

Patient Centric Healthcare Systems - Asia's Chance to Leap-Frog the West

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Introduction

In this chapter we will consider new paradigms in healthcare systems aimed at the needs of Asia's 21st century healthcare and demographic challenges. There is an urgent need for innovation in this area as traditional "western" healthcare models are not necessarily a good fit for Asian environments, especially for large areas of under-served, predominantly rural and low-income population regions. These new systems, which will evolve, we believe by local innovation rather than along western lines, must improve health outcomes and increase delivery and quality of care provision, must be cost effective, sustainable, and scalable, as well as integrate with existing metropolitan hospital infrastructures. They must tackle head on the need to promote healthy living and disease prevention throughout these emerging economies. We have particularly in mind a new service model connecting major hospitals, local clinics and the public, based on low-cost mobile and Internet technologies.

Rapid Growth Needs Better Healthcare

Over the next 20 years Asia – and China and India in particular - will have the highest GDP and business growth rates, as well as per capita growth in spending power of any region in the world.

How will Asian governments and private companies prepare their health systems to support this golden future? For surely, without significant investment and innovation, in tackling the endemic regional health burdens of contagious and tropical diseases, a "diabesity" crisis (obesity and diabetes), infant mortality and sexually transmitted diseases, this golden future will be harder to achieve and harder to sustain.

And when governments invest in health infrastructures, what models and designs will they use? In the past 50 years, the 'gold standard' in these matters was inevitably American or European. Medical technologies were introduced which were based around the Western concepts of extensive primary care networks (General Practitioner (GP)-hospitals-teaching hospitals) using capital intensive medical therapies and interventions, employing an apparently unlimited resource of highly skilled medical professionals. The western developed economies are typified geographically by populations living in a landscape of small to medium sized towns and cities dispersed fairly uniformly amid a rural environment of agricultural prosperity.

For a sick person to get treatment, the journey is usually a car ride of a few miles to the local town GP, and then maybe another car ride to the local hospital. Or, if an emergency, an ambulance will be called, arrive within 5 – 20 minutes, and paramedic

care provided on the short journey to hospital. If the local hospital does not have the requisite specialty to treat the patient, he or she will be referred to a metropolitan hospital, and, in an emergency, transport arranged often by helicopter. These healthcare systems are indeed a marvel of design and achievement, but they come at enormous cost, large-scale technological capital commitment, and make enormous demands on skilled labour at all levels. They have emerged to suit the prosperous economies they tend, and in turn have been hugely influential in sustaining the emergence of western growth and economic power.

But for Asia, are these models right for the emerging economies of the region? What if, instead of replicating western Healthcare structures, Asian emerging economies innovate health systems differently from the West, more attuned to their individual cultural and economic conditions? Asia is so varied, countries are so different from one another, it is dangerous to generalise. Nevertheless, there are some cultural and geographic similarities that are radically different from North American or European countries: The following model is not unrepresentative: a small number of large cities which are crucibles of high growth rates, skills, capital, technology, innovation and modernity, set in a rural landscape characterised by lower-income agricultural economies, with lower rates of economic growth, skills, and investment. If a rural farm worker gets sick, his or her path to treatment is entirely different from his American cousin in Kansas.

If Asian countries were to plan the ideal healthcare system for their populations, would they set about replicating the current US health system? We think not: Technology innovation will evolve differently in Asian markets.

There are two key design considerations for governments in planning any healthcare system in emerging economies:

- 1) Healthcare Service Model; Given the demographic characteristics and health care objectives, how to deploy technology, points of delivery (hospitals, clinics, etc.), health care services (emergency and acute care, chronic disease care, palliative care, out-patient and maternity services, etc.) and medical professional skills, to make the most impact on health care improvement across an entire population.
- 2) Technology: Given the desired service model, what is the most effective technology solution to deploy, measured both in terms of practicality and cost efficiency.

Choice of the optimal service model should logically precede choice of the technology delivery platform. Unfortunately, it appears that – at least in the past – the choices have often been made the other way around. The reason is that the range of models and technologies have evolved together around a common set of western requirements.

