



Preventive Services in Old Age

Liang-Kung Chen

Epidemiology

Using what we know about determinants of wellness, illness, disability and death to improve outcomes

- ▶ Etiology
- ▶ Risk profile
- ▶ Natural history
- ▶ Efficacy of preventive and therapeutic measures
- ▶ Practicability of preventive and therapeutic measures
- ▶ Intended and other consequences – social, cultural, economic and other

Epidemiologic Process

- ▶ Determine who is at risk
- ▶ Stratify groups by level of risk
- ▶ Determine why they are at risk
- ▶ Craft interventions to reduce that risk
- ▶ Track progress against projections

Numerators and Denominators

- ▶ Numerator = the number sick
- ▶ Denominator = the number at risk
- ▶ **The secret to success for preventive services is figuring out how best to define the denominator(s)**
 - ▶ Who
 - ▶ How many?
 - ▶ How do we connect with them?

Policy

- ▶ Strategy
- ▶ Tactics
- ▶ Deciding what to do and how to do it
- ▶ Deciding who pays and who benefits

Politics

- ▶ ***Politics is based on values and perceptions -- it may or may not consider science***
- ▶ Big “P” politics – partisan and electoral
- ▶ Small “p” – politics -- inter and intra agency
- ▶ Decided on basis of stakeholder conflict and negotiation
- ▶ politics is often (but not always) the process by which policy is decided

Science and Policy

- ▶ ***Policy should be based on both politics and science***
- ▶ **Science is needed**
 - ▶ To identify problems amenable to interventions
 - ▶ To select interventions
 - ▶ To project efficacy and cost efficiency
 - ▶ **To assure positive outcomes**
- ▶ **Health professionals need to insert science into the policy dialogue at every level**
 - ▶ Within the organization
 - ▶ Community
 - ▶ Political jurisdiction
- ▶ Epidemiology is the basic science of public health

Direct Benefits of Preventive Services

- ▶ **Improved health outcomes**
- ▶ Persons served (process) (denominator)
- ▶ Illness/healthcare services averted (outcome) (numerator)
- ▶ Better understanding and increased personal responsibility by patients (system)

Indirect Benefits of Preventive Services

- ▶ Better adherence to medical recommendations for other health conditions
- ▶ Other improvements in lifestyle
- ▶ Improved member/patient and staff satisfaction and loyalty
- ▶ Possible competitive advantage in the marketplace

Other Consequences of Preventive Services

- ▶ Increased outpatient costs
 - ▶ Longer visits (health education and counseling)
 - ▶ More visits
 - ▶ Better adherence to prescribed regimens of care
 - ▶ Alerted to early signs
- ▶ Low morale if by doctors and nurses not compensated for extra counseling/screening etc.
- ▶ Adverse reactions to preventive medications (statins, ACE inhibitors, etc)
- ▶ Adverse patient selection (from health insurance perspective)

Projecting Costs and Benefits – Special Issues

- ▶ Healthcare system
 - ▶ Fiscal/healthcare utilization
- ▶ Patient
 - ▶ Rates of illness, complications and death
 - ▶ Rates of long-term disability
 - ▶ Quality of life – for patient and for family members
 - ▶ Quality-adjusted Life Years (QALY's)
 - ▶ Disability-adjusted Life Years (DALY's)
- ▶ Employer
 - ▶ Absenteeism and on-the-job productivity)

Small-Numbers Epidemiology

- ▶ Statistical significance impossible with community-level planning and evaluation
- ▶ **Rely on baselines and trends**
- ▶ $p < 0.2$ guideline can be used for program evaluation
- ▶ ***NEVER*** base a policy decision on a test of statistical significance

Medical Data Model

- ▶ **ICD9 Codes** (illustrated as Leading Causes of Death in 2000, with Rates per 100,000)

| | | |
|---|-------|-------|
| ▶ Heart disease | 258.2 | |
| ▶ Malignant neoplasm | | 200.9 |
| ▶ Cerebrovascular disease | 60.9 | |
| ▶ Chronic lower respiratory tract disease | | 44.3 |
| ▶ Unintentional injuries | 35.6 | |
| ▶ All Causes | 873.1 | |

- ▶ **Medical Procedure Codes**

- ▶ Per Mokdad et al, JAMA 2004; 291:1238-1245

Public Health Data Models

- ▶ **Risk factors** (illustrated as Major Causes of Preventable Death in 2000 with percent of deaths)

| | | |
|-------------------------------------|-------|-------|
| ▶ Tobacco | 18.1% | |
| ▶ Poor diet and physical inactivity | | 16.6% |
| ▶ Alcohol consumption | 3.5% | |
| ▶ Microbial agents | 3.1% | |
| ▶ Toxic agents | | 2.3% |

- ▶ **Skilled use of public data sets**

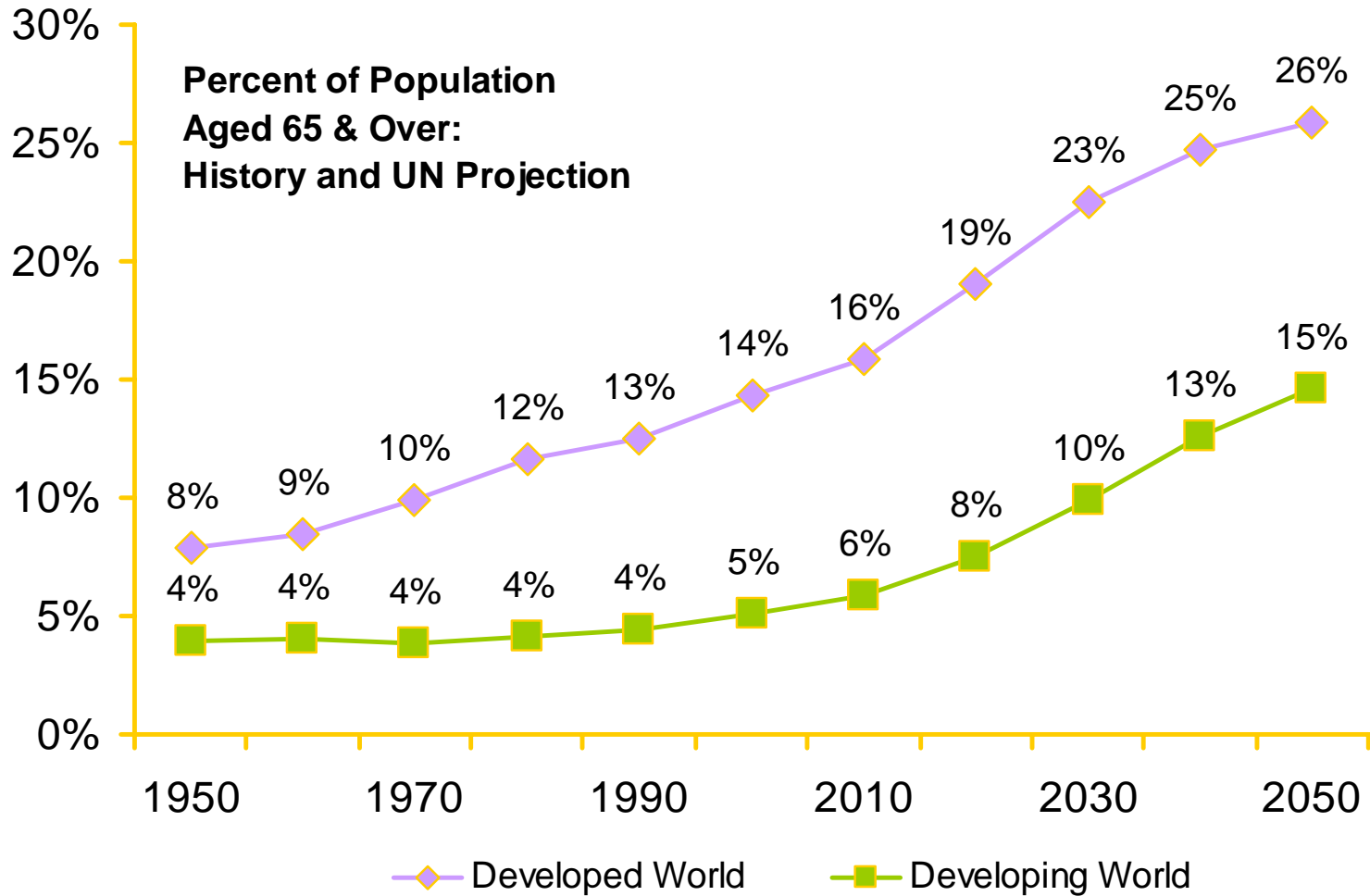
- ▶ Census and demographics
- ▶ Vital records
- ▶ National surveys

