



Navigating the evidentiary turn in public health: Sensemaking strategies to integrate genomics into state-level chronic disease prevention programs



Laura Senier^{a,b,*}, Leandra Smollin^c, Rachael Lee^a, Lauren Nicoll^d, Michael Shields^a, Catherine Tan^a

^a Department of Sociology & Anthropology, Northeastern University, 360 Huntington Avenue, Boston, MA, 02115, USA

^b Department of Health Sciences, Northeastern University, 360 Huntington Avenue, Boston, MA, 02115, USA

^c Department of Sociology & Criminal Justice, State University of New York at Potsdam, 44 Pierrepont Avenue, Potsdam, NY, 13676, USA

^d Community College of Rhode Island, 400 East Ave, Warwick, RI, 02886, USA

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ABSTRACT

In the past decade, healthcare delivery has faced two major disruptions: the mapping of the human genome and the rise of evidence-based practice. Sociologists have documented the paradigmatic shift towards evidence-based practice in medicine, but have yet to examine its effect on other health professions or the broader healthcare arena. This article shows how evidence-based practice is transforming public health in the United States. We present an in-depth qualitative analysis of interview, ethnographic, and archival data to show how Michigan's state public health agency has navigated the turn to evidence-based practice, as they have integrated scientific advances in genomics into their chronic disease prevention programming. Drawing on organizational theory, we demonstrate how they managed ambiguity through a combination of sensegiving and sensemaking activities. Specifically, they linked novel developments in genomics to a long-accepted public health planning model, the Core Public Health Functions. This made cutting edge advances in genomics more familiar to their peers in the state health agency. They also marshaled state-specific surveillance data to illustrate the public health burden of hereditary cancers in Michigan, and to make expert panel recommendations for genetic screening more locally relevant. Finally, they mobilized expertise to help their internal colleagues and external partners modernize conventional public health activities in chronic disease prevention. Our findings show that tools and concepts from organizational sociology can help medical sociologists understand how evidence-based practice is shaping institutions and interprofessional relations in the healthcare arena.

In the spring of 2013, Angelina Jolie revealed in the *New York Times* that she had been screened for hereditary breast and ovarian cancer (HBOC), that she had learned that she carried genetic variants elevating her risk of both cancers, and that she had decided to undergo prophylactic mastectomy to minimize her risk of disease. This dramatic announcement triggered increased demand for HBOC screening around the globe (Evans et al., 2014), and seemed to indicate that the long-awaited era of precision medicine had finally arrived. However, while screening for HBOC can be very beneficial, it is not recommended for all women, only for those with a very strong family history of breast cancer (U.S. Preventative Services Task Force (USPSTF 2005)). Genomics is thus not only elevating expectations for personalized medicine, but it is also pushing public health officials to embrace “precision public health,” which tailors health promotion initiatives such as cancer screening to specific subpopulations (Khoury et al., 2017). Taking breast cancer as an example, a precision public health approach would

entail initiatives to identify the small proportion of women who might benefit from screening for HBOC, while maintaining recommendations that typical-risk women receive biennial mammography starting at age 50 (USPSTF, 2016). To date, however, expert panels have recommended genomic screening for only a few conditions (breast cancer being one of them), and champions of genomic medicine and precision public health are eagerly awaiting evidence-based recommendations to guide further integration of genomics in clinical practice and in precision public health.

In this paper, we approach the advent of genomic medicine and evidence-based practice as converging *environmental jolts*—“sudden and unprecedented event[s]” requiring organizational change (Meyer 1982)—that are reshaping contemporary public health practice. While social scientists have examined the paradigmatic shift towards evidence-based practice in the medical profession (e.g., Timmermans, 2010), there has been limited exploration to date of how evidence-

* Corresponding author. Department of Sociology & Anthropology and Department of Health Sciences, Northeastern University, 360 Huntington Avenue, Boston, MA, 02115, USA.
E-mail address: l.senier@northeastern.edu (L. Senier).

Table 1
Characteristics of evidence based medicine and evidence based public health.

	Evidence Based Medicine	Evidence Based Public Health
<i>Application</i>	For assessing the utility of novel healthcare innovations to maintain “quality of health care and cost control” (Timmermans and Kolker, 2005)	For “integrating science-based interventions with community preferences to improve the health of populations.” (Kohatsu et al., 2004: 218)
<i>Methodology</i>	Standardized; randomized controlled trials and meta-analyses	Diversified; epidemiological research, quasi-experimental designs, natural experiments
<i>Setting and actors</i>	Medical schools, clinics Physicians, researchers, and patients	Multi-sectoral: Federal, state, local health departments Multi-professional: healthcare providers, engineers, lawyers, educators, community outreach workers
<i>Prestige</i>	High (Brandt and Gardner, 2000)	Lower prestige relative to medicine and underfunded (Brandt and Gardner, 2000)

based practice is affecting the other health professions, especially public health. Public health programming must be responsive to local context and characteristics, which complicates the implantation and standardization of evidence-based practices (Dobrow et al., 2004; Kirmayer, 2012); and the idea that there are “best solutions” overly simplifies policy decision-making processes (Kemmer, 2006). While these challenges have been explored in international and cross-cultural contexts (Behague et al., 2009; Wang et al., 2018), the integration of evidence-based practice in US public health systems remains under-explored.

