



The Medical Arms Race
A New Global Perspective

Volterra Health
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About Volterra Health

Rising costs and fiscal pressures are combining to create an irresistible movement for change in health services worldwide. At present many of the world's health systems are seeing diminishing returns to ever increasing expenditure; they are face-to-face with the flat of Enthoven's curve of diminishing returns. The challenge is to bend the cost curve so that we see better healthcare for less.

The future of health service organisations will depend on their ability to ensure that change creates new opportunities for investment and improves rather than limits services. The future needs to be different from the past.

Volterra Health is a new consultancy which will work with clients in both the public, private and not for profit sectors to seize these new opportunities. Our combination of health sector experience, modelling techniques and policy connections makes us uniquely placed to help and improve health services across the globe.

Health economics up to now has been mainly based in the US and the UK. It is now spreading worldwide. We will seek to provide full information on how established and emerging techniques of health economics are being used by health agencies across Asia, Europe and the US.

Working with an international network of 'curve-benders', *Volterra Health* will:

- Deliver incisive assessments of health trends in Europe, Asia and the US;
- Provide intelligence and strategic planning for enterprises involved in redesign of healthcare; and,
- Create a virtual network to communicate and share best practice across national systems.

Across Europe, Asia and the US there is great dissatisfaction with the outcomes and processes of traditional health services. Many of these health systems and services are now regarded as being on the flat of curve.

For more information

For more information on how *Volterra Health* can support you in bending the curve, contact Charlotte Alldritt on 020 8878 6333 or calldritt@volterra.co.uk.

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Nick is a sought after speaker and contributor to the leading journals and industry press. His publications include: Bosanquet, N. and Sikora, K. 'The Economics of Cancer Care' (Cambridge University Press, 2006) and Bosanquet, N. and Leese, B. 'Family Doctors and Economic Incentives' (Gower, 1989).

Bridget Rosewell

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Bridget is also Consultant Chief Economic Adviser to the Greater London Authority, through which she advises the Mayor of London, the Greater London Authority, Transport for London and the London Development Agency on economic matters.

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Introduction

Study of health policy at present suffers from multi-national blur. Much is based on OECD or WHO system level data with a focus on small variations between countries, rather than on the key variables which condition decision making across all countries.

Volterra Health brings a new approach, based on four critical insights:

1. **Think regionally:** The key directions are much clearer if we assess them across four main blocs: the US, Europe, Latin America and Asia.
2. **Beware the ‘New Model’:** There is a new model of healthcare emerging which will impact differently on these blocs. This model is being widely presented as cost saving, but in fact it may well lead to extraordinary new pressures on total cost as intervention and treatment rates change.
3. **Note the supply-side:** National systems vary, but share one key characteristic – a profound misconception about the key drivers of health expenditure. Usually framed as demand side factors, such as population ageing, they are in reality mainly supply-side driven. Health services are closed national systems which are affected by stagflation and cost-push pressures. In the global economy the opportunity cost of these rising cost services in closed national markets is showing a very significant increase.
4. **Halt the medical arms-race:** The main direction for reform should be towards changes in funding and incentives, which will increase competition and choice. ‘Big Bang’ reform plans for systems as a whole simply increase defensive cost-push pressures.

This document concentrates on three of our four regional blocs – the US, Europe and Asia. It sets out the key components of *Volterra Health’s* approach to reform:

- **Power to patient choice** through better access to information on quality and outcomes. Informed confident “customer” power is critical.
- A much **clearer role for government** in setting national strategies in key disease areas.
- Opening up **supply side competition** to any willing provider—including international competition.
- Improved quality and access will come through improved performance by local units—within a common framework of **information about quality**.

In the final section we suggest how health system providers, payors and policy makers can start to bend the curve of diminishing returns, achieving better results at lower cost.

The Medical Arms Race: A New Global Perspective

“Of 7,190 American soldiers captured in the first stages of the Korean War, 38 per cent (2,730) died in captivity. The death rate higher than in any previous wars including the revolution was ‘not primarily due to... maltreatment “but to self neglect and lack of mutual support.’

Of 229 Turkish soldiers captured none died in captivity. ‘When a Turk got sick, the rest nursed him back to health.’”

Eugene Kinkead, ‘Why They Collaborated’ (1959)

PART 1: The Old and New Models of Healthcare

There is a new model of care which is widely seen as having potential for better quality service for its ‘customers’ and at lower cost. In this report, *Volterra Health* explores: what is this model, and will it deliver the health oasis or just a mirage?

The Old Model (b. 1880 d. circa 1980)

The ‘Old Model’ of care focussed mainly on a system of triage and staged treatment of patients by doctors. Patients visited doctors, presented their symptoms and were then either treated for these symptoms there and then, or let through the gate into the specialist universe of diagnostics and treatment in hospital. There were other programmes such as public health, immunization and school health, but they were often run by non-medical personnel such as public health inspectors or school nurses. The focus of medical prestige and admiration was overwhelmingly with the surgeon in hospital. Primary care physicians were, in the phrase of a famous British physician, doctors who “had fallen off the ladder” (Bosanquet and Salisbury, 1998).

In its time this model achieved very remarkable outcomes. The UK, for example, saw life expectancy at birth rise from 42 to 63 years between 1880 and 1945. Infant mortality fell from 200 to 30 (per 1000 births) and infectious diseases for adults were greatly reduced (McKeown, 1979).

The cost was also remarkably low. In 1950 health spending in the UK was three per cent of GDP. Even in the US in 1970 health spending was only seven per cent of GDP, rather less at the time than spending in Denmark at nine per cent of GDP. However over the last three decades the cost of the Old Model – the foundation of most OECD systems even now - has begun to rise – on average at least one per cent a year faster than real GDP across the OECD. OECD average spending has risen from five per cent of GDP in 1970 to nine per cent now (OECD, 2010).¹

¹ The rise took place even with much reduced spending on child health.

Pressure on the Old Model to Change

New information and patient group pressure on persistent health inequalities and service quality variation began to lead to increasing dissatisfaction with the old system. Episodic treatment proved to be more successful in preventing death than in raising the quality of life of the survivors. New investments in special hospital units, diagnostics and treatment tended to raise the costs of episodes rather than address the problems raised by those with longer term conditions. Health systems across much of Europe and the US moved onto the ‘flat of the curve’. That is, marginal increases in health expenditure did not lead to commensurate increases in the health outcomes. Or, as in Winston Churchill’s description of the Anzio landings in World War Two, “I had hoped that we were hurling a wildcat onto the shore, but all we got was a stranded whale.”

One important source of pressure on the Old Model was worldwide dissatisfaction of health funders – whether governments or insurers. Funders have, on the whole, become more dissatisfied with rising cost and poor outcomes than patients, many of whom retained faith in (or fear of change to) their system.

Another driver away from the Old Model was the perception of a technical lag between health services and a rapidly developing service economy. Health services in most systems seemed to be on the wrong side of the digital divide. As technology marched ahead in industry and other services – particularly Information and Communication Technologies (ICT) – there were suggestions that publicly or third party funded health services were being delivered in obsolete ways. While the absurdities of unusable outputs created by agricultural subsidy were visible, the medical service mountain was not. This driver was felt similarly across much of Europe, but particularly manifest in the US, with ever higher spending on specialist technology (Smith et al, 2009)².

The Old Model was strained by competing pressures of technology – at one time driving costs upwards by increasingly specialised diagnostic tools and treatments, and at another, by failing to apply ICTs that other industries were using to transform their business processes. Failure to integrate adequate and/or cost-effective communication technologies only exacerbated a fragmented model which already treated short episodes of illness through a series of often disconnected steps. Remnants of the Old Model limped on, but its days seemed numbered.

The New Model (b. circa 1980)

Visions of the New Model proposed solutions to several perceived problems of the Old. These problems were identified as including:

- **Poor prevention:** inadequate investment upstream in preventing or postponing the onset of disease;
- **Earlier diagnosis:** inadequate investment of time and funding in earlier diagnosis. As the number of effective therapies increased, it became clear — for aids related disease and cancer, for example — that timing of start of treatment was crucial to effectiveness (HPA, 2010). It was no longer enough to wait for the patient to show up at the surgery with symptoms. The focus was on achieving patient contact and diagnosis at the optimum time for effective treatment;

² Despite managing to contain costs until about the 1970s (compared to European systems), technology driven excess cost drivers were evident in the USA even from the late nineteenth century.

