National Healthcare Spending in the U.S. and Japan: National Economic Policy and Implications for Neurosurgery

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Abstract

Growth of national healthcare spending is a problem confronting national governments of all industrially advanced countries. Healthcare spending in the U.S. reached 13.9% of the Gross Domestic Product (GDP) in 2003, compared to only 8% in Japan. In the U.S., health insurance is voluntary, with 15% of the population uninsured. In Japan, health insurance is mandatory and virtually universal, with growth in national health costs about half the rate of growth in the U.S.

U.S. healthcare costs are projected to reach 18.4% of GDP 2013. The predicted growth in health care costs is expected to cause strain on the federal budget and a growing inability of employers and employees to pay for private insurance.

Different national policies are the reason for different national health care costs in the U.S. and Japan. The U.S. has higher healthcare prices for salaries, equipment, supplies, and pharmaceuticals as compared to Japan. Higher prices, higher service intensity and volume during hospitalization create higher total cost in the U.S. Price controls in Japan kept medical inflation low at 0.46%/yr from 1980–2000.

Market-pricing mechanisms in the U.S. have proven ineffective in controlling national healthcare costs, while Japan's national fee and price control policies have kept national costs among the lowest within the Organization for Economic Cooperation and Development. To guide insurance coverage policy, neurosurgery and other highly technical specialties should better define the comparative health benefit of high price technical services by prospective outcome studies.

Key words: health care cost, national health care spending, outcome study, health insurance coverage, medical price control

Every modern industrialized nation faces problems of rising healthcare costs. National policies often determine the distribution and the cost of medical care. Some countries control costs better than others, but often at the expense of limiting available healthcare resources. Each country devises solutions based on its culture and dominant social values, its history, economic strength, and politics. Solutions in one country cannot necessarily be imported into another because of differing historical backgrounds, prevailing economic and social condi-

tions, unique moral and cultural beliefs, and conflicting internal politics. However, it is instructive to examine the answers other countries have used for the same problems, to learn what succeeds and what fails, what is possible and what is not, and how one country's solutions might be applied, at least in part, to another country's internal domestic health policies.¹²⁾

The Organization for Economic Cooperation and Development (OECD) annually collects and analyzes economic and healthcare data from 30 industrialized countries around the world, providing a basis for comparison and for tracking changes over time.¹⁾ In comparing the resources applied to healthcare in different countries, the Gross Domestic Product (GDP) is often used as a comparative metric, rather than absolute monetary equivalents, since the GDP is a measure of a country's available economic resources and a better assessment of the percentage

This paper was presented at the Second American-Japanese Neurosurgical Friendship Symposium, held on October 5, 2004 in Nagoya in conjunction with the 63rd Annual Meeting of The Japan Neurosurgical Society (Jun Yoshida, President). The author has kindly agreed to publish this paper at the request of the editorial board of *Neurologica medico-chirurgica*.

Table 1 Cross-national comparisons: 1999 data

Country	National expenditures on health care	
	%GDP	Per capita
Korea	5.6%	\$758
Taiwan	6.0%	\$686
U.K.	7.1%	\$1666
Japan	7.4%	\$1852
Canada	9.2%	\$2616
Germany	10.7%	\$2428
U.S.	13.0%	\$4373

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of those resources available for economic purposes, in this case, healthcare. In 2003, the median proportion of the GDP spent on healthcare in all countries included in the OECD tracking was 8.3%. The proportion spent in the U.S. in 2003 was 13.9%, the highest in the world by a substantial margin. The amount spent on healthcare in Japan in that same year was 8%, or 43% less than that spent within the U.S.¹¹⁾ The question is, why the difference, and what added benefit, if any, do Americans gain for the added expense?

