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What Japan Can Do To Push Its Longevity Envelope

by Kimiko Tanaka and Nan E. Johnson

(May 2006) Since the Second World War, Japan has gone through rapid industrialization and urbanization as well as improved nutrition and living conditions that have sharply reduced the nation's death rate.[1] As a result, in the past 60 years, Japan 's life expectancy at birth (LEB) has grown 28 years for men (to age 78) and 31 years for women (to age 85, see Table 1). Japan 's overall LEB of 82 years—the highest in the world—is four years longer than that for the United States.[2]

Table 1
Life Expectancy at Birth for Men and Women

Year	Male	Female
1947	50.06	53.96
1960	65.32	70.19
1970	69.31	74.66
1980	73.35	78.76
1990	75.92	81.90
2000	77.72	84.60
2005	78.11	85.20
2025*	79.76	87.52

*Projected.

Source: National Institute of Population and Social Security Research, 2005.

But can longevity in Japan continue to rise in the face of the country's changing dietary and lifestyle habits? Rising affluence has come with a cost: increased meat consumption and rising body mass indices, which have put the Japanese at increased risk of contracting chronic, potentially fatal diseases such as heart attack, stroke, diabetes, and some cancers.[3] In addition, rates of smoking have increased dramatically in Japan since the Second World War, especially among men. As a result, the top three causes of death in Japan are now cancer, cardiovascular disease, and stroke.[4]

These changes in habit may also be creating a ceiling against further increases in the country's LEB. Indeed, a 1995 study showed that Japan had slipped to sixth place in the world regarding life expectancy for people who had reached age 80.[5] Yet Japan has been slow to respond to upswings in the death rates from chronic diseases with appropriate public health measures.

To determine which public health steps might be the most effective in maintaining Japan at the forefront of countries with the longest longevity, we analyzed the top six underlying medical causes of death in Japan in 2000. The results may hold lessons not only for Japan, but for other postindustrial societies struggling with combating chronic diseases.

Comparing Medical Causes of Death: The Multiple-Decrement Life Table

Because underlying medical conditions often share risk factors (obesity, for

instance, puts someone at risk of diabetes, colorectal cancer, breast cancer, heart disease, or stroke, among other illnesses), we use a *multiple-decrement life table* to determine the diagnoses that are most responsible for shortening lives (see Table 2).

Table 2
Life Expectancy at Birth, by Medical Cause of Death and Gender: Japan, 2000

Cause of death	Deaths at any age from this cause[a]	LEB from births to exact age 85[b]
Men		
Accidents	68.50	76.48
Cancer	75.59	78.60
Cardiovascular disease	80.07	76.76
Cerebral disease	81.40	76.54
Lung inflammation	85.50	76.19
Suicide	55.18	76.51
All other causes	78.96	77.61
Women		
Accidents	80.31	80.40
Cancer	79.22	81.88
Cardiovascular disease	88.38	80.64
Cerebral disease	88.16	80.62
Lung inflammation	90.65	80.33
Suicide	62.84	80.42
All other causes	86.90	81.29

[a]If one does not die from the other possible causes.
[b]If this cause of death were eliminated.
Source: Authors' calculations based on data from the Japan Ministry of Health, Labor, and Welfare, *Vital Statistics 2000* (2003).

The multiple-decrement life table allows us to calculate the life expectancy at birth for someone who will ultimately die from a particular underlying medical cause while also facing a full set of competing causes (Table 2, column 1). The medical diagnosis that kills earliest in the life course produces the shortest life expectancy at birth.

Also, the multiple-decrement life table allows us to determine the life expectancy between birth and age 85 if a particular underlying medical cause of death were eliminated from the set of competing medical causes (Table 2, column 2). The diagnosis that (if it could be eliminated as a cause of death) would produce the longest life expectancy from birth to age 85 is the one that is most responsible for shortening lives in the population as a whole. (The LEB only up to the 85th birthday is calculated in column 2 because the exact age at death in the oldest age group of Japanese—ages 85 and older—is unknown.)

Suicide

Table 2 shows that the LEB is shortest for those Japanese who will ultimately die from suicide.

If suicide could be wiped out as a cause of death while the risks of dying from other causes remained the same, would that offer Japanese the highest possible life expectancy from birth to at least age 85?

The intuitive answer is yes. But Table 2, column 2 shows that eliminating suicide would offer only the fourth-highest life expectancy between birth and age 85 for both men and women in Japan. The reason? At ages 45-64, when the rate of deaths by suicide is highest during the life course, suicide still competes heavily with cancer and heart disease to be the cause of death. Thus, eradicating cancer, heart disease, or stroke would produce a longer life expectancy between birth and age 85 than would eliminating suicide.

Lung Inflammation

On the other hand, those Japanese who die from inflammation of the lungs —from bronchitis, influenza, or pneumonia—have the longest LEB (see Table 2, column 1). Other studies have confirmed this finding for the United States: When Americans reach age 55 in robust condition, they are more likely than their less healthy peers to live to the oldest-old ages and then die from respiratory disease. But the elimination of lung inflammation as a cause of death would yield the shortest life expectancy between birth and age 85 (see Table 2, column 2) because this cause of death strikes hardest at the oldest ages, where the smallest incremental gains in life expectancy can be made.

