

Date : October 11, 2025
Total Marks : 100
Writing Time : 150 minutes (2.5 hours)
Reading Time : 15 minutes (prior to writing time)

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is to check the number of pages of Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **TWO SECTIONS**, namely SECTION A & SECTION B:
 - **SECTION A** has two parts: Part I - 30 Multiple Choice Questions
 Part II - 4 Short Answer Questions

All questions under SECTION A are **COMPULSORY**.
 - **SECTION B** consists of two Case Studies. Choose only **ONE** case study and answer the questions of your choice.
4. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
5. All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating the Section, Part and Question Number will NOT be evaluated and no marks will be awarded.
6. Begin each Section and Part on a fresh page of the Answer Booklet.
7. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
8. Use of any other paper including paper for rough work is not permitted.
9. **You must hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
10. This paper has **11 printed pages**, including this instruction page.

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SECTION A

PART I: Multiple Choice Questions [30 marks]

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (d). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. Which measure best describes the risk of developing a disease in a population over time?
 - a) Prevalence
 - b) Incidence rate
 - c) Case-fatality rate
 - d) Odds ratio
2. The generic measure of disease burden, including both the quality and the quantity of life lived refers to:
 - a) DALY
 - b) QALY
 - c) YLL
 - d) YLD
3. Association of mine workers and silicosis of lungs (an occupational lung disease among miners) was observed repeatedly by different persons, in different places, at different times, and using different methods.
Which Bradford Hill criterion does this best illustrate?
 - a) Analogy
 - b) Plausibility
 - c) Consistency
 - d) Specificity
4. The ability of a test to correctly identify the proportion of individuals who have a specific disease or condition, thereby accurately identify most people who are sick, reducing the likelihood of missing cases.
 - a) True negative rate
 - b) False negative rate
 - c) True positive rate
 - d) False positive rate
5. According to the UNICEF Bhutan, what percent of the Bhutanese population have access to basic sanitation services?
 - a) 63%
 - b) 73%
 - c) 83%
 - d) 93%

6. A very small airborne solid particles or liquid particles suspended in the air like smoke, soot, dust, and chemicals that can be inhaled deep into the lungs and cause various health problems. Which of the following measures of air pollution level is referred to?
- a) PM2.5
 - b) PM10
 - c) Nitrogen Dioxide (NO₂)
 - d) Carbon Monoxide (CO)
7. Which of the following best describes the role of Health Promotion and Behavioral Sciences in public health?
- a) Monitoring disease outbreaks and enforcing health laws
 - b) Conducting surgical procedures and prescribing medications
 - c) Understanding health behaviors, designing behavior change strategies, and engaging communities
 - d) Managing hospital administration and budgeting
8. Which of the following are the three strategic priorities of the World Health Organization (WHO) in Bhutan?
- a) Expanding hospital infrastructure, increasing medical tourism, and promoting herbal medicine exports
 - b) Strengthening health systems for UHC, building national capacities for public health security, and managing major diseases
 - c) Privatizing healthcare services, reducing immunization campaigns, and outsourcing surveillance functions
 - d) Promoting traditional healing systems, building regional trade agreements, and establishing medical colleges
9. Which of the following statements best reflects the budgeting principles and health financing approach in Bhutan?
- a) Bhutan follows a fully privatized health financing system with minimal government input.
 - b) Health financing in Bhutan is based on out-of-pocket payments and voluntary insurance schemes.
 - c) Bhutan follows a publicly funded model with health care provided free at the point of delivery, primarily financed through general taxation and external grants.
 - d) Bhutan allocates less than 2% of its national budget to health care, relying solely on donor support.
10. A Health Assistant in a Primary Health Centre (PHC) at Nagor in Silambi in Mongar District is delivering preventive measures for communicable and non-communicable diseases through comprehensive school health programs and outreach health camps. This is an example of:
- a) Curative health service
 - b) Preventive and promotive health service
 - c) Emergency response service
 - d) Rehabilitative service

