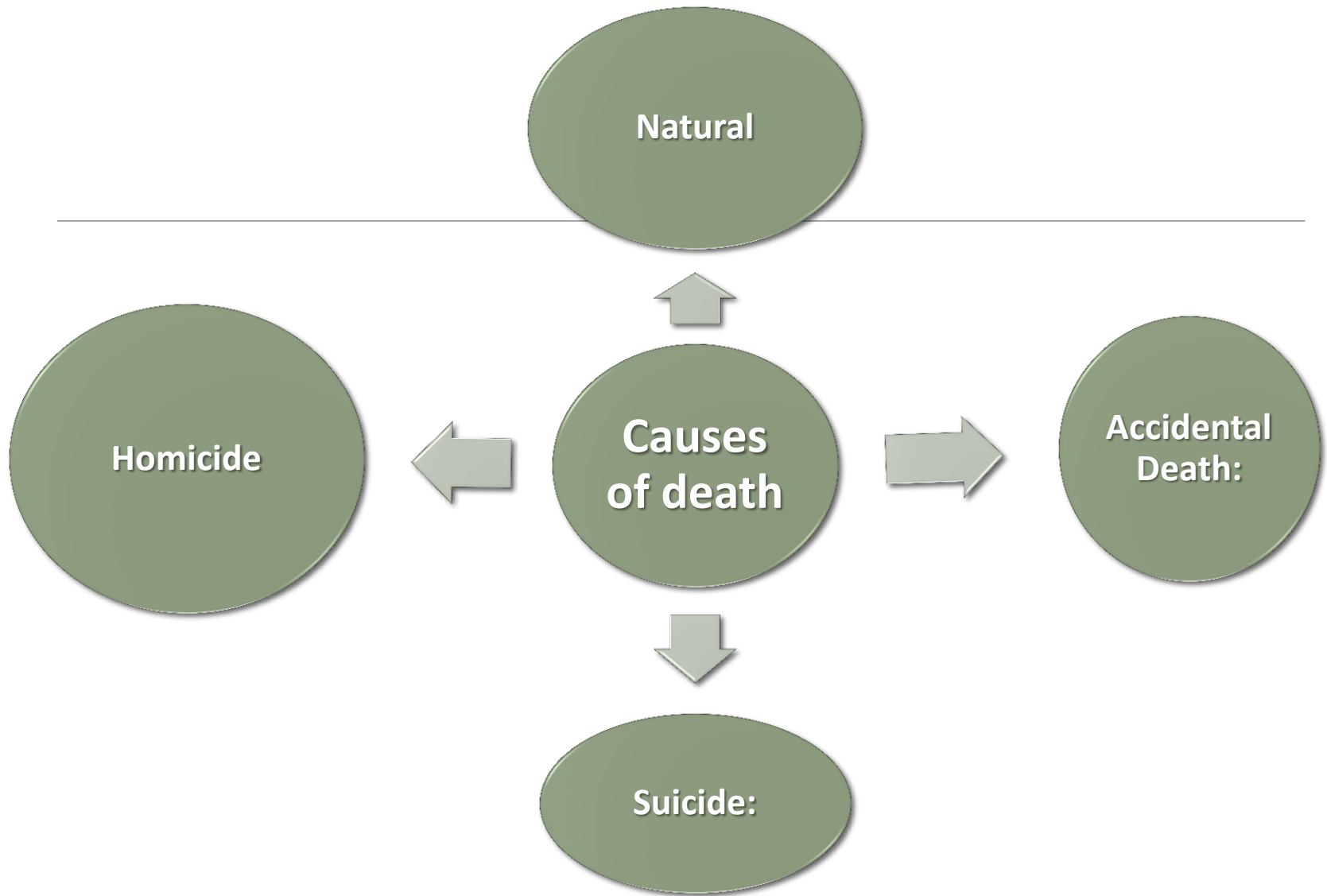


«Mortality»

CHAPTER -7



Mortality is the process of extinction of a generation, consisting of many single deaths occurring at different ages



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graph TD; A[Mortality Factors] --> B[Endogenous]; A --> C[Exogenous];
```

Mortality Factors

Endogenous

Exogenous

Mortality rates

```
graph TD; A[Mortality rates] --> B[Absolute]; A --> C[Realtive];
```

Absolute

Realtive

The main relative mortality rates

Crude mortality rate =
Total number of deaths per year
/ Average annual population ×
1000

Estimating the level of the overall death rate

<i>The first approach</i>		<i>The second approach</i>	
The value of the coefficient, ‰	Characteristics of the level	The value of the coefficient, ‰	Characteristics of the level
More than 20	Very tall	35.0 and above	Excessively high
16–20	Tall		
13-15	Above average	25,0–34,9	Very tall
11-12	Average	15,0–24,9	Tall
9-10	Below the average	10,0–14,9	Average
7-8	Low	До 10	Low
7	Very low		

Total number of deaths of a certain age group (both sexes, men and women) /
The average annual population (of both sexes, men and women) of this age group × 1000

$$ASDR = \frac{{}_n D_x}{{}_n P_x} * 1000$$

ASMR - Age-specific death rates

**Cause Specific Mortality Rate = Number
of deaths from i-th cause /
Average annual population × 1000**

Infant Mortality Rate (IMR)

