay within the formulary and are notified of potential drug interactions directly at the time of the order so adjustments can be made.
	From a number of errors and omissions in the writing of the orders that then need to be adjusted by the provider sometimes causing delay in filling the prescription.	**To** providers using order templates that require all fields be completed correctly prior to sending the order.
	From orders with phone verification and co-signed the following day by provider on call.	**To** the on call provider using the system to email or fax prescriptions with an electronic signature at the time of the order.
	From a process that involves over 27 steps between writing an order and having the medication delivered to the med room for	**To** a 60% reduction in the number of steps using order entry through an electronic health record system.

	administration. Note: A study of the process for writing and filling a non-narcotic prescription[26], which is just a subset of the Jail Health Services Medication Administration process, revealed that there are over 27 key steps involved in filling a new prescription. This activity involves the provider, nurse, pharmacy assistant, and pharmacist. Note: In 2004 Jail Health Services filled over 100,500 prescriptions, a monthly average of over 5,000 new and over 3,000 refills.	Note: Steps were reduced from 27 to 11 with use of an E H R according to a recent JHS study[27].
Adherence to Formulary	**From** providers ordering according to their individual profile without the benefit of review. **From** providers receiving no offer of alternatives or assistance in the current system for appropriate management of drug utilization.	**To** providers ordering from a formulary within the system and having non-formulary choices sent for review to the Medical Director for approval. **To** a system that connects the ordering to a databank where there are detailed comparisons of average wholesale cost; therapeutic class analysis according to multiple national standards with respect to drugs; and therapeutic substitutions based on the formulary recommendations.

	Note: Not unlike its health care counterparts in the community, Jail Health Services has limited ways to manage its pharmaceutical budget line. In 2005, this line item represents almost 9% of Jail Health Services total budget and is the fastest growing line item at a average annual increase of more than 20%.	Note: In a study conducted by Wang, an expert panel[28] estimated that alternative drug suggestion reminders would save 15% (range of 5% to 25%) of total drug costs per year.
Record of Medication Administration	**From** the manual process for noting the changes and redirecting the paper-based Medication Administration Records (MARs). Note: An analysis[29] of the nursing resources assigned to the task of preparing for medication pass indicates that nurses spend almost 8,400 hours annually on this function. Assuming that 80% of this time is related to the updating and rerouting and managing the MAR, this represents a cost of almost $ 133,000.	**To** using an electronic MAR to assist with medication administration thereby greatly reducing the amount of time in managing the MARs as well as reducing errors in transcribing and copying orders.
Safety of Care	**From** not offering alerts to providers of possible adverse drug events and no way to track preventable adverse drug events (ADE's).	**To** using an alert system that notifies the provider of a possible ADE and track preventable adverse drug events as a quality improvement and patient safety improvement activity.

	Note: The patient safety literature shows that adverse drug reactions occur, most commonly in patients taking multiple medications. Numerous "sound-alike" medications get confused or misinterpreted. Poor handwriting is misinterpreted by pharmacists and by patients.[30]	Note: An expert panel involved in the implementation of an Electronic Medical Record studied by Wang[31] indicated that ADEs could be reduced by approximately 34%.

Conclusion

Envisioning this change from managing pharmacy ordering and medication administration in JHS current environment to managing these functions with an electronic health record the Steering Committee expects that implementing an electronic health record will result in:

2.1 Improved legibility of orders and assurances that renewals/refills are exactly duplicated.

2.2 Improved patient safety with alerts immediately displayed for providers regarding sensitivities and drug-drug and food-drug interactions so that modifications can be made.

2.3 Improved compliance to the approved pharmacy formulary leading to a reduction in the cost of pharmaceuticals.

2.4 Direct receipt of electronic orders changing work flow in pharmacy eliminating the need for pharmacy staff to do direct entry of the order.

2.5 Increase in the accuracy of medication administration and a decrease in staff time needed to prepare for medication pass.

Problem Area #3: Charting and Documenting

Overview

Each encounter within Jail Health Services results in a chart note. The health care team relies on this record of events and clinical information to provide continuity of care in treatments and to assure quality in clinical decision making. This documentation constitutes a legal record and represents a picture of all care provided to an individual. As with reports throughout the health care industry, the quality and legibility of Jail Health Services documentation has been raised as a high-risk issue.

FROM the charting and documenting practices in the Current Environment TO charting and documenting with an Electronic Health Record System

Issue	Current Environment	Electronic Health Record
Time spent in charting	**From** clinicians spending hours each day hand writing notes and updates in the paper medical records frequently documenting the same note in multiple locations of the chart. Note: Jail Health Services' nurses spend over 26,400 hours annually doing paperwork, charting and writing in logs[32].	**To** using a systematic data entry process with JHS designed templates to capture relevant clinical information at the point of care so that the most current information is available to other care-givers in real time. Note: EMR reduces that amount of time nurses spend working with medical records. One estimate[33] is that EMR results in a 15 percent reduction (1.2 hours per day) of a nurse's time working with the patient's record.
Accessibility of information	**From** clinicians searching the chart for the most recent information and shuffling through accumulated stacks of paper "to be filed," to locate additional clinical information at the	**To** having available the relevant clinical information necessary for a clinical decision organized and presented in a form and format that is easy to use and includes the

	time a clinical decision needs to be made. **From** a paper-based medical record system that includes related information and documents in separate labeled sections of the chart.	most current information. **To** using the system's relational database and document imaging capacity to show related documents and information that are a part of the health record.
Communication between Providers	**From** clinicians passing information related to patient care using Post-its and route and transfer slips.	**To** using a system that includes electronic mail (secured) to direct specific inmate health care information to team members supporting the care needs of the individual, along with a tracking system to assure that information was transferred.
Completeness of documentation	**From** inconsistency in the completeness of documentation within the current system leading to potential for bad outcomes.	**To** using a structured format for data entry leading to improvements in the quality and the thoroughness of the documentation.
Chart Review Time	**From** clinicians spending 2 to 3 hours a day combing charts looking for critical information in order to sign orders, adjust care plans, or order refills on prescriptions. **From** taking an average of 5 ½ minutes per chart. Note: The most expensive resources in the healthcare environment are physicians and nurses.	**To** a system that provides a Clinical Summary, including trend analyses. **To** reviewing a chart in under 2 minutes. Note: The EHR system is designed to increase clinician efficiency, sometimes by as much as 50%, by relegating clerical work to lesser-paid staff and delivering timely,

		organized, meaningful information to the key providers.
Safety of Care	**From** inconsistent follow up on care recommendations and no systematic tracking of compliance measures.	**To** using workflow management tools that assure that tasks, which are required to be done in support of patient care, are assigned and noted when complete.
Data Retrieval	**From** a labor intensive and disorganized approach to using existing data for support in clinical decision-making, CQI studies, and outcome studies.	**To** using increasing amounts of codified information to improve day-to-day clinical decisions and CQI studies.
Risk Management	**From** inconsistent quality, legibility and content of documentation in the medical records putting Jail Health Services, Public Health and King County at risk should the chart be introduced during litigation.	**To** legible and organized documentation of a complete medical record leading to improved communication between clinicians resulting in improved patient outcomes and reduced risk of litigation. Note: Research confirms that computer-based patient records improve documentation over hand-written records, both in volume and accuracy[34].

Conclusion

Envisioning this change from charting and documenting practices in JHS current environment to charting and documenting with an electronic health record the Steering Committee expects that implementing an electronic health record will result in:

3.1 Pertinent health care data being readily available to nursing staff and ease of data entry post patient encounter requiring less nursing time working with the patient's record.

3.2 Improved clinical decision making through critical clinical data displayed graphically and reported over time.

3.3 Improved continuity of care through improved communication between providers.

Problem Area #4: Results Reporting

Overview

Currently there is a manual system for alerting provider that results have been returned on labs and other tests. This system causes delay in provider notification and in the information being filed in the chart. Frequently, a provider will see the inmate a second time without the benefit of the test or lab results.

