

# Measuring health

In view of major limitations imposed by the lack of suitable measurements that can capture the meaning of health as defined in the WHO Constitution (“Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”) this assessment of health trends uses

conventional indicators such as life expectancy, mortality and morbidity. Efforts are under way, however, to develop indicators of positive health such as health expectancy and its variants, but problems of standardization of definitions and comparability of values derived inhibit their usage for trend assessment at this stage.

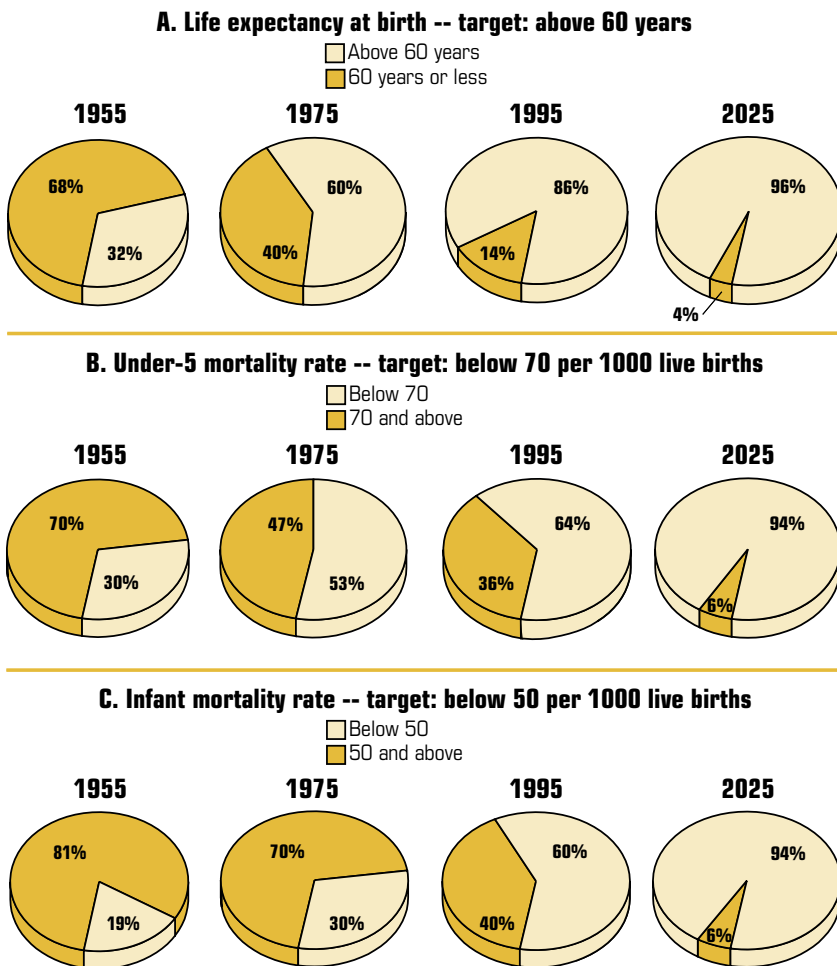
The Global Strategy for Health for All by the Year 2000 (HFA2000) set the following guiding targets:

- life expectancy at birth above 60 years;
- infant mortality rate below 50 per 1000 live births;
- under-5 mortality rate below 70 per 1000 live births.

In 1997, nearly 3.8 billion people (64% of the global population) lived in at least 106 countries that had reached those values. In 1975, there were at least 1.2 billion (30% of the global population) living in 69 countries. At least 102 countries (60% of the global population) reached all these values in 1995. The percentage of the global population living in countries which have reached these values since 1955, and which are expected to reach them by 2025, are shown in Fig. 1. There is, however, increasing evidence that as national average values are beginning to converge, internal disparities among population groups are widening.

**Life expectancy at birth** has increased globally by 17 years, from 48 in 1955 to 65 in 1995, and is projected to reach a level of 73 years by 2025, when it is expected that there will be no country with a life expectancy

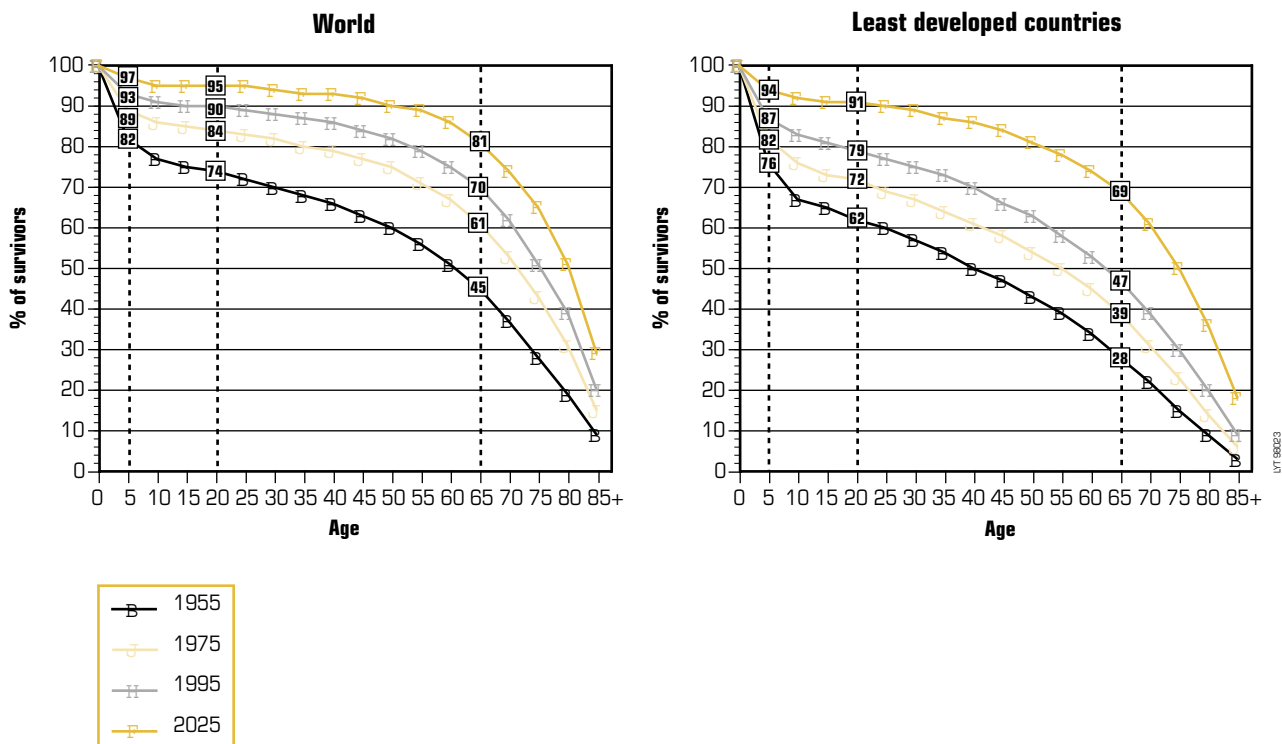
**Fig. 1. Progress in achieving global targets for health for all by the year 2000 <sup>a</sup>**



<sup>a</sup> Percentages of the total population of all Member States.

LYF 98008

Fig. 2. Survival curves, 1955-2025



expected to be 25 years between 1955 and 2025, when life expectancy for these countries will reach 65. In all, more than 5 billion people now live in 120 countries where life expectancy at birth is above 60. About 890 million people live in 26 countries where life expectancy at birth increased by 10 years or more between 1975 and 1995. About 1 billion people live in 56 countries where a similar increase is expected between 1995 and 2025. Such spectacular progress is not shared by all, however. More than 50 million people are still living in countries with a life expectancy at birth below 45. About 300 million people live in 16 countries which experienced a decrease in life expectancy at birth between 1975 and 1995. The range in national values for life expectancy at birth is expected to decrease from 43 years in 1955 to 31 in 2025.

Some of the population who are likely to be alive by the end of the 21st century are already born and alive today. Their *survival rates* have

improved during the period 1955-1995. The same is true of the equivalent survival rates in the LDCs, but the percentages are considerably lower than the global percentages. For every 100 babies born in 1995, globally 70 are expected to live to at least 65 years, but in the LDCs only 47 are expected to do so. Globally for every 100 persons aged 20 in 1995, about 70 are forecast to survive at least 50 years (to age 70). Only 50 are likely to survive to this age in the LDCs.

### Mortality trends

In its search for a simple and meaningful measure of health, WHO proposed in its second Report on the World Health Situation (in 1963), the *proportional mortality ratio* – the number of deaths at age 50 and above as a percentage of deaths at all ages – as a possible indicator. Applying this measure to study historical trends, globally the proportional mortality

