

Teaching Residents Population Health Management

November 2019

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Executive Summary

In primary care graduate medical education, physician training programs have recognized the importance of prioritizing new models of primary care to ensure that the future primary care workforce is adequate in supply, skilled at meeting the needs of patients and populations, and ready to meet the demands of high-value care. Population health management (PHM) is one building block of high-functioning, high-value primary care but is inconsistently understood and operationalized in practice and training settings.

On June 25-26, 2018, the AAMC sponsored “Population Health Management in Primary Care Residency Training Programs,” a meeting to describe PHM best practices in primary care residency teaching practices, with an emphasis on how residents are trained. The meeting included representatives of the AAMC, University of California, San Francisco Center for Excellence in Primary Care, and Centers for Disease Control and Prevention and leaders from seven residency programs in family medicine, internal medicine, and pediatrics that were identified as exemplary in key aspects of PHM. Intended for residency program directors, this report summarizes the components of PHM and offers vignettes describing how several of the seven participating residency programs implemented these components.

PHM refers to a systematic approach to ensuring that all members of a defined population (e.g., all patients receiving care at a primary care practice or all patients receiving care from their personal clinician) receive appropriate preventive, chronic, and transitional care.¹ PHM also helps providers identify and address health care inequities among subgroups within that population and includes screening and assistance for those clinic patients facing barriers to optimal health such as food insecurity, insufficient income, precarious or unsafe housing, and domestic or neighborhood violence. PHM broadens the traditional approach of focusing only on individual patients.

Meeting participants often referred to PHM as focused on the “small p” population and noted that it addresses the needs of clinic and clinician panels, while “large P” population health is concerned with populations not necessarily associated with one clinic, clinician, or health system. The distinction between PHM and population health is analogous to the distinction between health care and health.

The most effective way to train residents in PHM is through experiential learning — having residents take part in the day-to-day PHM workflows at their clinics. Meeting participants identified 10 interrelated requirements that collectively constitute a comprehensive PHM system.

Foundational Elements

1. **Data infrastructure:** Data infrastructure is the organizing, tracking, reporting, and making transparent demographic and clinical data within the electronic health record and specific data registries.
2. **Team-based care:** Team-based care is the process of creating teams with a variety of health professions represented, including physicians, nurse practitioners, medical assistants, pharmacists, social workers, and others.
3. **Community engagement:** Community engagement requires an understanding of local community needs and assets and the development of intentional partnerships with community members near the clinic, including residents, community-based organizations, and health departments.

Key Activities

4. **Panel management:** Panel management ensures that all patients in a population (the entire clinic's patients or the panel of one clinician or one team) have their routine evidence-based preventive and chronic care tasks performed in a timely manner, including recognizing and addressing inequities. This process includes addressing "care gaps" and actively engaging patients at risk of poor health outcomes while in the clinic and between visits.
5. **Patient risk stratification:** Risk stratification is the process by which patients are placed into subgroups that are determined by the area of focus of the clinic.
6. **Care management:** Care management for patients with chronic conditions, often done by nurses or pharmacists, assists patients with behavior change and medication management.
7. **Self-management support:** Self-management support helps patients acquire the knowledge, skills, and confidence to participate actively in the care of their chronic condition or for preventive health measures.
8. **Complex care management:** Complex care management is a program to identify high-needs and high-cost patients and systematically address these patient needs using a team-based interprofessional approach.
9. **Addressing social determinants of health:** Addressing social determinants of health requires systematic efforts to meet patients' social needs that may affect their well-being, as identified by the care team and denoted in the electronic health record.
10. **Ensuring health equity:** PHM can be fully realized only if an equity lens is applied to ensure a reduction of health disparities while improving health outcomes for the patient population. Addressing health inequities among a population requires stratifying clinical data by factors such as race/ethnicity, language, gender identity, sexual orientation, ZIP code, and insurance status to identify any gaps in health outcomes within subgroups of the patient population.

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Introduction

As the U.S. health care system increasingly prioritizes the value of services provided to patients and establishes reimbursement models that incentivize efficiency and quality, our physician training programs must similarly adapt.

In primary care graduate medical education (GME), physician training programs have recognized the importance of prioritizing new models of primary care to ensure that the future primary care workforce is adequate in supply, skilled at meeting the needs of patients and populations, and ready to meet the demands of high-value care. These skills are the “building blocks” of a high-functioning primary care practice and are outlined in a 2016 AAMC report, *High-Functioning Primary Care Residency Clinics: Building Blocks for Providing Excellent Care and Training*.¹

Population health management (PHM) is one building block of high-functioning, high-value primary care but is inconsistently understood and operationalized in practice and training settings. As we train the next generation of physicians and as our delivery system shifts to focus on managing populations and individuals, a framework for approaching this work is necessary, particularly in residency training.

On June 25-26, 2018, the AAMC sponsored the meeting “Population Health Management in Primary Care Residency Training Programs.” Held in the AAMC’s Washington, D.C., offices, the meeting included representatives of the AAMC, University of California, San Francisco Center for Excellence in Primary Care (UCSF CEPC), and Centers for Disease Control and Prevention (CDC) and leaders from seven residency programs in family medicine, internal medicine, and pediatrics that were identified as exemplary in key aspects of PHM.

The meeting was funded in part by CDC’s Division of Scientific Education and Professional Development, Centers for Surveillance, Epidemiology, and Laboratory Services, through cooperative agreement 5 NU36OE000007. The AAMC asked the UCSF CEPC to assist with meeting planning and facilitation, based in part on their efforts to investigate high-functioning primary care in GME practice sites, including PHM. The lessons from these prior visits were captured in two AAMC reports, one in 2016 and one in 2018.^{1,2}

The purpose of the meeting was to describe best practices in PHM in primary care residency teaching practices, with an emphasis on how residents are trained. Intended for residency program directors, this report summarizes the components of PHM and offers vignettes describing how several of the seven participating residency programs

TERMINOLOGY

The following terms represent the consensus of the meeting participants.

Clinician refers to physicians, nurse practitioners (NPs), and physician assistants (PAs) — those professionals authorized to make diagnoses, prescribe medications, and bill for clinical services provided.

Population health management (PHM) refers to a systematic approach to ensuring that all members of a defined population (e.g., all patients receiving care at a primary care practice or all patients receiving care from their personal clinician) receive appropriate preventive, chronic, and transitional care.³ PHM also helps providers identify and address health care inequities among subgroups within that population and includes screening and assistance for those clinic patients facing barriers to optimal health such as food insecurity, insufficient income, precarious or unsafe housing, and domestic or neighborhood violence. PHM broadens the traditional approach of focusing only on individual patients.

Population health is defined as the health outcomes of a group of individuals, including the distribution of such outcomes within the group.⁴ These groups are often geographically contiguous populations, such as nations or communities, but can also be groups such as employees

implemented these components. The vignettes may provide ideas to residency practices that wish to improve their PHM competency.

The seven programs described in this report vary significantly in the practice of PHM. Similarly, programs that wish to develop a PHM system may do so in different ways, applying either a narrow, targeted approach or a more comprehensive approach to adopting the elements of PHM into their practices. The descriptions provided here can be applied in a variety of combinations and illustrate how these elements are operationalized in diverse clinical settings.

Meeting participants identified 10 interrelated requirements that comprise a comprehensive PHM system.

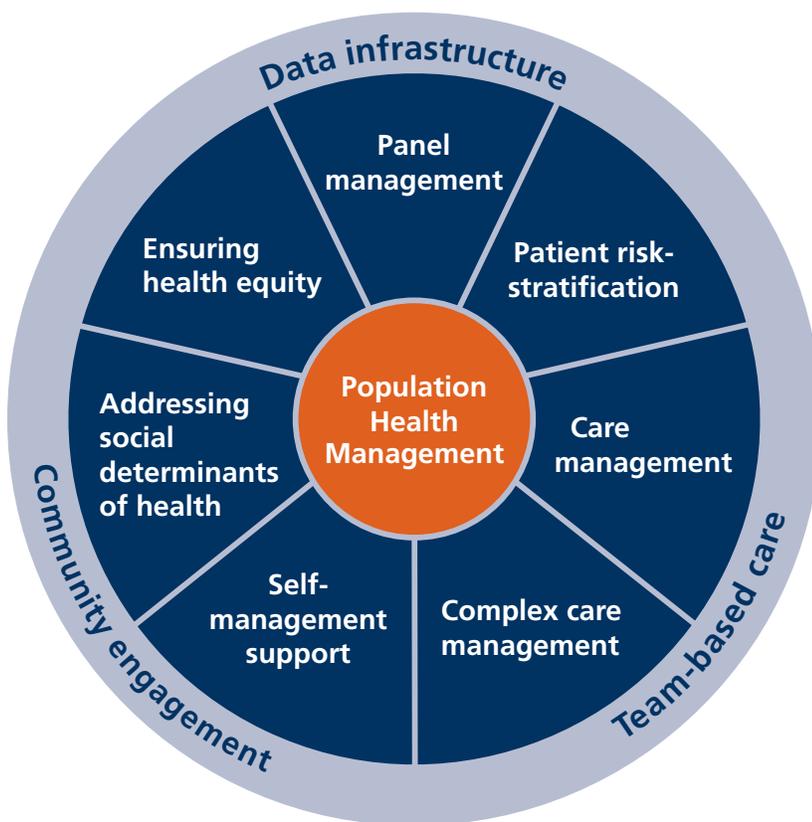


Figure 1. The 10 interrelated requirements of a comprehensive population health management system.

of a company, ethnic groups, disabled persons, prisoners, or any other defined group. Population health includes the broader determinants of the health of people within a defined population and addresses health inequities within subgroups. Population health goes beyond specific clinical metrics and considers what interventions in addition to medical care are needed to keep a population healthy (e.g., access to jobs, healthy food, safe environment, reasonable income).

