Abstract
Optimizing the health of populations, whether defined as persons receiving care from a health care delivery system or more broadly as persons in a region, is emerging as a core focus in the era of health care reform. To achieve this goal requires an approach in which preventive care is valued and “nonmedical” determinants of patients’ health are engaged. For large, multimission systems such as academic medical centers, navigating the evolution to a population-oriented paradigm across the domains of patient care, education, and research poses real challenges but also offers tremendous opportunities, as important objectives across each mission begin to align with external trends and incentives. In clinical care, opportunities exist to improve capacity for assuming risk, optimize community benefit, and make innovative use of advances in health information technology. Education must equip the next generation of leaders to understand and address population-level goals in addition to patient-level needs. And the prospects for research to define strategies for measuring and optimizing the health of populations have never been stronger. A remarkable convergence of trends has created compelling opportunities for academic medical centers to advance their core goals by endorsing and committing to advancing the health of populations.

Converging Notions of Populations
Health care delivery has traditionally focused on caring for individual persons. For AMCs this has been the essential framework for medical student and postgraduate education, clinical care, and the research enterprise. Examples of exceptions include the introductory epidemiology class or, in the clinical realm, the aggregation of outcome data from individual patients cared for during a specified time period. By contrast, populations, not individuals, are the stock in trade for public health officials and health policy experts, who typically define populations on the basis of residential location or a common characteristic such as race, ethnicity, gender, age, primary language spoken, or disease status.

This difference in conceptualizing populations, on the one hand as aggregates of individuals receiving care from a delivery system and on the other as the total population in a geographic area or with a particular characteristic regardless of whether engaged in care, mirrors the divergence of the fields of medicine and public health that dates back to the early 1900s. Schools of medicine focus on caring for individual patients, training physicians, and defining mechanisms of pathophysiology, whereas schools of public health take on system-level approaches to improving health, training public health practitioners, and defining social and environmental determinants of health.

In recent years, a growing chorus of investigators, educators, and policy experts have argued for greater integration of the individual and public health approaches to advancing health. The term population health, as set forth by Kindig and Stoddart as well as others, encompasses “the health outcomes of a group of individuals.” Concern for the health of individuals is implicit in this framing, but illuminating and setting in motion interventions to reduce disparities in the health of subgroups, whether defined by race, socioeconomic status or geography, is its central focus.

How does population health differ from public health? Fundamentally, population health is concerned with measuring and optimizing the health of groups, and in so doing embraces the full range of determinants of health, including health care delivery, whereas public health is concerned more generally with influences on health, and the levers to improve them, that exist largely outside of the personal health care system. Population health has grown rapidly as a framework that includes and integrates the activities of the health care sector as among the significant determinants of health outcomes among groups of persons.

Does the rapid adoption of the phrase “population health” into the health care...
delivery lexicon reflect sudden eagerness by health systems to take responsibility for addressing nonmedical determinants of health? The phrase cut its teeth most prominently as a core element of the “triple aim” paradigm, framed in 2008 by Berwick and colleagues8 and incorporated into the Affordable Care Act (ACA) and the concept of accountable care. The triple aim defines three linked, concurrent goals for health care delivery: improving care for individuals, improving health of populations, and reducing per capita costs. In this framework, the responsible system, whether a delivery network, large insurer, or other entity, must balance attention to these three goals such that outcomes are optimized within and across domains. Attention to preventing leading causes of morbidity and mortality, such as obesity, smoking, physical inactivity, and violence, is an expectation of the parent system. Because tackling these “upstream” causes of disease is best accomplished in concert with efforts by other sectors, such as public health, education, housing, and transportation, the population focus of the triple aim is very much in step with the broader concept of population health. In practice, however, population health under the ACA has often taken on a more clinical connotation in which the population is defined as a group of persons receiving health care from a given system or practice, rather than more broadly as, for example, the health of persons in a geographic area.6

To do justice to their missions and position themselves for the increased alignment of health care delivery and public health goals that lies ahead, AMCs must become leaders in embracing and realizing the fullest vision of population health. In practical terms, doing so will mean finding an ever-shifting “sweet spot” that best balances daily delivery system management with total population health goals, reflecting continuously evolving financial and performance targets and incentives. Specific opportunities for adopting a population health framework across clinical, education, and research missions are outlined below.