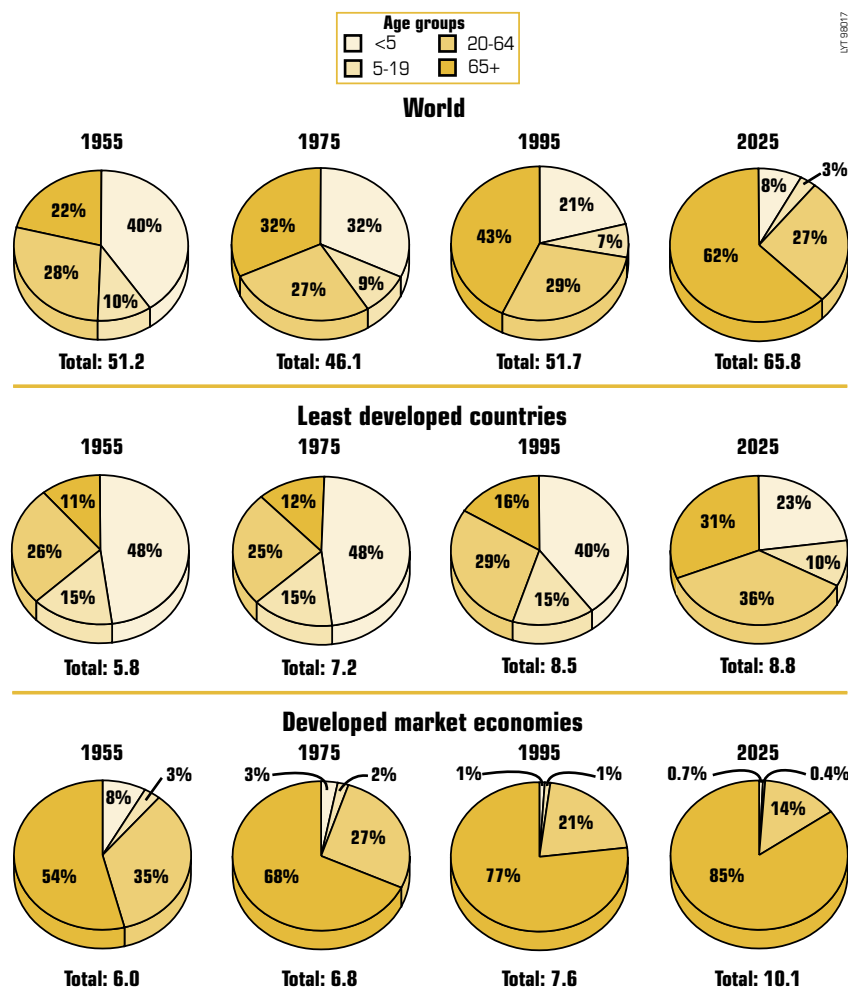
ratio increased from 34% in 1955 to 45% in 1975, and 58% in 1995; it is expected to be around 80% in 2025. Here again disparities are striking – in 1955, the LDCs had a value of 20% compared with 27% for other developing countries and 75% for the developed market economies; in 1995, the LDCs had a value of 26%, other developing countries 56% and the developed market economies 91%.

Overall *mortality adjusted for age and sex* composition of the population declined globally from 1860 deaths per 100 000 population in 1955 to 910 deaths per 100 000 in 1995 – a 50% reduction – and is projected to fall further to 610 deaths per 100 000 in 2025; for the LDCs, however, the standardized death rate fell by more than 40% from 1955 to 1995 and should be about 950 deaths per 100 000 in 2025. There was also a reduction globally of 67% from 1955 to 1995 in death rates among children under 5 and of 66% among those aged 5-19. Among those aged 20-64, the reduction was about 50%. In respect of those aged 20-64, death rates declined by 56% for females but only 49% for males. Here too, while age- and sex-specific mortality has been falling, the pace of decline is not uniform.

Fig. 3 shows the number of deaths at different ages and their distribution expressed as a percentage of total deaths. The general trend in the percentage of deaths occurring in the various age groups, both for the developed market economies and for the LDCs, is downward, except in the age group 65 and above. Overall, the number of deaths worldwide was the same in 1995 as in 1955 but with a significant decline of about 50% among children under 5, and of about 30% in the age group 5-19. There was an increase of about 5% in the working population aged 20-64. However, a

relatively small reduction of 6% was experienced by the female population in the reproductive age group 15-49. A comparison of the age distribution of total deaths worldwide and their trends reveal a changing pattern both for the developed market economies and the LDCs. Less than 2% of total deaths in the developed market economies in 1995 occurred among the population aged below 20, and about 1% is projected for 2025. In the LDCs however, the decreasing trend in the proportion of deaths among children, and a rapid increase in the proportion of deaths among older people, are noticeable. In the case of children, the proportion was nearly

**Fig. 3. Age structure of deaths, 1955-2025<sup>a</sup>**



<sup>a</sup> Totals refer to the number of deaths in millions.

LYF 98017

50% in 1955, had decreased to 41% by 1995, and is expected to be 23% in 2025 – about half of what it was in 1955. Unfortunately, the proportion of deaths among adults – the working-age population – has been increasing from about 25% in 1975 to 29% in 1995, and is expected to be almost 36% in 2025.

Worldwide, there have also been differential patterns in **age- and sex-specific death rates** since 1955. The death rate per 100 000 population declined between 1955 and 1995 from 5280 to 1720 among children under 5; from 620 to 210 among older children and adolescents aged 5-19; from 1040 to 500 among adults aged 20-64; and from 7550 to 6040 among older people aged 65 and above.

The relative death rate among females compared with males (the ratio of age-specific death rates for females to that of males) increased from 96% in 1955 to 99% in 1995 for children under 5, but decreased from 102% to 97% for older children and adolescents aged 5-19, from 79% to 68% for adults aged 20-64 and from 85% to 81% for older people aged 65 and above. Even for the age group 15-49, the ratio of death rates among women of childbearing age to men aged 15-49 declined from 84% to 73%. At least in respect of mortality, gender difference seems to favour the female population at all ages, although the relative decline in rates among children under 5 has not been so rapid as for other age groups.

The death rate among women of childbearing age decreased from 620 per 100 000 in 1955 to 230 per 100 000 in 1995, and is likely to reach 140 per 100 000 by 2025. Globally, about 585 000 women die each year of pregnancy-related causes, most of which are preventable. The **maternal mortality ratio**, representing the risk of pregnancy-related deaths associated with each pregnancy, was

estimated at 430 maternal deaths per 100 000 live births in 1990 globally, but it varies widely among and within countries. For every 100 000 live births there were about 13 maternal deaths in the developed market economies, but more than 1050 in the LDCs. In other words, one woman dies of pregnancy-related causes for every 100 babies born alive. Less is known about the incidence and prevalence of pregnancy-related morbidity and disabilities. Although the immediate causes of maternal mortality and morbidity are inadequate care of the mother during pregnancy and delivery, other factors include women's subordinate status, poor health and inadequate nutrition.

**Under-5 mortality rates** decreased from 210 per 1000 live births in 1955 to 121 in 1975, and to 78 per 1000 in 1995 – a decrease of 42% between 1955 and 1975 and of 36% between 1975 and 1995, when the child survival initiative was launched. It is expected to decline further to 37 per 1000 live births by 2025.

In 1995, at least 105 countries (with 50% of global live births and 50% of children under 5 worldwide) have an estimated under-5 mortality below 70 per 1000 live births. In 1955, this was the case for 40 countries (18% of global live births) and in 1975 for 75 countries (37% of global live births). The pace of progress in under-5 mortality reduction during 1975-1995 was not so fast as during 1955-1975. It is expected to accelerate during 1995-2025 with 151 countries (89% of global live births) having an under-5 mortality rate below 70 per 1000 by the year 2025. In 1955 there were only three countries with an under-5 mortality rate below 20 per 1000 live births; by 2025 at least 84 countries are expected to have such a low rate. While all countries improved their under-5 mortality, at least 82 countries (with about two-

At least in respect  
of mortality,  
gender difference  
seems to favour  
the female population  
at all ages.

thirds of live births worldwide) registered significant decreases in under-5 mortality – of at least 40 per 1000 live births – between 1975 and 1995.

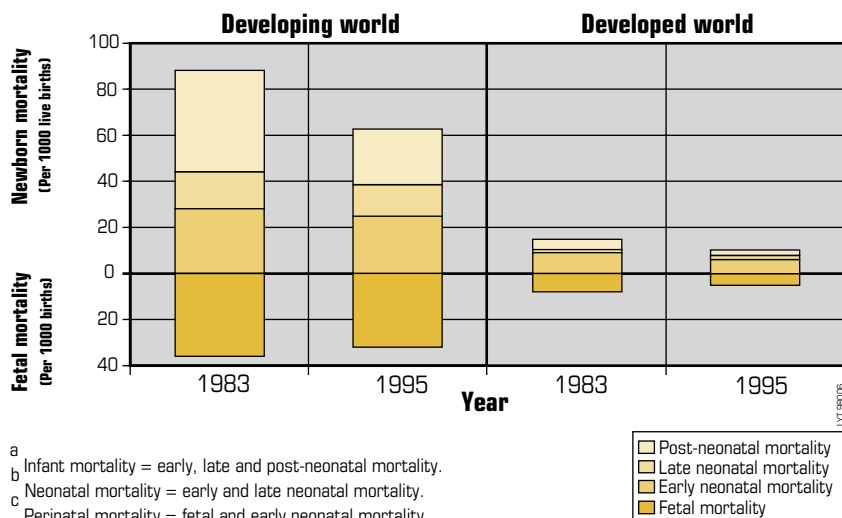
In the developed market economies, the under-5 mortality rate declined by 52% during 1955-1975 and by 57% during 1975-1995. It is expected to reach a level of 7 per 1000 live births by 2025 from the present level of 8 per 1000 live births. For the developing world, under-5 mortality declined by 45% during 1955-1975 and by 37% during 1975-1995 and is expected to reach by 2025 a level of 40 from the present level of 87 per 1000 live births. However, even in countries that have made notable progress, child mortality is still unacceptably high. The LDCs in particular continue to struggle to reduce mortality rates; under-5 mortality decreased from about 280 to about 150 per 1000 live births between 1955 and 1995. Seven countries – six of which are in Africa – still have under-5 mortality rates greater than 200 per 1000 live births in 1995.

Infant mortality has continued to decline in recent decades. Globally, the **infant mortality rate** (IMR) fell from 148 per 1000 live births in 1955 to 90 per 1000 in 1975, and to 59 per 1000 in 1995 – a decrease of 39% from 1955 to 1975, and a further 34% decrease from 1975 to 1995. The IMR is projected to reach a value of 29 per 1000 live births in 2025.

Overall, the number of countries with an IMR below 50 per 1000 live births increased from 23 countries in 1955 to 70 in 1975, and to 102 (34% of global live births) in 1995. It is expected that by 2025 there will be at least 151 countries (43% of global live births) with an IMR below 50 per 1000. In 1955, the ratio of the highest value of IMR to the lowest value was 13 to 1; in 1975 it was 25 to 1; and in 1995, the ratio was 42 to 1.

