Electronic Health Record Best Practices for Managing Patients with Hypertension and Diabetes

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Introduction

One in every three American adults has hypertension (HTN)[1] and the Centers for Disease Control and Prevention (CDC) estimates that one in every three Americans could have diabetes by 2050.[2] These diseases pose a significant threat to quality of life and impose a heavy financial burden on our health care system. Because of the current and prospective impact to the health of the United States (US) population, both hypertension and diabetes are a major focus of quality improvement programs such as Meaningful Use (MU) and the Merit-based Incentive Payment System (MIPS). Both of these federal programs emphasize the appropriate management of patients using technology. *See Appendix I for a summary of MU and MIPS requirements.*

Electronic Health Records (EHR) enable a variety of technology tools to improve health care delivery and management of chronic diseases such as hypertension and diabetes. This informational document describes six EHR tools that help health systems identify, engage, track, and monitor patients:

- Population health management
- Clinical decision support (CDS)
- Patient portals
- Health information exchange (HIE)
- Care coordination
- ePrescribing

For each technology best practice, we have appended a list of MU (Modified Stage 2) and MIPS measures and objectives that may be satisfied through effective use of the tool. *In addition to the information within this document, the Million Hearts EHR optimization guides for Allscripts, Cerner, and NextGen EHRs may be useful.[3]*

Population Health Management

Population health management is defined[4] as managing "the health outcomes of a group of individuals, including the distribution of such outcomes within the group" and leverages electronic tools, data, and engagement techniques. Populations with chronic diseases, such as hypertension and diabetes, particularly benefit from the coordinated management of care and tracking and monitoring of fluctuations in key disease markers. Organizations are able to measure how well care is being delivered to a particular patient population in order to prevent disease or help patients stay as healthy

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[1] Centers for Disease Control and Prevention. "High Blood Pressure Facts." https://www.cdc.gov/bloodpressure/facts.htm

[2] State of Obesity. "Diabetes in the United States." https://stateofobesity.org/diabetes/

[3] HealthIT.gov. "Resource Center: Million Hearts." U.S. Department of Health & Human Services. https://www.healthit.gov/providers-professionals/million-hearts

[4] Kindig D. "What is Population Health?" Improving Population Health. http://www.improvingpopulationhealth.org/blog/what-is-population-health.html

as possible. Many health care organizations have implemented disease registries to support effective population health programs by serving as the backbone for defining the population(s) of focus. A disease registry is a collection of information about individuals, usually focused on a specific diagnosis or condition, and may be integrated into an EHR.[5] Nevertheless, while EHRs typically provide some population health management capabilities, many health care organizations are adopting electronic systems specifically designed for this function to complement their EHR.

Population health activities include outreach, screening, public education, self-management support, and treatment. These modes of health care can be applied to both diabetes and hypertension. Once patients are identified using population health management tools, the care team can partner with them to manage their health, which may include supporting patients in accessing services beyond the four walls of the clinic.

It is important to keep in mind, implementing population health technology is a long-term investment and results are achieved over time. An article by Dr. Jonathan Niloff in HealthcareITNews outlines five steps to a successful implementation.[6]

1. Centralizing access to data is important and can be the biggest initial barrier to adoption. Often, data resides in clinical silos and across disparate IT systems making it difficult to access and aggregate.
2. Once information has been connected, the next step is to begin analysis of the data. By applying analytics, an organization can uncover populations in need of improved care delivery and begin to take actions towards better outcomes. Categories of analysis often include high utilization, significant comorbidities, specific clinical factors such as A1c and blood pressure control, substance abuse and/or mental health issues, and socioeconomic criteria such as homelessness.
3. Once patient populations are identified, interventions such as targeted preventive services, or intensive chronic care management, may be implemented.
4. Next, patient engagement is critical. Empowering patients to take an active role in their care is an important enabler of any population health management strategy.
5. Finally, supporting the ongoing program is a critical step in successful implementation. Providing adequate personnel and IT solutions can make the difference in the impact of a population health management program. Another online article (*Health IT Analytics*) introducing Population Health Management is

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[5] National Institutes of Health. "List of Registries." https://www.nih.gov/health-information/nih-clinical-research-trials-you/list-registries
[6] Niloff J. "5 Steps to Population Health Management." Healthcare IT News. 11 February 2015. http://www.healthcareitnews.com/blog/5-steps-population-health-management

referenced below[7]. Additional resources are available through the Learning and Action Network[8] and Quality Innovation Network.[9]

MU requirements and MIPS measures related to population health incentivize data aggregation and analysis. Because an effective population health management strategy often relies on the use of disease registries, data reporting for MU, MIPS, and other quality improvement programs is facilitated by the use of population health management. For example, MU (eCQM CMS122v6) requires reporting of the *percentage of patients 18-75 years of age with diabetes who had hemoglobin A1c > 9.0 percent during the measurement period.*

See Appendix II for MU/MIPS Population Health Management Related Measures.