How Public Health Policy Can Further Increase Life Expectancy in Japan

For both sexes in Japan, eliminating cancer as a cause of death would produce the longest life expectancy for everyone before age 85: 78.60 years for males and 81.88 years for females. Our findings hold several implications for public health policies in Japan.

Smoking and cancer. Cigarette smoking is implicated in mortality from lung cancer and liver cancer, both of which have been rising in Japanese men since the 1950s. On May 1, 2003, the first-ever smoking-related law in Japan went into effect to prevent passive smoking in public. This law requires restaurants to encourage the reduction of smoking, but it carries no penalties for noncompliance. Restaurant owners in Japan are not required to provide smoke-free dining rooms.

The law is proving ineffective. A recent study of 163 restaurants in Yonago City found that only six restaurants were smoke-free or had nonsmoking sections in their dining rooms. Seventy-four percent of the owners did not even know about the law.[6] Those who knew but did not comply said that they would lose business if they reserved seating for nonsmokers or that they had insufficient money to spend on segregating tables by smoking status or on ventilation systems. Amendment of this public health law to impose stiff fines for noncompliance will be necessary to reduce

environmental tobacco smoke in public restaurants.

New York City 's success at curbing adult smoking suggests that multiple antismoking policies will also probably be needed in Japan to reduce the prevalence of smoking. In 2002, New York raised its state and city tax on a pack of cigarettes by $1.81, to $3.00 a pack. In 2003, New York City also enacted a package of antismoking measures—including a ban on smoking in all indoor work areas (including bars and restaurants); nicotine replacement therapy; and a media campaign.

As a result, the prevalence rate of adult smoking in New York City declined by 11 percent, from 21.6 percent to 19.2 percent.[7] Of the reasons New York City residents gave for reducing their smoking in 2002-2003, between 33 percent and 54 percent said they were motivated by the tax hike.[8]

By contrast, Japan raised its tobacco tax by 0.82 yen (less than one U.S. penny) per cigarette in July 2005. The trivial increase reflects the conflict of interest faced by the Ministry of Finance due to the valuable tax revenue it collects from the sale of tobacco and its fears that increased taxes would cut into those sales. However, New York City's revenue from the sale of tobacco increased tenfold despite a 15 percent decline between 2002 and 2003 in the number of cigarettes purchased there.[9]

Because the smoking prevalence rate of Japanese men is about 47 percent, multiple public health policies (including a substantial hike in the tobacco tax) will likely be needed in Japan to reduce smoking there to parity with that for New York City adults.[10]

Female cancer mortality. Breast cancer and colorectal cancer mortality rates have risen in females over the past several decades in Japan, partly because of Japanese women's growing consumption of animal fat. Female mortality from these forms of cancer can be curbed through nutritional education programs that emphasize the indigenous diet of fish and vegetables and the advantage of low-sodium soy sauce. Rising affluence may have created a receptive audience. Recently, increasing numbers of health-seeking consumers in Japan have started to turn back to old-time cereals such as unpolished rice and foxtail millet.[11]

Nevertheless, stomach cancer remains the most common site of terminal cancer in Japanese women. Although only a small percentage (13 percent) of women in Japan smoke, public health initiatives to curb smoking will reduce their mortality from stomach cancer, since tobacco consumption is correlated with the disease.[12] Japan provides free screening for stomach cancer to those Japanese ages 40 and older, but only a minority avail themselves of this service.[13] Media campaigns are needed to publicize the importance of stomach-cancer screening.

Curbing Influenza. The ceiling on the LEB in Japan can also be raised if deaths from pulmonary infections are curbed. Most Japanese people who die of influenza have not been vaccinated against it. The influenza injection rate fell from about 130 vaccinations per 1,000 in 1985 to less than 10 per 1,000 in 1997, the last year for which we have data.[14] The drop-off in vaccination has been attributed to "poorly designed" epidemiological studies

that have challenged the effectiveness of influenza vaccines.[15] It behooves the public health community to design influenza vaccine trials carefully; to inform the public if the vaccine proves effective; or (if the vaccine is not effective) to improve it.

Implications for Other Post-Industrial Societies

Life expectancy at birth in Japan can surpass 80 years for men and approach 90 years for women in the 21st century if the country's public health community declares war on cancer. Unlike Japan, heart disease produces the highest death rate in the United States ; but smoking cessation and complex medical management of heart disease after diagnosis are delaying deaths from this cause and putting more Americans at risk of cancer mortality. The age-adjusted death rates from both heart disease and cancer declined between 2002 and 2003 in the United States (to 232.3 deaths and 191.5 deaths per 100,000 people, respectively), but the decline was steeper for heart disease (3.5 percent versus 1.8 percent).[16]

If the current trend continues, cancer will emerge as the leading cause of death in the United States as well. It behooves public health institutions in both societies to promote multiple, synergistic policies that emphasize cancer prevention, early diagnosis, and careful medical management.

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