THE FOUR FORMATIVE PILLARS

Top Health IT Capabilities That Will Improve Comprehensive Medication Management

Introduction

As a professional interested in using health information technology (health IT) services, how can I navigate this complicated field to best optimize medication use through comprehensive medication management (CMM) based on my situation and resource availability. The GTMRx Health IT to Support Optimized Medication Use Workgroup has identified four pillars as foundational components to advancing the CMM Framework. Although numbered, the Pillars are not intended to be in a sequential order:

1. Clinical Decision Support Tools

2. Population Health and Risk Stratification

3. Patient Engagement and Care Coordination

4. Outcomes: Economic, Clinical and Humanistic Outcomes

Goal

Recognizing that the interprofessional team is made up of many diverse members and that practice setting may vary, the workgroup has developed a set of use case personas. The goal of these health IT use cases is to provide leadership, guidance and recommendations that will enable broad practice adoption of a systematic approach to CMM use throughout the continuum of care. Success will be defined as increased adoption of current and future information technology standards of practice that provide optimal outcomes for all health care participants through effective medication management.

What is CMM? The standard of care that ensures each patient's medications (whether they are prescription, nonprescription, alternative, traditional, vitamins or nutritional supplements) are individually assessed to determine that each medication is appropriate for the patient, effective for the medical condition, safe given the comorbidities and other medications being taken and able to be taken by the patient as intended.†

† McInnis, Terry, et al., editors (2010). *The Patient-Centered Medical Home: Integrating Comprehensive Medication Management to Optimize Patient Outcomes.* 2nd ed., Patient-Centered Primary Care Collaborative, PCPCC Medication Management Task Force collaborative document.

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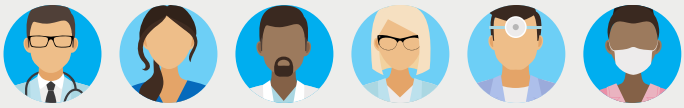
Understanding that adoption and utilization of health information technology to enable medication optimization through CMM practice is a journey of maturation, it is often helped or hindered through leadership support and health IT resource allocation. These use cases seek to share tangible and actionable examples from the field in various practice settings, within organizations and across partnerships of various sizes and levels of maturity. Throughout these use cases, highlighted are pillars, or health IT capabilities, that should be present within your health IT strategy. These include data acquisition, risk stratification, care coordination and outcome reporting.

Personas



- Clinical pharmacists providing CMM Services
- Prescribers wishing to partner with pharmacists providing CMM
- Operation leaders in a health care system looking to start CMM services in their practice
- Value based networks interested in providing CMM services to their population
- Program managers in a health care system looking to evolve their CMM services by leveraging technology
- Care center organizations looking to provide/improve CMM services for their customer populations

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PILLAR ONE: Clinical Decision Support Tools

Capability Description Access to diagnostic results, clinical notes, patient status and other clinical information accessible to the team at the point-of-care allows providers to fulfill important activities in the CMM process. This information offers insight into patients experiencing medication therapy problems, and it helps the clinicians determine whether or not the patient has achieved the clinical goals of therapy. Having the ability to evaluate actual use patterns of all medications (e.g., over the counter, supplements, prescribed drugs and biologics) is also important. A medication-related dashboard should have the ability to support anyone on the care team, allowing them to make simple, streamlined decisions about a patient's medication therapy. This dashboard should include objective data, like a blood pressure value or A1c, that help clinicians decide whether a patient needs a higher-level statin, the blood pressure medicine should be increased or pharmacogenomic data are needed to assess the safety or efficacy of the medications.

Why is this a Pillar? At the point of care, this full view of information is essential to properly assess each medication's indication, effectiveness, safety and convenience. It can easily allow any care provider to focus on the achievement of the clinical goals for each therapy. Organization and interpretation of these data in a medication-centric workflow can improve the efficiency and efficacy of clinical decision making supporting the 10 step CMM model.

