National Institute of
Diabetes and Digestive
and Kidney Diseases

Kidney Interagency Coordinating Committee (KICC) Meeting
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Meeting Participants and Summary

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I. Welcome and Introductions
Andrew Narva, MD, FACP

The goal of the committee is to encourage cooperation, communication, and collaboration across federal agencies involved in kidney research and other kidney-related activities.

This KICC meeting focuses on the Veterans Health Administration's (VA) innovative approaches to the management of kidney disease.

II. Agent-Based Modeling of VA Dialysis: Contracting, Forecasting, and Resource Analysis
John Hotchkiss, MD

Agent-based modeling is a computational approach to analyzing complex systems composed of individual elements (i.e., agents) that each possess specific, process-relevant attributes. It tracks the individual agents as the system evolves over time or space—creating a virtual world populated by agents that allows behaviors to be observed and quantified. Agent-based modeling is deeply rooted in simulation—essentially, you build a world and see what happens. Improved computing power has allowed for the greater application of agent-based models.

Characteristics of Agent-Based Modeling
- Discrete models over time   - Predicated on explicit tracking of "agents" (in healthcare, individuals)   "Behaviors" are governed by explicit rules   - Agents have attributes   - Attributes can change over time   - Rules can change   - Agents can interact with each other, the environment, both, or neither

This type of modeling offers various advantages in certain settings. These include:

- Contexts where there is high-process stochasticity (i.e., the quality of lacking any predictable order or plan) and/or small populations;
- Spatially heterogeneous environments;
- Settings where heterogeneous agent attributes strongly modulate dynamics;
- When changes in agent states are a major aspect of system dynamics.

Dr. Hotchkiss used agent-based analysis to explore issues related to dialysis and chronic kidney disease (CKD) within the VA. Specifically, his research explored:

- Contracting considerations;
- Forecasting future prevalence;
- Identifying optimal location for resource deployment.

Currently, the VA contracts with private dialysis vendors who provide dialysis three times a week to veterans. This treatment is very expensive. There is variation in terms of the distribution of patients, cost of services, availability of services (i.e., geographic distribution of facilities), and the vendors predominant in a particular region.

The first analyses explored how to best provide dialysis services given various considerations. These include: cost; access (e.g. travel distance); stability (e.g., impact on smaller vendors); and equity (e.g., convenience for patients). The model accounted for various attributes for both patients (e.g., payor) and provider (e.g., capacity, existing contractual agreements).

The tools developed for these analyses examined patient distribution across providers, taking into consideration availability, travel distance, and patient characteristics. It also incorporated costs for the VA, as well as predictions of future workload. These were provided at both the national and the Veterans Integrated Service Network (VISN) level. The analysis emphasized the dependence on large providers, who have an increasing market share.

A second suite of tools was developed to explore the time dependent prevalence for each stage of CKD at the national and regional level. These tools explored manpower and resource needs as well as potential cost savings. Stages of CKD were stratified by age, observed progression rates, and mortality by region. The expected future burden of high stage CKD was then predicted for each region. Likely effects of interventions slowing the rate of progression to dialysis dependence on disease burden and cost were also elucidated.

A third geospatial tool is currently being used to help guide regional allocation of high impact, high cost resources. This tool focuses on identifying optimal solutions that maximize access and operational efficiency while minimizing cost.

Discussion

- Dr. Narva commented that the Indian Health Service (IHS) has also developed models, which show that measures slowing progression rates of CKD decrease incidence initially and shift increases in disease burden to later time points. Dr. Hotchkiss said that the VA tools described provided cohort analyses and that similar patterns were seen. For this reason VA currently limits prediction horizons to three years.
- Dr. Narva commented that IHS is in the process of responding to an inquiry from the Office of the Inspector General about access to dialysis for Native Americans. The agent-based modeling methodology could be helpful in developing a data-based response.
- Dr. Flessner asked if the model takes into consideration travel costs in general and the specific type of transportation (e.g., ambulance, taxi, etc.). Dr. Hotchkiss stated that the model does incorporate transportation costs. Using geospatial analysis allows calculation of real travel time (not just estimating distance between sites). This undertaking requires a fine scale analysis, such as that currently underway at VA VISN Support Services Center.
- Dr. Flessner asked if VA patients are able to select where they receive their dialysis treatment. Some patients prefer to go to a unit that is less convenient for various reasons (e.g., prefer staff at one unit over another). This can drive up cost. Dr. Crowley stated that patients do have a choice but most opt to attend the closest unit. Dr. Morreale added that there are limitations in terms of choice (e.g., if a patient selects a unit that is further away VA will not pay travel costs).

