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**Health Information Technology Project Management Tools – Modernizing Telehealth in Alaska and creating a Chronic Kidney Disease Registry**

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# Health Information Technology Project Management Tools – Modernizing Telehealth in Alaska and creating a Chronic Kidney Disease Registry

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## Portfolio Introduction

This portfolio is an exploration of informatics tools to implement health care informatics projects. I've highlighted below the two projects that I created during the portfolio classes. The first one is about modernizing the telehealth workflow using modern systems that are currently in use at the Alaska Tribal Health hospitals and clinics. This project focus on working relationship with the Electronic Health Record vendor company, Cerner, and the video conferencing vendor, Vidy. It also focus on the security feature of the system as well as program policy and development to implement the project. The second project is creating a Chronic Kidney Disease Registry. This project allow me to discover project management tools, how to best use emerging technologies in projects, and learn about visualization systems.

## Telehealth

### I. Summary

American Indian and Alaska Native people have experienced lower health status when compared with other Americans. Some of the reasons are: disparities in access to care, preventable morbidity and mortality, and the burden of chronic disease. The prevalence of heart disease, diabetes, and other conditions is considerably higher among American Indian and Alaska Natives compared with the rest of the US population. American Indians and Alaska Natives continue to die at higher rates than other Americans from tuberculosis (500 percent higher), alcoholism (519 percent higher), diabetes (195 percent higher), unintentional injuries (149 percent higher), homicide (92 percent higher), and suicide (72 percent higher).

Given persistent health status disparities, innovation in care delivery systems and models is a vital priority. Working in partnership between Tribes and Tribal programs, the timely and strategic use of health information technology and system delivery innovation to support and address the preventive and treatment needs of American Indian and Alaska Native patients and communities. Health information technology (HIT) can be a key component of the expanded focus on effective quality health delivery and efficient resource management. Electronic health records and telehealth service delivery are two noteworthy examples of this emphasis. The tools advance the long-standing focus and the vision of the Alaska Native Tribal Health Consortium to have Alaska Native people being the healthiest people in the world. They are also a critical component of initiatives supporting true patient-centered care within a community orientation and population health perspective. For the past 16 years Alaska has been using a telehealth solution call Alaska Federal Health Care Access Network (AFHCAN) and provides telehealth services to 248 sites across Alaska. Due to the challenges in telecommunication connectivity, the services is only targeted toward store-and-forward (i.e., asynchronous) rather than live videoconferencing. Currently, with the use of Cerner EHR and a better telecommunication network such as Vidy, I am proposing a system to integrate Vidy in the Cerner Patient portal so that live videoconferencing can happen seamless and at the tip of the patient's finger.

## Public Health and Business Impact

Telehealth has proved to improve access to care, reduce the cost of care delivery, and improved the efficiency and productivity of providers. The current AFCAN systems are becoming obsolete and more modern technology can be replace to make the provider workflow more seamless, save the cost of replacing old systems and supporting them, and help patients get quicker access to specialist providers.

## II. Introduction

Telehealth encompasses four distinct domains of applications commonly known as:

- Live video (synchronous) – “Real-time”, Live, two-way interaction between a person (patient, caregiver, or provider) and a provider using audiovisual telecommunications technology. This type of service may serve as a substitute for an in-person encounter when it is not available. Live video can be used for both consultative and diagnostic and treatment services.
- Store-and-forward (asynchronous) – Transmission of recorded health record ( for example, pre-recorded videos and digital images such as x-rays and photos) through a secure electronic communications system to a practitioner, usually a specialist, who uses the information to evaluate the case or render service outside of a real-time live interaction. Store and forward technology can be used to help access specialty care, even when there are limited board-certified specialists in their community. This is the current service provided by the Alaska Tribal Health Consortium.
- Remote patient monitoring (RPM) – Personal health and medical data collection from an individual using electronic communication technologies which then is transmitted to a provider using data processing service for use in care and related support. This type of service allows a provider to continue to track healthcare data for a patient once released to home or a care facility, reducing readmission rates.
- Mobile health (mhealth) – Health care and public health practice and education supported by mobile communication devices such as cell phones, tablet computers, and PDAs. Applications can range from targeted text messages that promote healthy behavior to wide-scale alerts about disease outbreaks.<sup>1</sup>

