Understanding the technology that supports population health programs

The role of EHRs and other information technology in patient care

By Marisa L. Wilson, DNSc, MHSc, RN-BC, CPHIMS, FAAN

John Davidson, age 76, has a history of heart failure (HF), hypertension, and diabetes. Two years ago, his HF symptoms started to get worse. When they become too hard to manage at home, his wife calls an ambulance to take him to the emergency department, where he receives noninvasive ventilation, vasodilators, and I.V. loop diuretics. Once stabilized, he is admitted to a medical-surgical unit for a few days until his symptoms subside. Then he is discharged home.

For Mr. Davidson, this episode is part of a recurring cycle of HF readmissions, which have become more frequent. To help stop this cycle, his healthcare providers arrange for him to enter a population health management program for HF patients. The program includes ongoing patient and caregiver education, regular communication with providers, symptom monitoring and management, and an emphasis on self-care activities (such as diet, activity, and symptom management). It's supported largely by technology—from recruit-

ment and communications through ongoing monitoring. Nurses are key members of the interdisciplinary team that manages the program.

Mr. Davidson's population health-management program targets patients at high risk for poor HF management and frequent readmissions. These programs were developed to help move care delivery from the fee-for-service model (where the *quantity* of care is important) to one that focuses on quality of care and improved patient outcomes through a bundled model across the care continuum.

To successfully implement this model, information technology tools and informatics techniques are used to:

- determine the patient population of interest
- find the practices and evidence to manage the target population
- operationalize interactions between patients and interdisciplinary team members
- monitor quality of outcomes.

Claims data vs. EHR data

Claims data have long been considered the starting point for determining patient populations of interest and monitoring outcomes. (See *What are claims data?*) Although such data are standardized, structured, and easily available, alternative data sources have become more available, thanks to the rapid expansion and capabilities of technology. Today, data entered into the patient's electronic health record (EHR) and collected through interactions mediated by mobile applications, patient portals, and telehealth/telemedicine applications are joining claims data to help interprofessional teams identify, manage, and evaluate high-risk populations. The goal: improved quality of life, better outcomes, and reduced costs.

EHR data include vital signs, allergies, laboratory results, imaging test reports, immunizations, specific medication information, and treatment responses. The EHR also contains details about processes of care; provider impressions; information

What are claims data?

Claims data include patient demographics, diagnosis codes, service dates, and service costs. These data come from entities that pay for the patient's health care (such as insurance companies, health maintenance organizations, and the Centers for Medicare & Medicaid Services). They're available after an inpatient, outpatient, emergent, or urgent care event has occurred and the bills stemming from that care have been paid.

Claims data represent a starting point for identifying and understanding high-risk populations. They're commonly used to stratify patients into risk categories. They also identify high-risk patients' main medical concerns and how much their care costs.

However, claims data are retrospective and can be months or even years old, which reduces their usefulness in real-time, proactive population health planning. Moreover, they don't provide the rich clinical, social, and behavioral data needed to fully understand and manage high-risk populations and keep them as healthy as possible and living optimally. In addition, claims data don't yield insight into potential contributions of the entire interdisciplinary team on patient outcomes and provide a viewpoint only into the activities of the team members who can bill for services.

that the patient volunteers about his or her concerns; and assessment, intervention, and outcome data. In short, EHR data provide a much fuller clinical picture than claims data, offering greater insight into patient outcomes. (See *Important clues from the EHR*.)

Although EHR data provide a real-time look at the details of managing high-risk patient populations, the data must be standardized, complete, accurate, and representational of the input of all interprofessional team members across the transitions of care. To more accurately target and manage health populations of interest, many healthcare organizations are using business intelligence, visual analytics, and data mining tools to harvest information from EHRs. Nurses and other healthcare providers who enter data into a patient's EHR should realize that as an aggregate, that data will be compiled along with data from other patients to manage high-risk populations to help improve outcomes.

Role of patient portals, mobile apps, and telehealth/telemedicine

Engaging patients in their own self-care is an important foundation of successful population health man-

agement. Patient portals, mobile apps, and telehealth/telemedicine can promote this engagement.

As part of his population health-management program, Mr. Davidson receives automated phone calls through which he reports his weight and symptoms. He and his wife also use his patient portal to report his symptoms, send messages to his providers, and obtain medication education. Changes in certain health parameters trigger calls by the care management nurse, who, along with a nurse practitioner, provide ongoing treatment for symptom control. This nurse also can request a dietary consult, which triggers a call to a nutritionist, who provides education on reducing sodium intake to Mr. Davidson and his wife. Over the next year, a telehealth program is added, allowing more robust audiovisual communications and interactions between Mr. Davidson and his healthcare team.

