

Technotalk

Providing Everyone with Better Healthcare through Practical Innovations

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Healthcare faces numerous challenges that vary between countries and regions. While the requirement in developed economies is for the use of IT to provide more sophisticated medical services and greater efficiency to control rising medical costs, emerging and developing economies need simple and low-cost medical devices and services and the provision of healthcare infrastructure. Hitachi is involved in all aspects of the healthcare business, including diagnosis and treatment, testing and reagents, and informatics. By supplying a wide range of products, services, and solutions, and delivering innovations through collaborative creation with customers, Hitachi is responding to the challenges of healthcare both in Japan and elsewhere.

Healthcare Transformation in the USA

Reddy: Recent years have seen many changes in healthcare, including the use of information technology (IT) for disease prevention and medical safety. In the USA, in particular, a healthcare transformation is underway in the form of changes to the medical insurance system. Can you give us some background on these developments?

Gottlieb: The starting point for these recent healthcare changes came around the beginning of this new century with two major reports from the Institute of Medicine that focused on medical mistakes. While this focused many people's attention on safety, and led to a search for IT-based solutions, it was hampered at the time by a lack of investment.

Watanabe: Safety has become a major issue for healthcare in Japan. Hitachi's series of hospital information solutions use IT to assist with safety management activities such as incident management.

Gottlieb: That is certainly important work. In the USA, meanwhile, the inauguration of President Obama in January 2009 gave a boost to moves toward healthcare reform. This included a large funding allocation for medical IT in economic stimulus measures aimed at restoring the economy. This was reinforced by an emphasis on population health management (PHM) in the Affordable Care Act (ACA), a way of using data to reduce the risk of chronic illnesses, and adopting a long-term perspective extending from prevention to recuperation.

In the case of Medicare (the US healthcare

insurance scheme for the elderly), 10% of recipients account for about 70% of total medical expenditures. A similar calculation for the entire USA finds that 50% of expenditures are used for just 5% of the population. In other words, appropriate medical intervention directed at the small number of patients at high risk of chronic illnesses is vital to controlling overall healthcare expenditures.

Watanabe: Appropriate medical intervention to prevent the deterioration of chronic illness is also a major concern within the Japanese health insurance industry. This has led to moves to provide better healthcare by coordinating medical data from the community. Because IT holds the key to healthcare reforms like this, Hitachi is drawing on its strengths in IT and data analytics to focus on solutions for healthcare reform. One example is a lifestyle guidance program aimed at tackling lifestyle diseases such as diabetes that launched in the UK in collaboration with the National Health Service Greater Manchester (NHS GM). It utilizes people's healthcare data and combines the clinical knowledge of NHS GM with Hitachi's data analytics to support personalized care.

Advances in Medicine Facilitated by Partners HealthCare

Reddy: Dr. Gottlieb, as President and Chief Executive Officer (CEO) of Partners HealthCare, a non-profit organization, you have taken the initiative and invested heavily in the healthcare transformation in the USA.

Gottlieb: Partners HealthCare was established in 1994 based on a vision of building a healthcare system



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CEO of Partners In Health

From 2010 until February of 2015, he served as President and CEO of Partners HealthCare, the parent of the Brigham and Women's and Massachusetts General Hospitals, operating the largest health care delivery organization in New England and among the nation's largest nonprofit biomedical research and training enterprises.

Dr. Gottlieb is a professor of psychiatry at Harvard Medical School and a member of the National Academy of Medicine. He served as president of Brigham and Women's/Faulkner Hospitals, as president of North Shore Medical Center, and as chairman of Partners Psychiatry.

that combines patient care, education, research, and community service. It includes community and specialty hospitals, a managed care organization, a physician network, community health centers, home care and other health-related entities, and employs a total of approximately 60,000 doctors, nurses, and other staff.

Partners' precious mission is to take really extraordinary people and have them take care of the sickest patient populations. Partners aims to cut medical costs by improving the quality and efficiency of care for the people among our population who are at the highest risk of serious illness. One such strategy is to use data and science to drive advances in medicine.

Watanabe: I understand that Partners HealthCare developed some of its own hospital information systems.

Gottlieb: Over the last 20 years, Partners and its hospitals developed a decision support based order entry system to make hospital operations safer and more efficient, an outpatient electronic medical record, an electronic medication administration system and several other best in breed solutions. As research and development in health IT progressed, Partners recognized there are limits to what we could do by

ourselves and that we needed to call on the resources of an IT company.

Watanabe: I understand. For a company such as ourselves with the capabilities to build information systems, we see the potential for having ideas from the workplace taken on board by society and used to transform healthcare through IT.

Gottlieb: This concept of transforming healthcare through IT carries a very strong message. The reform of the healthcare system is something that involves a long-term perspective, looking ahead to the next decade or the next century. Partners HealthCare is currently undergoing a major change in our culture to adopt an IT-based clinical administration system. I launched this one billion-dollar project with the intention of it being used across the system and to enable our patients to have the safest possible care and rapid access to their own data and communication with their physicians and other providers. The system will change workflows dramatically.