Clinical Care and Population Health

Many points of alignment exist between the AMC’s clinical mission and the goal of advancing population health. Indeed, there is wide variation in the extent to which AMCs are adopting a population focus, reflecting regional scope, urban or rural setting, referral center or community orientation, and payer mix, among other factors. As payment structures, electronic health record networks, and community benefit expectations evolve, however, alignment between delivery system and population health goals will become increasingly widespread.

Improving capacity for assuming population risk

As payment mechanisms evolve towards greater assumption of risk by health care systems for episodes of care and defined populations, the value of strategies that reduce use of costly acute care services increases. For example, in a fee-for-service paradigm, the business case is challenging for investing scarce institutional resources to mitigate asthma triggers even in a community from which a delivery system draws a substantial number of patients. But priorities shift when an increasing mix of financial risk is involved. When a single accountable care organization has broad regional penetration, delivery system investment in area-wide prevention will come more readily than for a hospital system in a large city that cares for only a modest proportion of the overall population. But even in dense urban centers, strategies are emerging that bridge traditional boundaries.7 Could there be a clinically driven business case for an urban AMC to share with the public sector the cost of combating smoking beyond the institution’s premises, or promoting access to childhood immunizations among local populations? AMCs, many with depth in prevention and in health services research, are uniquely positioned to model the potential financial impact of specific interventions that extend beyond the persons for whom they are already providing care, and to lead in implementing and evaluating interventions that bridge this divide.

Optimizing community benefit

To maintain their nonprofit status, AMCs must delineate to the Internal Revenue Service (IRS) annually their expenditures of benefit to the broader community. As access to health insurance expands under the ACA, the proportion of the community benefit contribution represented by charity care and unreimbursed Medicaid is likely to decline, and hospitals may need to increase support for other initiatives meeting community benefit criteria.8 The ACA stipulates that nonprofit hospitals must complete a community needs assessment every three years that engages stakeholders including the public health sector, and implement a plan to address the findings.9 For many AMCs, this expectation offers one of the few points of direct alignment between corporate and financial goals (IRS compliance and maintenance of tax-exempt status) and advancing population health. For AMCs that bear risk for populations in surrounding communities, neighborhood- or home-based interventions hold promise for reducing overuse of health care services while improving outcomes.10 Community benefit efforts can also align with institutional research agendas and educational goals.

Emerging models of care

Momentum continues to grow for extending health care beyond discrete office visits and into patients’ daily lives, reflecting the move towards self-management and patient-centered care, with promising early indications of impact on health outcomes and costs.11 Integrating health coaches, patient navigators, and community health workers into the patient-centered medical home can yield more continuously distributed care tailored to patients’ level of need, while fostering medication adherence, behavior change, and engagement in needed mental health or substance abuse treatment. For interventions that are strong, or even weak yet inexpensive, investments in community capacity for extending the spectrum of care are certain to deliver important benefits at the population level.

Harnessing health information technology

Tremendous potential exists for AMCs to improve the efficiency, quality, and value of the care they deliver by integrating analytics and engineering processes more deeply into their operations.12 Examples range from applying queuing theory to improve emergency department throughput, to reducing the potential for severe medication interactions by verifying electronic medication lists against those populated by patients through a Web-based portal.13,14 Indeed, leveraging the
vast array of data generated in the process of care with the goal of refining and continuously improving performance—transforming into a “learning health system”—is emerging as a vital goal for large delivery systems. Regional linkages between delivery system health information technology (HIT) networks, or health information exchanges, offer new tools for identifying emerging trends and targeting subgroups that may benefit from tailored interventions. Patient-reported outcomes, gathered either actively (e.g., FluNearYou) or passively (e.g., Propeller Health) and aggregated creatively, can offer additional, actionable tools to delivery systems seeking to optimize population-level outcomes.

Employees and their families
Many AMCs are major regional employers and self-insured. In providing care for lower-wage employees and their families, delivery systems reach many persons who reside in area neighborhoods from which other patients are also drawn. Forming partnerships with employees as “health ambassadors” to their communities can promote the health of both workforce and community while offering the potential for improved service utilization and health outcomes among “covered lives.”