FROM results reporting in the Current Environment TO an integrated results reporting function within an Electronic Health Record System

Issue	Current Environment	Electronic Health Record
Timely availability of results	**From** lab and test results sitting in "to be filed" baskets making its way into the patient's paper medical record, a process that can take days.	**To** direct entry or scanning results greatly reducing the time delay and improving diagnosis and treatment.
Repeat Labs	**From** providers repeating tests previously ordered. Note: It is estimated[35] that 20% of the lab tests paid for by Jail Health are unnecessarily repeated due to lack of medical information	**To** providers having the benefit of lab results during their visit with the inmate and avoiding unnecessary repeat lab tests.

	available or inaccurate and incomplete information in the patient's medical record. This translates into an unnecessary expense of $20,000 per year[36].	

Safety of Care	**From** the risk of missing a critical change in a lab value because of a manual system for monitoring results over time. **From** a manual route and transfer system of the paper result and the paper medical record so that lab results are reviewed and a provider sign off occurs.	**To** quickly detecting trends by viewing graphed results over time providing key clinical information for clinical decision making. **To** system-generated patient summary reports and daily orders sent to the physician's inbox for review and signature.
Continuity of Care	**From** limited or no information provided to an individual at the time of release related to the treatment they have received or recommendations for follow-up once released.	**To** a client-specific discharge instructions and a clinical summary for the referral source can be printed and provided to the individual at time of release.

Conclusion

Envisioning this change from results reporting in JHS current environment to an integrated results reporting function within an electronic health record the Steering Committee expects that implementing an electronic health record will result in:

4.1 Improved diagnosis and treatment as providers have timely access to test results.

4.2 A reduction in the number of duplicate tests ordered by providers.

4.3 Improved compliance for medical record compliance with notification to providers of unsigned notes and orders.

4.4 Improved continuity of care and referral management by providing inmates with discharge information related to their care while incarcerated.

Problem Area #5: Staff Assessment of Importance and Satisfaction

Overview

In an online survey[37] conducted between February 9th and February 18th, 2005, clinical and non-clinical staff were asked to assess the importance of particular medical records-related issues as well as their satisfaction with the current system in place at JHS. There were 65 total respondents, 47 clinical and 18 non-clinical. This survey represents a pre-implementation measure and is intended to provide a baseline measure on staff satisfaction.

From staff satisfaction with the current system for managing health care information to the satisfaction of staff in an environment where an electronic health record is being used to support clinical care.

Results of Questions asked of Clinical and Non-Clinical Staff – Satisfaction with the Current Environment

	Clinical Staff		Non-Clinical Staff	
Question	**Importance of Issue Avg. Rating**	**Satisfaction with Current Practice Avg. Rating**	**Importance of Issue Avg. Rating**	**Satisfaction with Current Practice Avg. Rating**
Organization of patient records.	Very important	Dissatisfied	Very important	Somewhat satisfied

Ease of accessing a patient's MR.	Very important	Dissatisfied	Very important	Dissatisfied
Confidentiality and security of patient records.	Very important	Somewhat satisfied	Very important	Somewhat satisfied
The efficiency with which you can communicate patient info.	Very important	Dissatisfied	Very important	Dissatisfied
The medical records system contributes to the quality of care provided.	Very important	Dissatisfied	Very important	Dissatisfied
Degree of confidence in the current Route and Transfer system.	N/A	Dissatisfied	N/A	Dissatisfied
Effectiveness of Route and Transfer system.	N/A	Dissatisfied	N/A	Dissatisfied

Beyond the questions asked of both clinical and non-clinical staff, there were some questions that were specifically asked of each group, based on their area of expertise and knowledge of the current system.

Results of Questions Asked of Clinical Staff Only-

Satisfaction with the Current Environment

Question	Clinical Importance of Issue Avg. Rating	Clinical Satisfaction with Current Practice Avg. Rating
Ease of finding specific information within a patient's medical record.	Very important	Dissatisfied

Ease of tracking results of clinical operations.	Very important	Dissatisfied
Ease with which medical records help prevent overlooked patient information	Very important	Dissatisfied
Medical records as a tool to help deliver preventive care.	Very important	Dissatisfied
Systems are in place to prevent prescriptions for medications that might result in allergic drug reactions or drug-drug interactions.	Very important	Dissatisfied

Results of Questions Asked of Non-Clinical Staff Only-

Satisfaction with the Current Environment

Question	Non-Clinical Importance of Issue Avg. Rating	Non-Clinical Satisfaction with Current Practice Avg. Rating
Accessibility of medical record information.	Very important	Dissatisfied
Information is accurately and clearly documented by clinical staff into the medical record.	Very important	Dissatisfied
Contribution of medical records to the overall efficiency of business operations.	Very important	Dissatisfied
Minimal time spent accessing medical records.	Very important	Dissatisfied

The medical records system contributes to the overall quality of work life.	Very important	Dissatisfied

"Describe the ways you feel an Electronic Health Record would benefit our current practice."

A question was included in the Assessment Survey designed to gain a preliminary measurement of staff's attitudes about the implementation of an electronic health record. An open-ended statement was posed. Below is a sampling of staff's response:

- "We will eliminate the need to find charts all the time and to send records back and forth between sites and archives."
- ". . . Very beneficial in terms of instant access for both sites to patient medical information."
- "It will greatly reduce medical errors while providing us a favorable return on investment over time."
- "Instant, up to date information on patients, which is crucial for providers."
- "Better organization of information; easier access to information; more effective patient care; better communication among staff; less care overlooked."
- "EHR would greatly assist in a higher efficacy of health care delivery in JHS. Ease in accessing information, increased speed in obtaining information, less time spent physically searching for charts and patient information would be more cost effective for the department and allow for better time management of staff."
- "It would allow timely communication between all providers, from prescription writer to pharmacy to prescription deliverer."

Conclusion

Envisioning the change in the level of staff satisfaction with the current system for managing health care information to the satisfaction of staff in an environment where an electronic health record is being used to support clinical care the Steering Committee expects that implementing an electronic health record will result in:

5.1 Improved staff satisfaction with the ease of accessing the health record.

5.2 Improvements in non-clinical staff's satisfaction with their overall quality of work life.

5.3 Improvements in the level of satisfaction that staff report in the efficiency of communication related to a patient's care.

SECTION III: SUMMARY OF OBJECTIVES

Based on a review of the literature and on conversations about what is achievable as JHS moves from the current paper-based medical record to an electronic health record the Steering Committee established a set of objectives. These objectives constitute one component of the evaluation model the Steering Committee established to decide on a preferred solution as well as the foundation for the measurement plan which will be established during the implementation planning stage along with the selected vendor. The measurement plan will include a measurement definition, an expected target, and reporting timeframes.

Below is a summary of the objectives that Jail Health Services expects to achieve with the implementation of an electronic health record:

1.1 Pertinent health care data being readily available to health care staff in a timely manner to optimize patient care and improve patient safety.

1.2 A reduction in the amount of time to locate health care information resulting in more efficient use of staff resources.

1.3 Improved efficiency in health care operations through decreased number of paper record chart pulls and a decrease in the time required to get information into the medical record.

1.4 Modify risk of litigation through improved health care documentation and chart legibility.

2.1 Improved legibility of orders and assurances that renewals/refills are exactly duplicated.

2.2 Improved patient safety with alerts immediately displayed for providers of sensitivities and drug-drug and food-drug interactions so that modifications can be made.

2.3 Improved compliance to the approved pharmacy formulary leading to a reduction in the cost of pharmaceuticals.

2.4 Direct receipt of electronic orders changing work flow in pharmacy eliminating the need for pharmacy staff to do direct entry of the order.

2.5 Increase in the accuracy of medication administration and a decrease in staff time needed to prepare for medication pass.