- Dr. Kimmel stated that there are significant differences related to access to dialysis in urban and rural areas and asked if rural areas should be considered separately. Dr. Hotchkiss stated that free standing dialysis units require a certain minimum volume to be financially viable. Rural areas, with lower volumes of patients, are thus less attractive sites for free standing dialysis units. Dr. Kimmel added that units can be based within rural VA medical centers (i.e., in-center dialysis program). Dr. Hotchkiss agreed that this seems to be a very reasonable idea and stated that home dialysis programs can also be added to in-center programs to increase the effective provision of dialysis services.
- Dr. Oliver asked if the model explored how travel time/distance impacts morbidity and mortality. Dr. Hotchkiss stated that commutes are fairly short (30 miles). The VA does have data showing lower hospitalization rates and emergency room (ER) visits for dialysis patients. This could be due in part to the VA being an integrated health service system, which facilitates care coordination. Another factor could be that VA patients may have more interactions with higher level care providers per month, which has been associated with fewer ER visits.
- Dr. Zieman asked if agent based models can be applied to multiple chronic conditions. Dr. Hotchkiss stated that it is possible but that forecasting in the setting of many relevant variables can result in very complicated models—making access to large databases critical for the formulation of accurate "rules" for the agent based models.
- Dr. Andress asked if the geospatial analysis calculates actual travel distance on surface roads (not as the crow flies) and whether alternative modes of travel (e.g., mass transit) were considered. Dr. Hotchkiss stated that these factors are being explicitly considered in the fine scale analyses performed by VSSC as part of VA's decision process.
- Dr. Williams stated that the model is heavily dependent on distance to the nearest facility. Other considerations, such as socioeconomic factors, are also important.

III. Capturing and Reporting National Quality Metrics: The VA Dialysis Dashboard
Karen Sovern, RN, MSN, OCN

The development of the VA Dialysis Dashboard was guided by a workgroup made up of members representing various domains including leadership, operations, clinical services, and research. Following a summit meeting, the workgroup met weekly via conference call. The workgroup defined the requirements for the Dashboard. These requirements included:

- Identifying necessary resources for the development of the Dashboard;
- Identifying data elements needed for measures;
- Identifying and performing gap analysis on data available in the Corporate Data Warehouse, which stores data for all VISNs on a daily basis; and
- Determining acceptable laboratory values to be used in calculating the quality measures.

Involvement of clinical leadership and the Office of Informatics and Analytics were especially important to ensure the success of the Dashboard and future buy-in. Staff from dialysis centers were also involved throughout the process, which was helpful when it came to implementing the Dashboard in the field. Dialysis center staff also volunteered to serve as mentors to other sites during roll out.

The workgroup reviewed 78 measures before selecting 11 measures. These measures align with measures promulgated by Centers for Medicare and Medicaid Services (CMS) and the National Quality Forum. Measures address dialysis adequacy, vascular access, anemia, bone and mineral metabolism, and infection and immunization.

To identify the patient population, the workgroup used both CPT codes and stop codes. Only out-patient dialysis patients who have been in the center for more than 30 days are included.

In the development of the Dashboard,

Dashboard Development Process

- Identify target patient population
- Establish lab mapping tables
- Data mining through Corporate Data Warehouse to extract elements necessary for calculating measures
- Set up tables using Standard Query Language programming
- Design dashboard displaying clinical quality measures
- Develop written support documentation
- Construct web application to supplement missing data elements with self-reported clinical information.

