

EPIDEMIOLOGY

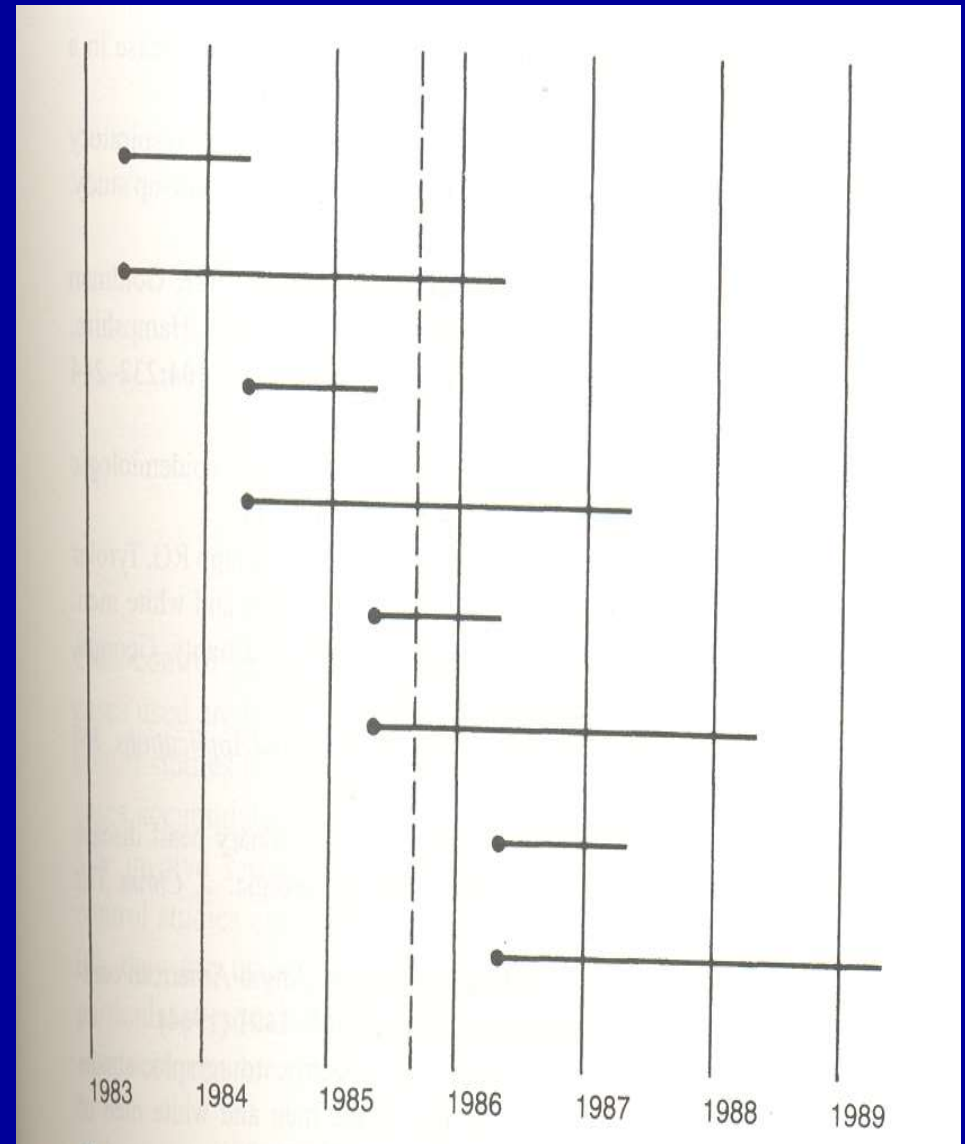


Part-III: 04 Sep 2024

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Ex - 1

- In the Fig each horizontal line represents the duration of a case of disease, beginning at the left with a dot. One 1 – year case and one 3 – year case begin in April every year. A cross sectional study was conducted in Sep 1985, as represented by vertical broken line.