3.1 Pertinent health care data being readily available to nursing staff and ease of data entry post patient encounter requiring less nursing time working with the patient's record.

3.2 Improved clinical decision making through critical clinical data displayed graphically and reported over time.

3.3 Improved continuity of care through improved communication between providers.

4.1 Improved diagnosis and treatment as providers have timely access to test results.

4.2 A reduction in the number of duplicate tests ordered by providers.

4.3 Improved compliance for medical record compliance with notification to providers of unsigned notes and orders.

4.4 Improved continuity of care and referral management by providing inmates with discharge information related to their care while incarcerated.

5.1 Improved staff satisfaction with the ease of accessing the health record.

5.2 Improvements in non-clinical staff's satisfaction with their overall quality of work life.

5.3 Improvements in the level of satisfaction that staff report in the efficiency of communication related to a patient's care.

In addition to these objectives, Jail Health Services expects specific and measurable improvements related to the business process re-engineering that will take place through implementation of the Electronic Health Record. There will be a three-way partnership between Jail Health Services, the selected vendor and the Department of Adult and Juvenile Detention (DAJD) to not just make existing paper processes more efficient but to use the system of choice to improve the overall business practice while ensuring optimum quality of care. DAJD and Jail Health Services has convened a group and begun a collaborative process[38] to identify the interdependencies and opportunities through the EHR implementation. A detail metrics and measurement plan will be developed along with appropriate measurement intervals for selected indicators.

SECTION IV: ASSUMPTIONS

Below is a summary of the key assumptions made by the Steering Committee as it relates to the selection, implementation and operation of an Electronic Health Record within the Jail Health setting:

1. The Electronic Health Record is a critical tool for Jail Health Services which needs to be in place before many of the cost savings and risk reducing changes recommended in the Wellcon Report can be implemented and expected benefits realized.
2. There is a software solution with a robust and tested electronic health record application that can meet at least 80% of Jail Health Services business requirements; assist in achieving JHS objectives; meet company viability threshold; meet King County and Public Health Information System Technical requirements; and provide a sufficient return on investment within 7 years.
3. The four key interfaces required to assure that the goals outlined in the project are met, are feasible. These include DAJD; FSI (Pharmacy); Dynacare Lab; and Signature.
4. The Integrated Security Project (ISP) will fund the necessary upgrades to the network infrastructure at both Jail Health Services sites.
5. The network will be robust and reliable enough to support the use of the electronic health record at the point of care (versus a retrospective data entry model). This requires that the system selected will have the ability to meet the performance and reliability requirements as stated in the RFP. These requirements are:

   - The system must run 7x24x365 environment.
   - Response times: in 2 seconds or less 99 percent of the time.
   - Available 99.99 percent of the time.
   - The system must capable of handling thousands of concurrent users.
   - The system must be scalable enough to handle future increases in volumes.
   - Ability to perform backups without taking any portion of the system down.

SECTION V: REVIEW OF OPTIONS

This section of the Business Case describes the steps taken to identify viable software solutions with a robust and tested Electronic Health Record application for use throughout Jail Health Services. In addition this section reports the results of the first level review of the options[39]. This first level review compares and contrasts the information provided to Jail Health through the responses to the Request for Proposal against six evaluation criteria established by the Electronic Health Record Executive Steering Committee.

Evaluation Criteria	Description
Meets the Technical Requirements Threshold	Must adhere, or be technically acceptable, to Public Health IT with no fatal flaw being identified. Given the level of support these types of applications require, preference is given to vendors who offer an Application Service Provider (ASP) model, a remotely hosted model.
Meets Business Requirements Threshold	The Steering Committee acknowledged the Business Requirements were set with very high expectations and as stated in the RFP "we do not expect any vendor's system will satisfy all our requirements". Therefore, the Steering Committee adopted an 80% minimum threshold for this portion of the evaluation process.
Company Viability & Reliability Threshold	Preference is given to a vendor who has been in business for seven years or more and has Correctional Healthcare Industry expertise in a site similar in size and complexity as JHS".

Ability to Meet Stated Objectives	The initial review of the attributes of the application should provide some confidence that the system can support Jail Health Services in meeting its objectives
Cost/Benefit Threshold	Must be within budget and able to return an ROI within 7 years.

The Executive Steering Committee is committed to managing a series of evaluation steps beginning with preparation of a detailed business requirements document and concluding with the contracting with the selected vendor representing the Preferred Solution. The steps include:

1. Prepare a comprehensive Business Requirement document.
2. Prepare and release a Request for Proposal.
3. Conduct a First Level Review[40] of Electronic Health Record System Options applying the selected evaluation criteria.
4. Identify preferred vendor(s).
5. Develop and receive approval of the recommendations supported by the JHS Electronic Health Record Business Case at the close of the First Level Review.
6. Conduct Second Level Review of preferred vendor(s).
7. Conduct Contract Negotiations with selected vendor

Comprehensive Business Requirement Document

In the fall of 2004, the EHR Steering Committee commissioned the development of a comprehensive EHR Requirements Document. Several key sources were considered in the

development of the requirements including: JHS Policy and Procedure Manuals; JHS Forms currently being used in the paper Medical Record; results of shadowing JHS staff as they perform day-to-day tasks; standards from National Commission on Correctional Health Care; HIPAA; Public Health IT standards; the WELLCON Report; Community Partners who have or are in the process of implementing an Electronic Health Record; and, Internet Research.

The intent was that the Requirements Document be of sufficient detail to clearly define the business functions of Jail Health Services and provide the basis for an unbiased Request for Proposal scoring methodology.

The Requirements Document[41] was divided into five major sections:

1) Requirements for Clinical Operations including: Intake, Transfer, Release; Master Problem List; Encounters; Treatment Plans; Clinical Notes and Documentation; Flow Sheets; Orders and Results Reporting; Consents, Release of Information Requests, Refusals; Patient Education; Referrals; Admission, Discharge, Transfers, Reversal; and, Population Based Clinical Areas (Registries).
2) Requirements for Clinical Specialties including: Pharmacy; Psychiatric; Dental; Obstetrics; and, Communicable Disease.
3) Requirements for Staff Management.
4) Requirements for the General System Functions including: Multi-Entity; Master Patient Index (MPI); Tables and Master Files; Clinical Access View (CAV); Clinical Decision Support (CDS); Controlled Medical Vocabulary (CMV); Clinical Pathways and Guidelines; Cost Measuring and Quality Assurance; Integrated E-Mail (Secure Clinical

Messaging); Access (Log-On); Screen Displays; Data Entry; Screen Builder; Report Generator; and, Standard Reports.

5) Requirements for the Technical Environment including: Server Architecture; Desktop Architecture; Peripheral Architecture; WEB Architecture; Network Architecture; Third Party Software; Database Architecture; Interface Engine/Building Interfaces; and Performance and Reliability.

The EHR Project Team developed a draft EHR Requirements Document that was distributed to the Stakeholders and the Steering Committee. A joint review of the requirements was conducted. The EHR Steering Committee approved the final version of the EHR Requirements Document in October 2004.

Prepare and Release a Request for Proposal

In preparation for the distribution of an EHR Request for Proposal (RFP), the EHR Project Team conducted market research using the Internet, Correctional Health magazines, Community Partners, and the NCCHC National Convention to identify potential EHR vendors[42]. This list was approved by the Steering Committee in November 2004.

