건강 질병 현상의 시간적/인적/지역적 특성에 따른 기술

김 동 현

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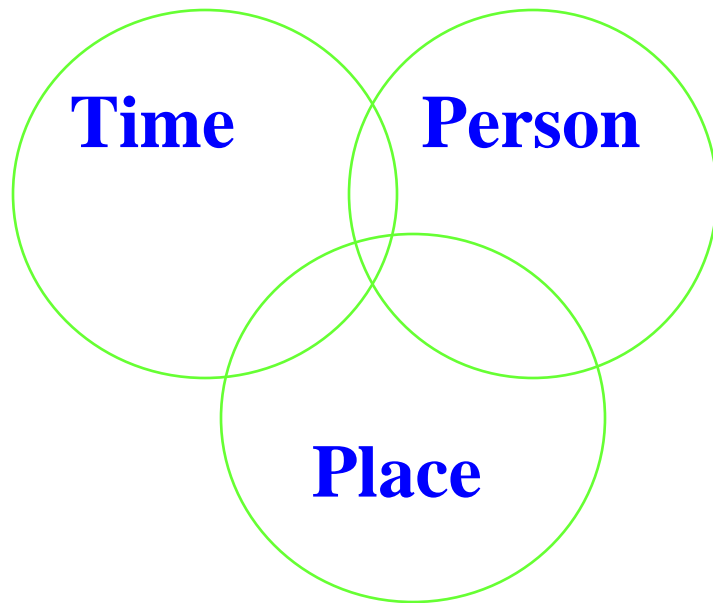
학 습 목 표

1. 기술역학에 이용되는 기본 변수를 크게 3가지로 구분하여 설명한다.

2. 인적, 시간적, 지역적 변수를 구성하는 주요 요인들을 학습한다.

3. 기본 변수들 상호간의 영향을 비교, 평가하는 연구 방안에 대해 이해한다.

4. 질병 발병에 있어 환경적 요인과 유전적 요인의 상대적 중요성을 비교
   평가하는 이민자 연구에 대해 이해한다.

기술 역학
Descriptive Epidemiology

Time **Person**

Place

→ 새로운 연구 가설 수립

질병 발병 수준의 변화

- 가짜 변화

  - 질병 발견 수준의 변화

  - 질병 분류기준의 변화

  - 질병보고체계 변화

  - 모집단(분모) 수 계산과정의 실수

- 실제 변화
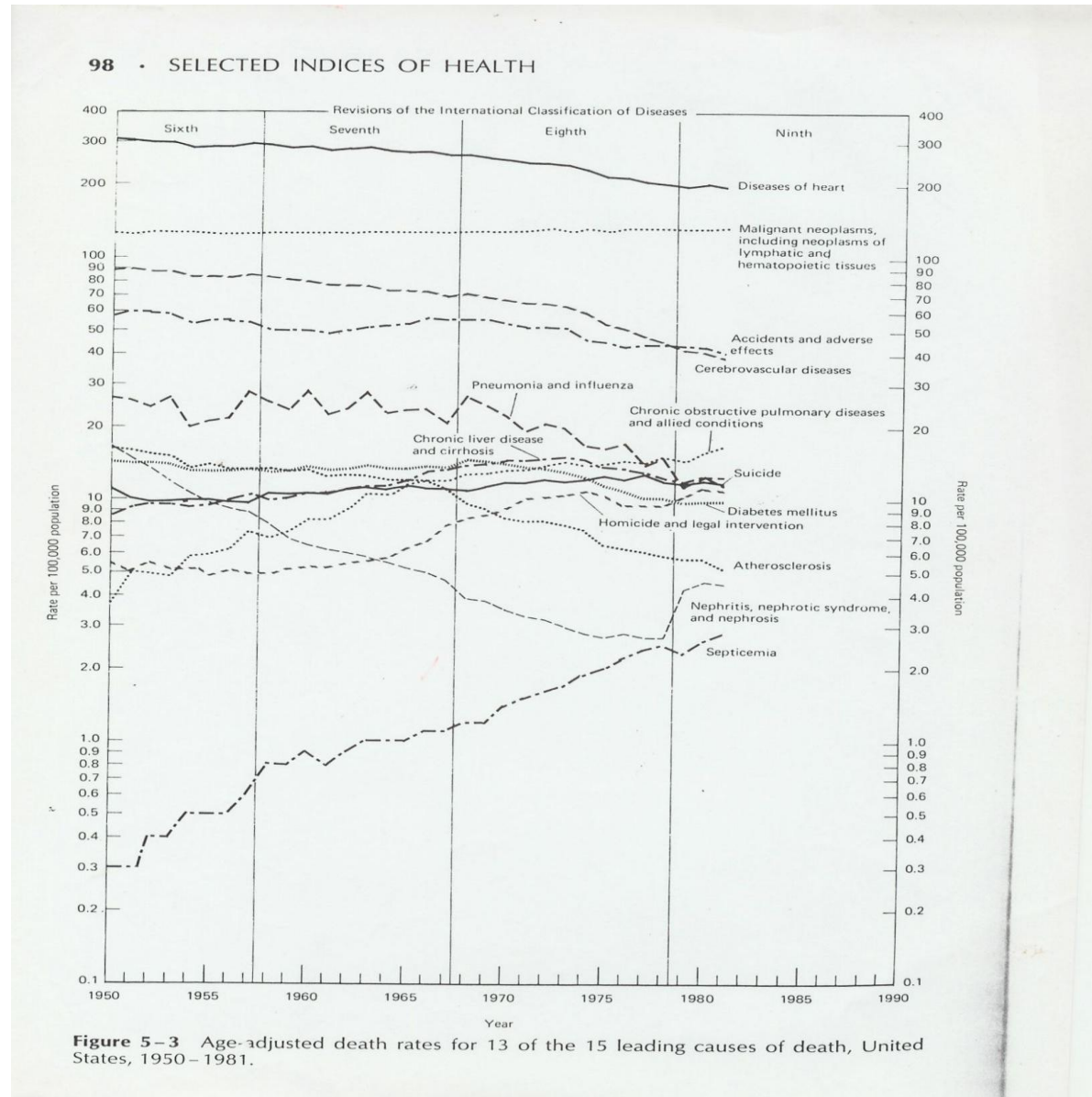
  - 인구 연령 구조의 변화

  - 환자 생존양상 변화

  - 신규 발생의 증가 → 선행 요인이 무엇인가 ?

1. Time (1)

- 시간에 따른 질병 발병률의 변화
  - 규칙적 : 건강사업에 대한 예측
  - 예측되지 않은 돌발적 증가 : 원인을 규명하고, 적절한 관리 대책 마련

- 시간을 축으로 하는 도표
  - Y 축 : 질병 수준, X 축 : 시간
  - 경시적 변화 경향과 향후 예측
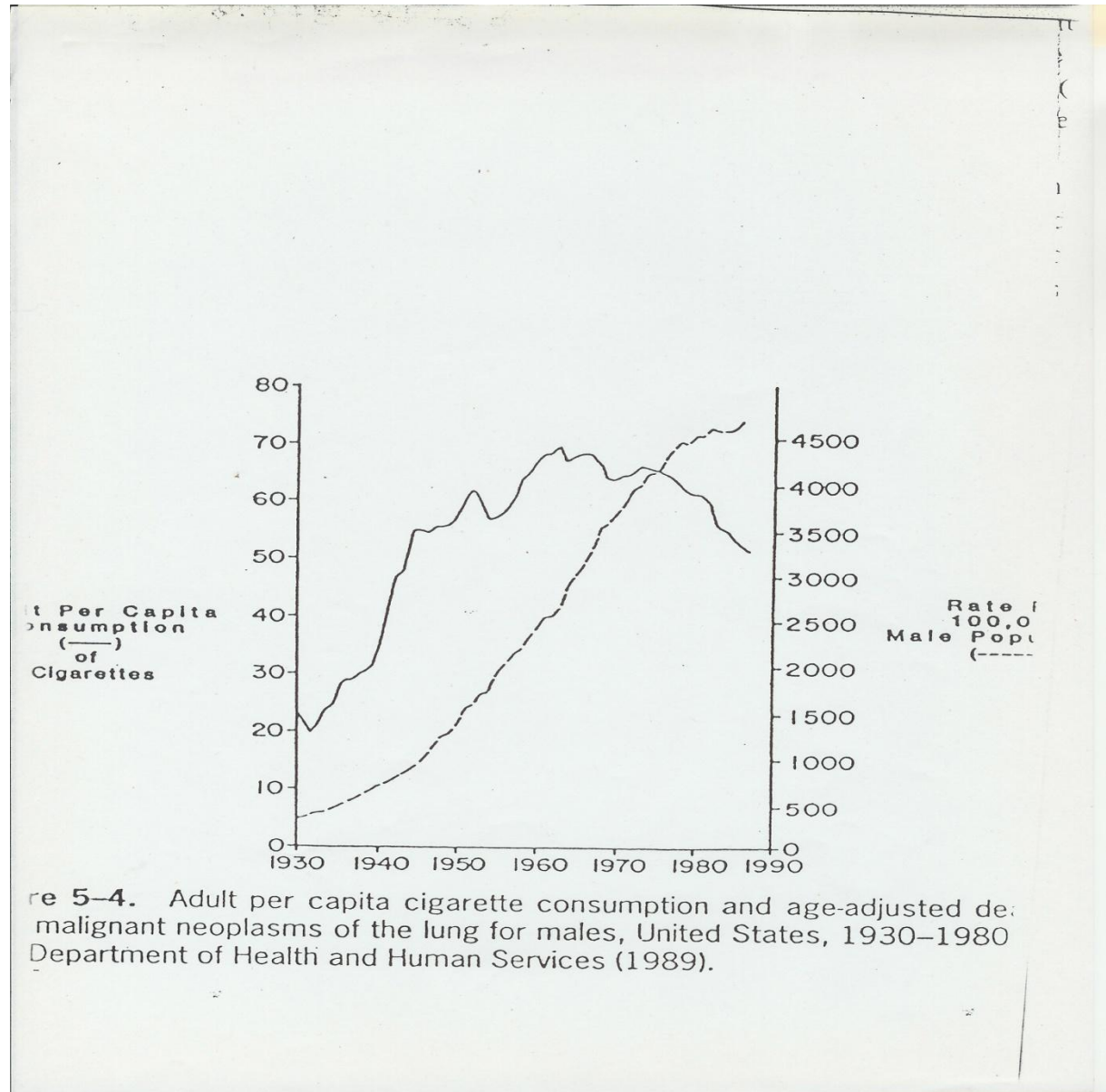 - 원인에 대한 추론

