

# Rejuvenating health systems for aging communities

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**ABSTRACT.** Nowadays, about the half of Swiss women die after their 84th birthday (1). This unprecedented proportion of the population reaching an old age, or even a very old age (25% of women die after 89 years, and 5% after 95 years) is a novel aspect of human demographics, and represents the very last stage of the epidemiological transition, a term coined to describe the transformation of the prevailing health burden in the population, shifting from infectious and communicable pathologies to chronic and degenerative diseases. In developed countries, this epidemiological transition has been well documented during the last century (2); worldwide, a similar transition is taking place, with some countries still at mid (3) or early stages of transition (4). A striking aspect of the current transition is its speed. In India, the mean duration of life since 1947 has increased from 32 to 62 years. As a result, India, like many other developing countries, is facing a double burden of disease, i.e., an upsurge of degenerative diseases while the burden from the old agenda (i.e., malaria, tuberculosis) still reaches devastating proportions in the population. This double burden is certainly a crucial problem in developing countries, and probably is the most important health challenge for the coming century. A similar accelerated pace of change is observed with the decline of mortality at old age. Worldwide, the current estimate of centenarians is 100 000, i.e., ten times more centenarians than the number estimated in 1960 (5). The downward trend in mortality, which is steeper with increasing age (6), is now the leading factor to increase the life expectancy in developed countries. In the United Kingdom, life expectancy increased by 2.5 years between 1971 and 1991; this is equivalent to the increase observed between 1851 and 1961 (7). This accelerated increase will influence public health in two different ways. The first will be the absolute increase in the number of older persons, with a corresponding increase in degenerative diseases. A second consequence will be the need for a substantial and rapid adaptation of the

health care system. Three selected aspects are addressed below: 1) the increase of resources, 2) the improvement of performance, and 3) the reduction of demand through preventive strategies.

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## INCREASING RESOURCES

Because health care is a very labor intensive activity, human resource is the key factor to consider. This is especially true for the care of chronic and degenerative disease, i.e., the part of health care directly linked with the aging of the population, which will increase in the future. The sort of human resource needed in the future is likely to be the same as nowadays because few dramatic changes towards rationalization and/or automation are expected for the care of, say, advanced Alzheimer's disease or palliative care. However, the volume of health care provided will have to increase to follow the demographic pressure.

The proportion of active population working in the health care sector is already high, a fact reflected by the level of health expenditures in developed countries. In 1995, health employment (as a proportion of total employment) was 10.1% in Switzerland and 5.6% in Canada. Corresponding figures in selected other OECD countries are presented in Table 1. The same Table presents the density of health personnel (second column) as well as the proportion of population aged 65 and over (third column).

At first glance, there is no relation between the proportion of aged people and health employment in these affluent countries: health employment varies widely across these countries, by a factor between 2 or 2.5 for both indicators, while the proportion of aged people is relatively stable (varying between 12 and 17%). This variation may reflect problems with the validity of indicators, but also suggests a wide variation in resources invested in health systems. This variation cannot be explained by demographic factors. Showing substantial variation in resources for the same level of needs might be the very first

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Table 1 - Total health employment as proportion of total employment and as density in general population in selected countries in 1997. Source: OECD.

	Total health employment: % of total employment	Total health employment: density per 1000 population	Population 65 and over: % of total population
Sweden	7.8	35.0	17.4
Italy	4.2	15.0	17.3
Germany	9.7	42.3	16.5
United Kingdom	6.6	29.9	15.7
Japan (1996)	4.0	20.4	15.7
Denmark (1995)	4.7	23.2	15.0
Finland	10.0	42.0	14.6
Hungary	4.5	16.1	14.4
Netherlands (1995)	5.3	23.8	13.4
Australia	5.9	26.3	12.1

step to analyze structural and functional discrepancies between health systems.

In general, during the last decades the trend in most countries has been an increase in health personnel. However, several countries have already experienced a stabilization or even a decrease in health employment, at least for certain categories of personnel. Figure 1 shows how the number of certified nurses decreased in Canada after 1992, contrarily to Sweden and USA for example. While this probably reflects a variety of local factors, including policy for cost control, and the lack of appeal of the profession, the situation in Canada might be taken as an early sign of a growing problem in developed countries. As a matter of fact, the shortage of

health personnel is likely to increase, and will mainly affect nursing care. The main reason is a structural one. In Switzerland, demographic analyses predict a decline between 10 and 30% in the number of persons aged 15 to 29 years until the year 2040 (8). The effects of this structural shortage will become worse without a substantial improvement in the working conditions; thus, the fewer young people available on the labor market will end up preferring more appealing jobs.