The national health expenditures of a representative sampling of countries can be compared to get an idea of the range of spending in different industrialized countries. A sampling of western Pacific rim countries, as well as European and Western Hemisphere nations are listed in the order of magnitude of their annual expenditures as a percentage of GDP in Table 1.⁸⁾ In 1999, Japan spent 7.4% of its GDP on healthcare; the U.S. spent 13%, or 65% more than Japan. Taiwan and Korea were at the lower end of relative healthcare spending, while Canada and Germany were near the upper end of the scale. However, the U.S. ranked virtually off the upper end of the scale. In absolute dollar terms, the U.S. spent 140% more per capita than Japan (\$4373 vs. \$1852).⁸⁾ According to these data, the U.S. spends 66% more of its economic potential (GDP) and 140% more in actual money per citizen, than Japan, to provide healthcare. Physicians, as well as all citizens with health insurance, are beneficiaries of the money spent on healthcare. But why the difference between the two countries, and who's better off?

Most of the difference in spending between countries, 90%, can be explained simply on the basis of difference in national economies.¹¹⁾ Countries with more productive capacity, and more available resources, spend more money on health care.

Table 2 How is national health affected by spending?: survival statistics

Country	Life expectancy	Infant mortality
Japan	80 (M 77, F 84)	3.4/1000
Korea	75	7.7/1000
Taiwan	74	6.5/1000
U.K.	77	5.8/1000
Canada	79	5.3/1000
Germany	78	4.5/1000
U.S.	76 (M 73, F 79)	7.1/1000

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Moreover, the higher the level of GDP, the higher the proportion of productive capacity spent on health care, so that the increase in health care spending is not linear, but a rising curve. Countries with lower national economic production spend less of their resources on healthcare, because other more basic social needs must be met first, such as housing, sanitation, nutrition, defense, transportation, communication, and energy resources. The fundamental social needs of the many must be satisfied before spending large amounts on expensive, high tech medical care for a few.

The U.S. has been called a case of “exceptionalism” in the general pattern of national healthcare spending, because it is an outlier from all other countries.¹²⁾ Exceptionalism in this case implies two things: first, that more money is available for healthcare spending and second, a belief that the benefit it buys is worth the extra expense. From 2001 OECD data, the U.S. would be predicted to have spent \$3435 per capita, while the actual cost was \$4887, or 42% higher.¹¹⁾ The differences between the U.S. and other countries are due to different national political policies and healthcare system design.

So, what are the differences, and what does the U.S. get for the extra money? Table 2 illustrates that the amount spent on healthcare does not necessarily translate into better overall population health and survival indicators, such as life expectancy and infant mortality.⁸⁾ There is a trend, looking from Korea to Taiwan, England, Canada, and Germany, as levels of expenditures go up, for survival indicators to rise also. However, Japan, near the lower end of GDP expenditures, has the best general population health indicators (80 yr life expectancy, 3.4/1000 infant mortality) while the U.S. has only fair population health statistics (76 yr average life expectancy, 7.1/1000 infant mortality) to show for its world record health care spending.^{8,15)}

Table 3 How are health care funds spent?

Resource	Japan	U.S.
Hospitals	9200	5000
Inpatient beds/1000	16	3.7
ALOS, days	30	6
Doctors/100,000	190	270
Doctor visits/yr	13	5
MR imaging scanners/million	23	8
CT scanners/million	84	13
Prescription, % total cost	28	9
ICU beds/million	80	245
CCU beds/million	18	46

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Since the U.S. spends so much more, for what appears to be less general health benefit, it is instructive to look at how the money is spent. Japan has a population of about 125 million, while the U.S. has 280 million, or 130% more people. Japan has twice as many hospitals (9200 vs. 5000), four times as many beds per capita (16/1000 vs. 3.7/1000), and five times the average length of hospital stay (30 days vs. 6 days) (Table 3).¹⁾ Japan has 42% fewer doctors (190/100,000 vs. 270/100,000), but has 2.5 times more doctor visits/yr per capita (13 vs. 5). Japan also has three times as many magnetic resonance (MR) imaging scanners and six times as many computed tomography scanners per capita,¹⁾ and spends three times as much per capita on pills and drugs (28% vs. 9%).¹⁶⁾ Yet, despite all this resource utilization, the total expense in Japan is 43% lower in relative cost (% of GDP), and 58% lower in actual cost per person (dollars, or yen, per capita). Where's all the money going? The number of intensive care unit (ICU) beds gives a clue. There are three times as many ICU beds per capita in the U.S. (245/million in the U.S. vs. 80/million in Japan), and 2.5 times as many coronary care unit beds (46/million vs. 18/million).¹³⁾ So, in the U.S. the excess money is going to different medical use: it's going to high tech, high intensity, highly priced, highly specialized care.

