a. Calculate the odds ratio (OR) (the odds of having high salt intake to the odds of having low salt intake)

OR= $\frac{a/b}{c/d} = \frac{ad}{bc} = \frac{50 \times 100}{40 \times 20} = \frac{25}{4} = 6.25$ ✓

b. What does this mean?

who having high salt intake is at risk 6.25 times more than who having low salt intake.

3. In a study of a certain disease among 2350 factory workers, it was found that a total of 110 factory workers developed arthritis. A standard population was selected and the number of arthritis cases and the population distribution in the different age groups is given in the table below.

	Study population	Standard population			
Age	Number of men in factory	Number with arthritis	Number of men	Age specific rate (Mx) for standard	Expected cases
15-24	700	5	2000	2.5×10^{-3} ?	1.75
25-34	500	50	4000	0.0125 ?	6.25
35-44	550	100	5000	0.02	?
45-54	400	208	5200	0.04	?
55-64	200	600	6000	0.1	20
Total	2350	963	22200		55

a. *Which method was used to obtain the expected cases?*

i. *Direct standardization*

(ii.) *Indirect standardization* ✓

b. *Complete all the four missing gaps in the table*

c. *Calculate the standardized morbidity ratio (SMR).* SMR= 0.382 ✗

d. *Interpret the result obtained*

7. If the number of cholera cases in a region was found to be "clearly in excess of normal expectancy," what would you say about cholera in this case?

   a. An epidemic disease
   b. An endemic disease
   c. An excess disease
   d. A normal disease

8. Which of the following data is collected once in 10 years or once in five years?

   a. Vital statistics
   b. Health care data
   c. Census data
   d. Disease registry data

9. Which of the following data provides national figures for different causes of death?

   a. Vital statistics
   b. Census data
   c. Disease registry data
   d. Surveillance data

10. If a high proportion of those exposed to a disease get infected, what would you say?

    a. The infectivity is high
    b. The pathogenicity is high
    c. The virulence is high
    d. The poison is high

11. If a high proportion of those infected develop the clinical disease, what would you say?

    a. The infectivity is high
    b. The pathogenicity is high
    c. The virulence is high
    d. The poison is high

12. If a high proportion of those developing the clinical disease become very ill, what would you say?

    a. The infectivity is high
    b. The pathogenicity is high
    c. The virulence is high
    d. The poison is high

Part 1 (8 marks): Answer all questions, selected the single best answer

1. 'The start of pathologic changes in a person' belongs to which of the following stages of the natural history of disease?

   a. Stage of susceptibility
   b. Stage of pre-symptomatic disease
   c. Stage of clinical disease
   d. Stage of recovery, disability or death

2. 'The appearance of symptoms ' belongs to which of the following stages of the natural history of disease?

   a. Stage of susceptibility
   b. Stage of pre-symptomatic disease
   c. Stage of clinical disease
   d. Stage of recovery, disability or death

3. 'The latency period ' belongs to which of the following stages of the natural history of disease?

   a. Stage of susceptibility
   b. Stage of pre-symptomatic disease
   c. Stage of clinical disease
   d. Stage of recovery, disability or death

4. Which of the following is the correct description of a 'multiple cause of death'?
   a. The cause that occurs many times
   b. The underlying cause of death
   c. The final cause of death
   d. Any cause listed on the death certificate

5. Which of the following is the correct description of the 'principal cause of death'?
   a. The cause that occurs many times
   b. The underlying cause of death
   c. The final cause of death
   d. Any cause listed on the death certificate

6. Natural history of a disease refers to which of the following?
   a. The course of disease over time, affected by treatment
   b. The treatment outcome of disease over time
   c. The course of disease over time, unaffected by treatment
   d. The history of the treatment of disease

15. Two clinical nutritionists independently classify patients into two groups (maintains balanced diet / maintains unbalanced diet) based observation and answers to a few questions. Classification of 60 patients gives a kappa value of 0.7. What does this mean?
    a. 70% of the patients maintain balanced diet
    b. 70% of the patients maintain unbalanced diet
    c. The agreement between the clinical nutritionists is moderate
    d. The agreement between the clinical nutritionists is good

16. Which of the models of causation gives an important role to the 'genetic core'?
    a. Germ theory
    b. Triad model of causation
    c. Wheel model
    d. Web model of causation

17. Which of the models of causation is expressed in terms of the relationship between the host, agent, and environment?
    a. Germ theory
    b. Triad model of causation
    c. Wheel model
    d. Web model of causation