During this same time period, the EHR Steering Committee developed a scoring methodology preparing for review of the RFP responses. This methodology relies on the self-scoring of the responder's product against the requirements. The responder awarded themselves points on each EHR Requirement according to the following scheme:

EHR SYSTEM REQUIREMENT	CURRENTLY AVAILABLE, fully meets requirement	CURRENTLY AVAILABLE, partially meets requirement	IN DEVELOPMENT, available by July 2005	NOT AVAILABLE	COMMENTS
POINTS AWARDED	2	1	1	0	

When a responder could not meet all of the requirements for specific criteria they were directed to score a (1), and then to elaborate on the deficiency in the corresponding comments area. In addition responders were asked to complete a series of attachments providing additional detail required for the evaluation. The attachments included: Peripheral Architecture specifications; WEB Architecture specifications; Network Architecture specifications; Application and Third Party Software Architecture specifications; Company Profile; References; Vendor Project Team; Preliminary Project Plan; and Pricing Proposal.

In December of 2004, Jail Health Services coordinated with King County Procurement to distribute, to the list of potential vendors as well as on the King County Website, a Request for Proposal (RFP)[43] for and Electronic Health Record Management System.

King County Procurement conducted a Pre-Proposal Conference to discuss questions related to the RFP in the early part of January 2004. By the close of the sealed proposal timeline Jail Health Services received four responses to the Request for Proposal. Jail Health Services, for the purpose of this Business Case, labeled the responders Option 1 through Option 4. A brief description of the Options is shown as an attachment[44].

Conduct a First Level Review of Electronic Health Record System Options

Three teams were assigned to conduct the first level review evaluating the Technical Architecture, Business Requirement/Company Viability & Reliability, and the Cost/Benefit Analysis.

Technical Architecture Team Review and Findings

The objective of the first level review was to evaluate the technical architecture of proposed by the four vendors in response to the Request for Proposal. The Technology Team, comprised of King County Public Health Information Technology staff, conducted a technical assessment[45]. Each of the four options was screened against the requirements set forth in the RFP evaluating the degree to which the Technical Architecture in the proposal is in line with the King County and Public Health Information Technology standards and meets the threshold established by the Steering Committee. One important aspect of this review was the strengths and weaknesses of the technical model used by the vendor. During this analysis the team generated a list of follow-up questions[46] for each vendor. The EHR Project Manager, in coordination with Procurement, solicited answers to these questions. Based on the detailed information provided by the vendors and the clarifying information that came from the vendors in response to the questions, the Technology Team appraised the Options as follows:

Summary of Technical Review Findings for Option 1:

Option 1 utilizes an Application Service Provider (ASP) model also known as a remotely hosted model. This model requires fewer hardware components on-site in Public Health or Jail Health Services; and does not require additional internal IT staff to support the

maintenance, day-to-day operations, and disaster recovery of the system. The architecture is technically acceptable with no fatal flaw being identified.

Conclusion:

Option 1 passes the first level Technical Review and should move forward to the Business Requirement Review.

Summary of Technical Review Findings for Option 2:

Concerns were raised that Option 2 did not have an ASP model but proposed an in-house technically supported model. Option 2 would require hiring an estimated 6 new internal IT staff with unique skills and training as well as a level of expertise for maintenance, day-to-day operations and disaster recovery. The concern was two fold: can the Public Health infrastructure support an application with this complexity and the expense of maintaining that infrastructure. The architecture is technically acceptable with no fatal flaw being identified.

Conclusion:

Option 2 passes the first level Technical Review and should move forward to the Business Requirement Review, but with a caveat that the additional FTE's are incorporated into the cost analysis.

Summary of Technical Review Findings for Option 3:

Option 3 utilizes an Application Service Provider (ASP) model. The architecture is technically acceptable with no fatal flaw being identified.

Conclusion:

Option 3 passes the first level Technical Review and should move forward to the Business Requirement Review.

Summary of Technical Review Findings for Option 4:

Due to a fatal flaw in its underlying technical architecture, the use of Access™ as its database, Option 4 is not technically acceptable.

Conclusion:

Drop Option 4 from further evaluation.

The EHR Steering Committee approved this recommendation. Option 1, Option 2, and Option 3 were moved forward to the Business Requirement Review and Option 4 was eliminated from further deliberation.

Business Requirement/Company Viability & Reliability Team Review and Findings

Following the technical review and based on the action taken by the Steering Committee the Business Review Team conducted an analysis[47] on the three remaining Options. This analysis was based on the responses provided by each responder in the Request for Proposal. The self-scoring in the Clinical Operations, Clinical Specialties, and the General System Functions sections of the business requirements were transferred into the Multi-Attribute Utility (MAU) model[48]. No vendor proposed a Staff Management module, therefore this set of requirements was not considered in the overall scoring. The objective of the Multi-Attribute Utility (MAU) Model is to provide a means for Business Review Team to understand the capabilities and weaknesses

of each of the Options as well as to provide an objective scoring methodology to determine if the Option met or exceeded the Steering Committee threshold. Under the MAU a vendor had the possibility of scoring a perfect score of 474 points. Below are the results of the MAU analysis:

Vendor Self Scoring Results			
	Option 1	Option 2	Option 3
Score	395	423	292
% Of Requirements met	83.33%	89.24%	61.60%
Meets Steering Committee Criteria?	Yes	Yes	No

In addition to assessing which Options meet the 80% threshold, the information related to weaknesses was summarized for the Stakeholders group who were asked to assess the importance that this requirement be met. Option 3 indicated in their response they had planned release of modules for Spring 2005. The Business Review Team agreed that if this release timeline was met the vendor would possibly be able to bring their score to the 80% threshold. As a result, the team agreed to not eliminate any of the 3 options before the Stakeholders Meeting.

In advance of the Stakeholders Meeting each stakeholder was provided with a copy of the three RFP responses and they were asked to review them prior to the meeting. The purpose of the Stakeholders Meeting was to analyze each of the three remaining vendor Options from a variety of different viewpoints including the viability and reliability of the company. A SWOT (strengths, weaknesses, opportunities and threats) Analysis provided the framework to help the

stakeholders answer the question, "what are the prospects for success under each of the options?" This interactive process provided the Stakeholders with an opportunity to express their views about the different options and discuss the implications.

Based on the SWOT Analysis stakeholders raised a series of questions[49] and made a tentative recommendation for each Option. As a part of the first level review a selected subset[50] of the questions were researched by the EHR Project Manager, in coordination with King County office of Procurement. This information was factored into the final recommendations from the Business Review Team.

The last activity within the Business Review was a review of the supportive materials the vendors submitted with their responses to the RFP against the Steering Committee approved objectives. The Review Team incorporated into the final recommendations a statement reflecting the degree of confidence that the business team had in each of the Options being able to assist JHS in meeting the objectives. The second level review will, through the scripts that will be written for vendor presentation, do a more rigorous review of the product's capability in meeting and exceeding the objectives.

Based on the results of the MAU model; the stakeholder SWOT; the follow-up questions, and the first level review of the ability of the Option to address JHS objectives, the Options were appraised as follows:

Summary of Business Review Findings for Option 1: Option 1 meets the minimum 80% business requirements threshold. The company offers a proven EHR product, has an ASP model, and has a solid customer base with correctional health care clients similar in size to JHS. Option 1 describes features and functionality within it currently operating application that provides confidence that JHS objectives can be met through implementation of this system. Of particular note is the experience that the Option apparently has with integrating and interfacing with other healthcare and medical information system products. Finally, this company has what appears to be a tested structured implementation methodology.

Conclusion: Option 1 passes both the Business Requirements and Company Viability & Reliability thresholds and appears to have the features and functionality to assist Jail Health Services in meeting the objectives. In addition this vendor indicated experience in business practice reengineering, which would add a level of expertise to the implementation team.

Summary of Business Team Findings for Option 2: Option 2 meets the minimum 80% business requirements threshold. However, the company is small and does not have a large customer base. It has no experience with a large multi-site correctional facility like Jail Health Services; the company's largest client has only about thirty users. The company does not offer an ASP model which will require Public Health to provide the infrastructure support and the day-to-day technical management of the system. Based on the information provided in the Application Architecture attachment this vendor has

methods and features that would support achievement of the JHS objectives. There remain some concerns around the use of templates and the flexibility of the system.