Time : Secular trend

98 · SELECTED INDICES OF HEALTH

Figure 5-3 Age-adjusted death rates for 13 of the 15 leading causes of death, United States, 1950-1981.

1. Time (2)

- **장기 추세변동 (Secular trends over a long period of time**
  - 심장 질환, 말라리아

- **주기 변동 (Cyclic variation over several year)**
  - 유행성 이하선염(mumps), 홍역(measles)
  - 집단 면역(herd immunity)

- **계절적 변동(Seasonal variation)**
  - **by week or month**
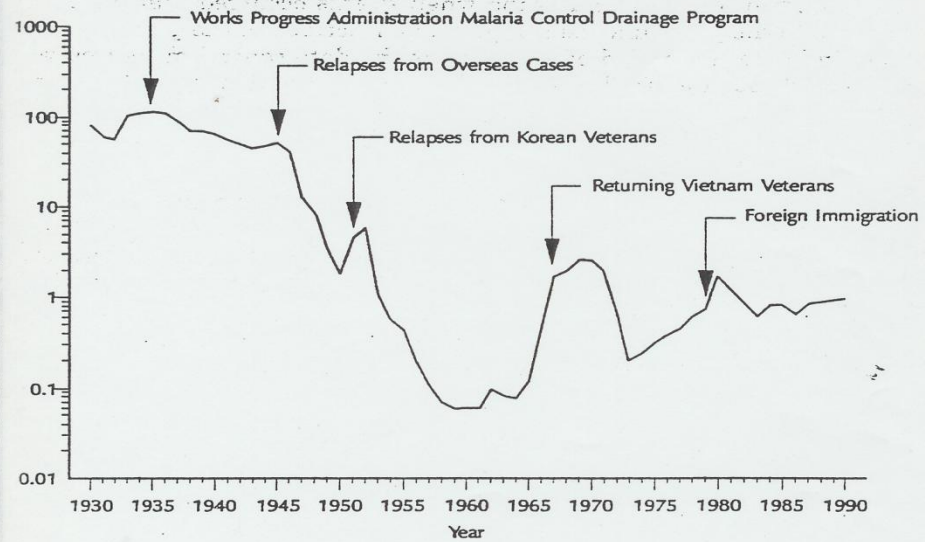 - **influenza - winter, HFRS - autumn**

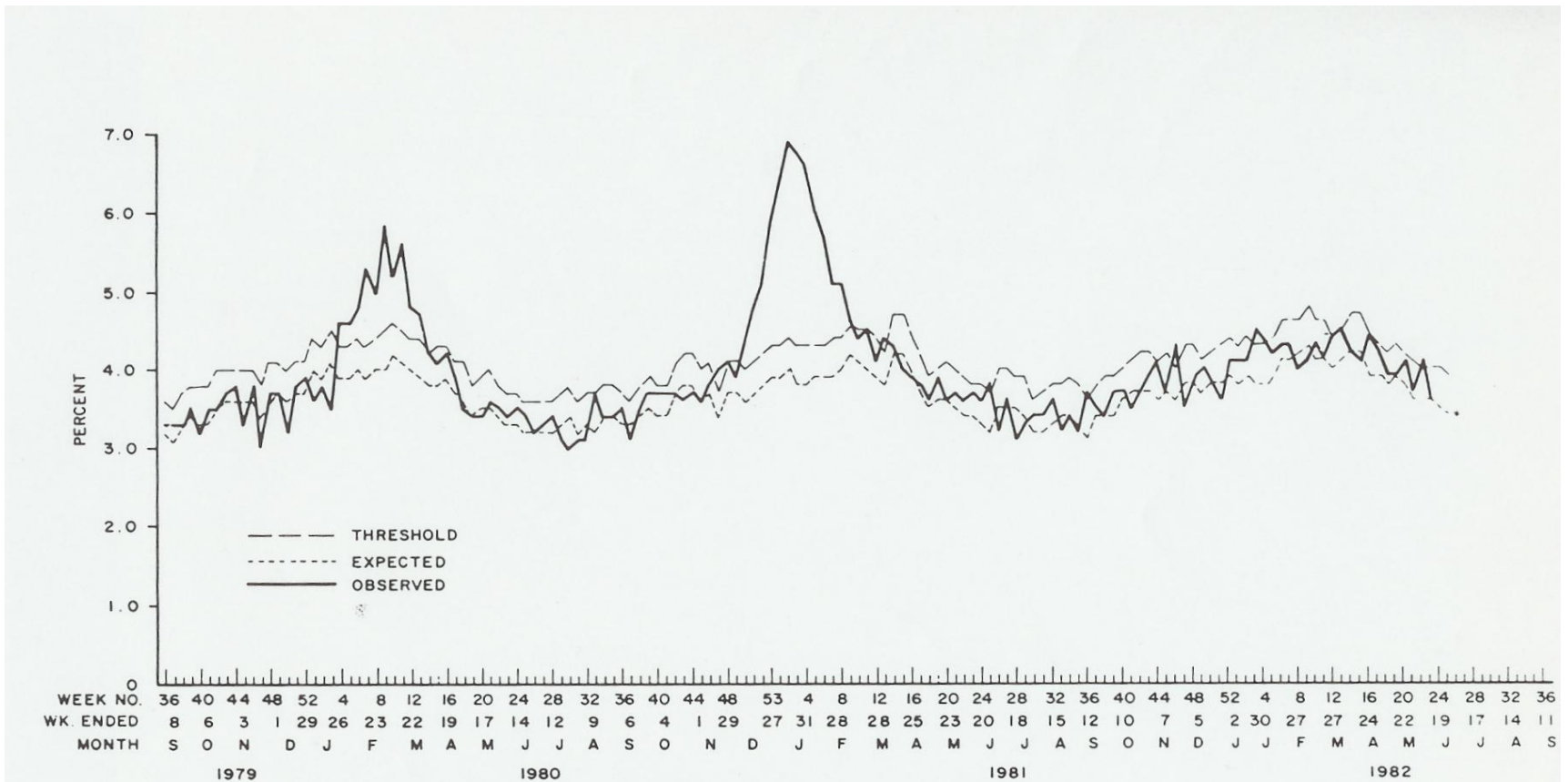- **유행 곡선(Epidemic curve)**
  - 증상 개시일, 진단 일자

Time : Secular trend

re 5–4. Adult per capita cigarette consumption and age-adjusted de
malignant neoplasms of the lung for males, United States, 1930–1980
Department of Health and Human Services (1989).

Time : Secular trend

FIGURE 1.3
Malaria by year, United States, 1930–1990

Works Progress Administration Malaria Control Drainage Program

Relapses from Overseas Cases

Relapses from Korean Veterans

Returning Vietnam Veterans

Foreign Immigration

Time : Seasonal variation

Figure 6–16 Observed and expected rates of deaths attributed to pneumonia and influenza in 121 cities, September 1979–August 1982. (From Morbidity and Mortality Weekly Report, *31*:376, 1982.)

