Secondary Prevention

Screening for Hypertension

Christian Viquerat, M.D.
Geneva

- The decline in cardiovascular diseases is by far the most remarkable achievement of medicine in the last half of the Twentieth Century.

- The treatment of hypertension is the only known medical intervention to have left a clear imprint on mortality trends.

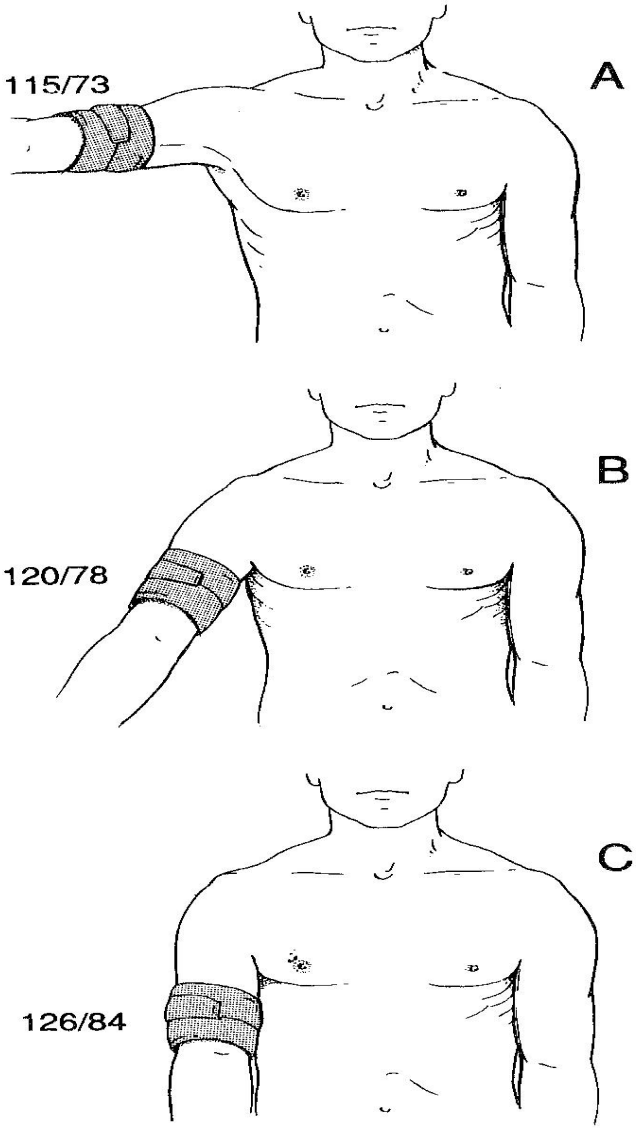


Fig. 3. The effects of varying arm position on blood pressure recorded from the brachial artery. *From* Pickering TG. Blood pressure variability and ambulatory monitoring. Curr Opin Nephrol Hypertens 1993a;2:380; with permission.