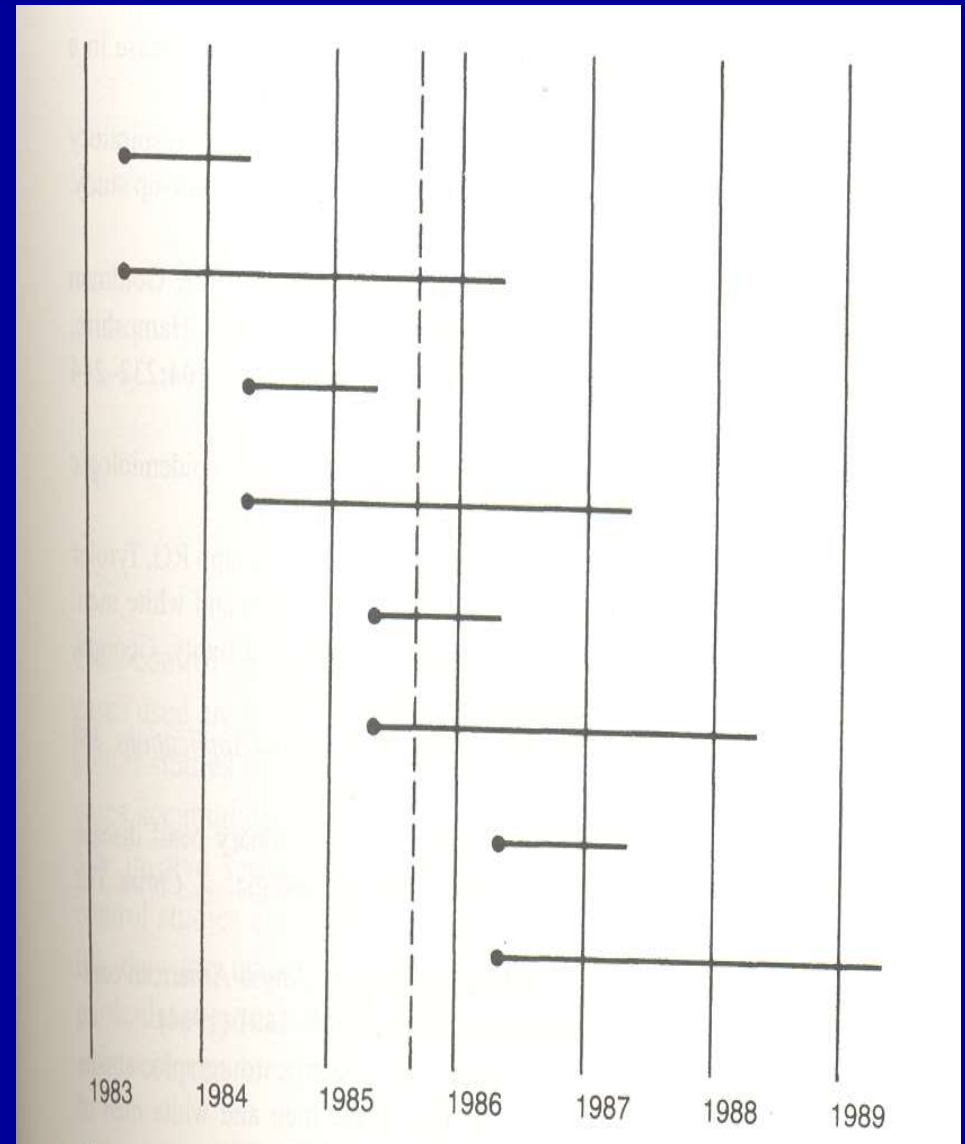
Ex - 1

Q 1. Find the prevalence of the disease at the time of study (assume popn as 100 persons).

Ans: Prevalence = 4/ 100

Q 2. What was the incidence of the disease each year from 1983 – 1986?