Time : Epidemic curve

FIGURE 1.22
Example of the classic epidemic curve of a
propagated epidemic: Measles cases by date of onset,
Aberdeen, South Dakota, October 15, 1970–January 16, 1971

Day of Onset of Illness
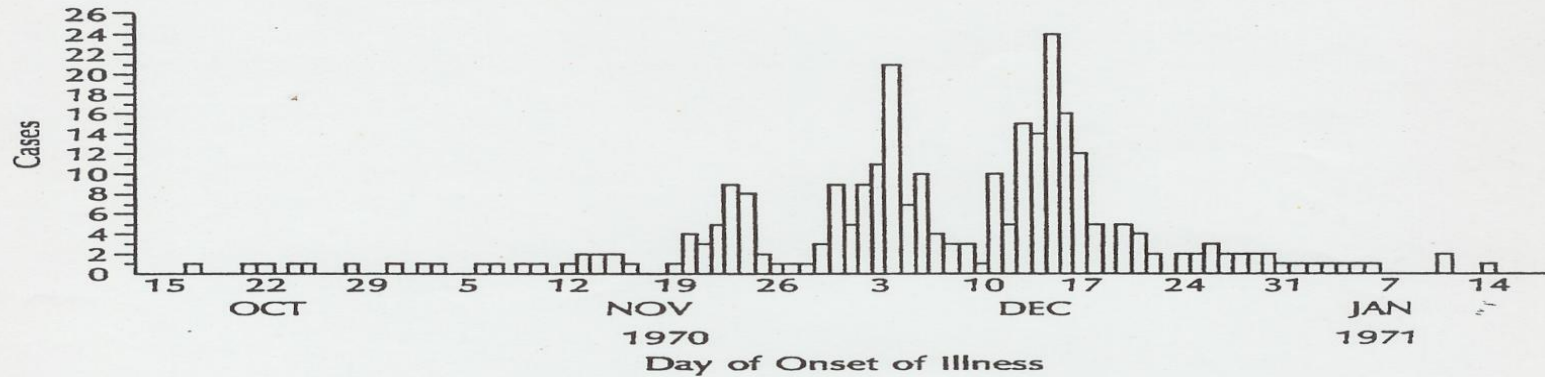
2. Person (1)

- 인적 변수의 범주
  - 타고난 특성 : 성, 인종
  - 획득한 특성 : 면역 기능, 결혼 상태
  - 생활습관 : 흡연, 음주, 운동, 식이 등 ..
  - 사회적 환경 : 직업, 경제 수준, 의료기관 등 ..

- 연령
  - 질병 발생 관련하여 가장 중요한 인적 요인
  - **J-shape**
  - 연령과 같이 변하는 요인 : 질병 감수성, 폭로 기회, 잠복 기/잠재기, 생리적 변화
  - 연령군 구분 : 0-4, 5-9, 10-14, … / 0-9, 10-19, 20-29 …
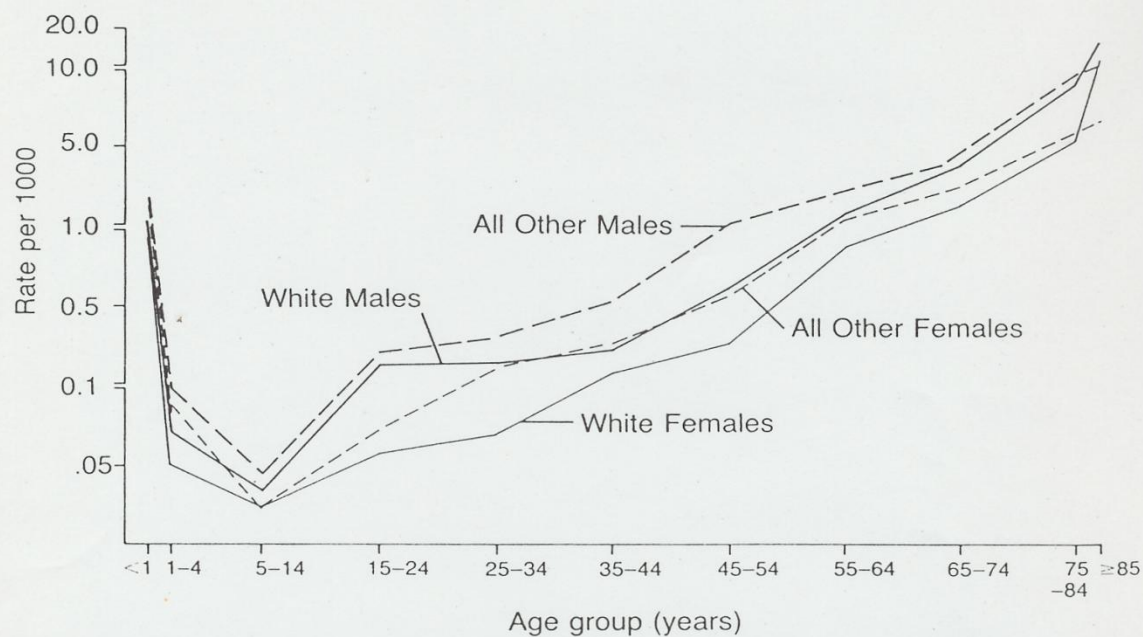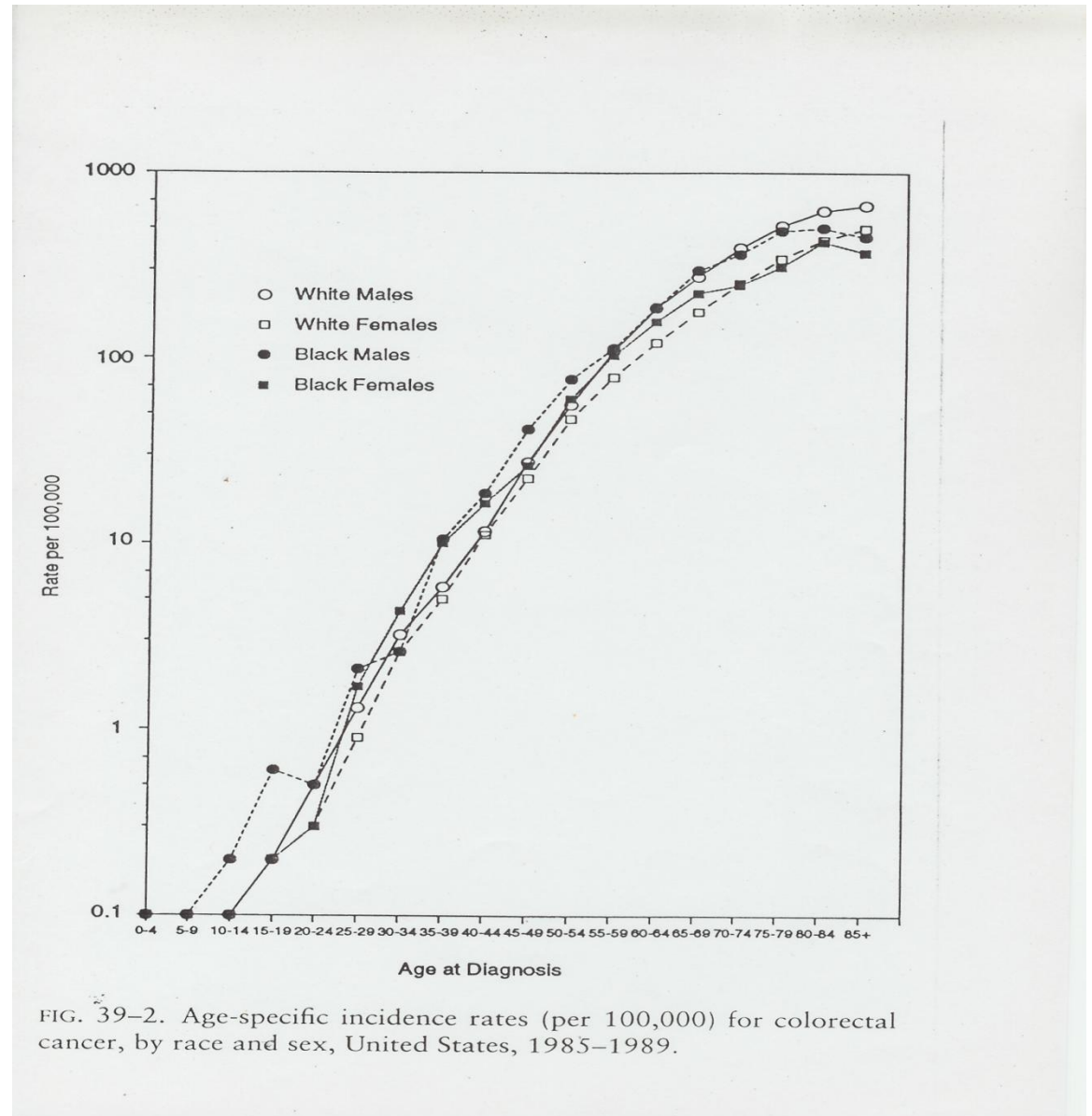   / 0-4, 5-14, 15-24, 24-34, … / 0-14, 15-34, 35-64, >= 65

Person : Age

Figure 6 – 1 Death rates per 1000 by age, color and sex, United States, 1980. (Note: graph is on a semilogarithmic scale.) (Data from National Center for Health Statistics: Vital Statistics of the United States. Vols. I and II. U.S. Govt. Printing Office, Washington, D.C., 1980.)