Surgical rates compared between Japan and the U.S. tell the same story. The surgical procedure rate in Japan is about one-third that in the U.S.,⁶⁾ and this trend dates back to data from the early 1980s,¹³⁾ when the most common and generally discretionary common surgical procedures, such as cholecystectomy, inguinal hernia, tonsillectomy, and hysterectomy, were performed three to five times more often

per capita than in the U.S. coronary artery bypass, well past its infancy by then, was performed 60 times more often in the U.S. Invasive, high tech, high cost procedures have been a driving force in U.S. healthcare for decades, and continue to drive U.S. costs, out of proportion to other nations.

With all this money poured into U.S. healthcare, the long-term economic consequence is alarming.³⁾ U.S. spending is projected to increase from 13.9% of GDP in 2003 (\$1.5 trillion) to 18.4% of GDP in 2013 (\$3.36 billion), a 30% increase over 10 years.¹¹⁾ As for the effect on government spending, Medicare spent \$277 billion in 2003, or 2.5% of GDP, but at current growth rates will spend 5% of GDP by 2030, and 9.2% of GDP by 2075. At this rate of increase, Medicare, Medicaid, and Social Security together will spend ALL available U.S. federal tax revenue (18% of GDP, at current tax rate) by 2075.¹⁵⁾ There's not enough money in the U.S. Treasury or federal tax base to fund this excess, so a political and economic crisis in healthcare looms on the horizon. But solving the funding and spending problem before it reaches truly crisis proportions has always been a political problem, if not impossibility, in the U.S. It's always been easier to promise more benefits to voters, than to pass the taxes necessary to make the benefits sustainable, or reduce the promised benefits.

The burden of healthcare costs also weighs heavily on U.S. workers, whose healthcare is an employment benefit. The effect of growing healthcare costs on employees in the U.S. in private businesses is predicted to be as bad as the effect on government taxes.¹¹⁾ Healthcare costs and private employee premiums are growing at 10%/yr, while worker earning potential grows at about 4%/yr, assuming an average productivity increase of 1.5% each year, and inflation of 2.5% per year. A worker earning \$35,000 in 2003, with \$8800 in health benefits, will find the percentage of compensation going to healthcare will rise from around 25% to 42% in 10 years, assuming a salary of \$50,000 and health benefits totaling \$21,000.¹¹⁾ That means all a worker's pay raises and other compensation will be diverted to healthcare, and take-home pay will drop as inflation of 2.5%/yr erodes the value of earnings. An employer and worker crisis will undoubtedly result, with public demands to control the cost of health insurance, and employers offering fixed contributions, or dropping coverage altogether, adding to the already high and growing U.S. uninsured rate.

Japan's healthcare expenditures, in contrast to the U.S., have tended to follow the growth or decline in the economy. In the heyday economic boom of the 1980s, Japan saw 6% annual GDP growth, and

Fig. 1 Japan's annual change in national medical expenditures (NME), Gross Domestic Product (GDP), and fees. Reproduced from *Health Aff (Millwood)* (23: 26-36, 2004), Copyright © 2004, Project HOPE.

enjoyed a parallel 5% annual increase in healthcare spending. When the economy slowed in the 1990s, and slipped into recession in the late 1990s and early 2000s, health spending growth followed suit and slowed proportionately, even becoming negative when the annual GDP output actually shrank. Japan managed to keep overall medical inflation averaged over 20 years from 1980 to 2000 at 0.46%, a full 1% less, or one-third the growth rate of the Consumer Price Index, a remarkable accomplishment.⁷⁾