Ans: Incidence = 2 cases / 100 / year



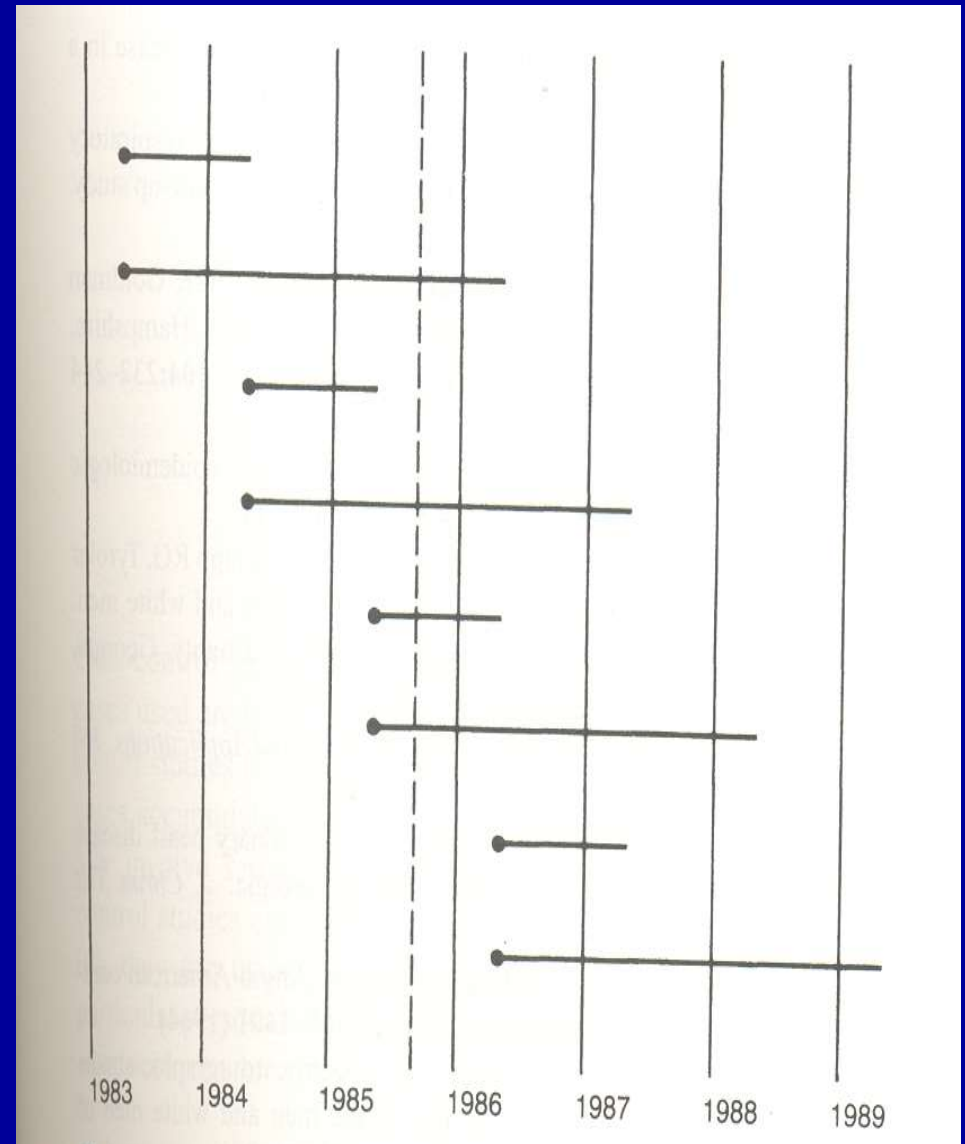
Ex - 1

Q 3. Find the mean duration of the disease.

Ans: $P = ID$ i.e. $D = P/I = 0.04/0.02 = 2$ years

Q 4. What proportion of the cases included in the cross sectional study were long duration cases?

Ans: In the study 3 out of four i.e. 75% cases were of long duration.



Ex - 2

- In Jan 1996, 1000 adult residents of a community were examined for hypothyroidism. Of the 8 persons, found to have disease, 3 were newly detected. Same group was examined again in Jan 1998. 6 new cases of hypothyroidism were discovered, of these 2 were diagnosed and treated several months earlier. Of the 8 cases detected in 1996, one had discontinued treatment and died with complications in 1997. Otherwise all persons examined in 1996, came to the second examination.

Ex - 2

Q 1. Find the prevalence of hypothyroidism, treated or not, in Jan 1996 & in Jan 1998.

Ans: Prevalence in Jan 1996 8/ 1000

Prevalence in Jan 1998 13/ 1000

(one death in 1997 due to complications)

Q 2. Find the annual incidence of hypothyroidism in the group.

Ans: Cumulative incidence was 6 new cases per 992 persons at risk in 2 years.