11. Which is a key element of the primary health care approach?
- a) Hospital-based care
 - b) Specialist services
 - c) Community participation
 - d) Expensive technologies
12. The Gross National Happiness (GNH) framework in Bhutan integrates health under which pillar?
- a) Good Governance
 - b) Sustainable Socio-economic Development
 - c) Preservation of Culture
 - d) Conservation of Environment
13. Bhutan's current health expenditure is approximately 4 to 4.5% of GDP. According to the Abuja Declaration of 2001, what percentage of the annual budget should be allocated to the improvement of the health sector?
- a) 10 %
 - b) 15%
 - c) 20%
 - d) 30%
14. Which types of disease and programs are consuming the largest share of health expenditure currently, as per the national health accounts, MoH, Bhutan?
- a) Infectious disease followed by NCDs and reproductive health care.
 - b) Non-communicable diseases (NCDs) followed by reproductive health care and infectious diseases.
 - c) Reproductive health care, followed by NCDs and infectious disease.
 - d) HIV, TB and Malaria.
15. What is herd immunity?
- a) Vaccinating only vulnerable groups
 - b) Immunity from past infections
 - c) Protection of unvaccinated people due to high community immunity
 - d) A method for treating disease
16. The main aim of outbreak investigation is to:
- a) Blame the source
 - b) Find patient zero
 - c) Control the outbreak
 - d) Publish data
17. Which level of prevention involves vaccination?
- a) Primary
 - b) Secondary
 - c) Tertiary
 - d) Quaternary

18. Most common diarrheal agent for infant is:
- Rhino virus
 - Rota virus
 - Enterovirus
 - E. coli
19. Which vitamin deficiency is a major cause of preventable childhood blindness?
- Vitamin A
 - Vitamin B12
 - Vitamin C
 - Vitamin D
20. Bhutan achieved IDD elimination in 2003, but ongoing monitoring is needed to ensure this status is maintained. Iodine surveillance in community is done by:
- Testing iodine secretion in urine
 - Measuring iodine from packets
 - Analysis of goiter prevalence
 - Data collection
21. According to the National Health Survey report, 2023, what is the current maternal mortality ratio in Bhutan?
- 53 per 1000 live births.
 - 53 per 100000 live births.
 - 89 per 1000 live births.
 - 89 per 100000 live births
22. Calculating formula of General Fertility Rate (GFR):
- No. of live birth /Population of women of reproductive age (15-49yrs) *1000
 - No. of live birth /Population of married women of reproductive age (15-49yrs) *1000
 - No. of live birth /Total population of women*1000
 - No. of live birth /Population of women of reproductive age (15-49 yrs) *100000
23. What is the recommended minimum number of ANC visits according to WHO?
- Two
 - Three
 - Four
 - Eight
24. The very important variable for assessing nutrition of under 5 children is/are:
- Weight
 - Height
 - Age
 - All of above

25. Which of the following is the leading cause of premature death among adults worldwide in recent years?
- a) Road Traffic accidents
 - b) Ischemic Heart Diseases (CVDs)
 - c) Tuberculosis
 - d) COPD
26. Identify a pair of cancers with a risk factors linked to infectious agents from the following:
- a) Lungs and Liver cancers.
 - b) Cervical and Breast Cancers.
 - c) Stomach and Cervical Cancers
 - d) Head and Neck cancers.
27. Which mental health condition is most prevalent among adolescents in Bhutan according to Annual Health Bulletin 2025?
- a) Schizophrenia
 - b) Anxiety disorder
 - c) Depression
 - d) Bipolar disorder
28. One Health is a collaborative approach to:
- a) Human health only
 - b) Animal welfare only
 - c) Environmental sustainability
 - d) Human, animal, and environmental health
29. The introduction of Bhutan's electronic Patient Information System (ePIS) can improve health equity primarily by:
- a) Providing equal access to accurate patient health records across all health facilities, including rural areas
 - b) Limiting health services to those living in urban centers with internet access
 - c) Prioritizing high-income patients in data management
 - d) Restricting the sharing of patient data between healthcare providers
30. Collaboration between allopathic (modern) medicine/Doctors and traditional medicine/*Drungtshos* is important in order to achieve which of the following goals?
- a) Improve healthcare service coverage and accessibility
 - b) Integrate diverse medical knowledge for holistic patient care
 - c) Enhance patient trust and cultural acceptance of treatments
 - d) Strengthen national health systems and achieve Universal Health Coverage (UHC)
 - e) All of the above

PART II – Short Answer Questions [20 marks]

This part has Short Answer Questions. Answer ALL the questions. Mark for each sub-question is indicated in the brackets.