Living in Alaska allows me to experience public health and healthcare delivery in a way that the rest of the country does not experience. Alaska ranks first in land mass but 47<sup>th</sup> in road miles. 75% of Alaskan communities are unconnected by road to a hospital, and 25% of these have no airports. Alaska Tribal Health System is a voluntary affiliation of 30 Alaska tribes and tribal organizations providing health services to 153,000 Alaskan Natives/American Indians. Each of these organization is autonomous and serves a specific geographical area. The main hospital that serves the whole state is based in Anchorage, and is a tertiary/ specialty hospital for all regions. Providers at the hospital have a regular travel schedules to provide specialty services to the regional populations in rural Alaskan villages. With the rise of the patient portal and the fact that smart phones

have a better connection to the internet these days, I propose using the Cerner Electronic Health Record (EHR), the Cerner patient portal and Vidyo video conference services to provide video visits to patients in these rural clinics to reduce travel time and cost to the health care system, as well as provide effective access to care for patients.

Most of Alaska tribal clinics are using the share Cerner EHR which means patients have the same medical record across the state. Additionally, Cerner has a patient portal that is branded HealtheLife along with a smartphone App that patients can access using their iPhone or Android phone. Furthermore, the Tribal Health System already uses video conferencing services by Vidyo. My proposal would be to embed video functionality from Vidyo in the patient portal so that patients and providers can use video visits at the tip of their fingers.

Telehealth has been proven to be an effective method for healthcare deliveries that save lives, reduce cost and provide access to care for patient population in remote areas. The Institute for Healthcare Improvement has designed a framework called the Triple Aim to optimize health system performance. This framework simultaneously pursue three dimensions:

- Improve the patient experience of care (including quality and satisfaction);
- Improve the health of populations; and
- Reduce the per capita cost of health care.<sup>2</sup>

The US health care system is the most costly in the world, accounting for 17% of the gross domestic product with estimates that this percentage will grow to nearly 20% by 2020.<sup>10</sup> Aging populations and increased longevity, coupled with chronic health problems, have become a global challenge, putting new demands on medical and social services.

The Triple Aim entails ambitious improvement at all levels of the system, thus a need for a systematic approach to change is necessary. IHI believes that to do this work effectively, it is important to harness a range of community determinants of health, empower individuals and families, substantially broaden the role and impact of primary care and other community based services, and ensure a seamless journey through the whole system of care throughout a person's life.

In the US environment many areas of health reform can be furthered and strengthened by Triple Aim thinking, including: accountable care organizations, bundled payments, and other innovative financing approaches; new models of primary care, such as patient-centered medical homes; sanctions for avoidable events, such as hospital readmissions or infections; and the integration of information technology.

IHI's design of the Triple Aim concept include five components:

- Focus on individuals and families
- Redesign of primary care services and structures
- Population health management

- Cost control platform
- System integration and execution<sup>11</sup>

According to the president of the American Telemedicine Association Board of Directors, Dr. Yulun Wang, there are not many options for improving care while also decrease costs but telemedicine is an area where health systems, hospitals and physician practices should work more aggressively. Telemedicine can be used across a very large number of applications. The can lower cost while drive up quality simultaneously. One area there telehealth could save money for the industry is in addressing chronic disease, especially as the industry focuses on a pay-for-value model and keeping chronic patients well. Preventive care and telemedicine go hand-in-hand. Through technology, providers can link to their patients who are at home and gain data to “head off negative trend lines.”<sup>9</sup>

Access to care is a major issue in the Alaska Native health system as well as nationally. The National Institute of Medicine identifies access to care as a critical element in its Aims of Improvement, citing the need for both equitable and timely care. In Alaska, it is not uncommon for a patient in a remote village to wait for several months to see a specialist, and physicians recall scenarios where poor outcomes resulted from untimely care or lack of access for the most appropriate care. Generally speaking, poor access and longer waiting times result in more complex care, more visits, higher costs, and poorer patient outcomes.

