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# CHRONIC CARE DRIVING A FUNDAMENTAL SHIFT IN HEALTH CARE SUPPLY CHAINS

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# CHRONIC CARE DRIVING A FUNDAMENTAL SHIFT IN HEALTH CARE SUPPLY CHAINS

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**ABSTRACT:** *The health care industry in the United States is being reshaped by a dramatic shift away from acute care and towards chronic care (called the A2C shift). By 2020, it is expected that half of the US population will suffer from chronic disease and that the management of these conditions will represent 80% of health care spending. These changes will have a profound effect on demand and associated supply chains. For example, a surge in demand for home-based health care services is expected. The MIT Efficient Health care Delivery Project (MEHD) is a multi-year research effort created by the MIT Center for Transportation & Logistics to identify and analyze structural changes in the health care industry. The project is developing ways to build the supply chains that will support the new generation of A2C health care services.*

### Fundamental Shift

In 2003, an estimated 109 million Americans suffered from the eight most common diseases in the United States, including stroke, hypertension, cancer, diabetes, heart disease, pulmonary conditions, and mental disorders. The estimated annual cost of treatment for these diseases was $277 billion, accompanied by a productivity loss of nearly one trillion dollars. It is estimated that 125 million Americans suffer from at least one chronic disease and 60 million suffer from several disorders. By 2020, it is expected that half of the US population will suffer from chronic disease and that management of these conditions will represent 80% of health care spending. Factors such as an aging population, increasingly sedentary lifestyles, and the rising tide of obesity account for the steady rise in the number of chronically-ill Americans. A report by Miliken Institute (2007) indicates that the economic cost of chronic diseases is $1 trillion and is projected to increase to $6 trillion by 2050.

This trend is driving a fundamental shift in the nature of health care. Traditionally, the main focus of the health care industry model has been acute care, but chronic care needs dominate the new model. The shift is well-documented, and is directly related to the aging of the world's populations, the dramatic extension of life spans, and the availability of effective new medical therapies.

It is vitally important that we shed light on the rise of chronic disease and its associated impact on health care delivery. Of the many maladies that afflict health care in the U.S., the chronic illness issue is one of the most important as it will shift the nature of demand being placed upon the industry. Gaining a deeper understanding of the implications must be a top priority for all stakeholders.

We refer to this shift as "A2C," a convenient and concise term for a complex phenomenon. Historically, the entire health care system—from its infrastructure to the nature of medical practice to reimbursement—is optimized to deliver acute care. Therefore, A2C necessarily implies burdening the current structure with a new set of demands that require continuous monitoring and attention. These demands are fundamentally different from the event-driven acute care needs that have shaped the industry up until now.

Clearly, the health care system is not designed for this new reality and requires re-invention on many levels. In fact, the rapid increase in chronic care needs is a likely contributor to soaring health care costs and growing dissatisfaction with the system's performance. In order to understand this phenomenon properly, the research must focus on such key questions as:

- How will the A2C shift change demand patterns for health care products and services?
- What are the implications of A2C for stakeholders in the various segments of the industry?
- How will A2C affect supply chains at all levels of the industry?

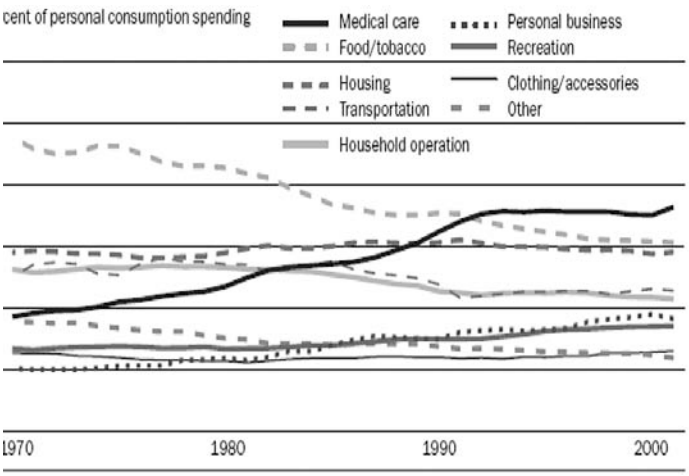
» What new capabilities and investments must be made to address A2C?
» What strategies will individual players need to adopt in order to survive and thrive in the health care system of tomorrow?