Point of Care Clinical Decision Support

Electronic clinical decision support (CDS) tools at the point of care improve the ability of providers to manage patient outcomes. CDS tools such as standard order sets, alerts for potentially dangerous situations, and evidence-based care suggestions offer efficient and timely information to inform treatment decisions and the patient's care plan.[10] Alerts can be triggered for key disease markers, such as high levels of hemoglobin A1c for patients with diabetes and elevated blood pressure for patients with hypertension.[11] Providers may also receive alerts for overdue preventive care such as immunizations or wellness checks.

In 2015, the California Health Care Foundation (CHCF) highlighted CDS efforts of Petaluma Health Center (a member of the Redwood Community Health Coalition).[12] The Center successfully paired CDS with a comprehensive team-based approach to identify and treat patients with hypertension. By leveraging the evidence-based protocols and timely availability of clinical data, the organization was better able to control blood pressure in its patient population.

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[7] Bresnick J. "How to Get Started with a Population Health Management Program." Health IT Analytics. 14 April 2017. https://healthitanalytics.com/features/how-to-get-started-with-a-population-health-management-program

[8] Health Care Payment Learning & Action Network. "Health Care Payment Learning & Action Network." https://hcp-lan.org/

[9] Quality Improvement Organizations.. "Quality Improvement Organizations." http://qioprogram.org/

[10] Agency for Healthcare Research and Quality. "Clinical Decision Support (CDS)." U.S. Department of Health & Human Services. https://digital.ahrq.gov/ahrq-funded-projects/current-priorities/clinical-decision-support-cds

[11] Agency for Healthcare Research and Quality. "Computerized Disease Registries." U.S. Department of Health & Human Services. https://healthit.ahrq.gov/key-topics/computerized-disease-registries

[12] California Health Care Foundation. "Controlling Blood Pressure Through Better Clinical Decision Support." 16 January 2015. http://www.chcf.org/projects/2014/controlling-blood-pressure-cds

An excellent tool for implementing CDS was developed by the Centers for Medicare and Medicaid Services (CMS) eHealth University.[13] The guide helps organizations think through the type of information available, the individuals who should receive that information, the channels with which the information may be delivered, and the workflow considerations of implementing CDS. In addition to the CMS document, HealthIT.gov offers guidance in five parts on their website linked below.[14] A key consideration when implementing CDS is involving the right people up front, especially clinical partners, to set goals for the quality improvement program.[15] Assessing the organization's readiness to implement, and assembling a team, are critical next steps. Another key consideration is implementing CDS in a way that combats or prevents alert fatigue among providers. Alert fatigue is defined as provider desensitization to reminders and alerts.[16] The negative effects may include ignoring or failing to respond appropriately to CDS warnings. The Agency for Healthcare Research and Quality (AHRQ) has developed five suggested methods to avoiding alert fatigue[17]:

- Increase alert specificity by reducing or eliminating clinically inconsequential alerts.
- Tailor alerts to patient characteristics and critical integrated clusters of physiologic indicators. For example, incorporate renal function test results into the alert system so that alerts for nephrotoxic medications are triggered only for patients at high risk.
- Tier alerts according to severity. Warnings could be presented in different ways, in order to key clinicians to alerts that are more clinically consequential.
- Make only high-level (severe) alerts interruptive.
- Apply human factors principles when designing alerts (e.g., format, content, legibility, and color of alerts).

As is true with many IT implementations, other important considerations include documenting the workflow and providing proper training and program support.
CDS is explicitly called out by MU and MIPS as an important capability. MU Objective 2 requires the use of "clinical decision support to improve performance on high-priority health conditions." [18] To satisfy this objective, five CDS interventions must be