Journey Toward a Mature Heath IT Support System to Optimize Medication Use

LEVEL 1 | **Ability to use essential data and work with the data you have**

- Availability of standard data elements can be a challenge for some CMM providers. Patients often receive their health care services at various locations and through different care networks, but this should not stop you from getting started. Organize and use the data you currently have available to begin supporting medication related decisions. To help you, the US CORE Set Data promoted by the Office of the National Coordinator for Health Information Technology (ONC) offers both high level and detailed descriptions of data helpful to optimize and coordinate patient care. Whenever possible, assemble as many of these core data elements as possible.

- Park Nicollet Health Services, an integrated delivery network, and their team of CMM clinicians created CMM note templates in the EHR that automatically pull in and organize the key objective data and lab values into a single view to improve efficiency of decision making regarding medication optimization.

- Community mental health centers (CMHC) collaborate with trained medication safety clinicians that have access to medication histories, demographics and claim information to support the delivery of patient care. As trusted advisors, these clinicians work as team members within CMHCs and provide insights and recommendations for the patient's medication safety. Often with EHR access, they may reference the CMHC's medical and lab information to provide additional insight and recommendations that improve patient care.

LEVEL 2 | **Ability to build a medication-centric workflow for CMM clinicians**

- An accountable care organization (ACO) in Pennsylvania is working to organize data at the point of care by utilizing medications with associated diagnoses to create measurable data points (e.g. ambulatory care sensitive conditions with high-risk medications, laboratory results and diagnostic test results), providing insight into the complexity of the patient's problems to better inform clinicians providing comprehensive medication management (CMM).
- At Orange Regional Medical Center, the community hospital organizes patient medications, patient biomarkers and dose data to help the care team quickly monitor, identify and resolve medication therapy problems.
- At Park Nicollet Health Services, the medication management leadership worked with the IT Department to create a new medication management department in the EHR. This allowed the CMM clinicians to tailor their filters, views and visit navigator, to better flow with the CMM care process.

LEVEL 3 | **Ability to incorporate enhanced data points such as pharmacogenomics (PGx), medical claims and social determinants of health (SDoH)**

- Integrated pharmacy care teams may offer specialized services to support collaboration between community mental health centers (CMHC) and their onsite pharmacies. Clinicians may use a series of guided workflows in the clinical documentation software to capture the patient's medication experience. The clinical documentation system is connected to other databases (e.g. Medi-Span®), which allows for the identification of potential drug-drug and drug-disease interactions.
- The Program for All-Inclusive Care of the Elderly (PACE), a Tabula Rasa Assisted Living/Home visit service, creates a visual dashboard to incorporate PGx testing, medical claims and over the counter medications into a comprehensive grid for care team members to consume in one flow. This synthesized medication related data enables the CMM model and supports more efficient prescriber/pharmacist decision support.

Incorporation of health care data allows clinicians to efficiently identify and resolve drug therapy problems to optimize the patient's pharmacotherapy regimen.

- Social determinants of health (SDoH) describe the personal and social environment of the patient. Factors such as access to safe housing, health care and transportation, as well as language/literacy assessment are important in terms of the patient's ability to understand and follow recommendations from a CMM consultation. For example, medications requiring refrigeration should be avoided in patients with limited or no housing, and complicated regimens need to be simplified and described appropriately for a literacy-limited patient. Adding a template to collect SDoH, or access to SDoH recorded in another system, to the system used for CMM allows the clinician to address medication therapy with respect to the patient and their environment.

LEVEL 4 | **Ability to introduce automation and algorithms to improve decision making**

- Ridgeview Medical Center created a specialty CMM service by leveraging core data elements with automated algorithms to identify pharmacogenomic (PGx) testing candidates. These patients are ordered a PGx test and clinicians use those data as a core clinical decision support tool.

- Coriell Life Sciences created Gene Dose Live™—a cloud-hosted, workflow-integrated, clinical decision support tool—to leverage patient-specific information on PGx, medication regimen, disease indications, lifestyle factors and demographics. The tool presents a prioritized understanding of a patient's risks by medication and the ability to audition and select more appropriate, alternative drugs by therapeutic class. Risk algorithms assess the alternative choices in real-time while adhering to the guidance of the specific plan formulary. The tool provides a recommendation document that is communicated to the prescriber for action. Decision making is streamlined through efficient, transparent displays of risks, severity and alternatives.