Meeting participants often referred to PHM as focused on the “small p” population and noted that it addresses the needs of clinic and clinician panels, while “large P” population health is concerned with populations not necessarily associated with one clinic, clinician, or health system. The distinction between PHM and population health is analogous to the distinction between health care and health.

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Key Activities

4. **Panel management:** Panel management ensures that all patients in a population (the entire clinic's patients or the panel of one clinician or one team) have their routine evidence-based preventive and chronic care tasks performed in a timely manner, including recognizing and addressing inequities. This process includes addressing "care gaps" and actively engaging patients at risk of poor health outcomes while in the clinic and between visits.
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10. **Ensuring health equity:** PHM can be fully realized only if an equity lens is applied to ensure a reduction of health disparities while improving health outcomes for the patient population. Addressing health inequities among a population requires stratifying clinical data by factors such as race/ethnicity, language, gender identity, sexual orientation, ZIP code, and insurance status to identify any gaps in health outcomes within subgroups of the patient population.

The rest of this report further describes the foundational elements and key activities of PHM and concludes with an overview of how to integrate these principles into a primary care residency.

1. Data Infrastructure

Individual patient care requires data — from the history, physical exam, lab tests, and imaging tests. Similarly, PHM relies on health systems and teaching clinics’ collecting, aggregating, organizing, tracking, and reporting demographic and clinical data. Data are critical to tracking quality measures that primary care practices are expected to collect. Increasingly, health system reimbursement partly depends on quality performance metrics that in turn require data.

A teaching clinic’s data often derive from the data infrastructure of the health system in which the clinic is embedded. Usually an information technology (IT) specialist or IT department at the larger health system builds the data system. For teaching clinics, establishing a close relationship with the health system’s IT specialist is essential. Smaller health systems, for example Federally Qualified Health Centers (FQHCs), may have an IT specialist within the clinic. IT specialists are not clinicians, so a data-savvy clinician within the teaching clinic must work with the IT specialist to build a data system that serves the clinic’s PHM needs. If a clinic’s health system lacks an engaged and accessible IT specialist, the teaching clinic’s leadership needs to make the case for the resources that are needed to hire one.

A key component of a teaching clinic’s data system is the data registry. Registries are lists of all patients enrolled in a clinic or empaneled to a clinician, with patient-specific clinical, social, and demographic data. In the past, EHRs lacked a registry function and many practices used stand-alone registries. Increasingly, EHR systems feature registries populated from patient charts and laboratory results. Registries may be comprehensive, providing data on multiple chronic conditions and preventive care. Alternatively, registries may be disease-specific, providing data on diabetes, depression, or asthma, for example.

Once the registry is built, the IT specialist and data-savvy clinician(s) work together to create daily, monthly, or quarterly reports for clinicians and staff at the teaching clinic. The reports can provide data by clinician and team so that individual clinicians and teams can see and discuss whether their preventive and chronic care metrics are improving and whether there are disparities among subgroups. The reports may also aggregate the data longitudinally (run charts) by metric so the clinic can judge its progress.

Many health care organizations fail to track data on health inequities.⁵ If data on race/ethnicity, education, income, and health insurance, for example, are included in the demographic data for each patient, registry reports can be run that show inequities in measures such as blood pressure control or cervical, breast, and colorectal cancer screening. Practices that fail to collect, track, and analyze these data are missing an opportunity to address health inequities.

For future clinicians to be competent in PHM, they must learn about data systems, including what a registry is, how it is created, and how registry reports are run. They must also learn how these reports are used to improve the health outcomes of their panel of patients and identify inequities. Residents do not need to become IT specialists, but a training goal for residents might be to master the role of the data-savvy clinician who makes the data “actionable.”

Data-Driven Improvement at the University of North Carolina

The UNC Family Medicine Center (FMC) uses data to improve PHM. FMC not only collects and tracks data on a large variety of clinical and operational metrics but also posts these data everywhere. Walking through the FMC, one views data walls at every turn.

The IT specialist who collects, tracks, and reports on the data is part of the clinic leadership team. Clinical metrics include cancer screenings, immunizations, diabetes process and outcomes measures, and depression and fall-risk screening. Operational metrics include third next available appointment, continuity of care, on-time start rooming, on-time start provider, calls answered within 30 seconds, and cycle time. The system also tracks patient, provider, and staff satisfaction. The data are drilled down to the team and provider level, including residents. Each provider's performance is transparent for all to see, and the data are updated every day.

On a large white board at each team's work area are the team's clinical metrics for the previous month and operational metrics that are current FMC priorities (e.g., on-time starts for staff and providers). For each metric, the target is listed in red or green to indicate whether the team is passing. There is friendly competition among faculty, residents, and staff to have the highest number of green metrics.

Data-Driven Improvement at Washington University

The Washington University in St. Louis/Barnes-Jewish Hospital internal medicine residency clinic has a 6 + 2 scheduling model (six weeks of in-patient or elective rotations and two weeks of ambulatory rotations). The clinic is a main outpatient training site for 140 residents who are divided into teams; a registered nurse (RN) supports each team. The clinic also has a pharmacist, diabetes educator, nutritionist, and social worker. The faculty do not have patient panels, but they precept the 16-20 residents in clinic each half-day session.

From 2008 to 2011, the clinic began using the National Committee for Quality Assurance Diabetes Recognition Program to benchmark diabetes performance. A data extraction tool abstracted information from the EHR into a spreadsheet. Individual panel data were emailed to residents quarterly with clinic metrics and goals, but residents inconsistently evaluated and changed practice patterns based upon the data. During 2011 to 2012, residents were asked to use Plan-Do-Study-Act cycles to improve one diabetes quality metric. The project had variable resident engagement and a high administrative burden and did not clearly improve care.

From 2012 to 2013, the clinic switched to a team structure with 16 residents per team. Because residents often saw the patients of other residents, individual performance data had little meaning, so residents received quarterly data on team performance. During 2013 to 2014, the Washington University IT department took the data abstraction

tool from the EHR and turned it into a web-based registry, making it possible to easily generate reports for patients with diabetes seen within the last year. The reports included each patient's team/physician, diabetes metrics, and demographic information. Residents and attendings received monthly reports with eye exam rates, the percentage of patients with HbA1c>9%, the percentage of patients with HbA1c<7%, and the percentage of patients with blood pressure >140/90.

In 2014, the clinic started focusing on improving performance on foot exams since completion and documentation of the exam had previously been inconsistent. From January 2014 to May 2018, the percentage of patients with diabetes who had a foot exam increased from 40% to 73%. Twice per year, residents receive diabetes metrics on their patients with overall team and clinic performance. This report includes data on inequities in diabetes metrics based on race, gender, primary language, and insurance type.

The clinic has sustained improvement in the diabetes quality metrics related to screening and treatment for nephropathy and hyperlipidemia. The ability to access the performance data for these metrics was a critical first step. No significant changes have been observed for HbA1c and blood pressure control, which is likely multifactorial, including physician and patient factors. Challenges for improving the diabetes metrics include lack of continuity between resident and faculty physicians and patients and lack of administrative support to analyze the data. The clinic has improved some metrics through physician education, partnerships with ancillary clinic services, and linking diabetes metrics with the Accreditation Council for Graduate Medical Education (ACGME) milestones (read on for a discussion of PHM and milestones).



Data Infrastructure Checklist

- Implement electronic health records (EHRs)
- Create data registry
- Designate IT staff or clinician lead
- Establish metrics or targets for clinical outcomes/improvements
- Regularly review reports by disease, strategy, and population
- Ensure care teams discuss data

2. Team-Based Care

Teams in most primary care practices consist of a core team and an extended care team. In residency teaching practices, the core team is generally a small group of clinicians and support personnel, often medical assistants (MAs), but in some clinics they are licensed practical nurses (LPNs), RNs, or a mixture of nursing and assistant personnel. The extended care team, which supports several core teams, often includes RN care managers, pharmacists, behaviorists, and social workers. It may also include physical therapists, nutritionists, community health workers (CHWs), patient navigators, and health coaches.