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[13] eHealthUniversity. "Clinical Decision Support: More than Just 'Alerts' Tipsheet." Centers for Medicare & Medicaid Services. https://www.cms.gov/regulations-and-guidance/legislation/EHRincentiveprograms/downloads/clinicaldecisionsupport_tipsheet-.pdf
[14] HealthIT.gov. "Clinical Decision Support: What is Clinical Decision Support (CDS)?." U.S. Department of Health & Human Services. https://www.healthit.gov/topic/safety/clinical-decision-support
[15] Byrne C, Sherry D, Mercincavage L, Johnston D, Pan E, Schiff G. "Advancing Clinical Decision Support: Key Lessons in Clinical Decision Support Implementation." U.S. Department of Health & Human Services. https://www.healthit.gov/sites/default/files/acds-lessons-in-cds-implementation-deliverablev2.pdf
[16] Agency for Healthcare Research and Quality. "Alert Fatigue." U.S. Department of Health & Human Services. https://psnet.ahrq.gov/primers/primer/28/alert-fatigue
[17] *Ibid.*
[18] Centers for Medicare and Medicaid Services. "Eligible Professional Medicaid EHR Incentive Program Modified Stage 2 Objectives and Measures for 2017: Objective 2 of 10." https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/MedicaidEPStage2_Obj2.pdf

implemented in addition to drug-drug and drug-allergy checks. MIPS requires CDS prompts to facilitate fall screening and assessment programs (IA_PSPA_21).
See Appendix II for MU/MIPS Clinical Decision Support Related Measures.

Patient Portals

Patient portals are an important piece of an overall strategy to better manage chronic conditions such as HTN and diabetes, whether through an EHR or with a stand-alone personal health record vendor. Portals allow patients to stay attuned with their health care needs, including the ability to schedule appointments and receive reminders for important upcoming visits in a variety of ways including email, text, and automated phone messages. Allowing patients to access laboratory results and message providers securely offers convenient options for patients to engage in their health care. Enabling medication refills via an online patient portal may improve medication adherence and can result in improved clinical outcomes.[19] Online portal access to educational material for eating plans, smoking cessation, stroke information, and self-management[20] is a key strategy in patient engagement. The National Learning Consortium has developed a guide on how to optimize patient portals.[21]

Patient adoption and utilization of patient portals requires a marketing strategy in addition to populating the portal with relevant information. An important marketing opportunity exists before the patient visit and at the point of care, during which patients can be informed of the value of using the portal. Incorporating education around portal availability while the patient or patient's family member or caregiver is in the clinic ensures the ability to capture critical information such as email addresses, or assist the patient to enroll in the portal. A simple guide on how to navigate the portal to access information should be included in the marketing material. To drive meaningful utilization of the portal, organizations need to set policies to allow timely availability of test results and education. This may also include messaging associated with information within the portal or notifications that new data is available. Appointment and medication management, in addition to secure messaging, are important features to attract and retain patient users. Although the point of care is the best time to promote activation, ongoing coordinated marketing is necessary for sustained uptake of the portal. Pairing face-to-face strategies with email- and paper-based campaigns will promote ongoing

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[19] Sarkar U, Lyles C, Parker M, Allen J, Nguyen R, Moffet H, Schillinger D, Karter A. (2014) "Use of the Refill Function through an Online Patient Portal is Associated with Improved Adherence to Statins in an Integrated Health System." *Medical Care*, 52(3): 194-201.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4005993/

[20] Casey I. (2016) "The effect of education on portal personal health record use." *Online Journal of Nursing Informatics (OJNI)*, 20(2). http://www.himss.org/library/effect-education-portal-personal-health-record-use

[21] HealthIT.gov. "National Learning Consortium Fact Sheet: How to Optimize Patient Portals for Patient Engagement and Meet Meaningful Use Requirements." U.S. Department of Health & Human Services. May 2013.
https://www.healthit.gov/sites/default/files/nlc_how_to_optimizepatientportals_for_patientengagement.pdf

use of the tool. Sending post card reminders to patients and caregivers highlighting new features or updates to the portal will also help.

Activating features that patients care about and populating the patient portal with relevant and timely information will help facilitate adoption and utilization. The top activities that patients value in a portal include:[22]

1. Schedule appointments
2. View test/laboratory results
3. View and pay bills
4. View Medications/request refills
5. Messaging

For further details on how to implement patient portals, reference the National Learning Consortium guide. [23]

Implementing a patient portal satisfies a number of MU and MIPS requirements. Some requirements are directly addressed, such as MU Objective 8 (Patient Electronic Access), while others are supported indirectly by deploying a patient portal. Adequate control of blood pressure, (MU eCQM 165v6) for example, can be achieved (in-part), by empowering patients to engage in health care decision making and managing medications online. The patient portal plays a major role in encouraging self-management and keeping chronic and acute conditions under control.

See Appendix II for Meaningful Use/MIPS Patient Portal Related Measures.

