

Overview

Healthcare Innovation: Industry Challenges Being Addressed by Global One Hitachi

Harry Reddy, MS, MEng.,
MBA, Ph.D. (cont.)
Tomoyoshi Takeo

CHANGES SOUGHT IN HEALTHCARE

HEALTHCARE costs are increasing, but care delivery is not necessarily centered on patients' final outcomes and has too much variation from one hospital to another and from one region to another. One explanation for such a situation is that healthcare is too complex and fragmented, so to solve this problem it is necessary to adopt an industrial approach to innovate new solutions not only to improve care quality and patient outcomes, but also to reduce healthcare costs by "systems thinking."

Healthcare systems are different in different countries, and instead of focusing on which country's system is good or bad the focus needs to be on learning from different systems to improve healthcare systems. For example, the healthcare systems in the USA, UK, and Japan are all different, and not just in cost. What it means for Hitachi is that it should leverage its global competencies and innovate toward a next generation of healthcare that drives both effectiveness and efficiency in care delivery.

The healthcare industry is undergoing major changes, which are remarkable in the USA, with some of the key changes including: 1) the accountable care organization (ACO) concept whereby hospitals not only provide care but are also accountable for total cost and patient outcomes, 2) incentives for better care and cost control with new payment models, 3) engaged patients or consumerism, 4) medical home, 5) personalized medicine, and 6) growth opportunities with care consolidation, an aging society, and a growing middle class.

Major healthcare players such as General Electric Company (GE), Philips, and Siemens are investing in both internal innovation (biotech, mobility, services, clinical decision support, etc.) and external acquisitions. Major electronic companies such as

Samsung and Sony are entering healthcare. Even focused non-healthcare companies such as Asahi Kasei and Bosch are entering healthcare. And, interestingly, Chinese companies such as Mindray are focusing on global growth by acquiring global companies.

Medical standardization, scale-up, evidence-based medicine, and access to remote areas are key issues in developing countries to meet the rising population. In developed countries, cost containment is a key issue because of the significant healthcare cost involved as a percentage of national gross domestic product (GDP)—for example 17.5% in the USA.

NEXT-GENERATION HEALTHCARE

The current healthcare system is in fact a sickcare system, which attempts to cure patients who are sick, but not to prevent their sickness! Next-generation healthcare (NGH) focuses on all three key components of healthcare—improving patient outcomes, improving quality of care, and reducing the cost of care—which is different from traditional healthcare in which neither patient outcome nor cost reduction is addressed. The three components are not just to be optimized but also simultaneously to be improved in NGH, which demands a systemic focus on disease prevention and management through continuums of care.

In this concept, prevention and total care management through the care cycle are the most important drivers of reducing the overall cost, which achieves true "health care," not just "sick care."

HITACHI'S INNOVATION FOR VALUE-BASED HEALTHCARE

Five Pillars Holding Up NGH

The three-component objective of next-generation healthcare is fulfilled by innovating and implementing

the five pillars—(1) patient-centric, (2) productivity improvement, (3) preventative care, (4) precision diagnosis & treatment, and (5) personalized medicine (see Fig. 1).

Building these five pillars will require advanced solutions—the first three being the information-and-communications-technology- (ICT) based technologies while the last two are medical-based technologies.

In this new NGH, the role of doctors will change, and new doctors will be introduced to not only enhance healthcare delivery, but also transform it for better efficiency and effectiveness.

While even the best conventional healthcare is focused on two types of doctors—Dr. Doctor (medical doctors—checkups, diagnoses, procedures and treatments) and Dr. Medicine (medicine/drugs and therapies), the next-generation healthcare focus is on three additional types of doctors—Dr. Patient (patients serving as doctors in taking care of their own care, thereby increasing the patient experience), Dr. Process (processes serving as doctors in improving productivity, thereby increasing healthcare efficiency),

and Dr. Data (data serving as doctors in offering insights and preventive care management, thereby decreasing healthcare costs).

What Should Hitachi Address and Why?

The innovations of conventional technologies have a good impact on quality of care, but little impact on healthcare cost reduction, so in order to reduce the cost of healthcare, the focus of innovation should also be on net-value-adding technologies that not only have a good impact on quality of care, but also have an impact on healthcare cost reduction and improved patient outcomes. Therefore, to lead into next-generation healthcare, it is also necessary to provide net-value-adding solutions in the areas of preventative care, disease management, data analytics, and process improvement.