- **Community services:** inadequate investment in diagnostics and treatment capability closer to the patient;
- **Poor information:** quality of healthcare was highly variable, but there was little information on where and why this was the case. Even by 2010, “There is virtually no information on the quality of services of individual providers in the majority of OECD countries. “ (Journard et al., 2010 p.32); and,
- **Poor communication:** poor and inconsistent communication with patients and a lack of management to prevent risk recurrence.

The New Model has been proposed in various guises since the 1980s, emphasising a different arrangement of new and old types of healthcare organisation and management. This meant a focus on:

1. Prevention
2. Screening/early diagnosis
3. Ambulatory treatment
4. Workforce specialization
5. Care programmes and risk management
6. New treatments and technologies

The New Model: A Parallel Universe of Pilot Schemes and Fitness Fanatics?

The New Model is often presented as an imminent solution to all the problems of the Old Model, dealing with the problems of fragmented services, poor information and rising costs. A series of case studies, such as Valencia, Kaiser Permanente, or disease management in diabetes, are usually quoted as evidence for this view.

But how realistic are expectations that the New Model can remedy the defects of the Old? In this section we set out the key question for the economics of the New Model: *how will it impact on the demand and supply of health services?*

1. **Prevention:** Will prevention lower the demand for healthcare by reducing disease incidence? Here the international evidence is mixed. For example, a study in Norfolk, UK showed that people adopting four healthy behaviours had 14 years additional life expectancy and less chronic illness compared with those who adopted none of these behaviours (Khaw et al, 2008). Evidence from Poland also shows a reduction in chronic heart disease and overall premature mortality rates from changes in diet and smoking, two forms of behaviour-based prevention (Zatonski, 2003). Some societies, especially in central Europe in the post-Soviet era, have achieved very significant gains from a shift towards greater prevention, as have some areas in Scandinavia such as North Karelia in Finland (Puska, 2002). Meanwhile China has experienced a rapid and significant improvement in its control of infectious diseases, but changing diets, decreased levels of physical activity and other high risk behaviours have brought about an equally rapid rise in the burden of preventable chronic conditions (Yang, 2008).

A consistent international trend is towards health polarization, suggesting that preventative efforts need to be targeted at certain population groups. While the more affluent groups in societies are showing a stronger demand for health in terms of lifestyle change and activity, social and economic determinants of health outcomes have a high impact (Marmot and Bell, 2009), for example: “it has been estimated that in the United States 886, 202 deaths could

have been averted between 1991 and 2000 if mortality rates between white and black individuals had been equalized” (p 1169).

So while health inequalities exist between countries (broadly between rich and poor countries), there are growing differences within countries across key lifestyle indicators, including:

- Smoking rates
- Obesity
- Activity/exercise
- Limiting long term illness

The degree of health polarization in the face of population ageing has been particularly striking - some of the greatest differences in the rates of long term illness among older people are across class groups.³

It should be noted that - in general - prevention has been more successful in reducing early mortality than in reducing long term illness (see, for example, Colin-Thome, 2002). Preventative approaches also rely on engaging the population in behaviour change – personal incentives and motivation are critical. However, at a relatively small cost primary care prevention has very positive effects on individuals’ health and the returns are fairly secure and low risk (see, for example, UK Department of Health Cancer Reform Strategy, 2009).

Leap-Frogging the Curve: Prevention in Asia

Asian societies start with a remarkable record in terms of life expectancy (relative to health expenditure), but it remains to be seen whether this will continue under the burden of rising chronic behaviour-based conditions. Will Asian societies take the route of Asian migrants to the US, who soon begins to show high rates of western type diseases? Or will they maintain their enviable record?

Writing in *The Lancet*, Gonghuan Yang et al., (2008: 49) are optimistic:

“Just as China was able to control infectious diseases within a shorter time frame than other countries, it has the opportunity today to reduce the time over which chronic diseases take a high health and economic toll in the country.

China’s early and substantial success in control of infectious diseases was achieved by prevention strategies; prevention will also be an urgent strategy that can be implemented both within China’s public-health structure and by practitioners of clinical care.”

Yet in one area at least, that of mental health, the changes appear ominous. While showing a large fall across Europe (halving in the last two decades in all EU countries except Belgium), suicide rates have risen markedly in China (China Daily, 9th November 2009).

In summary, social determinants of health outcomes impact upon the effectiveness of preventative strategies; across Asia, Europe and the US we have seen a marked polarizing effect within the countries, with the burden of communicable and non-communicable

³ Although improvements in child health, which were a striking feature of the mid twentieth century health scene, had a fairly wide effect across the child population, improvements in adult health have been much more uneven. This polarization in fact explains some of the effects of population aging.

diseases falling most heavily on the poorest groups in the population (Tang et al, 2008). Yet there is a paradox: the individual return to preventative investment is secure with low variability, but the return to society in terms of reducing the incidence of disease and the demand for health care has been highly variable. The challenge for worldwide preventative strategies of the future is to engage whole populations in effective behaviour change. This will help to reduce the demand for healthcare and spiralling cost of chronic conditions, and narrow growing health inequalities which perpetuate down the generations.

2. **Screening/early diagnosis:** Will screening and early diagnosis reduce the demand for healthcare? It will certainly bring about a shift in costs and activities, but it may well be optimistic to project actual total cost reductions. Sources of extra cost include:
 - Pressure for more frequent opportunistic screening
 - Identification of false positives
 - Increase in diagnostics
 - Longer term care needs of survivors many of whom may be in poor health

The effectiveness of screening and early diagnosis may be highly variable between, and even within, disease groups. For breast cancer, for example, early diagnosis has been critical in improving outcomes (Bosanquet and Sikora, 2006). However it is likely that total treatment costs have increased through greater spending on drug therapies for preventing recurrence. For prostate cancer earlier detection has also increased diagnostic and treatment costs with many discoveries of asymptomatic disease. Similarly outcomes have vastly improved for cystic fibrosis, but it is likely that total spending has increased as there is a small 'Pareto group' of survivors with very high care needs (and thus higher treatment costs). Yet earlier identification of people at high risk of heart disease (and treatment in ambulatory care) has reduced costs per patient through reductions in long and costly cardiac surgery (UK Department of Health, 1999).

In general screening and early diagnosis has had fairly consistent results in improving outcomes — but here the New Model has had much more variable effects on total expenditure. The frequency of opportunistic screening has been a key force in raising health spending and activity in the US system.

3. **Ambulatory care:** Will walk-in outpatient clinics reduce total costs? Outpatient clinics have enabled improved outcomes as a result of increased specialization and avoidance of hospital admissions. However, this strategy is very unlikely to see total expenditure fall; more accessible treatment will to change referral thresholds so that more patients are treated albeit at lower cost per patient. For example, laparoscopic surgery for the diagnosis and treatment of the gall bladder has lowered costs (per operation) but led to increased expenditure in the US and in the UK as more people came forward for this less invasive form of surgery. Another example of ambulatory care reducing per patient costs is in orthopaedic surgery where hip replacements are being increasingly carried out with spinal blocks instead of general anaesthetics. With patients recovering much faster from this ambulatory approach (requiring only a single overnight stay), demand is likely to rise.
4. **Workforce specialization:** Can more specialised teams of clinicians improve quality at lower cost? This is one part of the New Model where there are likely to be dual positive effects in improving outcomes and reducing costs. Experienced teams are likely to be able to treat patients with more complex illnesses in a much more effective manner. Experienced teams are also able to shorten length of stay for harder to treat patients by better selection and management of treatment programmes.

Within the UK's NHS there is plenty of evidence that the more stable health teams (which have time to build their experience in working within disciplines and with each other) in the North of England achieve better results than might be expected from the background social indicators (see NHS North East, 2008). Other examples include trauma centres, where more specialized centres achieve better results (especially for patients with head injuries) and surgery for pancreatic cancer, where outcomes in centres carrying out more operations are 40 per cent better than in smaller centres (Begg et al, 1998).