Relating performance measures to population health
The value of patient-reported outcomes, including metrics of functional status and social role function, is gaining acceptance alongside traditional measures of quality and safety. By extending beyond disease-specific measures to global measures of functional status, delivery systems’ attention will be drawn to dimensions of health status beyond their traditional scope. For example, if metrics from patients residing in a particular neighborhood consistently indicate low rates of physical activity, a delivery system could respond by partnering with a community organization to develop local resources that promote exercise.

Medical Education and Population Health
Although health and effective health care delivery are heavily influenced by social, behavioral, and environmental factors, attention to these core determinants is broadly lacking in medical education.

Broadening the scope of medical student education
There is growing recognition of the importance of educating students in “nonmedical” influences on health and health care delivery. The Institute of Medicine has emphasized the need for deeper education in the social and behavioral sciences. The Association of American Medical Colleges (AAMC) announced a significant overhaul of the Medical College Admission Test to emphasize knowledge in these domains. A cooperative agreement between the AAMC and the Centers for Disease Control and Prevention (CDC) aims to integrate education in core public and population health content into medical school curricula. And new programming at some medical schools seeks to educate students in the science of health care delivery, including quality and safety. Yet although some exposure to epidemiology and biostatistics is widespread, education remains fragmented and often sparse in such areas as health economics and policy, health care delivery, health promotion and disease prevention, community and global health, and medical ethics.

Efforts to expand training in these areas must align with trends to condense the duration of preclinical training and, in some cases, medical school itself. Medical schools must define an evolving “canon” in population health that will ensure their graduates’ and future leaders’ ability to understand as well as leverage the context in which their clinical skills are applied.

Primary care and population health
A decades-long push to foster interest in primary care among medical students has recently gained momentum, spurred in part by the demand anticipated as greater access to care follows from the ACA. Valuable opportunities exist to align medical schools’ efforts to increase interest in primary care with initiatives to broaden education in population health. If new delivery system paradigms such as medical homes and accountable care are to succeed, future leaders must bridge clinic and community in managing care and optimizing health promotion and prevention.

Engaging today’s students at the interface of primary care and population health, a stated focus of some newer medical schools and of new tracks at others, advances this agenda while providing rich opportunities for experiential learning. Postgraduate training can advance value-based care by supporting resource stewardship, for example by training clinicians in the Choosing Wisely initiative launched by the American Board of Internal Medicine.

Research and Population Health
Unprecedented opportunities exist for AMCs to conduct research that advances knowledge and practice in optimizing the health of populations.

Growing emphasis on T3/T4 research
At less than 5% of the overall health-related research budget, total federal spending on population-health-related research remains disproportionately low and often threatened by political currents. Yet “downstream” translational research (often referred to as “T3” and “T4” when compared with the upstream “bench to clinic” rubrics of “T1” and “T2” research) has seen important investment in recent years. Comparative effectiveness research and its twin, patient-centered outcomes research, have received major infusions of federal support. The advent of ever-larger distributed data networks is making possible increasingly rigorous analysis of observational data derived from nonexperimental settings.

PCORnet, recently initiated by the Patient Centered Outcomes Research Institute (PCORI), promises large-scale integration of delivery system and patient-reported data to facilitate large simple trials and comparative effectiveness research. National Institutes of Health (NIH) Common Fund initiatives such as the Research Collaboratory aim to bridge established investigative teams with frontline health care delivery systems to answer pressing challenges in implementation research. Recent funding announcements from PCORI and the Centers for Medicare and Medicaid Innovation offer additional fresh avenues for investigators. In short, population health-related opportunities represent a crucial area of growth for the AMC research enterprise.

Fostering community partnership
AMCs have long recognized the value of partnering with communities in research initiatives aligned with local health priorities. Three trends are now converging to elevate the importance of community linkages for AMCs. First, optimizing the impact of evidence-based health-advancing interventions on overall public health and health disparities requires research.
on implementation, dissemination, and sustainability in real-world community settings. Such research, which includes attention to culture, language, and social context, is supported by the CDC’s Prevention Research Centers and also increasingly by the NIH through institute-based funding opportunities as well as the Clinical and Translational Science Institute award program of the National Center for Advancing Translational Science. Second, care delivery models such as accountable care organizations and health homes will need community-anchored interventions and services to optimize the health of the patient populations for which they assume responsibility. Finally, the community benefit requirement is gathering strength, as discussed above. Taken together, these developments argue persuasively for deepening AMCs’ investment in and alliance with neighborhood and community partners.