At the Norton Sound Regional Hospital, prior to telehealth, a total of 1,216 patients were seen from 1991 to 2001. Following the introduction of telehealth, 276 patients were seen in a specialty clinics from 2002 – 2004 and 210 were seen from 2005-2007. The “post-telehealth” patients are split in this manner as this allows us to view the data separately during the transition years (that inherit the previous backlog) from the stable or mature telehealth years. The average wait time prior to telehealth was 4.17 months – which then reduced to 2.87 months immediately after the introduction of telehealth and then down to 2.15 months in the more stable or mature years. The percent of patients who waited five months or more to get an appointment was close to 50% prior to telehealth- but was reduced to 8% within three years of telehealth and then down to 3% in the subsequent years. Since 2001, the audiologists at NSRH have conducted 2,080 telehealth consults – of which only 10.18% still needed to see a specialist. Telehealth is used as a tool to provide a triage mechanism for the patients. While 225 still needed to see specialist, a total of 1,855 patients did not need to see a specialist in-person. The case study at NSRH shows that 90% of all patients are now able to obtain an appointment within three months, compared to 35% prior to telehealth. As the use of telehealth grew at NSHC, the request for in-person consultations decreased and overall access improved.<sup>6</sup>

A successfully implemented telehealth program is well positioned to achieve the interrelated objectives of improved health, as well as enhancing the experience of care at a lower cost.

Several studies have done to determine the factors most critical to the costs in delivering health care in the existing referral system in the Alaska Native health care system. The two most critical factors in the cost efficiency of telehealth are:

- Minimize the need for in-person specialty consultation
- Provide care at the patient's location to minimize patient travel

The Alaska Tribal health system has a problem with recruiting and retaining specialists. In this environment, it is vital to maximize the productivity of specialty physicians. Telehealth leads to efficiency in health care delivery by maximizing specialty provider productivity, reducing the need for patient travel, and eliminating unnecessary appointments.

With the help of telehealth, the dermatology and ENT departments at ANMC indicated that specialists were able to consult on an average of 350 cases per year per specialist without specifically dedicating time to telehealth in their schedules. Accordingly, in the ENT department six physicians review telehealth cases with a twenty-four hour turn around and currently provide over 2000 reviews per year. The consults are provided at no additional expense in manpower or resources at ANMC – yet provide access to more than 2,000 patients from 17 different organizations, access for specialty consultation that would not otherwise exist.

Another example is the ENT department for pre-surgical planning. Pre-surgical planning requires an examination of the patient so that the clinically appropriate procedure can be chosen and operating room time can be accurately scheduled. It is determined that there is no difference in the ability to accurately schedule surgery or in the predicted operative times. Thus, it is currently more common practice to schedule an elective surgery directly from a telehealth case and see the patient for the first time on the day prior to surgery during the pre-operative examination. This approach eliminated the need for many appointments. This is a more efficient approach for the provider and the patient.<sup>6</sup>

Telehealth has reduced unnecessary patient appointments in the Alaska Native health care system. It is a common experience in any health care system that some appointments are, in retrospect, unnecessary and unproductive. For example, important records or results may not be available to the provider at the time of the visit, the appointment is used primarily for information exchange that could have been accomplished by other means and prior to the appointment, or the provider may inform the patient that she really needs to see a different provider with different expertise. In the Alaska Native system, unnecessary appointments come at a high cost; the patients have usually traveled great distances at great expense to the payer to be put face to face with a provider, and they have taken an appointment slot that could have been used for another patient waiting in the typically long queue to see the specialist.<sup>12</sup>

Overall, patient travel is prevented for almost 80% of all specialty consults, and 20% of all primary care cases. The overall travel savings generated by the use of telehealth amounts to approximately \$14 million of 15, 600 encounters over seven years for which travel was avoided. This assumes that 50% of all patients require a parent or guardian to travel (and doubling the costs), and that travel to a regional facility for primary care requires a \$300 airfare whereas travel to Anchorage requires a \$900 airfare. Annual savings, based on 2007 data, is approximately \$3.5 million. Telehealth also prevents the occasional medical evacuation air flight – at a savings of \$10,000 to \$30,000 per incident.<sup>12</sup>