- ▶ Per Mokdad et al, JAMA 2004; 291:1238-1245

Community Data Models

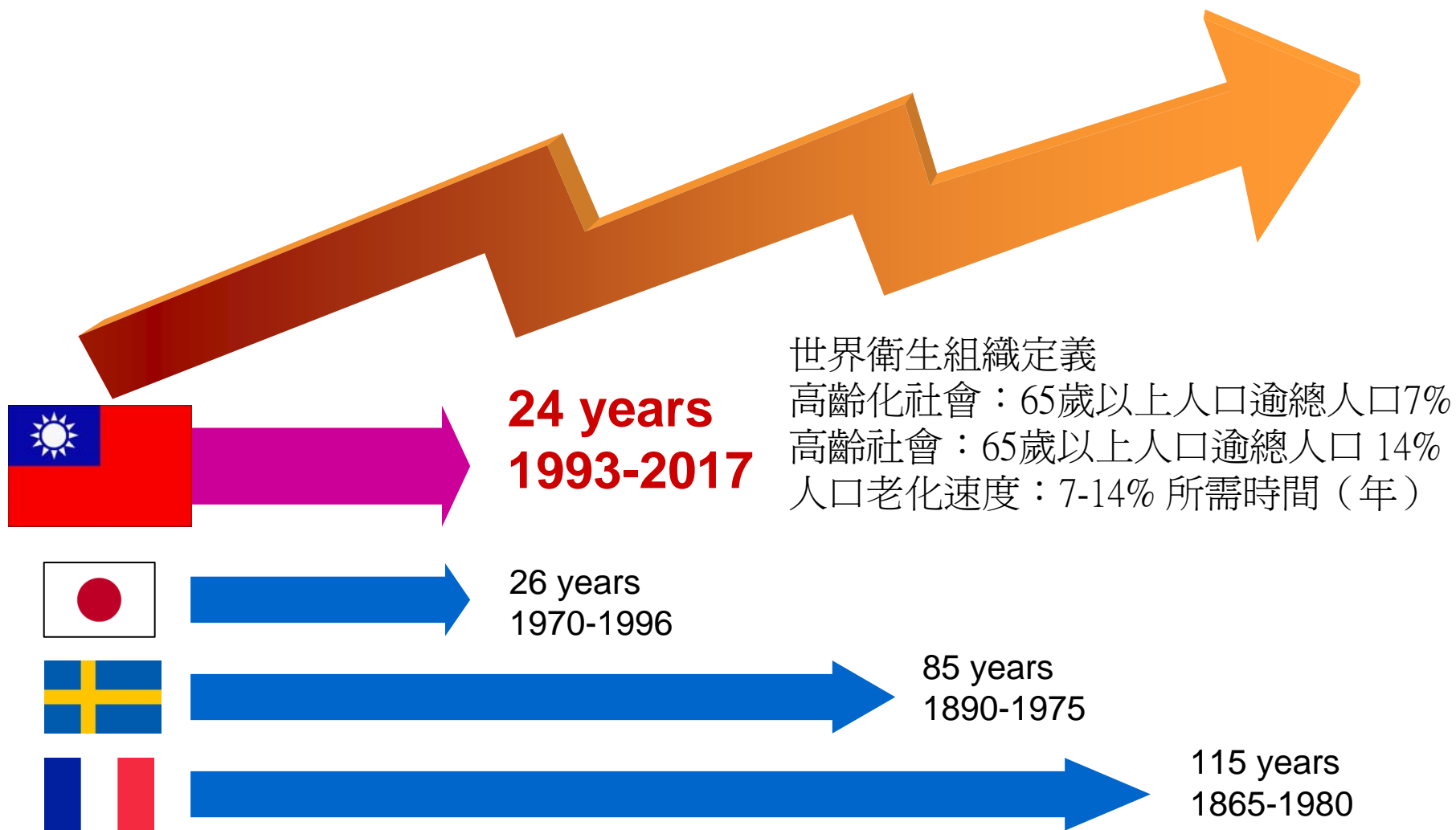
- ▶ Social inequalities
 - ▶ Poverty/indigency
 - ▶ Race/ethnicity/discrimination
 - ▶ Literacy
- ▶ Social isolation - lack of family/friends
- ▶ Mental illness – temporary or long term
- ▶ Cultural acceptance of high risk activities
- ▶ Lack of access to healthcare and other services

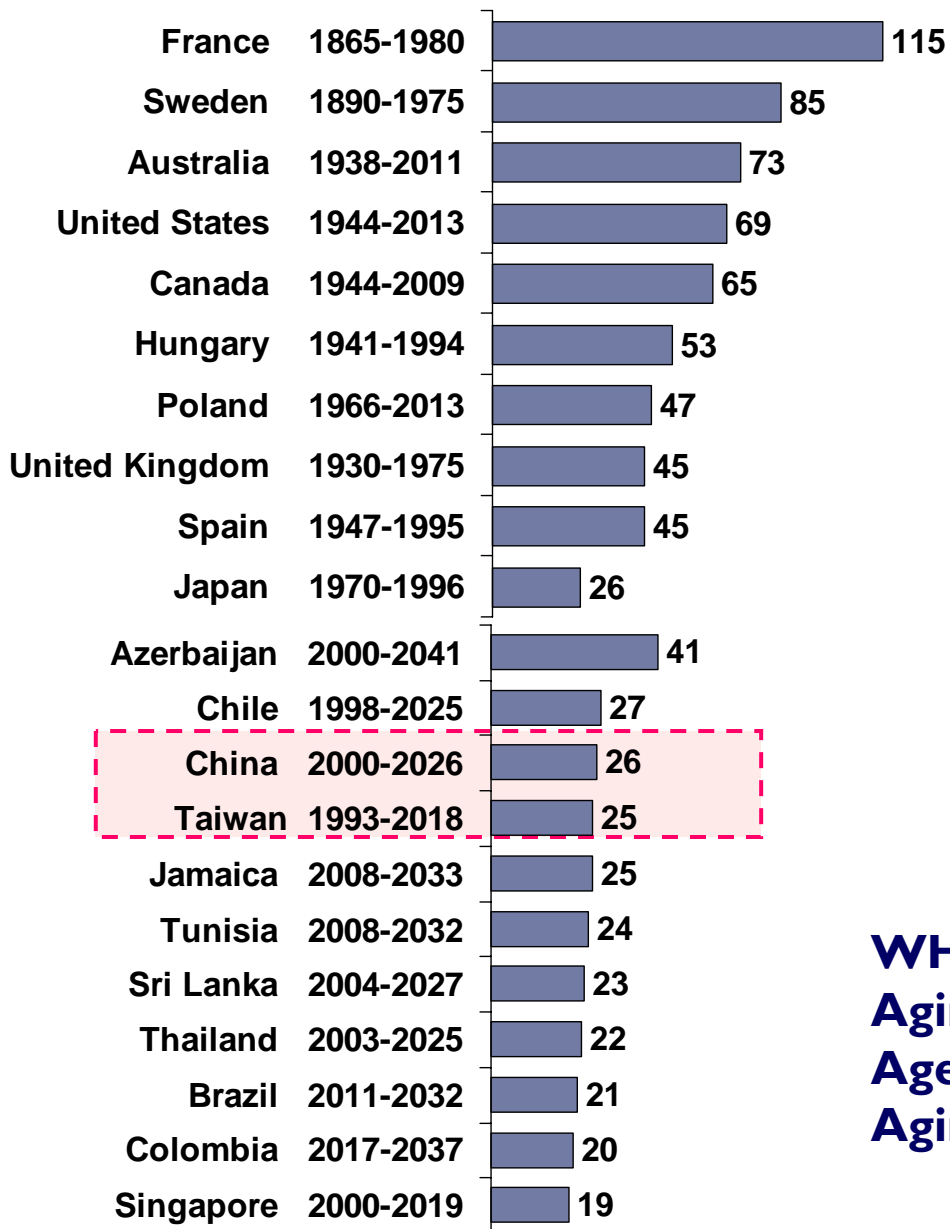
Global population aging



Source: UN (2005)