For the developed market econo-

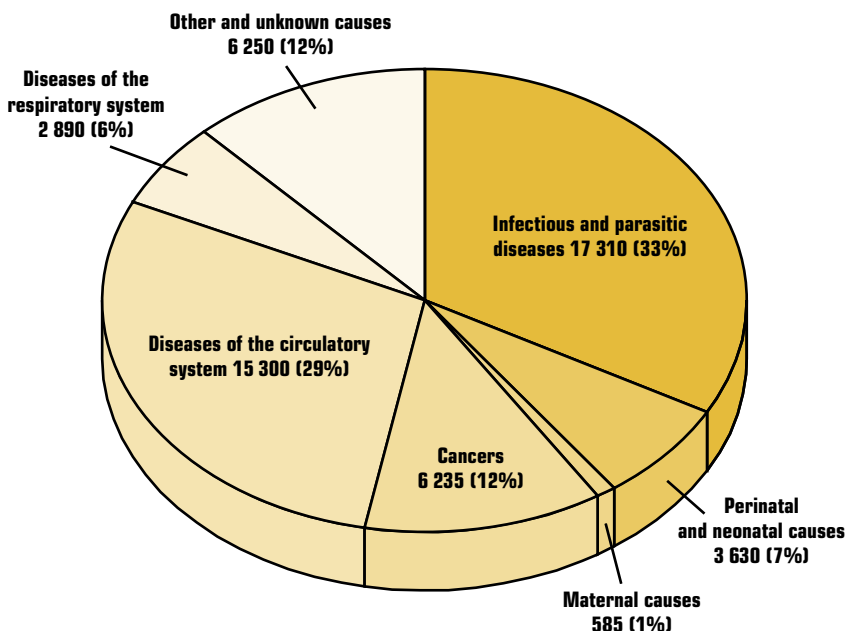
**Fig. 4. Infant,<sup>a</sup> neonatal<sup>b</sup> and perinatal<sup>c</sup> mortality, by level of development, 1983 and 1995**



mies, the IMR declined by 58% between 1955 and 1975 and by a further 57% between 1975 and 1995. The present level is of 6 per 1000 live births and it is expected to reach by the year 2025 a level of 5. The developing world experienced a decline in the IMR of 41% during 1955-1975 and of 36% during 1975-1995, and it is expected to decline further to reach a level of 32 by the year 2025 from the present level of 62 per 1000 live births. In the LDCs, the IMR changed only from 186 to 104 per 1000 between 1955 and 1995 – about 75% of the decline experienced by developing countries other than LDCs. In 1995, there were 24 countries – 20 of them in Africa – where one in every 10 liveborns died within a year of birth. By 2025 the IMR is expected to decline to 50 per 1000 – still double the average of 25 per 1000 live births for developing countries other than LDCs.

While infant mortality declined markedly during the early 1980s and late 1990s, most of this improvement was among older infants. The death toll during the perinatal period (stillbirths and during the first week of

**Fig. 5. Global causes of death, 1997<sup>a</sup>**



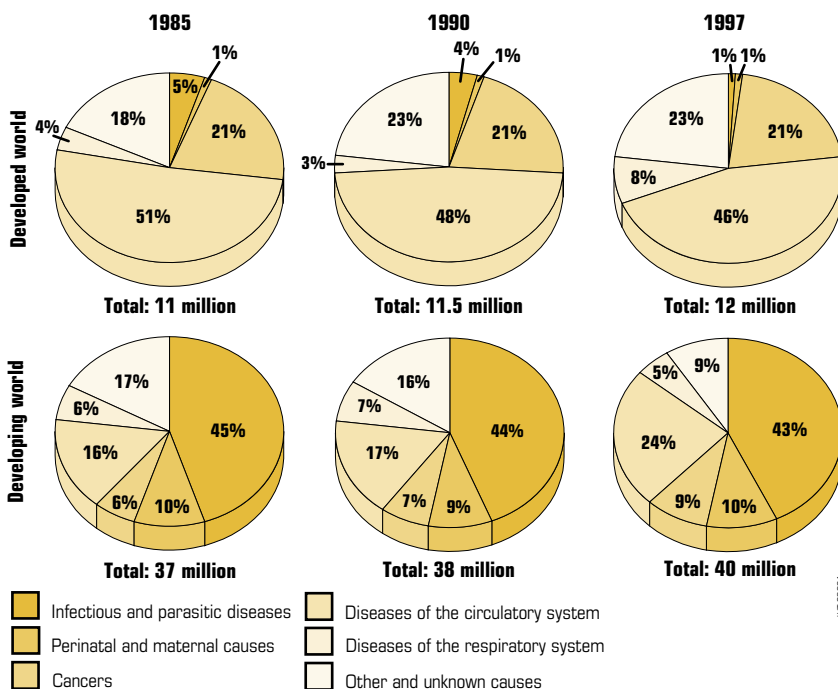
<sup>a</sup> – Deaths in thousands and percentages of total.  
 – Infectious and parasitic diseases include acute lower respiratory infections and neonatal tetanus and are excluded from diseases of the circulatory system and perinatal and neonatal causes respectively.

life) has fallen only slightly from 64 to 57 deaths per 1000 live births. It is also estimated that mortality during the neonatal period (the first 28 days of life) has declined from 40 to 36 deaths per 1000 live births during 1983-1995 (Fig. 4). In all, there have been about 4 million stillbirths, 3.2 million deaths during the first week of life and 1.6 million deaths among newborns living more than a week but dying within 28 days after birth. There are about 9 million deaths of which 7.5 million are perinatal deaths and 4.8 million neonatal deaths annually worldwide.

### Disease trends

Based on available information, WHO estimates that, of more than 50 million deaths worldwide in 1997, about one-third were due to infectious and parasitic diseases such as acute lower respiratory diseases, tuberculosis, diarrhoea, HIV/AIDS and malaria; 29% were due to circulatory diseases such as coronary heart disease and cerebrovascular diseases; and about 12% were due to cancers (Fig. 5). While deaths due to circulatory diseases declined from 51% to 46% of total deaths in the developed world during the period 1985-1997, they increased from 16% to 24% of total deaths in the developing world (Fig. 6). Cancer deaths increased from 6% to 9% of total deaths in the developing world but they formed a constant proportion of 21% of total deaths in the developed world. Infectious and parasitic diseases decreased from 5% to 1% of total deaths in the developed world and from 45% to 43% of total deaths in the developing world. This confirms earlier findings that noncommunicable diseases are emerging as a major killer in the developing countries as well. An approximate distribution of deaths by cause is given in Table 3. Table 4 gives

**Fig. 6. Causes of death: distribution of deaths by main causes, by level of development, 1985, 1990 and 1997**



**Table 3. Global health situation: mortality, morbidity and disability, selected causes for which data are available, all ages, 1997 estimates<sup>a</sup>**

Diseases/conditions	Number (000)			
	Deaths	Cases		Persons with severe activity limitation <sup>b</sup>
	New	(incidence)	(prevalence)	
	All			
<b>(based on ICD-10)</b>				
<b>ALL CAUSES</b>	<b>52 200</b>			
<b>Certain infectious and parasitic diseases (selected), of which:</b>	<b>17 310</b>			
Acute lower respiratory infection (ALRI)	3 745	395 000 <sup>c</sup>	...	...
Tuberculosis	2 910	7 250	16 300	8 420
Diarrhoea (including dysentery)	2 455	4 000 000 <sup>c</sup>	...	...
HIV/AIDS	2 300	5 800	30 600	...
Malaria	1 500-2 700	300 000-500 000	...	...
Measles	960	31 075	...	...
Hepatitis B	605	67 730	...	...
Whooping cough (pertussis)	410	45 050	...	...
Neonatal tetanus	275	415	...	...
Dengue fever/dengue haemorrhagic fever	140	3 100	...	...
Noma/cancrum oris	110	140	770	30
Trypanosomiasis, African (sleeping sickness)	100	150	400	200
Leishmaniasis	80	2 000	12 000	...
Leishmaniasis, visceral (kala-azar)	80	500	2 500	...
Leishmaniasis, cutaneous and mucocutaneous	...	1 500	9 500	...
Amoebiasis (Entamoeba histolytica)	70	48 000	...	...
Hookworm diseases (ancylostomiasis and necatoriasis)	65	...	151 000 <sup>d</sup>	...
Rabies (dog-mediated)	60	60 <sup>e</sup>	...	...
Ascariasis (roundworm)	60	...	250 000 <sup>f</sup>	...
Meningococcal meningitis (see also bacterial meningitis)	50	...	500	60
Onchocerciasis (river blindness)	45	...	17 655	770
Trypanosomiasis, American (Chagas disease)	45	300	18 000	...
Yellow fever	30	200	...	...
Schistosomiasis	20	...	200 000	120 000
Japanese encephalitis	10	45	...	...
Trematode infections (foodborne)	10	...	40 000	...
Trichuriasis (whipworm)	10	...	45 530 <sup>g</sup>	...
Cholera (1996 notifications)	10	145	...	...
Leprosy	2	570	1 150	3 000
Poliomyelitis, acute	1.8	35	...	10 600
Plague (1995 notifications)	0.14	2.9	...	...
Giardiasis	...	500	...	...
Endemic treponematoses	...	460	2 600	260
Dracunculiasis (guinea-worm infection)	...	70	70	...
Hepatitis C	...	...	170 000	...
Trachoma	...	...	152 420	5 600
Lymphatic filariasis	...	...	119 100	119 100
Sexually transmitted diseases (selected), of which:				
Trichomoniasis	...	170 000	113 000	...
Chlamydial infections, including lymphogranuloma (venereum)	...	89 000	85 000	...
Gonococcal infection (gonorrhoea)	...	62 000	23 000	...
Anogenital warts	...	30 000	...	...
Anogenital herpes	...	20 000	...	...
Syphilis	...	12 000	28 000	...
Chancroid	...	2 000	2 000	...
Others (including emerging diseases e.g. influenza, Ebola, Lassa)	630	...	...	...