Person : Age

FIG. 39–2. Age-specific incidence rates (per 100,000) for colorectal cancer, by race and sex, United States, 1985–1989.
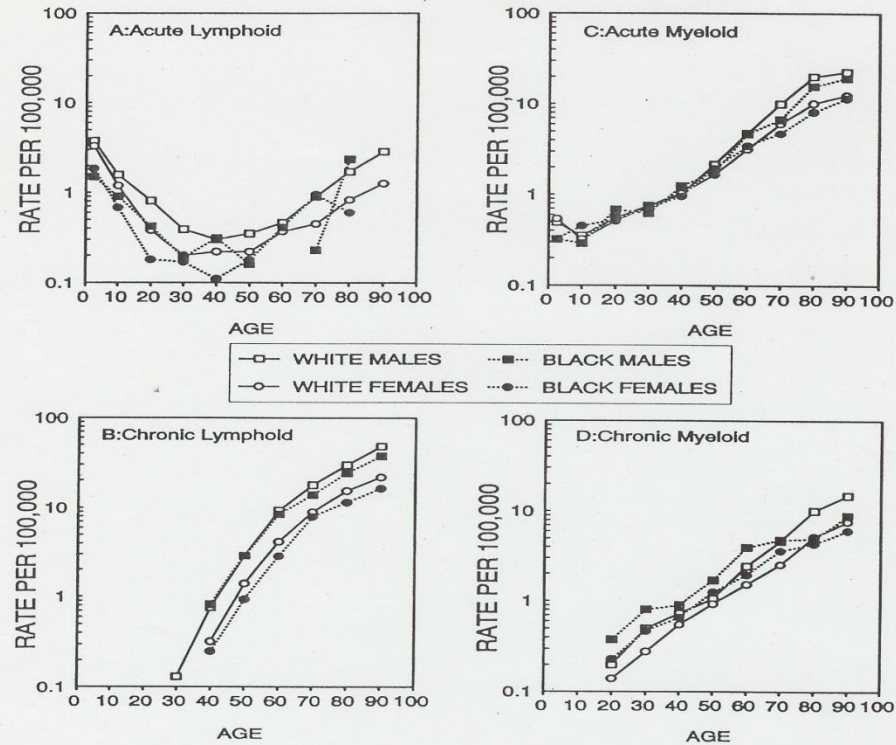
Person : Age

THE LEUKEMIAS

FIG. 40–3. Age-specific incidence rates for leukemia by cell type, race, and sex for nine SEER areas, 1973–87. (A: Acute Lymphoid Leukemia; B: Chronic Lymphoid Leukemia; C: Acute Myeloid Leukemia; D: Chronic Myeloid Leukemia.) (Reprinted from European Journal of Cancer, Volume 31A, F.D. Groves et al, "Patterns of occurrence of the leukemias," pages 941–949, 1995, with kind permission from Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington OX5 1GB UK.)

Person : Age
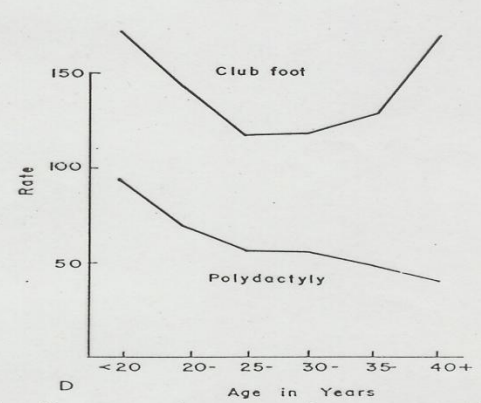
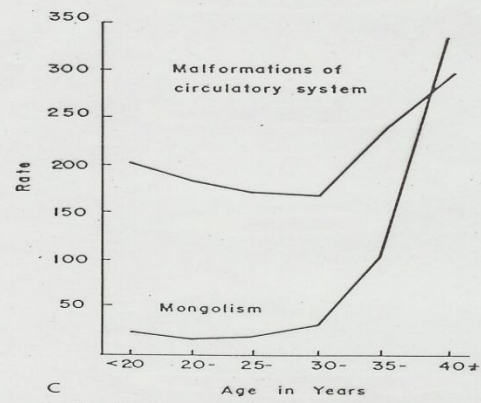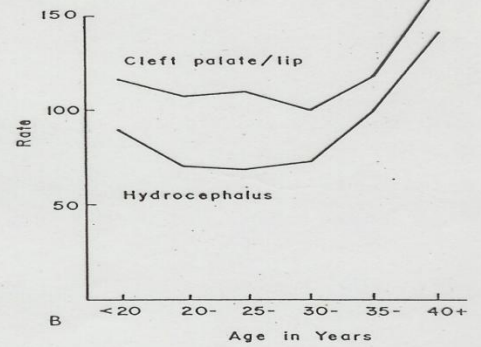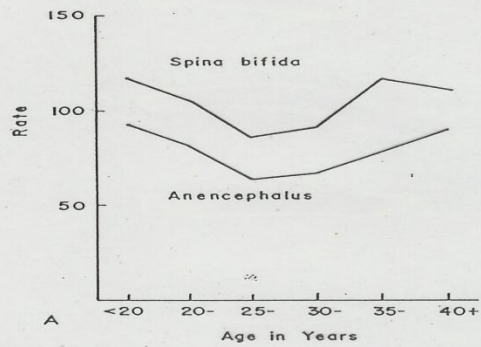**Figure 6–9** Incidence of selected congenital malformations by maternal age, upstate New York, 1950 – 1960 (cases per 100,000 total births). (From Gittelson, A. M., and Milham, S., Jr.: Vital record incidence of congenital malformations in New York State. In Neel, J. V., Shaw, M. W., et al. (eds.): Genetics and the Epidemiology of Chronic Diseases. USPHS Pub. No. 1163, U.S. Govt. Printing Office, Washington, D.C., 1965.)

2. Person (2)

- **성**
  - 남성의 사망률이 일반적으로 높다
  - 유전적, 홀몬, 또는 해부학적 차이
    → 폭로수준 또는 기회의 차이

- **인종**
  - 사회경제적 수준과 식이습관 등의 차이
  - **Black and White in USA, Mormon at Utah**

- **사회 계급, 사회경제적 수준**
  - **occupation, family income, educational level, living condition, etc**
  - **schizophrenia vs SES (Socio-Economic Class), breeder or drift**

Person : Sex

TABLE 6–1 Ratio of Age-Adjusted Death Rates for 15 Leading Causes of Death, by Sex*

Cause of Death	Ratio of Male Rate to Female Rate
All causes	1.80
Homicide and legal intervention	3.88
Chronic obstructive pulmonary disease	3.13
Suicide	3.05
Accidents and adverse effects	2.96
Chronic liver disease and cirrhosis	2.19
Diseases of the heart	2.01
Pneumonia and influenza	1.86
Nephritis, nephrotic syndrome, and nephrosis	1.58
Malignant neoplasms	1.51
Septicemia	1.40
Atherosclerosis	1.29
Certain conditions originating in the perinatal period	1.26
Cerebrovascular diseases	1.19
Congenital anomalies	1.15
Diabetes mellitus	1.04

* From National Center for Health Statistics. Advance Report, Final Mortality Statistics, 1979. U.S. Govt. Printing Office, Washington, D.C., September 1982.

Person : Race

Table 5–10. Some Mortality Differences between Blacks and Whites in the United States per 100,000 Population, 1988

CAUSE OF DEATH (ICD-9 CODE)	BLACK	WHITE
All causes	788.8	509.8
Malignant neoplasms (140–208)	171.3	130.0
Cardiovascular disease (390–488)	293.0	199.2
Diabetes (250)	21.2	9.0
Hypertension (401, 403)	5.7	1.5
Homicide (E960–E978)	34.1	5.3
Maternal mortality*	19.5	5.9
Infant mortality**	17.6	8.5

*Per 100,000 live births.

**Per 1,000 live births.

Source: Vital Statistics of the United States (1991).

Person : Race

TABLE 6-2 Vital Statistics of the United States, 1980*

	Total Population	White	Black & Other
Mortality Rates			
Infant	12.6	11.0	21.4
Neonatal (<28 days)	8.5	7.5	14.1
Fetal death ratio	9.1	8.1	14.5
Maternal (per 100,000 live births)	9.2	6.7	21.5
Life Expectancy at Birth (yrs)	73.7		
Male		70.0	63.7
Female		78.1	72.3

* From National Center for Health Statistics. Advanced Report, Final Mortality Statistics, 1980. U.S. Govt. Printing Office, Washington, D.C., August, 1983.