Building team science
Just as achieving broad-scale health improvements requires input and engagement from multiple sectors, often referred to as a “health in all policies” approach, effectively tackling population health research requires integrated attention from multiple disciplines. Though this kind of “team science” approach is increasingly aspired to in many academic research settings, it can be difficult to realize. Drawing broadly from the health, behavioral, social, and applied sciences, population health research is inherently transdisciplinary, providing an ideal “dry lab” platform for building and strengthening research and policy initiatives that bridge departments as well as affiliated institutes and schools (e.g., business, management, arts, and sciences). Important questions span traditional boundaries. What scale of investment in the health of the general population is required to promote economic vitality and growth? Could broad-scale community-level education of lay health workers yield dividends in reducing unnecessary hospital admissions? Can advances in mobile applications be harnessed to advance personal health goals independently of literacy or educational background? These and myriad population health research challenges are uniquely amenable to a team science approach.

Defining metrics of population health
Better metrics of population health are needed to allow delivery systems, including those led by AMCs, to measure progress towards optimizing health outcomes at the population level. For example, defining and quantifying preventable deficits in morbidity among a population in care or local community could shape interventions for persons whose health is at once the concern of a delivery system, a community, and a local health department. Attention to intermediate outcomes such as physical activity or smoking prevalence is also critical. Although increasingly sophisticated measures quantify population health status at the global, national, and county levels, they rarely focus on populations of persons receiving care from specific health care delivery systems. Conversely, measures applied to populations in care are often so narrowly construed as to exclude persons not deeply engaged in the delivery system in question. AMCs can lead efforts to develop population health metrics that bridge this divide.

Measuring AMC impact on population health
How might the impact of an AMC’s initiatives on the health of one or more populations be measured? Clearly, this would depend on the populations in question: whether in care in an allied delivery system, or living in surrounding neighborhoods, or perhaps nationally or globally following dissemination and application of new knowledge arising from the institution’s research. Though challenging, modeling the impact of an AMC’s clinical, educational and research missions on the health of populations could yield valuable measures against which institutions could measure themselves and the influence of their efforts.

Academic Homes for Population Health
Where in the organizational structure of an AMC should the disciplines of population health best be housed? To date, institutional history and dynamics have been the chief arbiters of such assignments. When a medical school is not affiliated with a school of public health, core population health disciplines are often assembled under one or several departmental umbrellas. At one end of the spectrum, a dedicated department of population health (or of population medicine or public health) provides a primary academic home. Alternatively, departments of preventive medicine, community health, social medicine, health policy, biostatistics, and epidemiology address population health through their several lenses. Elsewhere still, the transdisciplinary nature of the field is reflected in a school or institute structure. At NYU School of Medicine, a new Department of Population Health with ties to other departments, institutes, and schools, including NYU’s Global Institute of Public Health, serves as the medical school’s primary academic home for health delivery science, behavior change strategies, behavioral economics, value and comparative effectiveness, health policy, community and global health, biostatistics, epidemiology, and medical ethics. Because “population health” is not formally recognized as a distinct academic discipline, time will tell whether programs bearing this name become widespread. But the value of such institutional recognition cannot be overstated. Population health embodies integration of the AMC’s social mission with its more routinely embraced missions of patient care, education, and research. Establishing an academic home for population health elevates consideration of the context in which medical care is delivered, while giving a home to education and research in related themes and taking a step forward in bridging medicine and public health.