The responsibility for the continuity of PHM resides with the core team. Each participant of the team should be closely involved to the level of their expertise. In residency clinics, team-based care is critical to implementing PHM for several reasons:

- Residency clinics should promote continuity of care for residents to the highest extent possible. However, because residents and many faculty are commonly in clinic for only a small portion of their time, teams are needed for optimal continuity of care. Usually, teams with many residents and faculty are too large to provide high rates of care continuity by the team's physicians; continuity in large teams is often best achieved by full-time nurse practitioners (NPs), physician assistants (PAs), or RNs who are familiar with and are trusted by those patients with chronic health care needs.⁶
- Because physicians have many health issues to address in the average patient visit, they lack time for identifying and closing chronic and preventive care gaps during the visit. Core team members, usually MAs and less commonly RNs, are best tasked with the responsibility for panel management; ideally, they are empowered with standing order sets.⁷
- Members of the extended care team, in particular RNs, pharmacists, behaviorists, and social workers, generally assist high-needs, high-cost patients.

To become competent in PHM, residents need experience working in care teams in which non-physician team members are empowered to take responsibility for all or portions of the PHM. Residents can learn the scope of practice of each professional team member, what is clinically appropriate, how and when to communicate with team members, which tasks can be delegated to other team members, which tasks must be done by the resident, and how generally to “share the care” with team members. Communication is key. Because many teaching practices have not yet created and nurtured high-performing teams,¹ residents may not experience true team-based care in their training. Programs should consider ways to reduce this risk for their residents, who will be expected to lead and contribute to team-based care models in their future practice settings.

Teams at Family Medicine Residency of Idaho (FMRI)

FMRI has four clinics divided into seven teams, each consisting of two to four faculty, four to eight residents, one full-time NP or PA, three to four MAs, one to two RNs, and a licensed clinical social worker. Residents work with the same MA 60% of the time and with the team RN virtually all the time. All residents are matched with one of their team MAs, who manages their desktop. Clinicians, MAs, and nurses are co-located to enhance minute-to-minute communication. Centrally located data extractors evaluate patient charts before the session to identify care gaps. Behavioral health staff are on the floor every day at all clinics to help with patient care; clinical pharmacists, CHWs, and a dietician float between clinics and integrate their services into provider appointments.

Residents shadow each team member, including billing staff, front office staff, medical coders, nurses, and MAs. Residents attend their monthly team meetings, which begin with kudos to members across the full spectrum of the team to build team culture and appreciation. Each staff category presents successes and challenges, after which the team reviews its clinical and operational metrics. Team members hear a talk on a common outpatient medicine topic, after which faculty, residents, and nursing staff do registry management of their patient panels. Residents' clinic and rotation time shuts down so they can attend their team meeting, which is part of their curriculum and learning. Many clinic staff explain that FMRI "feels like a family" and that "everyone here feels empowered and important."

Teams at the University of Cincinnati

The University of Cincinnati's internal medicine residency has pioneered a resident scheduling model, the "long block," in which residents in this three-year program spend the entire second year of their residency providing ambulatory care.⁸ The resident practice has five core teams, each with one MA or LPN working with five long-block residents, with RNs acting as team leaders. Patients stay on the same team with the same MA or RN for years, ensuring longitudinal continuity. Because RNs work with the same patients over several years, they often know the team's panel of 800-850 patients better than a patient's resident.

RNs are responsible for in-reach and outreach panel management (see definitions on page 16), ensuring accuracy of panel lists, coordinating care, triaging calls to the team, screening inbox messages, and providing care management visits for hypertension and diabetes. They are also central in the transition from one long-block resident to the next. Residents value working with their team nurse: "They really teach us, especially early in long block." With the recent addition of a team of care coordinators, residents can refer patients to these nurses, who call patients in for follow-up, help arrange appointments with specialists, and coordinate home health care.

Surrounding the core teams is an extended care team, including pharmacy, social work, depression care management, and diabetes educators. Clinical pharmacists support medication adherence, medication titration for diabetes and hypertension, anticoagulation, and smoking cessation. Residents do warm handoffs to the depression care manager to ensure transitions are as seamless as possible between providers. Residents finish their long-block year with a deep and positive experience of working in team-based care.⁹



Team-Based Care Checklist

- Develop a core clinical team
- Develop an extended care team
- Distribute responsibilities among team members
- Establish effective communication channels to which all team members can contribute
- Ensure that residents understand team roles and learn from team members

3. Community Engagement

According to CDC, community engagement is “the process of working collaboratively with and through groups of people affiliated by geographic proximity, special interest, or similar situations to address issues affecting the well-being of those people. It is a powerful vehicle for initiating environmental and behavioral changes that will improve the health of the community and its members. It often involves partnerships and coalitions that help mobilize resources and influence systems, change relationships among partners, and serve as catalysts for changing policies, programs, and practices.”

The community that teaching practices may engage with is often geographically close to the practice and includes multiple potential community partners: neighborhood organizations and leaders, faith-based organizations, community-based health practitioners, and governmental agencies. These communities can be viewed as complex systems composed of individuals, organizations, interest groups, city councils, and state and local public health departments.^{10,11}

Community engagement in primary care residencies is varied. Some programs focus on community service, and others have long-standing partnerships with community organizations to meet shared health improvement goals.

As related to PHM, primary care residency programs are beginning to align their patient population work to the overall needs of the community. Typically, nonprofit health systems in the geographic area perform community health needs assessments (CHNAs) every three years as a requirement for obtaining tax-exempt status. In addition, local health departments are also required to complete a community health assessment (CHA) every five years to maintain their accreditation. Residents should become familiar with the CHNA of their hospital and the CHA for the surrounding area. Residents should consider engaging in community health outreach or service-learning projects in alignment with the institution’s CHNA and in partnership with other community-based organizations that have a sustainable commitment to the project. Particularly forward-thinking GME programs may consider how to involve residents in the CHNA process.

Community Engagement at FMRI

At FMRI, population health is both an internal (“small p”) and external (“big P”) journey. The internal journey involves providing the highest quality care to FMRI’s panel of 25,000 Idahoans. On the external journey, FMRI develops outreach strategies to reduce health disparities in nearby communities, specifically those of refugees and Latino seasonal farmworkers.

FMRI has provided health care to the large refugee population since the late 1990s, when Bosnian immigrants began arriving in Boise. In 2017, the top countries of origin for individuals in FMRI’s area of Idaho were the Democratic Republic of the Congo, Syria, Iraq, Afghanistan, Bhutan, and Eritrea. In 2011, FMRI took over the refugee-screening contract for Southwest Idaho; since then, every refugee entering Boise has come to the clinic within their first month to receive blood tests, immunizations, and mental health

screening. Sixty percent of refugees screened through the program become patients of FMRI's primary care doctors, including residents. The refugees also benefit from FMRI's HIV Ryan White and tuberculosis clinics.

In 2015, FMRI opened the Refugee Continuity Clinic to better support refugees during their first year in the United States. A case manager screens all patients for social determinants of health and helps patients with complex medical or mental health needs. The clinic has dedicated transportation and scheduling coordinators to make sure that patients come to their appointments. A community health worker helps refugees with health insurance and disability applications. Four interpreters speak Arabic, Swahili, Kirundi, Kinyarwanda, and French.

Residents are involved in refugee care in several ways. All interns spend at least one day in the refugee-screening clinic. All residents receive one hour of didactics on "Refugee 101" and a yearly half-day didactic session targeted at infectious disease issues refugees face. Two second-year residents and two third-year residents care for their continuity patients in the refugee clinic and meet with faculty every four weeks to discuss refugee care topics. These residents design a quality improvement project for refugee patients and present regionally and nationally on a topic related to refugee care.

In addition, FMRI facilitates a monthly meeting of community agencies and institutions — health clinics, hospitals, the local health department, and resettlement agencies — to coordinate refugee care. FMRI organizes periodic health fairs where dentists and eye care specialists volunteer to provide refugee services.

FMRI's journey working with seasonal farmworkers began in 2014. At that time, the clinic cared for only 10 seasonal farmworkers. When the clinic became a FQHC, a CHW, or "promotora," began to work with the seasonal farmworker population, which is predominately Latino. Since then, the CHW department has grown to six employees, three of whom are bilingual in Spanish and provide outreach to the seasonal farmworker population. FMRI expanded its clinic system to a city closer to Southwest Idaho's agricultural regions. CHWs organized joint events with local Spanish radio stations, listened to by 70% of the Latino community. CHWs went to all the tree nurseries in the Boise area to meet with seasonal workers. In July and August, CHWs go into corn, onion, wheat, alfalfa, potato, and hops fields to distribute water to farmworkers.

Over 450 Latino seasonal farmworkers are now patients at FMRI. Bilingual residents have been featured on local Spanish radio to talk about diabetes, colorectal cancer, and women's health. Resident physicians and Spanish-speaking CHWs have worked together to provide care to farmworkers with chronic conditions. FMRI collects narratives of patients who have been helped by resident-CHW teams and hires employees who grew up in these cultures.

Staff learn culturally appropriate ways to serve the variety of populations coming to the clinic. Residents participate in culturally appropriate care with multiple populations and take these skills with them into the wider world after graduation.