Regardless of where you are on your journey toward integrating health IT to support CMM in practice, these are a few helpful tips and recommendations.

Success Factors

- Whenever possible, obtain and assemble standardized and coded data elements like the United States Core Data for Interoperability, SNOMED Codes and use FHIR enabled platforms. These can simplify interoperability and data sharing.
- In a team-based environment, be flexible to differentiate workflows, displays and organization of medication related data to better inform decisions and support various team members including CMM providers. Adaptable note templates, dashboards and workflows can optimize team-based care.
- Medication related outcomes can be affected by various traditionally non-health care related factors. Data incorporating additional stretch elements like personality typing, pharmacogenomics and social determinants of health can enhance medication-related decision making.

Lessons Learned

- Data and health IT builds must be 'fit-for-purpose' for the intended end-user. For example, a population health dashboard is not as useful to a clinician with a specific patient in front of them. A clinician providing CMM must have certain data points available to inform patient-specific strong clinical decisions.
- Allowing clinicians to analyze an individual medication list in a holistic way, rather than the one-to-one drug utilization reviews, has allowed an advanced perspective. Additionally, creation of a risk score can create a strong stratification measurement for large populations of administrators, plan sponsors or system strategic leadership.
- Organizations with extensive IT resources are leveraging data science and proprietary PGx algorithms to further enhance CMM practice. Leadership must thoughtfully discern how this data will be integrated into existing workflows and platforms to avoid overwhelming the system.
- Sites may have limited access to the EHR to view results and/or may have to obtain them from a third party vendor.
- Documentation standards (for PGx) are still evolving but are needed to promote practice consistency and uphold ethical standards of care. (e.g. performing drug utilization reviews and ensuring PGx info is utilized).

PILLAR TWO: Population Health and Risk Stratification

Capability Description Recognizing that health care resources are finite and to maximize impact, the ability to identify and risk stratify populations of patients who will benefit most from comprehensive medication management (CMM) services is necessary. Population-based approaches to CMM services necessitate assembly of critical data elements and effective data architecture. Ideally, the health care system identifies patients who can benefit from CMM services. Population health management and prospective CMM patient identification happen independently of, but complement, direct patient care.

Why is this a Pillar? Health care organizations need to allocate their resources carefully. There are certain patient populations that benefit more from CMM services. Tools that integrate data from electronic health records (EHRs), pharmacies, health plans and other reliable sources can provide the foundation for deployment of comprehensive risk models. Risk modeling tools allow the payor, provider or value-based network to easily identify the patients who are at risk and will benefit most from CMM services. Health systems, pharmacies, payors and prescribers should also have the ability to proactively reach out and invite at-risk patients to participate in CMM services, effectively automating a process and decreasing administrative burden from the point-of-care clinician.

Journey Toward a Mature Heath IT Support System to Optimize Medication Use

LEVEL 1 | **Ability to properly identify patients given basic data (e.g. specific medications, non-adherence, specific lab value)**

- Coborn's pharmacies identify patients who are using one or more albuterol inhalers each month. This identification strategy can help them identify patients with chronic respiratory conditions who may benefit from CMM.
- In the early stages of CMM program development, a primary care clinic can identify patients with an objective marker of drug therapy that is out of goal range, such as an A1c above nine.
- A health plan can examine medication-related adherence data. Patients who appear non-adherent to one or more medication categories could possibly benefit from a CMM encounter with a clinician.

LEVEL 2 | **Ability to combine data elements and sources at a single system level**

- A health system or even a health plan can combine an emergency department visit with the presence of a high-risk medication category, like an antithrombotic or hypoglycemic medication. Patients with this combination could have already had an adverse event and may be at further risk of additional events.
- A patient centered medical home with a quality measure dashboard can identify patients who are failing one or more quality goals related to management of chronic conditions. Patients failing to meet quality goals related to medication therapy would benefit from CMM services.