Annual incidence = 3 cases/ 1000/ year

Ex - 2

Q 3. Find 2 year period prevalence of hypothyroidism.

Ans: 2 year period prevalence = $14 / 1000$

Q 4. Find the case fatality rate of hypothyroidism.

Ans: CFR = $1 / 8 = 0.125$

Q 5. Of all cases detected at the two examinations, what proportion was newly detected?

Ans: Proportion of newly detected cases = $7 / 14 = 0.5$

Ex - 3

- A city contains 100,000 people (45,000 males & 55,000 females), and 1,000 people die per year (600 males and 400 females). There were 50 cases (40 males & 10 females) of lung cancer per year, of whom 45 died (36 males & 9 females). Compute:
 - a. Crude mortality rate
 - b. Sex specific mortality rate
 - c. Cause specific mortality rate for lung cancer
 - d. Case fatality rate for lung cancer
 - e. Proportional mortality rate for lung cancer

- a. Crude mortality rate =
 $1000/100000 * 1000 = 10$ per 1000 per year
- b. Sex specific mortality rate =
 $600/45000 * 1000 = 13.3$ per 1000 males
 $400/55000 * 1000 = 7.3$ per 1000 females
- c. Cause specific mortality rate for lung cancer
 $45/100,000 * 1000 = 0.45$ per 1000
- d. Case fatality rate for lung cancer =
 $45/50 * 100 = 90\%$
- e. Proportional mortality rate for lung cancer =
 $45/1000 * 100 = 4.5\%$

Ex - 4

- The table below depicts data on a food poisoning outbreak following a party attended by 200 medical students:

	Ate food			Did not eat food		
	Ill	Not ill	Total	Ill	Not ill	Total
Barbecue	90	30	120	20	60	80
Fish	67	33	100	43	57	100
Total	157	63	220	63	117	180

Q- Which of the two is the cause of food poisoning and why?

Ex - 4

	Ate food			Did not eat food		
	Ill	Not ill	Total	Ill	Not ill	Total
Barbecue	90	30	120	20	60	80
Fish	67	33	100	43	57	100
Total	157	63	220	63	117	180

	Attack rate (a)	Attack rate (b)	a – b
Barbecue	75%	25%	50%
Fish	67%	43%	24%

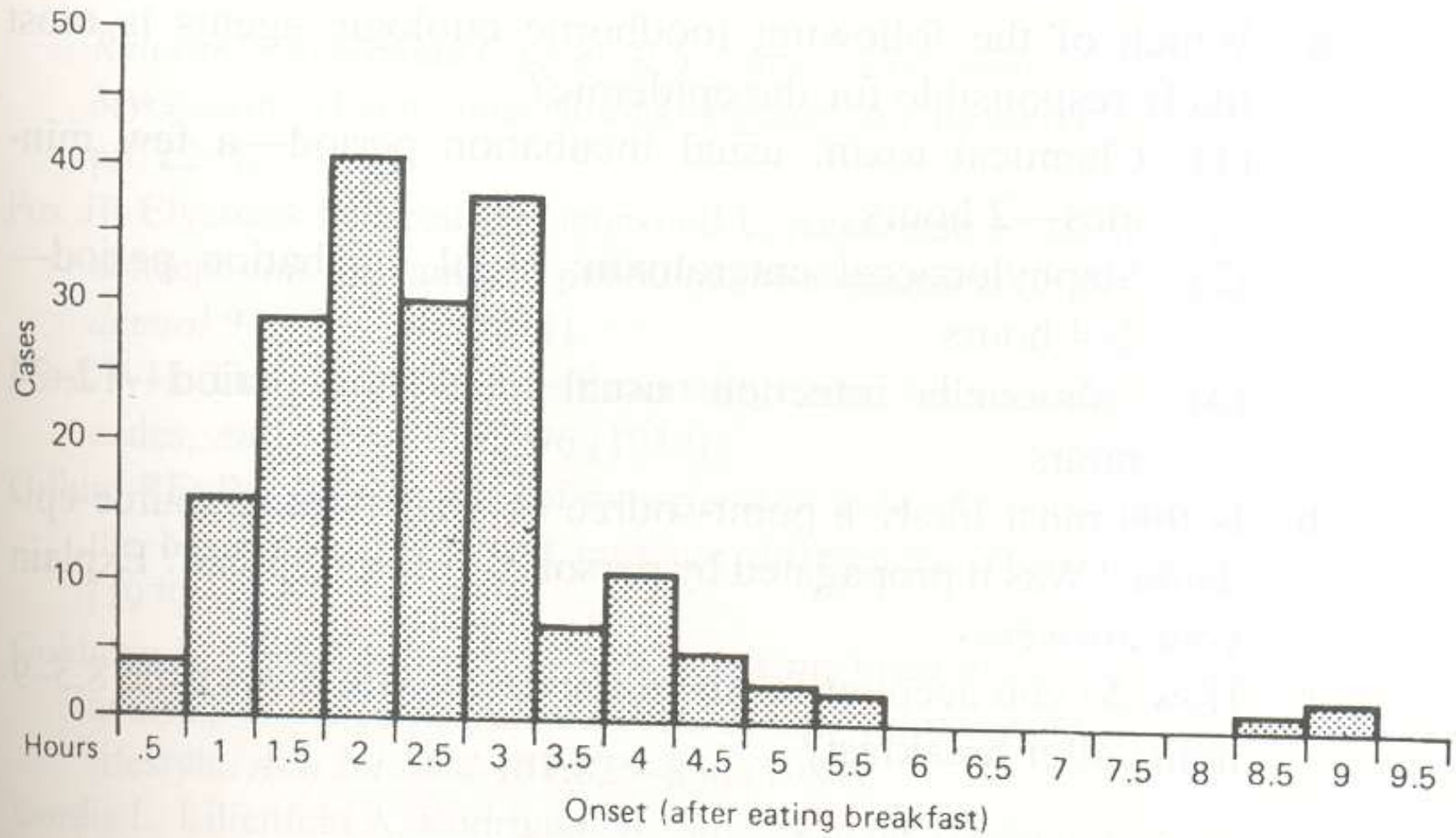
The food substance that led to food poisoning: Barbecue