New Categories of Healthcare Innovation

By considering the trends of next-generation healthcare, Hitachi is innovating in strategic areas such as: 1) data-based and process-based solutions to improve the efficiency of care and reduce healthcare

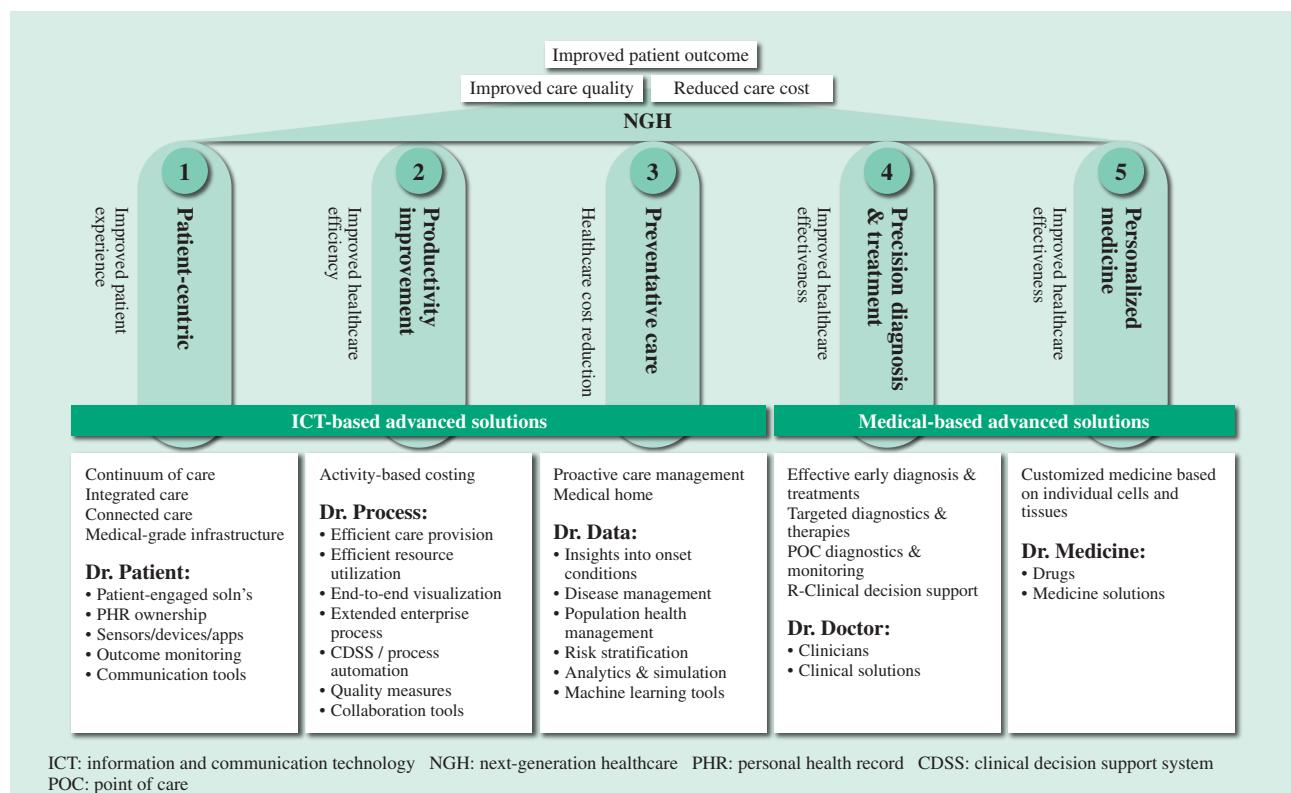


Fig. 1—Five Pillars of NGH.

Hitachi is implementing NGH by using ICT and medical technologies to establish five pillars. NGH differs significantly from the focus of existing healthcare on treating illness by instead adopting value-based healthcare that simultaneously improves the three critical elements of outcome, quality, and cost.

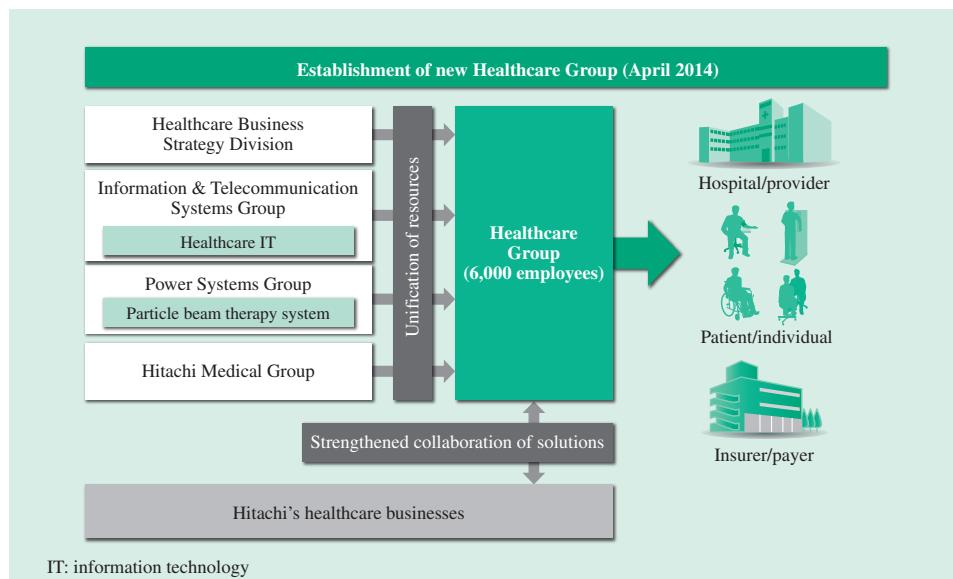


Fig. 2—Establishment of Healthcare Group.
Hitachi established its new Healthcare Group by consolidating four existing businesses.