Watanabe: You have been responsible for major investment in healthcare transformation in your role as CEO of Partners HealthCare, and I believe this is a wonderful example of leadership that looks to the future. As an IT vendor, Hitachi intends to press ahead with the use of IT in healthcare by working with customers led by people like you.

Partners In Health: Improving Healthcare in the Developing World

Reddy: Dr. Gottlieb, your recent appointment in March 2015 as CEO of Partners In Health, a non-governmental organization, expands your field of activities from the USA to the rest of the world. Please tell us about this new challenge.

Gottlieb: Partners In Health (PIH) was established in 1987 with the aim of providing healthcare to communities outside the reach of existing services. The organization has a staff of around 15,000, and provides healthcare to 3 million people in about 10 countries. It works in collaboration with local governments, multilateral agencies, corporate partners, foundations, and others on building sustainable health care systems in severely resource-constrained settings. Areas of great focus include treatment of tuberculosis and human immunodeficiency virus (HIV), improvement of maternal and child health, and malnutrition. PIH is also very invested in building pipelines of human resources for health in the countries where we serve. This includes sustainable education and training, including a new project to establish a University for Global Health Equity in rural Rwanda.

Watanabe: Does this include a focus on preventive

medicine?

Gottlieb: Very much so. There are four areas of particular importance when it comes to preventive medicine for the poor. These are the elimination of maternal mortality, death of children under five due to malnutrition, maternal-fetal transmission of HIV, and death from tuberculosis. To reduce maternal mortality, we are working on providing adequate facility based settings for care to complement primary and community based care. We are working collaboratively on a variety of point-of-care diagnostic techniques that can be deployed in the field at relatively low cost.

I see great potential for partnering with great companies like Hitachi. Partnerships have an important part to play in providing high-quality medical services.

Looking more widely, there are opportunities for genuine transformation and innovation, and we still have much to learn. Recent years have seen a rise in interest in “reverse innovation,” whereby technologies or business models developed for developing and emerging economies are deployed in the developed world, and we hope to invest in fostering new innovations like this. Innovators like Hitachi are well placed to develop flexible technologies with potential for use both in the industrial world and in more constrained situations.

One example is the need for a means of unique patient identification in places that lack a system of residential registration. Providing healthcare infrastructure like this also boosts economic growth in the countries and regions concerned.

Watanabe: That is valuable advice. Hitachi is taking a one-step-at-a-time approach to emerging markets. For example, technology developed by Hitachi for identifying people from their finger veins is being used in research aimed at improving the accuracy of personal identification in census-taking in developing nations. We believe that increasing the accuracy of identification leads to advances not only in healthcare but also right across public services.

We are also doing what we can to aid economic development in places like Myanmar and Vietnam through activities such as the construction of data centers, training of IT personnel, and providing IT infrastructure. I too look forward to opportunities for working alongside Partners In Health to promote healthcare in emerging and developing economies.

Hitachi's Healthcare Business Targeting Growth through One Global Healthcare

Reddy: Next I would like to talk about our healthcare business. Hitachi has been developing and marketing medical equipment such as diagnostic X-ray, magnetic



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Joined Hitachi, Ltd. in 1982 and was appointed President of the Enterprise Server Division, Information & Telecommunication Systems Group in 2007; Vice President and Executive Officer, and Chief Strategy Officer of Information Telecommunication Systems Company in 2012; Vice President and Executive Officer, President and CEO of Hitachi America, Ltd., Chairman & CEO of Hitachi Information & Telecommunication Systems Global Holding Corporation, and Chairman of Hitachi Consulting Corporation in 2014. He was appointed to his current position in 2015.

resonance imaging (MRI), and diagnostic ultrasound systems since around 1950. In recent years, this business has also expanded into therapy systems and medical IT, leading to its consolidation in April 2014 through the establishment of the Healthcare Group. Under new leadership, this approximately 6,000-strong organization is targeting growth based on a concept of “One Global Healthcare.”

Watanabe: The operations of the Healthcare Group can be broadly divided into a diagnostic and clinical business that handles such products as diagnostic imaging systems, a testing and reagents business that deals with analyzers and similar, and an informatics business that includes medical information platforms. Rather than selling standalone machines, this involves solutions that combine diagnosis and treatment and that integrate technologies and services such as IT from other parts of the Hitachi Group. The business is contributing to quality improvements and efficiencies in healthcare through the implementation of healthcare innovations in response to needs such as support for the care cycle all the way from disease prevention to care during recuperation; providing

medical information infrastructure for community-wide healthcare integration; and improvements to hospital administration.

