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Avoiding medical overactivity as a strategy for improving the health care system

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The most interesting research is unplanned. My Harkness Fellowship at The Dartmouth Institute for Health Policy and Clinical Practice guided my scholarship towards addressing medical overactivity. Identifying technology as a strong driver of excessive diagnostic testing initiated a study of the major drivers of overactivity as well as strategies to mitigate and prevent it. The studies started at The Dartmouth Institute and nourished by the Harkness Fellowship have directed subsequent research on overdiagnosis, low-value imaging, and medical overactivity in general.

While the intention with my Harkness Fellowship was to study overdiagnosis in breast cancer screening, comparing the USA and Norway (Avoiding Over-Diagnosis as a Strategy for a High Performing Health Care System), my focus rapidly shifted to studying medical overactivity more broadly, with a particular emphasis on the driving force of new diagnostic tests.

As with all research, unplanned possibilities may turn out to give the most fruitful outcomes. Two unplanned events were crucial to my project. First, I was placed with the Shared Decision Making (SDM) group of Glyn Elvyn at Dartmouth Institute. This group was and remains one of the world's leading research environments on shared decision making (SDM). While I had worked extensively on patient autonomy and informed consent, I was a novice in SDM. Being in Glyn Elvyn's group gave me a unique opportunity to learn from some of the very best researchers internationally, which has significantly influenced several of my later publications.

The second pivotal event was that H.Gilbert Welch, my other mentor, was interested in new diagnostic tests – not only in terms of their medical safety, efficacy, and effectiveness but also regarding their economic impact

and the subsequent unnecessary testing and treatment they might generate. This introduced me to an exciting world of new technologies, high diagnostic hopes, venture capital, and market estimates.

What began as a specific project to compare screening programs in the USA and Norway ended as a general endeavor to investigate strategies for improving the health care system by avoiding and reducing medical overactivity.

Findings

Both the inspiration from SDM and the studies of diagnostic tests resulted in a publication in the *BMJ* that examined the hype and overuse of medical technology (1). The article analyzed some of the key drivers of irrational implementation and use of technology in healthcare. By identifying some of the main mechanisms behind overuse of technology, it pointed to efforts needed to foster safe, efficacious, effective, efficient, and sustainable use of technology in healthcare.

In another publication in the *BMJ*, Welch and I documented how innovative technologies and ample venture capital are combining to produce new disease biomarkers and mobile monitoring devices that, while technologically advanced, do not automatically provide improvements in clinical care and population health (2). We found that while these innovations may benefit some patients, they also increase the frequency of false alarms, overdiagnosis, and overtreatment, thereby escalating healthcare workload and shifting clinicians' focus towards healthy individuals. We argued that misleading feedback at both the population and individual levels tends to drive further market growth and that clinicians must counterbalance this by educating patients, respecting baseline risk, considering downstream consequences, and anticipating misleading feedback (2).

Impact

The project at Dartmouth inspired a host of related publications on the concept of overdiagnosis (3-8), patient engagement in health technology assessment, and biases and imperatives in handling medical technologies (9, 10).

Furthermore, the Harkness Fellowship stimulated further studies on the (ir)rationality and overuse of diagnostic tests. These studies subsequently led to a research project financed by the Norwegian Research Council: *Improving the radiological services* (https://www.ntnu.edu/web/ihg/iros). The IROS-project had three distinguished Harkness Fellows on the Advisory Board: Fiona Clement, Adam Elshaug, and Stirling Bryan.

IROS identified significant geographical variations in imaging services, low-value imaging procedures, and effective interventions to reduce unnecessary imaging. The project aimed to enhance the quality, safety, effectiveness, efficiency, and sustainability of medical imaging.

In addition to the academic outputs (two PhD-theses, three master's theses, 20 peer reviewed articles, 38 contributions at scientific conferences and a range of articles in newspapers and other media) the project's findings have been used by health authorities in a national project to reduce unwarranted geographical variations and overuse of imaging and laboratory services in Norway. Additionally, I and other members of the IROS-project have served as experts for this national project.

Career

My experiences with the outstanding researchers at Dartmouth Institute and the exposure to U.S. health care/policy have shaped my academic career in several ways. Most notably, they have influenced my research focus and the formulation of my research questions, as well as facilitated valuable networks and collaborations. For example, I have had a very fruitful collaboration on uncertainty in medicine with senior Scientist in the Behavioral Research Program Paul Han at NIH.

Moreover, the insights gained through the exceptional health policy program of the Harkness Fellowship have deepened my interest in health services research, public health, and public health ethics.

Lastly, the fellowship has strongly reinforced my commitment to improving the quality and sustainability of the Norwegian healthcare system.

Future work

I plan to continue working towards improving the quality, safety, effectiveness, efficiency, and sustainability of healthcare by addressing and reducing medical overactivity – a commitment that was first sparked by my Harkness Fellowship.

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