costs, 2) point-of-care diagnostics and monitoring to improve both the effectiveness and efficiency of care, and 3) targeted therapy and personalized medicine to improve the effectiveness of care.

These innovations are carried out in healthcare businesses, medical areas, and care cycles, and their value is further enhanced by the Social Innovation Business, as described in the next section.

HITACHI'S HEALTHCARE BUSINESS TRANSFORMATION

Hitachi has re-organized its healthcare businesses, which were scattered around within Hitachi Group, and created a new Healthcare Group effective April 2014. The new Healthcare Group is the integrated

formation of four previously existing businesses in different divisions, and has about 6,000 employees. The purpose of the new group is twofold—1) integrate resources and establish unified strategies, and 2) strengthen collaboration with related Hitachi divisions. The target customers are of three types: hospitals/providers, patients/individuals, and insurers (private and governmental) (see Fig. 2).

Hitachi's existing healthcare solutions are mainly grouped into three categories: diagnostics and therapy solutions, in vitro diagnostics (IVD), and healthcare informatics, with annual total revenue of \$3.2B.

In diagnostics, it offers imaging equipment, such as X-ray, computed tomography (CT), magnetic resonance imaging (MRI), ultrasound, and optical topography.

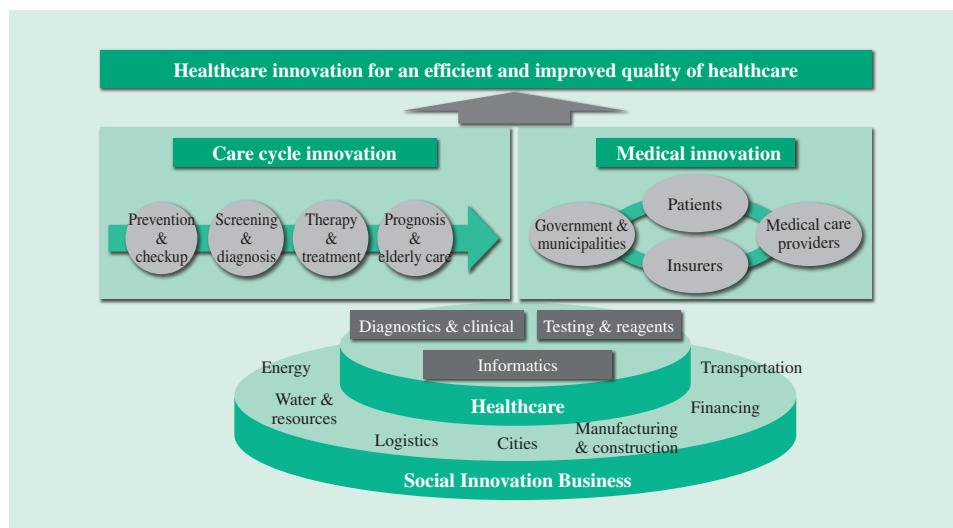


Fig. 3—Hitachi's Concept of Healthcare Innovation.
Hitachi intends to deliver healthcare innovation to hospitals, health insurers, and others through care cycle innovation and medical innovation.