Diseases/conditions	Number (000)			Persons with severe activity limitation <sup>b</sup>
	Deaths	Cases		
		New		
<b>Malignant neoplasms (cancers) – all sites</b>	<b>6 235</b>	<b>9 240</b>	<b>57 455</b>	
Trachea, bronchus and lung	1 050	1 190	4 465	...
Stomach	765	925	3 715	...
Colon and rectum	525	890	6 185	...
Liver	505	510	1 415	...
Breast (female)	385	895	7 995	...
Oesophagus	355	370	1 135	...
Mouth and pharynx	260	420	2 810	...
Prostate	235	460	3 505	...
Lymphomas <sup>h</sup>	225	375	2 740	...
Leukaemia	215	260	1 565	...
Cervix	195	425	3 955	...
Bladder	140	300	2 330	...
Ovary	120	185	1 655	...
Kidney	100	170	1 255	...
Body of the uterus	65	160	1 425	...
Melanoma of skin	40	120	915	...
Other malignant neoplasms	1 055	1 585	10 390	...
<b>Diseases of the blood and bloodforming organs and certain disorders involving the immune mechanism (selected), of which:</b>	<b>240</b>			
Thalassaemias and sickle cell disorder	240	290	2 320	...
Haemophilia	...	15	420	...
Anaemia, of which:	...	...	1 987 300	...
Iron deficiency anaemia	...	...	1 788 600	...
<b>Endocrine, nutritional and metabolic diseases (selected), of which:</b>	<b>370</b>			
Malnutrition including protein-energy malnutrition (PEM)	370 <sup>i</sup>	...	170 000 <sup>j</sup>	...
Diabetes mellitus	...	10 540	142 540	...
Iodine deficiencies (disorders of thyroid gland), of which:	...	...	...	...
Goitre	...	...	844 700	...
Cretinoids	...	...	49 600	49 600
Cretinism	...	...	16 500	16 500
<b>Mental and behavioural disorders (selected), of which:</b>	<b>200</b>			
Dementia	200	2 610	29 000	15 950
Mood (affective) disorders	...	122 865	340 000	146 000
Schizophrenic disorders	...	4 500	45 000	27 000
Anxiety disorders	...	...	400 000	...
Mental retardation (all types)	...	...	60 000	36 000
<b>Diseases of the nervous system (selected), of which:</b>	<b>220</b>			
Bacterial meningitis (excluding neonatal meningitis)	135	...	1 200	160
Parkinson disease	60	305	3 765	2 635
Multiple sclerosis	25	105	2 505	750
Epilepsy	...	2 000	40 000	10 000
<b>Diseases of the circulatory system (selected), of which:</b>	<b>15 300</b>			
Ischaemic (coronary) heart disease	7 200	...	...	...
Cerebrovascular disease	4 600	...	9 000	...
Other heart diseases (e.g. peri-, endo-, and myocarditis and cardiomyopathy)	3 000	...	...	...
Rheumatic fever and rheumatic heart disease	500	...	12 000	...
Hypertensive disease	...	...	690 600	...
<b>Diseases of the respiratory system (selected), of which:</b>	<b>2 890</b>			
Chronic obstructive pulmonary disease (COPD)	2 890	...	600 000	...
Asthma	...	...	155 000	...

Diseases/conditions	Number (000)			
	Deaths	Cases		Persons with severe activity limitation <sup>b</sup>
		New		
<b>Diseases of the musculoskeletal system and connective tissue (selected), of which:</b>				
Neck and back disorders	...	...	1 039 200	...
Arthritis and arthrosis, of which:	...	...	...	...
Osteoarthritis	...	...	189 500	...
Rheumatoid arthritis	...	...	165 000	...
<b>Pregnancy, childbirth and the puerperium (selected), of which: 585      76 300</b>				
Haemorrhage	145	14 000	...	...
Indirect obstetric causes	115	13 200	...	...
Sepsis	90	11 800	...	...
Abortion	75	19 700	...	...
Hypertensive disorders in pregnancy	75	6 900	...	...
Obstructed labour	45	7 200	...	...
Other direct obstetric causes	40	3 500	...	...
<b>Certain conditions originating in the perinatal period (selected), of which: 3 630<sup>k</sup></b>				
Prematurity	1 120	...	...	...
Birth asphyxia	920	...	...	...
Congenital anomalies	495	3 600	...	...
Neonatal sepsis and meningitis	440	...	...	...
Birth trauma	430	...	...	...
Other causes	225	...	...	...
<b>External causes (selected), of which: 1 165</b>				
Suicide	835	...	...	...
Occupational injuries due to accidents at work	330	250 000	...	25 000
Occupational diseases	...	217 000	...	20 000
<b>Other and unknown causes 4 055</b>				
<b>Visual disability (blindness and low vision), of which:</b>				<b>179 200</b>
Blindness (total):	...	...	44 800	44 800
Onchocerciasis-related	...	45	290	290
Cataract-related	...	...	19 340	19 340
Glaucoma-related	...	...	6 400	6 400
Trachoma-related	...	...	5 600	5 600
Vitamin A deficiency-xerophthalmia (children under 5)	...	...	2 740	2 740
Other	...	...	10 430	10 430
<b>Hearing loss (41 or more decibels)</b>			<b>123 000</b>	<b>123 000</b>

<sup>a</sup> No adjustments have been made for comorbidity. Caution should be exercised when using these data for comparative purposes as estimation procedures may have been refined from one World Health Report to the next.

<sup>b</sup> Permanent and long-term.

<sup>c</sup> Incidence figure refers to episodes.

<sup>d</sup> Number of infected persons is 1.25 billion.

<sup>e</sup> In addition, approximately 50 million doses of vaccine are used for post-exposure prophylaxis.

<sup>f</sup> Number of infected persons is 1.38 billion.

<sup>g</sup> Number of infected persons is 1 billion.

<sup>h</sup> Includes Non-Hodgkin lymphoma, multiple myeloma and Hodgkin disease.

<sup>i</sup> This excludes 4.8 million malnutrition-associated deaths among children under 5.

<sup>j</sup> Figure refers to children under 5.

<sup>k</sup> This excludes neo- and perinatal deaths due to neonatal pneumonia, neonatal tetanus and neonatal diarrhoea.

... Data not available or not applicable.

**Table 4. Global health situation: leading causes of mortality, morbidity and disability, selected causes for which data are available, all ages, 1997 estimates\***

Diseases/conditions (based on ICD-10)	Deaths		Cases		Persons with severe activity limitation		
	Rank	Number (000)	New (incidence)	Rank	All (prevalence)	Rank	Number
Ischaemic (coronary) heart disease	1	7 200	...	...	...	...	...
Cerebrovascular disease	2	4 600	...	9 000	...	...	...
Acute lower respiratory infection	3	3 745	395 000	...	...	...	...
Tuberculosis	4	2 910	7 250	16 300	8 420	...	...
COPD	5	2 890	...	600 000	...	...	...
Diarrhoea (including dysentery)	6	2 455	4 000 000	...	...	...	...
HIV/AIDS	7	2 300	5 800	30 600	...	...	...
Malaria	8	1 500-2 700	300 000-500 000	...	...	...	...
Prematurity	9	1 120	...	...	...	...	...
Cancer of trachea, bronchus and lung	10	1 050	1 190	4 465	...	...	...
Measles	11	960	31 075	...	...	...	...
Birth asphyxia	12	920	...	...	...	...	...
Occupational injuries	...	330	250 000	...	8 25 000	...	...
Occupational diseases	...	...	217 000	...	9 20 000	...	...
Trichomoniasis	...	...	170 000	113 000	...	...	...
Mood (affective) disorders	...	...	122 865	340 000	1 146 000	...	...
Chlamydial infections	...	...	89 000	85 000	...	...	...
Hepatitis B	...	605	67 730	...	...	...	...
Gonococcal infection (gonorrhoea)	...	...	62 000	23 000	...	...	...
Amoebiasis (Entamoeba histolytica)	...	70	48 000	...	...	...	...
Whooping cough (pertussis)	...	410	45 050	...	...	...	...
Iron deficiency anaemia	...	...	...	1 788 600	...	...	...
Neck and back disorders	...	...	...	1 039 200	...	...	...
Goitre	...	...	...	3 844 700	...	...	...
Hypertensive disease	...	...	...	4 690 600	...	...	...
Anxiety disorders	...	...	...	6 400 000	...	...	...
Arthritis and arthrosis	...	...	...	7 354 500	...	...	...
Ascariasis (roundworm)	...	60	...	9 250 000	...	...	...
Schistosomiasis	...	20	...	10 200 000	3 120 000	...	...
Hepatitis C	...	...	...	11 170 000	...	...	...
Malnutrition including PEM	...	370	...	11 170 000	...	...	...
Hearing loss (41 or more decibels)	...	...	...	123 000	2 123 000	...	...
Lymphatic filariasis	...	...	...	119 100	4 119 100	...	...
Cretinoids	...	...	...	49 600	5 49 600	...	...
Mental retardation (all types)	...	...	...	60 000	6 36 000	...	...
Schizophrenic disorders	...	...	...	45 000	7 27 000	...	...
Cataract-related blindness	...	...	...	19 340	10 19 340	...	...
Cretinism	...	...	...	16 500	11 16 500	...	...

Leading selected causes of mortality	Rank	Number (000)	Deaths Number (000)
Ischaemic (coronary) heart disease	1	4 000 000	7 200
Cerebrovascular disease	2	3 000 000-500 000	4 600
Acute lower respiratory infection	3	395 000	3 745
Tuberculosis	4	250 000	2 910
COPD	5	217 000	2 890
Diarrhoea (including dysentery)	6	170 000	2 455
HIV/AIDS	7	122 865	2 300
Malaria	8	89 000	1 500-2 700
Prematurity	9	67 730	1 120
Cancer of trachea, bronchus and lung	10	62 000	1 050
Measles	11	48 000	960
Birth asphyxia	12	45 050	920

Leading selected causes of morbidity	Rank	Number (000)	Cases New (incidence)	Rank	All (prevalence)
Diarrhoea (including dysentery)	1	4 000 000	4 000 000	1	...
Malaria	2	300 000-500 000	300 000-500 000	2	...
Acute lower respiratory infection	3	395 000	395 000	3	...
Occupational injuries	4	250 000	250 000	4	...
Occupational diseases	5	217 000	217 000	5	...
Trichomoniasis	6	170 000	170 000	6	...
Mood (affective) disorders	7	122 865	122 865	7	113 000
Chlamydial infections	8	89 000	89 000	8	340 000
Hepatitis B	9	67 730	67 730	9	85 000
Gonococcal infection	10	62 000	62 000	10	23 000
Amoebiasis	11	48 000	48 000	11	...
Whooping cough (pertussis)	12	45 050	45 050	12	...