Community Engagement Checklist

- Ensure that residents and faculty are familiar with the local community health needs assessment (CHNA)
- Align PHM work with the local CHNA
- Align community service projects with the needs of the local community and the needs of the patient population
- Develop partnerships with local community organizations that are aligned with the CHNA and the PHM work of the clinic

4. Panel Management

The term “panel management” has two meanings in primary care, which has led to some confusion. In one version, panel management is the process of empanelment. This is defined as linking every patient to a primary care clinician, making sure each clinician’s panel is not too large or small; risk-adjusting panels for patient complexity so that clinicians with many complex patients have smaller panels than clinicians with many healthy patients; and having clear guidelines for transferring patients from graduating residents to other residents or faculty. Empanelment allows clinicians and care teams to identify whose care they are responsible for in the long term. With a defined panel, care teams can regularly review their patients and think beyond the office visit to improve preventive and chronic care for their panel of patients. Without empanelment, many elements of PHM would not be possible.¹²

This report focuses on the other meaning of the term “panel management,” which ensures that all patients in a population (the entire clinic’s patients or the panel of one clinician or one team) have their routine evidence-based preventive and chronic care tasks performed in a timely manner; it also includes recognizing and addressing inequities. For example, panel management allows a clinician to know which patients in their panel are overdue for colorectal cancer screening or which patients with diabetes are overdue for retinal screening. Panel management also allows a clinician to know which patients with diabetes in their panel have HbA1c levels above 9% and thus need more intensive management. Panel management, concerned with all patients of a clinic or of a clinician’s panel, is a key part of PHM.¹³

Re-empaneling patients from graduating third-year residents is an aspect of panel management specific to teaching practices. Prior to graduation, residents identify: (1) patients who might be better served by a specific clinic or provider; and (2) complex patients who should be assigned to more senior residents instead of incoming interns. Residents are asked to “say goodbye” to families as graduation approaches and are provided with literature to guide these discussions.¹⁴ A clinic team member, ideally one known to the patients, also sends letters to all families notifying them when a resident is graduating and introducing them to their new provider. Panels are assigned to new interns with the same supervising attending to provide continuity of care at the attending level.

Without reliable and current data, panel management is not possible. Two crucial data platforms are needed: the registry (as described above) and the EHR health maintenance screen. On many EHRs, the health maintenance screen is one of the first screens seen by clinicians when opening a patient’s chart. It lists the current standard recommended health maintenance (preventive and chronic) services appropriate for that patient, which services have been performed, and which are overdue. The health maintenance screen provides data for one patient, while the registry includes data for all patients of a clinic or a clinician’s panel. Additionally, to track health disparities within the population, the EHR needs to collect information on race, ethnicity, and other demographic characteristics.

Care Gaps

The term “care gap” refers to services that are overdue (e.g., no mammogram on a 60-year old woman for five years) or outcome measures that are abnormal (e.g., HbA1c of 9% or blood pressure of 160/100). To identify a care gap, a practice must know the evidence-

based guidelines regarding that service — for example, that women over 50 years old are recommended to have a mammogram every two years or that patients with diabetes are recommended to have HbA1c levels below 7% or 8%. The medical leadership of each clinic decides on clinical practice guidelines for each metric, often relying on guidelines recommended by the U.S. Preventive Services Task Force.¹⁴ Both clinician and non-clinician team members responsible for panel management need to know their clinic’s guidelines to determine whether a care gap exists. Studies show that when non-clinician team members are trained and given responsibility for identifying and addressing care gaps, performance improves because clinicians lack the time to perform this important but relatively routine function.⁷

When a clinic begins to perform panel management, the team must first decide which preventive and chronic care services to actively measure. Early on, a clinic may provide panel management for only a limited array of measures, such as colon cancer screening and flu vaccines. Over time, clinics expand their panel management activities to include other cancer screenings, vaccinations, diabetes care processes, outcome measures for diabetes and hypertension, fall-risk assessment, depression screening, and more as their expertise in panel management improves.

Registries and EHR health maintenance screens will often visually highlight which patients have care gaps. This requires that the clinical practice guidelines agreed upon by the health system or clinic medical leadership be embedded into the registry. For example, if a guideline recommends HbA1c tests every six months for patients with poorly controlled diabetes and a patient has not had a HbA1c test for nine months, the registry or health maintenance screen may highlight the HbA1c test in red to indicate that a care gap exists. When the HbA1c test is performed, the notification disappears.

In-Reach and Outreach

Identifying and addressing a patient’s care gaps when the patient is present in clinic is called “in-reach.” Identifying and addressing a patient’s care gaps when the patient is not present in clinic is referred to as “outreach.” Outreach involves contacting patients on a clinician’s panel who do not have scheduled visits and arranging for them to close their care gaps. An example might be sending e-messages through the patient portal to patients who have diabetes but have not had a HbA1c in the last six months, reminding them that a HbA1c test has been ordered and requesting that they come to the lab. Outreach can also be conducted through letters or phone calls. In many practices, in-reach and outreach are the responsibility of the MA or nursing staff.¹³

Panel Management at Johns Hopkins

With about 16,000 visits each year, the Harriet Lane Clinic is the main general pediatrics training site for Johns Hopkins residents. The goals of panel management in pediatrics are (1) providing preventive and routine chronic care services and promoting wellness among the clinic’s entire population; (2) tracking metrics, including well child visits in the first 15 months of life, well child visits in preschool age children, and well child visits in adolescence; (3) delivering immunizations to children and adolescents; and (4) providing lead screening, asthma and weight assessment, and counseling for nutrition and physical activity.

The EHR provides reports of the population of patients with specific diagnoses (e.g., asthma, obesity), medications (e.g., which patients are on Fluticasone), and vital sign abnormalities (e.g., high blood pressure or elevated BMI). The Johns Hopkins Health System provides metrics, including immunization rates and preventive visit rates for the patient population, at the provider level and the clinic level. Data provided by a Medicaid managed care plan representing most patients served by the clinic are another resource for panel management in the clinic.

Each resident receives a monthly dashboard from the EHR with metrics sorted by resident provider. The dashboard includes all patients assigned to a resident's panel, whether or not they have attended a clinic visit. There is dedicated time during clinic sessions throughout the year to review patient panels and, working with CHWs, to conduct outreach to patients with care gaps. Residents also receive data related to the prevalence of specific diagnoses (obesity, asthma, etc.) within their patient panel.

In-Reach at UNC

At the UNC FMC, clinical teams include about six faculty and six residents (two from each residency year), about four credentialed medical assistants (CMAs), and a team clerk. Each team is made up of provider-CMA "teamlets"; each CMA is linked with three to four providers, generally a mix of faculty and residents. Each day a schedule is created called "Where is my clinic today and who am I working with?" For each team, it lists the doctors working that session and the CMA they are paired with. Before each clinic session (morning and afternoon), the provider and CMA discuss the patients on the schedule and review care gaps.

CMAs have a long list of pre-visit responsibilities, written down in a standard work document, which includes panel management in-reach. CMAs screen patients for tobacco, alcohol, drugs, falls in the past year, pain, and depression. To identify and address care gaps, CMAs rely on an EHR function called BPAs, Best Practice Advisories. If the patient has a care gap for a cancer screening, immunization, or routine diabetes service, the BPA "fires" (i.e., it is highlighted in yellow on the EHR health maintenance screen). CMAs can pend lab and mammogram orders on the EHR and perform some BPAs (e.g., give FIT/FOBT tests for colon cancer and do diabetes foot exams under standing orders). For colonoscopies, the CMA advises the patient to have a discussion with the provider. Residents learn how to use the BPAs and receive BPA alerts, but the CMA's role is to implement the workflow.

CMA clinical training is generally accomplished through peer training with the lead CMA and by shadowing experienced CMAs. Lead CMAs supervise new CMAs in all their responsibilities, quiz them, and document competency milestones within a standard list of required job responsibilities. Supervisors regularly audit staff members using a checklist to evaluate how they are carrying out their responsibilities. Audits are used as a coaching opportunity and are not punitive.

The FMC’s system allows the team to track how many individual patients have care gaps for each metric; for example, the clinic may need to screen 100 more patients to reach its colon cancer screening target. Moreover, each provider knows how many (and which) patients need care gaps addressed for the provider to reach an individual performance target. The care gaps for the day for each provider are listed on a printout on the work desk and posted on a white board. Each teamlet huddles to review daily opportunities to close care gaps. The in-reach motto is “Even if it’s not your patient, close the gap.” The entire clinical team meets monthly in front of their white board to discuss progress and how to achieve not-yet-reached targets.⁷ Figures 2 and 3 illustrate some metrics that the clinical teams track each month.