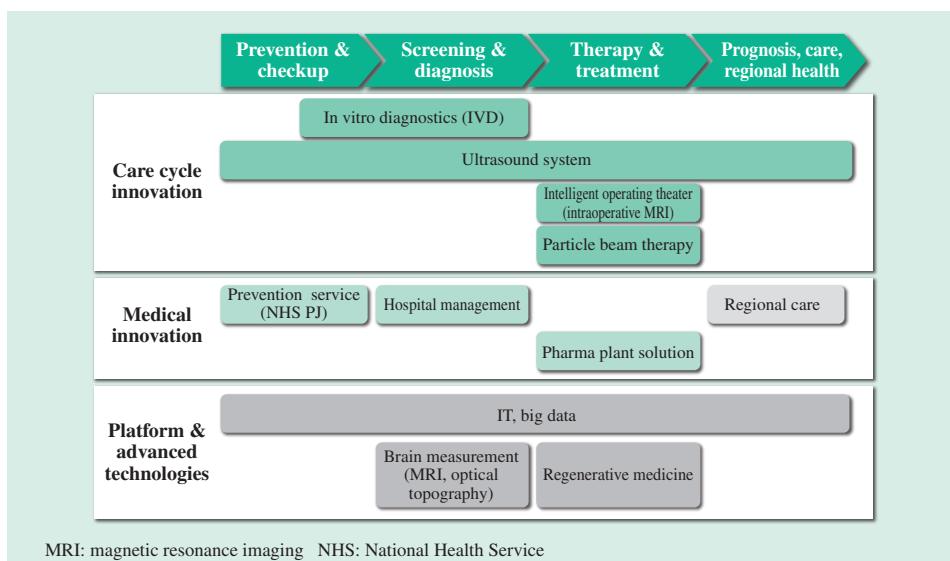


Fig. 4—Summary of this Issue of Hitachi Review.

The 10 articles in this issue of Hitachi Review cover care cycle innovation, medical innovation, and the platforms and advanced technologies that support them.

In the therapy category, it offers particle therapy equipment^(a). This equipment includes very advanced cancer tumor irradiation systems that do not cause many side effects on healthy tissue.

In the IVD category, it offers a diversified product portfolio, including clinical analyzers, sample preparation, and DNA sequencers^(b).

In the healthcare informatics category, it offers several solutions and services, mainly in Japan, and data storage and clinical repository solutions available world-wide.

These transformations are further augmented by innovating and offering new solutions (see Figs. 3 and 4).

Care Cycle Innovation

In order to improve care quality and efficiency, it is important to provide seamless healthcare services through care continuums, both horizontally (among disparate care settings) and vertically (among disparate care providers), for example, a connection between diagnostic imaging and therapy, and data re-utilization in various care settings. Hitachi offers an intelligent operation system that provides image guidance from permanent MRI for brain surgery operations to contribute to the accuracy of operations.

(a) Particle therapy equipment

A form of radiotherapy that directs a beam of high energy particles (heavy ions or protons) produced by an accelerator at cancerous tissue with pin-point accuracy to treat the cancer with minimal effects on healthy tissue.

(b) DNA sequencer

A device for automatically determining the sequence of bases in deoxyribonucleic acid (DNA). Reading the base sequence of DNA provides genetic information about the organism. In addition to their important role in human genome analysis, DNA sequencers are also used for DNA profiling and genetic diagnosis.

Medical Innovation

Hitachi offers a total solution that provides total hospital management improvement and total healthcare system management, including payers (private and public sector). As a total solution for one hospital, Hitachi has been working with Kurume University Hospital for a long time and began to build up a diabetes prevention system with the NHS^(c) in Manchester, UK.

Platform and Advanced Technologies

Hitachi has recently acquired Pentaho, which specializes in big data analytics and visualization, and has been leveraging several internal technologies to offer platforms and advanced technologies such as a clinical semantic linker for clinical contextualization, natural language processor for capturing notes and voice, disease progression models, cost simulations, clinical content repository, and disease management cloud models.

CONCLUSIONS

In summary, Hitachi healthcare delivers value-based healthcare, resulting in integrated care for individuals and holistic value for society. It intends to fulfill its mission of innovating and offering healthcare solutions in two dimensions: care cycle innovation and medical innovation. Hitachi is also innovating

(c) NHS

Abbreviation of National Health Service, the UK public health system. Although not all general practitioners are covered, the NHS is government-funded and provides free access (with some exceptions) to services such as treatment of illness or injury, emergency medical centers, and use of ambulances.

in “value co-creation” with customers by using new business models for a sustainable future.

REFERENCES

- (1) World Health Organization (WHO), <http://www.who.int/en/>
- (2) Organisation for Economic Co-operation and Development (OECD), <http://www.oecd.org/>
- (3) Ministry of Health, Labour and Welfare, <http://www.mhlw.go.jp/english/>
- (4) M. E. Porter et al., “Redefining Health Care: Creating Value-Based Competition on Results” (2006).
- (5) W. J. Baumol et al., “The Cost Disease: Why Computers Get Cheaper and Health Care Doesn’t” (2012).
- (6) C. Christensen et al., “The Innovator’s Prescription: A Disruptive Solution for Health Care,” McGraw-Hill, p. 496 (2008).
- (7) E. Von Hippel, “Lead Users: A Source of Novel Product Concepts,” *Management Science* **32** (7), pp. 791–806 (1986).

ABOUT THE AUTHORS



**Harry Reddy, MS, MEng., MBA, Ph.D.
(cont.)**
Deputy General Manager & Strategist, Healthcare Group, Hitachi, Ltd. He is currently engaged in execution for growth and strategy & business development.



Tomoyoshi Takeo
Strategy Planning Division, Healthcare Strategy Planning & Development Office, Healthcare Company, Hitachi, Ltd. He is currently engaged in planning of mid-term strategy and new business development.