Health Information Exchange Participation

Comprehensive population health management often requires health care organizations to have access to data originating outside the four walls of any given clinic. Traditionally, data generated by other provider organizations has been siloed in each individual organization's EHR. Data sharing is typically limited to point-to-point data sharing models, such as faxing. These methods do not always ensure that all relevant data is available at the point-of-care or to care managers when needed. Through industry-wide standardization of health care data, certified EHRs are now increasingly able to share data across provider organizations via health information exchange (HIE), often through participation in Health Information Organizations (HIO) that facilitate HIE activities in any given community.

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[22] Pennic F. "Patient Portal Features: Which Is the Most Beneficial & Frustrating for Consumers?" *HIT Consultant*. 19 August 2014. http://hitconsultant.net/2014/08/19/patient-portal-features-which-is-the-most-beneficial-frustrating/
[23] *Ibid.*

HIE participation and use enhances the ability for robust population health management, since data on the patient's visits, tests, and hospitalizations from external providers help to inform the patient's overall treatment, care plan, and longitudinal health record. The Office of the National Coordinator (ONC) has identified five overarching benefits of HIE:[24]

1. improves quality and patient safety by reducing errors due to lack of available information;
2. improves efficiency by reducing duplicative testing and services;
3. reduces administrative complexity;
4. better engages patients by reducing the time they spend providing historical information; and,
5. supports community-based organizations by sharing relevant clinical information.

In addition, HIE provides a useful tool for aggregating data for use in advanced population health management use cases such as clinical analytics.[25]

Getting started with HIE can be complex; there are a variety of HIE models, business approaches, and methods of participation.[26] Before considering HIE you should assess the needs of your organization regarding access to externally generated data, as well as what options are available in your community to facilitate data sharing. In many cases, the most useful data an organization can receive from outside its four walls is the data generated by health care providers that are geographically proximate. For this reason, HIOs often form regionally to facilitate data sharing among groups of provider organizations that share a common referral-network. National data-sharing networks are also emerging that enable EHRs to connect directly with one another (e.g. eHealthExchange, Carequality, and Commonwell). Experts recommend organizations take the following questions and take high-level steps to assess needs around HIE, as well as options in the community:[27] [28]

1. What patient health data do you need that you are not currently receiving today?
2. Are you currently receiving certain data that could be delivered more efficiently, or in a more automated fashion?

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[24] HealthIT.gov. "Why is health information exchange important?" U.S. Department of Health & Human Services. https://www.healthit.gov/faq/why-health-information-exchange-important
[25] Kim KK, Hack LL, Browe DK, Minch DA, Logan HC. (2013) "HIE Toolkit for Provider Decision Making." Broadband Technology Opportunity Program, University of California Davis and CalHIPSO.
[26] HealthIT.gov. "Health Information Exchange (HIE): Getting Started with HIE." U.S. Department of Health & Human Services. https://www.healthit.gov/providers-professionals/health-information-exchange/getting-started-hie
[27] Kim et al.
[28] UC Davis Institute for Population Health Improvement. (2013) "California Health eQuality Provider Guide: Adopting HIE to Add Value and Improve Patient Care." California Health and Human Services Agency.

3. What use-cases will HIE ideally support for you? For instance, do you have a need to see as much data as possible on a given patient at the point-of-care, or would specific, targeted information be more useful?
4. Is your organization seeking to integrate outside patient health data directly into your EHR?
5. Is there an HIO that is operating in the community that meets your organizational needs?
6. What types of integration with HIE does your EHR vendor support?

The answers to these questions should help to form a business case for HIE that can guide an organization's strategy. In many cases, organizations that pursue an HIE strategy that is limited to meeting the minimum HIE requirements outlined in MU and MIPS without first outlining the business-case for their organization do not see value in HIE. This is because the minimum requirements for these programs are mapped to what is *easy to achieve* from a technology standpoint, rather than what might be *most optimal for health care organizations seeking to effectively manage their patient populations.*

As with other best practices described in this document, some measures are addressed directly by enabling HIE (MU Objective 5) and bilateral exchange of patient information (MIPS A_CC_13), depending on the HIE approach implemented, while others are supported indirectly. Controlling blood pressure and hemoglobin A1c levels, for example, can be done more effectively by having a full picture of the patient's health data available for clinical decision-making and information reconciliation.

See Appendix II for Meaningful Use/MIPS Health Information Exchange Related Measures.

Care Coordination

Care coordination is defined as the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient's care to facilitate the appropriate delivery of health care services.[29] The often-used phrase "care management" is generally synonymous with this definition of care coordination. EHR-enabled care coordination allows for more efficient integration of the care team's clinical interactions with a patient.[30] Care coordination modules may also include non-clinical interactions such as community-based services. This tool broadens any single care provider's view and allows for improved information sharing and clinical planning.