5. **Care programmes and risk management:** Surely comprehensive care programmes and pre-emptive case management can improve health systems? Care programmes are indeed a clear win situation. They do not raise volume of treatment (as the patients are people who have had serious illness), and they can reduce cost by reducing emergency admissions. The UK National Audit Office Report on Delivering Cancer Strategy (2010) estimated, for example, that there were 100,000 emergency admissions of late stage cancer patients many of which could be avoided through better communication and support outside hospital. Care programmes can also improve outcomes. A recent trial of end of life care programmes for patients with lung cancer showed higher survival gains than being achieved with many new drug therapies for late stage cancer (Temel, 2010).
6. **New treatments and technologies:** Do new treatments and technologies always lead to lower costs and better quality care? In many ways a double-edged sword, the New Model required services and technologies which were not used or available under the Old Model, including:
 - Social marketing to change motivation on lifestyle for prevention
 - Organization of large scale screening programmes
 - Use of IT in improving communication with patients
 - Greater access to diagnostics in primary care
 - Redesign of services for more ambulatory and day care

Many of these new treatments and technologies offer the potential for monetary savings, improved clinical outcomes and higher quality patient experience. However, as discussed in Section 2, they can also be an endogenous driver of ever-rising costs.

Differences between the US, Europe and Asia

The key change is the rise in morbidity resulting from lifestyle change. The rise in morbidity shows sharp differences between the three regions.

The US shows deterioration in health of the population, while Europe has shown some deterioration but at a slower pace. This change has divided the population into three groups:

1. Those without ill health;
2. Those whose ill health problems are stabilized and can be managed by lower cost interventions; and,
3. Those who have serious problems requiring multiple interventions.

Change in behaviours and lifestyle means there are many fewer people in the US in the first group. Much of Europe is also experiencing pressure from groups 2 and 3, albeit at a slower rate of increase than in the US. (A UK/US comparison can be seen in Figure 1 below.)

Asia is in a very different position. For China the traditional lifestyle has led to high life expectancy and the diseases of affluence are still second to infectious diseases (although the former are rising fast). Japan, the society with the longest exposure to the temptations of affluence, has yet to show many adverse effects with the quality of diet offsetting some of the effects of heavy cigarette smoking. The future of Asian health services depends partly on whether this favourable position continues. Will Asians continue to be healthier than Europeans and will Europeans continue to be healthier than Americans?

There are also differences between the three regions on the impact of the New Model. In the US there is now a serious problem of double running. The New Model is expanding as an 'addition to' rather than a substitute for the Old. Thus ambulatory care has taken cost and volume away from hospital and physician office treatment, but it has been provider led and in provider interests.

In Europe the take up of the New Model has been slow outside a few innovation sites. The most general adoption affecting the greatest number of patients has been in Germany with disease management for diabetes. The UK has also moved towards the New Model, but without any very clear integration; it remains a series of pilot projects and screening/social marketing programmes rather than a serious substitute for the older model of episode based care.

In Asia the pressures are mainly towards increased spending on high-tech specialist care. Much of the technology is made in Asia and the current low level of spending gives room for expansion. However the South Korean example shows that the combination of open-ended third party payment with a strong medical enterprise culture can produce an (ultimately unsustainable) expansion in spending even faster than the US. As with health status, the developments over costs during the next decade are uncertain.

Summary: The Old Model limps on

Fragmented attempts at reform over the last few decades have not been sufficient to shift healthcare out of the Old Model into the New. Failure to complete the transition has resulted in increasing health polarization. While most of the population under 70 rarely see a doctor, there has been a growing group of people with severe long term problems who need recurrent treatment. Thus within the UK the numbers of patients alive with end stage renal failure rose from 100 in 1965 to 85,000 in 2010. Survival in the 40-70 years age group has been the main demand side driver of health expenditure (not population aging). Together with supply factors of new technologies and therapies, the health system has come to be Pareto positive with 80 per cent of costs concentrated on 20 per cent of users. In British hospitals in 2004, for example, four per cent of in patients accounted for 40 per cent of in-patient days.

The New Model will have highly variable effects between different groups, but across the health system it is unlikely to reduce costs if simply added on to the existing system. The New Model is usually seen as moving forward through a series of pilot projects, which are then expected to diffuse through a conversion 'Road to Damascus' method.

However professional and financial incentives will drive patients through the Old Model. The New Model does not fit well with older patterns of clinical responsibility. It does not emerge into an innocent world without ingrained professional attitudes, embedded practices and existing systems of financial incentives. The net impact will depend on funding levels and the strength of the enterprise culture among doctors.

Health systems could find they have to meet the cost of dual running, with the heavy capital commitments of the Old Model and the technologies and processes of the New. Scarce resources of experienced staff time will be more stretched. The White Knight will fall off his horse.

The New Model does mean potential for improved outcomes and even for lower cost certainly compared with the Old Model, but it will only achieve this with investment and momentum. As a tack-on of pilot projects it will not deliver. In fact it will add to total expenditure, and to confusion.

Figure 1: Self-reported health by education and income in England and the United States, ages 55-64 years

Table 1. Self-reported Health by Education and Income in England and the United States, Ages 55-64 Years*

	England				United States			
	Low	Medium	High	Total	Low	Medium	High	Total
Years of Schooling, Percent Distribution								
Unweighted sample size	1745	969	967	3681	2293	1003	1090	4386
Diabetes	7.0	4.8	5.7	6.1	14.3†	12.3†	9.5†	12.5†
Hypertension	36.6	31.4	31.0	33.8	46.3†	40.8†	37.0†	42.4†
All heart disease	11.6	7.7	7.8	9.6	17.1†	14.8†	12.0†	15.1†
Myocardial infarction	4.5	3.6	3.4	4.0	6.7†	4.1	4.4	5.4†
Stroke	2.7	2.2	1.6	2.3	4.8†	4.2†	1.7	3.8†
Lung disease	8.2	5.2	3.7	6.3	10.9†	8.3†	3.1	8.1†
Cancer	5.2	5.5	6.3	5.5	8.9†	10.0†	10.0†	9.5†
Income, Percent Distribution								
Unweighted sample size	1204	1212	1259	3681	1574	1484	1328	4386
Diabetes	7.3	6.7	4.4	6.1	17.4†	11.8†	8.2†	12.5†
Hypertension	36.7	34.6	30.3	33.8	46.3†	43.6†	37.1†	42.4†
All heart disease	13.7	8.7	6.5	9.6	20.0†	13.3†	12.0†	15.1†
Myocardial infarction	6.5	3.1	2.4	4.0	8.5	4.6	3.2	5.4†
Stroke	3.6	1.8	1.4	2.3	6.0†	3.8†	1.5	3.8†
Lung disease	8.1	6.4	4.4	6.3	13.2†	7.1	4.1	8.1†
Cancer	5.9	5.2	5.5	5.5	9.6†	9.6†	9.3†	9.5†

*English data are from the first wave of English Longitudinal Survey of Aging, and US data are from the 2002 wave of the Health and Retirement Survey. Within each country, weekly family income adjusted for family size is divided into 3 equally sized income tertiles with one third of the weighted population in each group. In the United States, the range of the middle income group is \$322-\$635 while in England the range of the middle income group is £127-£241. In the United States, education is separated into high school or less (0-12 years), more than high school but not a college graduate (13-15 years), and college or more (≥16 years). In England the 3-way education division is qualified to a level lower than "O-level" or equivalent (typically 0-11 years of schooling), qualified to a level lower than "A-level" or equivalent (typically 12-13 years), and a higher qualification (typically >13 years). All data are weighted.

†P<.01 vs data with England.

‡P<.05 vs data with England.

Source: Banks, J. et al. JAMA 2006 295:2037-2045

PART 2: Understanding Cost Drivers

While previous analyses have tended to focus largely on *either* demand *or* institutional design, they have largely failed to capture the dynamic interaction of these factors within systems. Failure to understand how demand and supply interact has been the undoing of attempts to explain international trends in health expenditure and outcomes.

Volterra Health makes a bolder claim, namely that supply factors are the dominant reason for ever higher health expenditures in the OECD. We compare the number, speciality and remuneration of physicians; the structures and mechanisms of systems, and the extent to which low/high-cost technologies are integrated into various health systems. While patterns of behaviour are a major factor driving up future demand and associated costs, they have been secondary factors in explaining why countries have hit the ‘flat of the curve’ (Enthoven, 1980) and are no longer seeing a return to their return on health expenditure. These supply concerns have much to teach us in the application of the ‘New Model’.