Although the nurses represent the most challenging problem here (because they are at the core of care personnel), other categories of health personnel may be confronted with similar problems of shortage. For example, shortage could become a real issue for physi-

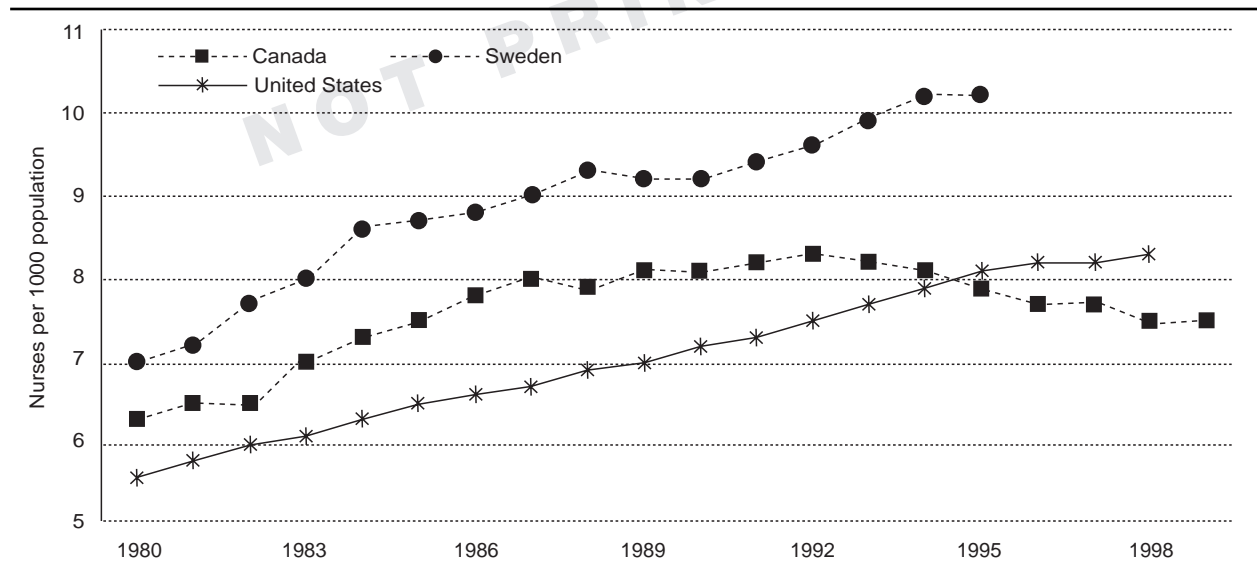


Figure 1 - Trends in number of certified nurses (per 1000 population).

cians due to the combined effects of medical specialization (which reduces the field of intervention of each practitioner), diversification of the activities of physicians (with the development of various tasks of management, controlling and teaching) (8), and the rapid feminization of the medical profession (feminization generally implies unpredictable movements in and out the health system) (9).

In any case, this perspective implies that thoughtful strategies are needed to increase (and even only to maintain) the recruitment of health personnel. A substantial part of these strategies has to do with active recruitment in countries with a more favorable demographic pattern. These countries clearly are in the Southern hemisphere (10). Although there is already a substantial immigration in developed countries (from 5 to 20% of the active population in Europe is of foreign origin (11), the challenge, however, is different when the immigrants have to be recruited to become very skilled workers, like those needed in health care. If Africa becomes the main purveyor of labor forces in Europe for the next 100 years (population aged 65 and more represents 3% in Africa, against 15% in Europe) (12), one of the challenges will be to develop adequate strategies of professional education (13).

If the problem of human resources cannot be solved locally, the globalization of health care would provide more radical solutions. The negotiations undertaken under the auspices of the World Trade Organization also concern health services: they will be under free trade regulations, and this includes personal health care. Internationalization also means that all services could be delocalized, starting with insurance companies (14, 15) and laboratory, ending up with health care. If human resources become scarce and/or unbearably expensive in developed countries, it might be more efficient to send the patients to countries offering abundant and inexpensive manpower (16-18). Such a scenario might be unpleasant, but not unlikely if current trends of health care toward "megacorporate" services continue (19), with international companies controlling both insurance systems and the chains of health services. This avenue has been already explored for various specialized care settings, but this will certainly represent a novel approach for the care of chronic diseases, like Alzheimer's disease.

### IMPROVING PERFORMANCE

Improving the performance of health care, i.e., increasing the health output at a constant level of resources, is another strategy to be developed in aging communities. This improvement will limit the need for new resources or, at worst, will be the only way to maintain a decent level of services.