For Asia, even in the second decade of the 21st century, available technology choices are largely determined by the set of products and services from existing international technology companies. These supplier technologies have been shaped to the needs of 500-700 million, predominantly western people, adapted to the social and demographic characteristics of developed economies on the western model. It is indeed an impressive

warehouse of different forms of computer hardware (from supercomputers to PCs), medical devices, and of course an almost inexhaustible range of software.

The range of available Healthcare service models, however, offers a much narrower field of choice: Healthcare service models have also largely evolved to meet the need of western health care priorities, practice and experience. Medical and pharmaceutical research plays an important influence in this respect. The achievement in these areas after 100 years of largely western scientific endeavour is unquestionable. However, its very success has shaped what medical therapies are considered standard, and what drugs are considered appropriate.

As we shall argue, this is the area where Asia needs most to innovate its own solutions to its individual conditions. So, what should steer the choices for Asian governments embarking on health system design?

Metropolitan Hospitals – Beacons of Excellence or Health for the Few?

Firstly, there is no escaping the need in every country to provide for major hospitals, with their concentrations of highly skilled medical practitioners (doctors, surgeons and care specialists), high-tech, capital-intensive diagnostic machinery (X-ray machines, MRI, CAT, scanners, etc.), health databases, and the whole range of support administrative systems. Let us define Metropolitan hospitals to mean major hospitals, located in large cities, which are centers of in-country excellence and medical expertise, and very often are teaching hospitals as well. Every country in Asia has its Metropolitan hospitals – they are the best examples of the western model properly applied in emerging economies. However, they have their limitations:

- 1) Metropolitan hospitals tend to be “few and far between” - physically and culturally remote from a large proportion of the population, very often those at greatest need for medical services.
- 2) Hospitals are efficient at providing specialist treatment but are not well equipped to meet needs of dispersed low-level sickness and chronic diseases in the general population.
- 3) They are intrinsically doctor-focused rather than patient-focused, and thus do not contribute directly to the social imperative of empowering individuals in society to take charge of their own health.
- 4) They are equipped to treat sickness, rather than promote wellness and disease prevention, which would contribute higher returns to the economy and social development.
- 5) Their treatment options are largely unaffordable to ordinary people, and often cater primarily to just the most affluent urban minority.

Rural Healthcare

The real challenge, it seems to us, comes one layer down in the healthcare system, in the provision of clinics and GPs, particularly in rural areas, remote from the cities, and in small urban communities. And this is where Asia has a real opportunity to innovate.

Let's look again at those two design criteria we mentioned earlier: Healthcare Service Model and Technology, but this time in the context of a typical scene in a rural province of an Asian country.

A Month in the Life of a Rural Type 2 Diabetic:

Let us look at the circumstances of a small farmer, diagnosed 5 years ago with type 2 diabetes, living 80 km from the nearest Metropolitan hospital, located in the provincial capital. He has no PC, but has a mobile phone. What are currently his healthcare options? There is a small local town with a clinic 18 km away. The clinic is staffed by one doctor who has to serve the needs within a radius of 20 km, and by 2 assistants who have limited medical experience. Our farmer has access in the same town to a pharmacy, and there is an informal network of unregistered traditional outlets for health advice and self-medication in the villages nearby. A visit to the clinic takes a whole day, as not only is the doctor called away frequently, the clinic is set up on a first-come-first-serve basis, and waiting times are long and unpredictable. Because our farmer cannot spare the time for a quarterly visit to the clinic, he tends to self-treat with insulin purchased in the grey market.

As a result, his blood glucose management is far from optimal, and complications emerge in due course, and a lower leg ulcer develops. He delays treatment until he can no longer support his farm, goes to the clinic, and, after a delay of 6 hours, is told by the doctor that he is likely to need a leg amputation and directs him to the Metropolitan hospital for specialist treatment. This is a catastrophic outcome for the farmer, as the prospect of a physical disability will surely lead to loss of income and severe outcomes for his family. Getting to the hospital entails great expense in time and money for transport, and the need for in-patient care for 1 week.