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significant effort was devoted to the establishment of the lab mapping tables. The workgroup reviewed hundreds of thousands of lab results from more than 70 facilities. Based on the review, the workgroup developed standard categories.

The Dashboard stores aggregated data on clinical measures at the dialysis center level. Data come from various sources: electronic medical record (EMR), VA Infection Surveillance Database, and self-reported data. The data presented are from the previous month. This is a major improvement given that the VA has relied on outside agencies to provided data that were more than six months to twelve months old.

The Dashboard's web application provides a secure interface for the clinician to input data. The system can pull data from other systems, which lessens the data entry burden. In addition, the system has "pop up" definitions and reminders to assist clinicians. The Dashboard also allows clinicians to drill down to the patient level and provides data over time so clinicians have a historical perspective.

To ensure the success of the Dashboard in the field, testing was conducted relating to patients, labs, and medication usage. Testing also identified that not all facilities were using proper stop codes and CPT codes. Pilot testing helped to ensure that the web application was user friendly and efficient in the field. As the Dashboard is rolled out, VA is working with the University of Michigan Kidney Epidemiology and Cost Center to validate reported data.

Discussion

- Dr. Abbott asked if data related to access are collected. Ms. Sovern stated they capture what access the patient is using on the last day of the month (not all patients have their lines placed by a VA facility). Dr. Abbott stated that the Richmond facility uses direct interface between machines and whether this is available in other facilities. Dr. Crowley stated that this is available in about 30 percent of facilities.

- Dr. Williams asked if the Dashboard can capture data from dialysis centers outside of the VA. Ms. Sovern stated that the data are only from VA facilities.
- Dr. Kim Smith stated that it is interesting that the measures are aligned with those from the CMS Quality Incentive Program but are being implemented differently. CMS uses the measures to penalize facilities. In the VA they are used for provider feedback. In addition, the systems are different because all the data is maintained in the VA Dashboard. With CMS, data in the system are often self-reported (e.g., multiple hemoglobin draws during a month—the clinician can select the best to report). Ms. Sovern stated that the VA needs to be able to compare its outcomes to the private sectors and it is important to align to CMS measures. With the Dashboard, outcomes cannot be fudged.
- Dr. Narva asked how many dialysis units are in the VA system. Dr. Crowley stated that there are 69 outpatient units.
- Dr. Moxey-Mims asked if units have access to only their own data or can access data from other units. Ms. Sovern stated that currently, units have access to their own data. In the future, the data will be reported at a VISN and national level.
- Dr. Flessner asked if the Dashboard tracks grafts. Ms. Sovern stated that they are tracking grafts and that the process is modeled after CROWNWeb.
- Dr. Zieman asked whether these data will be available outside of VA. Ms. Sovern stated that it is not currently linked but it might be in the future.
- Dr. Abbott asked about the accessibility of patient databases. Dr. Crowley stated that VA is working to link this database to others. Dr. Andress said that CMS must collect specific data but there are limitations on what can be shared.

IV. Enhancing CKD Medication Management through Clinical Pharmacist (CP) Engagement
Anthony Morreale, PharmD, MBA, BCPS, FASHP

There are approximately 7,000 clinical pharmacists (CP) employed by the VA. Of these, approximately 2,800 (41 percent), practice at an advanced level under a scope of practice with prescriptive privileges. In the VA, these CP work collaboratively with primary and specialty care providers to:

- Ensure medication safety;
- Perform comprehensive medication management in primary and specialty care; and
- Assess and evaluate medication.

Studies have demonstrated that every dollar invested in clinical pharmacy services results in $4 in benefits. In addition, by fulfilling these functions, CP allow other providers to focus on the evaluation of disease progression and identification of new illness.

The Clinical Pharmacy Program Office (CPPO) was established in 2010. At that time, there was no organized structure for standardizing CP practices across the VA. The Office sought to define the role of CP in the VA system, with a focus on the CP serving as a bridge between primary and specialty care. It also explored the qualifications of pharmacists within the VA in order to determine how to utilize pharmacists to their full potential. Of the CP within VA, 62 percent

have completed a residency program, 34 percent have board certification, and over 72 percent have combination of these qualifications, making for an extremely well trained workforce.