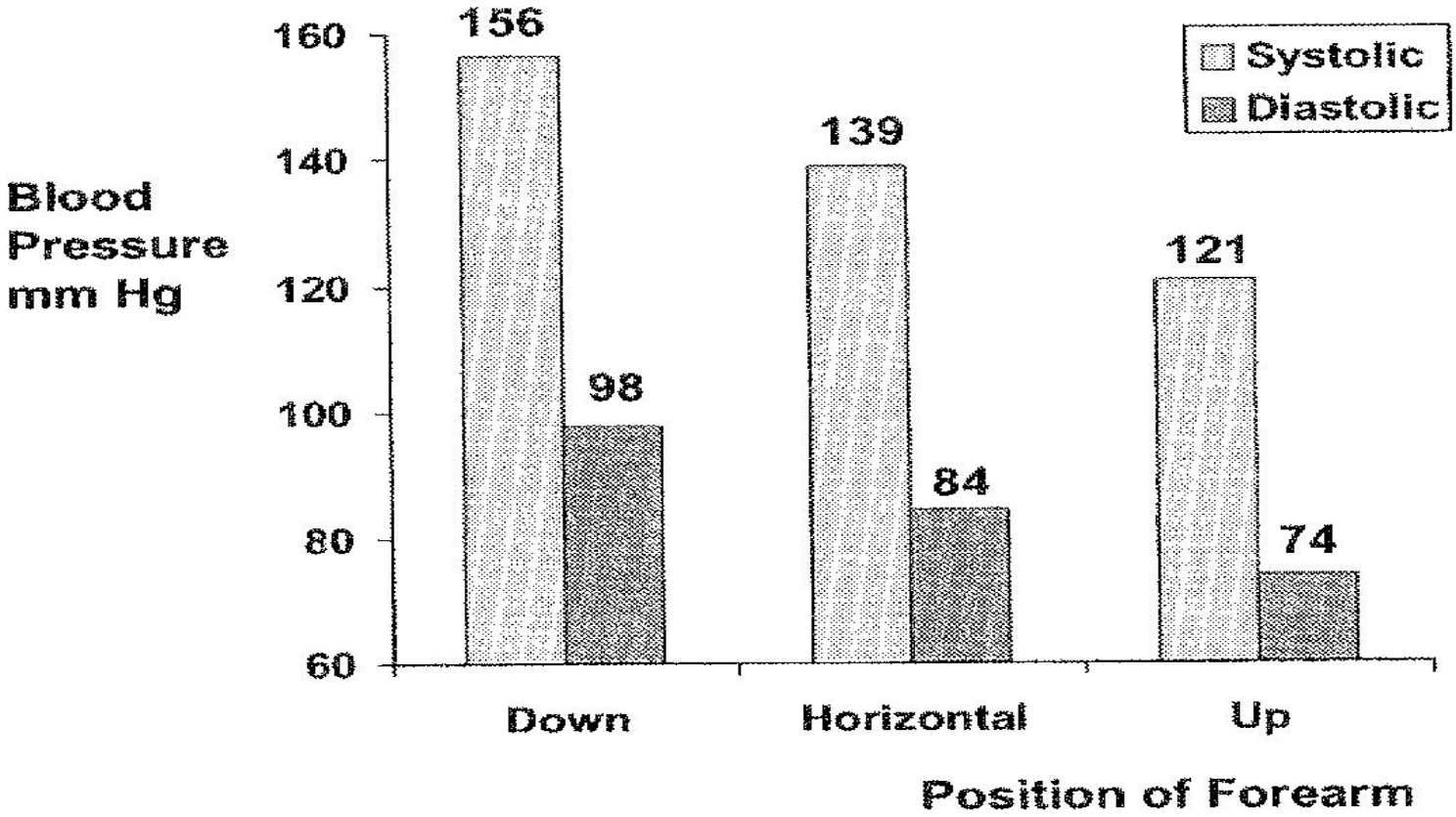


Fig. 6. The effects of changes in the position of the forearm on the blood pressure recorded by a wrist monitor. Ten readings were taken in each of three positions: vertically down, horizontal, and vertically up. The average values are shown at the top of each bar.

- Worldwide
  - Hypertension affects an estimated 690 million persons, primarily adults
  - An estimated 5-6% of total deaths are attributable to hypertension.
    - *Lancet 1997; 349; 1436*