Context

International variation in health spending is wide, with the US at one end of the spectrum spending \$7,285 per capita (total health expenditure \$PPP) and Zimbabwe at the other with just \$20 per capita (\$PPP). As Figure 2 shows, even excluding the US as an outlier, the difference in per capita total expenditure on health is over \$2,000 between the top 10 highest spending countries alone.

Figure 2: Top 10 International Health Spending Countries

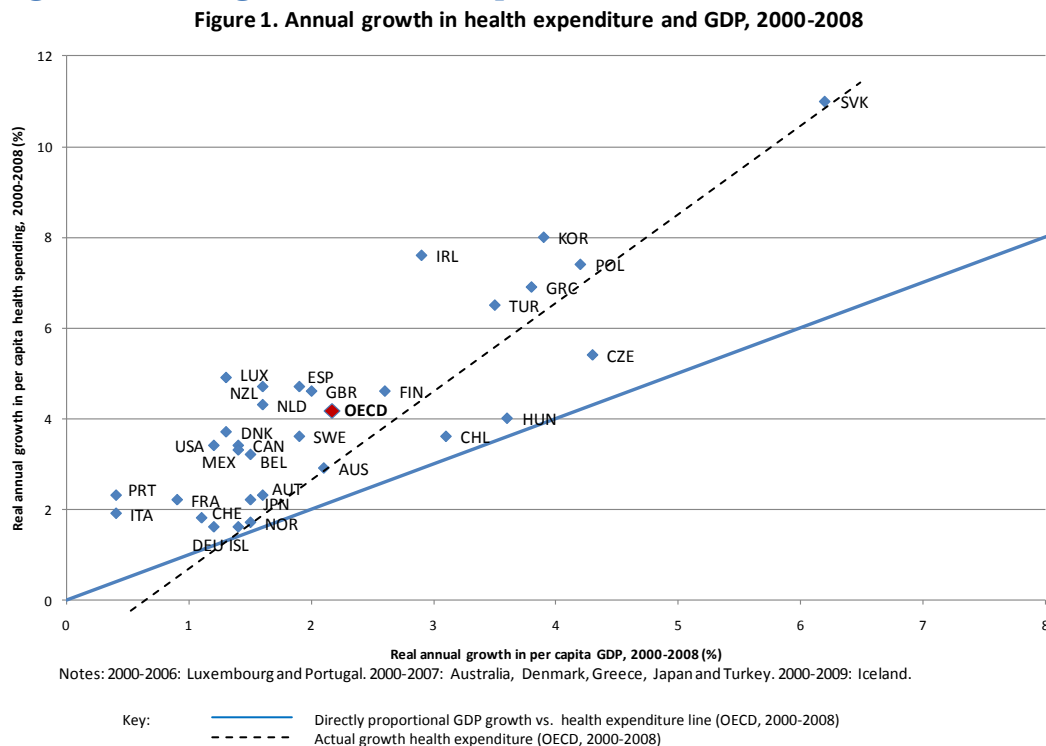
2007 Ranking	COUNTRY	Per capita total (PPP int. \$)	2000 Ranking
1	United States of America	7 285	1
2	Luxembourg	5 734	3
3	Norway	4 763	4
4	Switzerland	4 417	2
5	Malta	4 053	5
6	Canada	3 900	11
7	Austria	3 763	6
8	France	3 709	9
9	Germany	3 588	8
10	Denmark	3 513	12

Source: *Volterra Health*, based on *World Health Statistics 2010*

As an economic good, the amount of healthcare consumed typically increases as income rises. As such, it is not surprising that international health systems have – as global Gross Domestic Product (GDP) has risen over recent decades – witnessed a broad upwards trend in total spending.

However, developing countries have failed to contain the rise in their health expenditure. Figure 3 below shows that the annual rate of growth in health spending outstripped that of GDP in every OECD member country between 2000 and 2008.

Figure 3: Annual growth in health expenditure and GDP, 2000-2008



Source: OECD (2009)

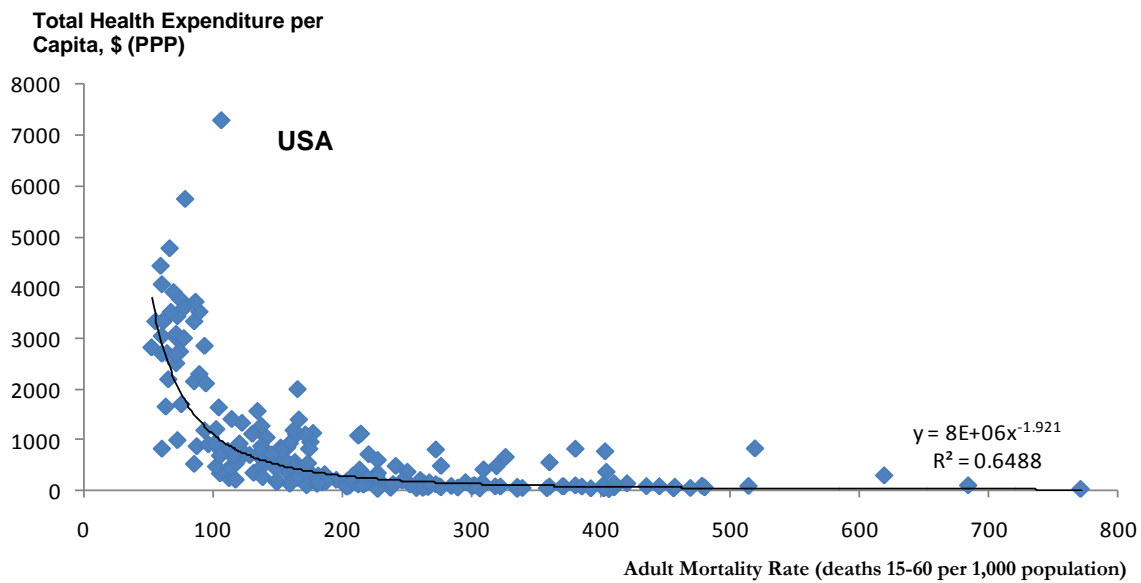
Many comparative analyses of health spending concentrate on the demand factors attributed to rising total spend. It is true that ageing and increasingly mobile populations present new challenges associated with chronic health conditions (often accounting for 70% of expenditure). Rising patient expectations regarding access to new drug treatments and technologies also represent a challenge to health systems.⁴

Other commentators have focussed on institutional structures in general and the degree of marketisation and public regulation in particular to explain differences in health system costs and outcomes. However, an extensive comparison of system types across the OECD finds that “no broad type of health care system performs systematically better than another in improving the population health status in a cost-effective manner.” (OECD, 2010)

Figure 4 below illustrates this lack of correlation between system expenditure and outcomes (measured here by adult mortality rate). Some countries – such as Chile, China, Singapore and Korea – spend relatively very little for comparable or better outcomes than high spending countries.

⁴ For example, according to the Kaiser Family Foundation (2010) 90% of elderly patients and 58% of non-elderly adults rely on prescription drugs on a regular basis in the US.

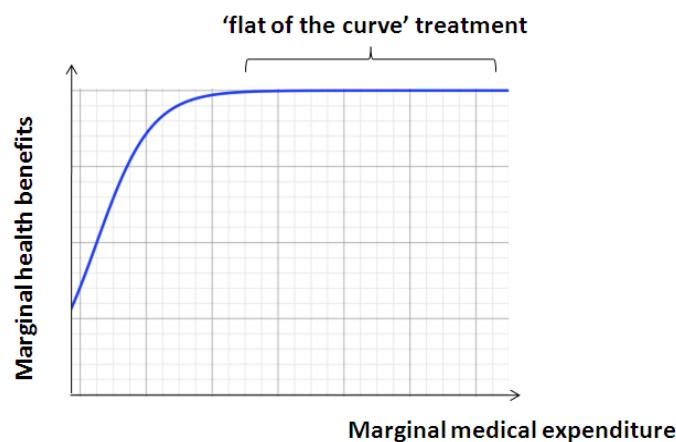
Figure 4: Higher spending does not necessarily lead to better outcomes



Source: *Volterra Health, based on World Health Statistics 2010*

If we apply the insight of Enthoven (1980) to Figure 4, it is possible that those countries spending over about \$2500 per capita are hitting the ‘flat of the curve’ in terms of the marginal cost versus benefits (proxied above by the adult mortality rate). At a micro level there is evidence to suggest the presence of relationship. For example, researchers from Harvard University, the US National Cancer Institute, and National Bureau of Economic Research reported in 2007 that average life-expectancy for lung cancer patients rose by less than one month between 1983 and 1997, while costs rose by over \$20,000 per patient (Woodward, R. et al., 2007). Figure 5 illustrates Enthoven’s diminishing return to health expenditure:

Figure 5: Enthoven's curve - diminishing returns to health benefits from increased medical expenditure



Source: *Volterra Health*

Volterra Health Check: United States of America

The USA is an outlier in the amount it spends on healthcare as a proportion of Gross Domestic Product (GDP). At 16% GDP (2008, OECD 2010), or \$7538 per capita, the US spends more than twice as much as comparative Western economies such as France, Germany and the UK. Of all the OECD countries, public finances in America contribute the smallest percentage of total healthcare expenditure (46.5% in 2008 compared to 70.2% in Canada and 82.6% in the UK; OECD, 2010).