1. Epidemiological studies help determine how often diseases occur, identify risk factors, and understand how diseases spread. Choosing the appropriate study design is a crucial step in an epidemiological investigation. This knowledge is crucial for developing strategies to control disease outbreaks, prevent future illnesses, and improve overall public health.
 - a) List the types of epidemiological studies or study designs. **(2 marks)**
 - b) Describe/list, in which studies the relative risk (RR) and the odds ratio (OR) are used. **(1 mark)**
 - c) In a case–control study, the odds ratio for developing disease “X” among individuals exposed to risk factor “Y” was found to be 4 compared to those not exposed. Interpret this odds ratio. **(1 mark)**
 - d) List two most important purposes of randomizing during sampling. **(1 marks)**

2. According to the Annual Health Bulletin 2025, a total of 920 Tuberculosis (TB) cases were reported in 2024 with increasing case notification trend, underscoring the continued urgency for comprehensive prevention and treatment strategies.

As of December 2024, Bhutan has recorded a cumulative of 1020 HIV cases since 1993. In 2024, 85 new cases were detected. In total, 774 people are living with HIV and 98% of them are on antiretroviral therapy treatment (ART).

 - a) Given that Bhutan reported 920 TB cases in 2024 and has recorded a cumulative 1020 HIV cases since 1993, what does this data imply about the country’s infectious disease burden? **(2 marks)**
 - b) If 774 people are living with HIV and 98% are on ART.
 - Calculate the number of patients currently on ART. **(1/2 mark)**
 - Discuss/list, why high ART coverage is crucial in HIV control. **(1/2 mark)**
 - c) Explain briefly why integrated TB and HIV programs are important in Bhutan, considering the reported TB and HIV statistics. **(1 mark)**
 - d) Based on the reported data, propose two priority public health interventions that the Ministry of Health should focus on in 2025 to address rising incidence of TB and HIV. **(1 mark)**

3. According to data from the Royal Centre for Disease Control (RCDC), 154,221 cases of notifiable diseases were recorded through the weekly reporting system in 2024. RCDC also serves as the nodal point of disease surveillance system in Bhutan.
- a) How many immediately notifiable diseases or syndromes AND how many weekly notifiable diseases or syndromes are there currently in place with RCDC? **(1 mark)**
 - b) Among the weekly reportable diseases and syndromes, acute respiratory infections (ARI) and acute watery diarrhea (AWD) were the most frequently reported, accounting for 82.0% and 15.0% of cases, respectively in 2024.
 - Discuss which age group is most predominantly affected by the ARI and AWD. **(1 mark)**
 - Enumerate up to three preventive measures for ARI and AWD respectively. **(1 marks)**
 - c) List the types of disease surveillance system in public health. What do you understand by sentinel surveillance? **(1 marks)**
 - d) Define the following with suitable examples of each:
 - Epidemic **(1/2 mark)**
 - Pandemic **(1/2 mark)**
4. Answering the following questions
- a) Discuss Universal Health Coverage (UHC - SDG 3.8). What are the two indicators used to track Progress on UHC, which are (SDG 3.8.1 & SDG 3.8.2). **(2 marks)**
 - b) Outline or list the stages involved in the health planning cycle/process. **(2 marks)**
 - c) According to the National Blood Lead Level Survey 2024, an alarming percentage (75.9%) of children 1-6 years old had blood lead levels (BLLs) ≥ 3.5 $\mu\text{g/dL}$.
 - Enumerate ways to reduce the risk of lead exposure. **(1 mark)**

SECTION B: Case Study [50 marks]

Choose either CASE I OR CASE II from this section. Each case study carries 50 marks. Mark for each sub-question is indicated in the brackets.