Prevalence of Hypertension in China

- 1960 : 30 million
- 1980: 59 million
- 1990 : 94 million

- *Hypertension, 2002; 40;920*

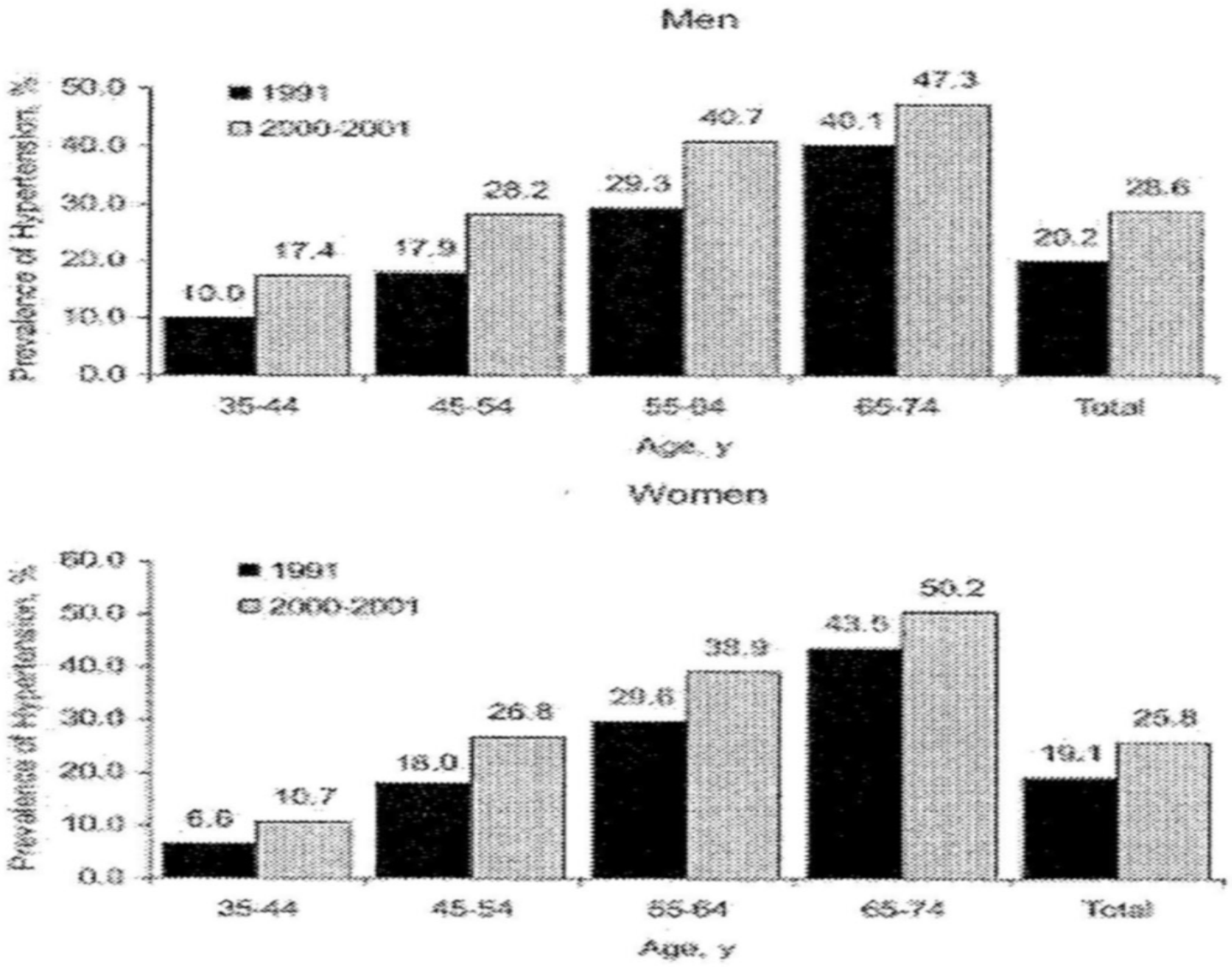


Figure 1. Prevalence of hypertension among Chinese, ages 35 to 74 years, in the 1991 Chinese National Hypertension Survey[12] and 2000–2001 InterASIA.