Even after national health benefits, his out of pocket expenses and lost time away from the farm amount to several months of income and are a heavy burden for his family. After amputation, the farmer cannot work the farm effectively, his productivity falls, and the family income is no longer sufficient to maintain his daughter in high school education beyond the minimum school leaving age, even though she is the brightest in her year. And so the damage ripples on.

Here in a nutshell is a story of modern life in many parts of the region. And of course there are many others that share the terrifying calculus of loss of income, productivity, opportunity, and well being for individuals and their families caught up not so much with disease but with the lack of care and treatment in the health systems. No matter how good the Metropolitan hospital, the damage is done for the farmer long before the

hospital is involved. Integrated across a whole economy, the country suffers lower rates of growth, lower productivity, high rate of work absenteeism, and lower educational and skills attainment.

Thus, diabetes in particular is not just an individual disease but rather one that directly affects everyone in his or her family.

In the Appendix we illustrate the healthcare challenges in a specific example, Indonesia, which illustrates the range and scale of these issues.

Why does this situation still prevail, even in those countries achieving high rates of development and growth? We think the answer has much to do with the fact that the rural predicament our farmer experiences has not been seen in the “developed world” for 100 years, and certainly not seen since the emergence of western technology-based medicine. More precisely, western suppliers of healthcare and technology have developed no healthcare service models for this type of problem.

Furthermore, technology itself, until recently, offered no affordable solution either. Can you really fault the local government, the local clinic or medical staff when even stand-alone PCs, let alone software and networks, were, until very recently, strictly unaffordable? The rural healthcare example did what it could within the limits of the budgets and technological opportunities prevailing in the past.

However, that has all changed.

Let's go back and rewrite our farmer's story, as it should be, given today's toolkit of technologies:

The Farmer:

- (i) Our farmer, when diagnosed with diabetes is given basic health education about self-management of the disease, and registered to use a mobile-based diabetes self-care system (like [lifewatcher](#), see below);
- (ii) His mobile healthcare management system costs \$ 1 per month, and allows him to keep track of his blood glucose levels (and other key biomedical data such as weight, BMI, blood pressure, daily physical and mental well being), as well as those critical aspects of lifestyle that influence his disease – most importantly nutrition and exercise;
- (iii) He can use his mobile phone to communicate with the clinic by voice and email, and he can book appointments in advance;
- (iv) He is monitored by a nurse call centre for diabetes patients, administered by the Metropolitan hospital. The nurse has PC access to his biomedical and more importantly his lifestyle real-time data and histories, and calls him once a month for a brief check-up on his condition, answers questions and triages any medical issues, e.g. directing him to the clinic for blood tests, etc.;

- (v) The farmer finds the system easy to use, attains an understanding of the disease and gains confidence that he can confront his fears about the disease. His awareness of his role as breadwinner in the family, leads him to diligent control of glucose and lifestyle management;
- (vi) As a result of tighter controls and good self-management, disease complications do not occur, and his feeling of well being and being in control improves.

The Clinic:

- (i) The clinic is provided with two netbook PCs, at a cost of \$250 each or less, which are connected by internet to a rural healthcare system (like lifewatcher REMOTE), administered by the Metropolitan hospital;
- (ii) When our farmer patient arrives, after referral by the call centre nurse, the clinic has access to the farmer's data, and in case of need may refer cases to review by specialists in the Metropolitan hospital. This may result in further treatment at the clinic, or a referral and appointment at the hospital;
- (iii) In this way the clinic gains access to medical expertise and support at an early stage. For example, even if the farmer suspected a leg ulcer, a photograph emailed via the mobile phone could quickly be assessed by the clinic or passed on to the hospital for advice and treatment – at speed and low cost;
- (iv) The rural mobile healthcare worker and local doctor, by using lifewatcher & lifewatcher REMOTE, *one clinician can now become the "Front End" for a nation-wide virtual hospital.*

The Hospital:

- (i) The rural healthcare system allows the hospital to communicate with and manage a network of patients and rural clinics dispersed across a wide geographic area, at service levels that previously were quite out of the question;
- (ii) The system's infrastructure and cost is low in relation to typical hospital IT capital costs. It would comprise a simple database and server installation;
- (iii) The system allows controlled and prioritized access to the scarce medical specialists. Senior hospital doctors can give electronic consultations at minimal resource costs;

- (iv) Health policy objectives and programs can be promoted across the system, data collection improved, better control of epidemics and epidemiology. Health training and assessment can be facilitated, as well as educational programs for patients.