## Unsustainable Cost Structure

We are witnessing the impact of the A2C shift on the health care system, as health care currently represents an alarming 17% of Gross Domestic Product (GDP) in the U.S. But more importantly, health care costs are rising much faster than inflation and are being passed on to the public and corporations in the form of higher prices and higher taxes. Not surprisingly, companies are starting to transfer some of the burden to their employees. Although patients' lives aren't directly at risk their access to care is being affected and a growing number are living without health insurance.

Further proof of the deterioration in the cost structure is that medical spending as a percentage of household expenses has grown from 9% in 1970 to almost 18% in 2000 (Figure 1). Soaring health care costs are also blunting the global competitiveness of U.S. companies. The U.S. spends US $5,711 per capita on health care per year — the highest expenditure in the world. Germany, for example, spends only US $2,983 per capita per year[1]. Moreover, the inexorable rise in health care costs shows no signs of abating. By 2016, national health care costs in the U.S. are projected to rise to 20% of GDP (Figure 2), putting even more pressure on a system that is already severely stressed. In addition to rising costs, the system will also have to adjust to a number of other important market drivers. These include the following.

» Off-shoring manufacturing and health care services
» Demise of the blockbuster drug model
» Changing economics of drug distribution
» 'Retailization' of health care — Retail Clinics and Wal-Mart selling cheap generics
» Miniaturization and proliferation of 'intelligent' medical diagnostic tools
» Emergence of new players such as Google, Microsoft, UpToDate, etc.
» Integration of data and emergence of data-mining techniques
» Emerging consumer economies in the BRIC countries (Brazil, Russia, India, and China)




JRCE: U.S. Bureau of Economic Analysis.
TES: "Other" includes religious activities, education and research, personal care, and foreign travel. Components add to 100 cent.

**FIGURE 1. COMPONENTS OF US PERSONAL CONSUMPTION SPENDING 1970-2001**

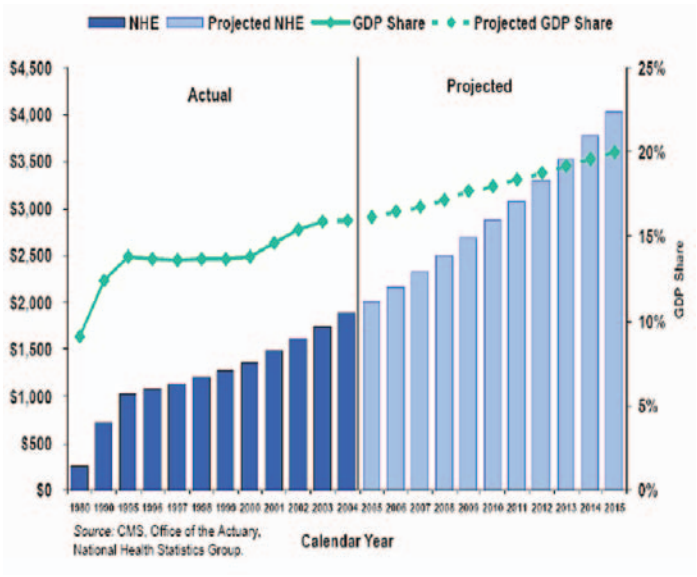



**FIGURE 2. U.S. NATIONAL HEALTH CARE EXPENDITURE**

Clearly, the health care system is in need of radical surgery. Deploying piecemeal solutions is not a cure; fundamental change is needed. But where and how should the country start to fix its ailing health care system? In response to this dilemma, the MIT Center for Transportation and Logistics (MIT CTL) launched a research consortium, the MIT Efficient Health Care Delivery Group (MEHD) in July 2007. MEHD research draws on interdisciplinary researchers from across MIT in conjunction with industry participation. The project's industry participants come from all sectors of health care; therefore, they understand the interactions between providers, payers, hospitals, clinics, insurers, manufacturers, retailers, technology providers, and government.

## Supply Chains at the Heart

Supply chains represent a key component of the health care delivery challenge. The efficient delivery of care requires that caregivers, equipment, and supplies are available when and where they are needed. More importantly, all this must be achieved in a cost-effective manner. A typical approach to studying supply chains involves three interrelated categories of flows: products or physical objects, information, and money. Figure 3 represents various possible demand flows that are triggered when a patient enters the health care system.