Nevertheless, the scale of American spending is such that total government spending (which currently provides insurance coverage for the elderly and disabled people – Medicare – and some of the poor – Medicaid) is greater than in all other OECD countries except Norway and Luxembourg (OECD, 2009). Note also that public spending grew more rapidly than private spending between 1990 and 2007. The OECD attributes this growth largely due to expansion in public insurance coverage (2009).

Spending is high but coverage is not universal

While the level of spending in the US is disproportionately high, there is no evidence to suggest that the quality of care is commensurately higher than other countries. The US has a lower life expectancy than the OECD average and in examining the relationship between GDP and health expenditure for all other countries, “a country with the income level of the United States would be expected to spend around \$2500 less per capita than it actually does – equivalent to \$750bn per year” (OECD, 2009). But the high healthcare price tag in the US is also not sufficient to provide universal coverage for its population; a recent survey by the National Center for Health Statistics found that the proportion of people in the US without insurance had risen to 15.4% in 2010, up slightly from 14.7% in 2008. Combined with other social factors, lack of coverage amongst certain population groups helps to entrench already stark health inequalities in the US (see Marmot and Bell, 2010).

High input prices and big-ticket technologies drive up costs

Several research studies point to supply factors driving up total costs, and high input prices in particular (including: the relative cost of physicians, hospital costs, pharmaceuticals, early diagnostic/scanning technologies). While there are some islands of success, such as the Veterans Administration and Kaiser Permanente (typically where the supply pressures are weaker), a series in the journal *Health Affairs* came to the conclusion that “much of the spending differences [between the USA and other OECD countries] are attributable to the higher per capita income of the United States and the fact that *Americans pay much higher prices for medical care services*” (Anderson and Frogner, 2008:1719 - emphasis added).

Making a Global Diagnosis

Finally, there is another swathe of contemporary healthcare literature which refers to the rising costs of non-communicable diseases induced by lifestyle choices of individuals across societies; poor diet, lack of exercise, smoking and drinking – for example – are driving up demand for healthcare and associated costs. Advocates of this demand led approach refer the fact that 70% of total spending in much of the OECD goes on treating chronic behaviour-based conditions. They also stress the future costs of this behaviour, entrenched and perpetuated as it is by socio-economic factors and health polarization within countries (even more so than between countries) of the developed world.

However, if we consider the role of demand to date in pushing health systems to the flat of the curve – the point at which increased spending per capita (at purchasing power parity) ceases to bring about a marginal improvement in health outcomes – we can show that it has had relatively little effect.

Demographic change - which many demand-based analyses put in pride of place - will certainly impose considerable cost pressures in the future, but population ageing effects have yet to feed through (Smith et al., 2009). The costs of treating chronic conditions are indeed often averaging two thirds of total health expenditure. But what is missing is an understanding of why health systems are failing to contain these costs. Is it simply runaway demand? Or is it a product of the interaction between these demand drivers *within the norms, expectations, structures and incentives of the supply environment*? This report argues the latter.

Supply side commentators have focussed largely on the comparative degree of marketisation of healthcare systems. In practice, however, most countries exhibit a mix of competition (e.g. between payors (insurers) and/or providers) and regulation (e.g. government legislation – e.g. compulsory emergency care – funding (via general taxation, inducing top-down monitoring and scrutiny) and/or direct provision. To explain comparative health outcomes and expenditure levels we consider how demand factors interact within the supply environment and the varying extent to which health systems are able to contain costs.

We find that the three supply-based factors explain much of the variance:

- 1. New treatments and technologies**
- 2. Provider incentives** (including supply-induced demand)
- 3. Volumes and prices**

1. New treatments and technologies

Expectations of access to, and the quality of, healthcare tend to increase as overall income rises. International data show that 92% of the increase in health spending correlates with positive GDP growth. But health specific inflation is widely outstripping aggregate inflation and economic growth rates. New treatments and technologies are part and parcel of these rising expectations and cost increases (some studies, such as Smith et al. (2009), suggest they account for up to nearly half of health spending growth since 1960 in the USA (see also Newhouse, 1993). Whether or not technology is the *primary* cost driver, it is certainly true that the technological developments have ushered in greater usage of more expensive healthcare devices.

The OECD Health Data 2010 report, for example, shows “there has been a rapid growth in the supply and use of computed tomography (CT) scanners and magnetic resonance imaging (MRI) units used for diagnostic purposes. MRI units per capita more than doubled on average across OECD countries between 2000 and 2008, reaching 13 machines per million population in 2008, up from 6 in 2000.”⁵ The US is a particularly heavy user of such equipment (per capita), to the extent that it “has raised concerns that some imaging may not be useful. To reduce unnecessary procedures and cut costs, many OECD countries are trying to promote rational use of costly medical technologies.” (OECD Health Data, 2010)

While rising expectations and patient demand for access to cutting edge technologies might be conceived of as demand drivers, the subsequent rise in costs represents a failure of

⁵ http://www.oecd.org/document/11/0,3343,en_2649_34631_45549771_1_1_1_37407,00.html

systems to contain costs. There are endogenous system drivers of technology, brought about by a combination of patient demand (they deem access to technologies a matter of right), supplier-induced demand and supply inertia. Institutions (i.e. system structures and norms) matter when it comes to the level of technology uptake, absorption, incentives on use and innovation. As such, they have bearing on the containment of costs created by technology.

2. Provider incentives

There are many reasons why healthcare is typically considered to be underprovided if left to the free market. These reasons include the common problems of insurance contracts (e.g. incomplete contracts or moral hazard); consumer myopia (e.g. ‘it’ll never happen to me’); other difficulties associated with individual decision making under imperfect information and uncertainty, and patterns of income distribution prohibiting universal access to healthcare (e.g. I might be able to afford routine out-of-pocket payments, but could not meet the cost of treating serious illness or injury). Such underprovision has given rise to a range of health systems subsidised – to a greater or lesser degree – by general taxation.

These health systems have in turn relied upon a varying degree of competition and market incentives to ensure that, despite publicly funded and/or publicly produced healthcare services, quality remains high and costs low. Economic theory suggests that market incentives are required to achieve this state of affairs; empirical evidence in healthcare is moving towards this conclusion. So while, for example, “McKinsey’s experience working in more than 20 health systems around the world... [has revealed] examples of situations in which providers competition has resulted in poor outcomes, duplicate costs, and inefficient allocation of resources...we [McKinsey & Company] have been most struck by health systems in which provider competition, managed effectively, has improved outcomes and patient choice significantly, while at the same time reducing system costs.” (2010:33)

Failure to provide the correct incentives for healthcare providers and (where appropriate) payors, is a critical factor in enabling costs to be contained. In the US, for example, poorly designed lack of effective competition in Medicare’s pilot auctions for pricing of equipment has led to “severely distorted” prices, with the result that “Some are too high, causing excess expense. Others are too low, causing supply shortages and compromising service quality.” (Cramton and Katzman, 2010) Information, transparency and proportionate regulation are, at a minimum, required to ensure effective competition and aligned incentives for all involved across the system, including, and especially, patients.

While competition will not always and everywhere be appropriate (e.g. for highly specialised hospital care within a certain geographical area), barriers to entry and patient choice should be encouraged. More widely, competition should be encouraged and enabled (e.g. through secure transferable patient records), especially for less specialised hospital care and primary/community care.