Population aging in Taiwan





Definition of elderly Otto von Bismarck



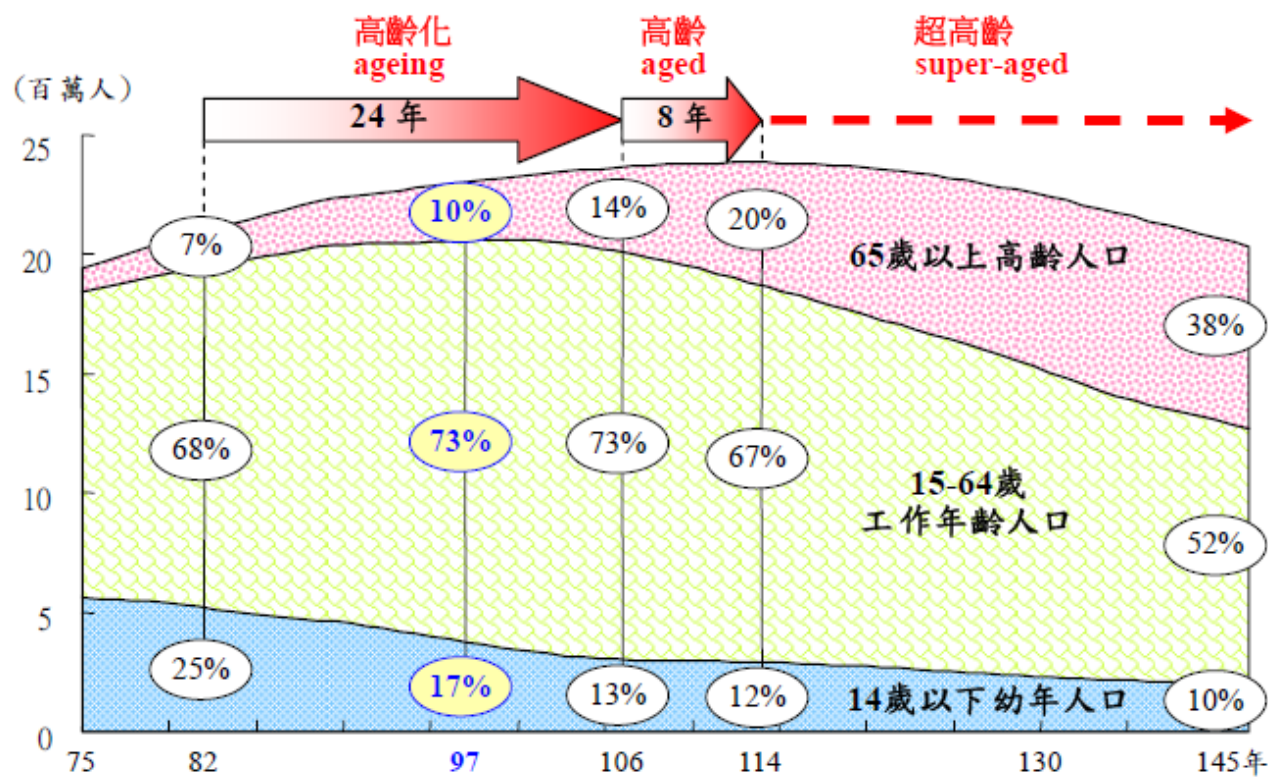
WHO Definition

Aging country: elderly people > 7%

Aged country: elderly people > 14%

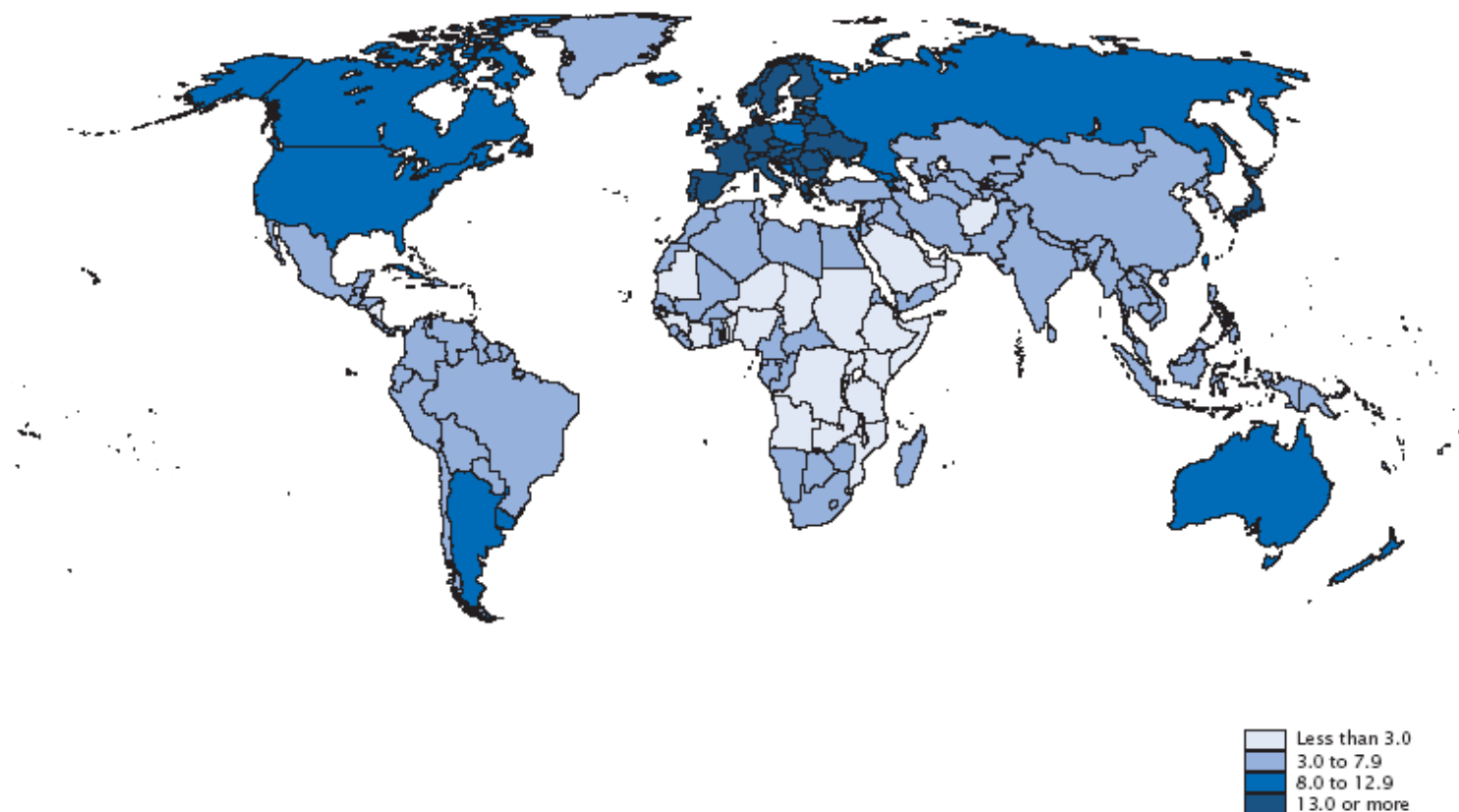
Aging speed: years from 7-14%

Becoming Japan soon



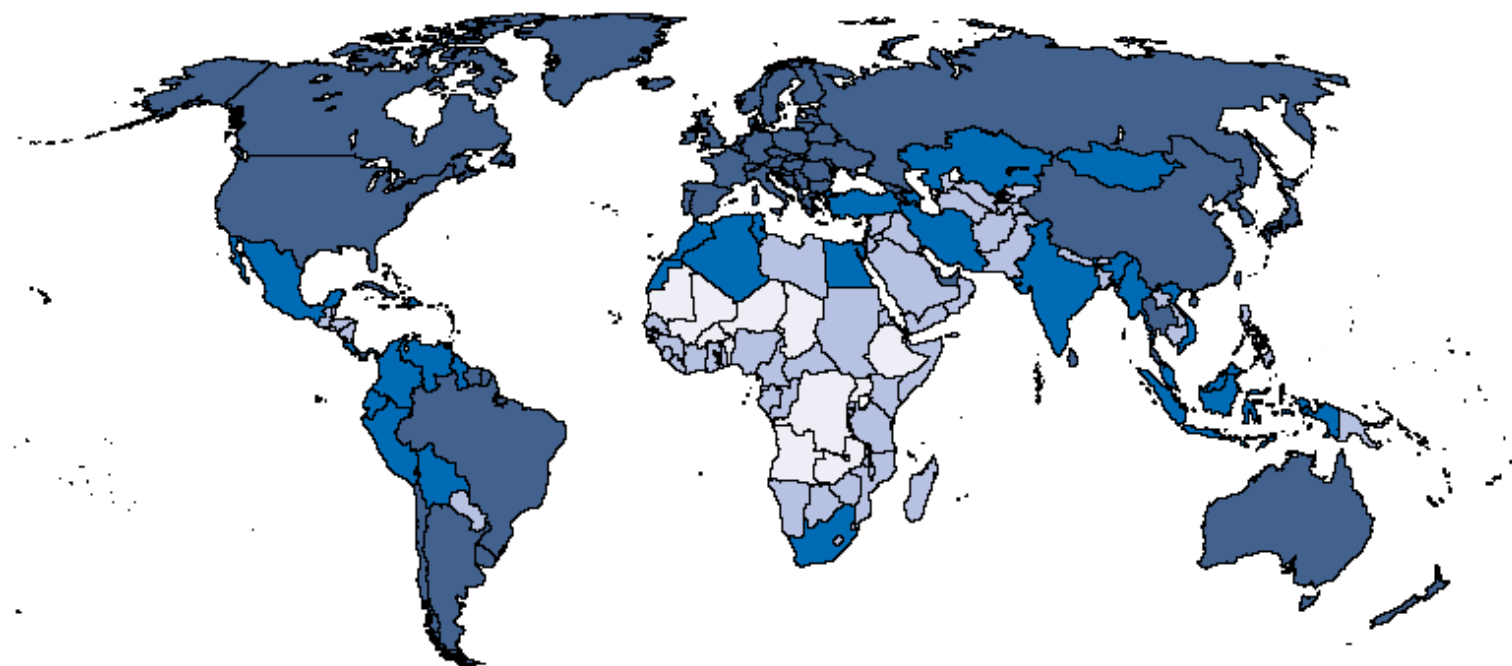
Aging world

Percent Aged 65 and Over: 2000



Aging world

Percent Aged 65 and Over: 2030



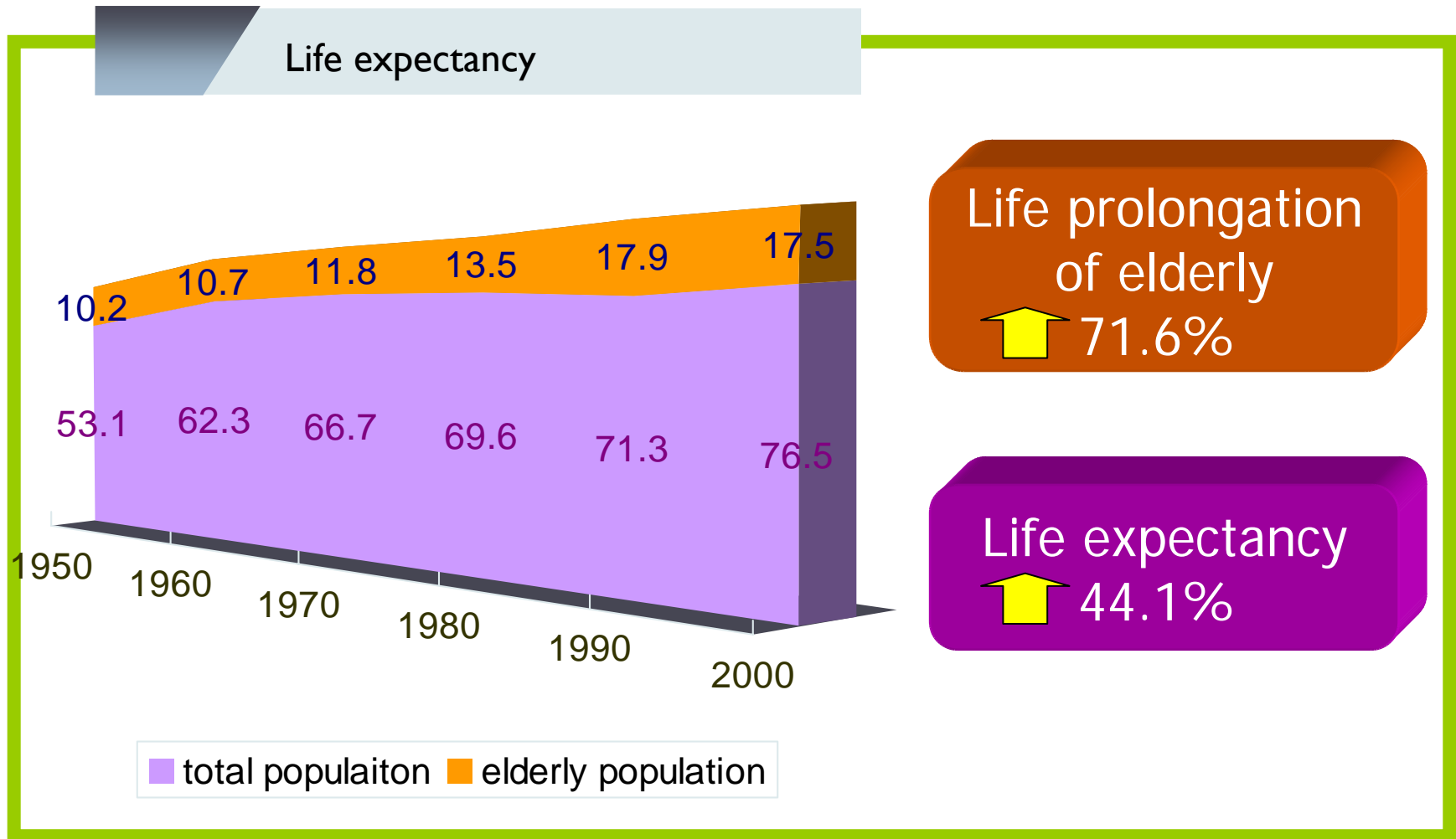
Aging world

Average Annual Percent Growth of Elderly Population in Developed and Developing Countries



Source: United Nations, 1999.

Population aging in Taiwan



Global health impact of aging

Change in Rank Order of Disease Burden for Top Ten Leading Causes in the World: 1990 and 2020

(Disease burden measured in disability-adjusted life years)

| | 1990 | 2020 |
|------|--|---------------------------------------|
| Rank | Disease or injury | Disease or injury |
| 1 | Lower respiratory infections | Ischemic heart disease |
| 2 | Diarrhoeal diseases | Unipolar major depression |
| 3 | Conditions arising during the perinatal period | Road traffic accidents |
| 4 | Unipolar major depression | Cerebrovascular disease |
| 5 | Ischemic heart disease | Chronic obstructive pulmonary disease |
| 6 | Cerebrovascular disease | Lower respiratory infections |
| 7 | Tuberculosis | Tuberculosis |
| 8 | Measles | War |
| 9 | Road traffic accidents | Diarrhoeal diseases |
| 10 | Congenital anomalies | HIV |

Changes of cause of death