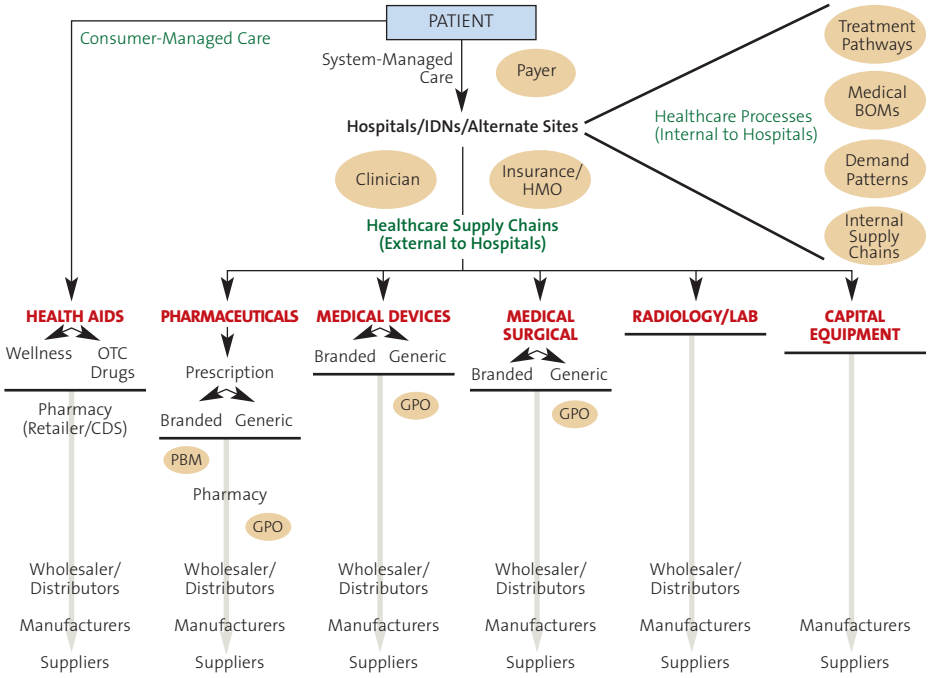



**FIGURE 3. DEMAND FLOW IN THE HEALTH CARE SECTOR**

As more and more patients seek relief from chronic conditions, we see the center of gravity move away from hospitals to homes. Indeed, technology is playing a leading role in this transformation by allowing care to be delivered remotely. For instance, with the revolutionary changes in diagnostic products, it is now possible for patients to monitor their own vital signs at home with little or no help from the medical caregivers. In the very near future, we will be able to carry out a number of tests at home that currently require patients to travel to a medical facility.

Providing care at home will require significantly different types of supply chain capabilities. More technology, coupled with greater use of biotech products, will promote personalization of care, resulting in rampant product proliferation. Delivering an array of products to individuals will be a herculean task that will require a very high level of supply chain sophistication — a level that doesn't exist today. Compounding this problem will be the extreme care required when shipping biotech products that require cold chain facilities and protection against the higher risk of counterfeits. Supplying in a personalized care paradigm without delivery mistakes will come at cost that the current system is not ready to bear. In the end, the success of effective personalized care to support chronic conditions may rest squarely on the ability of the health care supply chains to deal with complex requirements.

## MEHD Research

In light of the A2C shift and other fundamental changes taking place in the health care system, it is necessary to explore and understand the architecture of the health care system to reveal its critical challenges and peculiarities. The research will identify potential structural changes that can improve outcomes across the entire system rather than just optimizing one player's short-term performance at the expense of the system. The isolation of key drivers causing systemic problems will allow us to focus on primary pain points for maximum impact. The results will also help us identify leverage points in the system, allowing us to make principled changes and sound investments that improve delivery efficiency.

The MEHD research seeks to improve health care delivery by fostering innovation in health care supply chain management. The initial phase of the work has looked at health care from a system-wide perspective in order to understand the industry's dynamics and reveal the key sources of the disruptive change that pervades the industry. A summary of the MEHD Group research tiers, goals, and scope is provided in Figure 5.

[1] Source: http://www.kff.org/insurance/snapshot/chcm010307oth.cfm accessed on 11/15/07.

## NEXT STEPS

*The MIT Efficient Health Care Delivery Project (MEHD) is a multi-year research effort being conducted by the MIT Center for Transportation and Logistics (MIT CTL) to identify and analyze structural changes in the health care industry. MEHD research aims to develop concepts and solutions for improving the efficiency of health care delivery with a sharp focus on health care supply chains. For further information, contact Dr. Mahender Singh at msingh@mit.edu or 617-253-1701 or David Riquier at riquier@mit.edu or 617-253-5329.*