Ex - 5

The Fig shows the distribution of onset times in an epidemic of vomiting and diarrhoea that occurred after breakfast on an airliner travelling from New York to Delhi on 28 Feb 1998.

- a. Which is the most likely etiologic agent of the food poisoning?
- b. What kind of an epidemic it is?
- c. How do you account for the three cases with onset time 8.5 – 9 hours after breakfast?

Ex - 5



Ex - 5

- a. Staphylococcal enterotoxin – most cases occurred about 1.5 to 3 hours after breakfast.
- b. Probably a point source epidemic because
 - a. Started and ended abruptly
 - b. Short duration
- c. They may have saved some contaminated food for later consumption or may have had a different illness.

Ex - 6

- The table below depicts data on a food poisoning outbreak following a party attended by 200 medical students:

	Ate food			Did not eat food		
	Ill	Not ill	Total	Ill	Not ill	Total
Barbecue	90	30	120	20	60	80
Fish	67	33	100	43	57	100
Total	157	63	220	63	117	180

Q-1. What is the RR of developing food poisoning after barbecue consumption?

Q- 2. what is the RR of developing food poisoning after fish consumption?

- Q-1

- Incidence among exposed = $90 / 120 = 0.75$
- Incidence among unexposed = $20 / 80 = 0.25$
- $RR = 0.75 / 0.25 = 3$

- Q – 2

- Incidence among exposed = $67 / 100 = 0.67$
- Incidence among unexposed = $43 / 100 = 0.43$
- $RR = 0.67 / 0.43 = 1.56$

Ex - 7

- Findings of a cross sectional study of the relationship between smoking and anxiety are given below:

	Anxiety level		
	High	Low	Total
Smoker	200	300	500
Nonsmoker	100	400	500
Total	300	700	1000

Q-1. What is the incidence of high anxiety levels among study participants?

Q-2. What is the prevalence of high anxiety levels?

Q-3. What is the RR of high anxiety for smokers compared to nonsmokers?

Q-4. What is the OR?