3. Volumes and prices

All health systems are quasi-markets to an extent. This means that system structures and incentives have direct and indirect effects upon input prices (and/or quantities). For example, even the multinational pharmaceutical company, Merck, highlights the increased cost in developing a new drug “often in the vicinity of \$1 billion” as a reason for higher prescription costs and the degree of drug/technological misuse as a major contributor to

increased health costs).⁶ Systems have developed various ways of regulating and/or passing on the costs of prescription drugs. In the UK, for example, the internationally esteemed regulatory body NICE, was set up to constrain supplier induced cost pressures. This body has recently lost its authority to licence drugs to the UK market, prompting a shake up in the institutional ‘supply’ environment. Left-leaning columnist, Polly Toynbee, describes how she envisages this change will play out:

“NHS drug prices have been set since the early days to guarantee British-based companies a 20% profit, to encourage a successful industry. Many have long thought this cost should be borne by the business and not the health secretary. Nice was the first coherent check on runaway drug costs, but value-based pricing will re-open it all, to the industry's delight. Nice, says the government, will no longer be "making decisions on whether patients should access drugs that their doctors want to prescribe".

Any doctor can prescribe anything? A glance at the history of how well drug companies manipulate, bribe and bamboozle busy doctors into prescribing their most expensive products instead of cheaper and equally effective ones tells why the pharmaceutical industry is throwing its bats in the air...” (Polly Toynbee, Guardian 1 November 2010)

Summary: A failure to contain costs

While supply factors are not the only reasons we attribute to the rampant health inflation across the US, Europe and Asia, they form the norms and incentive structures shaping the interplay with patient demand. As Truffer et al. (2010) have shown, the US has been able to slow its rate of health inflation by 21.3% reduction in Medicare payment rates to physicians under Sustainable Growth Rate provisions. In his submission to the US Senate, Mark Pearson (Head, OECD Health Division) also highlights the role of the supply side in determining costs in the US: “...all evidence suggests that prices of health goods and services are significantly higher in the United States than in most OECD countries, and that this is the main cause of high overall health spending...But it is notable that where there are payment structures that encourage cost-consciousness, the United States has a very efficient system: there are few physicians and hospital beds, and average length of stay in hospital is low. This is a sign that the structure of the health system determines expenditure.” (OECD, 2009: 10)

Other countries in the OECD “have more mechanisms built into their health systems to restrict expenditures...either by regulating quantities or prices or both” (OECD, 2009:11). Rising healthcare expenditures are a result of a failure to contain costs, driven primarily by supply side factors. Demand side pressures exacerbate the situation, and can only be expected to grow as the impacts of an ageing population start to feed through. Health systems in the US, Asia and Europe will need to build in effective means through which to contain their costs now before they escalate to the point where large population groups are priced out of the ‘market’ (within out-of-pocket, general taxation or insurance-based funding models).

⁶ See www.merck.com/mmpe/sec22/ch340/ch340b.html

Volterra Health Check: China

With economic prosperity, China has made great strides in health status. Amongst China's population of 1.3 billion (2008) - a fifth of the world's total - healthcare has become a number one concern. Access to affordable medical advice and treatment is the main problem, with the average cost of a single hospital admission almost equivalent to China's annual income per head (Hu, S. et al., 2008). Tackling the problem of affordable access has been at the heart of recent reform efforts by the Chinese Government.

Measured by broad indicators China health system looks to be performing fairly well. Life expectancy at birth has increased from 67.9 years in 1981 to 71.4 years in 2000 (Liu, Y., et al, 2008) and up to 74 years in 2008 (WHO, 2010). The adult mortality rate in China is now barely higher than that of the United States. China recorded 113 deaths per 1000 people aged 15-60 years in 2008, and the USA 107 (WHO, 2010).

But there are considerable inequalities of access and outcomes

However, there are considerable inequities in the system: access to effective healthcare is typically worse for the poor, those living in rural areas and provinces beyond the south-east economic engine of China (e.g. Shanghai, Guangdong, Fujian and Zhejiang experience far higher rates of healthcare coverage than those regions in the north-west, including Xinjiang, Inner Mongolia, Gansu and Qinghai). This disparity in coverage impacts on comparative outcomes. There is a 13 year difference in life expectancy between the poorest provinces and Shanghai (Tang, S., et al, 2008). The recent surge of migrants into urban areas has been estimated at 140 million (2005). This unprecedented human phenomenon has exacerbated inequalities within urban areas – home to 43% of the country's population – as new migrants do not have access to the same level of education or healthcare.

Out-of-pocket expenses are such that the risk of medical impoverishment and 'catastrophic spending' (where payments are equal or greater than 30% of the household's capacity to pay) is internationally very high. Sixteen per cent of China's rural, and 14% of its urban, population incurred catastrophic spending in 2003 (compared to the zero in the UK, Czech Republic and Slovakia, and just over 10% in Vietnam and Brazil, which top Ke Xu et al's (2009) comparison of 59 countries (not including India; Xu, K., 2009).

Demand for healthcare is changing and expectations are rising

Just as in much of US, Europe, and the rest of Asia, China's population is ageing rapidly as fertility and mortality decline. It is expected that nearly a quarter of the population will be over 60 years in 2035, up from 6% in 1964 and only 10% in 2000 (WHO, 2009). This places new demands on the country's health system, which met considerable success between 1970s and 1990s in managing infectious diseases and perinatal conditions (largely through the effects of improved vaccination coverage, water quality, sanitation and higher incomes, better nutrition and housing). China's health system is already starting to see the effect of people living longer, and with a higher rate of chronic behavioural conditions.

In recent decades, and largely in line with economic and social advances, China has experienced a dramatic epidemiological transition from infectious to chronic diseases: "The pace and spread of behavioural changes, including changing diets, decreased physical activity, high rates of male smoking and other high risk behaviours, has accelerated to an unprecedented degree." (Yang, G,

2008: 42) Between 1992 and 2002 the proportion of people classified as obese⁷ increased by 97%, and approximately 177 million adults live with hypertension (Yang, G, 2008). Expectations for the quality of healthcare are also rising – with people becoming increasingly dissatisfied with their experience of, or lack of access to, treatment (Ma, K. 2007; The Chinese Social Science Academy, 2007). As demand increases, so too could the associated health-care costs.

China stands to gain much from the ‘New Model’

Nearly 60% of all deaths are a result of chronic, non-communicable diseases. China has piloted some successful programmes in preventative disease management (e.g. strokes and smoking cessation – see Jian, W, 2010), but stands to gain much from the low-medium ticket technologies, ambulatory treatment and a determined focus on prevention-based pathways which comprise the ‘New Model’.

Volterra Health Check: India

India has a population of 1.1 billion, 29% of whom live in urban areas. The country spends 4.9% GDP (2006) on health, amounting to \$109 PPP per capita. Only 0.9% GDP is spent by government and three-quarters of all health spending in India is borne directly by Indian households (Academy of International Health Studies, 2008).

India has made headway in improving some topline measures of health status. Average life expectancy at birth is now 64 years and the country’s adult mortality rate is 213, just below the regional averages of 65 and 218 respectively. For example, the rate of infant mortality has declined considerably since 1990, and access to improved drinking-water and sanitation facilities has increased in urban and rural areas (albeit it sometimes from a low base, especially in the case of the latter). India also has more physicians and nurses and midwives (per 10 000 population) than the average for the South East Asia region, and comparatively lower rates of tobacco consumption and obesity.

India is home to deep healthcare inequalities

However, there are considerable health inequalities in the country. An estimated 27.5% of Indians live below the national poverty line, 300 million people live on less than a dollar a day and more than 50% of all children are malnourished (2004; PwC, 2007). It is in part due to such persistent poverty – and with it “substandard housing, inadequate water, sewage and waste management systems [and] a crumbling public health infrastructure” that is seeing a return of infectious diseases once thought to be under control – including dengue fever, viral hepatitis, tuberculosis, malaria and pneumonia (PwC, 2007).