$$IMR = \frac{D_0}{B} * 1000$$

where,

D₀: is the number of infants who died before celebrating their first birthday

B: is the total number live births taken place in that year and geographical region.

Year	Live Births	Infant deaths to the	
		Same Year Birth	Previous Year Birth
1	B1	DS1	D(P1)
2	B2	DS2	D(P2)
3	B3	DS3	D(P3)

(a) Numerator Separation Method:

$$IMR = \left[\frac{D2 * (1 - f)}{B1} + \frac{f * D2}{B1} \right] * 1000$$

(b) Denominator Separation Method:

$$IMR = \left[\frac{D2}{(1 - f)B2 + fB1} \right] * 1000$$

where $D2 = DS2 + DP2$, $f = DP2/D2$

Child Mortality Rate

$$\text{Under5Mortality} = \frac{\text{Number of deaths of children aged 1 to 4 year in given year and region}}{\text{total population aged 1 to 4 in the given year and a given region}} * 1000$$

Neonatal Mortality Rate (NMR):

$$ENMR = \frac{\text{Deaths of Infants in the first week of life}}{\text{Number of live births}} * 1000$$

Post Neonatal Mortality Rate (PNMR)

$$PNMR = \frac{\text{Number of deaths of Newborns between 4 weeks and less than 1 year old in a year}}{\text{Number of live births during the same year}} * 1000$$

Maternal Mortality Ratio (MMR)

Pregnancy/ childbirth /abortion related

$$\text{MMR} = \frac{\text{Deaths of pregnant women and women after termination of pregnancy within 6 weeks}}{\text{Number of live births during the same year}} * 100,000$$

Maternal Mortality Rate (MMRT)