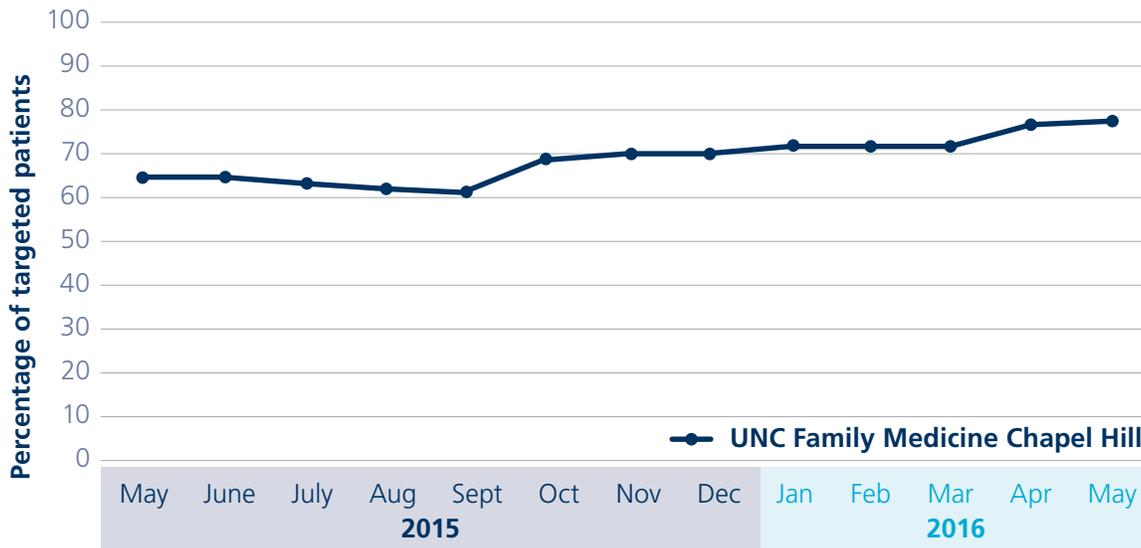


Figure 2. Example of UNC run chart, statin use.

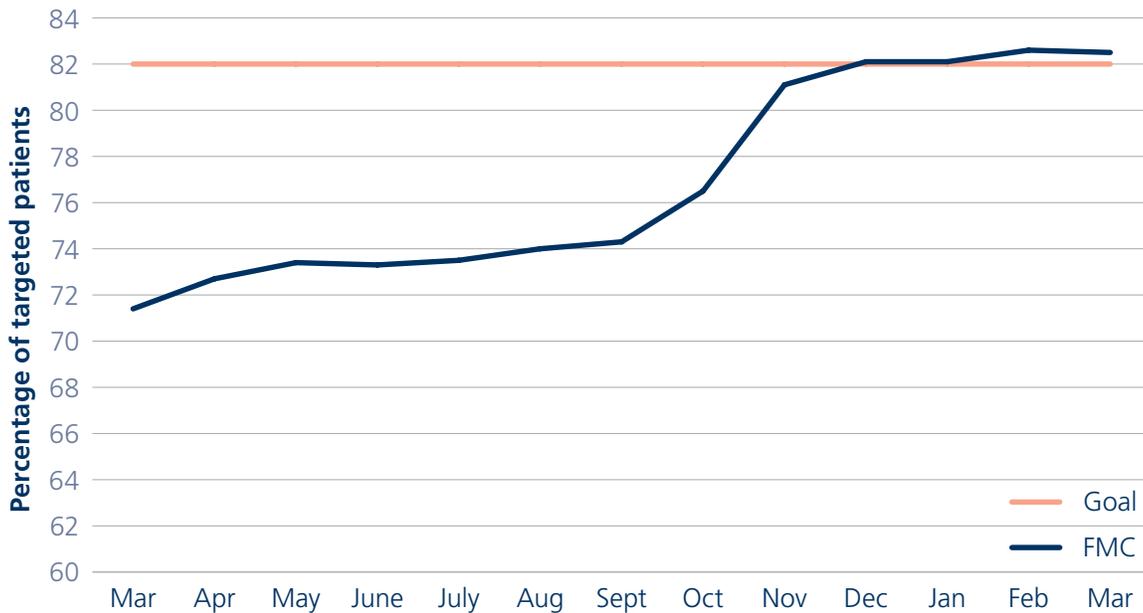


Figure 3. Example of UNC run chart, pap smear.

In-Reach and Outreach at the University of Arizona

The University of Arizona health system in Phoenix merged with Banner Health in 2015 to create the Banner-University Medical Center Phoenix (BUMCP). The Family Medicine Center resident teaching practice has developed two MA positions that will specialize as “population health MAs,” each working with two of the four teams. The population health MAs review the schedule for the day, look for patient care gaps in the EHR health maintenance screen, and place electronic notes in those patients’ charts. Each morning, the residents review the notes with the “rooming” MA they are working with that day and create a task list for the rooming MA using standing orders. The population health MAs often place orders the day before for items that have standing orders (e.g., mammograms and HbA1c labs).

After the visit, patients check in with their population health MA to go over logistics for mammography and colorectal cancer screening and to check whether all care gaps on the notes have been addressed. If not, the population health MA can do needed counseling and pend orders that physicians sign later. For items not addressed by the rooming MAs, patients meet with the population health MA. The clinic creates a monthly performance scorecard (see Figure 4).

The population health MAs are entirely responsible for panel management outreach. Each second- and third-year resident meets monthly with their population health MA to review their panel list and identify care gaps. During this process, the MAs actively teach residents how to do PHM. The population health MAs contact patients with care gaps — usually by phone — and ask them to come in for needed lab work, cancer screening, or immunizations. As more patients sign up for the patient portal, the center will use it for outreach.

BUMCP Clinical Performance Scorecard 2018			
October 2018	2018 Performance Target	2018 Performance Stretch Target	Family Medicine Clinic
Future Fall-Risk Screening	61.0%	63.0%	89.1%
Influenza Vaccination	73.0%	74.0%	86.6%
Pneumococcal Vaccination	70.0%	70.0%	80.1%
Depression Screening	80.0%	90.0%	86.3%
Colorectal Cancer Screening	68.0%	72.0%	68.9%
Breast Cancer Screening	74.0%	78.0%	67.0%
Diabetic Control (HbA1c <9%)	69.0%	73.0%	72.6%
Hypertension Control	71.0%	75.0%	74.2%

Figure 4. Banner-University Medical Center Phoenix clinical performance scorecard example.



Panel Management Checklist

- Ensure that all patients in a population are included in a panel to regularly observe evidence-based preventive and chronic care tasks and recognize health disparities
- Develop a system to identify care gaps
- Develop a process to close care gaps and inequities with “in-reach”
- Develop a process to close care gaps and inequities with “outreach”

5. Patient Risk Stratification

PHM addresses the needs of various subgroups within a population. Risk stratification is the process by which patients are placed into subgroups that are determined by the area of focus of the clinic. The subgroups might be based on age, gender, race/ethnicity, neighborhood, or other characteristics. Primary preventive services aimed at mitigating risks can be variably applied to different subgroups depending on the prevalence of poor health outcomes experienced among these subgroups.

Another way to define a population's subgroups is by risk of poor health outcomes or high health care costs.¹⁵ Using this latter approach, a clinic's population can be risk-stratified to determine the level of services required for each of three overall risk strata:

1. Many patients are healthy and need only routine preventive services.
2. About half the patients in a clinic or clinician's panel have one or two chronic conditions in fair control (e.g., patients with diabetes and hypertension). These patients generally require care management visits for health coaching and routine medication management.
3. Perhaps 5% to 10% of a clinic's or clinician's panel has complex health care needs, often with multiple diagnoses, many medications, and frequent emergency department visits or hospital admissions.

Some practices risk-stratify within clinical conditions. A child with asthma may have rare attacks and require only patient education and a rescue inhaler as needed. Other children with frequent asthma exacerbations need regular follow-up, asthma action plans, and both rescue and controller inhalers. Children with severe asthma and multiple emergency department visits require intensive asthma management, including screening to identify and address asthma triggers, particularly in the home, and self-management training of the patient and family with an asthma educator or health coach. As a result, clinics will often aim to ensure an asthma action plan is created for the population with this chronic condition, clarifying their risks and attendant care plans.

More complex patients are often risk-stratified using likelihood-to-be-hospitalized formulae, which look at numbers of diagnoses and medications, past hospitalizations, and the presence of serious mental illness, drug addiction, homelessness, and social isolation. In addition to computer algorithms, clinicians can rely on their experience to help identify patients at risk for catastrophe.^{6,15}

Residents can learn the concept of risk stratification, estimating risk and planning the appropriate intensity of care for their patients. At UNC and the University of Cincinnati, residents attend practice management discussions that involve risk stratification. The University of Arizona uses meetings with specially trained population health MAs and other experiential learning methods to teach risk stratification. At Johns Hopkins, pediatrics residents are asked to identify medically complex patients in their panel. FMRI is starting to have residents look at their most costly Medicaid patients and devise plans to potentially reduce their overall costs. Hopkins residents also pay considerable attention to the neighborhoods where their patients live and the attendant risks associated, such as the risk of lead poisoning and need to engage with community resources around lead abatement in the home. Washington University residents risk-stratify by race/ethnicity as described on page 31.