- In a care delivery setting, risk stratification for patients can be done based on number of medications, complexity of regimens and lab results. Focus on ambulatory care sensitive conditions (ACSC) can be determined at this level to target patients who may benefit most from CMM. Additional algorithms can be deployed here via EHRs such as medication regimen complexity index scoring (MRCI), medication appropriateness index and/or other validated tools that require sophisticated algorithms to identify patients who may be at high risk for medication therapy problems (MTPs).

- An Accountable Care Organization (ACO) in Pennsylvania combines clinical data elements from EHRs, for example, high-risk conditions with specific additional criteria, patients at high risk for falls or who have had falls (annual wellness visits vs discrete documentation), medications classes (e.g. insulin > three times per day, sulfonylureas), psychotropic medications: skeletal muscle relaxants or multiple antithrombotic meds. Many hospitals identify high-risk patients based on various criteria, but a common tool used is the LACE+ score (length of stay in hospital, acuity of admission, comorbidities and emergency department utilization within six months of current admission).

LEVEL 3 | **Ability to integrate advanced or non-traditional data elements (such as pharmacogenomics, patient wearables, digital devices or social determinants of health)**

- Many accountable care organizations (ACOs) and clinically integrated networks (CINs) utilize population health software to identify high-risk patients and target case management that coordinates care based on the patients' needs to reduce cost of care. Individuals are identified as utilizers based on low, moderate or high use of health care services. Some claims-based programs for population management may calculate either high-risk and/or rising-risk patients based on proprietary algorithms. In addition, claims-based data combined with SDoH performed as part of a community health needs assessment (CHNA), can help identify those patients who are at highest risk. Examples of integrated claims-based elements include polypharmacy (> 15 meds), high-risk, chronic conditions managed with medications, high cost utilization rates (ED, hospitalization) and medication non-adherence.

Many of these software programs incorporate claims-based data with appropriate inputs which helps create a picture of the severity of illness for a patient as well as pharmacy claims for medications.

- Tabula Rasa HealthCare developed MedWise™ to enable certified MedWise™ Advisor clinicians to prioritize patients based on risk scoring of medications, medical conditions, key laboratory data and those who would most likely be at high-risk for medication-related problems (MRPs), including most likely to experience side effects. This scoring system is known as the MedWise Risk Score™. Prescribers are given an action plan with recommendations showing insights into the outcomes expected by accepting these recommendations. Follow-ups with the patient are scheduled to review progress and track on a longitudinal basis.

- Organizations specializing in various medication management solutions may also utilize customized risk-scoring algorithms in conjunction with claims analyses and real-time data feeds to identify high-risk patients who would benefit from CMM services. High-risk patients often take more than five medications per day, live with multiple chronic conditions and have a high annual medical spend. Depending on the goals of the program and/or organization, additional factors can be layered into the analysis to focus on specific disease state(s) and/or outcome(s) such as serious mental illness (SMI).

- In order to be vigilant on readmissions, some hospitals utilize clinicians at the point of discharge to perform a comprehensive medication review for patients that are indicated as high medication/safety risks by using custom discharge reports within their EHR system. The prescriber reviews the discharge notes and follow-ups are scheduled with the appropriate care team members, including a clinician providing CMM, to review current health status with the patient, medication management challenges and changes that may affect achievement of health goals.

LEVEL 4 | **Ability to create multi-faceted risk score assignment and advanced analytics**

- HealthPartners health plan offers CMM to the vast majority of members. Many members also receive care in their integrated delivery network. A CMM risk score was developed combining over 20 data points utilizing both medical claims data and clinical information from the EHR. Points were assigned based on diagnoses codes, high-cost health care utilization, objective lab data values, adherence to a variety of medication classes and presence of high-risk medications.

Transparent risk scores enabled the patient engagement team to prioritize and tailor outreach and engagement strategies.