Person : Race

Figure 6–6 Suicide rates by age, color, and sex, 1974. (From the National Center for Health Statistics, Vol. IIA, U.S. Govt. Printing Office, Washington, D.C., 1978.)
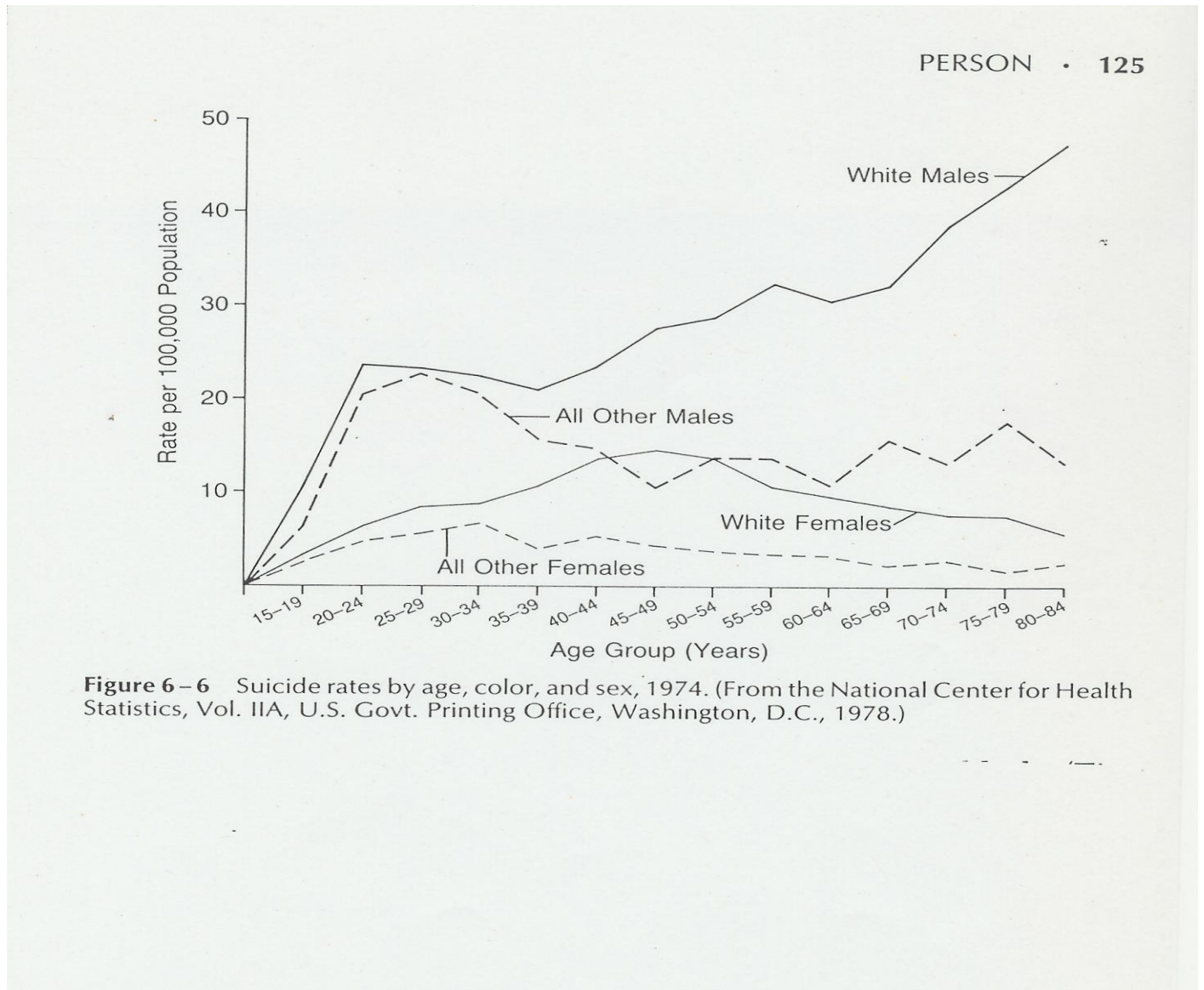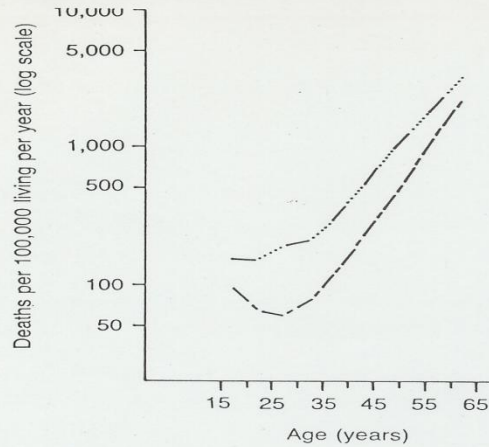
Person : Class

Figure 6–7 Death rates for males by social class and age. (Data from Great Britain Office of Population Censuses and Surveys: Occupational Mortality: The Registrar General's Decennial Supplement for England and Wales, 1970–72. H. M. Stationery Off., London, 1978.)

TABLE 6–3 Mortality Rates by Social Class 1970–1972: Men Aged 15–64 and Infant Mortality by Sex*

Social Class	Crude Death[1] Rate	Age-Standardized Death Rates	Standardized Mortality Ratios (SMRs)	Infant Mortality Rate[2] Male	Female
I Professional	399	462	77	14	10
II Intermediate	554	486	81	15	12
III Nonmanual, skilled	580	591	99	17	12
III Manual, skilled	608	633	106	19	15
IV Partly skilled	797	681	114	22	17
V Unskilled	989	832	137	35	27
All men[3] aged 15–64, all infants	597	597	100	20	15

[1] Deaths per 100,000 men per year.
[2] Deaths per 1000 live births.
[3] Includes those not assigned to a social class.
* From Great Britain Office of Population Censuses and Surveys: Occupational Mortality: The Registrar General's Decennial Supplement for England and Wales, 1970–72. H. M. Stationery Off., London, 1978.
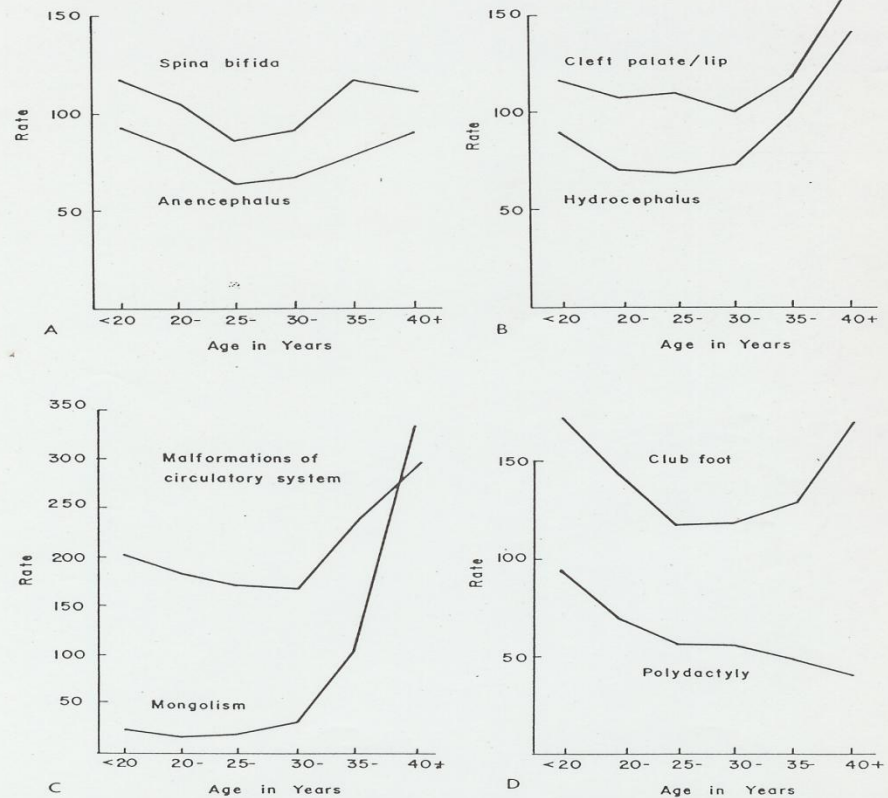
2. Person (3)

- **결혼 상태**
  - 자녀 양육과 성활동 등 생리적 변화
  - 독신자에서 높은 자살율

- **가족관련 특성**
  - 가족의 크기, 출생 순위, 출생시 산모의 나이, 부모 박탈
  - 질병 가족력 →

    유전적 감수성 vs 환경의 공유 ?

Person : Maternal age

Figure 6–9 Incidence of selected congenital malformations by maternal age, upstate New York, 1950–1960 (cases per 100,000 total births). (From Gittelson, A. M., and Milham, S., Jr.: Vital record incidence of congenital malformations in New York State. In Neel, J. V., Shaw, M. W., et al. (eds.): Genetics and the Epidemiology of Chronic Diseases. USPHS Pub. No. 1163, U.S. Govt. Printing Office, Washington, D.C., 1965.)