Conclusion: Passes the Business Requirements threshold with a guarded confidence that the objectives can be readily met through the use of the application. Also of concern is the company's ability to implement and provide acceptable levels of on-going support. Since the company does not offer an ASP model the deciding factor whether this option should be included in the second phase of the evaluation will be the results of the Cost/Benefit analysis.

Summary of Business Team Review for Option 3: Option 3 does not currently meet the 80% business requirement threshold. However, the next phase of their EHR product is currently in development and is due to be released in Spring 2005. It appears with this additional functionality the 80% threshold would be meet. The company currently has only two EHR clients but has a solid customer base in the Corrections Management software field. Albeit, there are considerable risks associated with an unproven product, but the company does offer an ASP model. Materials provided by the vendor related to the product's functionality did not provide enough information to assess a degree of confidence around achieving JHS objectives, however seeing details around the upcoming releases may provide the needed information

Conclusion: Place this option on hold, and possibly re-evaluate in summer 2005 if the other Options falter.

Cost Benefit Team Review and Findings

Jail Health conducted a Cost Benefit Analysis reviewing the estimated costs of the three electronic health record options compared to the projected savings. The structure this analysis is the development of a proforma financial plan for implementation of EHR system for Jail Health Services. It includes the quantifiable financial benefits and costs of implementing such a system.

The structure of the financial plan includes:

- Initial costs and ongoing costs and benefits of an EHR for up to 7 years of operation, with specific focus on 3, 5, and 7 with 5 as a likely baseline.
- Net present value calculation looks at baseline of 8% nominal discount rate which using the baseline of 3% inflation is 5% real rate of return on investment.

Quantifiable benefits[51] would include projected operating savings expected from an EHR to include:

1. Savings in the operation of medical records through reduction in FTE as a result of a reduction in the number of chart pulls and time in managing paper-based records.
2. Nursing time spent in record keeping and preparation for medication administration resulting in a reduction in FTE.
3. Pharmacy staffing FTE reduction as a result of direct order entry through an interface.

4. Reducing Pharmaceutical expenditures by 20% (using a baseline 2005 expenditure of $1,828,151) as a result of managing a facility formulary through a structured order entry in combination with a Medical Director approval process.
5. Reducing the number of duplicative lab tests as a result of results reporting through an interface.
6. Overhead associated with reduction in FTE.

The costs of implementation include direct vendor costs, JHS incremental hardware and equipment costs, JHS staff training, implementation and 'cross-over costs', JHS Phase I & II EHR budgeted sunk costs-$235,000, implementation costs and ongoing costs to maintain a new EHR system.

Each alternative was evaluated on a Net Present Value (NPV) basis to bring future costs and benefits back to current 2005 investment $'s. Each was evaluated over 3, 5, and 7 years of operation. The benefits of each alternative were assumed to be equivalent with only the estimated vendor and JHS costs varying with each proposal. Values were expressed both with annual dollar equivalent savings for each period as well as lump sum NPV values.

The results of this review among all three options indicate that Option 1 provides the most favorable economics: lowest initial cost, low ongoing cost, and earliest breakeven (year 5), and highest net present value.

Relative Option Economics

	Benefits	Initial Cost	Ongoing Cost	Break-even year (approx)	NPV of project	Overall Ranking
Option 1	Same	Lowest	Low/mid	5	Highest	1
Option 2	Same	Mid range	Much higher	Well beyond 7	Lowest	3
Option 3	Same	Highest	Lowest	6	Slightly less than high	2

NPV breakeven for Option 1, as currently estimated, would occur by end of year 5. Over 7 years of operation the Option 1 proposal is estimated to derive a net total savings of approximately $1,030,000, equivalent to an annual savings of about $213,000 per year.

Summary statistics for each of the options is as follows:

Summary of Option Economics

	5 year		7 year	
	NPV	IRR	NPV	IRR
Option 1	$159,005	10.6%	$1,029,402	19.6%
Option 2	($1,685,476)	n/a	($1,338,868)	-9.5%
Option 3	($41,881)	7.5%	$985,040	16.8%

NPV calculated at an 8% discount rate

These summary statistics allow for evaluation of the sensitivity of the Option 1 baseline case to investment periods, allowance for additional costs or reduced savings, and even higher discount rates than the 8% used:

- For example, while a 7 year period is reasonable, breakeven can occur by the end of year 5

- While estimates of costs include 20% contingencies and projected savings are intended to be reasonably conservative, breakeven could occur even if annual net benefits were less (e.g., benefits lower and/or costs higher) to an annual amount of $213,000 in the 7 year analysis.
- While 8% is the discount rate in NPV calculations, the 5 and 7-year scenarios provide returns of 10.6% and 19.6% respectively.

Of course, these costs and benefits and their respective timing will continue to be evaluated and updated as the project progresses. This analytical framework will ensure that minimum economic criteria are achieved and that results can be measured against this plan.

The appendix contains several exhibits:

- Summary of Expected Cost Benefit of Jail Health EHR[52]
- OIRM Form 1/Summary, Cost Benefit and Cash Flow Analysis[53]

SECTION VI: PREFERRED SOLUTION

The Steering Committee reviewed the findings and conclusions from the Technical Review, the Business Review and the Cost/Benefit Analysis and assessed the Options as follows:

Evaluation Criteria	Option 1	Option 2	Option 3
Meets the Technical Requirements Threshold	Yes	Yes	Yes
Meets Business Requirements Threshold	Yes	Yes	Maybe

Company Viability & Reliability Threshold	Yes	No	No
Ability to Meet Stated Objectives	Yes	Yes	Maybe
Cost/Benefit Threshold	Yes	No	Yes

The Steering Committee's recommendations are:

Option 1: A viable candidate, continue into the second level review of the vendor.

Option 2: Drop from further evaluation.

Option 3: Place on hold until late spring of 2005. Potentially resume this evaluation if our preferred option falters.

The second level review will be a strenuous and in-depth analysis Option 1. The first step in the second level review is to host on-site vendor presentations. During these visits, vendors will have the chance to exhibit their product to Jail Health Services and Public Health Management, the Steering Committee, and Public Health MIS.

Five expert teams will be charged with conducting in-depth analysis within their areas of expertise along with the preferred vendor. The teams include an executive team, technical team, functionality team, interface team, and financial team. These teams will conduct their analysis by conference call and in-person meetings held in conjunction with the produce presentations.

The vendor will be invited provide the scripted clinical scenario(s) in advance of a 2-day more structured presentation. The request is that they fulfill the requirements of the scenario(s) using their current commercial products (i.e. what they have proposed to JHS). The scenario(s) will be multi-disciplinary and include critical requirements.

In addition to the ratings of technical teams the audience invited to participate will be asked to provide feedback to the Executive Steering Committee.

The final phase of the second level review is customer visits and a visit to the vendor's Corporate Office and Operation Center. These structured visits will be conducted by the cross functional team.

SECTION VII: RISKS AND STRATEGIES TO REDUCE RISKS

Risk mitigation will be managed in coordination with the preferred vendor and JHS' other critical partners. The following checklist is a start and will assist in the transition from a paper to an electronic health record (EHR) as the legal medical record.