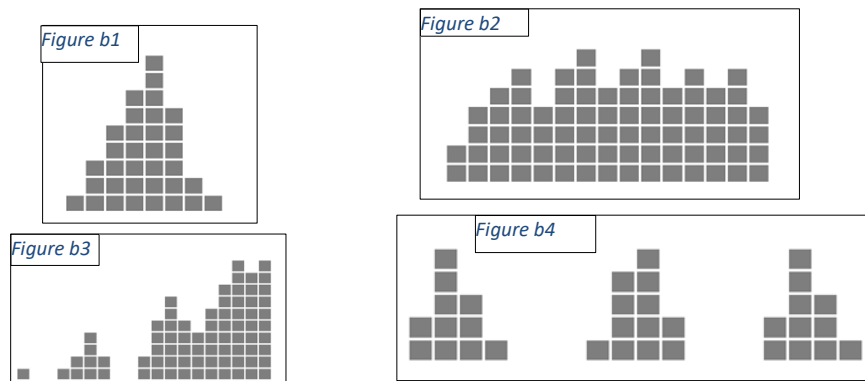
CASE I

On 1st July 2025, the Ministry of Health issues a “Press Release” stating that “Leptospirosis Confirmed as Cause of Acute Respiratory Distress Syndrome (ARDS) Cluster in Dewathang” based on laboratory confirmation and epidemiological link.

The WHO South-East Asia Region Epidemiological Bulletin, 13th edition (2025), 02 Jul 2025 reported that out of 230 trainees, 143 exhibited symptoms and have been treated as per clinical protocols. Of these, three passed away. The Ministry has initiated outbreak investigations and rapid response to the outbreak.

- What are the key steps in an outbreak investigation? How is a case definition developed and why is it important? (5+5=10 marks)
- How do you construct an epidemic curve (Epi curve)? List the importance of Epi curve (3+3=6 marks).

Interpret the following Epidemic Curve based on source of outbreaks (4 marks)



- Which type of epidemiological study designs or analytical studies are used to investigate the source and spread of an outbreak? (2 marks)
- Based on the information given in the Leptospirosis outbreak case scenario above, write the formula and then calculate Attack Rate (AR) and Case Fatality Ratio (CFR) due to Leptospirosis outbreak in Dewathang. Interpret the results. (8 marks)

- e) Define emerging and re-emerging infectious diseases with suitable examples. Describe what do you understand by the currently gaining popularity of One Health approach to disease prevention and control. **(10 marks)**
- f) Describe control and prevention measures implemented during a disease outbreak in general? **(10 marks)**

CASE II

According to the World Health Organization (WHO), Non-communicable diseases (NCDs) killed at least 43 million people in 2021, equivalent to 75% of non-pandemic-related deaths globally. In 2021, 18 million people died from an NCD before age 70 years. Of all NCD deaths, 73% are in low- and middle-income countries. Cardiovascular diseases (CVD) accounted for at least (19 million) deaths in 2021, followed by cancers (10 million), chronic respiratory diseases (COPD 4 million), and diabetes (>2 million including kidney disease deaths caused by diabetes). These four groups of diseases account for 80% of all premature NCD deaths. Top causes of death in Bhutan according to the WHO in 2021 is as shown in Figure 1.

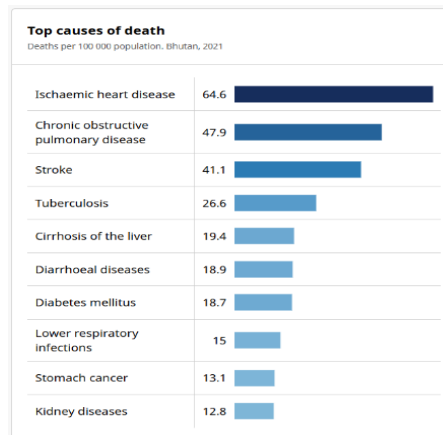


Figure 1 Top causes of death, Bhutan 2021

- a) Describe the Behavioral, Metabolic and Environmental risk factors of the major NCDs (CVD, COPD, liver cirrhosis, diabetes & cancers). **(10 marks)**
- b) How do NCDs impact socioeconomic development and the achievement of the 2030 Sustainable Development Goals (SDGs)? **(10 marks)**
- c) What characteristics of a disease would indicate its suitability for screening? **(4 marks)**
 What epidemiological study designs accordingly to you can be used to evaluate a screening programme, considering Diabetes Type 2 and Hypertension. Describe briefly. **(6 marks)**

d) Describe the four levels of prevention of modern epidemics like the NCDs.

Give examples of action at each level which would be appropriate as part of a comprehensive programme to prevent cardiovascular diseases (ischemic heart disease + stroke). **(10 marks)**

e) Describe your approach to management of NCDs in primary health care (PHC) setting. List the enablers and challenges of management of NCDs in PHCs. **(10 marks)**

TASHI DELEK