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Opinion paper

## Improving health determinants outside of the clinic does not mean outside of clinical science



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### ABSTRACT

There has been steady and growing interest in addressing patient health beyond the traditional interactions with clinicians. Much attention has been given to the social determinants of health which are associated with many non-communicable diseases. A challenge to the healthcare delivery system is to incorporate these environmental circumstances into a coherent diagnosis and treatment framework. As clinicians are expected to help transform the healthcare delivery systems to consider these extra-clinical factors, they may benefit from better understanding of pathways to disease. Similarly, payment systems should incorporate health economics outcomes research to augment the healthcare utilization measures used frequently today.

### Introduction

In the mid-18th century, Scottish physician James Lind prevented the terrible disease of scurvy by prescribing long-voyage sailors in the British Navy consume citric juices in their daily rations. The power of the treatment was profound. The British Naval Hospital at Haslar admitted 1457 cases of scurvy in 1780 and by 1810 there were only two.<sup>1</sup> Importantly, we know the story does not end there. In 1928, Albert Szent-Györgyi isolated vitamin C,<sup>2</sup> resulting in a deep understanding of the vitamin and its mechanism of action. Not long after, we could transition from relying on plant-derived vitamin C to synthesizing it in manufacturing labs. Once crudely treated with citrus fruits, it would take a century to fully understand scurvy and to decipher the method of action of vitamin C.

In many ways, U.S. healthcare is in the midst of something analogous to finding fruits for treatment. There are myriad well-documented associations between personal circumstance and the development or advancement of disease. These “non-clinical” factors are typically called the Social Determinants of Health (SDOH),<sup>3</sup> Prominent among them are access to transportation, stable housing, education attainment, access to health care, social support, and adequate food.

Fueled by the expansion of Medicaid, the growth of Medicare Advantage plans, and importantly, new flexibility to pay for activities that are not tied directly to a clinical condition, SDOH are increasingly targeted for improving the health of patients.<sup>4</sup> Popular among these new kinds of efforts are those that provide non-emergency transportation for health-relevant patient trips using ridesharing platforms like

Lyft.<sup>5</sup> For food access, one study of heart failure patients achieved better outcomes when heart-healthy meals are delivered by mail.<sup>6</sup> Some health plans are even supporting housing programs for those who have high health risk, and unreliable living circumstances.<sup>7</sup> There have been many published reports of positive returns on investment in these programs measured in terms of lower utilization of healthcare services such as less frequent trips to the emergency department.

Improving health, as reflected in lower utilization of health services, is logical and encouraging. However, these approaches may not connect to the deeper origins of the many chronic diseases that are justifying their costs without addressing three health economics challenges:

### Wrong pocket problems

As we hunt for interventions well outside of approved diagnostics and treatments, we drift further into often-expensive territories that may be difficult to sustain or scale. For example, the benefit of clean drinking water is paid for by fees assessed by public utilities and not by health insurance plans. Water treatment became law because of its health benefits. Is the benefit of assistance with food or transportation something that can feasibly be internalized to health care dollars?

Economic evaluations of health interventions may consider broad societal benefits, but they most frequently take the perspective of the “payer” for the health services (i.e. insurance companies, Medicaid, Medicare). This siloed approach causes a serious dilemma when it is time to pay for programs that improve SDOH or prevent/treat diseases with a large societal burden outside of the healthcare system. Medicare

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Advantage plans offering gym membership discounts or other fitness benefits may be a step in the right direction, but should we expect health insurance payers to start picking up the tab for bottled water for the residents of Flint after state and federal resources stopped flowing? When the health of an insured population significantly overlaps with the health of the general population, those paying for health outcomes should consider if the pocket the money comes out of should be a public or private one. Moreover, the line between medicine and public health is often drawn as the difference between diagnosing and treating an individual vs analysis and disease patterns in a population. The challenge to medicine in this arena lies with the individual and many efforts in SDOH confuse rectifying individual circumstance when the broader social context is the appropriate level of action.<sup>8</sup>