Person : Birth order

出產順位別 出生性比
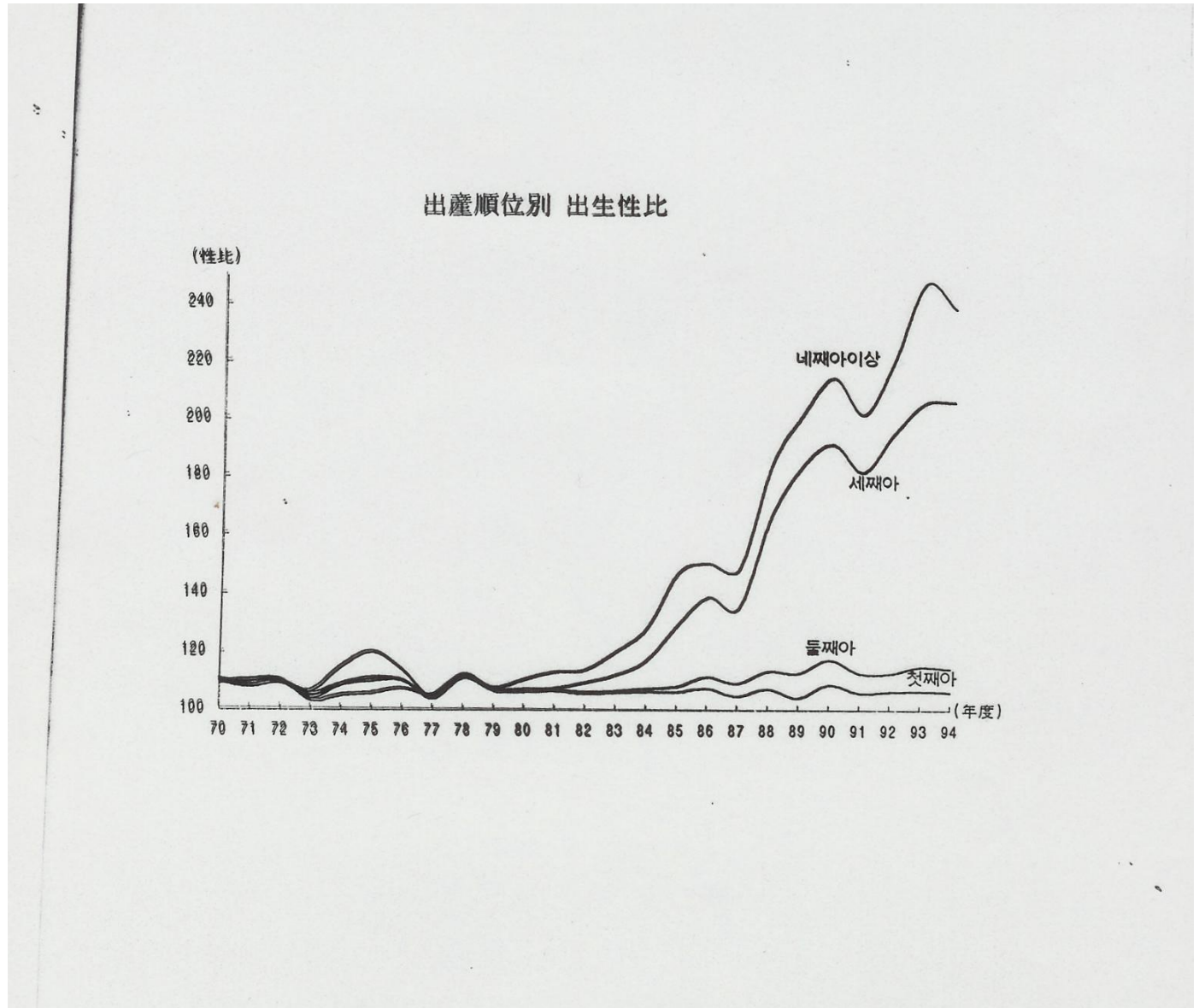
3. Place

- **Insight into a geographical extent of the problem**
  - place of residence, birth place, school district, hospital unit
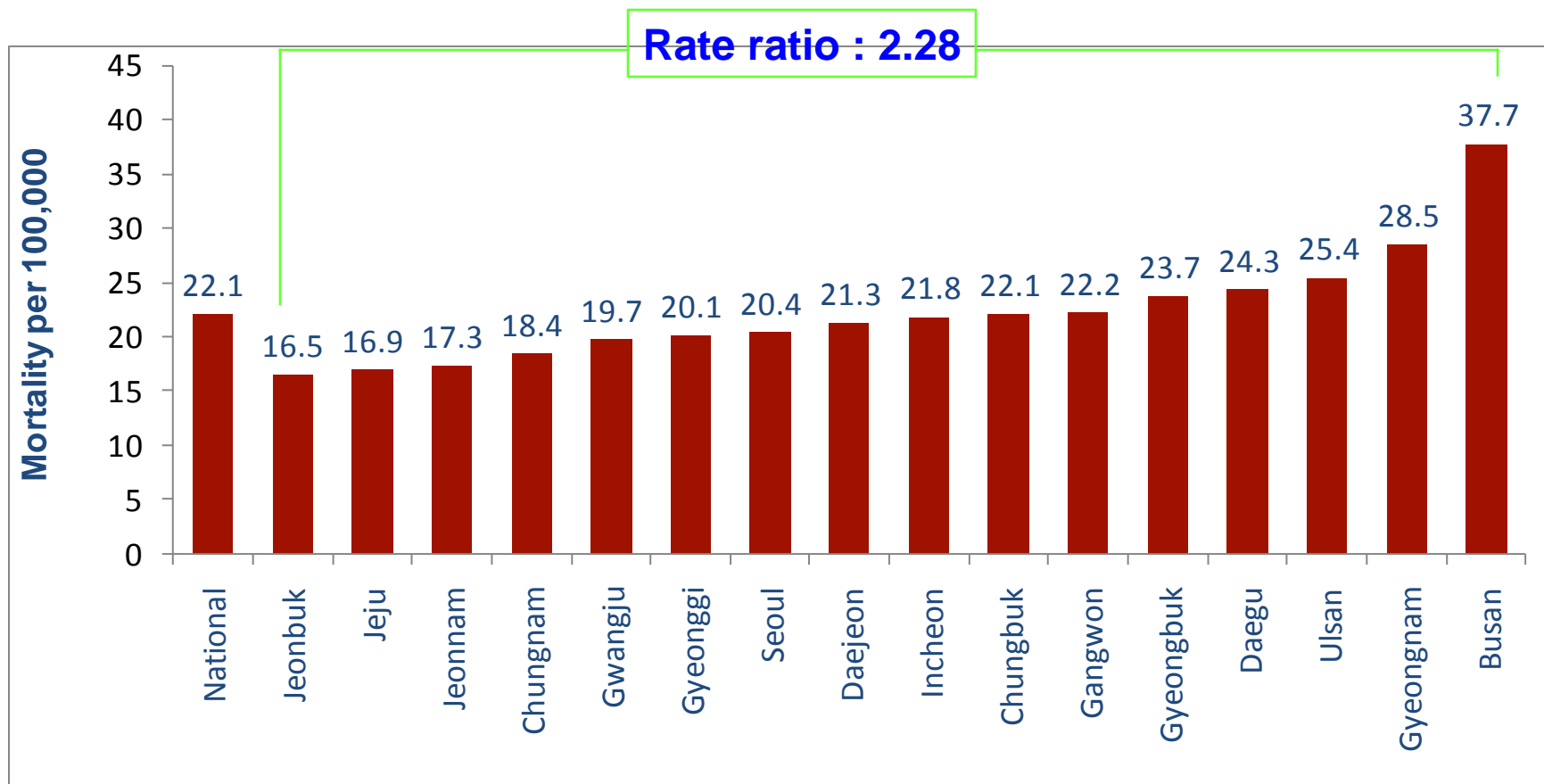 - large or small geographical unit - international, urban/rural
  - reflects social/cultural impacts on health

- **Spot map**
  - Snow on Cholera : Golden Square of London

- **GIS(Geographical Information System)**

Ischemic heart disease mortality* by province and metropolis in Korea, 2005-2008

Rate ratio : 2.28

Mortality per 100,000

Province	Value
National	22.1
Jeonbuk	16.5
Jeju	16.9
Jeonnam	17.3
Chungnam	18.4
Gwangju	19.7
Gyeonggi	20.1
Seoul	20.4
Daejeon	21.3
Incheon	21.8
Chungbuk	22.1
Gangwon	22.2
Gyeongbuk	23.7
Daegu	24.3
Ulsan	25.4
Gyeongnam	28.5
Busan	37.7