$$\text{MMR} = \frac{\text{Number of maternal deaths of women in age 15 - 49}}{\text{Number of women in age 15 - 49 in a given year}} * 100,000$$

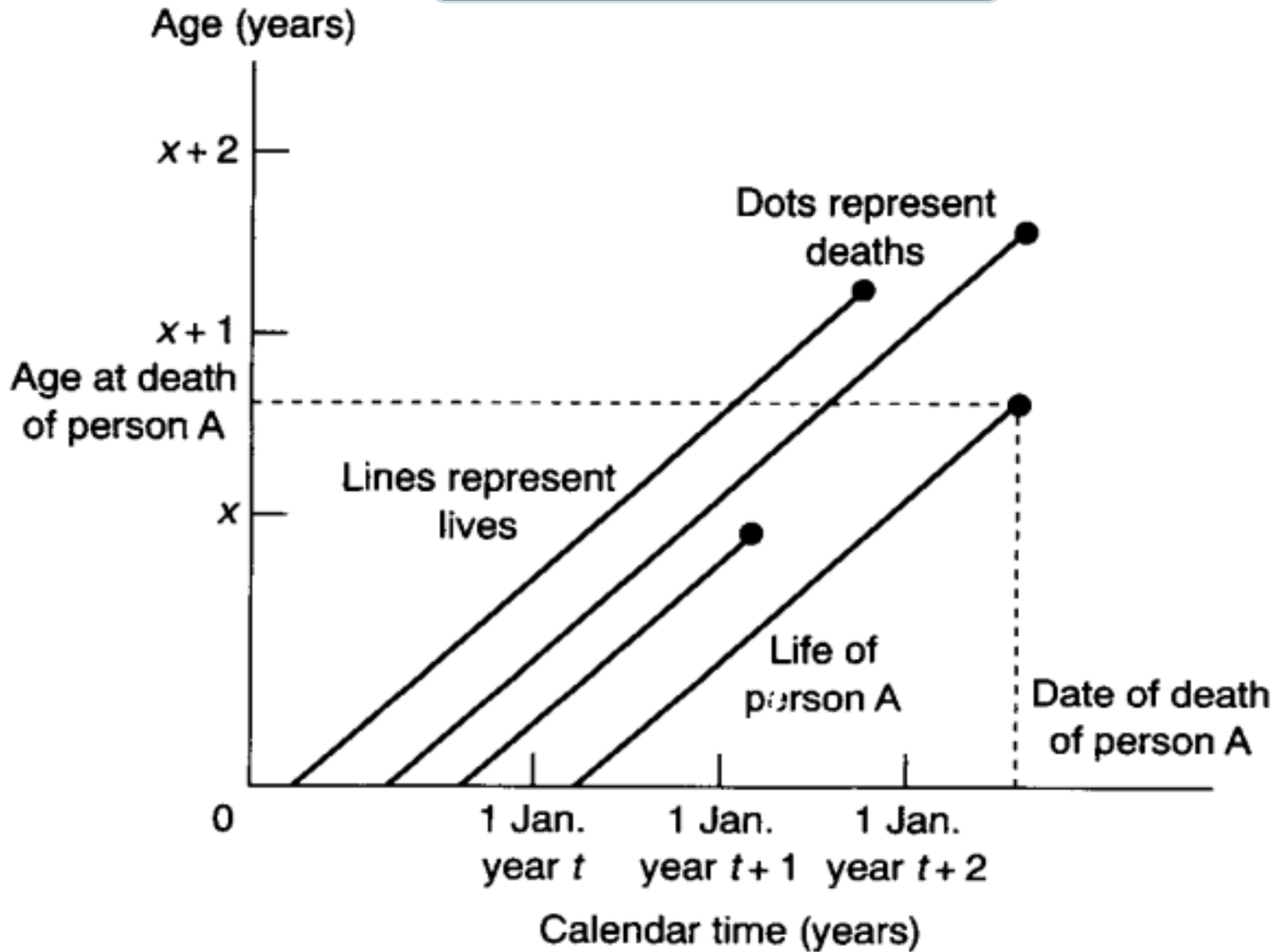
Incidence Rate

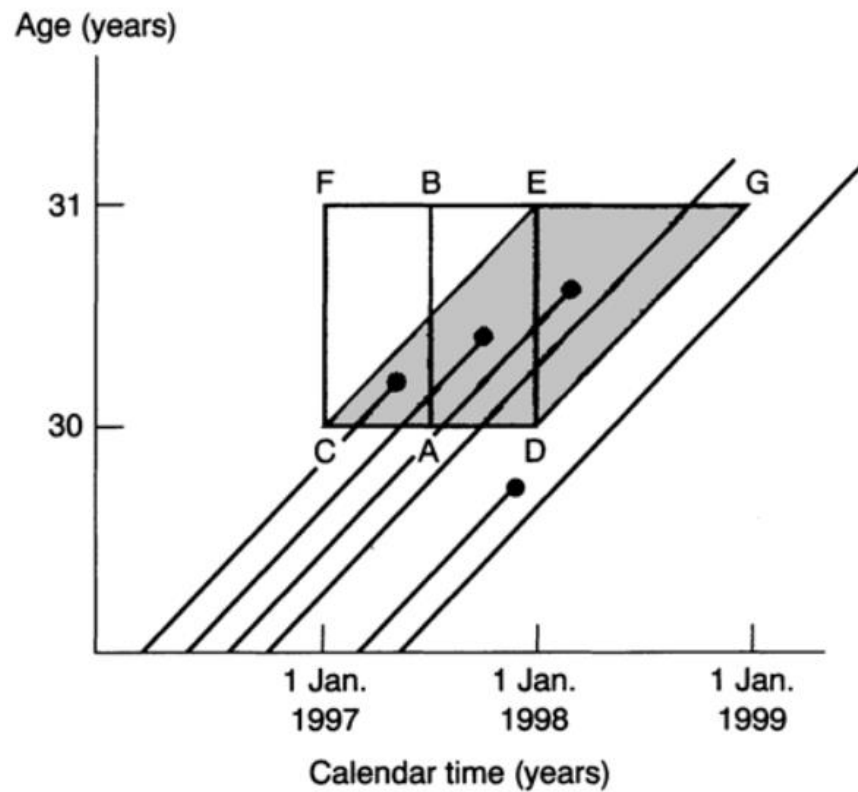
$$\text{Incidence Rate} = \frac{\text{Number of new cases of specified disease during a given time period}}{\text{Population at Risk}} * 1000$$

Prevalence Rate

$$\text{Prevalence Rate} = \frac{\text{Number of new and old cases of specified disease existing at a given point in time}}{\text{Estimated population at the same point in time}} * 1000$$

The Lexis chart





The standardized death

If we use the same population age structure when comparing different populations we will avoid the problem of confounding. ***This procedure is known as direct standardization.*** In direct standardization we compare two or more sets of age-specific rates by examining their impact on the same standard age structure.

The standardized death rate

standardized death rate for population $A = \frac{\sum_x ({}^A m_x {}^S P_x)}{\sum_x {}^S P_x}$

1. Simplified calculation Infant mortality rate

$$K_{I.M.} = (M_0/N_0 + M_1/N_1) \times 1000,$$

where

N₀- number of births last year;

N₁- number of births in the current year;

M₀ - the number of deaths under the age of 1 year in a given year from those born in the previous year;

M₁ - the number of deaths under the age of 1 year from the number born in a given year.

