

EXECUTIVE DIALOGUE

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PRECISION MEDICINE AND POPULATION HEALTH

Personalized and Population-Level Interventions
Key to Value-based Care

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Precision medicine and population health may seem like contradictory concepts. Precision medicine is about tailoring medical treatment to the individual characteristics of each patient. Population health is about the health status and health outcomes within a group of people. But, as the COVID-19 outbreak has shown, the two concepts are linked. During the pandemic, precision medicine provided a new paradigm in COVID-19 disease prevention, evaluation and management leading to more precise mitigation strategies, personalized pharmacologic options, as well as new biological therapy developments. COVID-19 also brought health disparities into sharp focus, and health care organizations relied on population health interventions to address public health, medical and socio-economic risk factors and to effectively and ethically respond to the needs of their patient communities. This executive dialogue explores how the pandemic brought into focus the relationship between precision medicine and population health and how the combination of population wide interventions to specific interventions tailored to higher-risk groups will be required to improve population health and narrow health disparities efficiently.

KEY TAKEAWAYS

- 1 The pandemic tamped down precision medicine in two ways. First, it caused fewer patients to seek cancer screenings and other preventive health care services, depriving precision medicine and, by extension, impacting population health with poorer health outcomes. Second, it caused hospitals and health systems to reallocate resources and shift priorities away from precision medicine programs to more immediate needs like COVID-19 testing and treatment.
- 2 Precision medicine and population health are complementary concepts and care services. Outcomes data gleaned from precision medicine can fuel population health programs by identifying, screening and risk stratifying patients who would benefit from specific preventive care or treatment protocols based on their genetic profiles. The use of precision medicine in primary care settings creates the biggest potential to improve short- and long-term outcomes for individuals and lower overall costs.
- 3 Integrating precision medicine and population health gives hospitals and health systems the opportunity to use the combined power of both to reduce disparities and improve equity. At the population health level, integration would help determine what treatments are most effective for patients based on their race, ethnicity or gender. At the personalized health level, integration would apply those lessons learned to individual patients.



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MODERATOR: (*Suzanna Hoppszallern, American Hospital Association*): **Let's open our discussion on the integration of precision medicine and population health with how the pandemic has affected your patient volume, particularly in patient populations with chronic diseases.**

PHILLIP FEBBO, M.D. (*Illumina*): As a practicing medical oncologist, I look at the impact of COVID-19 on cancer as well as other chronic diseases. As you know, cancer and heart disease are the two leading causes of death in this country. With COVID-19 shelter-in-place orders, restricted access to services and fears of infection, we've seen a dramatic drop in cancer screenings and diagnoses of new cancer cases. They're down 89% and 46%, respectively, according to the latest figures I've seen. We see the same thing with other chronic diseases — decreased testing and decreased access to preventive care. All of this will have significant repercussions in the coming months and years.

MATT MANNING, M.D. (*Cone Health*): Our experience is similar to what Phil described. We maintained the same level and volume of service for our oncology patients for the first months of the pandemic, and then things changed. Mammography screenings and colonoscopies came to a complete halt. And we saw that reflected in fewer new cancer diagnoses. People, especially the elderly, were afraid to come in for fear of contracting COVID-19. Our capacity was limited because we needed more time to clean equipment and rooms between patients. And because a lot of people lost their jobs and health insurance coverage, they opted not to pay for preventive care and screenings out of pocket.

STEPHEN BATUELLO, M.D. (*CommonSpirit Health*): We had the same experience across the entire sys-

tem — patients who wouldn't come in for routine preventive care or screenings nor seek care for acute and chronic conditions other than COVID-19. Our biggest concern initially was gearing up for all the COVID-19 testing that had to be done. Now jumping forward, our biggest concern is getting the vaccines into the arms of our front-line health care workers and our eligible patients. The pandemic creates priorities that come at you in waves, and there's not much time between the waves to do anything else.

"Mammography screenings and colonoscopies came to a complete halt. And we saw that reflected in fewer new cancer diagnoses."