18. According to the 'sufficient-component' model of causation, what is the name of the factor that is present in all cases of a disease but is not the only factor present?
    a. Sufficient cause
    b. Unique cause
    c. Necessary and sufficient cause
    d. Necessary but not sufficient cause

19. Which of the following is not true about an ecological study?
    a. It uses individuals as the unit of study
    b. It is a descriptive study
    c. It suffers from ecological bias
    d. It uses populations or groups as units of analysis

20. Which of the following is not an analytic study?
    a. Ecological study
    b. Descriptive study
    c. Cohort study
    d. Case-control study

Part 1: Answer all questions, selected the single best answer

1. Which of the following data provides national figures for different causes of death?
   a. Vital statistics
   b. Census data
   c. Disease registry data
   d. Surveillance data

2. What is the name for the cause of death that started the chain of events leading to the death?
   a. Multiple cause of death
   b. Contributing cause of death
   c. Principal cause of death
   d. Underlying cause of death

3. Which of the following is the correct description of the 'principal cause of death'?
   a. The cause that occurs many times
   b. The underlying cause of death
   c. The final cause of death
   d. Any cause listed on the death certificate

4. Which of the following is the correct description of a 'multiple cause of death'?
   a. The cause that occurs many times
   b. The underlying cause of death
   c. The final cause of death
   d. Any cause listed on the death certificate

6. The table below shows data obtained from a Cancer Registry

Year	Number of new cases of pancreatic cancer
1980	100
1981	120
1982	140

In addition,

Population at the beginning of 1980= 200 000

Population at the end of 1982= 300 000

Calculate the following:

a. The total number of new cases during the period 1980 to 1982= 360 ✓
b. The mid-interval population (average population) = 250000 ✓
c. To total person-years for by this average population= 250000 x 3 = 750 000
d. The person-time rate for pancreatic cancer= $\frac{360}{750\,000}$ = 0.00048

7. In a hospital, 1200 babies were born during a year. Of these, the number of deaths are given below:

Stage	Number of deaths
From 28 weeks of pregnancy to just before birth	30
From birth to less than 7 days	15
From 7 days to less than 28 days	20
From 28 days to less than a year	50

Calculate the following:

a. The number of perinatal deaths= 30+15 = 45
b. The number of neonatal deaths= 15+20 = 35
c. Neonatal mortality rate= $\frac{35}{1200}$ =
d. Post-neonatal mortality rate= $\frac{50}{1200}$
e. Perinatal mortality rate=: → $\frac{45}{1200+30}$
f. Infant mortality rate= $\frac{15+20+50}{1200} = \frac{85}{1200}$

21. Which of the following is not true about a descriptive study?
   a. It attempts to link exposure to effect
   b. It shows the distribution of rates in the population
   c. It shows the distribution of rates in different regions
   d. It shows rates over time

22. Which of the following is true about a cross-sectional study?
   a. It uses populations or groups as units of analysis
   b. It is also called prevalence study
   c. It uses individuals and units of analysis
   d. It is the same as an ecological study

23. In a study, a group of nurses are followed for 10 years. Before the end of the study, a second study is carried out in which those nurses with the disease are compared with a sample of nurses without the disease. What is the name of this second study?
   a. Cohort study
   b. Cross-sectional study
   c. Nested case-control study
   d. Cohort case-control study

24. In 1960, two groups of women were selected for study. The first group was made up of 200 women working in a radiation factory. The second group was made up of 200 women who working as school teachers. After 30 years, it was found that the 25 of the women in the radiation factory developed bone cancer while five (5) of the school teachers developed bone cancer. Which kind of study is this?
   a. *Case-control study*
   b. *Cross-sectional study*
   c. *Ecological study*
   d. *Cohort study*

25. *In randomized controlled trials, at which stage are the participants separated to 'study group' and 'control group'?*
   a. *Recruitment*
   b. *Informed consent*
   c. *Allocation*
   d. *Measurement*

26. *Which of the following is not true about cohort study?*
   a. *It can be done prospectively (present to the future)*
   b. *It can be done retrospectively (present to past)*
   c. *It allows you to start with those with the disease and then investigate the exposur*
   d. *It allows you to estimate incidence rates*