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[29] McDonald KM, Sundaram V, Bravata DM, Lewis R, Lin N, Kraft S, McKinnon M, Paguntalan H, Owens DK. (2007) *Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies (Vol. 7: Care Coordination).* Rockville, MD: Agency for Healthcare Research and Quality. https://www.ncbi.nlm.nih.gov/books/NBK44012/
[30] HealthIT.gov. "Benefits of EHRs: Improved Care Coordination." U.S. Department of Health & Human Services. https://www.healthit.gov/providers-professionals/improved-care-coordination

Having a care coordination EHR module or standalone vendor allows primary care providers, hospitals, specialists, behavioral health providers, pharmacists, community-based organizations, health plans, case managers, and community health educators to coordinate efforts and better impact outcomes.

A successful care coordination strategy involves considering a variety of important factors. At the center of care coordination is the patient's care plan. Care plans document the assessment of patients' needs and goals, help to select appropriate interventions, and evaluate the impact of interventions.[31] EHRs often have built-in care plan templates that document problems, goals, and interventions. In addition to the default templates available within the EHR, it may be useful to implement additional approaches. The AHRQ has developed a guide outlining the main elements of an effective care plan. Some major elements beyond problems, goals, and interventions include patient education, medication lists, plans tailored to the patient/family context, community-based support or services, and the status of permission to exchange information with each of them.[32] Another useful reference is the US Health Resources and Services Administration guide to components of an integrated behavioral health/primary care plan, also called the treatment and recovery plan, navigation of services, and/or disease management plan.[33]

Care coordination goes beyond just establishing a care plan: a true care coordination strategy involves sharing information and building an operational model that supports the deliberate organization of patient care activities. Therefore, additional factors to consider include staffing models, HIT tools, referral relationships, and a means to exchange health information. Resources for implementing care coordination are available through the Patient Centered Primary Care Collaborative (PCPCC)[34] and the Safety Net Medical Home Initiative.[35]

Similar to MU, care coordination is a major area of MIPS performance measurement (beneficiary engagement and patient safety are two other areas). Both programs emphasize the coordinated delivery of services across health care and community-

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[31] Freeman R. "What Does the Comprehensive Shared Care Plan Mean for Nursing?" *HealthITBuzz*. 8 May 2017. https://www.healthit.gov/buzz-blog/interoperability/comprehensive-shared-care-plan-nursing/
[32] Agency for Healthcare Research and Quality. "The Playbook: Develop a Shared Care Plan." U.S. Department of Health + Human Services.
https://integrationacademy.ahrq.gov/products/playbook/develop-shared-care-plan
[33] SAMHSA-HRSA Center for Integrated Health Solutions. "Care Planning and Coordination." U.S. Department of Health & Human Services. https://www.integration.samhsa.gov/workforce/care-planning-care-coordination
[34] Patient-Centered Primary Care Collaborative. "PCPCC Webinars/Videos."
https://www.pcpcc.org/webinars
[35] Horner K, Schaefer J, Wagner E. (2013) "Care Coordination: Reducing Care Fragmentation in Primary Care." In: Phillips KE, Weir V, eds. Safety Net Medical Home Initiative Implementation Guide Series, 2nd ed. Seattle, WA: Qualis Health and the MacColl Center for Health Care Innovation at the Group Health Research Institute. http://www.safetynetmedicalhome.org/sites/default/files/Implementation-Guide-Care-Coordination.pdf

based organizations. Care coordination touches on a variety of MU and MIPS requirements, some directly and others indirectly. A MIPS requirement directly satisfied is the implementation of practices/processes for developing regular individual care plans (IA_CC_9).

See Appendix II for Meaningful Use/MIPS Care Coordination Related Measures.

ePrescribing

ePrescribing is the ability to electronically create and send a prescription to a pharmacy. CMS considers ePrescribing an important element in improving the quality of patient care. There are a variety of benefits to prescribing electronically:

1. Patients do not need to drop off written prescriptions. Rather, the pharmacy of the patient's choosing is selected by the prescribing provider in dialogue with the patient and an order is sent immediately, often reducing the patient's wait time for prescription fulfillment.
2. Patients and providers may have conversations about generics and insurance coverage at the point of care.
3. From a patient safety perspective, pharmacies do not need to read handwritten prescriptions, thus reducing the opportunity for incorrect drugs or doses.
4. ePrescribing allows for viewing medication history and more effective reconciliation.
5. Prescribing providers will have secure access to a patient's prescription history, so they can be alerted to potential drug interactions, allergies, duplicate therapies, and other warnings.[36]
6. An EHR's ePrescribing module may work in tandem with the clinical decision support module to provide such alerts.