On the other hand, India’s burgeoning economy is creating an expanding middle class, with at least 50 million able to afford to buy Western medicine – a market only 20% smaller than the UK (PwC, 2007). As such, the market for private health insurance (especially employer-oriented schemes) is growing at over 30% annually, encouraged by government tax incentives (Academy of International Health Studies, 2008). Increasing affluence is also bringing about the adoption of unhealthy western diets, contributing to a rise in lifestyle-based illness such as hypertension, cancer and diabetes. Over the next decade it is expected that such lifestyle diseases will outpace infectious diseases; by 2025 it is estimated that 73.5 million Indians will suffer diabetes, for example, costing upwards of \$30 billion (PwC, 2007).

⁷ China classifies people as ‘overweight’ if they have a BMI greater than 24 and ‘obese’ if greater than 28. For more details, see, for example, Zhang et al (2008).

Reform of the Health System to Increase Access and Reduce Inequalities

India's National Health Bill (2009) has been designed to tackle the vast inequalities of the system. In particular, it seeks to legislate for right to access healthcare and emergency treatment to all Indians. At present, for example, some people in rural areas have to travel over 2 km to reach the first outlet selling paracetamol, over 6km for a blood test and 20km for hospital care (WHO, 2005). It also attempts to join up policy and programmes set by central government with those of the States. Lack of coherence between the various tiers of government has exacerbated India's fragmented health economy in the past, particularly regarding public health issues. Poor (or no) regulation of practitioners or drug treatments has also heightened the inequality of access to and quality of healthcare, with the highest trained staff finding little incentive to practice in rural areas with limited infrastructure. Trained staff is another significant problem restricting universal access to primary care, let alone specialised treatments. One estimate suggested that India would need an additional 200,000 doctors and 500,000 nurses to increase its patient: staff ratio to an 'adequate' level; "but far more are needed to match access statistics in Western countries" Academy of International Health Studies, 2008).

Low-cost Innovation Point towards a Brighter Future

Yet face-to-face access might not be necessary in all cases; there are cases of positive 'curve-bending' innovations in India around – pioneering, for example, low-cost technologies in surgery and remote access via telemedicine. As the Economist reported in 2009, India's "entrepreneurs are channelling the country's rich technological and medical talent towards frugal approaches that have much to teach the rich world's bloated health-care systems." It goes on to quote Shivinder Singh, head of Fortis, a hospital chain based in New Delhi, who says that "most of the new, expensive imaging machines are only a little better than older models. Meanwhile, vast markets for poorer patients go unserved. "We got out of this arms race a few years ago."...Fortis now promises only that its scanners are 'world class', not the newest." (Economist, April 16th 2009)

PART 3: Policy Options

“Nothing less than a feeling of glory prevents us from laughing at the taxis of the Marne. The developments of wireless telegraphy are making all other means of communication obsolete....The era of picked men and selected crews has arrived.”

De Gaulle, ‘The Army of the Future’ (Hutchinson 1940, p.44)

Unfortunately, there are no big bang solutions. However, *Volterra Health*’s insight suggests policy makers need to:

1. Structure health environment to reward innovation/cost reduction for a given quality
2. Work in partnership with private and non-profit organisations to develop new models of funding and delivery
3. Develop disease level strategies rather than funding generic activities; evidence based medicine will make most progress where it is linked to specific programmes to improve outcomes.

The New Levers for Curve Bending

To move off the flat of the curve, healthcare policy makers and providers need to think about:

- **Active prevention and lifestyle change.** In Poland there were successful strategies for reducing smoking and alcohol abuse. The result was a 35 per cent reduction in premature mortality for males over a 15 year period from 1990 to 2005. In the UK reductions in smoking have contributed to a 40 fall in cardiac mortality over a 15 year period.
- **National strategies for key disease areas.** National strategy or national disease management has been very successful across the globe. We would point to the Coronary Heart Disease strategy in the UK. In Germany disease management is improving care for patients with diabetes. In the US the national cancer strategy organized by the National Cancer Institute has helped to improve outcomes towards international leadership. In Chile the national cancer strategy has been particularly successful in reducing mortality from cancer of the cervix. Across Africa national strategies for, earlier diagnosis and treatment of AIDS partly funded by the Global Fund are showing remarkable results. In reducing mortality.
- **Improved access to drug therapies.** A whole range of new drug therapies is allowing better treatment with fewer hospital admissions. Health services have been able to use the wave of innovations in drug therapies developed from the 1970s onwards: however there is evidence which points to deficits in use with a new scope for targeted and personalized therapies.
- **Expanded role for pharmacies.** Again this is an international phenomenon. In the UK Alliance/Boots in Latin America, Ahumada and in India Apollo have developed a new range of services related to personal health.
- **Effective informatics.** Digital access has led to more data on performance of health services which has led to peer-group pressure to improve services. It is also raising a new potential for communication with patients.
- **Competition and pluralism.** There is now much evidence from Scandinavia, from the UK and from the US that competition can raise the quality of care (e.g. Burgess, Green and Propper, 2000).

Such levers taken together have already had surprising results. Perhaps the biggest surprise in world health services in the last two decades is that systems spending \$800-1000 dollars a year can deliver improved outcomes and access. The Services in Poland and Chile are examples. Another surprise is that programmes for lifestyle change and for treatment of high risk group in CHD can transform regions as has happened with North Karelia in Finland. There have also very clear successes for disease management programmes.

At *Volterra Health* we are optimistic about the opportunities for curve bending in achieving better results through better communication and service redesign. The next generation of health services will not be about big bang solutions for health systems but about grassroots ‘curve benders’.

Summary: The emergence of the New Model

While the emerging landscape of the New Model of healthcare is complex, what is clear is that they move away from the ‘old speak’ of clunky, bureaucratic/administrative system reform towards the creation of:

- **Conditions for greater innovation**, new players and redesign of services, and
- **Disease level strategies** based around the New Model - from prevention through to care programmes.

Health systems across the globe have struggled to constrain ever increasing costs. Growing expenditure on health has not led to a commensurate improvement in health outcomes. Health systems across the US, Europe and Asia are hitting the flat of the treatment curve. Pressure to contain costs will be ever greater in the face of rising demand as the effects of an ageing population soon start to feed through. The New Model offers a vision of the Holy Grail – improved health outcomes at lower cost. But the transition is plagued with trepidation of dual running costs, workforce disaffection and patient fear of the unknown (to name just a few).

In many ways the New Model isn’t new. It has been trying to break through for several decades. In moving forward, lessons must be learned why obsolete activities persist; change will only take place when there are clear incentives transforming the supply environment.

PART 4: Conclusion

Over the last three decades, the ‘New Model’ of healthcare has been trying – in various guises, and to varying degrees – to replace the Old. Barely changed from its basic structures and philosophy of its inception in the 1880s, the Old Model is not fit for the demands, expectations and competing cost pressures of the 21st Century. Yet it limps on, often alongside attempts to introduce new treatments, technologies and communications tools of the New Model. This dual running duplicates costs and increases existing inefficiencies; it is little wonder that health inflation outstrips GDP growth across the OECD.

A failure to contain costs and stave the ‘medical arms race’ of ever increasing spending on new medical technologies will only keep international health systems hitting the flat of Enthoven’s curve. Health expenditures will continue to rise faster than incomes, to the detriment of those priced out of the market and those left paying higher premiums to bear the costs of increasing health inequalities. Effective design of competitive markets – whether for funders, providers or suppliers – is critical to maintaining cost consciousness. Meanwhile effective regulation is vital to ensure that system wide incentives are aligned to meet the healthcare needs of local populations.

More competitive markets and effective regulation of health systems will involve:

- Greater patient choice;
- A clearer role for governments (at every level) in setting and delivering national strategies for key disease areas;
- Lower barriers to entry for any willing provider, including international players; and,
- Better performance management and public accountability through a common framework for information on quality.

Some systems and healthcare providers are starting to ‘bend the curve’ and transition to the New Model free from duplicated costs associated with running remnants of the Old Model in parallel. *Volterra Health* is committed to working with such ‘Curve Benders’ to develop a new economics of healthcare.