The number of CP with a scope of practice in the VA has grown significantly in the last few years, which has been critical to the adoption of the medical home model. CP are active members of the care team, with a focus on medication management. The scope of practice (SOP) for CP tends to be global in nature allowing them to manage a broad range of pharmacotherapy issues. Common disease states that pharmacists are managing in primary care include anticoagulation, lipids, diabetes, hypertension, smoking cessation, pain, and osteoporosis.

VA has focused on increasing the number of pharmacists with a global SOP since these clinicians provide more versatility to the care team. VA has conducted clinical pharmacy boot camps, which are designed to train pharmacists in a variety of disease states and allowed them to expand their scope of practice. VA has been conducting demonstration projects in various facilities to refine collaborative models of care between pharmacists and primary care providers. These studies have demonstrated that involving pharmacists in primary care improves patient outcomes.

Given the success of the demonstration projects, VA launched the Pharmacists Achieve Results with Medications Documentation (PhARMD) Project. It is designed to measure interventions and outcomes at a system level using a pharmacotherapy intervention tracking tool. The tool, which includes clinical reminders in the EMR, provides documentation of clinical interventions related to medication management by CP across the VA. It provides the ability to document pharmacotherapy interventions with demonstrated potential to reduce harm to patients and the costs to the health care systems.

Currently, approximately 800 CP are using the tool to document clinical interventions and therapeutic achievements for specific disease states. In FY 2013, the CP provided over 150,000 disease-related interventions and over 100,000 pharmacotherapy interventions. Diabetes management is the most frequent referral from the health care team.

Interventions measured in the PhARMD project are then fed into the Archimedes modeling tool and is used to project outcomes. Archimedes is a mathematical modeling tool designed to answer complex questions on health and health care. It can be used to:

- Analyze prevention activities and management of chronic conditions for patients;
- Design guidelines, performance measures, and incentive programs, such as pay-for-performance;
- Assess technologies and compare the effectiveness of different treatments;
- Design clinical trials;
- Analyze and improve health processes;
- Forecast the costs of health care; and
- Estimate the cost effectiveness of interventions.

Archimedes is being used to analyze PhARMD data to project both outcomes and cost benefit of various interventions in various cohorts, standardized to VA's demographics. It allows researchers to look at data at the national level and by individual sites.

One of the disease states included in the study is hypertension. The study included 370 patients referred for hypertension. Following intervention, blood pressure rates dropped significantly. By utilizing Archimedes the program office has been able to project forward reductions in cardiovascular events (myocardial infarction, stroke & death) as well as events like amputations. In addition, Archimedes allows the reviewers to project quality of life and cost of care implications.

The VA is not alone in taking greater advantage of the skills and expertise of CP. Ample data exist supporting the role CP can play in improving care for chronic diseases. Kaiser Permanente has a care model designed to use pharmacists at the highest level of practice and continues to do research in this area. Walgreens is also using pharmacists for disease management. However, there are barriers to expanding the scope of work of pharmacists outside the federal environments which have embraced these roles under federal supremacy. Although currently, pharmacists are not recognized by Social Security and CMS as health care providers, over 40 states do allow pharmacist to work under collaborative practice agreements and bill under Medication Therapy Management (MTM) regulations.