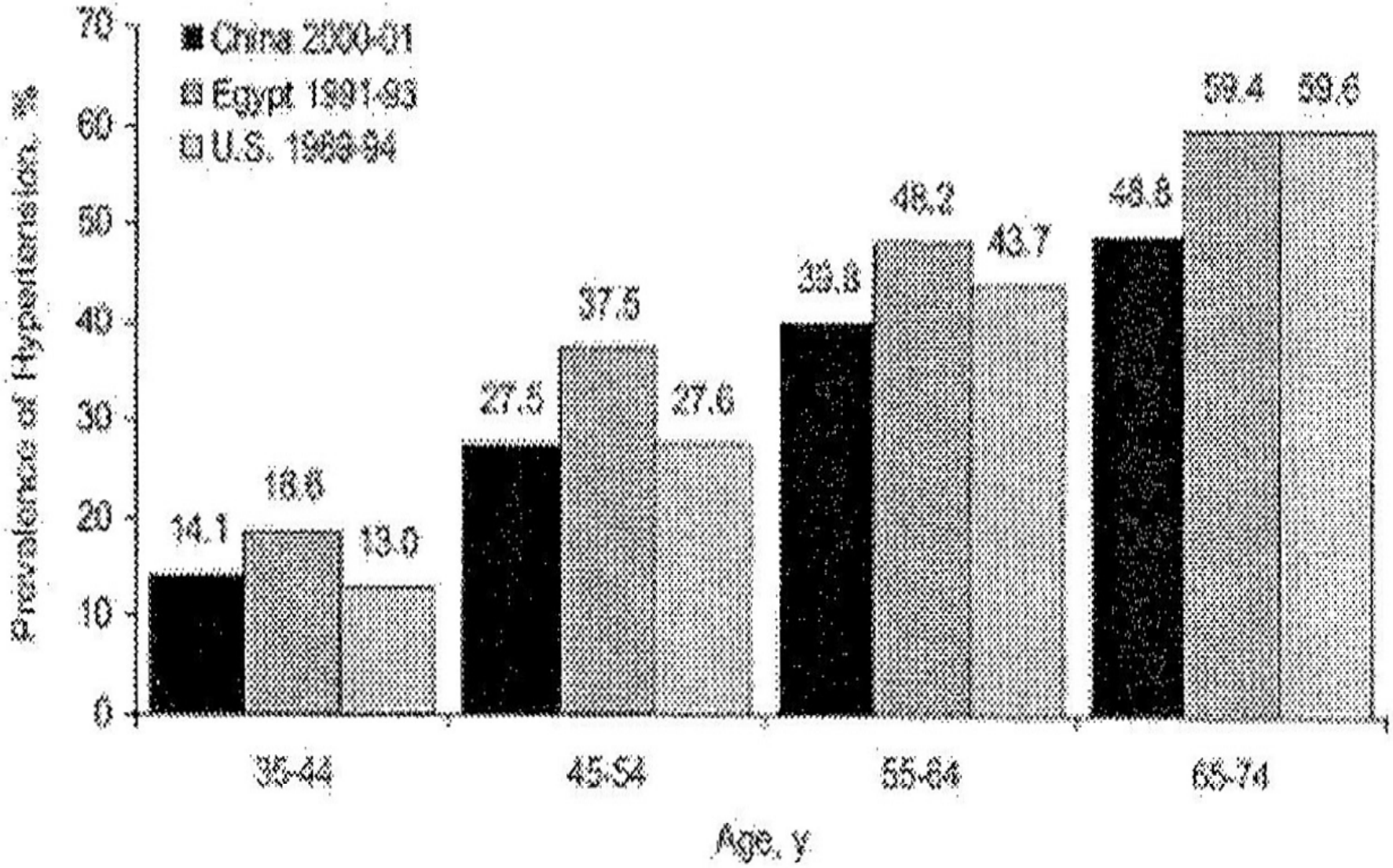
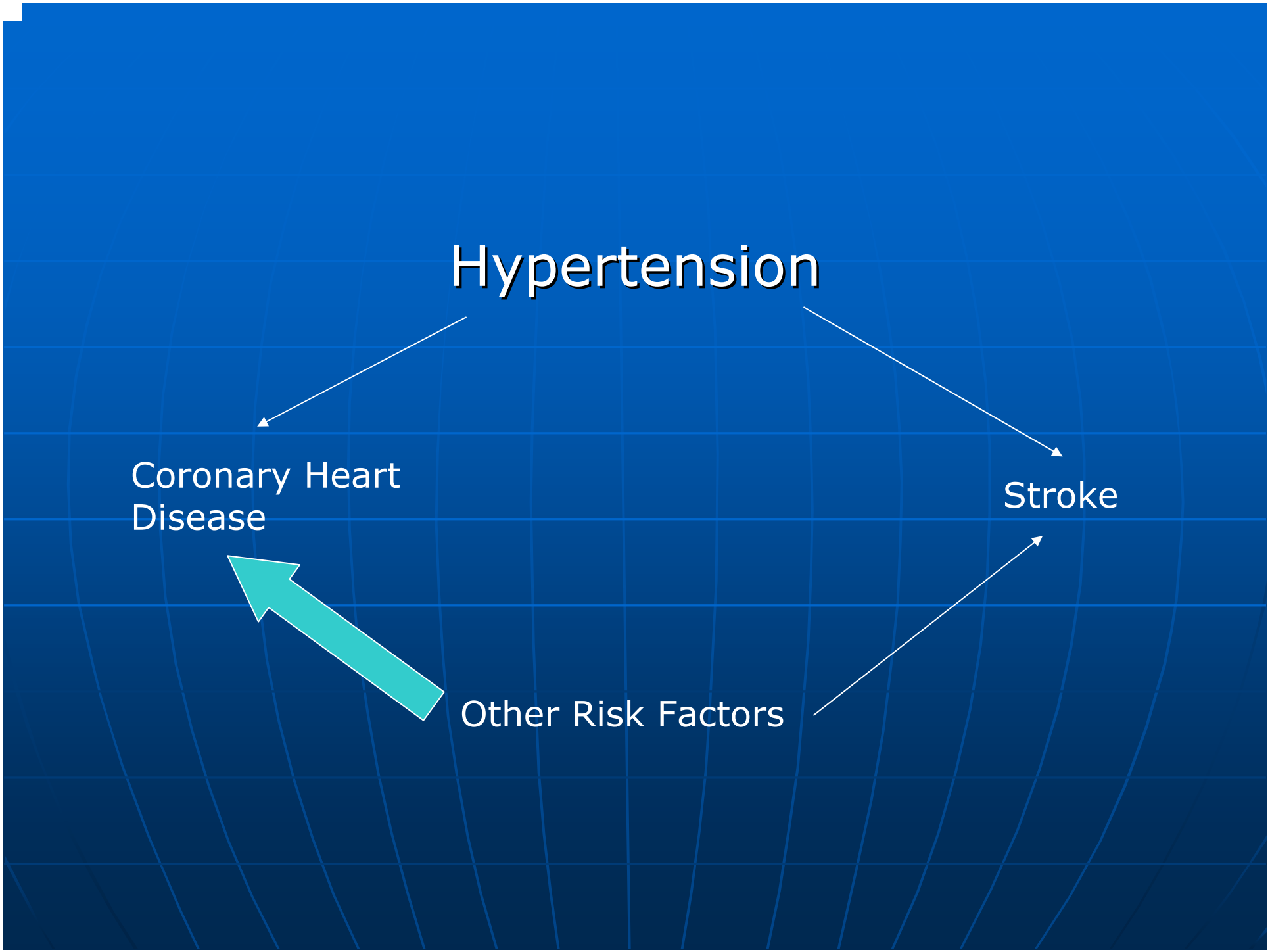
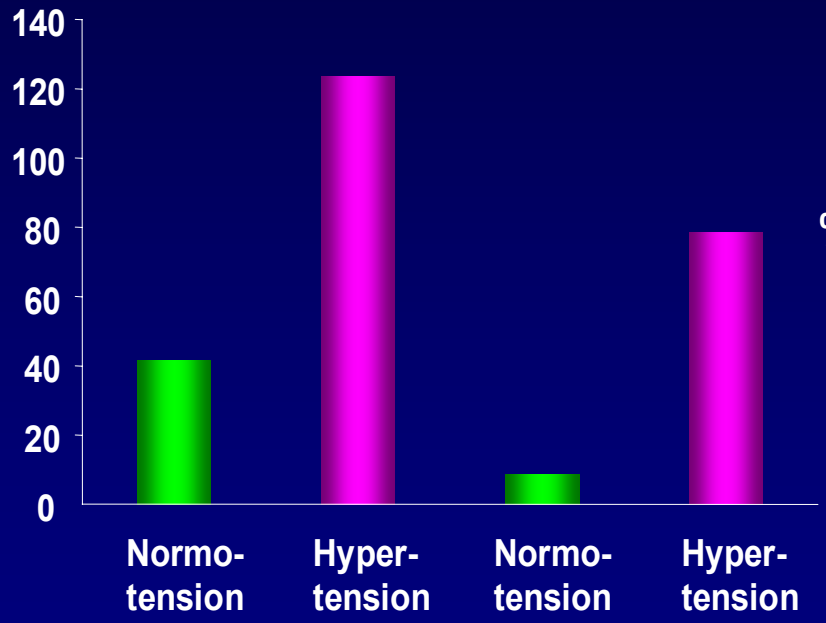