Figure 1 shows how healthcare spending growth follows GDP change in Japan, generally behind it by a year or more.⁷⁾ What is most notable is that national fees, fixed by a national negotiated fee schedule, seem to be the effective tool used to control cost growth, or at least match it to economic growth.⁶⁾ Even more striking, fees were actually reduced during significant economic downturns in 1985, 1999, and 2003. In fact the National Medical Fee and Price Schedule, which applies to all medical spending, whether physician fees, hospital reimbursement, pharmaceutical prices, or other medical services, equipment and supplies, is the primary tool for matching cost growth to economic growth. As the graph shows, price increase is carefully controlled at 2% annually or less, and average price is reduced when the economy turns sour. For the 3000 individual procedures, prices are reduced on a case by case basis when volume growth becomes excessive.⁶⁾ This cost control mechanism stands in contrast to the U.S. Medicare Fee Schedule cost control mechanism, in which a single conversion factor is used to increase or decrease all fees equally to achieve expenditure targets, with low volume services suffering from the cost effects of high volume services.

In judging whether study of the contrast of U.S. and Japanese healthcare costs is useful and valid, a comparison of the two health systems shows they are similar in many respects. They are both primarily employer-based insurance systems, with taxes subsidizing the elderly and poor. They both utilize public and private systems of care. Hospitals are predominantly private, reimbursement is primarily fee-for-service, and patients have a mostly free choice of physician and other providers under both national systems.¹²⁾

But there are important differences in health care policies between the U.S. and Japan, which seem to make all the difference in cost and coverage in the two countries. Japan requires mandatory coverage in one of its three principal categories of health plan, or one of three smaller categories.⁶⁾ By contrast, in the U.S. healthcare coverage is voluntary. As a result, Japan has virtually universal health insurance coverage, while the U.S. has a 17% non-elderly uninsured rate, affecting over 43 million people in 2002,¹⁵⁾ despite the U.S. spending 66% more than Japan. The most striking difference between the two countries is in price and fee control. In Japan, prices are set for all insurers and healthcare participants in a national uniform fee schedule negotiated by the Central Social Medical Care Council of the Ministry of Health, Labour, and Welfare.⁶⁾ When volume goes up, or the economy goes down, fees fall. In the U.S., fees are negotiated with individual payers in the market, except for government programs. The advantage for doctors in the U.S. is higher fees; the disadvantage is growing public pressure to lower costs.

Some of the features of the U.S. health care system are paradoxical. The U.S. has the highest per capita spending by far, but covers fewer people. It has the lowest number of hospital beds per capita, and the shortest hospital stay, yet, it has the highest procedure admission rate (which appears to be a principal cost-driver) and a 24% administrative cost in private plans, much of which is used to attempt to limit costly procedures, so the cost savings of the denied procedure is balanced by the high administrative cost required to manage or restrict the care.¹¹⁾ And despite the record total costs, the U.S. has the lowest public spending as a percentage of healthcare (41%), yet faces a Medicare funding crisis.

In the U.S. the cost drivers are primarily higher prices: higher labor salary levels, higher medical equipment and supply prices, higher priced medical services and fees, and higher priced pharmaceuticals.¹⁾ The frequency and intensity (complexity) of services is higher during hospitalization, and of course, the administrative overhead remains as an

added cost burden.

The U.S. dilemma, aside from private healthcare costs and a large uninsured population, is a brewing crisis over Medicare costs. Medicare will receive a surge of enrollees after 2011, when the post-World War II baby-boomers begin to retire. By 2030 the number of Medicare recipients will nearly double from 37 million in 2003 to 70 million, while the ratio of workers contributing money to the program to recipients in the program will fall from 3.7/1 in 2003 to 2.4/1 in 2030 and 2.0/1 in 2075. The ratio 34 years ago in 1970 was 4.6/1, meaning the worker to recipient ratio will be 50% less in 2030 than when the Medicare program began.^{5,15)} Meanwhile, the cost will continue to rise at 7%/yr, or 1.5 times faster than the growth of GDP (2.8%/yr per enrollee). That means more money from fewer working people to pay for growing numbers of elderly, until a political crisis occurs. At the current growth and funding rate, the Medicare Hospital Trust Fund faces insolvency by 2026.⁵⁾