Patient Risk Stratification Checklist

- Risk-stratify by population subgroup (race, ethnicity, neighborhood, insurance, languages spoken, citizenship, etc.)
- Risk-stratify by disease burden
- Risk-stratify by co-morbidity
- Risk-stratify by frequency of visits to emergency room or hospital admissions (see Complex Care Management)

6 and 7. Care Management and Self-Management Support

Care management usually involves an RN care manager who meets with patients to help them set and achieve health behavior-change goals, including medication adherence, and to guide the management and self-management of patients' chronic conditions. Because care management has become a common part of chronic illness care, residents benefit from learning how it functions. RN care managers generally assist patients with one or two uncomplicated chronic conditions such as diabetes and hypertension. High-needs, high-cost patients with multiple chronic conditions may receive intensive care management from an interdisciplinary team (see the following section, Complex Care Management). For patients with diabetes, care managers are most effective when they are empowered to adjust medication doses without awaiting physician approval.¹⁶ Compared with standard patient visits that have multiple agenda items, care management sessions are planned in-person, by phone, or electronically; the only agenda item is managing the patient's chronic conditions. Planned visits with a professional who is not the patient's primary care practitioner can overcome the "tyranny of the urgent," in which acute concerns curtail the patient education and goal-setting that is so important for improving clinical outcomes.¹⁷

Implementing care management is challenging because it requires new workflows, assessment tools, and available resources. Practices struggle with many decisions including how to structure the overall program, hire and train care managers, determine which patients are eligible, and standardize the content of care management visits.¹⁸

While care management is generally performed by an RN (or sometimes by a pharmacist or social worker), self-management support (health coaching) can also be provided by specially trained unlicensed staff such as MAs, patient navigators, or CHWs. Health coaching equips patients with the knowledge, skills, and confidence to become active, informed participants in managing their chronic conditions, which can lead to better health outcomes.¹⁹ For example, low-income patients working with trained medical assistant coaches or peer health coaches have better diabetes outcomes than patients without health coaches.^{20,21}

Care Management at Cambridge Health Alliance

Cambridge Health Alliance has developed the role of "Care Partners," most frequently recruited from a pool of high-performing MAs or LPNs, who are trained in motivational interviewing and health behavior change, including medication adherence. Care Partners help facilitate warm hand-offs, whereby the clinician recognizes the need for services during a visit and introduces the patient to the Care Partner in real time, enabling an initial personal connection and, depending upon the circumstances, initiation of care. Care Partners may address several conditions, including depression, anxiety, sleep hygiene, and smoking cessation. They support and develop care plans documented in the EHR, discuss mobile apps, and provide motivational interviewing, goal-setting, and coaching for healthy behavior change. Care Partners are paired with patients with

uncontrolled diabetes (HbA1c >9%) and depressed patients who have scores of >15 on the Patient Health Questionnaire-9 (PHQ-9), a depression and diagnostic severity measure. Residents may refer any other patients they feel would benefit by interacting with Care Partners. Care Partners participate in weekly team meetings. Cambridge Health Alliance budgets one full-time equivalent Care Partner for every 10,000 patients.

For patients with complex health care needs, a social worker and RN team work together to perform care management. The team provides patients with team members' phone numbers, coordinates with home health and adult day programs, assists with inpatient discharge transitions, and does home visits if needed. Residents can use the team for their patients, and the RN or social worker will frequently join the patient's resident during office visits.



Care Management and Self-Management Support Checklist

- Designate staff to create individual care plans for patients with chronic conditions
- Develop a system for patients to obtain self-management support
- Educate residents on this pathway and create a seamless referral system

8. Complex Care Management

Academic practices are increasingly implementing programs for high-needs, high-cost patients by assessing patient needs, training complex care managers, supporting patient/caregiver involvement, and partnering with social service organizations.²² High-needs, high-cost patients are best cared for by a complex care management (CCM) team with a small caseload. CCM teams often include physicians, RNs, social workers, pharmacists, behavioral health professionals, and sometimes unlicensed personnel such as MAs, patient navigators, health coaches, or CHWs. The goals of CCM teams are to improve care and reduce costs for their patients.

Several models of complex care management are functioning throughout the United States in both teaching and non-teaching practices. Traditionally, the health plan model involves a team employed by a health plan that provides telehealth care management, embeds care managers in primary care practices, or both. In the primary care model, patients remain with their primary care practitioner; a CCM team within the primary care practice assists with the intensive level of care appropriate to each patient's needs. The ambulatory intensive caring unit model involves transferring high-needs, high-cost patients away from their primary care practitioner to a separate high-risk clinic with a team led by a physician and RN. A hybrid model allows patients to choose to remain with their primary care practitioner, supported by the CCM team, or to be transferred to a CCM team that includes a physician.²³ Increasingly, these staff-intensive models are being augmented by telehealth modalities and related technologies that help facilitate timely check-ins and provide a stream of relevant data on these patients' health status.

Complex Care Management at the University of Arizona

The University of Arizona's residency clinic focuses on four categories of high-risk populations: recently hospitalized patients, behavioral health patients, patients with substance use disorder (SUD), and patients with uncontrolled chronic conditions.

For recently hospitalized patients, a nurse navigator rounds on all clinic patients hospitalized at the Banner-University Medical Center Phoenix. A Transitional Nurse Practitioner completes a transitional care visit. Residents round daily with the nurse navigator on the family medicine inpatient service and can consult with the nurse practitioner on care transition plans. Patients admitted to BUMCP from the family medicine residency clinic have 30-day readmission rates lower than the entire in-patient population of BUMCP.

For behavioral health patients, faculty and residents refer appropriate patients to an RN behavioral health manager. Eligible patients are those with new or uncertain psychiatric diagnoses or with suboptimal response to treatment, not including patients with serious mental illness or dementia. The program uses the University of Washington's Advancing Integrated Mental Health Solutions model by which medical practitioners work with an RN behavioral health care manager, who is supported by a psychiatrist consultant. Residents coordinate with the behavioral health care manager on their patients' care.

Patients with SUD are referred to an outpatient addiction recovery center with in-patient consultation as needed. They are co-managed by residents, who spend some time at the recovery center during their second-year psychiatry rotation. An addiction medicine elective rotation enables residents to obtain buprenorphine prescribing waivers and learn how to use medication-assisted treatment in their patients' care.

The uncontrolled chronic conditions category includes patients not meeting their hypertensive or diabetic control targets. Care of these patients is managed by an interdisciplinary team including pharmacists, social workers, nutritionists, and psychologists. Residents have monthly meetings with team members to discuss these patients. Residents also lead quality improvement noon conferences attended by interdisciplinary team members.

Complex Care Management at Johns Hopkins

Johns Hopkins Children's Center, part of Johns Hopkins Hospital, is financed by a global budget that aims to cap hospital spending while maintaining or improving quality of care; this provides a strong incentive to reduce hospital admissions and treat patients effectively earlier in their disease course. The hospital-based Harriet Lane Clinic uses several strategies to manage high-risk populations.

Children With Medical Complexity

ICD-10 codes are used to identify children with medical complexity and highlight these individuals on resident panels. As appropriate, they are enrolled with their insurer's case management program or the Maryland Medicaid Rare and Expensive Case Management (REM) program. Many of these children are technology-dependent (e.g., dependent on tracheostomy/ventilator or gastrostomy tube), are on three or more medications, or are followed by multiple pediatric subspecialists.

Most children in the clinic are insured through the Johns Hopkins Medicaid Managed Care Organization. Medically complex children with this insurance can receive case management from an embedded nurse case manager co-located in the clinic; this case manager is hired by the managed care organizations but works side-by-side with clinic providers. The case manager can meet with patients and caregivers during clinic visits, schedule home visits, and communicate with families via secure messaging and telephone.

Children qualifying for Medicaid's fee-for-service REM program are assigned off-site case managers (RNs or licensed clinical social workers) who connect with families by telephone or home visits and sometimes accompany families to clinic visits. Case managers provide patient education and family support services, coordinate provider services, and follow up on the recipient's progress. REM case managers can communicate with patients' resident physicians via secure email.

Children With Asthma

Another group of high-risk children that are identified by the clinic are those with more than two asthma emergency department visits or hospitalizations in a year. These children are followed by clinic-based Asthma Community Health Worker teams of two physicians and two CHWs who provide outreach and advocacy. The Asthma Community Health Worker teams see children treated for acute asthma exacerbations and follow-up visits. Families can access their CHW by text, phone, or email. The team coordinates in-school controller therapy, health department home visits for environmental controls, medication refills, and regular follow-up. Residents are taught an asthma treatment algorithm and attend a teaching session on asthma PHM.

Maternal Mental Health

The maternal mental health team consists of a case manager, mental health consultant, CHW, and part-time therapist with access to a psychiatrist who specializes in women's mood disorders. This team is located within the clinic and works closely with residents during their ambulatory block when they are seeing newborns. Residents and team members share a team room to promote consistent communication. A team member screens all mothers for post-partum depression and intimate partner violence during routine infant visits throughout the infant's first year. A subset of mothers participates in an on-site evidence-based parenting program (Circle of Security) that may include home visits.