2. French method of calculation :

$$K_{i.M.} = (M_0 / (3/4N_1 + 1/4N_0)) \times 1000, \text{ where}$$

M_0 – the number of deaths in the reporting year under the age of one year from those born in a given year

The formula of Johannes Rats

$$K_{i.m.} = (M_0 / (3/4N_{t-1} + 2/3N_t)) \times 1000,$$

were,

N_{t-1} – number of live births in the previous year;

N_t – number of live births in the current year;

M_0 – number of deaths in the reporting year at the age of up to one year from those born in a given year

Factors affecting the infant mortality rate

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graph TD; A[Factors affecting the infant mortality rate] --> B[Child's sex]; A --> C[Birth order]; A --> D[Breastfeeding]; A --> E[Terms of bearing]; A --> F[Mother's age];
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Child's sex

Birth order

Breastfeeding

Terms of bearing

Mother's age

Scales for the estimation of infant mortality rates

On the scale of B.C.Urlanis		On the scale of A.Merkov	
Infant mortality rate, %	Characteristics of the level	Infant mortality rate, %	Characteristics of the level
100 и более	Extremely high	75 и более	Very high level
75–99	Very high level	61–74	High level
50–74	High level	50–60	Above average
35–49	Average level	35–49	Average
20–34	low level	31–34	Below the average
До 20	Extremely low level	21–30	low level
		До 20	Very low