Because many social determinants of health overlap with community circumstances, healthcare leaders, clinical researchers, and civic leaders should engage in developing new frameworks to ensure that spending on community service includes more focused accounting of who should bear the cost for which benefits. In an era of big data, electronic health records, and cities filling with sensors, better research is possible with the right alignment. For example Kaiser Permanente conducted a study with Google's Street View cars to determine how much cardiovascular risk was associated roadway air pollution in Oakland, California.<sup>9</sup> Here, the cost of poor residential air quality is currently realized in the health consequence and medical claims of those breathing it. In the context of diagnosis and treatment, these nontraditional sources of environmental information can become part of treatment guidance. An overweight patient living near a busy roadway may merit more attention for diabetes and cardiovascular risk as part of the clinical encounter, if the healthcare delivery system is able to incorporate these other information sources.

### Financing discovery

The pharmaceutical and medical device industries are fueled by discovery capital that relies on the kinds of health economic analysis that considers specific, validated outcomes. While federal funding for clinical research is important, the potential payoff for discovering the next blockbuster therapy drives significant private investment in discovery, development, and clinical trials necessary for regulatory approval and reimbursement. Without similar economic incentives, the interest in spending on early stage research to find the specific clinical characteristics of patients who may benefit most as well as the actual clinical mechanisms of SDOH interventions may remain low. Intellectual property protection, similar to pharmaceutical patent rights provided by the Hatch-Waxman Act, may not be feasible for a program that ensures children have adequate access to healthy food. Experimentation in providing social supports is encouraging but missing the kinds of intellectual property lock-ins typical of new drugs, devices and procedures. Without a structure for rewarding discovery in this space, we may never learn about the essential factors in these interventions that carry the greatest promise, nor why.

### A better denominator

Like the person in the small boat, furiously scooping water out with a bucket as water pours in through a gaping hole, our efforts at improving treatments may be, in the long run, vain. It is possible that evaluating an intervention's effect by measuring its impact on utilization of healthcare services, we may arrive at a point of diminishing returns as we focus much of the energy on those who already have a diagnosed condition. Will we miss the opportunities to address the growth of the incidence of disease by focusing too many of our resources on limiting its severity? We know this is true of heart disease. The most recent analysis of the burden of disease,<sup>10</sup> highlights the fact that cardiovascular disease mortality is no longer declining in high income regions of the world, suggesting that new efforts are needed to

prevent the disease from occurring in the first place. If the goal is to maximize the total "health" of our population, focusing on disease management may be more of a stop-gap arrangement than an optimized and enduring solution. Spending billions of dollars on disease state management and only a fraction on SDOH research may be the equivalent of a research portfolio focused on developing fancier buckets.

True discovery of the specific mechanisms that link these social circumstances to the actual development of the underlying chronic diseases could follow the same century-long trajectory taken to get from handing out limes to determining the actual amount of vitamin C humans need each day. Healthcare leaders can take following steps to finding the deeper associations between environmental circumstance and disease risk:

### Integrating disease research into social experiments

Many leading healthcare organizations have begun to employ rigorous control trials of social services. However, these could be improved by adding flanking efforts to learn how these programs actually impact physiological processes in the causal pathways of disease development. Such clarity in analytical thinking can be achieved with a focus on the level and rigor of evidence.<sup>11</sup> For example, a recent study<sup>12</sup> has identified cardiovascular disease biomarkers associated with proximity to greenspaces, which aid in the identification of the "dose-response" relationship for this social determinant of health. Without such clarity of treatment effects, measured in specific and validated clinical markers, these chronic conditions will continue to remain a burden on our communities and economies.

### Conclusion

Remarkable progress has been made in understanding health outside the walls of the clinic. In the past, much of the improvement in clinical treatment was informed by high quality clinical science that rewards the kinds of breakthroughs that eliminate disease and suffering. However, it is time to synthesize the concepts and tools of laboratory science with real-world problems of population health, in to enrich our understanding of how the well-recognized social determinants work and how their influence on human health could be modified to increase health and prevent disease, so that chronic conditions, like cardiovascular disease, can be largely relegated to history alongside scurvy.

### Conflict of interest

The authors have no conflicts of interest to declare.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.hjdsi.2019.06.001>.

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