Japan has a similar, but even more pressing problem with population aging, facing increasing demand for health services, and a reduced working population paying for it with money transfers across plans. Japan's population growth is 0.1% per year, but aging increases almost 2% per year,⁷⁾ and health care costs for the elderly are rising at 9% annually, significantly faster than the rest of the population.¹⁰⁾ By 2024, 25% of the population will be over age 65 years. Two other factors have affected healthcare spending in Japan. The first is an increase in volume of services, which has reached a plateau since the mid-1990s, slowed by increased worker co-payments since 1997, and even 10% co-pay for the elderly since 2002.⁷⁾ The second is increasingly complex technology, which although often cited as a major driver of cost growth, has maintained a growth rate less than GDP growth.

In Japan, the growth of technology cost in healthcare is managed by price control, using the uniform national fee schedule. As an example, with the proliferation of MR imaging scanners, the expense of scans in Japan would be expected to grow substantially. However, to accommodate the growing number of scans without expanding the budget for scans, the price of MR imaging scans was reduced 30% in 2002: the price for an MR image of the head was reduced from 16,600 yen (\$151) to 11,400 yen (\$104).⁷⁾ Volume increase is balanced by price reduction biannually. By contrast, in the U.S. volume is controlled by utilization management, or administrative control of medical decisions; a poor answer which creates conflict between insurers and their clients, and hasn't yet been successful in con-

trolling utilization or cost growth.

As a result of this unique policy of cost control through individual price manipulation, technology has not been the driving force in cost growth in Japan, as it has in the U.S. After GDP, prices of healthcare products and services are the crucial drivers of national differences in health spending.¹⁾ Japan, having taken direct control of all healthcare pricing, has managed to keep healthcare costs at a stable growth rate, within its economic means, and without obvious detrimental effect on the health of its population.

Some of the future trends in healthcare spending policies in Japan can be predicted from the U.S. experience with medical cost growth.¹²⁾ Hospital payment in Japan is currently on a per diem basis, which encourages longer hospital stays, and extremely long hospital stays are a unique cultural and historical feature of Japanese healthcare. The current trend is to offer payment on a declining per diem payment over time, with the rate based on the diagnosis and procedures performed.⁷⁾ The future trend will more likely resemble the U.S. Medicare prospective hospital payment system (PPS), in which a fixed payment is given, regardless of the length of the hospital stay, based on an average cost estimated for the diagnostic condition.⁹⁾

Medical equipment manufacturers already pressure Japan to loosen its medical technology approval and pricing process, to allow foreign products into the Japanese healthcare market sooner and at higher rates.¹⁷⁾ Japan currently requires price limits equal to or lower than 150% of the "foreign reference price," the lowest price a manufacturer accepts in other world markets.²⁾ If this liberalization of technology cost and availability is successful, manufacturers will thrive, but Japan will lose one of its most effective national healthcare expenditure cost control tools.

Cost growth has two principal components: increase in service volume and intensity and increase in price per unit of service. Volume growth means increased frequency of a service, while intensity means a growing number of different services for a condition, with heightening complexity of those services. Japan has controlled half of the cost equation, that is, price per service. What can be expected are attempts to control the other side of the cost equation: volume growth. In the U.S., control of volume has been attempted through managed care methods that restrict the decision to perform a service or utilize a technical resource. This utilization control has taken the form of preauthorization of payment, retrospective review of medical necessity, concurrent review of ongoing care, and contrac-

tual agreements to abide by utilization decisions. Utilization management was responsible for a dramatic slowing in cost growth in the U.S. in the early 1990s,¹⁵⁾ as growing numbers of patients enrolled in HMOs (health maintenance organizations) and PPOs (preferred providers organizations), in which utilization management was a key tool for restricting physician decisions and services that were judged unnecessary or ineffective, by denying payment. However, a public backlash against managed care restrictions in the mid-1990s became so intense, that by the end of the decade, utilization management controls which restricted medical decision-making fell largely out of favor, and the cost growth pattern of about 10%/yr resumed. Japan can expect similar problems with utilization control methods, if interference with physician decision-making by administrative utilization management is imported as a cost control strategy.¹⁴⁾