- Q-1.
 - Can not be computed from the given data.
- Q- 2.
 - Prevalence = No. of all cases of high anxiety/ Total
$$= 300 / 1000 = 0.30 \text{ (or 30\%)}$$
- Q- 3.
 - Can not be computed from the given data.
- Q- 4.
 - $OR = ad / bc = 200*400 / 100*300 = 2.67$

Ex - 8

- Incidence of miscarriage among women exposed to an agricultural pesticide

	Miscarriage	No miscarriage	Total
Exposed	30	70	100
Not exposed	10	90	100
Total	40	160	200

Calculate (a) RR

(b) AR (or risk difference)

(c) Population AR

(d) AR percent in the exposed

- Q- (a)
 - $RR = \text{incidence among exposed} / \text{incidence among unexposed} = 0.3 / 0.1 = 3$
- Q- (b)
 - $AR = \text{incidence among exposed} - \text{incidence among unexposed} = 0.3 - 0.1 = 0.2 \text{ (or 20\%)}$

- Q- (c)

Can not be calculated from the given data

- Q- (d)

- AR percent in the exposed (also known as Attributable fraction)

$$= \text{AR} / \text{incidence among exposed} = 0.2 / 0.3 = 0.67$$

$$= (\text{RR} - 1) / \text{RR} = (3 - 1) / 3 = 0.67 \text{ (or 67\%)}$$

A cross sectional study was conducted in a group of 5000 soldiers to check whether hypertension is present or not and data was recorded as below:

Hypertension	No of Soldiers
Present	450
Absent	4550
Total	5000

Q: Calculate the prevalence of hypertension among soldiers?

$$\text{Prevalence} = \frac{\text{Total no of subjects having the outcome of interest}}{\text{Total Population under study}} \times 100$$

Prevalence of hypertension among soldiers=

$$\frac{450 \times 100}{5000} = \frac{45000}{5000} = 9\%$$

Q. A total of 1000 children of 1-2 years were examined in a cross sectional study for the occurrence of Measles and immunisation against Measles, the following information was collected:

- 10 children were suffering from Measles at the time of study
- 45 children had already suffered from Measles in the past
- 45 children were given Measles vaccine
- Rest were not suffering/ suffered/ immunised

- Calculate the prevalence of Measles in the children?

$$\begin{aligned} &\text{Prevalence of active disease of measles} = \\ &\quad \frac{\text{No of children having the active} \\ &\quad \text{disease at the time of study}}{\text{Total no of children examined}} \times 100 \\ &= \frac{10 \times 100}{1000} \\ &= 1\% \end{aligned}$$

What is the incidence of measles if all those children who were at risk were followed up for a period of 1 yr and 90 of them developed the measles during followup?

Incidence of a disease=

$\frac{\text{No of new cases of disease}}{\text{Total no of persons at risk persons followed up}} \times 1000$

No. of new cases = 90 over a period of one yr

Total no. of at risk children who were followed

up for one yr= $1000 - (45 + 45 + 10) = 900$

Thus, Incidence of measles= $\frac{90 \times 1000}{900}$
 $= 100 / 1000 / \text{yr}$

- A case control study was conducted to evaluate the risk of thromboembolism among the women using Oral contraceptive pills. The data collected is recorded in a 2X2 table

THROMBOEMBOLSIM

O
C
P

	Present	Absent	Total
Used	80	20	100
Not Used	20	80	100
Total	100	100	200

Calculate the Odds Ratio? Interpret the result?

$$\begin{aligned}\text{OR} &= \frac{a \times d}{c \times b} \\ &= \frac{80 \times 80}{20 \times 20} = 16\end{aligned}$$

Interpretation: The odds of OCP use is 16 times more among the women having thromboembolism than among the women not having thromboembolism

Calculate the Attributable Risk of OCP in thromboembolism? Interpret the result?

- In a household there are total of 5 children, one of them developed pertusis, however after the occurrence of first case two more occurred within 10 days of first case. One of the unaffected child was immunised full dose of DPT. Calculate secondary attack rate of Pertusis?

SAR=

$$\frac{\text{No of exposed persons developing the disease within the range of the incubation period}}{100} \times \text{Total no of susceptible contacts}$$

Here,

Numerator= 2

Denomintor= $5-(1+1)= 3$

- Since 1 is already the primary case and the other not at risk/ susceptible being immunised

- Thus SAR of Pertusis= $\frac{2 \times 100}{3} = 66.67\%$

DISCUSSION