* Age were adjusted to 2000 nationwide population census in Korea

Resource : Korean Statistical Information Service,

Place : Cancer incidence

2.1 Comparison of incidence rates between populations

**TABLE 9–5.** International Variation in Cancer Incidence*

Type of Cancer	Ratio (H/L)	High (H) Incidence Area	Rate†	Low (L) Incidence Area	Rate†
Melanoma	155	Australia (Queensland)	30.9	Japan (Osaka)	0.2
Lip	151	Canada (Newfoundland)	15.1	Japan (Osaka)	0.1
Nasopharynx	100	Hong Kong	30.0	U.K. (South Western)	0.3
Prostate	70	U.S. (Atlanta, black)	91.2	China (Tianjin)	1.3
Liver	49	China (Shanghai)	34.4	Canada (Nova Scotia)	0.7
Penis	42	Brazil (Recife)	8.3	Israel (Born Eur. and Am.)	0.2
Oral cavity	34	France (Bas-Rhin)	13.5	India (Poona)	0.4
Cervix uteri (F)	28	Brazil (Recife)	83.2	Israel (non-Jews)	3.0
Esophagus	27	France (Calvados)	29.9	Romania (Urban Cluj)	1.1
Stomach	22	Japan (Nagasaki)	82.0	Kuwait (Kuwaitis)	3.7
Thyroid	22	Hawaii (Chinese)	8.8	Poland (Warsaw City)	0.4
Multiple myeloma	22	U.S. (Alameda, black)	8.8	Phillipines (Rural)	0.4
Kidney	21	Canada (NWT and Yukon)	15.0	India (Poona)	0.7
Corpus uteri (F)	21	U.S. (Bay Area, white)	25.7	India (Nagpur)	1.2
Lung	19	U.S. (New Orleans, black)	110.0	India (Madras)	5.8
Colon	19	U.S. (Connecticut, white)	34.1	India (Madras)	1.8
Testis	17	Switzerland (Urban Vaud)	10.0	China (Tianjin)	0.6
Bladder	16	Switzerland (Basel)	27.8	India (Nagpur)	1.7
Lymphosarcoma	12	Switzerland (Basel)	9.2	Japan (Rural Miyagi)	0.8
Pancreas	11	U.S. (Los Angeles, Korean)	16.4	India (Poona)	1.5
Hodgkin's disease	10	Canada (Quebec)	4.8	Japan (Miyagi)	0.5
Brain	9	N.Z. (Polynesian Islanders)	9.7	India (Nagpur)	1.1
Larynx	8	Brazil (Sao Paulo)	17.8	Japan (Rural Miyagi)	2.1
Ovary (F)	8	N.Z. (Polynesian Islanders)	25.8	Kuwait (Kuwaitis)	3.3
Rectum	8	Israel (Born Eur. and Am.)	22.6	Kuwait (Kuwaitis)	3.0
Breast (F)	7	Hawaii (Hawaiian)	93.9	Israel (non-Jews)	14.1
Leukemia	5	Canada (Ontario)	11.6	India (Nagpur)	2.2

* Among males unless specified as females (F); rates based on less than 10 cases are excluded.
† Average annual rate per 100,000, age-adjusted based on the world standard population; rates generally are for the period 1978–1982.
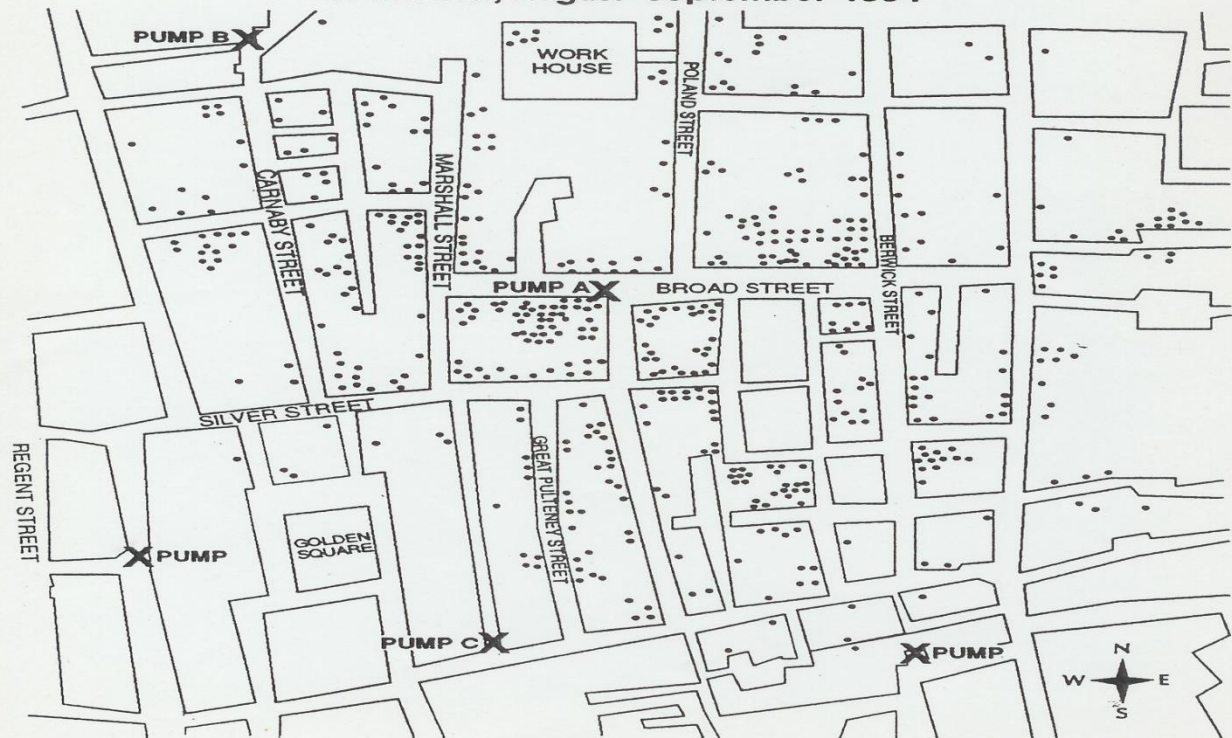(Muir C, Parkin M. International Agency for Research on Cancer, based on data abstracted from Muir C. Waterhouse J, Mack T. et al. eds. Cancer incidence in five continents, vol 5. Lyon: International

OECD 국가의 전체 암 발생률과 사망률, 남자, 2002
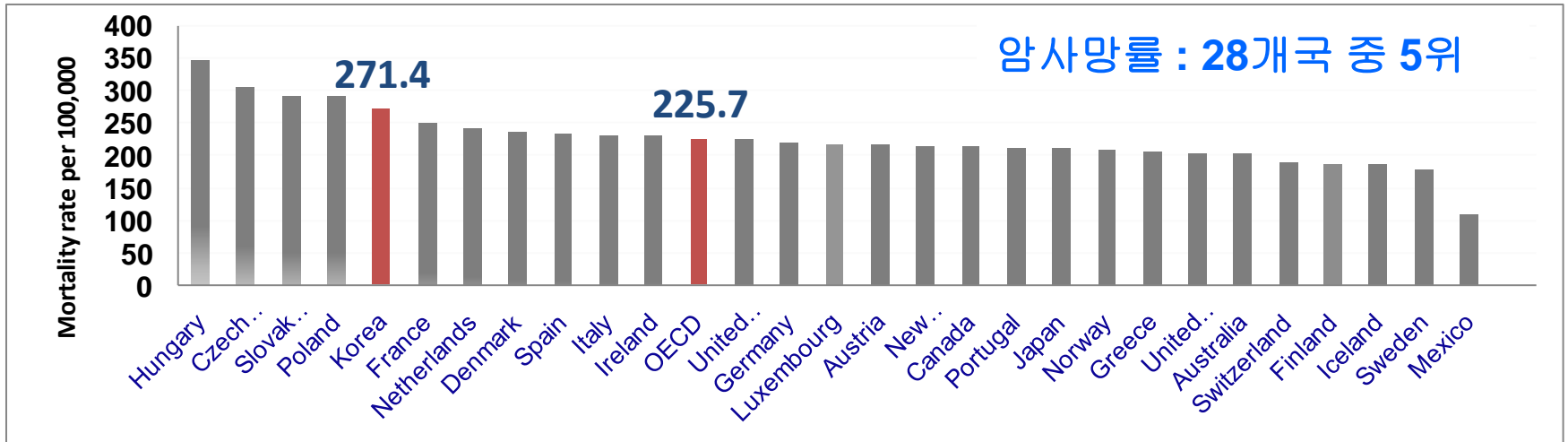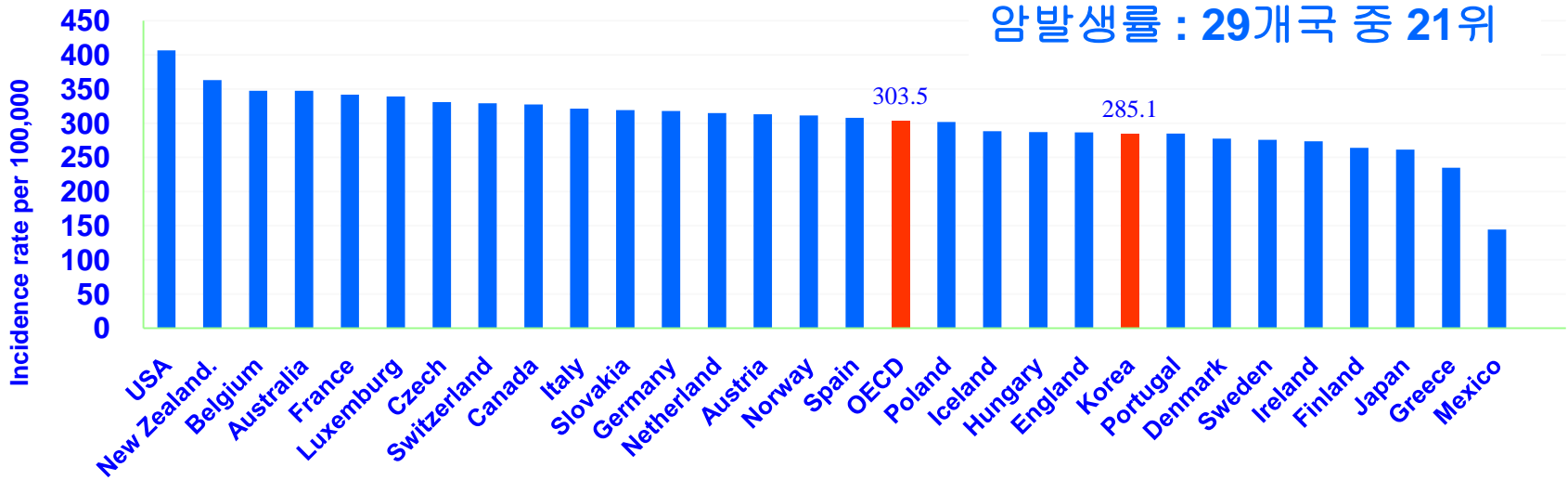
Place : Spot map