When implementing ePrescribing, there are a number of key considerations. First, understand the abilities and limitations of the ePrescribing system from an IT and provider workflow perspective. For example, does the system support the ability to electronically cancel a prescription that was sent in error? Alternatively, does the workflow allow for simple refill requests? Has the workflow been developed with providers and the pharmacy in mind? Other considerations include prescribing controlled substances and the types of providers to whom the tool will be available (i.e., physicians and nurses).[37] For additional information, ARHQ has developed implementation toolsets for ePrescribing for both pharmacies and providers.[38] The

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[36] Medicare.gov. "Electronic prescribing." U.S. Department of Health & Human Services. https://www.medicare.gov/manage-your-health/electronic-prescribing/electronic-prescribing.html

[37] Lamberts R. "Implementing E-prescribing." Physicians Practice. 06 July 2011. http://www.physicianspractice.com/pearls/implementing-e-prescribing

[38] Agency for Healthcare Research and Quality. "Implementation Toolsets for E-Prescribing." U.S. Department of Health & Human Services. https://healthit.ahrq.gov/health-it-tools-and-resources/implementation-toolsets-e-prescribing

toolsets include readiness assessments, sample workflow diagrams, and a vendor assessment tool.

As mentioned previously, CMS considers ePrescribing an important tactic to improve health care quality and efficiency. Electronic prescribing (MU Stage 2, Objective 4) requires that *more than 50 percent of permissible prescriptions written by the eligible providers (EP) are queried for a drug formulary and transmitted electronically* using a certified EHR. MIPS (ACI_EP_1) requires that *at least one permissible prescription written by the MIPS eligible clinician is queried for a drug formulary and transmitted electronically using certified EHR technology.*

See Appendix II for Meaningful Use/MIPS ePrescribing Related Measures.

Conclusion

The six EHR tools or add-ons; population health management, CDS, patient portals, HIE, care coordination and ePrescribing; are intended to identify, engage, track, and monitor patients, particularly individuals with chronic or complex problems. However, in isolation their value is diminished compared to how the tools offer complementary functions when used together to aid providers and staff in identifying, engaging, and managing diseases and conditions.

Building an Integrated Environment

The table below shows the many points of overlap in the clinical processes supported by the six EHR capabilities described in this report, demonstrating the potential for integrated use of these tools in support of improved care for patients with chronic conditions.

Features	Population Health Management	Clinical Decision Support	Patient Portal	HIE	Care Coordination	ePrescribing
Care coordination	✓			✓	✓	✓
Care plan adherence	✓	✓	✓		✓	
Clinical reconciliation of medication and problem lists				✓	✓	
Early intervention	✓	✓			✓	
Education	✓	✓	✓			
Engagement	✓		✓			
Medication adherence			✓			
Medication safety		✓				✓
Public health reporting				✓	✓	
Safe and efficient transitions of care				✓	✓	
Self-management	✓		✓			
Shared decision-making					✓	

Appendix I: Meaningful Use

Meaningful Use (MU)

In Fall 2015, CMS modified requirements for participation in MU for years 2015 through 2017 and in 2018 and beyond[39]. The resulting modified Stage Two requirements are briefly described below.

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[39] Centers for Medicare and Medicaid Services. "2017 Modified Stage 2 Program Requirements for Providers Attesting to their State's Medicaid EHR Incentive Program." U.S. Department of Health & Human Services. https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Stage2MedicaidModified_Require.html

For eligible professionals (EPs), there are ten required objectives.

- Objective 1: Protect Electronic Health Information
- Objective 2: Clinical Decision Support Rule
- Objective 3: Computerized Physician Order Entry for Medication, Lab, and Radiology Orders
- Objective 4: e-Prescribing (eRx)
- Objective 5: Health Information Exchange
- Objective 6: Patient Specific Education Resources
- Objective 7: Medication Reconciliation
- Objective 8: Patient Electronic Access
- Objective 9: Secure Electronic Messaging
- Objective 10: Public Health

In addition to the ten objectives above, nine electronic Clinical Quality Measures (eCQM) covering at-least three of the six National Quality Strategy (NQS) domains listed below are required.[40]

1. Patient and Family Engagement
2. Patient Safety
3. Care Coordination
4. Population/Public Health
5. Efficient Use of Health Care Resources
6. Clinical Process/Effectiveness

Although CMS is not requiring a core set of eCQMs, two core sets of eCQMs—one for adults[41] and one for children[42]—that focus on high-priority health conditions and best practices for care delivery have been recommended.