References

Enthoven, A.C. 'Health Plan: The Only Practical Solution to the Soaring Cost of Medical Care' (Reading, Mass., and Menlo Park, Calif.: Addison Wesley, 1980)

Anderson, G. and Frogner, B. 'Health Spending in OECD Countries: Obtaining Value Per Dollar' Health Affairs, Vol. 27, No.6 November/December 2008

Anderson, G. and Markovich, P, 'Multinational Comparisons of Health Systems Data, 2009' (The Commonwealth Fund, November 2009)

Banks, J. et al. 'Disease and Disadvantage in the United States and in England', JAMA 2006 295:2037-2045

Begg C. et al. 'Impact of hospital Volume on operative mortality for major cancer surgery', JAMA 280 1747-51 (1998)

Bhatia, M., Rannan-Eliya, R., Somanathan, A., Huq, M., Pande, B. and Chuluunzagd, B., 'Public Views of Health System Issues in Four Asian Countries' Health Affairs, Vol.28, No. 4 July/August 2009

Bodenheimer, T. and Fernandez, A. 'High and Rising Health Care Costs. Part 4: Can Costs Be Controlled While Preserving Quality?' Annals of Internal Medicine, Vol. 143, No. 1 July 2005

Bosanquet, N. and Salisbury, C. 'The Practice' in Loudon, I. and Horder, J. (eds) 'General practice Under the National Health Service, 1948-1997' (Oxford University Press, 1998)

Bosanquet, N. and Sikora, K. 'The Economics of Cancer Care' (Cambridge University Press, 2006)

China Daily, 'China's suicide rate among world's highest' (China Daily, 11th September 2007)

Burgess, S., Green, K. and Propper, C. 'Does competition between hospitals improve the quality of care? Hospital death rates and the NHS internal market', CMP0 working paper 00/27 (2002)

Colin-Thome, D. 'Ischaemic heart Disease in Runcorn' (Runcorn Primary Care Group, 2002)

Costa-Font, J., Courbage, C. and McGuire, A. (eds) 'The Economics of New Health Technologies, Incentives, Organization and Financing' (Oxford University Press, 2009)

Cramton, P. and Katzman, B. 'Reducing Healthcare Costs Requires Good Market Design' (The Economists' Voice: Berkeley Electronic Press, October 2010)

De Gaulle, C. 'The Army of the Future' (Hutchinson, 1940)

Department of Health, 'Cancer Reform Strategy, Achieving Local Implementation, Second Annual Report' (Department of Health, 2009)

Department of Health, 'Coronary Heart Disease National Service Framework' (Department of Health, 1999)

Economist, 'The Healthcare in India: Lessons from a Frugal Innovator' (April 16th, 2009)
http://www.economist.com/node/13496367?story_id=13496367

Eggleston, K., et al. 'Health Service Delivery in China: A Literature Review' World Bank Policy Research Working Paper 3978, August 2006

Gonghuan Yang et al., 'Emergence of chronic non-communicable diseases in China' The Lancet, Health System Reform in China 3, The Lancet, published online October 20, 2008

Health Protection Agency, 'Time to Test: Expanded Healthcare and Community HIV testing in England' (HPA, London: 2010)

Hu, S. et al. 'Reform of how health care is paid for in China: challenges and opportunities' The Lancet, Health System Reform in China 6 (Published Online October 20, 2008)

Huber, M. 'International Comparisons of Prices and Volumes in Health Care among OECD Countries' (European Center for Social Welfare Policy and Research, 2006)

Jian, W., et al. 'China's Rural-Urban Care Gap Shrank For Chronic Disease Patients, But Inequities Persist' Health Affairs, December 2010 Vol. 29 No. 12 2189-2196

Joseph P. Newhouse, "An Iconoclastic View of Cost Containment," Health Affairs, 12, Supplement 1993, pp. 152-171

Journard, I., Andre, C., and Nicq, C. 'Health care Systems: Efficiency and Institutions' OECD Economics Department Working Papers, No. 769, OECD Publishing (2010)

KaiserEdu analysis of Medical Expenditure Panel Survey Component Data taken from Agency for Healthcare Research and Quality, 'Prescription Medicines-Mean and Median Expenses per Person With Expense and Distribution of Expenses by Source of Payment: United States, 2007'. Generated interactively. (February 4, 2010) <http://www.kaiseredu.org/Issue-Modules/Prescription-Drug-Costs/Background-Brief.aspx#footnote4>

Ke Xu, David Evans, Kei Kawabata, Riadh Zeramdini, Jan Klavus, Christopher Murray, 'Household catastrophic health expenditure: a multicountry analysis' Lancet 2003; 362: 111–17

Ma K. 'Implementation of the central government's economic work conference for the benefit of 2007 development and reform' Macroeconomic Management 2007; 1: 8–13

Marmot, M. and Bell, R, 'Action on Health Disparities in the United States: Commission on Social Determinants of Health' JAMA. 2009; 301(11):1169-1171

McKeown, T. 'The Role of Medicine' (Blackwell, 1979)

McKinsey Health Care Payors & Providers, 'Health International' Number 10 (McKinsey & Company, 2010)

Ministry of Health and Family Welfare, 'Report of the National Commission on Macroeconomics and Health' (Government of India, 2005)

Moroney, S. and Kual, A. 'Understanding Health Care Cost Drivers' (National Institute of Health Policy, 2003)

National Audit Office Report on Delivering Cancer Strategy (NAO, 2010)

National Audit Office, 'Report on Delivering Cancer Strategy' (National Audit Office, 2010)

NHS North East, 'Our vision, our future, Our North East NHS', NHS North East (2008)

OECD, 'OECD Health Data 2010: Statistics and Indicators' (OECD, 2010)
http://www.oecd.org/document/30/0,3746,en_2649_37407_12968734_1_1_1_37407,00.html

Pearson, M. 'Disparities in health expenditure across OECD countries: Why does the United States spend so much more than other countries?' Written Statement to Senate Special Committee on Aging (OECD, 2009)

Peto, R., et al 'Tobacco: The growing epidemic in China' CVD Prevention and Control (2009) 4, 61-70

PricewaterhouseCoopers, 'Healthcare in India, Emerging market report 2007 (PwC, 2007)

Puska, P. 'Successful Prevention of non-communicable diseases: 25 years Experience with North Karelia Project in Finland' Public Health Medicine 2002, 4(1) 5-7

Sheila Smith, Joseph P. Newhouse, and Mark S. Freeland, 'Income, Insurance, and Technology: Why does health spending outpace economic growth?' Health Affairs, Vol.28, No. 5 September/October 2009

Stanton R. Mehr, 'Report on the Health System of India' (Academy of International Health Studies, 2008) <http://www.aihs.com/pdf/AIHSIndiaReportFinal.pdf>

Tang, S., et al., 'Tackling the challenges to health equity in China' The Lancet, Health System Reform in China 1 (Published Online October 20, 2008)

Temel, JS., et al. 'Early Palliative Care for patients with Metastatic Non-small-cell Lung Cancer' NEJM: 363, 733-4 (2010)

Toynbee, P., 'Forget patients. Andrew Lansley is the servant of big pharma' The Guardian, Monday 1 November 2010 <http://www.guardian.co.uk/commentisfree/2010/nov/01/andrew-lansley-servant-big-pharma>

Truffer, C., Keehan, S., Smith, S., Cylus, J., Sisko, A., Poisal, J., Lizonitz, J., and Clemens, M Kent. 'Health Spending Projections Through 2019: The Recession's Impact Continues' Health Affairs, Vol. 29, No.3 March 2010

Woodward, R. et al. "The Value of Medical Interventions for Lung Cancer in the Elderly: Results from SEER-CMHSF." Published Online: October 22, 2007; Print Issue Date: December 1, 2007

World Health Organization Mortality Statistics (2010)
www.who.int/healthinfo/statistics/mortality/en/

Yuanli Liu, Keqin Rao, Jing Wu, Emmanuela Gakidou, 'China's health system performance', Health System Reform in China 7 (The Lancet, published online October 20, 2008)

Zatonski, W. 'A Nation's Recovery, Tobacco Control in Poland' (Health promotion Foundation Warsaw, 2003)

Zhang, CX. et al. 'Cardiovascular risk factors in overweight and obese Chinese children A comparison of weight-for-height index and BMI as the screening criterion', European Journal of Nutrition Volume 47, Number 5, 244-250 (2008)

Zhang, CX., Tse, LA., Deng XQ., Jiang ZQ, 'Cardiovascular risk factors in overweight and obese Chinese children: a comparison of weight-for-height index and BMI as the screening criterion.' Eur J Nutr. 2008 Aug;47 (5):244-50. Epub 2008 Jun 28.
<http://www.ncbi.nlm.nih.gov/pubmed/18587680>