Figure 2. Prevalence of hypertension among 3 populations.


Hypertension
Coronary Heart Disease
Stroke
Other Risk Factors

Key Historic Milestones

Hypertension: Increased mortality and morbidity

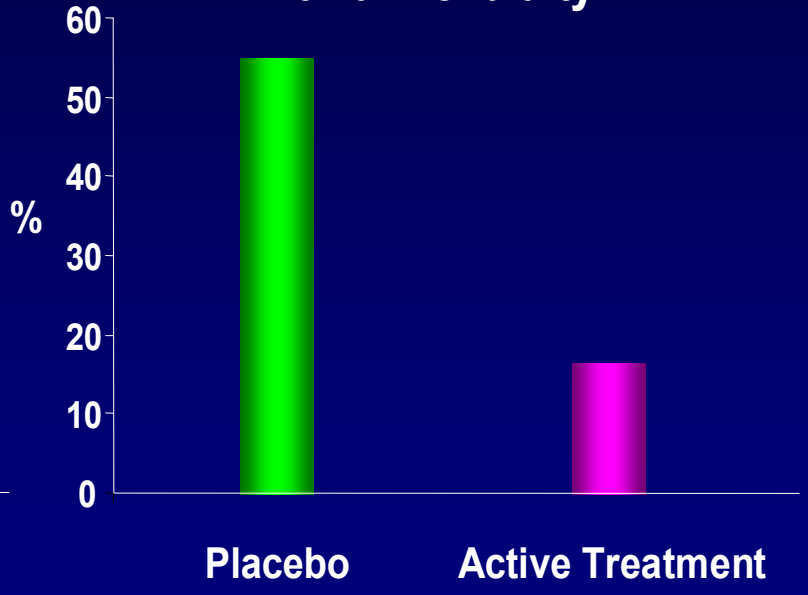


CHD incidence rate/1000

The Framingham Study

Ann Intern Med 1961;55:33-50

Treatment of hypertension: Significant reduction of mortality and morbidity



Cumulative incidence of all fatal and non/fatal endpoints

Veterans Administration Study II

JAMA 1970;213:1143-52

Good News

- In the majority of patients, hypertension can be easily diagnosed and readily controlled.
- The reduction of diastolic and/or systolic blood pressure levels is associated with really significant reductions in morbidity and mortality from:
  - heart disease
  - stroke
  - death from all causes