Appendix II: Merit-based Incentive Payment System Summary

The federal Quality Payment Program has an option to choose the Merit-based Incentive Payment System (MIPS) track. Those who decide to pursue MIPS track may

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[40] Centers for Medicare and Medicaid Services. "2014 Clinical Quality Measures." U.S. Department of Health & Human Services. https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/2014_ClinicalQualityMeasures.html

[41] Centers for Medicare and Medicaid Services. "2014 Clinical Quality Measures (CQMs) Adult Recommended Core Measures." U.S. Department of Health & Human Services. https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/2014_CQM_AdultRecommend_CoreSetTable.pdf

[42] Centers for Medicare and Medicaid Services. "2014 Clinical Quality Measures (CQMs) Pediatric Recommended Core Measures." U.S. Department of Health & Human Services. https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/2014_CQM_PrediatricRecommended_CoreSetTable.pdf

earn a performance-based payment adjustment. Providers who bill Medicare more than $30,000 in Part B allowed charges a year and provide care for more than 100 Medicare patients a year are eligible to participate.

The MIPS performance period opened January 1, 2017 (although providers may start anytime between January 1 and October 2, 2017) and closes December 31, 2017. In 2017 organizations must record quality data and record how technology was used to support the practice.[43] Data from 2017 must be submitted to MIPS by March 31, 2018 to potentially earn a positive payment adjustment. Medicare will then provide feedback about performance, and depending on the data from 2017, Medicare payments in 2019 will be adjusted up, down, or not at all. Potential payment adjustments go into effect on January 1, 2019.

MIPS allows providers to choose the level of data submission from 2017. For example, if the minimum amount of 2017 data is submitted, providers will avoid a downward payment adjustment. If 90 days of 2017 data is submitted, providers may earn a neutral or positive payment adjustment and may even earn the maximum adjustment. If a full year of 2017 data is submitted, a positive payment adjustment may be earned.

For eligible providers, MIPS measures and activities fall into three categories:

1. MIPS Quality Measures (60 percent): Up to six quality measures including one outcome measure are required out of 271 options.[44]
2. MIPS Advancing Care Information (25 percent): Depending upon the EHR edition, there are two measure set options: the first requires reporting on 15 measures and the second on 11 measures.[45] CMS proposes six objectives and their associated measures as required reporting for a base score.[46]
3. MIPS Improvement Activities (15 percent): Of the 92 activity options providers must complete up to four improvement activities for a minimum of 90 days.[47]

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[43] Quality Payment Program. "The Quality Payment Program." U.S. Department of Health & Human Services. https://qpp.cms.gov/

[44] Quality Payment Program. "MIPS Quality Measures." U.S. Department of Health & Human Services. https://qpp.cms.gov/mips/quality-measures

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Appendix III: Meaningful Use/MIPS Related Objectives and Measures

EHR Capability	Related Meaningful Use/MIPS Objectives and Measures
Population Health Management	- Meaningful Use Stage 2, Objective 10, Public Health Reporting (immunization registries, syndromic surveillance reporting, specialized registry reporting) - In addition to the Meaningful Use Objective 10 there are several eCQMs that require reporting that may be facilitated by population health - MIPS IA_PM_2, Anticoagulant management - MIPS IA_PM_1, Participation in systematic anticoagulation program - MIPS IA_PM_13, Chronic care and preventative care management - MIPS IA_PM_5, Community engagement - MIPS IA_PM_4, Documentation of individualized glycemic treatment - MIPS IA_PM_15, Implementation of episodic care management practice improvements - MIPS IA_PM_16, Implementation of medication management practice improvements - MIPS IA_PM_14, Implementation of improvements in longitudinal care management - MIPS IA_PM_8, Participation in CMMI models such as Million Hearts Campaign - MIPS IA_PM_9, Participation in population health research - MIPS IA_PM_12, Population empanelment - MIPS IA_PM_11, Implementation of regular reviews of targeted patient population - MIPS IA_PM_3, Participation in RHC, IHS or FQHC quality improvement activities - MIPS IA_PM_10, Use of Qualified Clinical Data Registry (QCDR) data for quality improvement - MIPS IA_PM_7, Use of QCDR for feedback reports that incorporate population health - MIPS IA_PM_6, Use of Population Health Toolkit - MIPS ACI_PHCDRR_5, Clinical data registry reporting - MIPS ACI_PHCDRR_3, Electronic case reporting - MIPS ACI_PHCDRR_1, Immunization registry - MIPS ACI_PHCDRR_4, Public health registry reporting - MIPS ACI_PHCDRR_2, Syndromic surveillance reporting - There are dozens of MIPS quality measures that require registry reporting, for example a MIPS quality measure that overlaps with Meaningful Use eCQM CMS165v6 requires reporting of the percentage of patients 18-85 years of age who had a diagnosis of hypertension and whose blood pressure was adequately controlled (<140/90mmHg) during the measurement period.