- At Coriell Life Sciences (CLS), a risk and eligibility assessment engine has been created to identify opportunities for economic and health improvement within populations through a rigorous analysis of current and past utilization of the health care system by each member. Pharmacy and full medical claims data are utilized to identify the right patients and provide a baseline to measure the success of the CMM program over time. Specifically, a CLS intervention appropriateness score is calculated based on demographic, economic and health characteristics as well as medication utilization overlayed against a proprietary CLS database of more than 200,000 previously performed pharmacogenomic tests. A feedback loop that includes a peer-reviewed research knowledge base and CMM intervention outcomes informs machine learning algorithms for continuous improvement of the scoring system.

Regardless of where you are on your journey toward integrating health IT to support CMM in practice, these are a few helpful tips and recommendations.

Success Factors

- Medication counts, high-risk medications and objective clinical markers of medication therapy are additional ways to stratify patient populations using the electronic health record or pharmacy software if the resources are not available to create an individualized algorithm.
- Vertically integrated delivery networks often utilize robustly interwoven medical, clinical and economic data to manage large populations. Patients and members can be identified for a variety of services, including CMM, through various risk stratification data points.
- Assurance that claims entered are processed appropriately by the provider and coders to account for hierarchical condition category (HCC) coding optimization can improve accuracy of patient identification.
- Prudent and ongoing validation of risk-stratification tools involving multiple risk factor scoring systems will ensure sensitivity and specificity for targeting CMM to appropriate patients, with no high-risk patients falling through the cracks.

Lessons Learned

- Claims-based data from insurers and CMS may be delayed due to their validation methods. For example, CMS-based data tends to have a three-month or 90-day lag. Therefore, interventions are based on patients who are identified with risk-stratification that could be more retrospective.
- Patient identification for CMM services needs to happen across the continuum of care. However, a great deal of this focus has been predominantly in ambulatory care settings with health plans and through contracted medication management program partners. Unfortunately, not all patients are captured, or there is a lack of adequate follow-up to embrace the CMM model.
- Rolling medical claims and cost data measures can be effective patient identification tools. However, organizations need to understand how the timeliness of their data can help or hinder their efforts. Availability of claims-based data in near real time or when claims are validated or adjudicated is most helpful for risk stratification utilizing a claims-based methodology.
- Given the variety of EHR vendors used by independent provider practices, there is a need to create an algorithm that identifies high-risk patients for CMM based on certain medical conditions, medications and key demographic information. This could be implemented initially as a trial and, based on success, be pushed out to all the customers of the EHR vendor. This could also be tied to every prescription sent electronically to a participating pharmacy.

PILLAR THREE: Patient Engagement and Care Coordination

Capability Description Health IT should enable and facilitate the exchange of information between the patient and care team. Patients gather information in various forms that can inform clinical decisions regarding medication therapy. The tools should have the ability to integrate the digital therapeutic health information from a patient with the pharmacogenomic data that clinicians currently receive as a separate, cumbersome report. These types of information would come together in an EHR in a usable fashion.

Why is this a Pillar? Health IT can facilitate bidirectional communication between the clinical pharmacist, prescriber and patient. Clinicians should have the ability to effectively and efficiently communicate across the continuum of care. In many cases, the patient's care team, including the clinicians providing comprehensive medication management (CMM), are not co-located and do not share a single EHR platform. It is imperative that health IT has the ability to enable bidirectional, secure health-related data exchange to promote optimal medication use.

Journey Toward a Mature Heath IT Support System to Optimize Medication Use

LEVEL 1 | **Ability to perform unstructured data exchanged via general communication tools in an ad hoc, ephemeral workflow**

- Independent trained medication safety consultants partner with organizations to coordinate care and identify patients within the population that may have a medication safety risk. They leverage common HIPAA compliant communication and documentation tools to perform comprehensive medication safety reviews. These tools include teleconferencing tools like doxy and secure office software, email and drives to safeguard protected health information (PHI). Some examples are Google's G Suite, Microsoft Office 365 and Quick Base.
- Some health systems have granted pharmacies access to their EHR through a secure portal. These pharmacists can enter results of questionnaires, vitals obtained, send a note to the clinic care team or enter a clinical note following a CMM visit.