One example that telehealth improve quality of care is that of a sixteen year old female presenting to a primary care provider at a regional hospital with a unilateral paralyzed face. The provider contacted the consulting ENT physician at the tertiary facility by phone, reported that there was an ear infection on the side of the paralyzed face and asked for recommendations regarding antibiotic treatment and possible transfer to the tertiary facility for surgical drainage of the ear. The consultant requested that images of the face and ears be sent by means of store-and-forward telehealth. The images verified the facial paralysis, but revealed a normal ear exam rather than the reported infection, consistent with a diagnosis of Bell's palsy. The appropriate treatment of oral steroids rather than antibiotics, testing and follow up was recommended and arranged to be done at the regional hospital. The patient was treated and the condition resolved without the patient leaving their home region. Had it not been for store-and-forward telehealth, the incorrect treatment would have been initiated for an incorrect diagnosis, and the patient would have been transferred unnecessarily to the tertiary facility.

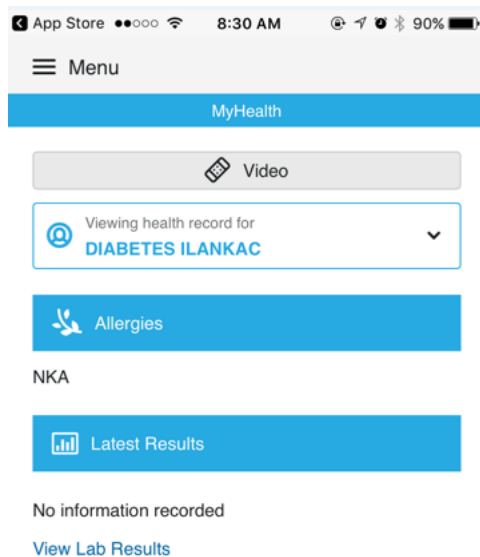
Some more examples do show that telehealth improve quality because it cause wait time to reduce and minimize patient and provider travel time and expenses. Specifically in remote regions in Alaska, several problems that add to the problems of the health care system including not having enough specialty providers and patient as well as provider travel time for the needed care. Additionally, a significant portion of the population have clinical issues that may remain undetected or untreated for a significant length of time. In all cases, faster access to care and earlier detection are critical factors in improving the quality of care. In earlier sections, telehealth was shown to reduce the waiting times for specialty consults, presumably leading to more immediate care for those needing it. Another example is in the audiology program where telehealth help patients to be seen with specialist to receive treatments months earlier compare to the traditional service. Thus, the quality of care improved because patients otherwise would not have been seen or would have been seen later in the course of their illnesses.

Currently, with the use of Cerner EHR and a better telecommunication network such as Vidyo, I am proposing a system to embed Vidyo in Cerner Millennium and the Cerner Patient portal so that live videoconferencing can happen seamlessly and at the tip of the patient's finger. Telehealth currently exist in Alaska in the form of Store-and-forward. This technology works by allowing the provider in a rural health clinic to capture relevant clinical data about a patient including patient records, MRI scans, test results, X-ray photos and other essential data into a file and send by secure encrypted Internet connection to the necessary professional. The proposed project is to allow real-time audio and video communication using the Cerner patient portal – MyHealth- and the video conferencing technology – Vidyo. The patient can connect to the necessary professional provider either at a clinical primary clinic in a rural village or at the patient's home. The projects involve:

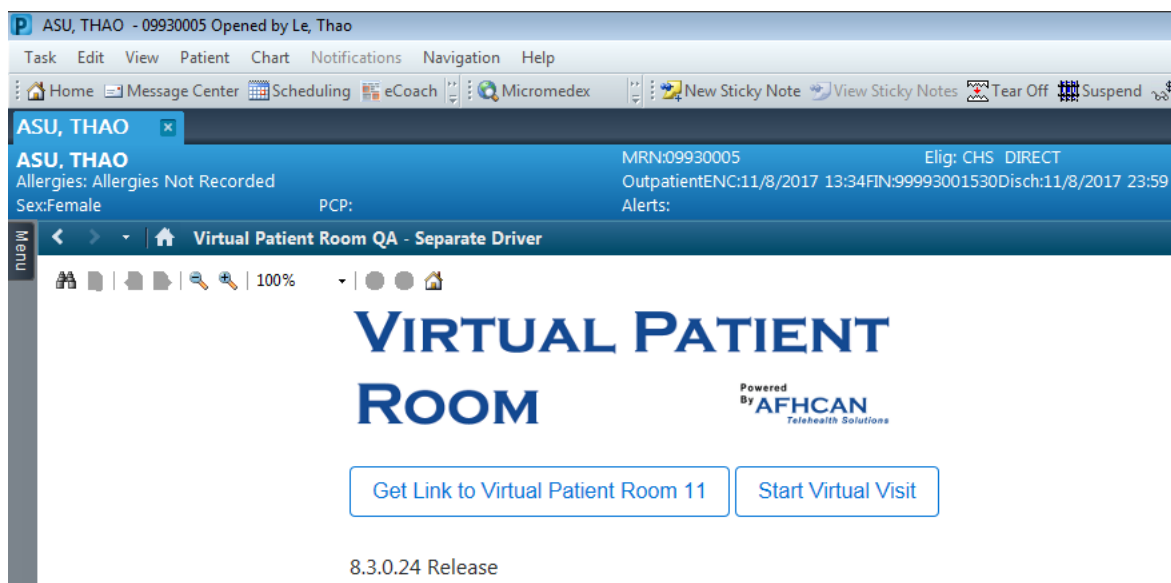
- Code development to embed Vidyo into Cerner Millennium and Cerner patient portal
- Security encryption development to make sure once connected the link and the video session is secured

- Documentation of the project
- Policy and program development to incorporate the functionality to clinics

*Graphic I: Video link in the patient's portal for the patient to connect with the provider*



*Graphic II: Video link in the provider workflow for the provider to connect directly to the patient from the Cerner EHR*



## Discussion

To increase and organize the evidence for the use of telehealth, the Center for Connected Health Policy (CCHP) has been examining published studies that have been designed to measure the use of telehealth in achieving one or more of the goals of the Triple Aim. CCHP has been cataloguing studies published in peer review journals that meet certain criteria. The catalogue

cited here is the result of one set concerning telehealth and behavior health from multiple population demographic. Studies ranged from the effect of telehealth on psychiatric patients and treatment effectiveness, to studies on access to care for rural areas.

As mentioned in the introduction, telehealth has the potential and has been proven to simultaneously help public health achieve the Triple Aim of the IHI:

- Improve the patient experience of care (including quality and satisfaction);
- Improve the health of populations; and
- Reduce the per capita cost of health care.

There are some barriers to telehealth, there are not enough guidance on reimbursement for the presenter site and the provider site, also reimbursement is limited to only certain services. Another barrier to telehealth is that it requires higher capital investment at the sending site including investment in equipment, training, and maintenance with low reimbursement. Currently the savings are benefited by the payers and the patients, not the clinics that provide the services.

The state of Alaska and the Indian Health Services as well as the Center for Medicare and Medicaid should develop policies around the practice of telehealth and increase reimbursement services in telehealth so that it is more advantageous for providers and clinics to participate in telehealth implementation.

## **Chronic Kidney Disease Registry**

### **I. Summary**

#### **The problem:**

Thirty million American adults have chronic kidney disease and millions of others are at increased risk.<sup>13</sup> Additionally, kidney disease is listed as the ninth most common cause of death by the National Center for Health Statistics.<sup>14</sup> However, most patients are unaware of their declining kidney function until it is in its late stages,<sup>15,16</sup> or they succumb prematurely, typically to cardiovascular disease.<sup>17,18</sup> Progression of CKD, and its attendant comorbidity, can be slowed or potentially even halted with optimal medical care,<sup>19,20,21</sup> with implications for increased lifespan, quality of life, and lower societal cost.