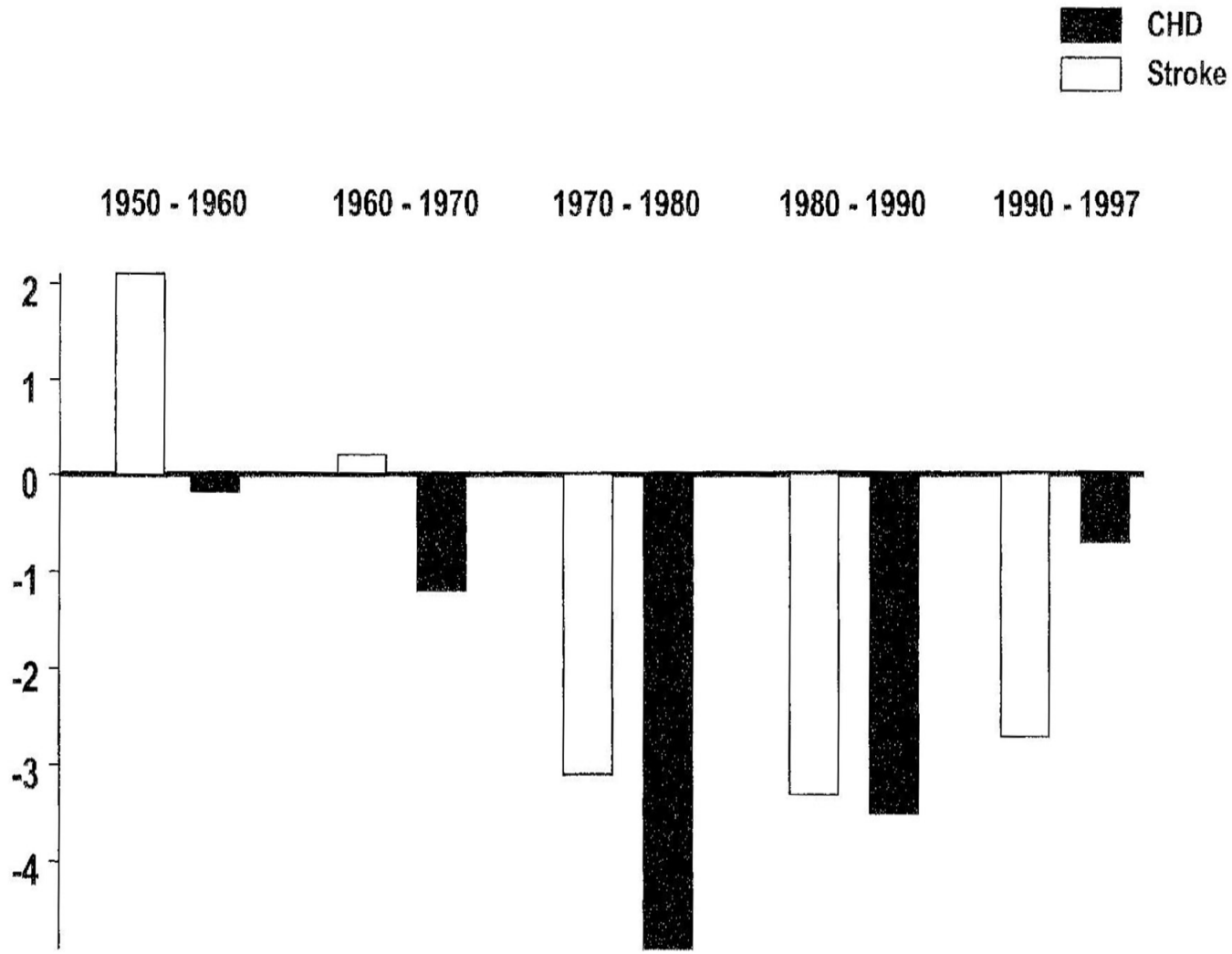


Fig. 1. Annual percent change in death rates for CHD and stroke in the United States by decade from 1950 to 1997.

Bad News

- Most hypertensives worldwide remain uncontrolled.
- Rate of decline in the age-adjusted death rate from stroke and coronary heart disease have slowed substantially.
- No significant improvement in recent years in hypertension awareness, treatment or control rates.

• *Archives of Internal Medicine 1997; 157; 2413*

Trends in the Awareness, Treatment, and Control of High Blood Pressure in Adults: United States, 1976-94*

	NHANES II (1976-80)	NHANES III (Phase 1) 1988-91	NHANES III (Phase 2) 1991-94
Awareness	51%	73%	68.4%
Treatment	31%	55%	53.6%
Control†	10%	29%	27.4%

* Data are for adults age 18 to 74 years with SBP of 140 mm Hg or greater, DBP of 90 mm Hg or greater, or taking antihypertensive medication.

† SBP below 140 mm Hg and DBP below 90 mm Hg.

Source: Burt V et al.[1] and unpublished NHANES III, phase 2, data provided by the Centers for Disease Control and Prevention, National Center for Health Statistics.[2]