The authors maintain that, in the field of health care innovation, this is where Asia should concentrate its creative genius and adopt this mobile healthcare model. This is the type of service model, based on low cost widely used technologies, that can make a large impact on the lives and health of Asia's populations, and is well suited to Asia's particular demographic and development needs.

The rural healthcare system described above is a revolutionary new paradigm for care provision across Asia. It was not possible 5 years ago. It is now possible – indeed available - at low cost, and is suited to the needs of countries in the region. It is made possible by the technologies of mobile internet, converged with low-cost Netbooks and robust secure networks.

Mobile Healthcare Platforms Offer a Solution

Mobile Healthcare Inc, of Japan, offers a cloud based healthcare system – the **lifewatcher** platform -designed for preventive management of lifestyle-related chronic diseases based on mobile and PC Internet technologies. It has won several global Innovation and Silicon Valley awards: The World Economic Forum Technology Pioneer 2009 Award Winner in Healthcare at Davos, Finalist in 2007 Asian Wall Street Journal@Entrepolis Innovation Award, Red Herring Global 100 and Red Herring Asia 100 Awards in 2007.

lifewatcher connects the user/patient with doctors and care providers using cell phones and Netbooks, maintains real-time records of relevant life sign and lifestyle data, and provides secure methods of communicating and monitoring data, information and advice between members on the system. The system can be used for self-management of weight, diet and exercise, self-management of diabetes and cardiovascular disease and can also be used for more active interventions by call center coaches.

Mobile (typically est. 62% by 2010) and internet (10% 2008) penetration in Asian countries are growing rapidly and provide a suitable infrastructure for use of low cost mobile healthcare applications.

lifewatcher offers these advantages to Asian healthcare systems:

1. **lifewatcher** is an effective tool for maintenance of health, fitness, and prevention of disease onset related to diet and lifestyle, including obesity and diabetes.
2. **lifewatcher** is an effective and efficient tool for diabetes sufferers to self-manage their health, preventing or delaying onset of deterioration and complications.

3. By connecting patient and doctor remotely, lifewatcher, if integrated into the rural health infrastructure, can reduce the barriers caused by distance, and improve patient quality of care, and increase patient use of the health system overall. This would reduce the incidence of self-medication and improve overall health outcomes.
4. lifewatcher can also be used as a robust, low-cost system to connect doctors and nurses in local clinics with metropolitan hospital “centres of excellence”, overcoming barriers caused by training disparity and distance, and delivering a higher quality of health care and control from major hospitals to the periphery.
5. Such a rural health system, built upon lifewatcher, could also be used for health education and literacy, and healthcare training.

Summary

As Asia develops, the pattern of healthcare services and business models **will diverge from those traditional in the West**. China, India, Indonesia and other Asian countries can be relied on to go their own way.

The impact that they will have on technological innovation in the next 20 years will be profound. Thus, business and service models will be completely different than those of today – indeed, how can it be otherwise, when geography, economy and culture are so very different?

Seen in this context, Asia is over reliant on western suppliers. The lesson from Japanese post-war development is that local Asian producers working in (somewhat protected) markets can become global, transformational giants within 20 years. The inherent challenge is for Asian government and business leaders to step up to the plate and implement these healthcare designs now. The time for affirmative action is now! Without investing in and implementing these social infrastructures, continued national growth will be imperiled and the aspirations of whole populations will be denied.

This is the challenge and the opportunity for all Asians in the 21st century – Generation 21!