#### **The Solution**

The critical task at hand is to identify those at risk or in the early stages of the disease, with the intent of effective implementation of proven preventive and therapeutic strategies. A disease registry is a special database that contains information about people diagnosed with a specific type of disease. Most disease registries are either hospital based or population based. I'm proposing a dedicated, comprehensive, and systematic registry that captures and tracks all aspects of CKD on the population level. The requirements of the solution include:

- The solution must be architected to be deployed in a commercial cloud environment,

- The solution must be able to take advantage of, and translate between multiple transport mechanisms,
- The solution must support current messaging standards that relate to kidney disease and also support future development and improvement in health care technology and standard,
- The solution should also recognize technological limitations with respect to ability to support standard message formats, and
- The solution must be capable of maintaining personal health information and protecting the security of that data in compliance with federal regulations.

## II. Introduction

### The problem:

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### Potential data source:

I'd like to look at datasets procurable from the various components of the US health care system. These included national surveys, registries, population-based and prospective cohort studies, private laboratories, and health care system data

Health care system data considered for inclusion in the CKD Registry include:

- 1) The Veterans' Affairs Health System (national) data,
- 2) Large, privately owned data warehouses, such as Medstat and Ingenix,
- 3) A variety of data from the Centers for Medicare and Medicaid Services (national),
- 4) The Indian Health Service (national),
- 5) Certain laboratory data sources, such as Labcorp and Joint Venture Hospital Laboratories.

Non- health care system data include:

- 6) National surveys, such as the NHANES and Behavior Risk Factor Surveillance System, and other surveys, such as those conducted by the National Kidney Disease Education Program;
- 7) Screening studies, such as the Kidney Early Evaluation Program;
- 8) National registries, such as the US Renal Data System for CKD stage 5D and the Scientific Registry of Transplant Recipients for CKD in recipients of solid organ transplants (kidney, liver, thoracic, etc.);

- 9) Population-based cohort studies, including Atherosclerosis Risk in Communities Study, Cardiovascular Heart Study, Multi-Ethnic Study of Atherosclerosis, Framingham Heart Study, and Coronary Artery Risk Development in Young Adults; and
- 10) CKD-based cohort studies, including the Chronic Renal Insufficiency Cohort Study, the Chronic Kidney Disease in Children, the Renal Research Institute Chronic Kidney Disease Study, and the African American Study of Kidney Disease and Hypertension (17–32).

### Data Use

Six topics to be addressed with the use of data that will be collected include:

1. Identify burden of CKD (prevalence/ incidence),
2. Promote awareness of CKD,
3. Identify risk factors for CKD,
4. Identify health consequences in CKD,
5. Determine processes and quality of care in CKD, and
6. Assess health system capacity for CKD.

These topics will be displayed through reports, executive summary, visualization of data analysis on a public webpage. Dissemination of the findings would raise awareness about this disease and its impact on the population and health care system, and would provide the impetus for public health action.

### Project Plan

The project should take 3 years to develop. The first part of the project is to put a team together. The team would include epidemiologists, generalist and specialist clinicians, biostatisticians, project managers, developers, business analyst, network infrastructure architect, data architect, and system administrator. The next steps include requirement and business analysis, and establishing a process for the project. The preplanning step should take about a year. Then the kick off and implementation, with each installment being three months apart so testing and improvements can be done throughout the project. The last three months of the project should be focus on rollout and training.