Rank Order of the Ten Leading Causes of Death in Taiwan: 1956, 1976, and 1996

| Order | 1956 | 1976 | 1996 |
|----------|--------------------------------------|---------------------------|---------------------------------|
| 1 | GDEC ¹ | Cerebrovascular disease | Malignant neoplasms |
| 2 | Pneumonia | Malignant neoplasms | Cerebrovascular disease |
| 3 | Tuberculosis | Accidents | Accidents |
| 4 | Perinatal conditions | Heart disease | Heart disease |
| 5 | Vascular lesions of CNS ² | Pneumonia | Diabetes mellitus |
| 6 | Heart disease | Tuberculosis | Cirrhosis/chronic liver disease |
| 7 | Malignant neoplasms | Cirrhosis of the liver | Nephritis/nephrosis |
| 8 | Nephritis/nephrosis | Bronchitis ³ | Pneumonia |
| 9 | Bronchitis | Hypertensive disease | Hypertensive disease |
| 10 | Stomach/duodenum ulcer | Nephritis/nephrosis ulcer | Bronchitis ³ |

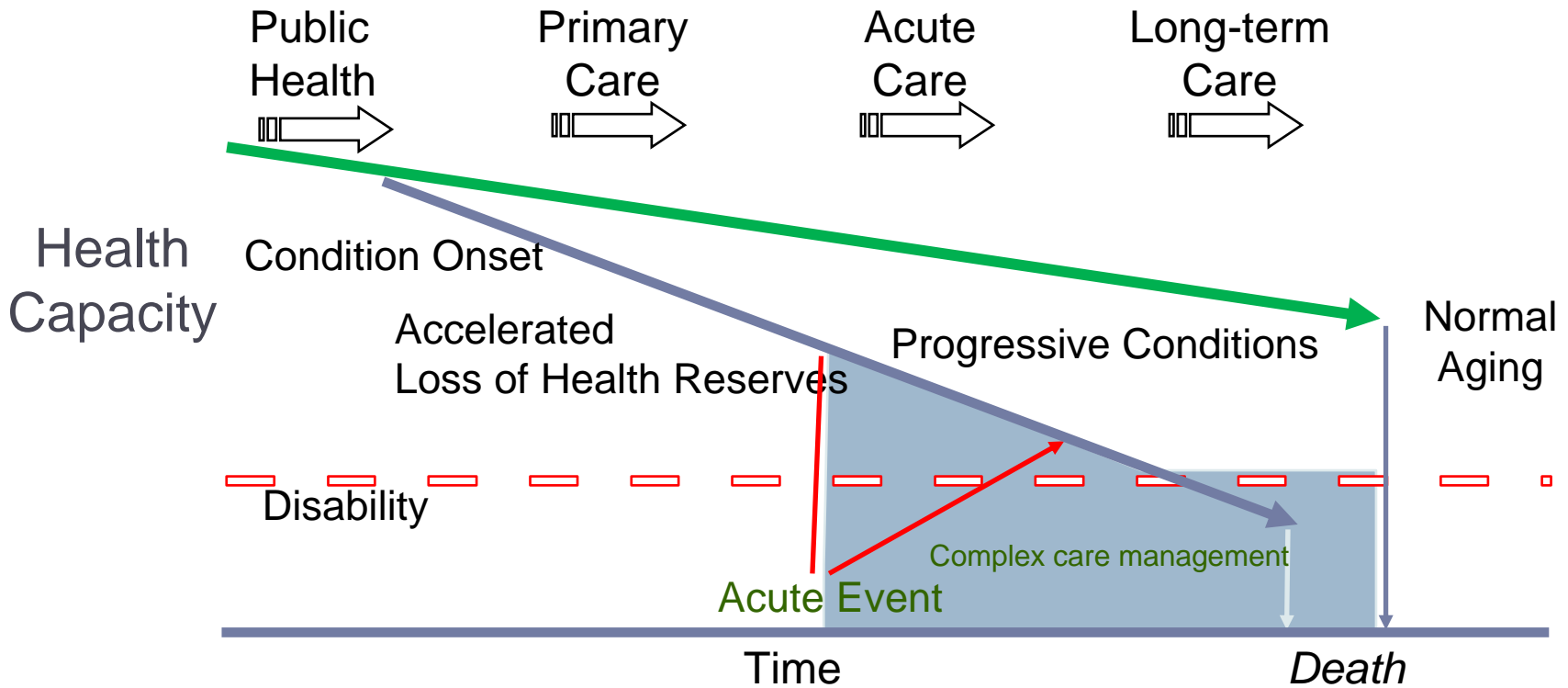
GDEC=gastritis, duodenitis, enteritis and colitis

Chronic illness and long-term care

Table 5. Percentage of older persons in need of long-term care by type of chronic illness

| <i>Diagnosis</i> | <i>Infirmity waiting list (Percentage)</i> | <i>Care and attention home waiting list (Percentage)</i> |
|------------------|--|--|
| Hypertension | 22.5 | 28.4 |
| Stroke | 43.1 | 21.5 |
| Diabetes | 12.0 | 20.1 |
| Arthritis | 15.7 | 14.1 |
| Dementia | 24.8 | 14.1 |
| Other fractures | 6.8 | 7.0 |
| Fracture hip | 7.5 | 5.2 |
| Parkinson's | 7.5 | 2.6 |
| Blindness | 3.0 | 3.4 |
| Amputation | 1.5 | 0.4 |