Complex Care Management Checklist

- Develop a process to accurately identify complex care patients
- Develop a small Complex Care Management (CCM) team for high-needs, high-cost patients
- Create the technology infrastructure to support the CCM team (telehealth, mobile application, etc.)
- Include nonclinical team members to provide wrap-around services (social worker, community health worker)

9. Addressing Social Determinants of Health for Residents' Patient Panels

A recent PHM innovation is “social prescribing,” which involves (1) screening for social needs (such as housing or food insecurity), (2) addressing patient needs with clinic or hospital resources such as a food bank or transportation vouchers, (3) referring patients with two or more comprehensive community-based services (such as housing support or meal delivery programs), and (4) supporting patients to access relevant services (often using a care coordinator or CHW).²⁴

A leader in social prescribing is Health Leads, a nonprofit national organization that trains and supervises volunteers to provide social support to patients.^{25,26} Patients can be referred by their primary care provider or identified by screening positive on a questionnaire that patients fill out in the clinic waiting room. Health Leads advocates typically occupy a desk within the clinic and work with patients to identify and navigate relevant community-based resources. Advocates maintain contact with patients as required and provide updates to the clinical team.

Community engagement is distinct from social prescribing in that the latter is associated with patient panels in a practice, while the former addresses the larger community, whether or not its members are patients of the practice. The “big P” population of the community may or may not be patients in the “small p” patient population of a resident or a clinic.

Residency programs are beginning to teach about social determinants of health (SDOH) and social prescribing using both didactic and experiential learning.^{27,28} Also, several residencies have initiated medical-legal partnerships in which medical and legal faculty and learners assist patients with health-harming legal needs.²⁹

Addressing the Social Determinants of Health at Johns Hopkins

Pediatricians from Johns Hopkins Harriet Lane Clinic capture families' basic resource needs in a social history section of the pediatrician's note in the EHR. Residents can refer families with identified needs to the in-clinic Health Leads desk staffed by trained college student advocates, whom the institution has granted patient-approved EHR access. Alternatively, families can fill out the screening questionnaire to access a Health Leads advocate. Once a referral through the EHR has been made, for example, for food insecurity, an advocate provides family education, makes appropriate referrals to community resources, and follows up with the family. An online teaching curriculum covers foundational pediatric primary care topics, including social determinants of health.

Addressing the Social Determinants of Health at Cambridge Health Alliance

Cambridge Health Alliance has developed the role of Patient Resource Coordinator (PRC). PRCs help patients identified by any member of the primary care team who need support around social determinants of health. They are available for warm hand-offs or referrals. PRCs assist patients with transportation, develop and initiate plans to meet food and housing security needs, and connect patients with community and area resources (e.g., job training/placement, legal services, child care, or personal care assistants).



Addressing Social Determinants of Health (SDOH) for Residents' Patient Panels Checklist

- Create a pathway within the EHR to collect information about SDOH
- Identify a member of the care team who can address SDOH
- Provide a list of social services/resources that can be used to meet the identified patient needs
- Develop a referral system for clinical team members to refer to the appropriate staff member to have these needs met

10. Ensuring Health Equity

While PHM often looks at care gaps of patients receiving preventive interventions, identifying gaps among patient subgroups is also important. Even well-intentioned clinical interventions may result in overall health improvement in a patient population, while certain subgroups experience worsening outcomes. Part of PHM is looking at data through an equity lens to ensure improvement in the health outcomes of all subpopulations.

Addressing health inequities among a population requires reporting clinical data by several factors, which could include race/ethnicity, language, gender, gender identity, sexual orientation, insurance status, and geography. Several of the seven residency programs that participated in the meeting teach residents about health inequities. However, few routinely report on quality metrics categorized by race/ethnicity, language, gender, or insurance status.

ACGME's Clinical Learning Environment Review (CLER) was designed to "provide US teaching hospitals, medical centers, health systems, and other clinical settings affiliated with ACGME-accredited institutions with periodic feedback that addresses [...] six focus areas." Of these six areas, Health Care Quality is one area in which the program has identified health care disparities as a key factor of resident education.³⁰ CLER expects that residents and faculty receive education on identifying and reducing health care disparities in their patient population and participate in projects that demonstrate this knowledge.³¹

FMRI has a four-week community health block in which all second-year residents learn about health care disparities through readings and experiential learning. They visit a prison and homeless shelter and spend time with the clinic's CHWs to learn about caring for Latino migrant farmworkers. In addition, the behavioral health staff lead a half-day resident conference on cultural humility. The University of Arizona schedules noon conferences that discuss the impact of health literacy and community resources for vulnerable populations. Two dedicated lectures focus on social determinants of health and health disparities. At UNC, residents have experiences in a FQHC, critical access hospital, migrant farmworker camps, inpatient prison facilities, and other programs chosen to highlight the realities and disparities within the health care system.

Ensuring Health Equity at Washington University

Twice a year, residents receive a report with data on inequities in diabetes metrics based on race, gender, primary language, and insurance type (see Figure 5). The residency program was motivated to create and spread the health disparity report because St. Louis is a highly segregated city with significant health inequities. This was partially motivated by several high-profile police cases highlighting inequities in the region. Consequently, local and regional initiatives focused on the health of African Americans have also emerged.

The residency program informs residents of these data through multiple venues. The health disparity report is discussed at clinic quality improvement meetings, which residents attend, if possible. Residents can also attend lectures and grand rounds about disparities. The clinic has launched initiatives to address disparities, including diabetes

education for non-English speaking patients and a retinal screening project to remove the eye clinic's high co-pay for uninsured patients. The clinic is beginning work to understand how the disparities data may influence physician behavior and ultimately reduce disparities within the clinic population.

Health Disparity Report for Team 6									
Measures	Race/Ethnicity		Language		Gender		Insurance status		
	Black/AA	Other	English	Non-English	Male	Female	Self	Medicare	Medicaid
Number of Patients	151	41	176	16	67	125	21	69	74
Average Age	53.8	52.9	53.5	54.7	52.9	54.0	48.7	55.7	54.1
%HbA1c <8	63%	61%	63%	62%	56%	66%	57%	71%	64%
% Scrn for Nephropathy	90%	90%	90%	87%	94%	88%	95%	92%	83%
% Ophtho exam	41%	29%	38%	37%	41%	36%	19%	46%	43%
BP>140/90	47%	41%	47%	31%	44%	46%	47%	49%	41%

Figure 5. Washington University health disparity report example.

Ensuring Health Equity at Cambridge Health Alliance

The residency program has pioneered Quality Equity and Safety Rounds. Morbidity and mortality (M and M) conferences are traditionally used as opportunities to reflect on error, both at the individual and system level, but these conferences rarely address clinical behavior and patient outcomes in the context of systemic racism and other structural inequities. Cambridge Health Alliance Department of Family Medicine transformed the traditional M and M format into a series of conferences that focus on quality through the lens of health equity. The department believes that quality or safety cannot be achieved without addressing fundamental questions of equity.

Initial sessions laid the groundwork by building a common language of race and equity work and created commitments for how the group would approach the difficult work of exploring race and equity issues respectfully and honestly, acknowledging that “we can’t make it all seem nice.” Through these sessions, the residency program has explored institutional policies such as dress code and maternal drug screening policies

that contain racial and gender equity issues, some of which have led to a change in hospital and residency policies.

The residency program has also developed a Community Health and Equity Syllabus to teach residents the skills, knowledge, and attitudes needed to promote health equity. Residents must develop and complete a 22-hour community health project collaboratively with a community agency, describe the project using a racial equity impact assessment toolkit, and present the project through a poster and an audio-visual conference.



Ensuring Health Equity Checklist

- Collect data on a variety of demographic factors such as race, ethnicity, gender identity, sexual orientation, languages spoken, and citizenship
- Ensure PHM and quality improvement initiatives have an equity analysis
- Provide data to residents and faculty on health inequities found within the patient population
- Once an inequity is identified, create a plan of action and accountability within the team to address the problem
- Incorporate lectures and case discussions that address inequities found in the clinic's patient population

Integrating Population Health Management Into Residency Training

Training primary care residents in PHM is challenging because residents have a vast amount of clinical medicine to learn and spend less than half their residency time in primary care clinic. Resident schedules are complex, making resident attendance at population health conferences and team meetings inconsistent. Also, many faculty physicians lack the expertise to teach PHM to residents.

Resident PHM training includes both didactic sessions to teach PHM principles and experiential learning during which residents practice PHM while caring for their patient panels.³² Moreover, PHM training can be linked to the ACGME milestones. The following narrative and vignettes describe various aspects of PHM, including (1) PHM didactics, (2) PHM experiential learning, (3) making time for PHM teaching, (4) faculty development in PHM, and (5) PHM curricula and milestones. Didactics and experiential learning often overlap with one another.

PHM Didactics at Johns Hopkins

Pediatric residents receive a didactic lecture on social determinants of health, population health, and health disparities, with a specific focus on Baltimore. Residents also receive a lecture on social determinants of health and home visitation during an inpatient rotation at an affiliated community hospital. The residency clinic uses modules on a web-based platform used by several programs nationally, which address a wide array of primary care issues that highlight population dynamics of common pediatric conditions and how social determinants of health drive health outcomes. Examples of modules include clinic and community resources, advocacy training in pediatrics, outpatient asthma management (including epidemiology and environmental control), screening for intimate partner violence, screening for and addressing maternal depression, and childhood injury prevention.