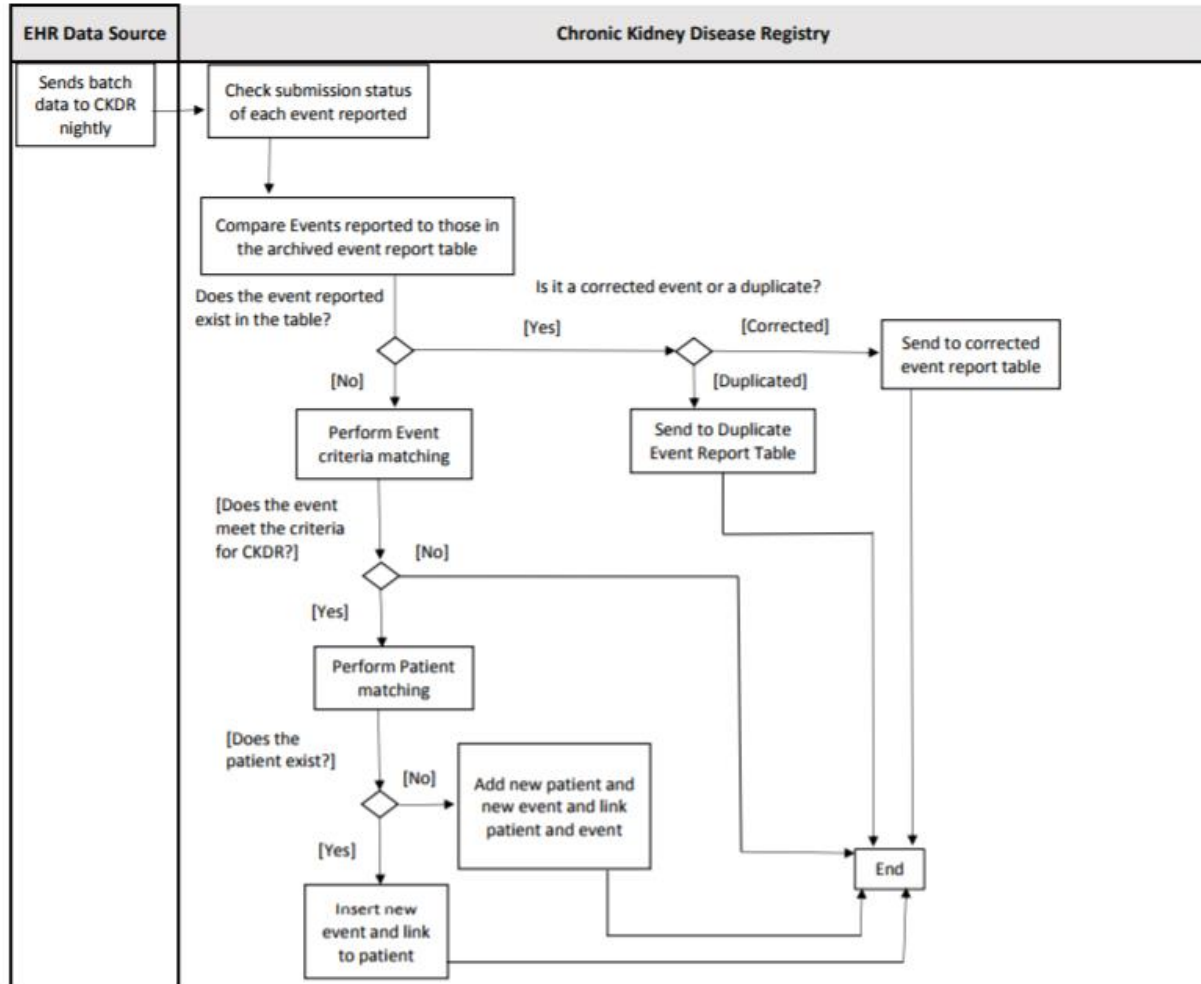
<b>Executive Milestones</b>	<b>Estimated Completion Timeframe</b>
Project planning and proposal	12 months
Engaging stakeholders	3 months
Business analysis	3 months
Kick-off event	Within 24 months
Implementation: <ul style="list-style-type: none"> <li>• This is a modified agile project management style, thus requirement gathering, build and test happen constantly during the two years</li> </ul>	2 year

### Business Process

Batch upload of data once a week for source system based on key words on provider notes, problem list, and diagnosis code. The data is then process by our cloud computing system and visual is display. The system also has the ability to track CKD resources such as specialist doctor

base on location. Education material is display and searchable base on keywords. The system also store data on kidney donors and track their location so that hospitals can query for donor information when needed.