— Matt Manning, M.D. —

MANNING: I agree. What we've tried to do between the waves is risk stratify our cancer patients to determine who needs treatment now, who can safely delay treatment and, in some cases, who should forgo treatment. An example would be putting a breast cancer patient on an anti-estrogen regimen for a few months rather than having a lumpectomy. These are difficult

decisions for patients as we've had to deviate from our ideal standards of care because of the pandemic.

MODERATOR: **During the COVID-19 storm, was precision medicine at the crest of the wave or in the trough between the waves in terms of priorities?**

FEBBO: For Illumina, precision medicine was at the crest of the COVID-19 wave because we needed gene sequencing to understand the virus and how it works. We used genomics to develop a diagnostic test for patients who may have contracted the coronavirus. We're continuing to use precision medicine and genomics to track the spread of the virus. When patients test positive, we do gene sequencing to determine the strain of the virus and where and when transmission likely occurred.

MANNING: We used precision medicine to help us stratify cancer patients by risk. Who were our high-risk patients? Who were our low-risk patients?

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As I mentioned, that helped us decide which patients needed treatment now versus who could safely wait. An example is the Oncotype DX genomic test that tells you how likely breast cancer may return after surgery and after chemotherapy for individual patients. That said, I think the pandemic lowered the priority of our overall precision medicine and precision health programs along with many other programs because the pandemic took precedence.

BATUELLO: The Precision Medicine Alliance is a wholly owned subsidiary of CommonSpirit Health, and its purpose is to design precision medicine programs and deploy them across the entire system. We just started to ramp up and then the pandemic hit. Dealing with the pandemic became the priority, so the alliance, like many other precision medicine programs, became less of a priority. We're not at the crest and not in the trough. We're in between riding out the waves. At the same time, I think the pandemic will show how important precision medicine is to both public health and population health when you consider the biology, genomics, sequencing, testing, diagnosing, contact tracing, transmission, planning for future epidemics and outbreaks. The pandemic is the ideal use case for precision medicine.

FEBBO: All hospitals and health systems are under incredible stress right now because of the pandemic, and they obviously must prioritize other things just to get through it. That has put precision medicine on a back burner for the time being. No doubt, there will be a long tail of financial strain on hospitals and health system, too, after the pandemic subsides. Perhaps precision medicine will be a key part of their recovery by creating clinical care

efficiencies and improving population health. Precision medicine could be part of the solution to right the ship again.

BATUELLO: Getting people to understand that precision medicine is not a discipline that you pull off the shelf and plug in, as you would certain other medical disciplines, has been somewhat of a challenge. But there is a keen awareness here that the future of health care delivery is going to be precision health and precision medicine in the post-pandemic environment.

MODERATOR: Let's talk more about population health being the ideal use case for precision medicine, which on the surface seems contradictory. One is about an individual and the other is about all patients. Connect the dots.

BATUELLO: Much of the literature says that population health and precision medicine can't co-exist. I think, by definition, they must co-exist. You can't help an individual without population data. You can't help populations without individual data in the aggregate. They complement each other perfectly.

FEBBO: Individual and precision care contribute to population health, and population health contributes to individual and precision care. It's a virtuous cycle. You bring precision medicine to an individual

patient, and you collect outcomes data from that encounter. Then you aggregate and analyze that data from all patients in a specific patient population to be able to bring even better precision medicine to the next patient.

MANNING: I agree. You can't have one without the other.

"You can't help an individual without population data. You can't help populations without individual data in the aggregate. They complement each other perfectly."

— Stephen Batuello, M.D. —

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PATRICK McCARTER, MS, PhD (*Cone Health*): That's all well and good in theory. But in practice, it can be challenging. What do you do with the information? Your population health data tell you that patients with a specific gene or genetic mutation are at a higher risk for a specific disease in the future. If your patient tests positive for that specific gene or genetic mutation, how do you as a clinician react to that information? What do you do with that information? If you tell the patient, that they have a genetic risk factor, what do you think the patient should do? Do you expect patients to change their behavior or lifestyles? Having a plan for what to do at the patient level and at the population health level with the information that you collect and aggregate is critical to the successful integration of precision medicine and population health.