FIGURE 1.1
Distribution of cholera cases in the Golden Square area of London, August—September 1854

PUMP B

WORK HOUSE

POLAND STREET

CARNABY STREET

MARSHALL STREET

BERWICK STREET

PUMP A   BROAD STREET

SILVER STREET

REGENT STREET

GREAT PULTENEY STREET

PUMP

GOLDEN SQUARE

PUMP C

PUMP

N
W   E
S

ource: 27

Place : GIS

AGE-ADJUSTED RATE

- ▓ SIGNIF. HIGH, IN HIGHEST DECILE
- ▒ SIGNIF. HIGH, NOT IN HIGHEST DECILE
- ░ IN HIGHEST DECILE, NOT SIGNIF.
- ░ NOT SIGNIF. DIFFERENT FROM U.S.
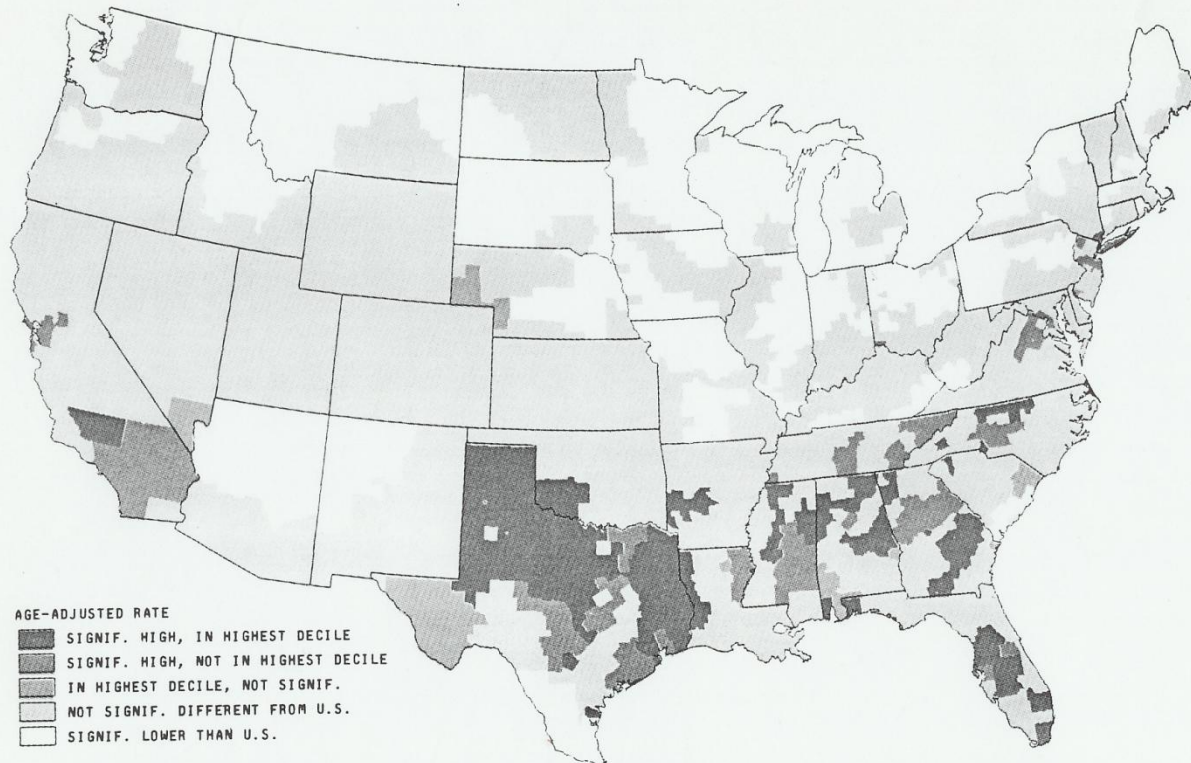- ☐ SIGNIF. LOWER THAN U.S.

Figure 6–10 Cancer Mortality, 1950–1969, by state economic area. Melanoma of skin, white males. (From Atlas of Cancer Mortality For U.S. Counties, 1950–1969 (RC 261 U 55). DHEW Pub. No. (NIH) 75–780, p. 44.)
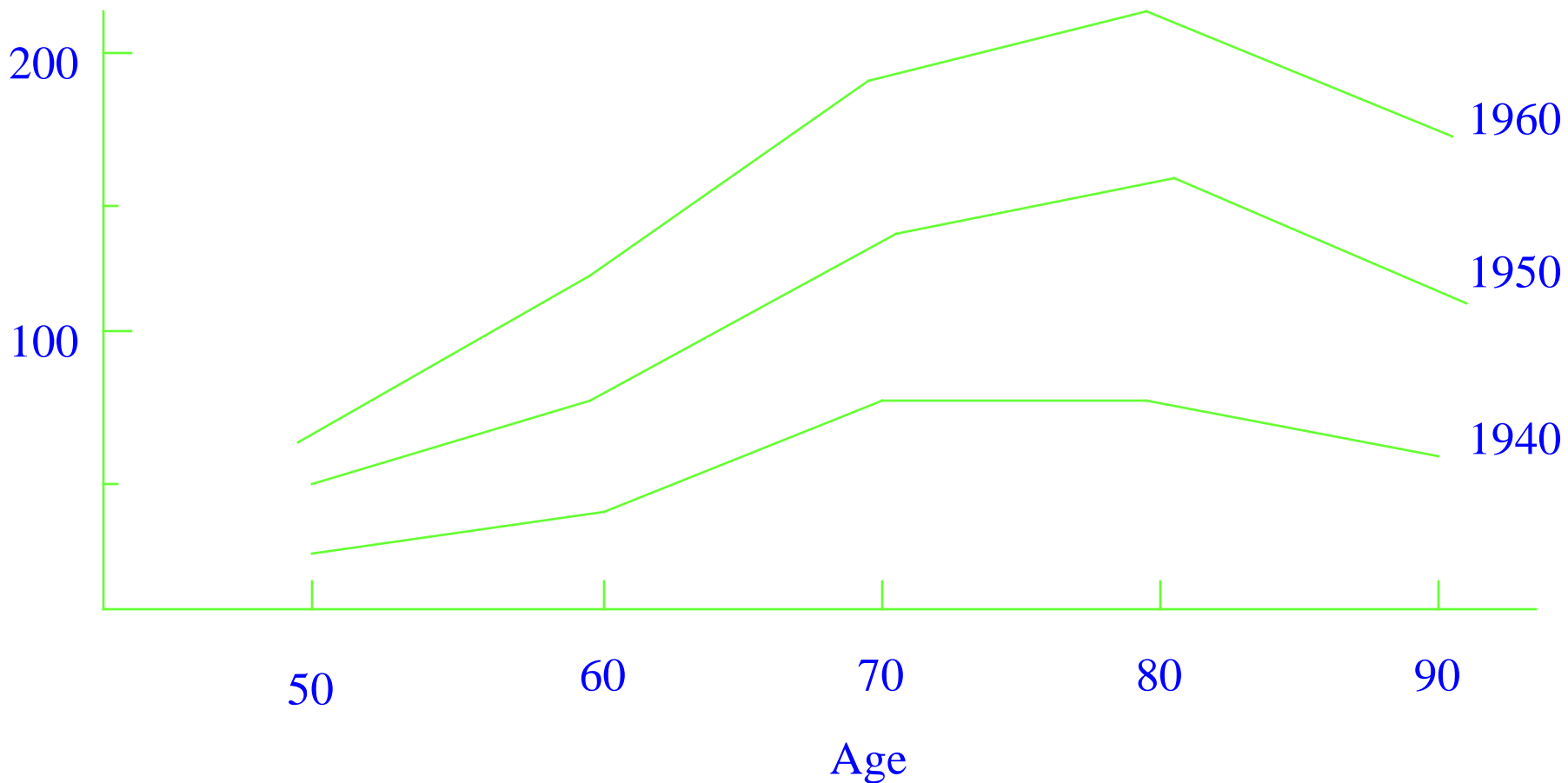
4. Combined

- 이주민 연구 (**Migrant study**)
  - **differentiate genetic factors (person) and**
    - **geographical environment(place) in disease causation**
    - **--> colon cancer incidence in Japanese immigrants to U.S.A.**
  - **identify periods of exposure of etiologic importance**
  - **--> stomach cancer incidence in Issei/Nisei Japanese immigrants**

- 출생 코호트 분석 (**Birth cohort analysis**)
  - **aging(person) vs birth cohort(time)**

- 입양아 연구 (**Adoption study**)
  - **genetic(person) vs environment(place)**

Birth cohort analysis

Lung cancer mortality

Birth cohort analysis

Lung cancer mortality