EHR Capability	Related Meaningful Use/MIPS Objectives and Measures
Clinical Decision Support	• Meaningful Use Stage 2, Objective 2, Clinical Decision Support • Meaningful Use Stage 2, eCQM 165, Control high blood pressure • Meaningful Use Stage 2, eCQM 122, Control Hemoglobin A1c • Meaningful Use Stage 2, eCQM 22, Preventive Care and Screening • MIPS, IA_PSPA_21, Implementation of fall screening and assessment programs • MIPS, IA_BE_12, evidence-based decision aids to support shared decision-making • MIPS, IA_PSPA_16, Use of decision support and standardized treatment protocols
Patient Portal	• Meaningful Use Stage 2, Objective 6, Patient Specific Education • Meaningful Use Stage 2, Objective 8, Patient Electronic Access (VDT) • MIPS ACI_PEA_1, Provide patient access • MIPS ACI_CCTPE_1, View Download and Transmit (VDT) • Meaningful Use Stage 2, Objective 9, Secure Messaging • MIPS ACI_CCTPE_2, Secure Messaging • Meaningful Use Stage 2, eCQM 165, Control high blood pressure • Meaningful Use Stage 2, eCQM 122, A1c control • Meaningful Use Stage 2, eCQM 122, Improvement in blood pressure • MIPS IA_BE_3, Patient self-management
HIE	• Meaningful Use Stage 2, Objective 5, HIE • MIPS ACI_HIE_3, Clinical information reconciliation • MIPS ACI_HIE_2, Request/Accept summary of care • MIPS ACI_HIE_1, Send summary of care

EHR Capability	Related Meaningful Use/MIPS Objectives and Measures
Care Coordination	• Meaningful Use Stage 2, Objective 8, VDT • Meaningful Use Stage 2, eCQM 50, Closing the Referral Loop: Receipt of Specialist Report • Meaningful Use Stage 2, eCQM 142, Diabetic Retinopathy: Communication with the Physician Managing Ongoing Diabetes Care • MIPS ACI_CCTPE_3, Patient generated health data • MIPS ACI_CCTPE_2, Secure Messaging • MIPS ACI_CCTPE_1, VDT • MIPS IA_CC_12, Care coordination agreements that promote improvements in patient tracking across settings • MIPS IA_CC_10, Care transition documentation practice improvements • MIPS IA_CC_11, Care transition standard operational improvements • MIPS IA_CC_5, CMS partner in Patients Hospital Improvement Innovation Networks • MIPS IA_CC_3, Implementation of additional activity as a result of TA for improving care coordination • MIPS IA_CC_8, Implementation of documentation improvements for practice/process improvements • MIPS IA_CC_2, Implementation of improvements that contribute to more timely communication of test results • MIPS IA_CC_9, Implementation of practices/processes for developing regular individual care plans • MIPS, IA_CC_1, Implementation of use of specialist reports back to referring clinician or group to close referral loop • MIPS IA_CC_13, Practice improvements for bilateral exchange of patient information • MIPS IA_CC_14, Practice improvements that engage community resources to support patient health goals • MIPS IA_CC_7, Regular training in care coordination • MIPS IA_CC_4, Transforming Clinical Practice Initiative participation • MIPS IA_CC_6, Use of Qualified Clinical Data Registry to promote standard practices, tools and processes in practice for improvement in care coordination • MIPS Quality 325, Adult Major Depressive Disorder (MDD): Coordination of Care of Patients with Specific Comorbid Conditions • There are dozens of MIPS quality measures that require care coordination for example the MIPS quality ID 47 requires reporting on the percentage of patients aged 65 years and older who have an advance care plan or surrogate decision maker documented in the medical record or documentation in the medical record that an advance care plan was discussed but the patient did not wish or was not able to name a surrogate decision maker or provide an advance care plan.

EHR Capability	Related Meaningful Use/MIPS Objectives and Measures
ePrescribing	• Meaningful Use Stage 2, Objective 4, electronic prescribing • Meaningful Use Stage 2, Objective 7, medication reconciliation • MIPS ACI_EP_1, e-Prescribing • MIPS IA_PM_2, Anticoagulant management improvements • MIPS IA_PSPA_6, Consultation of the Prescription Drug Monitoring program