

Decision-Based Evidence Making: The Logic of Agile Science for Improving Population Health

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Three emerging trends are disrupting current models for promoting health and treating illness: 1) unsustainable growth in the complexity and cost of healthcare & health promotion; 2) a movement towards more human-centered and personalized strategies for fostering health and treating disease; and 3) an explosion in information, communication, and computing technologies and the “big data” these systems produce. There is great excitement about the possibility of leveraging the second and third trends to realize the vision of a human-centered, preventive, cost-effective health system and corresponding “Culture of Health” but myriad technical and, perhaps more importantly, cultural challenges need to be overcome.

PURPOSE: The purpose of this presentation is to: 1) present the logic of an alternative research process called “agile science” that is explicitly formulated to realize the above vision; 2) describe on-going work both in terms of mapping out this process at a systems-level and a series of “in the weeds” use-cases that are designed to explicitly test the agile science thesis; and 3) argue for a strong concerted effort towards further expanding contributions to open science.

OUTLINE: A brief overview of the context and three trends will be discussed. Following this, the basic logic of agile science will be presented followed by a review of work on developing a variety of “precision behavior change” tools. I will then describe some emerging work including: 1) my support of citizen-led engineering and science as an example for understanding the shifting role of traditional “experts” in personalized health; 2) my work with industry partners, as an example of how careful system design can reduce the cost of evidence; and 3) my work on advancing the use of “ontologies” from informatics as one plausible strategy for fostering more robust “syncing” of evidence, tools, and insights across disparate groups for building a more robust accumulative knowledge base.

CONCLUSIONS: A data-rich “agile” health science will likely require strategies for increased democratization of the scientific process, reduced cost of gathering evidence, and the need for a “usable” evidence-base that produces evidence-based answers for individuals/patients, providers, and policymakers to the question they each ask: “What do I do now to produce the desired outcome?” To counteract the unintended consequence of increasing disparities that “precision” efforts could create, tools for curating knowledge and resources must be carefully integrated into precision technology infrastructures.