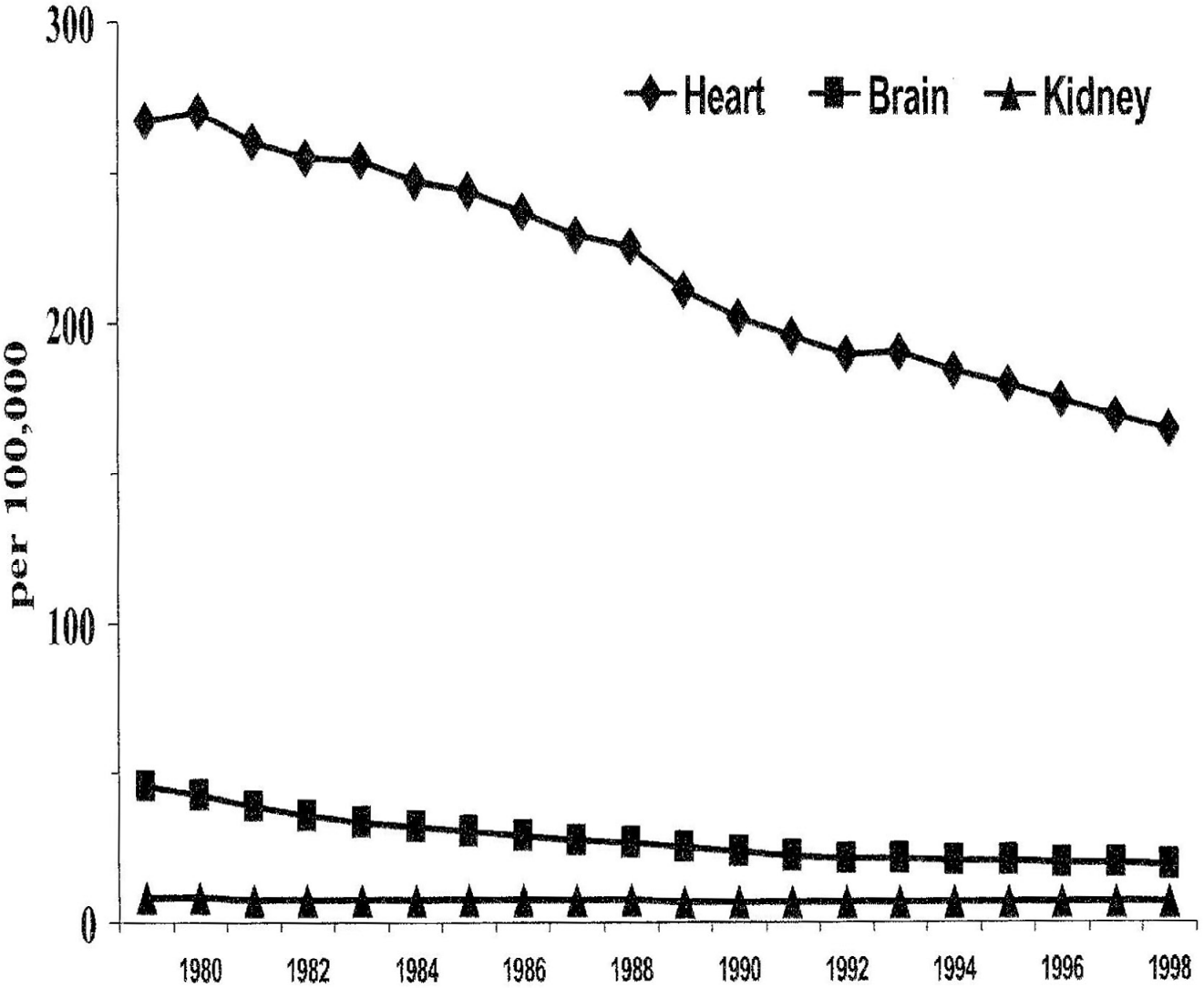
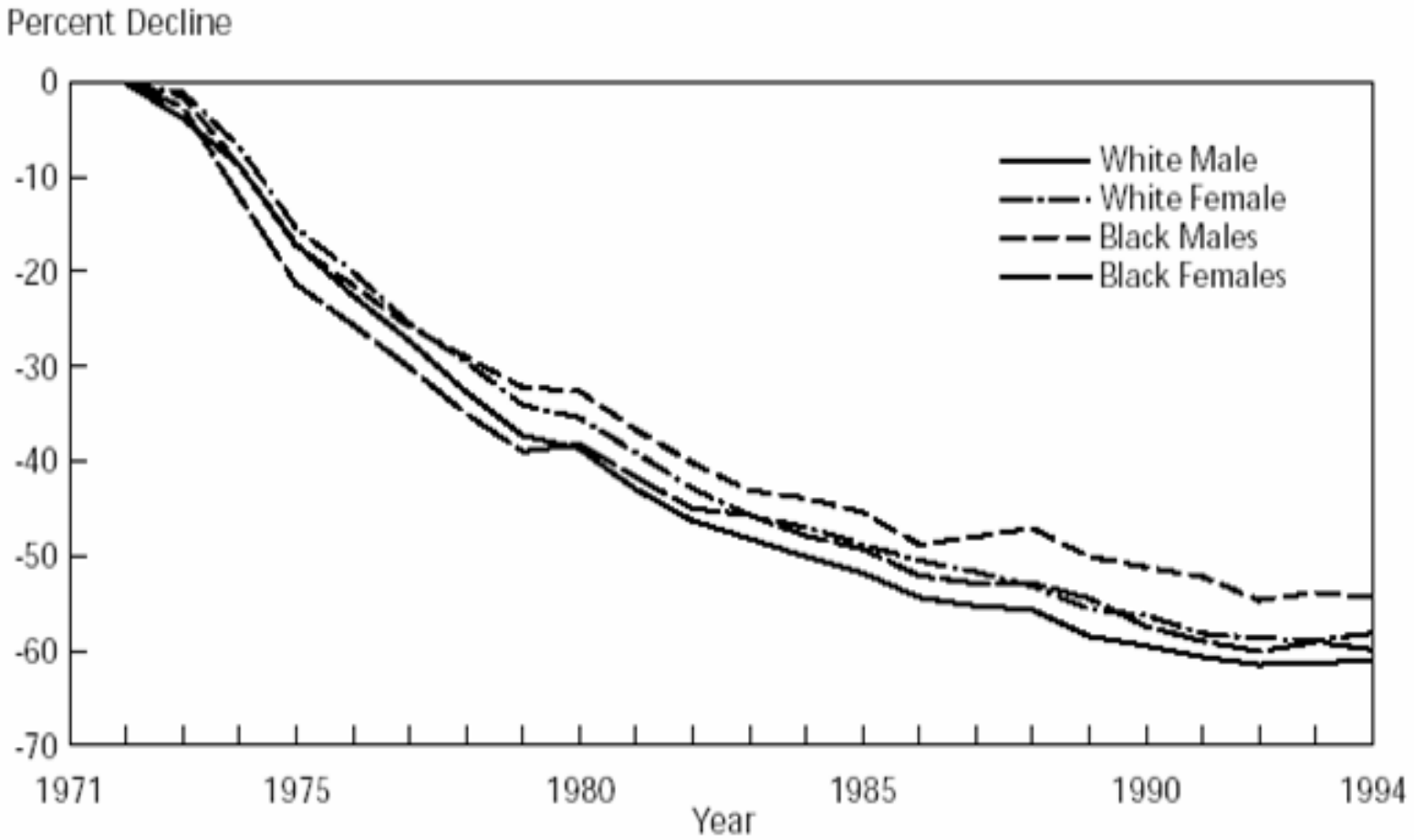