Graphic I: Sample workflow diagram

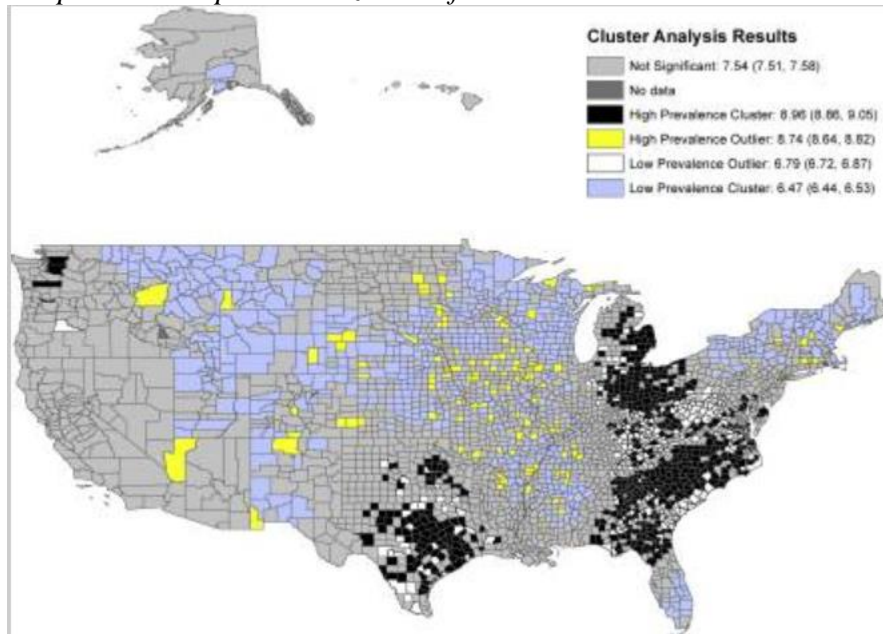


### Data Visualization

One of the biggest component of the registry is the data visualization. I opted to go with Tableau because I am familiar with this software and there are many open resources to learn and make great use of the system. Some other features of Tableau that help me in the visualization analysis process include:

1. The fact that Tableau connects with many different data sources and can visualize larger data sets. Also, in Tableau, different visualizations can be switched on the fly using one set of data,
2. Tableau allows for depth of data discovery: from basic trends as prediction to “what if” queries, and
3. It is easy to pull, cleanse and correlate data in Tableau.

*Graphic II: Sample visualization of data*



## Discussion

The primary objective of this project is to establish a chronic kidney disease registry to be able to:

1. Identify burden of CKD (prevalence/ incidence),
2. Promote awareness of CKD,
3. Identify risk factors for CKD,
4. Identify health consequences in CKD,
5. Determine processes and quality of care in CKD, and
6. Assess health system capacity for CKD.

I hope that a CKD registry would be useful for providers, public health authorities, policy makers and patients alike with reports that are easy to understand and a website that is user friendly as well as data visualization that connects to the audience. It is imperative that the CKD registry is also connected to other kidney and renal diseases as well as other chronic diseases to identify commonalities. Most importantly, the CKD registry is vital in the effort for ongoing assessment of CKD burden and its impact on the population at large as well as the health care system. I hope that this registry will lay the foundation for widespread efforts toward primary prevention, earlier detection, and implementation of optimal disease management strategies, with resultant decreased rates of CKD progression and lowered morbidity and mortality.

## Portfolio Conclusion

The portfolio projects allowed me the opportunities to learn about project management tools, how to use emerging technologies to implement health informatics project, understand more about visualization tools and the pros and cons of certain visualization system. The projects also pushed me to build relationships with stakeholders in my professional network to enrich my



circle and my professional experience. I will continue to learn these tools and add more tools regarding health care information technology project management into my toolbox. I have learned a tremendous amount of new and emerging technologies that are becoming solutions to the current health IT problems and I can't wait to implement my knowledge in my job and future jobs. My next step is to obtain the Project Management Professional Certification and move into a position that use these skills.



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