Discussion

- Dr. Narva asked about the educational interventions that CP conduct with CKD patients. Dr. Morreale stated that CP do provide counseling related to drugs and diseases. However, the goal is to use the CP at the highest level and this may not be for simple patient education, but rather more focused disease management and engagement with these patients.
- Dr. Crowley asked if avoidable drug events can be tracked in Archimedes. Dr. Morreale stated that PhARMD tool has two main strengths. One strength focuses on disease management and clinical outcomes while the other tracks interventions made by the pharmacist such as drug allergies and interactions.
- Dr. Kopp asked if the PhARMD data are used to identify patients for research studies. Dr. Morreale stated that the database is used primarily for operational purposes although there is a long term potential for selected research endeavors using this data.
- Dr. Flessner asked whether the VA is integrating pharmacists into intensive care units (ICUs) since these patients have significant pharmacotherapy needs. Dr. Morreale stated that some sites have CP embedded in ICUs. Systematic data collection across ICU's staffed by CP has not been conducted although they are working on a tool which might be used to track interventions in this and other acute care settings.
- Dr. Narva asked if CPs are provided training on how to effectively work with physicians to ensure that appropriate care is provided. Dr. Morreale stated that the clinical pharmacy boot camps are designed to standardize care across the system. These trainings along with guidance documents, like PACT business rules, and training provided by CPPO help pharmacist create a strong core processes for collaborative practices. The ultimate goal is that these documents and trainings are available outside the VA. They are available to

physicians and can serve to provide updates on pharmacotherapy for specific disease states.

- Dr. Narva asked about what happens if a patient prefers to see the CP over their primary care provider. Dr. Morreale stated that pharmacists are part of a team of care and work collaboratively with primary and specialty care providers where appropriate pharmacotherapy needs exist. They are not set up to become primary providers and patients are not maintained in their panels, but are referred back to their primary care provider. There are some situations, like anticoagulation clinics, where the CP may manage patients for one problem or set of problems over time, but always in a collaborative relationship.

V. Promoting Self-management and Kidney Disease Awareness
Susan Crowley, MD, FASN

Within the VA there is a growing volume of veterans with CKD but it is under-recognized by both providers and patients. There are poor health outcomes for CKD and high costs associated with this care. Within the VA the chronic care model is used to manage CKD. Changes that have been made within the VA system, such as those discussed by the other presenters, are designed to encourage patients to work with their providers for better outcomes.

Patient self-management is an important aspect of the chronic care model. Patient education has been correlated with better outcomes in various chronic conditions. Higher knowledge in advanced CKD patients is associated with:

- Adherence to dialysis prescription and dietary recommendations;
- Improved phosphorus management;
- Control of co-morbid diseases such as diabetes;
- Better self-reported mental function;
- Increased propensity for selecting home dialysis; and
- Greater likelihood of AV fistula use in incident dialysis patients.

The veteran population presents some challenges related to educating patients about CKD. Impaired health literacy has been identified in this population. In addition, the VA has not produced CKD-related materials tailored to the needs of veterans and that address the benefits available to veterans with CKD.

The VA e-Kidney Clinic is designed to address this unmet need. The goal is to create an online patient education tool for veterans. Key elements of the tool are:

- Understandable (e.g., 6th grade reading level);
- Accessible (e.g., no password);
- Integrated framework to improve understanding;
- Holistic approach taking into consideration psychosocial dimensions of care;
- Comprehensive coverage of CKD topics;
- Promotion of self-management; and
- Customized to the needs of veterans.

VA will be working to promote awareness of VA e-Kidney Clinic. The VA e-Kidney Clinic is being integrated into frequently trafficked VA websites.

V. Agency Update

CDC: Infection Prevention Materials for Dialysis Centers
Priti Patel, MD, MPH, Kristin Rainisch, MPH

CDC's Division of Healthcare Quality Promotion has developed infection prevention interventions for dialysis centers. A series of tools (e.g., poster, pocket guide) and a training video have been developed. The materials address hand hygiene and practices for catheters and fistulas/grafts. In addition to drawing on evidence-based interventions, CDC involved dialysis experts in the development and field testing of the interventions, and provided insight into effective dissemination of the tools. CDC plans to mail copies of the new materials to all outpatient hemodialysis centers in the country. Additional print copies (or video DVD) can be requested on CDC's website (http://wwwn.cdc.gov.pubs/dhqp.aspx).

The tools are available at:
cdc.gov/dialysis/prevention-tools/index.html

VI. Adjournment

Dr. Narva announced that the next KICC meeting is scheduled for March 7, 2014.