Persons with severe activity limitation (permanent and long-term)	Rank	Number
Mood (affective) disorders	1	146 000
Hearing loss (41 or more decibels)	2	123 000
Schistosomiasis	3	120 000
Lymphatic filariasis	4	119 100
Cretinoids	5	49 600
Mental retardation (all types)	6	36 000
Schizophrenic disorders	7	27 000
Occupational injuries	8	25 000
Occupational diseases	9	20 000
Cataract-related blindness	10	19 340
Cretinism	11	16 500
Dementia	12	15 950

the leading causes.

WHO has been assessing the health situation and publishing the findings through the Report on the World Health Situation at regular intervals since 1954. The first of these reports recognized, among others, malaria, tuberculosis, poliomyelitis and yaws, as well as respiratory cancer and circulatory diseases, as being of concern. Subsequent reports gradually expanded this list to a wide spectrum of diseases and disorders requiring attention. *Table 5* shows the diseases/disorders/conditions perceived as problems during the first 30 years of WHO. Some have been eliminated and a few others are under control and have been targeted for eradication or elimination by the end of this century. An overview of progress in controlling them is provided below.

### Infectious disease control

During the past few decades, substantial progress has been made in controlling some major infectious diseases. But while some have disappeared or are almost eliminated as public health problems, others remain daunting threats.

WHO's Expanded Programme on Immunization (EPI) was launched in 1974. As a result, by 1995 over 80% of the world's children had been immunized against diphtheria, tetanus, whooping cough, poliomyelitis, measles and tuberculosis, compared to less than 5% in 1974.

Global eradication of *smallpox* was declared in 1980 at the end of an eradication campaign which began in 1967, with the systematic vaccination of entire populations in over 30 endemic countries. The tropical disease *yaws*, which mainly affects the skin and bones, has virtually disappeared. Between 1950, when the first yaws campaign was launched in Haiti,

and 1965, 46 million patients in 49 countries were successfully treated with penicillin, and the disease is no longer a significant problem in most of the world.

Although *cholera* was mainly confined to Asia in the first half of the 20th century through improvements in sanitation elsewhere, the latest in a series of pandemics recorded since the early 19th century has been affecting much of the world since the 1960s, with epidemics ranging from South-East Asia to the Eastern Mediterranean, West Africa and parts of Latin America. Epidemics have become more widespread and more frequent in Africa since the 1970s. A new strain, *Vibrio cholerae* O139, was identified in India in 1992. Cholera is endemic in some 80 countries and is of concern to all regions of the world.

The global threat of *plague* has declined in the last four decades, largely due to the impact of antibiotics and insecticides and other control measures, but cyclical epidemics still occur and some countries in Africa, the Americas and Asia report cases almost every year. There is evidence of plague in rodents spreading in parts of the United States.

Improvements in standards of sanitation and hygiene in recent decades have also made outbreaks of *relapsing fever* transmitted by lice rare today. They are most likely to occur in unhygienic and crowded conditions arising from wars or natural disasters.

The largest *yellow fever* epidemic ever recorded was in Ethiopia in 1960-1962, causing about 30 000 deaths. There are now about 30 000 deaths globally every year among about 200 000 annual cases, a decline largely due to immunization. However, since the late 1980s there has been a dramatic resurgence of yellow fever in Africa and the Americas. It

Substantial progress  
has been made  
in controlling some  
major infectious  
diseases.

**Table 5. Importance of selected diseases and conditions over time according to the Report on the World Health Situation**

Disease	Report 1 1954-56	Report 2 1957-60	Report 3 1961-64	Report 4 1965-68	Report 5 1969-72	Report 6 1973-77	Report 7 1978-84	Report 8 1985-89
<b>Infectious diseases</b>								
Malaria	●					●	●	●
Tuberculosis	●	●	●	●	●	●	●	●
Cholera	●	●	●	●	●		●	
Poliomyelitis	●	●	●	●			●	●
Yaws	●	●	●					
Hepatitis, infectious	●		●					●
Relapsing fever	●			●				
Plague	●			●				
Yellow fever	●							●
Trachoma	●	●		●				
Onchocerciasis	●			●			●	
Leprosy	●	●	●	●	●	●		●
Smallpox	●	●	●	●	●	●		
Schistosomiasis	●		●	●	●		●	●
Sexually transmitted diseases		●	●	●	●	●	●	●
Influenza		●		●				
Filariasis			●	●		●		
Dysentery			●	●				
Trypanosomiasis, African			●			●		●
Trypanosomiasis, American			●	●	●			●
Ascariasis				●				
Ancylostomiasis				●				
Trichuriasis				●				
Diarrhoea				●		●	●	●
Meningitis				●	●		●	
Acute respiratory disease					●			●
Diphtheria						●		
Viral haemorrhagic fever						●		
Endemic treponematoses						●		●
Measles							●	●
Tetanus							●	●
Dracunculiasis							●	●
AIDS							●	●
Pneumonia								●
Dengue haemorrhagic fever								●
Pertussis								●
Rabies								●
Japanese encephalitis								●
Leishmaniasis								●
<b>Chronic conditions</b>								
Cancer	●	●	●	●	●	●	●	●
Circulatory diseases	●	●	●	●	●	●	●	●
Endocrine, nutritional and metabolic diseases	●			●	●	●	●	●
Accidents		●	●			●		
Mental disorders					●	●	●	●
<b>Others</b>								
Handicap						●		
Tobacco-related disorders								●
Alcohol-related disorders								●
Occupational injuries								●
Agrochemical-related hazards								●

is endemic in 34 countries of Africa, including 14 of the world's poorest, and in most of these, immunization programmes are weak. Outbreaks occurred in several countries in West Africa in 1994-1995, and in 1995 Peru experienced the largest yellow fever outbreak reported from any country in the Americas since 1950. The present situation is reflected in *Map 1*.

Recent environmental changes closely linked to water resources development, and increases in population densities, have led to the spread of *schistosomiasis* to previously low-endemic or non-endemic areas, and the disease remains endemic in 74 developing countries. Most of the transmission occurs in Africa, where there is an urgent need for a renewed commitment to control on the part of endemic countries and donors.

The *onchocerciasis* control programme which began in West Africa in 1974 has since protected an estimated 36 million people from the disease. The African Programme for Onchocerciasis Control began in January 1996 and covers 19 additional countries. The Onchocerciasis Elimination Programme in the Americas was stated in 1991 in six Latin American countries and aims to eliminate severe pathological manifestations of the disease and to reduce morbidity in the Americas through the distribution of ivermectin. It is expected that the global elimination of onchocerciasis as a public health problem will be achieved before 2008.

Prevalence of the parasitic *Chagas disease* (which exists only in the Americas from Mexico to Argentina) is currently estimated at 16-18 million in 21 endemic countries. The disease is being targeted for elimination of transmission by the year 2010 in the southern cone countries of Latin America.

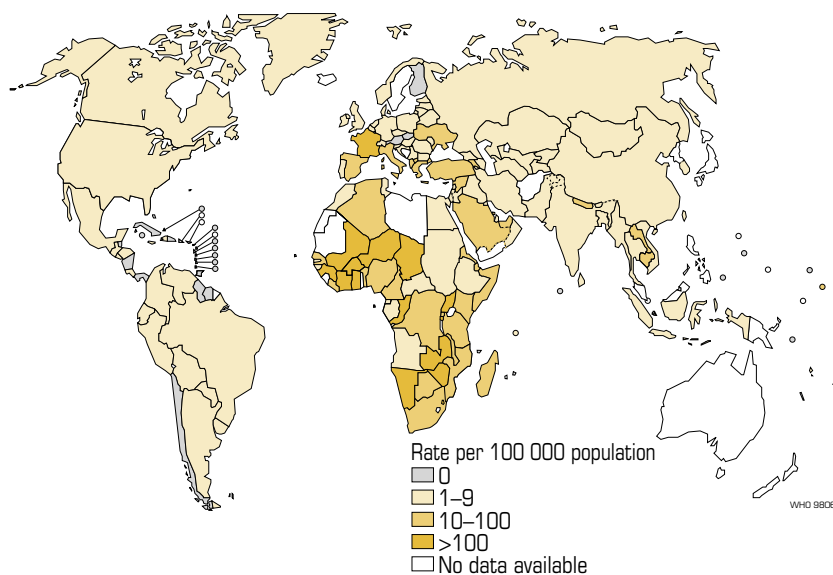
There has been an important

**Map 1. Yellow fever, 1997**



recrudescence of *sleeping sickness* (African trypanosomiasis), particularly in central Africa, where reported cases have more than doubled over the past few years. In 1997, the World Health Assembly acknowledged the danger of epidemics in a number of African countries. Ideally by the year 2000, at least 70% of all people at risk should be reached through medical surveillance, and prevalence of the disease should be reduced to a degree at which it is no longer a public health problem.

**Map 2. Reported measles incidence rate, 1996**



## Box 8. Lymphatic filariasis

A WHO plan to treat more than 1 billion people – a fifth of the world population – with a dose of medicine could lead to the elimination within about 20 years of lymphatic filariasis, one of the most painful and unpleasant of all tropical diseases – and simultaneously reduce the burden of other parasitic infections.

Lymphatic filariasis, a bloodborne disease transmitted by mosquitos, causes elephantiasis and male genital damage. It is a major social and economic scourge in the tropics and subtropics of Africa, Asia, the Western Pacific and parts of the Americas, affecting over 120 million people in 73 countries. More than 1.1 billion people live in areas where there is a risk of infection.

In 1997, the World Health Assembly adopted a resolution calling for the global elimination of the disease as a public health problem, in view of rapid advances during the previous decade in diagnosis, clinical understanding, treatment and control, the successes of recent control programmes, and increasing political commitment.