LEVEL 2 | **Ability to conduct semi-structured data exchanged via a secure, managed communication with a minimally orchestrated workflow**

- At Orange Regional Medical Center, clinicians capture medication-related information using an SBAR template in the notes section of the EHR. Patient information is automatically included along with current medications and labs. Pharmacy recommendations or consult notes to the health care team are communicated and visible to all care providers (e.g. antimicrobial stewardship recommendations or opioid stewardship notes). Secure chat is another communication tool within the EHR for quickly resolving non-urgent medication related issues.

- Through various patient portals, an EHR can facilitate communication by allowing patients to complete questionnaires like the PHQ-9 or the Asthma Control Test™ that automatically get entered into the EHR. This can reduce administrative and data entry burden, helping notify care team members more quickly and inform medication-related clinical decisions.

- Consumer medical devices and apps can aid patients in managing their medications and medical conditions, from reminding patients to take medications at the appropriate time to bringing the patient into their care management team. For example, there are a number of blood glucose monitors that communicate with smartphone apps to help the patient better manage their diabetes. App-based systems, like Glooko, exist to send blood glucose monitor measurements directly into the clinician's EHR to aid in diabetes management.

Some of the apps allow the measurement history to be printed or emailed to the clinician.

LEVEL 3 | Ability to carry-out structured, annotated data exchanged via a secure, managed communication platform with orchestrated workflows specific to CMM

- Independent clinicians providing CMM can leverage EHR cloud systems like Practice Fusion to create structured documentation and manage and track communication with their clients in a concierge engagement. Leveraging cloud EHR systems for solo or small consultancies gives them a robust HIPAA-compliant, high-trust, cloud-based system to manage their documentation and communication needs, which will meet regulatory compliance standards and practices.

- At Tabula Rasa HealthCare, the platform MedWise™, was created to focus on providing and documenting CMM cases. The system provides the ability to create queues and prioritize by several factors. The provided resources are then codified using SNOMED coding standards. This results in a clear output to engage patients in the form of a medication action plan, medication schedule refrigerator report and prescriber recommendation action plan. The patient uses these documents to communicate with their prescriber and discuss the action plan.

When an encounter is performed, the documentation process follows a care plan that consists of goals, recommendations and actions/activities.

- Medicare Advantage and Managed Medicaid plans collaborate with home- and community-based service organizations and leverage software systems like Aerial from Medecision to orchestrate patient engagement. They do this through communication and documentation workflows for their community partners, including clinicians providing CMM, to create efficient processes and consistent quality recommendation standards for their patient population.

LEVEL 4 | Ability to execute structured, annotated, or machine learning enhanced data exchanged via a secure, managed communication platform with orchestrated, automated workflows specific to CMM

- Using Amazon's Comprehend Medical, the prescriber enters their notes into the EHR, which automatically segments notes into goals, recommendations and activities with annotations using SNOMED and ICD10 codes. Using the derived structured data, workflows are automatically set into motion across disparate systems with appropriate care partners.

- At the University of Florida, machine learning was found to outperform traditional statistical models at predicting risk for opioid overdose. A collaboration between researchers from University of Washington and Taiwan have demonstrated potential use of machine learning in differentiating antidepressant treatment responders from non-responders prior to initiating therapy for major depression. More collaborations from pharmacogenomics and machine learning researchers are expected in the future. These machine learning models need to work their way through standardized validation steps but are expected to provide consistent quality and large-scale learnings to increase the bandwidth capability of the trained clinicians providing CMM.

With rapid advancements in artificial intelligence/ machine learning and pharmacogenomics, universities are researching the potential to leverage deep learning to improve clinical outcomes.

Regardless of where you are on your journey toward integrating health IT to support CMM in practice, these are a few helpful tips and recommendations.

Success Factors

- Adoption of industry standard terminology systems, such as SNOMED and RxNorm, and data exchange formats, such as FHIR, can streamline data exchange and care coordination.
- Adoption of a workflow engine allows for orchestration, repeatability, automation and observability of processes and workflows.
- Secure communication portals or platforms between care team members and patients reduce administrative burden and can organize various communications in appropriate places within the EHR.