Fig. 1. Age-adjusted death rates for diseases in hypertension-related target organs: United States, 1979–1998. Heart (ICD-9 402, 404, 410–413, 427–428, 429.2–429.3, 440–443.9); brain (ICD-9 430–435, 437.0–437.3); kidney (ICD-9 403, 404, 583–585). (*From* US Vital Statistics; age-adjusted to 2000 population.)

Percent Decline in Age-Adjusted Mortality Rates for Stroke by Sex and Race: United States, 1972-94



Source: Prepared by the NHLBI using data from *Vital Statistics of the United States*, National Center for Health Statistics. Age-adjusted to the 1940 U.S. census population. The decline in age-adjusted mortality from stroke in the total population is 59.0 percent.

Table 2. **Lifestyle Modifications to Prevent or Manage Hypertension.***

Modification	Comments
Maintain ideal body weight	Blood pressure reduced by 1.6/1.1 mm Hg for each 1 kg of weight loss
Engage in aerobic physical activity (30 to 45 minutes each day, most days of the week)	May reduce blood pressure as much as 13/8 mm Hg
Eat abundant fruits and vegetables and low-fat dairy products; reduce intake of saturated and total fats	May lower blood pressure by as much as 11.4/5.5 mm Hg after 8 weeks
Limit sodium intake to a maximum of 100 mmol per day (2.4 g of sodium or 6 g of sodium chloride)	May lower blood pressure by 3.7–4.8/0.9–2.5 mm Hg
Maintain adequate intake of dietary potassium (approximately 90 mmol per day)	
Maintain adequate intake of dietary calcium and magnesium	
Limit alcohol intake to a maximum of 30 ml (1 oz) per day (15 ml [0.5 oz] per day for women and people with low body weight)	
Stop smoking	

Table 1 Definitions and classification of blood pressure levels (mmHg)

Category	Systolic	Diastolic
Optimal	< 120	< 80
Normal	< 130	< 85
High-normal	130–139	85–89
Grade 1 hypertension (mild)	140–159	90–99
Subgroup: borderline	140–149	90–94
Grade 2 hypertension (moderate)	160–179	100–109
Grade 3 hypertension (severe)	⩾ 180	⩾ 110
Isolated systolic hypertension	⩾ 140	< 90
Subgroup: borderline	140–149	< 90

When a patient's systolic and diastolic blood pressures fall into different categories, the higher category should apply.

Factors Influencing Prognosis

Risk Factors for Cardiovascular Diseases

- Used for risk stratification

  - Levels of systolic and diastolic blood pressure (grades 1 - 3)
  - Men > 55 years
  - Women > 65 years
  - Smoking
  - Total cholesterol > 6.5 mmol/l (250 mg/dl)
  - Diabetes
  - Family history of premature cardiovascular disease

Risk Stratification

- Absolute Risk: Probability of an event over a specified period of time
- Relative Risk: Incidence of Exposed/Incidence of Unexposed
- Global Risk: How to incorporate absolute risk into the process of deciding when to treat an individual and with what degree of intensity

Table 3

Stratification of Risk to Quantify Prognosis

Other Risk Factors & Disease History	Blood Pressure (mmHg) Grade 1 (mild hypertension) SBP 140-159 or DBP 90-99	Grade 2 (moderate hypertension) SBP 160-179 or DBP 100-109	Grade 3 (severe hypertension) SBP ≥ 180 or DBP ≥ 110
I no other risk factors	LOW RISK	MED RISK	HIGH RISK
II 1-2 risk factors	MED RISK	MED RISK	V HIGH RISK
III 3 or more risk factors or TOD or diabetes	HIGH RISK	HIGH RISK	V HIGH RISK
IV ACC	V HIGH RISK	V HIGH RISK	V HIGH RISK

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- The decline in cardiovascular diseases is by far the most remarkable achievement of medicine in the last half of the Twentieth Century.