12. In a hospital, 1200 babies were born during a year. Of these, the number of deaths are given below:

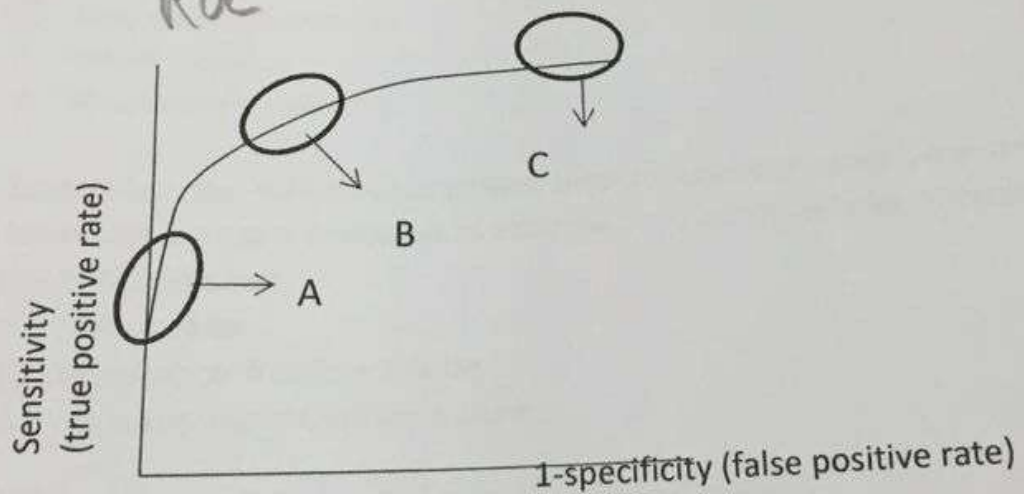
Stage	Number of deaths
During the first 28 days after birth	30
After 28 days but less than a year	50

Calculate the following (you can leave your answer in fraction, eg 20/50):

a. Neonatal mortality rate= $\frac{30}{1200} = \frac{1}{40}$
b. Post-neonatal mortality rate= $\frac{50}{1200} = \frac{1}{24}$
c. Infant mortality rate= $\frac{30+50}{1200} = \frac{80}{1200} = \frac{1}{15}$

Fig 1 below shows a graph of sensitivity and (1-specificity) for a certain test. What is the name of this graph? RAC or RSC

ROC



13. At which point (in Fig. 1) is the sensitivity low?
a. A
b. B
c. C

14. At which point (in Fig. 1) is the test good?
a. A
b. B
c. C

4. The table shows the relationship between lung cancer and smoking as obtained from a cohort study

		Disease		
		Lung cancer	No Lung cancer	Total
Exposure	Smokers	80 (a)	200 (b)	280
	Non-smokers	40 (c)	450 (d)	490
	Total	120	650	1000

a. Calculate the relative risk (RR) (the risk of cancer among those smoking to those not smoking)

RR= 3.5 ✓

$\frac{80/280}{40/490} =$

2/2

b. What does this mean?

Smokers have higher relative risk of getting lung cancer by 3.5 times more than non-smokers.

Part 3: Answer any two questions

5. Discuss the benefits and problems of national statistics on causes of death

6. Discuss the similarities and differences between direct and indirect standardization

7. What is a confounding variable? How do we control for the effect of confounding variables?

8. What is screening? What are the benefits of screening?

9. What do we know about the epidemiological profile of Saudi Arabia

10. Discuss the challenges of nutritional epidemiology

8. The table shows the relationship between hypertension and salt intake

		Hypertension		
		Present	Absent	
Exposure	High salt intake	50 (a)	40 (b)	90
	Low salt intake	20 (c)	100 (d)	120
		70	140	210

1. The odds ratio (the odds of having high salt intake to the odds of having low salt intake)

$$= \frac{a/b}{c/d} \quad 6.25$$

2. What does this mean?

9. List any three problems encountered with national statistics on causes of death

a. Misreporting of a named cause of death to another named cause of death or other unnamed cause

b. poor knowledge of completing the death notification form, can result in erroneous data

c. wrong choice of the underlying causes of death

d. poorly written causes of death, which cannot be read properly

10. Explain the difference between direct standardization and indirect standardization

	direct	indirect
	it's used when we have age-specific rates	it's used when we don't have age specific rates
Method:	study population rates applied to standard population	
required data in study population:	Age-specific rates	Age composition + total deaths or cases
required data in standard p.:	Ag population	Age specific rates (overall rate)
result:	Age adjusted rate	standardiesed mortality (morbidity) ratio (+ age adjusted rate)