Lessons Learned

- By tracking utilization of portal access, documentation mechanisms and communication tools, processes and pathways can uncover user experiences and opportunities for improvement.
- Create a continuous improvement feedback loop. By recording interactions in a codified way, analytics can be generated to provide feedback cross-referenced with long-term outcomes.
- Patient and care team effort needs to be minimized, streamlined and automated to reduce potential quality challenges in the delivery of service. The access and portal process should not be such a burden on the prescribers, pharmacists or patients, that it impedes their ability to adopt the technology and deliver value.

PILLAR FOUR: Outcomes—Economic, Clinical and Humanistic Outcomes (ECHO)

Capability Description Purpose-built IT infrastructure or software can drive consistency and demonstrate the value of CMM practice. Health IT ensures the capture of the compliance and regulatory reporting requirements unique to CMM services. These tools should have the ability to gather outcomes on the identification and resolution of medication therapy problems in a systematic way. Health IT capabilities should have the ability to track patient attribution, patient engagement and offer point-of-care insight to the clinician to optimize medication therapy. Additionally, health IT capabilities must connect the contribution of CMM services to the quadruple aim of our health care system.

Why is this a pillar? Value-based care requires data to support quality performance benchmarking. Widespread adoption of health IT standards for CMM outcomes creates the ability to gather and analyze information across systems, health plans, care settings and populations. The ability to identify and align CMM services to those that provide valuable clinical and economic changes for our populations is critical for continued validation and improvement. For statistical-based approaches to be used to describe CMM outcomes, the longitudinal measurement of specific and definable metrics with matched, identified control cohorts are necessary.

Journey Toward a Mature Heath IT Support System to Optimize Medication Use

LEVEL 1 | **Ability to work with publicly available data and re-purposed internal reporting mechanisms**

- In order to provide community-based clients insight into the value delivered by a CMM program, independent brokers or consultants can provide cost analysis reports and track hospitalizations, emergency department visits and falls. These strive to provide the client with insight into the total economic and clinical impact of their population. These consultants can showcase the value of CMM services by tracking these factors over time together or delineate from clients who are not providing CMM services as a benefit by reporting on the economic and clinical changes over time.

- CMM practices can evaluate patient experience with a survey. These qualitative evaluations can be combined into a quantitative summary of patient experience. Other standardized patient reported outcomes measures can be utilized as well. An example of this is the Morisky Medication Adherence Scale (MMAS), which can differentiate a change in adherence over time.

- Patient engagement in CMM services can be identified through placing a specific diagnosis on the EHR problem list or identifying the pharmacist as a member of the patient's care team. Reports can then be run to show which patients have that pharmacist on their care team, or more generally, patients with that CMM-specific diagnosis.

LEVEL 2 | Ability to perform ad hoc reporting extracting combined data elements from a single source

- Given a CMM encounter marker, multiple data points can be pulled related to these patients who received CMM services. Patient demographics, objective lab values and simple numbers related to the medication therapy problems (MTP) identified and resolved can be used to show a roster of CMM practice activity over a static time frame. These data can be exported to a spreadsheet which can be filtered to evaluate certain data points.
- Affinia Health Network leverages clinicians across a clinically integrated network (CIN) to meet with targeted patients to provide medication review and management services across 50+ primary care offices. Goals include showing improvement in total cost of care, appropriate utilization of pharmaceuticals, inpatient admission and emergency department visit volumes through medication management services. In this example, the stakeholders are the CIN and medical group executive leadership and pharmacy department leadership.

LEVEL 3 | Ability to execute standardized reporting and dedicated CMM analytics utilizing longitudinal data with appropriate controls