Risks in Implementation	Strategies to Reduce Risks	Status
Executive, management, and staff level support is critical to the successful implementation of an EHR.	• Form a Project Governance Structure. • Create Roles & Responsibilities document. • Create Communications Plan.	• Activated • Activated • Activated
Solid project management and	• Form an experienced EHR Project	• Activated

Risks in Implementation	Strategies to Reduce Risks	Status
utilizing a standard project methodology is critical to the successful implementation of an EHR.	Team. • Embrace proven IT project methodology. • Develop a comprehensive plan of action and milestones that details each step involved in moving to a fully electronic system that routinely gets reported to the governance structure. • Develop a migration strategy.	• Activated • Activated for Phase I & II. Phase III detail project plan will be developed with EHR vendor during contract negotiations. • Will be developed as part of Phase III project plan.
Once the decision to move to an EHR is made, organizations must address the paradigm change in culture for going paperless. PH/JHS embraces using technology to the full extent possible, that is, point of care entry.	• Develop a comprehensive data map of all JHS workflows and processes that may be affected by the transition to an EHR. The mapping will address both administrative and clinical workflows. • Identify appropriate steps to re-engineer and redevelop the workflows within the functionality of the EHR. • Develop comprehensive processes and procedures that address the conversion of paper-based documents to electronic form. • Develop a communications plan that provides the organization with a clear	• Work to support the Business Case ROI Cost/Benefits has been completed. Detail analysis will be scheduled as part of Phase III. • Will be developed as part of Phase III project plan. • Will be developed as part of Phase III project plan. • Will be developed as part of Phase III project plan.

Risks in Implementation	Strategies to Reduce Risks	Status
	understanding of the change process involved in moving toward a fully electronic system. • Develop a robust training and education plan. • Implement, in coordination with the vendor, a responsive Help Desk. • Implement Service Level Agreements with key parties including escalation procedures.	 • Will be developed as part of Phase III project plan. • Will be developed as part of Phase III project plan. • Will be developed as part of Phase III project plan.
Developing a clear understanding of the scope, content, and format of the EHR is critical.	• Create a project charter (Project Plan Summary document) • Develop a comprehensive Requirements Document that reflects the organizations vision for a paperless EHR.	• Activated • Activated
Selecting the "right" vendor.	• Use the Stakeholder and Steering Committee throughout the process. • Conduct a thorough market analysis. • Publish a comprehensive RFP. • Conduct a thorough analysis of the Responders using MAU models, SWOT, gap analysis, ROI, etc. Review the responses from several perspectives: Technical, Business	• Activated • Activated • Activated • Activated

Risks in Implementation	Strategies to Reduce Risks	Status
	Requirements, Cost and Benefits Realization, and Company Profile and Viability. • Get written answers to questions formulated during the analysis. • Conduct product demonstrations using scripting. • Conduct reference checks and site visits.	• Activated • Scheduled in Phase II • Scheduled in Phase II
Understand the impacts to Patient Confidentiality as a result of going paperless.	• Ensure the system is HIPAA compliant via the contract and a thorough review. • Ensure the system has adequate security mechanisms to restrict access, authenticate orders. • Review and update Policies and Procedures.	• Scheduled in Phase II and as part of the contract as stated in the RFP. • Scheduled in Phase II and as part of the contract as stated in the RFP. • Will be scheduled as part of Phase III project plan.
Unauthorized use, alteration, loss, or destruction of data.	• Reasonable cost-effective measures will be implemented to protect data, hardware, and software from inappropriate or unauthorized use, alteration, loss, or destruction.	• Will be scheduled as part of Phase III project plan.
Breach of security.	• Adherence to HIPPA, NCCHC, and other regulatory bodies as required, including county privacy and security	• Scheduled in Phase II and as part of the contract as stated in the RFP.

Risks in Implementation	Strategies to Reduce Risks	Status
	standards will be adopted.	
System Response and Reliability is essential in a 7x24x365 paperless environment. System down time and interruptions must be very minimal.	• Build a reliable and secure communication and computer infrastructure will be provided to ensure 99.9% system availability and seamless self-service access in a 7x24x365 environment. • Ensure the Network Infrastructure will support the requirement. • Build the technical infrastructure as dual redundant. • Ensure no single point of failure. • Implement only standard off the shelf products, no customization. • Stress test the system prior to go-live.	• Activated, part of the ISP remodel project. • Activated, part of the ISP remodel project. • Activated, part of the ISP remodel project and Phase III. • Phase III. • Activated in the RFP, part of Phase III. • Will be scheduled as part of Phase III.
Loss of Power / Connectivity to Service Provider or Servers.	• Business Continuation and IT Disaster Recovery plans will be developed prior to go-live. Annual tests will be conducted.	• Will be scheduled as part of Phase III.
Dependence on individual vendors	• Hardware and software will adhere to open (vendor independent) standards to promote flexibility, inter-operability, cost effectiveness, and mitigate the risk of dependence on individual vendors	• Activated via the RFP, and will be scheduled as part of Phase III.

SECTION VIII: WORK PLAN AND TIMELINES

Below is the preliminary project schedule, which accounts for the scope and complexity of this project. Jail Health Services will work along with the preferred vendor and DAJD to finalize the work plan, timelines and to further define the deliverables.

DATES	SYSTEM IMPLEMENTATION	NOTES
April 05	PHASE 2 VENDOR SELECTION	Preferred vendor will be invited to meet with technical and business teams to talk about the product and its ability to meet JHS requirements. This would include a structured presentation build around some scenarios to demonstrate the capability of the product.
May 05 – June 05	PHASE 2 VENDOR SELECTION – VISIT CUSTOMERS	JHS team to visit production center for preferred vendor and also make customer visits with a structured set of questions. Vendor will be asked to match its customers as close as possible to how JHS intends to use the product – point of care entry.
August 05	CONTRACT WITH VENDOR	Contract negotiation finalized after JHS satisfies the Council Proviso and receives approval of funding request to OIRM
September 05-October 05	SYSTEM IMPLEMENTATION PLANNING	JHS team, the vendor, and where applicable DAJD will identify our implementation strategies with an understanding of the costs, benefits, and risks associated with each approach. Goal: look for opportunities to implement in phases to minimize the

		risks and obtain earlier benefits.
September 05-October 05	SYSTEM ARCHITECTURE PLANNING	JHS team and the vendor will plan for all the technical components of the system in coordination with the Implementation Plan.
September 05-October 05	SYSTEM MIGRATION PLANNING	JHS team, the vendor, and where applicable DAJD will identify our data migration strategies with an understanding of the costs, benefits, and risks associated with each approach.
September 05-October 05	PROCESS RE-ENGINEERING PLAN	JHS team and the vendor will identify which business processes will be re-engineered in coordination with the EHR system implementation.
September 05 – October 05	BUSINESS CONTINUATION and DISASTER RECOVER PLANNING	JHS team with the vendor will ensure adequate plans are in place when system down time occurs. This will include Service Level Agreements and escalation procedures.
November 05-December 05	TRAINING[54]	JHS team and the vendor will develop a comprehensive training and on-going support plan. Key JHS personnel will be trained early in this process.
January 06-June 06	APPLICATION BUILD	JHS team with the vendor will build the application according to the vendor methodology.
July 06-September 06	APPLICATION UNIT TESTING	Using predefined test scripts, a thorough unit test will be performed after a portion of the EHR system has been built.
January 06 – June 06	INTERFACE BUILD	This is the design, programming, and testing of the agreed upon interfaces.
July 06-September 06	INTERFACE UNIT TESTING	Using predefined test scripts, a thorough interface test will be performed.
September 06	INTEGRATION TESTING	Once a application unit test has been completed and the

– November 06		associated interface(s) have been unit tested, a thorough integration test will be performed to ensure the application and the interface are functioning correctly together. An example is I/T/R.
November 06	SYSTEM TESTING	A comprehensive system test will be conducted once the entire application and interfaces have been tested.
January 06- June 06	CONVERSION BUILD	Actual design and programming of the data migration.
July 06 – September 06	CONVERSION TESTING	The processing of data to be converted (possibly FSI data) and/or the EHR populated by some other means (e.g. scanning, data entry) will tested.
December 06	SYSTEM STRESS TEST	This test will mimic the maximum number of users, data, processes, etc. occurring simultaneously to ensure minimal system derogation.
December 06	MODEL OFFICE	This is a mock complete walk through of the system to ensure "readiness" in a "real life" life situation.
December 06	CONVERSION AND/OR EHR DATA POPULATION	Actual conversion or data population of the EHR in preparation of go-live.
December 06	STAFF TRAINING	End-User classroom Training
January 07	GO LIVE	System start-up On-site support available during go live
June 07	POST IMPLEMENTATION REVIEW	Evaluation of implementation and early review of key success indicators and achievement of targets.