Patient portals

Currently, only a handful of basic patient portals engage patients. Instead, they act as a one-way source of selected data from the provider, perhaps with secure messaging, ap-

pointment setting, refill requests, and limited targeted health information functionality. Second-generation patient portals will need to be more robust, allowing patients and approved caregivers to enter patient-generated data for the provider to review and consider. For patients with HF, the data include daily weights, blood pressure readings, edema levels, sodium intake, and activity monitoring. Providers then could be alerted to changes, allowing them to interact with patients and respond earlier, helping to prevent deterioration.

Mobile apps

Most mobile health apps focus on wellness and medical management driven by consumers' desire for control and information, using the same smart devices that have become a part of everyday life. Some population health-management programs have embraced these apps as a way to provide their target groups with better, faster, and more cost-effective care, communication, and treatment.

Collectively, mobile apps can provide the following benefits:
- streamline workflow by improving communication and access to providers
- assist with monitoring and treating specific diseases (such as diabetes) through daily testing and results reporting
- aid in mental health assessment, diagnosis, and treatment through interactive technologies that provide feedback and promote positive behavior change
- support diagnosis, intervention, and outcomes improvement for cardiac, dental, respiratory, and women's health issues.

Robust and tested mobile apps used by high-risk patient groups and supported by care providers have the potential to deliver near real-time early identification of those pivotal moments that can signal potential deterioration of target health conditions. Smartphone apps with built-in diagnostic capability, portable physiologic monitors, and

Important clues from the EHR

Data from the electronic health record (EHR) provide more complete informa-tion on population questions and concerns that may indicate increased risk, such as the following:

- diagnostic or clinical findings that suggest a worrisome trend
- medication combinations that may be contraindicated
- important health screenings that have been missed, possibly leading to ex-acerbation of a health problem
- social or behavioral factors that can affect the primary health problem, such as smoking, poor living conditions, environmental exposures, limited access to healthy food choices, poor social support, or low reading or health infor-mation literacy levels
- other conditions or health concerns that can negatively affect the target concern.

wearable devices can help identify and engage patients to improve outcomes and quality of care.

Telehealth/telemedicine

Telehealth/telemedicine harness the power of videoconferencing, wire-less access, connected devices (such as scales), and smartphone technol-ogy to offer virtual provider visits to strengthen care management for high-risk populations. These tech-nologies allow remote monitoring, telephone advice lines, real-time re-mote diagnosis, and real-time spe-cialist consults—without geographic or transportation limitations. Such services can be offered between a home and a care provider, between a convenient local site and a care provider, or between care providers (as in the case of consults). The top five target conditions for telehealth/telemedicine services are HF, dia-betes, hypertension, chronic ob-structive pulmonary disease, and mental health.

Rethinking health information technologies

As a patient in a population health-management program, Mr. David-son remains connected to a team of providers on an ongoing basis, using selected high-tech tools that help him maintain an optimal lev-el of physiologic functioning and well-being. Provider data from encounters with him and other patients in his risk group are ac-cumulated and analyzed so all patients can receive the best care while also allowing individualiza-tion to address each patient's spe-cific needs.

The shift away from episodic, event-driven care to care aimed at identifying and managing high-risk populations of patients using standards, evidence, communica-tion, and engagement requires providers to rethink the role of health information technologies. No longer will technologies be used to solely document a single care event. Instead, innovative technologies, supportive networks, and informatics tools will be used to promote interdisciplinary team-work, more efficient workflows, and improved communications— as well as to engage and educate patients so they can attain a high-er quality of life and better out-comes across a continuum of care and in the community.

Through coordination, commu-nication, and integration using the same information technology and informatics tools, nurses can play a key role in a team that manages patients like Mr. Davidson. These valuable tools allow them to prac-tice at the highest level of their ed-ucation. ★

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What is population health?