The mainstay of WHO's elimination strategy is the use of simple, safe, inexpensive, conveniently delivered drugs that kill the parasite. An additional benefit is the simultaneous effectiveness of these medications against other well-entrenched diseases such as intestinal worms, lice and scabies.

The available drugs are albendazole, diethylcarbamazine (DEC) and ivermectin. Once-yearly administration of single doses of these drugs, given in 2-drug combinations, will reduce parasite blood counts by 99% for a year or more. Dramatic reductions in transmission have been documented in highly endemic areas even in the first year.

The success of the strategy has been made possible by the commitment of pharmaceutical companies.

SmithKline Beecham plc, which has already supported the development of drugs and programmes for controlling other tropical diseases, has agreed to donate to WHO for its programme on control of tropical diseases sufficient quantities of albendazole for as long as is necessary in order to eliminate the disease. The firm has also agreed to provide funds and human resources to help support the global elimination programme.

At the same time, Merck & Co., Inc., through Merck Research Laboratories, has recognized that ivermectin is especially needed as part of the combination for treating lymphatic filariasis in Africa because of its overlap with onchocerciasis and loiasis, diseases for which community-wide exposure to the alternative drug DEC may be unsafe. Merck is making ivermectin available for research programmes, some of which may be countrywide in scope, that will be carried out with WHO.

Further support has come from the Arab Fund for Economic and Social Development, which will provide funding for filariasis elimination in those of its member countries affected by the disease. The World Bank has strongly endorsed this new global elimination programme.

With encouragement and support from WHO, 13 countries have now revised their national filariasis control strategies and plans of action to take advantage of the new tools and approaches available. Seven of these countries have already initiated national programmes. In India, the largest, 40 million people were being targeted to receive single-dose treatment on National Filariasis Day early in 1998. WHO will support all endemic countries with the necessary technical advice and assistance for developing implementation plans for treatment, monitoring, evaluation and operational research.

The first effective injectable vaccines against *poliomyelitis* were introduced in 1955; since then the disease has gradually been eliminated in much of the world. Reported cases worldwide have declined by over 90% since the campaign for global eradication by the year 2000 was launched in 1988. Polioviruses have disappeared from the Americas, and the Western Pacific Region is rapidly becoming polio-free. The Indian subcontinent

remains heavily affected and the disease is still endemic in western and central Africa and some countries in the Eastern Mediterranean Region.

In 1966, WHO estimated that there were 10.5 million *leprosy* patients in the world with 1.8 million registered for treatment. WHO developed and promoted multidrug therapy, which it began to recommend in 1981. Since then, over 8.4 million patients have been cured and

the global leprosy burden reduced from 5.4 million registered cases in 1985 to 0.9 million in 1997. Most cases today are in South-East Asia, with relatively small numbers in Africa, the Americas, the Western Pacific and Eastern Mediterranean. WHO's goal is to eliminate leprosy as a public health problem by the year 2000, i.e. to reduce global prevalence to less than 1 per 10 000 population.

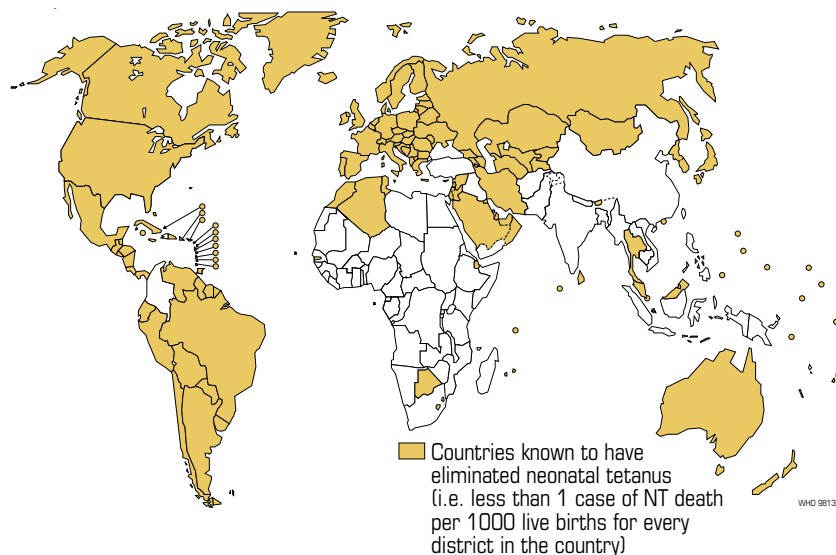
Progress towards the elimination of *dracunculiasis* (guinea-worm disease) in the past decade has been spectacular, with the number of cases falling worldwide from an estimated 3.2 million in 1986 to 70 000 in 1997. The disease affects those living in the most rural parts of 18 countries located in Africa south of the Sahara and Yemen. Twenty-one formerly endemic countries have been certified as free of dracunculiasis transmission.

The outlook for *filariasis* control and elimination is such that an international task force for disease eradication identified filariasis as one of only six currently eradicable or potentially eradicable diseases, and in 1997 the World Health Assembly called for the elimination of lymphatic filariasis as a public health problem globally (Box 8). The disease is of concern in Africa, the Eastern Mediterranean, and South-East Asia.

For the blinding disease *trachoma* the target is elimination by 2020 through long-lasting antibiotics. About 6 million people currently alive in Africa and Asia have been irreversibly blinded by it; another 152 million suffer from the disease and need treatment.

*Measles* remains the leading killer among vaccine-preventable diseases of children, and is still a concern in all six WHO regions. Despite excellent progress in recent years, particularly in the Americas, where there is hope of eliminating it by the year 2000,

**Map 3. Neonatal tetanus elimination status, 1997**

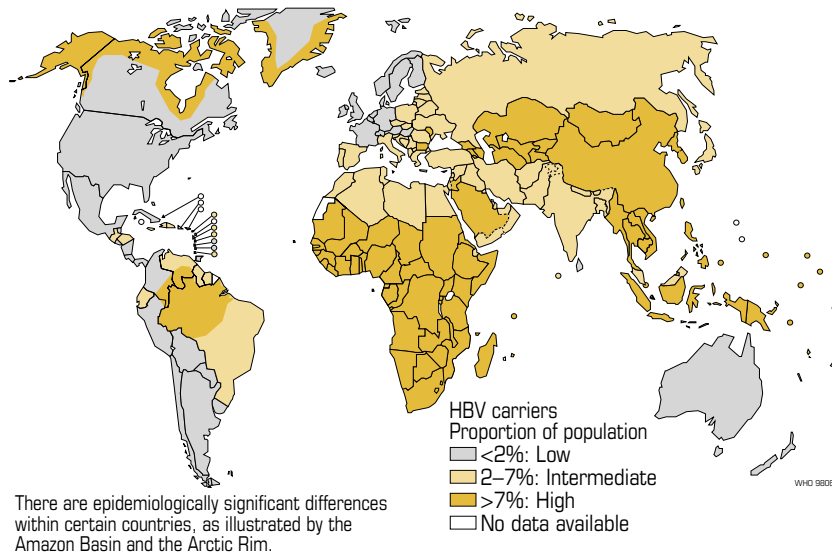


measles still kills about 1 million children a year. In some countries, mostly in Africa, measles vaccine coverage is below 50%, which means that the disease will continue to be epidemic there (Map 2).

*Tetanus* of the newborn is the third killer of children after measles and pertussis among the six EPI vaccine-preventable diseases and is a concern in all WHO regions except Europe. Between 800 000 and 1 million newborns a year died from tetanus in the early 1980s. An estimated 730 000 such deaths are now prevented every year, particularly by targeting elimination efforts to high-risk areas. In 1997, there were an estimated 275 000 deaths. WHO estimates that in 1995, about 90% of neonatal tetanus cases occurred in only 25 countries. The current status of elimination of neonatal tetanus is shown in Map 3.

Once also a target for eradication, *malaria* remains a major threat. In 1954 there were 2.5 million deaths annually and 250 million cases worldwide; now there are 1.5-2.7 million deaths and 300-500 million cases, 90% of them in tropical Africa, and

**Map 4. Hepatitis B prevalence, 1997 estimates**



the disease is endemic in 100 countries. The aim of the current Global Malaria Strategy is to reduce mortality by at least 20% compared to 1995 in at least 75% of affected countries by the year 2000. In 1997, WHO accelerated malaria control activities in 24 endemic countries in Africa. By the end of 1997, the objective of 90% of the affected countries having a national control plan in place was achieved.

Complacency towards **tuberculosis** in the last three decades led control programmes to be run down in many countries. The result has been a powerful resurgence of the disease, now estimated to kill around 3 million people a year, with 7.3 million new cases annually. WHO declared tuberculosis a global emergency in 1993. About 3 million cases a year occur in South-East Asia, and nearly 2 million in sub-Saharan Africa, with 340 000 in Europe. One-third of the incidence in the last five years can be attributed to HIV, which weakens the immune system and makes a person infected with the tubercle bacillus 30 times more likely to become ill with tuberculosis. Strains of the bacillus resistant to one or more drugs may

have infected up to 50 million people. WHO is promoting directly-observed treatment, short-course (DOTS) as the treatment strategy for detection and cure.

Epidemic **meningitis** is a recurrent problem in the “meningitis belt” of Africa stretching from Senegal to Ethiopia and including all or part of at least 15 countries with an estimated population of 300 million people.

Increasing urbanization during the last decades has led to a corresponding increase in the prevalence of **dengue and dengue haemorrhagic fever**. These conditions are reported from over 100 countries in all WHO regions except Europe. Dengue fever, and in particular life-threatening dengue haemorrhagic fever (DHF), often occurs in massive epidemics. In 1996, severe dengue epidemics were reported from 27 countries in the Americas and in South-East Asia, and dengue and DHF outbreaks were reported from Brazil, Cuba, India and Sri Lanka. As yet there is no vaccine or drug available for the control of dengue and DHF, and therefore WHO’s strategy continues to be based on prevention of transmission by controlling the vector.