SECTION IX: PROJECT MANAGEMENT AND STAFFING

Jail Health Services has an organization and management plan[55] which places authority for this project under a Steering Committee made up of leaders from Public Health and Jail Health Services and a representative from DAJD. This group provides the oversight and holds the project team accountable for completing its work plan on time and within budget. In addition the preferred vendor brings an experienced project team and other key resources. Finally, JHS and DAJD have a workgroup that will examine interdependent business processes impacted by the Electronic Health Record and report to the project team.

The preferred vendor and Jail Health Services will work collaboratively through a series of planning sessions to determine the most efficient and cost effective transition from Jail Health Services paper-based record to an electronic health record.

SECTION X: COST ESTIMATES AND FUNDING

The estimated implementation cost of $1,965,000 (including a 20% contingency) is slightly less than the existing appropriation of $2.0 million. This implementation budget would be financed from savings beginning in 2007 over a period of 5 to 7 years, depending on the financing structure. Since the discount rate is below the likely cost of borrowing (borrowing cost approximately 5% vs. the 8% discount rate assumed in the NPV analysis, we are confident that

the savings will be more than adequate to service the implementation cost loan even with a 5 year repayment structure. Thereafter the reoccurring annual cost will be approximately $504,000.

In 2003 King County Council set aside $2,000,000 for the Electronic Health Record Project. This figure was based on the advice of the County's chosen independent consultant; "Wellcon" and Wellcon's experience with a facility the County's size. The budget supports a Project Manager, two consultants, and an approved vendor from which JHS plans to purchase software and hardware. These costs are one-time only and will be borne beginning in 2004 and continuing through the early part of 2007.

The PRB released $250,000 in October 2004 to cover the development of the Electronic Health Record Business Case and the work required to prepare and release a Request for Proposal.

JHS requested $1,750,000 for implementation costs in the 2005 proposed budget requests. Since Jail Health Services advised the Council that the Business Case would not be completed until the first quarter 2005, the Council placed $1,675,000 under a proviso. The proviso indicated that this money should not be expended or encumbered until after the Council has approved by motion a Business Case that has been reviewed and approved by the Project Review Board.

SECTION XI: ALTERNATIVES CONSIDERED

JHS considered three point solutions and one process improvement as an alternative to implementing and E H R. Our analysis showed that none of these solutions, no matter how powerful, would generate the significant improvements needed to fully address the underlying problems and risk in record management or business practices in Jail Health Services.

Options Point Solutions:	Description of Options
Bar Coding	Software programs are available that electronically track the check out of medical records, including out guide information, generate reminders when a record has been checked out for too long, and can create pull lists which can be sorted in a predetermined order, such as terminal digit order, to make it easier to pull records. Jail Health expected benefits: • Reduce instances of "missing" records • Reduce time spent searching for "missing" records • Reports for auditing and QI • Help to eliminate redundant procedures • Help staff to perform their duties uniformly and in compliance with state, federal (HIPAA) or organizational guidelines • Improve customer service and care to clients by accessing information faster • Track check out of paper charts within and between multiple sites • Track check out multiple charts at multiple locations with one medical record number

	This plan is designed to decrease the number of charts that are not found while decreasing the time it takes to locate other charts. By decreasing the number of charts that are "not found", a recent study[56] reported 4%, by 80%, the overall time spent looking for charts would reduce by 30%. This is a savings of approximately $36,000 annually.

Options Point Solutions:	Description of Options
Pharmacy – Inmate Locator	Jail Health Services is currently working with DAJD, Public Health's MIS section, and Foundation Systems, Inc. (FSI -- the current pharmacy software vendor) to develop an inmate location interface. This enhancement will create a record in FSI indicating the inmate's current housing location, based on the most current information available in the DAJD information system. When the inmate is released that information will also be relayed to FSI. Jail Health expected benefits: • Reduce time for Pharmacy Tech spent looking locations up in the DAJD system • Help to eliminate redundant procedures • Help staff to perform their duties The cost of this solution for Jail Health Services is currently estimated at $3,600. This is the cost to pay FSI for programming support. Approximately 116 hours of Public Health and King County planning and programming time will be needed, but that support is paid through previously budgeted internal overhead. The "savings" is a reduction in the number of steps and time spent looking up inmates at the front end of the prescription process. This time savings would allow more prescriptions to be processed.

Options Point Solutions:	Description of Options
Transcription	Transcription services are used by health care providers to transcribe dictated notes into a printed form to be included in the paper medical record. With the implementation of this option Jail Health expected benefits: • Improve legibility of notes in medical record • Reports for auditing and QI • Help to eliminate redundant procedures, transcription can be cc'd and placed in appropriate location in chart • Save provider time, able to see more inmates The risks of transcription: 1. Must have equipment or pay a contractor to maintain it for you. 2. Need clerical support to oversee/manage report distribution. 3. Transcriptionists are hard to find and not many people tend to be going into this field. That means your best choice is to find a vendor who is willing to assume the risk of finding vacation and sick coverage and to maintain the turn-around times you want/need. Costs: Volumes have not yet been calculated. Assume that providers dictate 3/4 page of transcribed notes per dictation, the cost would be $3.00/report for the vendor.

Process Improvements	Description of Improvement
Route and Transfer	Currently, a Route & Transfer form is used not only for routing charts to multiple locations but for all types of communication and general requests. The form includes: name, DOB, AKA's, Number of Location, Location, and Date. Under a process improvement plan, this form will be used when charts need to be routed to multiple locations and omit other types of communications and general requests. Additions to the form would include a "Paperwork Only" check box to aid medical records staff identify what is being routed, a "Completed" check box to indicate when chart is ready to be routed to the next location and detailed instructions on how to complete the form as a reminder on how to use the form correctly. Refresher training to be provide to all staff prior to implementation. This plan is designed to decrease the number of charts that are not found while decreasing the time it takes to locate other charts. By decreasing the number of charts that are "not found" , a recent study[57] reported 4%, by 80%, the overall time spent looking for charts would reduce by 30%. It would also allow a decrease in the overall average time to find a chart to 3 minutes. This is a savings of approximately $36,000 annually.

SECTION XII: ARGUMENTS AND RESPONSES

During the development of this Business Case both the Steering Committee and the Stakeholders raised a number of questions. These questions have been included below with a response.

1) How do the business requirements for Jail Health Services align with those in Public Health?

During the development of JHS Business Requirements a group of stakeholders from Public Health were convened to evaluate the requirements from a Public Health perspective. Findings from this meeting were that while there were a few unique requirements for a system that would service public health clinics both public health and jail health shared the same requirements.

2) How does this project fit within King County Strategic Technology Plan?

Response: This project supports and meets virtually all the strategies outlined in the Strategic Plan. Specifically, strategy B Information Technology as Enabling More Effective and Efficient delivery system; strategy C Information Technology Standards; strategy D Access to information & Services; strategy E Business Process Improvement; strategy F Privacy and Security are all met with this project.

3) How does this project meet the Strategic Investment Criteria outlined in the 2005 Budget Process?

Response:

Investment Criteria: Provide for critical and essential health or life-saving services to citizens

King County is required by federal law to ensure healthcare services are provided to the inmates of its correctional facilities. Implementation of the Wellcon recommendations including an EHR solution results in significant cost savings while improving the quality and quantity of care provided by Public Health to the inmate population of King County.

Investment Criteria: Streamline business operations using cost-effective technology

Jail health services will undergo a complete business operations re-engineering in conjunction with an EHR solution. This is based upon the use of an EHR solution to the paper based medical chart, upon which operational changes identified in the Wellcon Proviso report will be implemented.

