

Health and Elderly Care Technology

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Technological developments have revolutionized the field of health care. New technology allows us to not only live longer and better, but changes where, when, how, and even if, we access treatment. However, the development and take-up of health care technology varies across both segments of the health care market and different national health care systems. Despite its reputation as a leader in the innovation and adoption of high powered medical technology, the United States has been in laggard in many aspects of the technological revolution in the field. In 2003, over 90% of Danish physician's offices used electronic health records, whereas only 17% of US physicians did (CDC 2005, Danish Ministry of Interior and Health 2004). The story does not stop here though. While concerns about privacy and the integrity of personal medical data have figured prominently in debates over computerization in the United States, in Denmark there has been rapid innovation in this field following from the widespread diffusion of this technology. Why have American hospitals been a core site for adopting novel surgical technology, whereas other health care systems have been far more successful at widely diffusing and developing administrative and consumer oriented medical technology? How do different rates of diffusion subsequently shape innovation and technological development in health care systems? How do these differences impact the health care system itself?

As a partner in the Innovation Alliance project on Information Technology for Assisted Living at Home (LINK), BRIE is researching issues surrounding technological diffusion and innovation in the field of elderly care. The fundamental questions driving this research are what determines differential rates of take-up of medical technology across advanced industrial economies and what are the implications of this in shaping new trajectories of development in medical technology? In so doing the project asks (1) how different national political systems, health care systems, and industrial processes, interact to drive innovations in medical technology for different end users (hospitals, administrators, and patients in home care settings); (2) what determines the adoption and diffusion of new technology across these sectors (3) how do different rates of technological diffusion impact subsequent innovation in the field of health care technology (4) what different types of institutional advantages emerge from the interaction of varying health care and industrial systems.

The interaction between state structures and markets are at the center of the analysis. Different institutional structures impact who buys, sells, and uses medical technology, creating different national patterns of technological development and diffusion. BRIE research examines these processes by first focusing on different structures of purchasing of care in three countries: the United States, Denmark and Finland. In each case, we examine a) how do structures of purchasing of medical technology vary across both types of goods and institutional contexts? b) how are concentrated and diffuse benefits of new technology distributed between different end-users and purchasers? c) how do national institutions/state structures integrate individual purchasers into a broader network of technological diffusion? The fragmented structure of purchasing of assistive technology for the elderly in the US (across HMOs, Medicare/Medicaid/Veterans Affairs, and private consumers) contrasts to integrated local purchasing of elderly care in Denmark and Finland. Danish and Finnish purchasers are both *able* to make significant procurement decisions and *capture* the benefits of diffuse performance enhancement; whereas, fragmentation in the US system means providers or end-users are often forced to pay concentrated costs for technological acquisition that delivers diffuse benefits. By contrast, purchasing in the high-tech surgical equipment market is structured different, with US hospitals often able to both make and capture the benefits of procurement of leading edge technology. This first step of our research involves carefully tracing

who is making purchasing decisions, how purchasing is structured across contexts, and how this impacts different rates and types of technological take up.

As a second step, BRIE will analyze the business strategies of key firms. The processes of innovation and diffusion are not separable, and the interaction between sophisticated lead users of new technologies in hospital, administrative, and home care settings shapes the trajectories of technological development. This project examines how widespread diffusion of technology impacts product development and business models by leading firms in the field of medical technology, and how these developments create different forms of competitive advantage across national contexts. In so doing, BRIE looks to map emerging differences in institutional advantages for not only technological diffusion but also innovation across the US and Nordic countries.

Third, this research examines how new technology is reshaping the structure of the state itself. Different institutional structures impact how technology is developed and diffused, but equally, technology has a transformative potential for health and elderly care systems. Advanced technology can alter the core bargains among the state, private companies and medical professionals that underpin different medical care systems. Technological developments in the field of elderly care have shifted many of the core decisions about resource allocation and individual treatment away from physicians and administrators towards local actors and individuals themselves. At the same time, new technology has raised new questions and conflicts over who owns and manages medical information itself, often requiring political actors to strike new bargains with producers, consumers and administrators in order to monitor and manage the system. Both developments put pressure on existing institutional structures and actors, creating new pressures for adjustment. State-market relationships both shape and are being shaped by differing trajectories of technological development.

This research project is embedded in broader efforts to develop and disseminate wireless technology to enable elderly to remain at home. In combining the efforts of researchers in the United States, Finland and Denmark, BRIE and its partners look to harness different institutional advantages for technological development and diffusion. In so doing, BRIE is well situated to gain first hand knowledge of the processes of technological development in elderly care, thereby contributing not only to our understanding of emerging medical technology markets but to developments in the field of elderly care itself.

Differences in take-up of new technology, innovation, and the pressures these create, matter not only for firms and state administrators, but ultimately for the elderly themselves. New technology in elderly care impacts the quality, cost and accessibility of care, but the ability of citizens to remain healthy and autonomous in old age. Different structures of technological development and diffusion then, give citizens in different countries different opportunities over structure of care, the ability to manage disability and illness, even how they age. Understanding the transformative potential of technology though, requires first understanding where it used, how it is developed, and what challenges it offers, something BRIE research is well positioned to contribute to.