Aging and health



Risk Factors

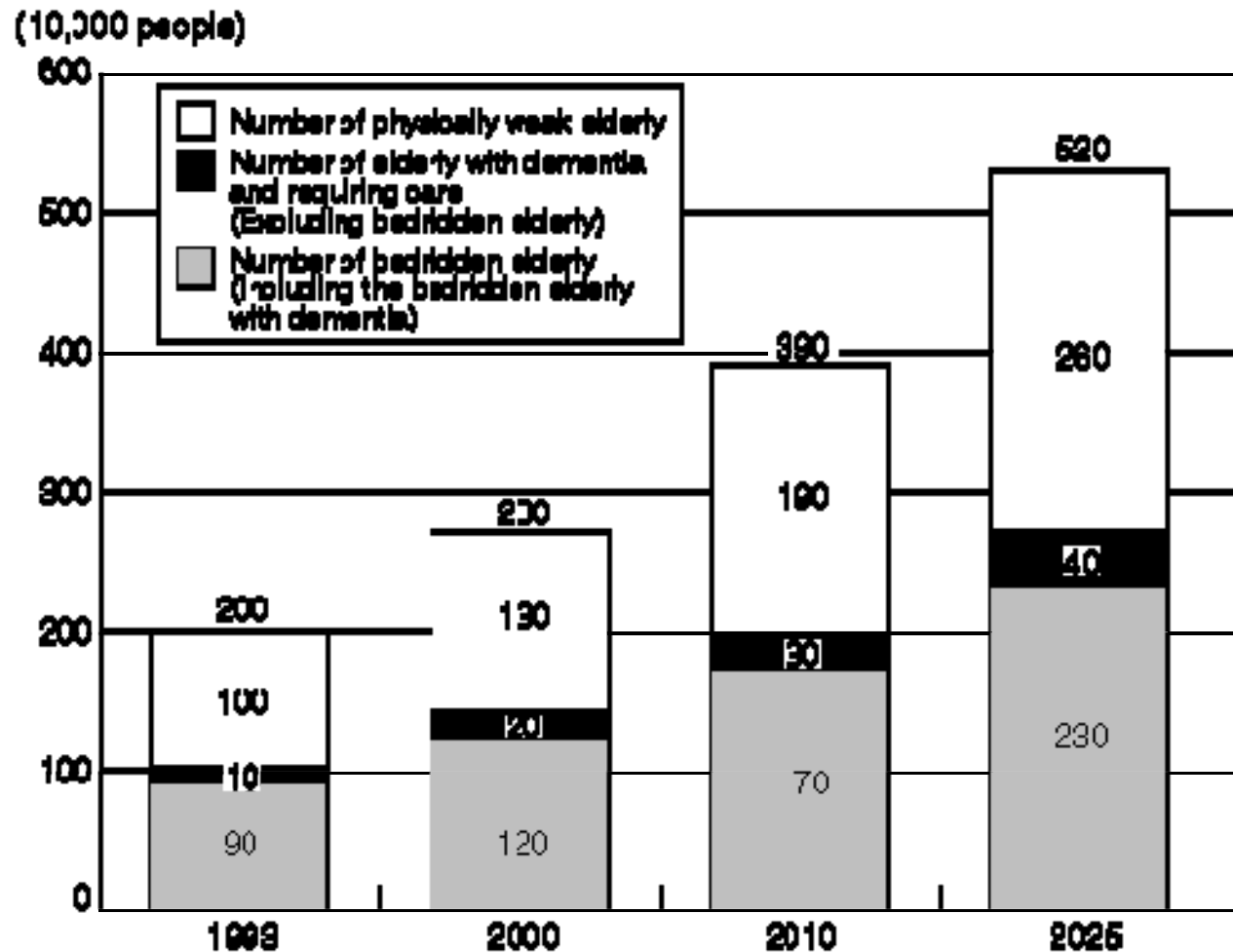
Obesity • Tobacco and Alcohol • Pollution • Hypertension • Rapid Weight Gain/Loss • Hyperglycemia • Hip Fracture • Stroke • CHF • COPD • Incontinence • Confusion • Caregiver Burnout • ADL/IADL Decline

← Interrelated needs require ongoing, coordinated care interventions →

Aging and disabilities

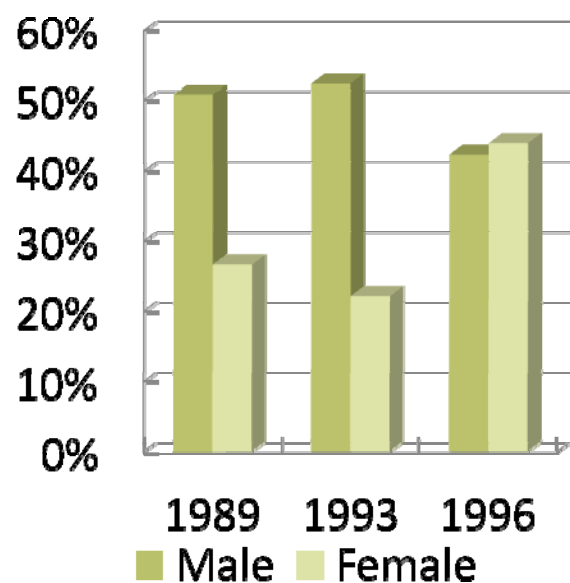
| | 認知 only(%) | IADL only(%) | 1-3ADL(%) | 4-6ADL(%) | 合計 |
|--------|---------------|-----------------|-----------|-----------|-------|
| 50-64歲 | 0.03 | 0.64 | 0.36 | 0.71 | 1.74 |
| 65-74歲 | 0.12 | 1.65 | 1.40 | 2.87 | 6.04 |
| 75-84歲 | 0.44 | 3.85 | 2.39 | 5.80 | 12.48 |
| 85歲以上 | 0.65 | 6.29 | 9.54 | 19.74 | 36.22 |
| 合計 | 0.15 | 1.70 | 1.36 | 2.93 | 6.14 |

Aging and function



Source: MHW Projection

Independent living of older people

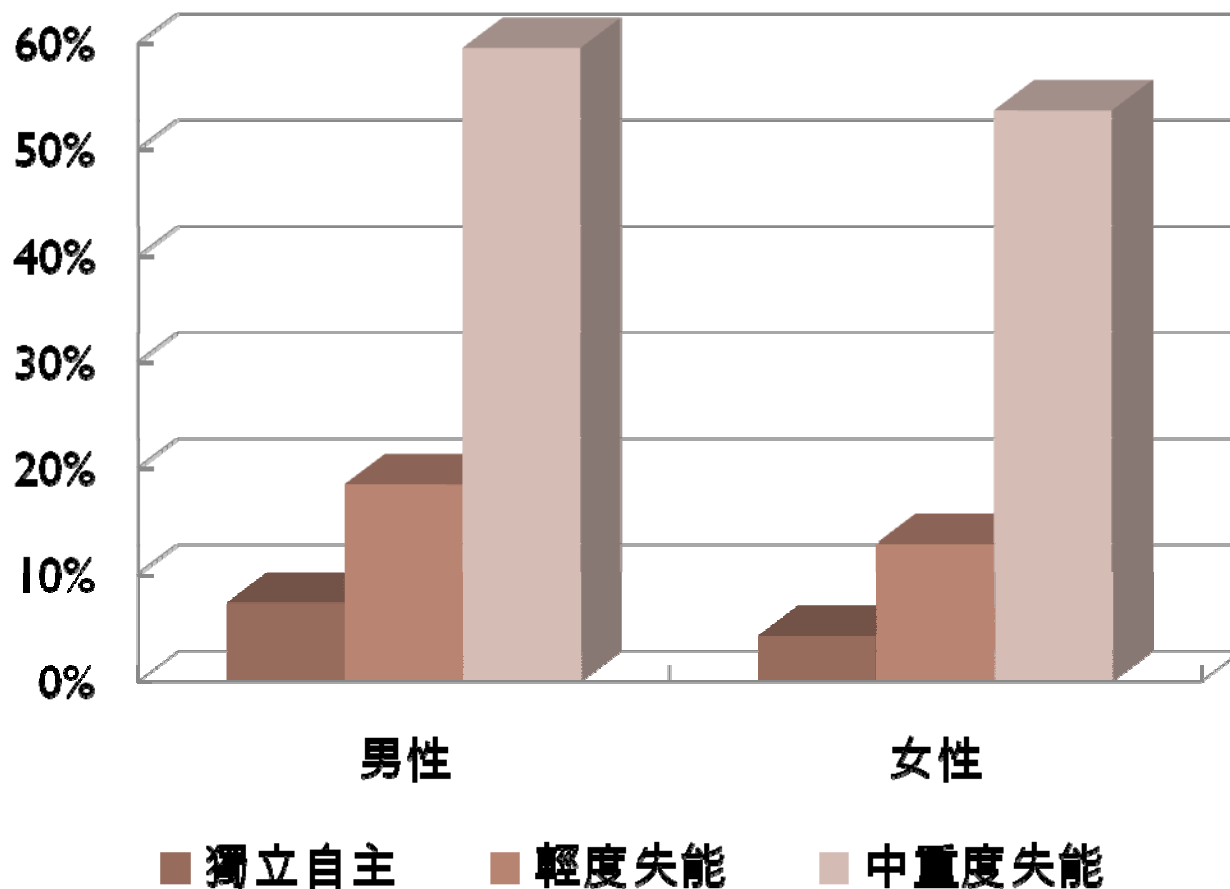


單位：%

| 自評健康 功能狀態 | 男性 | | | | 女性 | | | |
|--------------|------|------|------|-------|------|------|------|-------|
| | 好 | 普通 | 不好 | 合計(人) | 好 | 普通 | 不好 | 合計(人) |
| 1989年 | 46.4 | 36.5 | 17.1 | 2222 | 29.6 | 40.4 | 30.0 | 1660 |
| 獨力自主 | 64.8 | 30.2 | 5.0 | 1129 | 51.1 | 41.0 | 7.9 | 442 |
| 輕度失能 | 28.8 | 44.9 | 26.3 | 1019 | 22.9 | 41.9 | 35.2 | 1129 |
| 中度失能 | 8.1 | 17.6 | 74.3 | 74 | 7.9 | 19.1 | 73.0 | 89 |
| 1993年 | 50.5 | 32.6 | 16.9 | 1634 | 33.7 | 38.9 | 27.5 | 1223 |
| 獨力自主 | 67.9 | 27.0 | 5.1 | 856 | 57.0 | 33.3 | 9.6 | 270 |
| 輕度失能 | 32.3 | 39.3 | 28.3 | 745 | 28.0 | 41.0 | 31.0 | 913 |
| 中度失能 | 8.8 | 26.5 | 64.7 | 34 | 5.0 | 27.5 | 67.5 | 40 |
| 重度失能 | 8.6 | 14.3 | 77.1 | 63 | 2.4 | 9.5 | 88.1 | 42 |
| 1996年 | 32.7 | 35.6 | 31.7 | 1293 | 32.8 | 35.2 | 32.1 | 1022 |
| 獨力自主 | 50.1 | 35.6 | 14.3 | 547 | 49.7 | 35.6 | 14.7 | 449 |
| 輕度失能 | 20.6 | 36.1 | 43.4 | 715 | 19.9 | 35.6 | 44.4 | 547 |
| 中度失能 | 6.7 | 23.3 | 70.0 | 30 | 11.1 | 18.5 | 70.4 | 27 |
| 重度失能 | 9.5 | 7.9 | 82.5 | 63 | 2.4 | 12.2 | 85.4 | 41 |

