Community Medicine

6th lecture:

Health Indicators- tutorial

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Crude Death Rate

- In a certain Country in Year 2000,
- Total population: 30,000,000;
- Total deaths: 150,000

Calculate Crude Death Rate

$$Crude\,Death\,Rate = \frac{Total\ number\ of\ deaths\ in\ a\ certain\ year\ and\ locality}{Estimated\ mid-year\ population (Same\ year\ and\ locality)}\ X\ 1000$$

Crude Death Rate = 150,000/30,000,000 x 1000= 5 deaths per 1000 per year (we multiply by 1000 to get a whole number "integer" as 5 instead of 0.005)

*in this lecture; always multiply by 1000 to calculate "rate" unless you got a fraction, use a larger number as 100,000.

Age specific mortality rate

- In a certain Country in Year 2000,
- For age group: 25-34 yrs; population: 5,000,000; and deaths: 200,000 within same age group

Calculate Age-specific death rate

$$\text{Age specific death rate} = \frac{\text{Number of persons dying in a certain age and a certain year and area}}{\text{Total number in the same age group in the same year and same area}} x1000$$

Age-specific death rate= 200,000/5,000,000 x 1000= 40 deaths per 1000 population **per year for age group 25-34**

Cause-specific death rate

- In a certain Country in Year 2000,
- Total population was 5,000,000;
- Deaths due to (cause) accidents: 4,000

Calculate Cause-specific death rate (to calculate cause specific death rate, always multiply by 100,000)

$$= \frac{Deaths\ of\ a\ specific\ cause\ in\ a\ given\ year\ and\ locality}{Estimated\ mid-year\ population\ in\ same\ year\ and\ locality}\ X\ 100{,}000$$

Cause-specific death rate= 4,000/5,000,000 x 100,000 = **80 accidental deaths per 100,000 population per year**

Proportional mortality ratio (we multiply by 100 because it's a percentage)

- In a certain Country in Year 2000,
- total deaths from all causes was 150,000;
- deaths from cancer: 18,000

Calculate Proportional mortality ratio for cancer

$$Proportionate\ mortality = \frac{Deaths\ due\ to\ a\ particular\ cause}{Deaths\ from\ all\ causes} \times 100$$

Proportional mortality ratio= 18,000/150,000 x 100= **12% of total deaths per year from cancer**

Infant Mortality Rate

- In a certain Country in Year 2000,
- Number of live births was 325,000;
- infant deaths: 1,750

Calculate Infant Mortality Rate

$$\text{Infant mortality rate} = \frac{\begin{array}{c}\text{Total number of deaths from}\\ \text{zero up to less than one year during a}\\ \text{year and in a given locality}\end{array}}{\begin{array}{c}\text{Total number of live births in}\\ \text{the same year and locality}\end{array}} x1000$$

Infant Mortality Rate = 1,750/325,000 x 1000= 5.4 infant deaths per 1000 live births per year

Still Births Ratio

- In a certain Country in Year 2000,
- Number of Still births: 2,450;
- live births: 525,000

Calculate still births ratio

$$\begin{array}{l}\text{Still birth ratio}\\ = \dfrac{\begin{array}{c}\text{Number of fetal deaths of 28 weeks of gestation or more in a}\\ \text{year and in a given locality}\end{array}}{\text{Number of live births in the same year and locality}} x1000\end{array}$$

Still births ratio = 2,450/525,000 x 1000= 4.7 fetal deaths per 1000 live births

Still Births Rate

- In a certain Country in Year 2000,
- Number of Still births: 2,450;
- live births: 525,000

Calculate Still births rate

$$\text{Still birth rate} = \frac{\text{Number of still births during a year and in a given locality}}{\text{Total births (live births + still births) in the same year and locality}} x1000$$

Still births rate = 2,450/(525,000+2,450) x 1000= **4.64 fetal deaths per 1000 total births**

Perinatal Mortality Rate

- In a certain Country in Year 2000,
- Still birth (Fetal deaths): 3,250;
- early neonatal deaths: 5,750;
- Number of live births: 475,000

Calculate Perinatal mortality rate

$$\text{Perinatal M.R.} = \frac{\text{No. of stillbirths} + \text{No. of early neonatal deaths in certain year and locality}}{\text{Total births (Still and livebirths) in the same year and locality}} X1000$$

Perinatal mortality rate= (3,250+5,750)/(475,000+3,250) x 1000 = **18.8 perinatal deaths per 1000 Total births** (we didn't add early neonatal death in the denominator because it's already included in the number of births)

Neonatal Mortality Rate

- In a certain Country in Year 2000,
- Number of deaths at <28 days was 2,750;
- number of live births: 325,000

Calculate Neonatal mortality rate?

$$\text{Neonatal mortality rate} = \frac{\text{Total number of deaths from zero up to less than 28 days during a year and in a given locality}}{\text{Total number of live births in the same year and locality}} x 1000$$

Neonatal mortality rate= 2,750/325,000x1000= 8.5 neonatal deaths per 1000 live births

Maternal Mortality Ratio

- In a certain Country in Year 2000,
- number of deaths due to maternal causes: 275,
- Number of live births: 1,750,000.

Calculate maternal mortality ratio

$$\text{Maternal mortality ratio} = \frac{\text{Number of Maternal deaths asigned to causes related to pregnancy in a given year and locality}}{\text{Number of livebirths in the same year and locality}} X \ 100{,}000$$

Maternal mortality ratio= 275/1,750,000 x 100,000= 15.71 maternal deaths per 100,000 live births per year (in this example, number of ladies who gave birth 1,750,000 these include those who died due to maternal cause)

*ideally, we should divide by the number of total pregnancies but there's no such registry that's why we use total number of births instead.

*why is it called "ratio"? Because the nominator is the number of mothers and denominator is the number of babies (the nominator is not part of the denominator)

Frequently used measures of mortality

Measure	Numerator (x)	Denominator (y)	Expressed per number at risk (10^n)
Crude Death Rate	total number of deaths reported during a given time interval	Estimated mid-interval population	1,000 or 100,000
Cause-specific Death Rate	# deaths assigned to a specific cause during a given time interval	Estimated mid-interval population	100,000
Proportional Mortality	# deaths assigned to a specific cause during a given time interval	Total number of deaths from all causes during the same interval	100 or 1,000
Death-to-Case Ratio	# deaths assigned to a specific disease during a given time interval	# new cases of that disease reported during the same time interval	100
Neonatal Mortality Rate	# deaths under 28 days of age during a given time interval	# live births during the same time interval	1,000
Postneonatal Mortality Rate	# deaths from 28 days to, but not including, 1 year of age, during a given time interval	# live births during the same time interval	1,000
Infant Mortality Rate	# deaths under 1 year of age during a given time interval	#l live births reported during the same time interval	1,000
Maternal Mortality Rate	# deaths assigned to pregnancy-related causes during a given time interval	# live births during the same time interval	100,000

Summary:

- Rates whose denominators are total population:
  - Crude mortality rate (crude death rate)
  - Crude Birth rate (crude Birth rate)
  - Cause-specific mortality rate
- Rates whose denominators are live births:
  - Infant mortality rate
  - Neonatal mortality rate
  - Postneonatal mortality rate
  - Under 5 mortality rate
  - Still birth ratio
  - Maternal mortality ratio

When calculating:

- Cause specific mortality rate
- Maternal mortality ratio

} Multiply by 100,000

It was mentioned that there might be a question in the exam from the book.