Population health refers to the health outcomes of a group of individuals, including the distribution of the outcomes within the group.
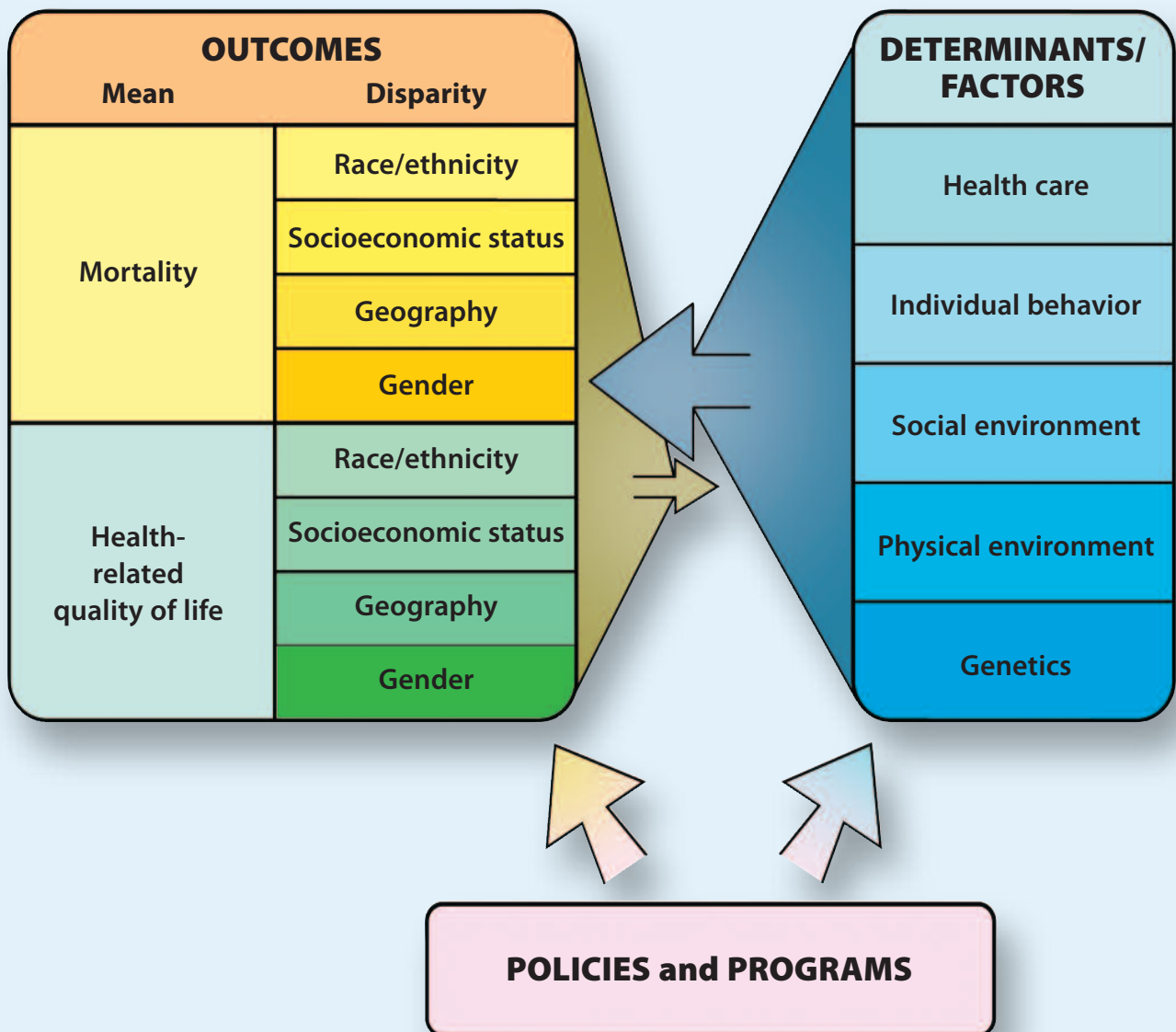
A **group** can comprise people in a geographic region (like a state or country) or individuals with a common characteristic (such as people with heart failure or diabetes).

The **distribution** of health is important; overall health of a population of people with diabetes could be high, but a minority could be much less healthy. The goal of population health is to eliminate or substantially reduce the differences.

Below is a model for population health. Each of the health determinants has a biological impact on individual and population health outcomes. The goal of policies and programs is to produce changes in these health determinates that result in improved health outcomes. Note that several factors, such as gender and socioeconomic status, can lead to possible disparities in mortality and quality of life.

Technology is a valuable tool for managing population health, as discussed in the article on p. 28.

OUTCOMES		DETERMINANTS/ FACTORS
Mean	**Disparity**	
Mortality	Race/ethnicity	**Health care**
	Socioeconomic status	**Individual behavior**
	Geography	**Social environment**
	Gender	
Health-related quality of life	Race/ethnicity	**Physical environment**
	Socioeconomic status	
	Geography	**Genetics**
	Gender	

POLICIES and PROGRAMS

Source: What is population health? improvingpopulationhealth.org/blog/what-is-population-health.html