Investment Criteria: Achieve direct cost savings over the cost of current operations

Seattle-King County jail health services are expensive and currently struggle with tremendous inefficiencies. Utilization of an EHR will JHS to significantly improve quality of care, reduce time spent in locating, reviewing, updating, and filing the paper medical chart. The physician's time spent on manual chart notes and their ability to easily and quickly read the chart will be significantly enhanced by the use on an EHR. This all translates into higher quality of care, more patients being seen by current healthcare staff, and

a reduction in human errors and misplaced/misfiled medical record charts. This also reduces the risk exposure to the County and Public Health.

4) What is your contingency plan if there are cost overruns in this project?

Response: The project team has estimated the entire cost of this project using the best available information. A contingency has been built into the cost estimates used in the Cost Benefit Analysis. As the contract is established with the vendor and JHS builds Phase III budgets for approval by the OIRM we will have an operating budget and in that process will make choices about project scope (Number of interfaces, etc.) that can be funded within the envelope presented in the CBA.

5) Staff are not ready for this kind of change.

Response: Information from the recent staff survey indicates that many of our staff have experience with an EHR. Additionally, the survey indicates staff are PC literate which is a huge benefit and will allow us concentrate on the EHR application training which will be planned in coordination with the vendor.

SECTION XIII: REFERENCES AND ATTACHMENTS

The items below marked with ** can be found in The Business Case Appendix Binder

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[1] **Wellcon Report, during the 2003 Budget process the County Council issued a proviso to review the Department of Adult and Juvenile Detention's (DAJD) provision of health care services through an independent assessment of the scope and necessity of healthcare services being delivered and the manner in which those services are delivered to jail inmates. Dr. Todd Wilcox, principle of Wellcon and a nationally known leader in jail health business process re-engineering, was selected to do the assessment. Report issued June 10, 2003 to the Proviso WorkGroup.

[2] **Jail Health Services Strategic Business Plan – Positioning for the Future, approved February 2004.

[3] ** Application Description

[4] Other potential partners include: FSI, Signature team, Dynacare, Harborview

[5] *The Computer-Based Patient Record: Essential Technology for Healthcare,* Institute of Medicine, 1991

[6] **Description of an Electronic Health Record

[7] ** Understanding the Jail Health Services Delivery System, A summary of the Continuum of Care

[8] Two facilities, the Seattle Correctional Facility and at the Kent Regional Justice Center.

[9] Average of medical provider, psychiatric provider, nursing and dental encounters over a three year period between 2002-2004.

[10] See #1 Wellcon Report, Report issued June 10, 2003 to the Proviso Work Group.

[11] **Evaluation of the degree to which improvements recommended in the Wellcon Report would be enabled or supported through the implementation of the Electronic Health Record.

[12] See # 2 Jail Health Services Strategic Business Plan – Positioning for the Future, approved February 2004.

[13] **Definition of Electronic Health Records Management, American Health Information Management Association e-HIM Task Force. "The Strategic Importance of Electronic Health Records Management." Journal AHIMA 75, no. 9 (October 2004): 80A-B

[14] HIPAA, Health Insurance Portability Accountability Act, This regulation imposes extensive requirements on every area within healthcare. It governs the use, transmission, maintenance, security and privacy of health care information.

[15] **Standard J-H-04 Availability and Use of Health Records, NCCHC Standards for Health Services in Jails, 2003

[16] **Missing Clinical Information During Primary Care Visits, JAMA, February 2, 2005 Vol 293 no. 5

[17] **JHS Process Analysis - Time to Locate a Chart, February 2005, Shawna Harris

[18] **Electronic Medical Records: How Can You Afford (Not) to Have One???, Wellcon Electronic Medical Record Lecture Slideset.

[19] **Standard J-E-03 Transfer Screening , NCCHC Standards for Health Services in Jails, 2003

[20] See # 18 Electronic Medical Records: How Can You Afford (No) to Have One???, Wellcon Electronic Medical Record Lecture Slideset.

[21] **JHS Medical Records Work Processes Analysis, February 2005, Shawna Harris

[22] **Ambulatory Electronic Records Implementation Cost Benefit: An Enterprise Case Study, Zdon; Director, Information Services, Allina System, Minneapolis, MN and Middleton, Vice President for Clinical Informatics, MedicaLogic

[23] Active charts are those charts that have a chart note within the last two years.

[24] See # 1 Wellcon Report

[25] ** Medical Records and Malpractice Risk Management, White Paper, MedicaLogic, September, 1998

[26] **JHS Process Analysis – Rx Order, January 2005, Judy MacCully

[27] See # 27 JHS Process Analysis – Rx Order, January 2005, Judy MacCully

[28] **Wang, S.J., Middleton, B, and others. "A Cost –Benefit Analysis of Electronic Medical Records in Primary Care." *American Journal of Medicine,* April 1, 2003

[29] **Nursing Post Order Analysis, February 2005, Shawna Harris

[30] See # 25 Electronic Medical Records and Malpractice Risk Management, White Paper, MedicaLogic, September, 1998

[31] See # 28 Wang, S.J., Middleton, B, and others. "A Cost –Benefit Analysis of Electronic Medical Records in Primary Care." *American Journal of Medicine,* April 1, 2003 see #22

[32] See # 29 Nursing Post Order Analysis, February 2005, Shawna Harris
[33]** The Economic Effect of Implementing An EMR in an Outpatient Clinical Setting, Health Care Information and Management Systems Society, Volume 18, Number 1, Winter 2004.
[34]See # 25 Medical Records and Malpractice Risk Management, White Paper, MedicaLogic, September, 1998
[35] Interview with JHS Medical Director
[36] JHS 2005 budget includes $72,000 to Dynacare Laboratories and $48,000 for PH lab tests, bringing the total amount budgeted on lab tests in 2005 to $120,000. Under the assumption that 20% of these tests are unnecessary due to repeat testing, Jail Health will spend $20,000 ($120,000 ÷ 1.2 = $100,000. $120,000 - $100,000 = $20,000) annually on repeat lab tests.
[37] **Medical Records Assessment Survey for Clinical and Non-Clinical Staff conducted February 2005
[38] **JHS and DAJD Interface Grid and Description of Analysis
[39] The options considered in the Review of Options section of the Business Case are those Responders to the JHS King County Request for Proposal for an Electronic Health Record issued in December 2004.
[40] **Description of First and Second Level Review Process
[41] ** Jail Health Services Detail Requirements Document Electronic Health Record System, October 2004
[42] **Seattle-King County Department of Public Health- Jail Health Services Vendor List
[43] ** RFP Title: Electronic Health Record Management System; Date Advertised: December 23, 2004.
[44] **Description of the four companies responding to the JHS RFP along with the Option number assigned by JHS for the purpose of the Business Case.
[45] **Technical Assessment First Level Review
[46] ** Follow up technical questions for the Technical review process
[47] **Multi-attribute Utility (MAU) Model conducted on EHR Options, January 2005, Lee Pollock
[48] See # 47 Multi-attribute utility (MUA) conducted on E H R options, January 2005, Lee Pollock
[49] ** Stakeholder SWOT analysis conducted on February 4, 2005
[50] **Selected Q&A to vendor from SWOT for first level review
[51] **Cost Savings contributing to the Cost Benefit Analysis
[52]** Jail Summary of Expected Cost Benefit of Jail Health EHR, Bob Williams, Financial Analyst Lead
[53]** OIRM Form 1/Summary, Cost Benefit and Cash Flow Analysis, Bob Williams, Financial Analyst Lead
[54] **Example of Training Approach, will be modified in conjunction with selected vendor
[55] **JHS Electronic Health Record Project Organization and Management Plan
[56]See #17 JHS Process Analysis - Time to Locate a Chart, February 2005, Shawna Harris
[57] See #17 JHS Process Analysis - Time to Locate a Chart, February 2005, Shawna Harris