As in other businesses, Hitachi is continually striving to develop leading-edge technologies for healthcare. In the case of diagnostic ultrasound systems, for example, Hitachi has been a leader in the field ever since the first model was released by Hitachi Aloka Medical, Ltd. (a Hitachi Group company) in 1960, including the development of a series of new technologies such as a convex probe with a curved tip, realtime ultrasound blood flow imaging, and cardiovascular color Doppler imaging. We also successfully commercialized an ultrasonic transducer in 2009 that works using semiconductor technology. We respond to the challenges of the medical workplace by supplying solutions derived from this portfolio of superior technologies.

Gottlieb: That is impressive. I look forward to seeing more technologies and tools for improving healthcare in the future.

Watanabe: In the clinical sector, we are devoting a lot of effort to proton beam cancer therapy systems that draw on technologies and know-how built up in the power systems business. We have made further enhancements to the system and developed various new technologies through joint research with customers at the forefront of this technology. For example, we are able to provide therapy that combines the spot scanning technique for precision targeting of the proton beam, which we worked on together with the MD Anderson Cancer Center in the USA, and the tumor tracking technique from Hokkaido University in Japan that enables the precise treatment of cancerous tissue even when it is moving inside the body.

Our involvement with the MD Anderson Cancer Center dates back to a 2002 order for a proton beam cancer therapy system, and recognition of its success from elsewhere in the USA has led to further orders for two systems from the Mayo Clinic in 2011 and one from St. Jude Children's Research Hospital in 2012.

Gottlieb: Both of these are superb high-profile institutions.

Watanabe: In the field of informatics, we are focusing on using data analytics to deliver innovations in the care cycle that extend from disease prevention to care during recuperation. The demonstration project being undertaken in collaboration with NHS GM in the UK provides a practical example of this.

The intelligent operating theater is another area of activity, and we have provided surgeons with the ability to view images from an open MRI system as they perform neurosurgical procedures. The system has already been installed at more than 10 facilities in Japan, and we plan

to market it in the USA also.

Seeking to Achieve Social Innovation through Collaborative Creation

Gottlieb: When Hitachi talks about its Social Innovation Business, what do you mean by that?

Watanabe: Hitachi's existing businesses deal with products, services, and solutions that underpin such social infrastructure as power systems, water and sewage systems, and railways. Our Social Innovation Business seeks to enhance social infrastructure by combining IT with the knowledge obtained from these activities so that we can provide the public with new forms of value in terms of convenience and comfort. It aims to overcome the societal challenges facing particular countries and regions through collaborative creation with the customers who work with us as partners in this business.

Naturally, medicine is an important part of the social infrastructure and healthcare is one of the pillars of our Social Innovation Business. In the case of our positron emission tomography (PET) support solution, for example, we are creating value through the early detection of cancer and consequent healthcare savings by supplying not only PET scanners, but also support for everything from finance to the construction and operation of PET clinics. Based on existing projects and other experience from Japan, we are also contributing to healthcare innovation in places like China and India by supporting the provision of hospital infrastructure and improved management through collaborative creation with partners.

In other words, our Social Innovation Business can be thought of as manifesting our Mission of "contributing to society through the development of superior, original technology and products" achieved by seeking commonality between business objectives and the resolution of societal challenges.

Perhaps you can offer some advice to me and the other 3,000 or so researchers at Hitachi who are seeking to discover and develop innovative and effective ideas about what areas we should be focusing on in the future if we are to realize this vision?

Gottlieb: The need in developing and emerging economies is for healthcare technologies that are effective and economical. Given things like diagnostic imaging solutions that are easier to use, point-of-care diagnostics, portable medical devices, and flexible IT platforms that are simple to use, great progress should be possible in the healthcare infrastructures of these nations. Some of the innovations at Partners In Health derive from the knowledge of community health workers and the challenges they face. These people have taught us which

technologies and other innovations are needed over the long term. This is an approach that can also be put to work in industrialized countries. The availability of testing and screening systems that are simple to use even by people without specialist skills should be of benefit to home healthcare in developed economies also.

Reddy: This shift in healthcare services from hospitals to the home is a common trend in both Japan and the USA.

Gottlieb: That's right. Advances in home healthcare cut medical costs and play a useful role in disease prevention. The use of IT to put healthcare data to work should assist with diagnosis. However, as we touched on earlier, the lack of compatibility between the devices and other information systems makes it difficult to share information. This is a major drag on healthcare efficiency, and there is a need to think about standardization throughout the healthcare industry. This is because it will expand our options and lead to greater innovation.

Watanabe: Because standardization is not something one company can achieve on its own, we hope to work on this in collaboration with strong partners such as your organization. We have gained an appreciation of how much there is we need to work on together if we are to realize the great vision of progress in medicine throughout the world. Thank you for your time today.



Moderator

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

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Harry Reddy is a successful business executive and an accomplished corporate director in healthcare and technology industries. His leadership & focus has been on business management, corporate development, strategy formulation, business growth, innovation management, corporate entrepreneurship and business transformation, and has extensive experience in the USA, EU, Japanese and emerging markets.