There is also a disturbing increase in the number of **leishmaniasis** infections. The disease is related to economic development and environmental changes which increase exposure to the sandfly vector. More recently the combination of visceral leishmaniasis and AIDS has risen in parts of the Americas, Eastern Mediterranean and South-East Asia with the spread of the AIDS pandemic. In anticipation of a worsening situation WHO has set up a surveillance system, with 10 countries already able to detect any major epidemiological change.

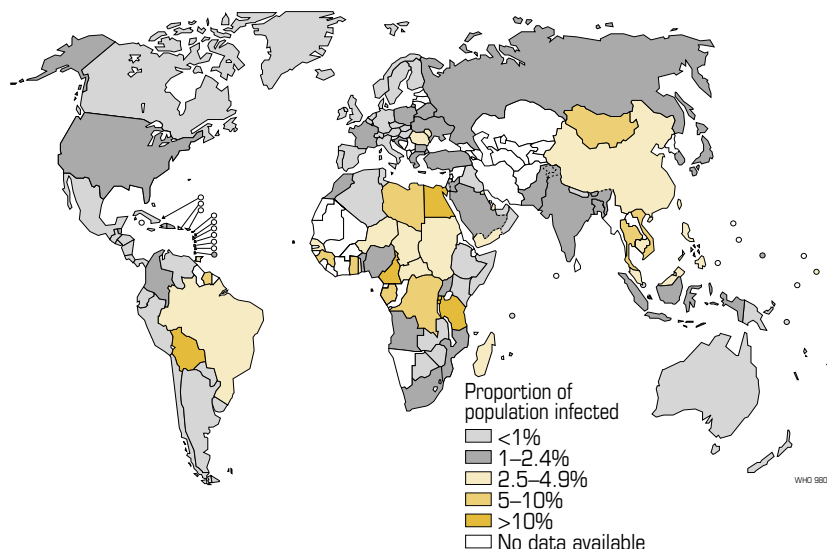
The **hepatitis B** virus infection (HBV) is a global problem, with 66%

of the world's population living in areas where there are high levels of infection (*Map 4*). More than 2 billion people worldwide have evidence of past or current HBV infection and 350 million are chronic carriers of the virus, which is harboured in the liver. The virus causes 60-80% of all primary liver cancer, which is one of the three top causes of cancer deaths in East and South-East Asia, the Pacific Basin and sub-Saharan Africa.

Vaccination is the most effective way of preventing HBV transmission. The hepatitis B vaccine is the first and currently the only vaccine against a major human cancer. Following WHO recommendations, 90 countries have now integrated it into their national immunization programmes. By this means, the target is to reduce new HBV carriers in children by 80% by the year 2001. For many countries, however, the major impediment to the universal introduction of the vaccine has been its cost. Even at \$ 0.50 per dose, a three-dose series of vaccinations is more expensive than the combined cost of the other six EPI vaccines. WHO and UNICEF have developed a support strategy to help the poorest and neediest countries to procure the vaccine. Implementation of this strategy, and the achievement of high HBV coverage, could effectively eliminate transmission of the disease by the year 2025.

First identified in 1989, the **hepatitis C** virus (HCV) has now become a major public health problem (*Map 5*). The incidence of HCV infection worldwide is not well known, but from a review of published prevalence studies on HCV, WHO estimates that 3% of the world population is infected with HCV and around 170 million individuals are chronic carriers at risk of developing liver cirrhosis and liver cancer. In many countries particular population subgroups such as volunteer blood donors have a

**Map 5. Hepatitis C, 1998 estimates**



very high prevalence of HCV infection, especially in the developing world. In the United States an estimated 4 million people have contracted the disease, four times more than HIV infection; approximately 30 000 new acute infections and 8000-10 000 deaths occur each year; it has also become the leading reason for liver transplantation. In France, 500 000-650 000 persons are infected, 3% of whom contracted the disease through blood transfusion. Australia also reports a prevalence of HCV infection far greater than that of HIV infection. In Canada, at least half of hepatitis C cases are associated with the use of injectable drugs but the actual proportion may be much greater; it is also the leading reason for liver transplantation.

Although HCV infection is not so easily transmitted as hepatitis B or HIV infections, its tendency to induce chronic liver disease in 50-80% of cases, leading to serious long-term clinical sequelae, places it among the pathogens of major public health concern. HCV is also characterized by genetic diversity enabling it to escape the host's immune system. In addition, the natural course of the

Cancer of the breast,  
colon and prostate  
have emerged in  
several countries  
in which they were  
hardly known  
20-30 years ago.

disease is uncertain, vaccine development is difficult, response to therapy is poor, and societal and medical costs can be high.

WHO called a meeting of experts in April 1998 to achieve a clearer understanding of the natural history of the disease and to develop appropriate approaches to diagnosis and monitoring, therapeutic intervention and prevention of transmission.

### Noncommunicable disease control

The increased life expectancy recorded in recent decades, together with changes in lifestyle stemming from socioeconomic development, paradoxically have favoured non-communicable diseases, especially circulatory disorders, cancer and some forms of mental illness. *Pellagra*, a dietary disorder among populations consuming maize or sorghum and little else, was a public health problem in the 1960s and 1970s in parts of Africa and Asia. Major outbreaks of this deficiency disease rarely occur today because of fortification of cereal products and nutrition education, but there have been several outbreaks in the past 20 years in refugee and displaced populations dependent on food aid where the cereal in rations has been unfortified maize.

Coronary heart disease and stroke account for at least 12 million deaths a year, cancer kills 6 million, and 2.8 million deaths are due to chronic obstructive pulmonary disease (COPD). These and other noncommunicable diseases now cause 39% of all deaths in developing countries, where they affect younger people than in industrialized countries – an alarming trend. The epidemiological transition, with its double burden of infectious and chronic diseases, is common to many developing coun-

tries, where 64% of deaths due to circulatory diseases, 60% of cancer deaths and 66% of COPD deaths now occur.

In contrast, some industrialized countries – Australia, Canada, Finland, New Zealand and the United States in particular – have shown dramatic reductions in mortality from **circulatory diseases** in the last two or three decades. These have been achieved by reducing risk factors such as hypertension and tobacco use and by introducing beneficial changes in diet, together with improvements in treatment. A project in North Karelia, Finland, shows that the effects are sustainable over a 20-year period. Here, a 65% reduction in coronary heart disease mortality in middle-aged adults was achieved by ensuring decreases in three main risk factors: cholesterol, hypertension and smoking. Noncommunicable disease prevention in Finland contributed most to the six-year increase in life expectancy over the last 25 years, during which time the number of people on disability pensions because of cardiovascular disease fell by about 25%. In Poland, changes in the pricing of meat and dairy products have clearly affected coronary heart disease death rates. In the United Kingdom, deaths from heart disease are reported to have fallen to second place as the most common cause, being replaced by cancer.

In many parts of the world, dramatic shifts in **cancer** occurrence are being observed. In several newly industrialized regions cancer has become, unexpectedly quickly, one of the leading causes of death. Cancer of the breast, colon and prostate have emerged in several countries in which they were hardly known 20-30 years ago. In western European countries and North America, more than 30% of tumours are associated with dietary habits.

Of more than 9 million cancer cases newly diagnosed in 1997 worldwide, 52% occurred in the developing countries. For all countries, lung cancer was the most common in men, followed in developed regions by prostate cancer, colorectal cancer and stomach cancer. In developing regions, stomach cancer is second, followed by liver cancer and cancer of the oesophagus. In women, breast cancer is the most common in affluent populations, followed by colorectal cancer, lung cancer and stomach cancer. In developing areas, breast cancer is also the most common, but cervical cancer is almost as common; stomach cancer and colorectal cancer are third and fourth respectively. The most remarkable changes in the rankings compared to 10 years ago are the steep upward trend of prostate cancer (partly due to the introduction of early detection programmes); the increase in breast cancer, especially in developing countries; and the increase in lung cancer worldwide. Much of the upward trend in the last few decades in rich countries has been due to tobacco smoking, a trend likely to be mirrored in coming years in developing countries, where smoking will also increase COPD deaths.

Population ageing, unhealthy diets, obesity and a sedentary lifestyle are the main factors that explain the alarming upward trend in recent years in *diabetes mellitus*. There are about 143 million sufferers and this number is projected to rise to almost 300 million by the year 2025.

Along with increased longevity and socioeconomic development has come an increase in some forms of *mental disorder* in the last two or three decades. Depression, schizophrenia and dementia rates have been rising, partly because more people are living to an age where the risk of developing these disorders is greater. Depression is also now be-

ing seen at younger ages and more frequently in countries as different as Lebanon, and the United States. On the basis of population ageing, it is projected that the number of persons with schizophrenia will increase by 45% between 1985 and the year 2000. Social and environmental factors play a role too, particularly in explaining increases in alcohol and drug abuse, suicide, violence and other behavioural problems.

### Emerging and re-emerging diseases

The last 20 years have seen the emergence of at least 20 new disease-causing organisms around the world. Of these the human immunodeficiency virus (HIV) which causes *AIDS* has had by far the most profound global impact. An unknown disease before 1981, AIDS has caused an estimated 11.7 million deaths since the epidemic began.

Some of the other new diseases include *Legionnaires' disease*, a form of potentially fatal pneumonia caused by bacteria which contaminate water and air-conditioning systems, and the deadly *Ebola haemorrhagic fever*, which has been confined to countries in tropical Africa. Both were first identified in 1976, in the United States and the Democratic Republic of the Congo respectively, and sporadic outbreaks of both diseases have since occurred elsewhere. WHO has played a leading role in the investigation and control of Ebola outbreaks. Recent years have seen the reappearance of *Rift Valley fever*, caused by a virus first isolated in 1931 in the Rift Valley of Kenya but which has also appeared in Egypt. At the end of 1997, WHO investigated a large outbreak of the disease in north-eastern Kenya and neighbouring Somalia.

There have also been sporadic outbreaks of *monkeypox*, a disease

AIDS has caused

an estimated

11.7 million deaths

since the epidemic

began.

### Box 9. Creutzfeldt-Jakob disease (CJD)

Since the announcement in March 1996 of the occurrence of a new clinicopathological variant of Creutzfeldt-Jakob disease (nvCJD) in the United Kingdom, evidence has demonstrated that nvCJD is almost certainly caused by the bovine spongiform encephalopathy (BSE) agent.