資料來源：「台灣地區老人保健與生活問題」調查，1989、1993、及 1996。衛生署國健局。

Disability and mortality



失能壓縮

陽明大學衛生福利研究所藍忠孚教授所提出

失能擴大

過去因慢性疾病而可能死亡的人現今可存活，因此擴大了慢性疾病與失能的影響

動態平衡

失能的狀況因醫療進步應不致於持續擴大，可維持動態的平衡



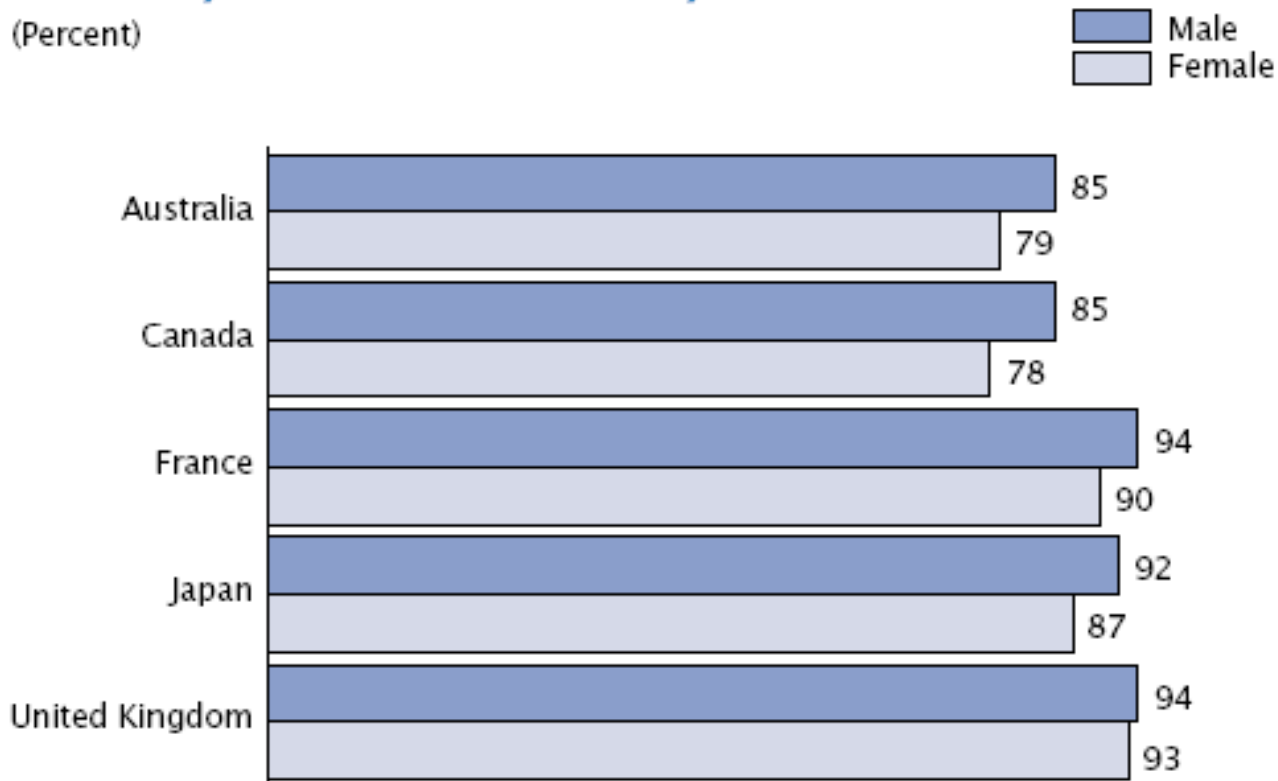
未來老年人慢性病與殘障率可經由個人或社會的力量進行改善

疾病壓縮

Older people without severe disability

Portion of Old Age Lived Without Severe Disability: Data From the Early 1990s

(Percent)



Population aging and health expenditure

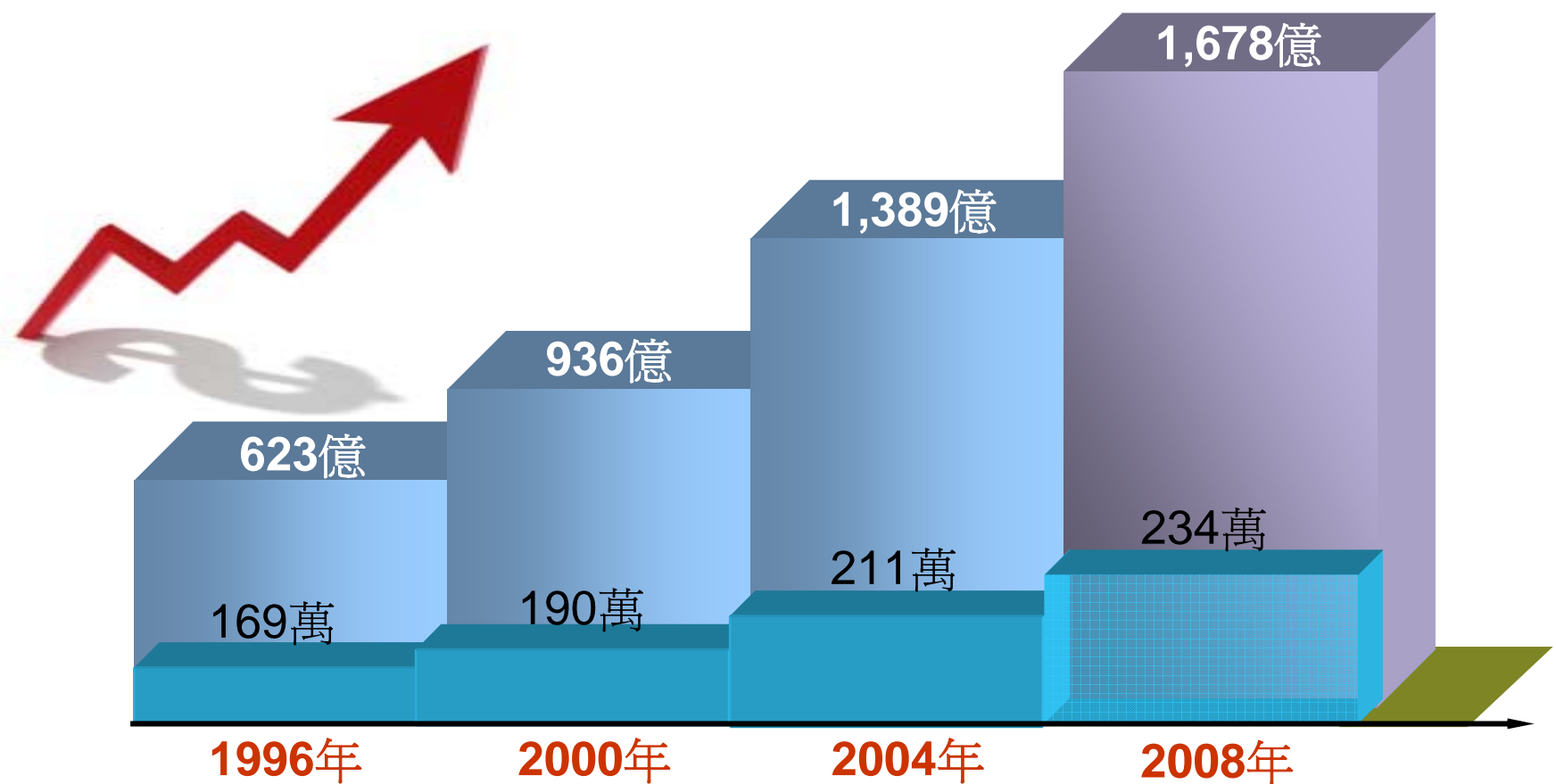
Relative Per Capita Health Expenditure by Age Group in 12 Countries: Circa 1993

(0-64 = 1.0)

| Country | 65-74 | 65+ | 75+ |
|-----------------------------|------------------|------------------|------------------|
| Australia | 2.8 | 4.0 | 6.0 |
| Finland | 2.8 | 4.0 | 5.5 |
| France | ¹ 2.2 | ² 3.0 | ³ 3.7 |
| Germany | 2.3 | 2.7 | 3.2 |
| Japan | ⁴ 3.1 | 4.8 | ³ 5.7 |
| Netherlands | (NA) | 4.4 | (NA) |
| New Zealand | 2.3 | 3.9 | 6.2 |
| Portugal | 1.4 | 1.7 | 2.1 |
| Sweden | 2.3 | 2.8 | 3.4 |
| Switzerland | 2.6 | 4.0 | 5.7 |
| United Kingdom (England) .. | 2.5 | 3.9 | 5.6 |
| United States | 3.1 | 4.2 | 5.2 |