MODERATOR: How does precision medicine help in the fight against the coronavirus at a population health level?

FEBBO: By sequencing the coronavirus in individual patients, we understand how it spreads in communities, schools, health care settings and elsewhere. Then we can take steps to mitigate the spread in those settings. As we sequence the virus in individuals and sequence individuals themselves, we can connect the dots between the severity of patients' COVID-19 illnesses and other comorbidities, genetic makeup and immune systems. We can use that information from individuals via precision medicine to risk stratify patient populations in terms of who's more or less likely to get sick and who's more or less likely to have a severe case of COVID-19. Then we can adopt strategies to mitigate those risks or to know more accurately how to treat individual patients.

MANNING: I agree with all of that. But at the same time, we're not collecting genomic and outcomes

data from individual patients who have stopped going to their doctors or to the hospital for preventive care, screenings and nonemergent procedures. Those data help fuel precision medicine and population health. There will be a shortage of data until those patients come back. At the same time, if those patients are forgoing or delaying care, precision medicine won't help them, and our overall population health will suffer.

MODERATOR: We agree that precision medicine and population health work hand in glove and are complementary services. How can hospitals and health systems operationalize that idea and what are some examples of how it can work now and post-pandemic?

“Individual and precision care contribute to population health, and population health contributes to individual and precision care. It's a virtuous cycle.”

— Phillip Febbo, M.D. —

FEBBO: From a COVID-19 perspective, precision medicine will help us understand who can benefit from the vaccines, who gets the most protection from the virus and how long that protection lasts in different individuals. In learning about post-vaccine immunity, we'll be able to apply it to a wider population of patients as well as to individuals within that population. Overall population health will improve because of precision medicine.

MANNING: What we learned during the initial COVID-19 surge was how to use precision medicine to risk stratify cancer patients, prioritize who needed services immediately and who could wait. We're using the results of that initial experience to guide the decisions we make now during this next phase of the pandemic. When the pandemic subsides, we'll use the outcomes data generated by precision medicine to support our population health work in terms of screenings, diagnosing new cancer cases and charting new courses of treatment for patients.

BATUELLO: We're now working on what we refer to as

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— Patrick McCarter, MS, PhD —

emerging opportunities post-pandemic. Two of those opportunities are personalized care, which spans a whole range of services, and precision medicine, which is the science of using genomic testing and other omics testing to improve outcomes and population health. We know both are going to be a big part of health care delivery moving forward.

McCARTER: We, (scientists and clinicians), spend a lot of time studying patient responses to targeted therapies based on their genetic profiles. What I’d like to see is the adoption of those precision medicine technologies at the clinic level, at the primary care level for all patients, not just at the inpatient level for already seriously ill patients.

MODERATOR: What would be the benefit of integrating precision medicine into primary care in terms of population health?

McCARTER: It would be a real game changer for population health. For example, if you could get a patient on the right drug for a chronic illness based on his or her genetic profile right away rather than by trial and error with different drugs, the patient would have better short- and long-term outcomes. Imagine doing that for every patient diagnosed

with a chronic condition in your clinic or primary care setting. Not only would outcomes improve, it would save time and reduce costs both for patients and for the entire system overall.

BATUELLO: That would be great if we could do that. There is great value for population health in using that approach and applying those types of data. If we were able to identify hereditary cancers in people who otherwise wouldn’t have known, we could manage them prospectively at a tremendous cost savings to the health care system. Another value that precision health brings to population health is the promise of identifying and reducing health disparities. Imagine doing genomic testing in large cohorts of people to determine what treatments are the most and least effective in patients by race, ethnicity or gender. Precision medicine is perfectly suited for that population health purpose.

MANNING: I’m also optimistic that we can use precision medicine to improve population health in general and provide greater health equity to patients specifically. By using precision medicine to identify disease risk, we can start closing those equity gaps.



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