Evidence-based practice in US public health is an especially ripe area for sociological theorizing, in part because the public health profession is much more heterogeneous than the profession of medicine, but also because responsibility for public health policy landscape in the US is shared between the federal and state governments. As a result, we find that expectations for evidence-based practice in public health in the US have (1) created professional challenges that are distinct from the epistemological and professional challenges that coalesced in the evidence-based medicine (EBM) paradigm, (2) that public health professionals have needed to use different strategies to respond to these demands, and (3) that these factors have played out differently in different states, producing regional variations in the uptake of evidence-based practice (Senier et al., 2018). To illustrate the challenges of navigating this evidentiary turn, we present a case study of how one particular state health agency—the Michigan Department of Health and Human Services (DHHS)—integrated scientific advances in genomics into their chronic disease programming when discourses around both evidence-based public health (EBPH) and precision public health were emerging. We draw from organizational theory to demonstrate how program staff used sensemaking and sensegiving practices to explain why genomics could be relevant to public health at a time when they also had to adhere to evolving expectations for EBPH. This paper expands sociological literature on evidence-based practice, attesting to its significance as a force of change in the healthcare arena that extends beyond the scope of EBM. Moreover, the emergence of public health genomics is an especially valuable case to explore how multi-professional and multi-sectoral organizations negotiate and adapt to paradigm shifts. We argue that sensemaking and sensegiving are two critically important strategies through which complex organizations prepare themselves to respond to major disruptions in their field.

1. Background: understanding public health in a tumultuous era

In this paper, we identify two distinct environmental jolts that have recently affected the public health profession: (1) the advent of EBPH and (2) the mapping of the human genome and the rise of precision public health. While these jolts certainly affected medical care, our focus in this paper is how these two environmental jolts have challenged traditional models of chronic disease prevention, and how public health agencies have responded to these technological and practice innovations.

Surfacing in the mid-1990s, EBM was formulated with the intent of using research to guide diagnosis and treatment, and thus improve patient outcomes (Sackett et al., 1996). EBM has also been touted as a means for assessing the utility of novel healthcare innovations, such as antiretroviral therapies that mitigate the risk of mother-to-child transmission of HIV (e.g., Suksomboon et al., 2007). In this sense, EBM not only helps standardize medical practice but also provides a framework for assessing new discoveries, determining whether they are ready to integrate into clinical practice, and provides physicians with clinical practice guidelines to assimilate new routines into their clinic operations. Sociological research on EBM has focused primarily on three main areas: epistemological struggles over what constitutes evidence in the development of clinical practice guidelines, the impact of EBM on the medical profession's autonomy, and the effect of EBM on doctor-patient interactions (for a recent review, see Timmermans, 2010). Soon after the emergence of EBM, other health professions embraced the model, and today we see textbooks, journals, and professional curricula devoted to evidence-based nursing, evidence-based psychiatry, and evidence-based pharmacy, to name a few (Djulbegovic and Guyatt, 2017; Satterfield et al., 2009).

EBPH emerged shortly after the introduction of EBM and has been defined as “the process of integrating science-based interventions with community preferences to improve the health of populations” (Kohatsu et al., 2004:218). While public health has faced similar challenges to the medical profession's assimilation of EBM, we argue it is distinct from EBM for four reasons (see Table 1). First, the maturation of EBPH produced distinct epistemological and political difficulties (Brownson et al., 2009; Eriksson, 2000). In EBM, clinicians are trained to consider the most recent and highest-quality research in guiding diagnosis and treatment; this training is predicated on a hierarchy of evidence, with a strong preference for results of randomized controlled trials and meta-analyses (Timmermans, 2010; Vitoria et al., 2004). Public health research, however, employs a wider array of research designs, including epidemiological research, quasi-experimental designs, and natural experiments. As such, the knowledge base is less well suited to the knowledge synthesis techniques that have been lionized in EBM. Public health research also embraces a continuum of research activities, from problem identification through developing and fielding an intervention and evaluating its impact (Kohatsu et al., 2004; Satterfield et al., 2009). Consequently, it has been difficult to achieve consensus on the best criteria for synthesizing knowledge that could guide EBPH (McGuire, 2005).

Second, not only is public health's evidence base more unruly than medicine's, but public health is institutionally and professionally more diverse. The public health workforce includes not only healthcare providers, but also engineers, lawyers, educators, and community health workers (Brownson et al., 2009). Third, public health has historically occupied a less prestigious position than the medical profession, especially in the US (Brandt and Gardner, 2000; Starr, 2009), making it difficult for public health agencies to promote evidence-based practices that require the voluntary participation of healthcare providers (Brownson et al., 2009). Finally, relative to biomedicine, public

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