- Analytics and purpose built health IT can collate outcomes specific to a CMM practice. Smartforms, flow charts and discrete data elements are common tools used to track medication therapy problems identified by medication, diagnosis and Medication Therapy Problem (MTP) Categories. Additionally, MTP resolution codes can be gathered to ascertain utilization of collaborative practice agreements or how often it was necessary to involve the prescriber. This data can be reported longitudinally by a unique patient and in aggregate. These are standard reports generated on a specific timeframe or able to be run on-demand.
- An integrated health system may leverage utilization data to measure improved health outcomes for a patient engaged with CMM. This includes monitoring clinical quality outcomes, hospitalizations and readmission rates within 30 days post-discharge. Patients are also monitored for rates of emergency department visits vs. primary care. Additional standardized reports may help identify underutilized resources within the system to support CMM services, allowing other providers to rebalance workloads that promote better alignment across interdisciplinary health care teams and expertise. Patient-centered data may be equally as important to organizations as the total cost of care. CMM services may also correlate to higher rates of patient satisfaction, engagement and improved health literacy.
- In development is the hc1 PGx Advisor® that would align pharmacists, prescribers and labs. The solution will offer a unified platform combining medication management, pharmacogenomics and clinical lab data. An "Rx Scoring Report" shows the number of individuals who are likely to be on the wrong medications and quantifies the wasted annual spending associated with those incorrect drugs. It utilizes a real-time database of drug interactions, U.S. Food and Drug Administration (FDA) warnings and pharmacogenomic markers combined with prescription and medical claims, formulary and demographic data. In the pilot phase, the solutions looks to gain continuous insight into health care savings through continuous monitoring of prescription and medical claims to provide leaders with real-time measurement.

An individual's unique genetic profile influences their ability to metabolize prescription drugs, ensuring patients are prescribed the most effective medications with the least amount of risk is critical to driving improved patient outcomes and reducing medical costs.

LEVEL 4 | Ability to create linked, multi-directional data flow that informs a virtuous cycle of implementation, measurement, evaluation and improvement.

- In Tabula Rasa HealthCare's MedWise™ program, as safety reviews are performed, the recommendations are captured with SNOMED codes to codify the recommendations in a measurable way. At the same time the analytics

team receives medical claims from the client to correlate the economic, humanistic and clinical outcomes in a graphical result, so that the impact of the medication management program can be measured.

- Coriell Life Sciences fully administers a CMM program that incorporates PGx testing and comprehensive medication review to members of a state-run pension plan. Real-time data analysis and dashboards are made available based on population data analysis, pharmacist suggestions empowered by clinical decision support, communications with each patient's health care prescriber(s), claims data and quadruple aim outcomes. Immediate evaluation and feedback provides the opportunity to make recommendations, adjustments and communicate with a network of patients, pharmacists, physicians, payors and other stakeholders. Using a defined methodology reviewed and attested by third party auditors, longitudinal evaluation of data from both the intervention cohort and a risk-normalized comparison cohort provides ECHO results reported quarterly. Open and coordinated dialog and reporting with the patients, pharmacists, prescribing physicians, payors and hospital systems completes a feedback loop of evaluation, change and improvement.

Regardless of where you are on your journey toward integrating health IT to support CMM in practice, these are a few helpful tips and recommendations.

Success Factors

- Standardized metrics for CMM services will simplify measurement of objective outcomes across sectors and platforms.
- Reportable results in plain language can improve dissemination and communication to broad audiences of stakeholders.
- CMM influence on patient reported data including non-medication related factors (e.g. social determinants of health, quality of life, access to care/food/resources and cultural impacts to organizations that utilize a patient-centered care model) are helpful to engage public health partners, patient advocacy communities and employer groups.
- For health-plan driven CMM programs especially, it is tremendously favorable to demonstrate CMM alignment to impact on HEDIS® measures, Star Ratings and other quality markers.

Lessons Learned

- Further development of health IT systems and applications for CMM-specific data analysis will require collaborative buy-in from IT, data scientists, researchers, health care professionals, health plans and patients.
- Rolling medical claims and cost measures can be effective outcome evaluation tools. Recognize that health care claims data have intrinsic time lags that can influence the ability to effectively measure and report certain ECHO outcomes.
- Leveraging standard reporting codes like SNOMED CT and LOINC®, can create a continuous improvement feedback loop, when cross-referencing with cost-analysis from pharmacy benefit managers and insurance providers.
- Evaluation of changes and impacts to the total cost of care should consider decreased costs but also be aware of potential increased costs for newly engaged members receiving better care and services from the health system/organization. Thus both short- and long-term measurements are important to better understand and describe the impacts of CMM programs.