Because products potentially contaminated by BSE were widely exported, the risk of nvCJD is worldwide. Furthermore, the results of new research raise the possibility of secondary iatrogenic spread of the disease, emphasizing the need for accurate case detection.

In May 1996 the WHO Consultation on clinical and neuropathological characteristics of nv CJD and other human and animal transmissible spongiform encephalopathies recommended that global CJD surveillance should be established. Experience gained from implementing this recommendation has led to the redefinition of a "suspected case" and a "case" to improve ascertainment, particularly in developing countries with low autopsy rates.

The average incubation period of nvCJD is unknown and estimates vary from 10 to more than 20 years. This makes prediction of the future number of cases difficult, but a potentially large epidemic with tens of thousands of cases, or more, is possible. The identification of effective treatment is therefore of paramount importance, and a WHO consultation in February 1998 stressed the pressing need for further research into the molecular properties of the CJD agent, to help identify effective means of treating the disease.

pearance of symptoms of nvCJD, it is impossible to estimate the scale of a potential epidemic based on the relatively small number of cases so far identified in the United Kingdom. WHO has convened expert group meetings on the disease.

Three *influenza* pandemics have occurred in this century – in 1918, 1957 and 1968. The WHO network for global influenza surveillance, which comprises 110 national influenza centres, maintains constant vigilance for evidence of the next pandemic (*Box 10*). These surveillance activities first identified human infection with a new influenza virus called A(H5N1) in Hong Kong. Initial fears that the outbreak heralded the start of a new pandemic were proved to be unfounded by investigations involving close collaboration between WHO and the Chinese Government.

### Health expectancy

clinically similar to smallpox, in Africa in the last 20 years. The smallpox vaccine protected against both diseases, but as vaccination stopped after smallpox eradication in 1980, children born since then are likely to be more susceptible to monkeypox than their elders. The largest outbreak ever recorded occurred in the Democratic Republic of the Congo in 1996-1997, involving more than 500 people, and was investigated by WHO specialists. While the natural host of some other infectious diseases remains unknown, there is strong evidence associating the new variant of *Creutzfeldt-Jakob disease* (nvCJD), a degenerative brain condition, with the consumption of beef and other products from cattle suffering from or infected by the agent causing bovine spongiform encephalopathy (*Box 9*). Because there may be a latent period of many years between infection and the ap-

For a long time, knowledge of life expectancy at different ages, the infant mortality rate and the distribution of the causes of death according to the principal disease headings was sufficient to assess the health status of populations and to determine national public health priorities. However, during the last 20 years the need for a new type of indicator has arisen as a result of changes such as the lengthening of life expectancy due to the fall in mortality at older ages, and the issue of quality of the years lived, at very old ages in particular. The former indicators remains indispensable, as important mortality inequalities still remain between countries and between the different groups making up populations. As not much is known about the limits of human longevity, health expectancy indicators – which provide information on the population's func-

## Box 10. Influenza – Preparing for a 21st century pandemic

WHO's global surveillance activities first identified human infection with a new influenza virus called A(H5N1) in Hong Kong in mid-1997 at one of the Organization's collaborating centres. The possibility that the outbreak heralded a global influenza pandemic did not materialize during the first 10 months after the emergence of the virus among humans, but the threat of a virus more easily transmitted between humans remains.

Sooner or later, however, such a pandemic will occur – and history shows that it must be taken with the utmost seriousness. The WHO Network for Global Influenza Surveillance, which involves 110 national influenza centres, therefore maintains constant vigilance.

New influenza viruses to which nobody is immune cross the barrier from animals to humans at unpredictable times. These events can result in local epidemics, but a few lead to global pandemics. Influenza was first described by Hippocrates in 412 BC and about 30 possible pandemics have been documented in the last 400 years. Three have occurred in this century – in 1918, 1957 and 1968.

The 1918 pandemic of what was known as Spanish Flu was by far the most devastating, killing more than 20 million people worldwide between 1918 and 1920. The virus responsible is believed to have originated in swine. The pandemic occurred because the new virus was easily transmitted from person to person.

Birds and poultry in particular are other sources of influenza viruses, and the A(H5N1) virus in Hong Kong infected chickens from a source or reservoir in nature that is still to be identified, before emerging in humans. Significant person-to-person transmission of this virus does not seem to have taken place. However, as a precautionary measure during the outbreak, the Hong Kong authorities destroyed poultry flocks to eliminate the risk of further transmission, and a team of experts organized

by WHO took over 1800 samples from birds and animals of 16 species to identify the natural reservoir of the virus and the extent of its spread in the animal population.

WHO has for many years played a leading role as a watchdog on the look-out for a pandemic, active in global influenza surveillance and in vaccine preparation. Every February, experts review results from WHO's influenza network and make a recommendation on the antigenic composition of the next year's influenza vaccine. WHO transmits this recommendation to health authorities and vaccine manufacturers.

Although the date of the next influenza pandemic cannot be predicted, the certainty of its eventual arrival means that pandemic emergency response plans have to be prepared in advance. WHO has created a Task Force of Experts on Influenza whose members include the directors of four main collaborating centres in Australia, Japan, the United Kingdom and the United States, WHO staff and representatives from three of the 110 national influenza centres which collaborate with WHO on surveillance.

The Task Force is developing a plan for the global management and control of a pandemic. The plan includes the promotion of high-growth seed virus for vaccine and the facilitation of vaccine production and international distribution and the dissemination of information, and logistic and other support, to national health authorities. It calls for each of these authorities to develop its own emergency response to a pandemic.

The A(H5N1) outbreak in Hong Kong was the first one in which WHO pandemic planning was used, with the step-by-step collection of information necessary to decide whether or not a new vaccine was required. The outbreak also provided the opportunity to adjust the plan in line with experience. In this way the scientific information necessary to make rational decisions on influenza control is being steadily accumulated.

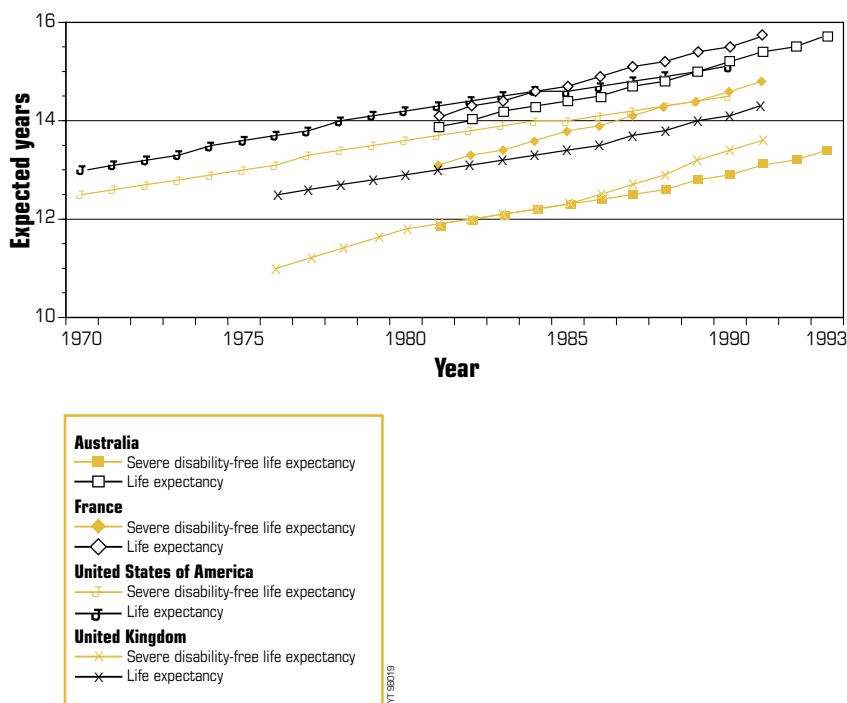
tional state and on its vitality (levels of activity and participation) as well as on its quality of life (level of felt or perceived health) – are well adapted to the new conditions.

In recent years, the number of calculations of health expectancy (disability-free life expectancy, life expectancy in good perceived health, etc.) has increased. They are used in

order to assess whether the lengthening of life expectancy is accompanied or not by an increase in time lived in bad health. The concept of life expectancy has thus been extended to morbidity and disability.

The notion of health expectancy was first put forward in the United States in 1964 and a first method of calculation was proposed in 1971. In

**Fig. 7. Evolution of life expectancy and life expectancy without severe disability, selected countries, males at age**



chronic disease, led to the calculation of life expectancy, disability-free life expectancy and life expectancy without chronic disease.

Thanks to this model the evolution of mortality, morbidity and disability can be assessed simultaneously. From the evolution of discrepancies between the three indicators the possible occurrence of different health scenarios can be estimated – pandemic of chronic diseases and disabilities, compression of morbidity, contradictory evolutions including the scenario of dynamic equilibrium, or postponement of diseases, disabilities and mortality to older ages. However, combining those different dimensions to provide a unitary index requires social consensus.

Since 1989, most researchers working on the development of these calculations have joined an international research network called REVES (*Réseau Espérance de Vie en Santé/ International Network on Health Expectancy and the Disability Process*). Today, a first estimate of health expectancy (generally a disability-free life expectancy) is available for 48 countries. These indicators do not make international direct comparisons possible, owing to the specific characteristic of national health surveys which provide the major part of the information used in the calculations. Most authors however now distinguish between life expectancy without severe disability and life expectancy without disability, all levels combined.

Based on available information, Fig. 7 shows that life expectancy without severe disability at age 65 in men progresses roughly in parallel with total life expectancy for the countries selected.

In the countries examined, the increase in life expectancy is not accompanied by an increase in the time spent with severe disability. The results indicate at worst a pandemic of light and moderate, but not of severe disabilities. They tend to confirm the theory of dynamic equilibrium which partly explains the increase in life expectancy by a slowing down in the rate of progression of chronic diseases. Thus, although the decline in mortality can lead to an increase in the prevalence of disabilities, these disabilities are less severe.