Aren’t the Broader Determinants of Health Beyond the Scope of AMCs?
If medical care exerts only a modest influence on the overall health of populations, and health-related behaviors, genetics, education, socioeconomic status, and environmental exposures together account for 90% of health outcomes, is it even reasonable to expect AMCs to focus on population health? Yes, for a number of reasons. To begin with, 10% is hardly trivial. If AMCs succeed in playing a central role in optimizing delivery of health care, that alone would constitute a meaningful contribution to population health. Second, health-related behaviors are responsible for an estimated 40% of premature morbidity and mortality. Academic medicine has much to offer here, through primary care and community-based interventions, integrating patient preferences into
clinical priority-setting regarding behavior change, and applying principles of behavioral economics to framing health-related choices. Third, though medical care may itself be only a modest determinant of health, professionals whose passion is to improve health are disproportionately concentrated in this sector. The impact and leadership of this fundamentally committed cadre is critical to moving the needle on the health of populations. Finally, addressing nonmedical determinants of health is a shared responsibility. Because AMCs are fundamentally concerned with improving health, it is only plausible that they work to maximize their impact at the population level, acknowledging clearly their areas of primary strength as well as when partnerships with communities and across sectors are most effectively leveraged.30

Concluding Thoughts

The time is right for AMCs to endorse and commit to the goal of improving the health of populations. In elevating the stature of and institutional commitment to population health, AMCs can leverage tremendous opportunities for advancing core clinical, educational, and research missions, while better preparing future leaders for the complex and multiply determined context in which medical care will continue to be delivered.

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Cover Art

Artist’s Statement: Paranoia

At Georgia Regents University and Health System, we are in the midst of consolidating a liberal arts master’s-level locally focused university and the state’s academic health center/health sciences university to create a wholly new comprehensive research university—a consolidation that will yield its fruit as the faculty recognize and embrace the great power of our interdisciplinary synergies. As I speak to our many liberal arts faculty about how this union will make us stronger, I am constantly reminded of what refuge the visual arts have been to me since an early age, allowing me the refuge of hiding in surreal worlds that reflected my nomadic immigrant childhood. And paradoxically, as I developed my own themes and styles, I found myself following in the traditions of this most irreverent of art styles—that of Ernst, Tanguy, Dalí, de Chirico, Ernst, Tanguy, Dalí, de Chirico, Duchamp, Masson, Buñuel, and Magritte, that of automatism, of chance and random motion, of random thought, of frottage and collage and found objects, of differing perspectives and fragmentation.

I am also reminded of how strongly and intimately the visual and medical arts intersect and synergize. Notably, the visual arts have been instrumental in furthering our understanding of what modern medicine is today. From ancient Egyptian steles, to Roman bas-reliefs, to the medieval illuminated Five Anatomical Figures, to the pen-and-ink work of Leonardo Da Vinci, to the anatomical drawings of Vesalius, to the obstetrical representations of Hunter, to the woodcuts of Paré, the rich illustrations of Netter, and finally to modern-day graphical representations of molecular processes and videos all have served to enhance our comprehension of what the human body, visibly or not, is.

But the visual arts and medicine not only intersect on how we demonstrate to others the processes, functions, and diseases we address, they also serve to enhance our ability to visualize, in our mind’s eye, what we as practitioners of the art are dealing with. The health and biomedical sciences require a significant ability to visualize those flows, structures, and signalings that our eyes cannot see. From the ebb and flow of hormonal homeostasis to the growth processes of malignant tumors; from the insertions of tendons and sinew during muscular contractions to the signaling in our brains when we read, or stroke, or become schizophrenic; from the counterregulations of our metabolism to the placements and locations of our inner organs, and to the potential consequences of trauma, disease, healing, or prevention—we must use our third eye to see things and processes that are not readily apparent.

This is a skill that I have stressed to many medical students, residents, fellows, and young faculty—a skill that can be developed through exercise and training in graphical representation. For this reason, having a strong liberal arts education in general—and in the visual arts in particular—can be critical to the formation of a successful health care provider and biomedical scientist (and many would argue for the formation of a thoughtful and contributing citizen).

It is this intersection between the visual arts and the biomedical sciences that presents extraordinary new opportunities for synergy and collaboration exposed by our universities’ consolidation. The artwork on this month’s cover reflects just that intersection, depicting in the surrealist tradition what we, as health care professionals, often do—visualizing in our mind’s eye the plasticity and graphic nature of our patients’ diseases while simultaneously distancing ourselves from them by dissecting and labeling what we envision.

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