Appendix: A Case in Point--- Key Healthcare Issues Facing Indonesia

The recent World Bank report “Health Expenditure Report 2008”¹ made these observations on health care challenges and priorities for Indonesia:

[On Demographic, nutritional and epidemiological transition:](#)

¹ *Investing in Indonesia’s Health: Challenges and opportunities for future public spending, World bank, June 2008*

- By 2015 Indonesia is expected to have a population of around 250 million, half the population will be 30-60 years old.
- This major demographic change is being accompanied by a nutritional transition to higher calorific and fat based diets, and an epidemiological transition towards an increase in non-communicable diseases (NCDs), including chronic diseases associated with more sedentary “western” lifestyles.

On NCDs and chronic diseases:

- NCDs such as diabetes and heart disease are inexorably on the rise. Diabetes and obesity are increasing and the complications resulting from are putting severe strain on the health insurance system.
- Most treatment options are based upon two simple strategies – (i) prescribe more drugs, and (ii) monitoring the development of the condition/complications as they happen. With a large dispersed population this becomes increasingly challenging, and providing effective access to appropriate expertise is both time consuming and expensive within the existing healthcare system.
- A key World Bank recommendation in relation to NCDs is to increase preventative care: “To a great extent NCDs can be prevented, or their onset delayed, through appropriate preventive health behaviours, such as reduced smoking, increased exercise and healthy eating.”

On access to healthcare challenges:

- Access to healthcare is also a major concern: Whilst Indonesia has a distributed health system relying on local clinics (Puskesmas and Posyandu), the utilisation rates are low due to a number of factors including health illiteracy, time and transportation costs involved in travelling to clinics, and a mixed quality and availability of care in the system.
- One problem is that local clinics serve on average a large population (23,000) and large service area (242 sq. km), and many facilities are poorly equipped. Local doctors and nurses are often inadequately trained.
- At the same time, rates of self-medication have increased over the years, based in part on local pharmacies. “Indonesians have increasingly changed their treatment-seeking behaviour away from outpatient facility-based services. More than 50 percent of people reported they relied on self-treatment during their last illness.”

Other recent studies confirm these trends and observations: In a 2000 study² by the Indonesian Diabetes Association, the authors warned: “Predications indicate a potentially explosive increase in the prevalence of diabetes worldwide, especially in developing countries like Indonesia”. Though regionally and ethnically varied, prevalence has grown dramatically over the past 15 years, particularly in urban populations, to levels that are comparable to other Asian ‘hot spots’.

² *The epidemiology and management of diabetes mellitus in Indonesia, Sutanegra D, Budhiarta AA, Diabetes Re Clin Practice 2000 Oct; 50 Suppl 2: S9-S16*

Absent significant improvement in the Indonesian health system, and in particular the delivery of services to its dispersed populations, and better methods for detection and treatment of diabetes and other NCDs, the implications for government future health expenditures and the health status in the population are potentially dire.



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In 2003, Canadian-born James Nakagawa began imagining a new kind of society where patients could be empowered using mobile technology to take their health issues, literally, into their own hands, monitoring their daily medication, nutritional intake and other key health indicators.

In 2010, Mobile Healthcare Inc's flagship product, *lifewatcher*, is on its way to becoming the global de facto standard for remote patient self-care in the arena of diabetes, obesity and other life-style related illnesses.

Mr. Nakagawa is a 2009 Davos World Economic Forum Technology Pioneer Award Winner in Healthcare. In November 2007, Mobile Healthcare Inc., was placed as a Top 6 Finalist for the Asian Wall Street Journal Innovation@Entrepolis Awards. Following this, In December 2007, his *lifewatcher* solution became a Red Herring 100 Asia and Red Herring 100 Global Award Winner, described as one of the most promising private technology ventures in the world.

From 1993 to 2003, prior to founding Mobile Healthcare Inc, Nakagawa was President of TWI Ltd, helping senior management in financial institutions tailor and develop web-centric solutions for delivering online trading services.

Together with his wife Megumi, they developed and operated Japan's first comprehensive cancer patient support site as a philanthropic endeavour, dedicated to his late father's battle with cancer.

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Richard Malone built his career in financial services in the areas of strategy consulting, financial analytics, analytic trading and trading technology. Mr Malone was managing director at Merrill Lynch & Co. for many years in Wall Street, London and Tokyo, and worked previously at JP Morgan in the capital markets businesses.

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