In the U.S., pressure for cost control in healthcare will intensify as the annual cost growth exceeds both individual and corporate earnings growth, and as public health care program costs exceed the available tax base. Methods for cost control in the U.S. already appearing are higher patient cost sharing through higher premiums, deductibles, and co-payments. Employers will limit exposure by offering fixed contributions, and health plans will adapt by offering tiered health plans, meaning multiple levels of benefits and cost-sharing options in health plans, with a wide range of premium costs. Catastrophic health plans paired with self-funded health savings accounts with limited funds to pay for routine care are another method being tried to cut spending by increasing patient cost-consciousness and cost-sharing. In addition, payment preauthorization will see resurgence, and be based on valid scientific evidence of efficacy, rather than arbitrary indications used in the prior decade. Authorization is more likely to be based on proof provided by prospective randomized outcome studies, which are scarce, and needed more than ever.

Price control is the one most consistently successful international method for medical cost control, which U.S. physicians, hospitals, and other health care providers have so far avoided, with the exception of government healthcare programs, such as Medicare and Medicaid. Pressure for universal coverage in the U.S. will likely become more intense as more employers drop health care benefits for cost reasons and the number of uninsured grows. But any compulsory health insurance requires effective cost controls, which looking at international examples, includes at a minimum price control, and

to be most effective, volume and resource control. No country can afford to require its citizens to pay for a benefit with a cost that threatens to bankrupt the public treasury and impoverish the average worker by consuming ever larger percentages of public revenue and personal income.

The implications for neurosurgery, and every medical or surgical specialty are clear. The value of high complexity, high cost technical care must be proven, and proven not by professional opinion, but by valid scientific studies. Outcome studies should focus particularly on frequent, high cost procedures in current use, such as lumbar fusion; expanded applications of current procedures, such as deep brain stimulation; and innovative techniques, such as the artificial intervertebral disc. The value of a procedure or service is directly related to the medical benefit, but inversely related to the cost. Today, most procedures are valued by their risk, and the benefit is assumed. Tomorrow, neurosurgery must prove the benefit and justify the cost.

Objective scientific data will drive both public and private coverage policy decisions. Private technology assessment, such as the Blue Cross/Blue Shield Technology Evaluation Center, will be used more often as the gold standard for proving the value of medical technology and procedures, and providing the basis for coverage policy.⁴⁾ Only statistically valid, prospective, randomized clinical effectiveness and outcome studies have the credibility to be considered in proving the health benefit and cost effectiveness of medical care as costly and complex as neurosurgery. Guidelines for utilization of services will require, and will be based on, adequate clinical studies. To limit or avoid price or fee cuts in the future, or coverage denials for expensive technical procedures, neurosurgeons must plan to prove technology cost effectiveness routinely.

The proportion of national economies spent on health care in most modern industrialized countries has risen steadily over the past 45 years, coincident with improving technology, available health insurance coverage, aging populations, and price inflation. The rate of growth varies in different countries according to national economies and payment policies. Japan and the U.S. provide a striking contrast in costs and health outcomes based on key differing policies, with Japan spending 43% less than the U.S. for equivalent or better health outcomes. The two health systems are quite similar in design, except for two commanding differences: compulsory universal health insurance coverage and system-wide price control in Japan, compared with voluntary health insurance and market-based pricing in the U.S. The U.S. faces a growing health

care cost crisis, for which Japan's success with cost control provides a model for potential solutions. Both countries must control both price and volume of services for long-term fiscal stability. Volume control depends upon proven cost-effectiveness of medical expenditures. Neurosurgery and other medical specialties must provide valid evidence of cost-benefit of their technical procedures through prospective, randomized, controlled outcome studies in order to guide insurance payment and coverage policies.

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