Source: OECD, 1994

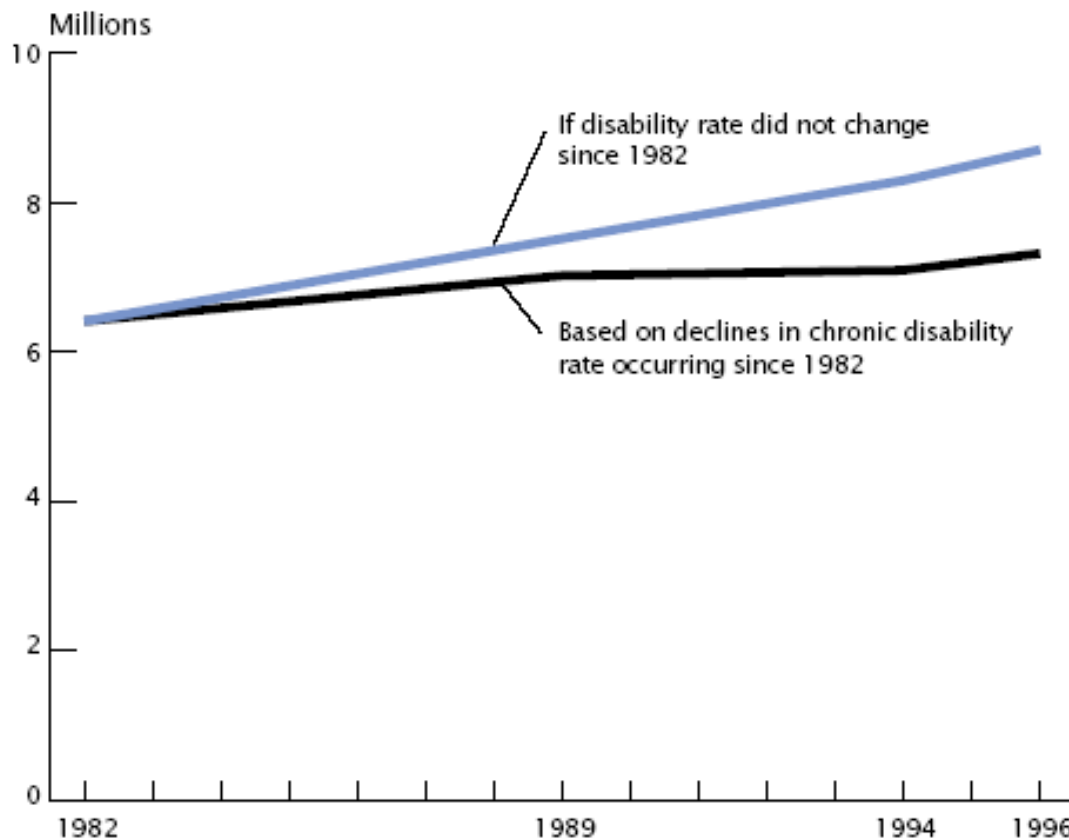
Population and health expenditure



老年人口數增加38%，費用成長169%

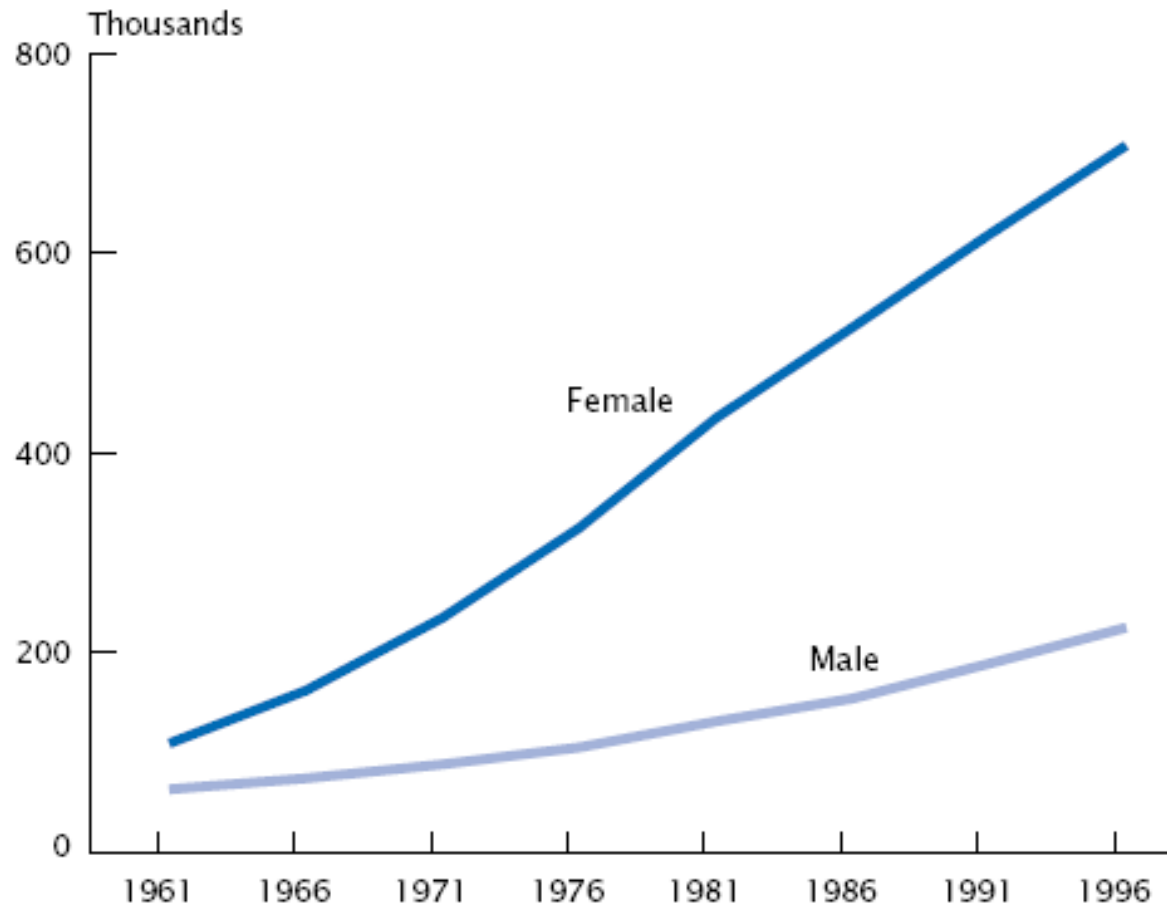
Disability is preventable

Number of Chronically Disabled People Aged 65 and Over in the United States: 1982 to 1996