PHM Experiential Learning at the University of Cincinnati

Each month during their long block, residents receive performance metrics on hypertension, diabetes, immunization rates, PHQ-9s, and other preventive measures for their own patients. In addition, residents can consult a real-time dashboard in the EHR for this same information. As part of their patient care education, residents learn to address many barriers to care faced by the clinic's vulnerable populations. Moreover, residents learn to work in interdisciplinary teams with pharmacists, a depression care manager, social workers, and an outreach case manager.

Before the start of the long block, residents are assigned a single outcome measure and asked to perform a literature review of the measure, termed the Defense of the Measures. Residents are required to attend Defense of the Measures conferences, with

teams of residents evaluating, for example, the evidence supporting the importance of the current diabetes measures and the strength of the medical literature that supports the continued use of these measures to improve patient outcomes. Long-block residents present their review to their entire team, including nurses and allied health professionals. The review concludes with a recommendation of whether the measure should be kept, changed, removed, or added. The entire team discusses the evidence presented and votes on what should be done. Since the inception of Defense of the Measures, outcomes measured in the practice have changed substantially, including a change in glycemic targets (HbA1c levels), new vaccinations (herpes zoster), or new screening recommendations (HIV, hepatitis C).

After Defense of the Measures was implemented, teams have not spent time arguing the value of measurement. Team members have also realized that they cannot track and measure everything, even if there is good evidence; thus, they must decide which measures are most critical for better outcomes in their population. The Defense of the Measures intervention empowers team members to critically examine the outcomes they are measured by and prepares residents to use these skills in their future practice.³³

Protected Time for Residents to Learn PHM

Integrating PHM into residents' complex schedules is a challenge for all teaching practices. Cambridge Health Alliance and the University of Arizona have rebalanced their programs to reduce some in-patient and subspecialty time, while still meeting ACGME requirements, and prioritize residents' attendance at meetings in which PHM is discussed. UNC and FMRI also protect resident time for meetings and registry management. The University of Cincinnati's long block is ideal for immersing residents in PHM and starts with a several-day orientation on how to interpret their patient registries. During long block, residents are excused from other clinical duties to attend weekly team meetings that address PHM issues. Residents are expected to use their registries to prep for clinic daily.

Faculty Development in PHM

Residency faculty members are not necessarily trained in or comfortable teaching PHM. UNC has many faculty with master of public health degrees who can teach PHM and a few experts responsible for resident education in PHM. Other programs rely on a few faculty members with PHM expertise. Because the University of Arizona has a small number of full-time faculty in the clinic, the entire faculty learns PHM through attending PHM noon conferences and — for their own patient panel — monthly meetings with the panel management MAs. Among the seven programs that participated in the 2018 PHM meeting, formal faculty development in PHM was rare and represents an opportunity for future development.

PHM Curricula and Milestones

Starting in 2013, residency programs have been required to assess resident development based on milestones in six general competency areas: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and system-based practice.³⁴ The 2015 report *Population Health Milestones in Graduate Medical Education* maps population health teaching to the milestones, as summarized in the following vignette.³⁵

PHM Curriculum at the University of Arizona

The program recently implemented a web-based longitudinal curriculum for second- and third-year residents to complete four self-study population health modules over the two-year span. Each block needs to be completed over a five-month period, prior to each meeting of the Clinical Competency Committee. The blocks include readings from, for example, the *Family Practice Management* journal and from the American Medical Association (AMA) STEPS Forward website. In addition to milestone evaluations, which include population health, residents are evaluated with pre-tests and post-tests on introduction to population health, team-based care, registries, standing orders, and payment models.

A bimonthly interdisciplinary quality improvement noon conference focuses on team-based quality improvement projects. Residents also attend sessions on team-based care, how to develop standing orders, and payments related to population health.

The goal of the curriculum is to foster an understanding of the role of patient registries and quality markers in managing the preventive and chronic health of the resident's patient population. With faculty supervision, residents lead a team in monitoring and coordinating the care of their continuity panel over the course of two years. The skills and procedural pathways learned are transferrable to managing population health in a wide variety of settings upon graduating.

By the end of this longitudinal experience, University of Arizona residents should be able to demonstrate competencies tied to the following ACGME Competencies:³⁵

- **Patient care:** Demonstrate how to access primary care provider-specific population health data collected by Banner Health; use these quality markers to evaluate the care of their patients; display an understanding of the role that registries play in managing patient and population health; and achieve base target scores for all routine Banner quality initiatives.
- **Medical knowledge:** Demonstrate improvement in quality measures over the course of the longitudinal experience.
- **Systems-based practice:** Demonstrate responsibility for the coordination of a care team to optimize the health of a continuity panel.
- **Practice-based learning and improvement:** Effectively use patient registries to assess and manage population health.
- **Professionalism:** Describe how Medicare/Medicaid, commercial insurers, and health systems utilize quality measures with regards to population health and physician payment; complete assigned curricular readings, assignments, and self-assessments in a timely fashion; and actively participate in semi-annual feedback sessions.
- **Communication:** Demonstrate how to accurately capture quality data within Banner Health's EHR and communicate collaboratively with the population health MAs.

Conclusion

For decades, residency programs have taught and emphasized the clinical care of individual patients. Now, primary care residency programs in family medicine, internal medicine, and pediatrics are responding to an additional need: to teach physicians in training how to prevent illness and improve care for a population of patients. Thinking about populations involves knowledge and skills separate from traditional clinical care. Just as individual clinical education requires not only didactic learning but also the experience of actual patient care, so does training in PHM require both didactic learning and actively conducting PHM with a panel of patients and an interdisciplinary team.

This report has covered a series of topics in PHM and population health, relying on vignettes from high-performing residency teaching clinics to illuminate this body of knowledge. Residency programs can self-assess their competency in PHM by examining their data systems; their panel management workflows, including in-reach and outreach to identify and address care gaps; their capacity to risk-stratify their panels and provide more intensive services for high-needs and high-cost patients; their uncovering of health inequities among their population; their concern for social determinants of health; and their alignment with community health needs and engagement with their local community. Twenty-first century physicians need to be skilled clinicians and experts in PHM. GME training programs are critical to developing a physician workforce that is culturally prepared and equipped to improve population health and reduce health inequities.

Appendix: Full PHM Checklist

Foundational Elements

1. Data Infrastructure

- Implement electronic health records (EHRs)
- Create data registry
- Designate IT staff or clinician lead
- Establish metrics or targets for clinical outcomes/improvements
- Regularly review reports by disease, strategy, and population
- Ensure care teams discuss data

2. Team-Based Care

- Develop a core clinical team
- Develop an extended care team
- Distribute responsibilities among team members
- Establish effective communication channels to which all team members can contribute
- Ensure that residents understand team roles and learn from team members

3. Community Engagement

- Ensure that residents and faculty are familiar with the local community health needs assessment (CHNA)
- Align PHM work with the local CHNA
- Align community service projects with the needs of the local community and the needs of the patient population
- Develop partnerships with local community organizations that are aligned with the CHNA and the PHM work of the clinic

Key Activities

4. Panel Management

- Ensure that all patients in a population are included in a panel to regularly observe evidence-based preventive and chronic care tasks and recognize health disparities
- Develop a system to identify care gaps
- Develop a process to close care gaps and inequities with “in-reach”
- Develop a process to close care gaps and inequities with “outreach”

5. Patient Risk Stratification

- Risk-stratify by population subgroup (race, ethnicity, neighborhood, insurance, languages spoken, citizenship, etc.)
- Risk-stratify by disease burden
- Risk-stratify by co-morbidity
- Risk-stratify by frequency of visits to emergency room or hospital admissions (see Complex Care Management)

6 and 7. Care Management and Self-Management Support

- Designate staff to create individual care plans for patients with chronic conditions
- Develop a system for patients to obtain self-management support
- Educate residents on this pathway and create a seamless referral system

8. Complex Care Management

- Develop a process to accurately identify complex care patients
- Develop a small Complex Care Management (CCM) team for high-needs, high-cost patients
- Create the technology infrastructure to support the CCM team (telehealth, mobile application, etc.)
- Include nonclinical team members to provide wrap-around services (social worker, community health worker)

9. Addressing Social Determinants of Health (SDOH)

- Create a pathway within the EHR to collect information about SDOH
- Identify a member of the care team who can address SDOH
- Provide a list of social services/resources that can be used to meet the identified patient needs
- Develop a referral system for clinical team members to refer to the appropriate staff member to have these needs met

10. Ensuring Health Equity

- Collect data on a variety of demographic factors such as race, ethnicity, gender identity, sexual orientation, languages spoken, and citizenship
- Ensure PHM and quality improvement initiatives have an equity analysis
- Provide data to residents and faculty on health inequities found within the patient population
- Once an inequity is identified, create a plan of action and accountability within the team to address the problem
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