Economic Studies at BROOKINGS

Obama Administration's Precision Medicine Initiative Should Better Balance Treatment and Prevention, Brookings' Hammond Argues

*Linking prevention *and* treatment, using emerging analytic and modeling techniques likely to yield biggest impact*

Early steps in implementing the Obama administration's Precision Medicine Initiative have tended to focus more on treatment of existing disease, when greater balance with prevention is needed, according to a new paper published today in *JAMA Pediatrics* co-authored by Brookings Senior Fellow Ross Hammond.

Although the Initiative aims to "[enable] health care providers to tailor treatment and prevention strategies to people's unique characteristics, including their genome sequence, microbiome composition, health history, lifestyle, and diet," the authors argue that more attention to integrating findings and methods between the treatment and prevention branches of precision medicine would accelerate progress toward effective and highly individualized approaches to improving health and treating disease.

In "Precision Treatment and Precision Prevention: Integrating 'Below and Above the Skin,'" Hammond, Senior Fellow in Economic Studies at Brookings and Director of the Center on Social Dynamics and Policy, and Professor and Director of the Obesity Prevention Program in the Department of Population Medicine at Harvard Medical School Matthew Gillman recommend strengthening precision medicine by applying lessons learned and sharing study designs across the prevention and treatment paradigms, and by using emerging analytic and modeling techniques – especially agent-based modeling – to connect seemingly distinct but interrelated health complexities.

By sharing lessons learned from "beneath the skin" approaches (often the focus of treatment) with those from "above the skin" approaches (often the focus of prevention), the authors argue solutions can be found that "transcend the skin barrier." For example, adherence to medicines is determined not only by biological mechanisms, but interacting psychological, economic and social factors as well. Treatment and prevention paradigms should also share study designs and clinical epidemiological principles to be most effective for patients. "Now, 'big cohort data' derived from medical care encounters from conception to old age, informed by judicious use of patient-empowered information from biology, behavior, social networks, geography, and the macro-environment, also have the potential to yield real-world answers to comparative effectiveness treatment questions," they write.

Finally, the application of emerging analytic and modeling techniques to newly available "big data" streams has the ability to establish connections and expose common features which might not otherwise be apparent across the complicated systems that govern health. "Agent-based modeling, a technique more often used in engineering, ecology, business, and social science, is particularly well-suited for modeling this type of feedback dynamics across the skin barrier, and holds promise for pinpointing best practices in both prevention and treatment," Hammond and Gillman argue.

Accounting for the roles of individual differences in people's genes, environments, and lifestyles in health outcomes may seem to be a daunting and monumental task, but establishing a fundamental understanding of these processes will set the basis for precision medicine going forward. Hammond and

Gillman call for setting in place an incentive structure to enhance partnerships across the prevention and treatment paradigms. It is by doing so that the precision medicine revolution will be able to reach its full potential, they conclude.

Read the paper

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