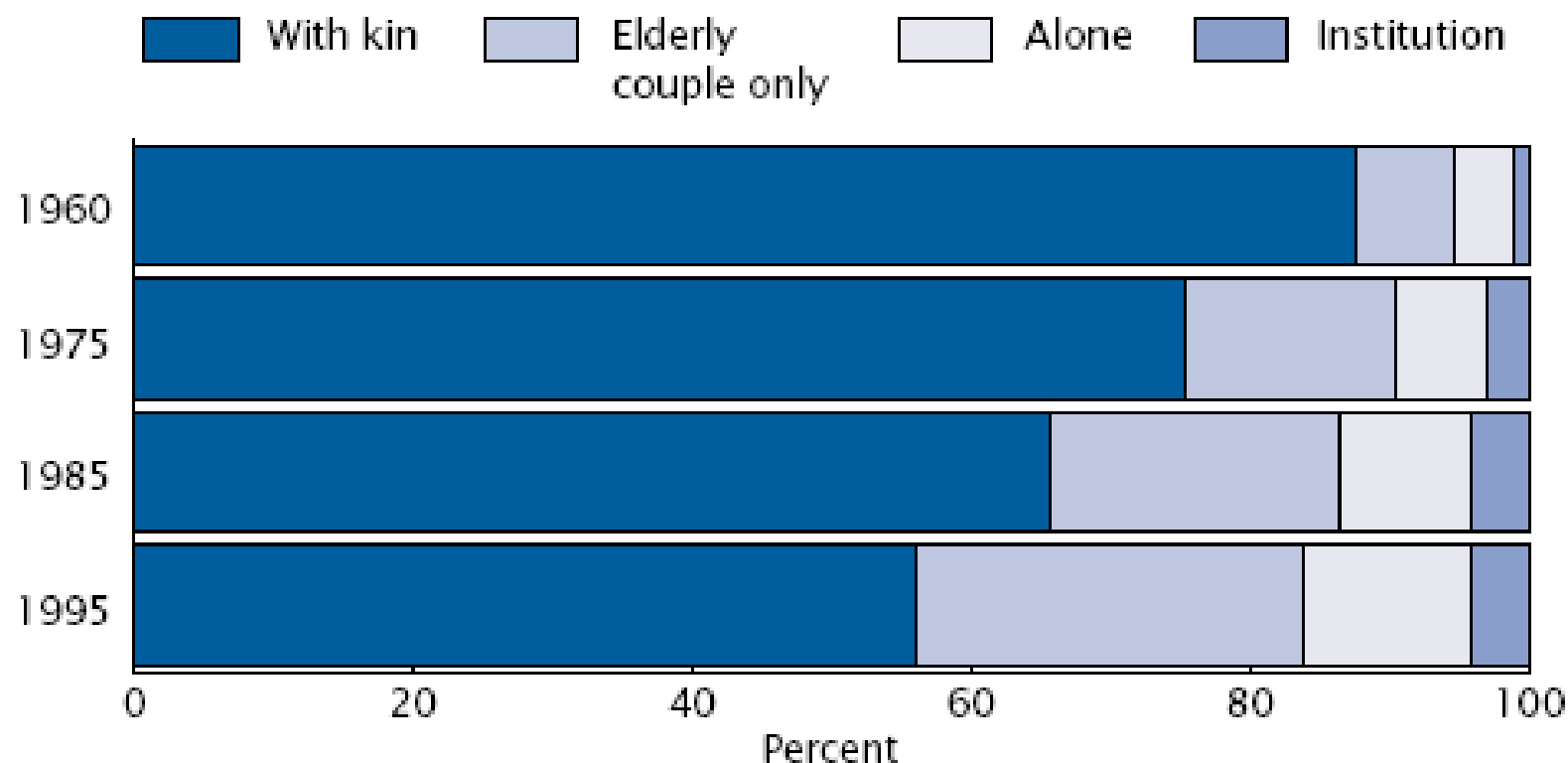
Solitary living elderly

Elderly Living Alone in Canada: 1961 to 1996



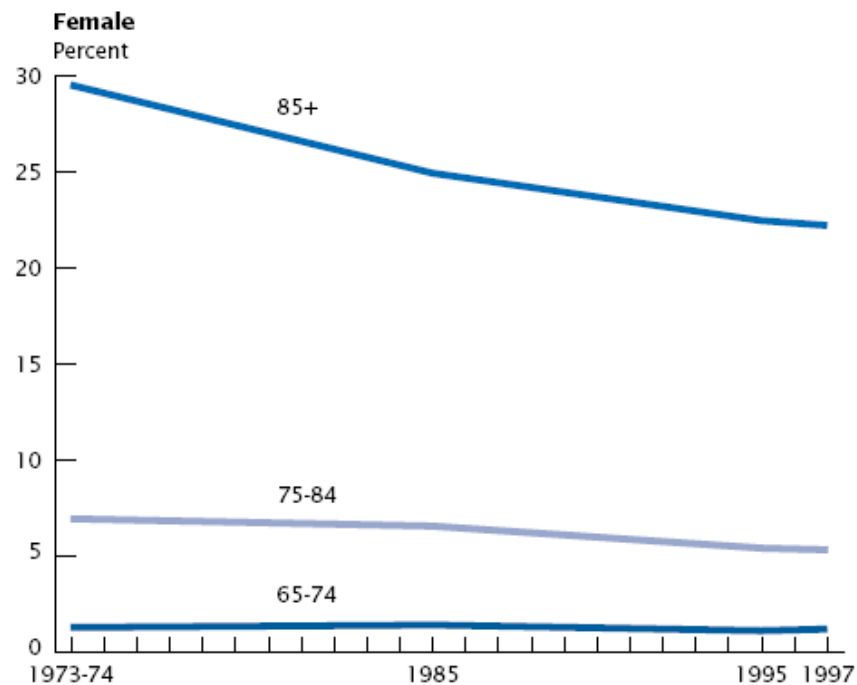
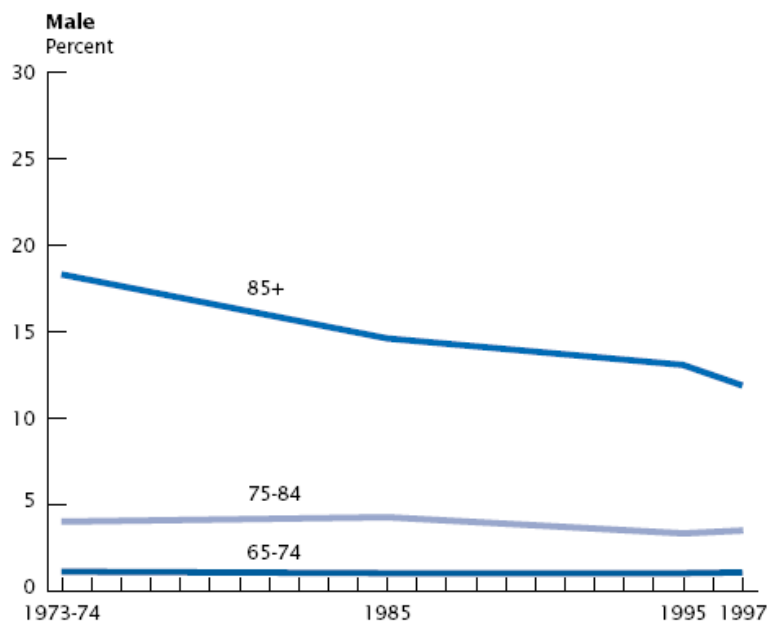
Living arrangement of older Japanese

Living Arrangements of Japanese Elderly: 1960 to 1995



Nursing home admission

**Percent of U.S. Elderly in Nursing Homes by Age:
1973-74, 1985, 1995, and 1997**



Evidenced-based Preventive Care Recommendations Overview

- ▶ Recommended preventive services (based on USPSTF and American Geriatric Society assessments).
- ▶ Other potentially beneficial services
- ▶ Screenings and tests not indicated for the elderly.
- ▶ Strategies for the effective delivery of preventive services for the elderly.



What the USPSTF Grades Mean and Suggestions for Practice

| Grade | Grade Definitions | Suggestions for Practice |
|-------|---|--|
| A | <ul style="list-style-type: none">■ USPSTF recommends the service■ High certainty that the net benefit is substantial | Offer or provide this service |
| B | <ul style="list-style-type: none">■ USPSTF recommends the service■ High certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial | Offer or provide this service |
| C | <ul style="list-style-type: none">■ USPSTF recommends against routinely providing the service■ Considerations may support providing the service in an individual patient■ There is moderate or high certainty that the net benefit is small | Offer or provide this service only if other considerations support offering/providing the service in an individual patient |



What the USPSTF Grades Mean and Suggestions for Practice

| Grade | Grade Definitions | Suggestions for Practice |
|----------------|---|--|
| D | USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits. | Discourage the use of this service. |
| I Statement | USPSTF concludes that current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality or conflicting, and the balance of benefits and harms cannot be determined. | Read "Clinical Considerations" section recommendation statement. Patients should understand the uncertainty about the balance of benefits and harms. |



All older adults should be screened for

- ▶ Hypertension and dyslipidemia.
- ▶ Obesity and malnutrition.
- ▶ Alcoholism.
- ▶ Breast, colorectal, and cervical cancers.
- ▶ Vision and hearing deficits.
- ▶ Smoking Cessation and Dental Care.
- ▶ Immunization Status.
- ▶ AAA in male smokers age 65-75.
- ▶ Injury Prevention/Osteoporosis.



Hypertension

- ▶ Prevalence increases with age.
- ▶ Treatment decreases mortality and morbidity from LVH, CHF, MI, & CVA.
- ▶ Strong evidence for treating SBP >160 mmHg
- ▶ Uncertain evidence > age 80.
- ▶ Action: check BP at least annually. (USPSTF 'A' Rating)



Dyslipidemia

- ▶ USPSTF strongly recommends screening and treating abnormal lipids for men > age 35 and women > age 45. ('A' Rating).
- ▶ Screen and treat older adults with CAD annually: LDL >130, HDL<35, TG>200. Strong benefit established.
- ▶ Target to LDL<100, HDL>40, TG<200.
- ▶ No evidence of benefit for elder lipid screening if no CAD and few CVS risk factors.



Obesity and Malnutrition (Diet Counseling)

- ▶ Measure weight/height routinely and calculate BMI.
 - ▶ Rule out obesity: $\text{BMI} > 27.8 \text{ kg/m}^2$ in men and 27.3 kg/m^2 in women.
 - ▶ Rule out malnutrition: 'unintended weight loss > 10 lbs in 6 months.
- ▶ Recommend intake appropriate for patient's BMI and health status.
- ▶ Encourage consumption of a balanced diet high in fruits & vegetables, low in fats, with adequate calcium and Vitamin D intake.



Alcoholism

- ▶ Older adults are more susceptible to effects of alcohol.
- ▶ Screen all adults at least once or whenever a problem is suspected.
- ▶ Use the CAGE (validated):
 - ▶ C = cut down
 - ▶ A = annoyed
 - ▶ G = guilt
 - ▶ E = eye opener.



Breast Cancer

- ▶ Breast cancer prevalence increases with age. Mammography well validated in the elderly. Strong evidence of benefit.
- ▶ Unclear if and at what age mammogram screening should stop:
 - ▶ USPSTF (age 70)
 - ▶ ACP (age 74)
 - ▶ AGS (age 85)
 - ▶ Likely to be beneficial as long as life expectancy 5-10 years.
- ▶ Medicare covers annual screening.
- ▶ No compelling evidence that self exam impacts morbidity or mortality.



Colorectal Cancer

- ▶ USPSTF now gives 'A' Rating to colorectal cancer screening.
 - ▶ Yearly FOBT, FFS q 5 yrs, or colonoscopy q 10 yrs ranked as 'equivalent'.
 - ▶ All are covered by Medicare.
 - ▶ Clear evidence of benefit.
- ▶ One time colonoscopy may be more cost effective and have more significant impact than other screens.
- ▶ Risk/benefit, provider/patient decision.



Cervical Cancer

- ▶ 40% of new cases & deaths in women > 65.
- ▶ Most cost-effective for women with incomplete screening previously.
- ▶ Cut-off age remains controversial.
- ▶ Action: PAP q 1-3 yr if patient is sexually active and has cervix. Stop after age 65 if h/o normal smears or after 2 normal smears 1 year apart.
- ▶ Medicare covers PAP/pelvic every 2 years.



Vision and hearing deficits

- ▶ Use Snellen Chart routinely to detect uncorrected refractive errors, glaucoma, cataracts, and macular degeneration.
 - ▶ Reduce fall risk.
 - ▶ Decrease isolation.
 - ▶ Increase intellectual stimulation.
- ▶ Question routinely to detect hearing loss and provide information about hearing aides. Decrease social isolation.



Smoking Cessation and Dental Care

- ▶ Discuss tobacco cessation at each visit in elder smokers. Emphasize that cessation at any age decreases rates of COPD, CAD, and many cancers.
- ▶ Emphasize the relation of dental health to problems with malnutrition, xerostomia, and oral cancers. Regular dental visits are effective and should be encouraged.



Update Immunizations

- ▶ Influenza: annually for all >65. Highly effective with a 70% risk reduction for illness and 90% risk reduction for mortality. Use chemoprophylaxis when indicated.
- ▶ Pneumovax: All >65. At least once. Re-vaccinate high risk q 7-10 yr, or if initial < age 65 in 5 yr. Strong evidence for risk reduction of bacteremia. Cost-effective for immune-competent elders.
- ▶ Tetanus: Booster q 10 years. 60% of infections occur in persons > age 60.



Abdominal Aortic Aneurysm

- ▶ The USPSTF recommends one-time screening for AAA by ultrasound in men age 65-75 who have ever smoked ('B' Rating).
- ▶ No recommendation for AAA screening for men age 65-75 who have never smoked.
- ▶ Discouraged screening for AAA screening for women.



Injury Prevention

- ▶ Balance (Tai Chi) and strengthening (quad sets) exercises to prevent falls.
- ◆ Osteoporosis screening and prevention. USPSTF recommends BMD at age 65 for normal risk women, earlier for higher risk women. Advise calcium/vitamin D intake and weight bearing exercise.
- ◆ Encourage multiple measures to reduce risks for falls and other mishaps, environmental hazards:
 - driving (seat belts, driving tests)
 - alcohol avoidance
 - polypharmacy reviews
 - home hazard review (fall avoidance, smoke detectors, water temperature).



Thank You

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