Measuring and analyzing the performance of health systems is a relatively new exercise in public health. Recent

reports from the National Health Service in the United Kingdom (20) and the World Health Organization (21) have popularized the issue. Typically, the WHO reports assess performance by identifying and measuring separately five dimensions of performance: the mean level and the distribution of health status; the mean level and the distribution of the stewardship; and the distribution of health care funding (21). These indicators are then used to produce some ranking of the communities under study.

Apart from the overall discussion on methodological issues and the political dimension of this approach, little is known regarding the performance of health care for a specific population like the aged population. We are still short of widely accepted indicators that reflect the process and the outcome of care given to old people.

An aspect relevant to the development of new indicators is the exploration of clinical performance. Because of a sort of medical nihilism, which was characteristic of the seventies (22, 23), substantial gains in the efficacy of medical care for major conditions have been overlooked in public health. Ischemic heart disease (24) and breast cancer (25), to cite two major killers among other conditions, are diseases where new drugs (e.g., thrombokinase for myocardial infarct) or new strategies (e.g., mammography screening) have been made available with a definite impact. Figure 2 presents the trends in mortality for males in a Swiss region over a 10-year period. It shows a substantial improvement in the prognosis, with a gain even for older men. Because these diseases are very frequent, even limited gains have a sizeable impact on population-based mortality.

Although the gains related to the care of chronic conditions are more difficult to demonstrate, substantial efforts should be made to develop measures reflecting the output of care in terms of quality of life or – why not? – quality

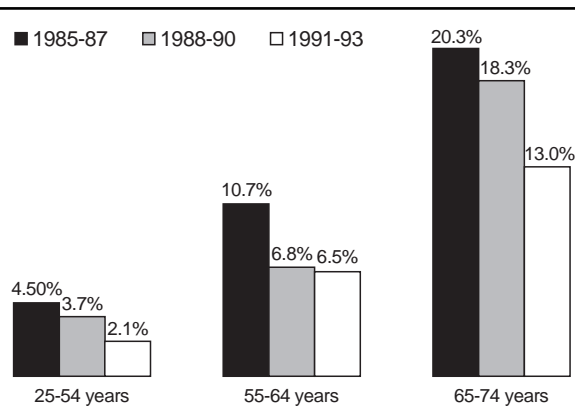


Figure 2 - Trends in 28-day mortality after acute myocardial infarct for hospital inpatients in Switzerland (Vaud & Fribourg), men aged 24-74 years, 1985-1993 (26).

of dying. Palliative care has been developed during the last decade and certainly represents an improvement in health care; this should not be overlooked in a fair monitoring of the performance of health systems, especially when considering care for the aged population.

### REDUCING THE BURDEN OF DISEASE THROUGH PREVENTIVE STRATEGIES

Increasing the resources available and improving the performance of the system may prove to be difficult to realize: decreasing the need for care is, therefore, another approach. Preventing the diseases of the old and the very old is not a novel strategy in medicine. As a matter of fact, we are already enjoying the benefits of prevention: the rapid decline of the mortality in the aged population reflects a substantial improvement in general health (27-31), with a corresponding increase in "disability-free life expectancy" and with signs of rectangularization of the survival curve (32); the period of illness and disablement is expected to be limited around the age at death (33, 34).

This overall improvement in turn is related to a better control of the risk factors for degenerative diseases during the entire life course. There are currently good epidemiological observations suggesting that degenerative conditions like cardiovascular disease and cancer may have their origin during pre-adult life (35, 36); there is a "tracking" of conventional risk factors from childhood to adulthood, and there are reasonable arguments suggesting some sort of "fetal programming" as a powerful model of etiology of degenerative diseases. Furthermore, biomedical mechanisms linking social conditions to medical problems are now available, showing for example the role of fetal and infantile environment for the later development of chronic disease (37), especially cardiovascular diseases (38-40). In this line, it has been estimated that an upward shift of the mean birth weight by 300 g would correspond to a reduction of 5% in cardiovascular mortality in Canada (41).

These observations may lead us to redesign preventive strategies, in the line of the life course perspective developed by Kuh and Ben-Shlomo (41). This perspective considers the existence of critical periods throughout life where exposures are especially powerful in predisposing to, or lessening the risk of disease later on. Critical periods imply exposures that must occur in some specified window(s) of time and often involve exposures that alter normal biological development. This opens large avenues of research, exploring new windows for intervention and assessing the effectiveness of various preventive tools.

### CONCLUSIONS

The 20th century will remain in the history of public health as the one of a massive aging of the population. Aging modifies the epidemiology of diseases and their determinants; furthermore, it will impact the structure and

the activity of health services, as well as many other aspects of the economic and social environment. Researchers and practitioners will have to deal with a number of issues, including the three mentioned in this short account, i.e., how to develop and maintain adequate human resources, how to improve the performance of care, and how to explore new preventive strategies.

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