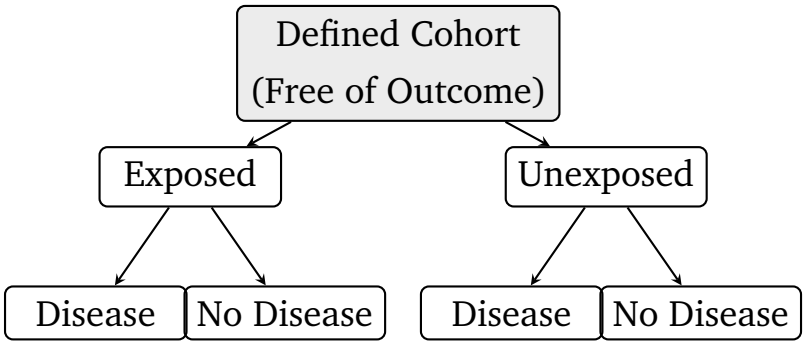
NEET PG Social & Preventive Medicine Sample Paper-10

Duration: 20 Minutes **Maximum Marks: 100**

Instructions

- This paper contains **25** Multiple Choice Questions.
- Each correct answer carries **+4** mark. Incorrect answer: **−1** marks. Only **one** correct option.
- Unattempted questions carry **0** marks.
- Use of mobile phones, smartwatches, or any electronic gadgets is strictly prohibited.

Q1. An investigator initiates a study where two defined groups of individuals, one exposed to a suspected risk factor and another unexposed, are followed over a 5-year period to determine the development of a specific cardiovascular outcome as illustrated below:



Which of the following is the primary measure of association derived from this study design?

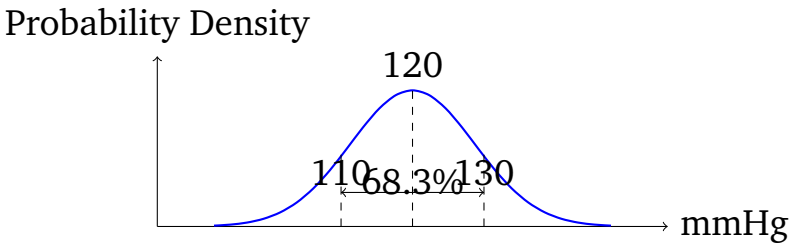
(A) Odds Ratio

(B) Relative Risk

(C) Prevalence Ratio

(D) Attributable Fraction among unexposed

Q2. The distribution of systolic blood pressure in a large healthy adult population follows a symmetrical, bell-shaped distribution curve centered around a mean of 120 mmHg with a standard deviation of 10 mmHg as shown below:



What percentage of this population is expected to have a systolic blood pressure between 100 mmHg and 140 mmHg?

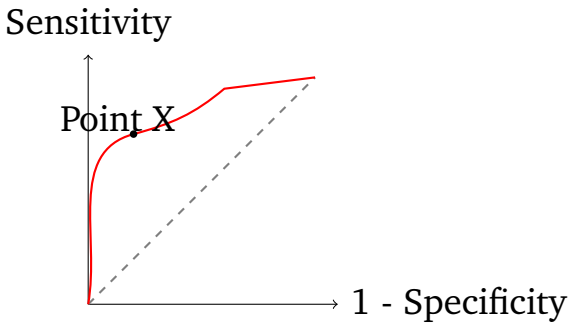
(A) 68.3%

(B) 95.4%

(C) 99.7%

(D) 45.0%

Q3. A new diagnostic biomarker is evaluated for the early detection of a malignant tumor. The performance of the screening tool across various threshold values is plotted using the receiver operating characteristic (ROC) curve below:



Moving the diagnostic cutoff point toward Point X on the curve would result in which of the following changes?

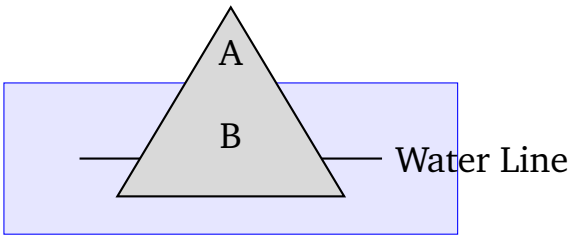
(A) Maximize both false positives and false negatives simultaneously

(B) Decrease sensitivity while increasing specificity

(C) Increase sensitivity while decreasing specificity

(D) Maintain identical predictive values regardless of prevalence

Q4. Consider the classic visual epidemiological representation of a disease in a community provided below:



In this diagram, the segment labeled 'A' above the water line corresponds most accurately to which of the following categories?

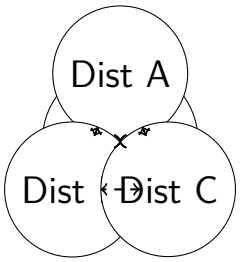
(A) Unapparent, subclinical infections in the community

(B) Presymptomatic cases detected via screening

(C) Symptomatic, diagnosed, and clinically manifest cases

(D) The pool of carriers providing a repository for transmission

Q5. The structural flow of public health communication in a decentralized surveillance network is mapped out schematically as shown here:



When horizontal information sharing occurs directly between peripheral entities (represented by the dashed lines) without passing through the central command, this communication pattern is structurally classified as?

(A) Formal vertical channel

(B) Lateral or horizontal communication

(C) Multi-tier top-down dissemination

(D) Bureaucratic circuitous feedback

Q6. A population of 10,000 baseline disease-free individuals was tracked for development of Pulmonary Tuberculosis over 1 year. On January 1st, 2025,

50 individuals were already undergoing treatment for TB. During the year, 120 new cases were detected. A total of 20 patients died due to complications of TB during this observation window. What is the incidence density of Tuberculosis per 1,000 person-years if the average tracking time for individuals developing disease or dying is exactly half a year?

(A) 12.00 per 1,000 person-years

(B) 12.14 per 1,000 person-years

(C) 17.00 per 1,000 person-years

(D) 14.20 per 1,000 person-years

Q7. In a major chemical spill accident scenario, public health officials want to ascertain whether acute chemical exposure is linked with subsequent transient peripheral neuropathy. Because the exposure is extremely rare and catastrophic, but the disease manifestation presents within a relatively short period, which study design provides the most resource-efficient method?

(A) Retrospective Cohort Study

(B) Classic Case-Control Study

(C) Ecological Correlation Study

(D) Time-Series Cross-Sectional Survey

Q8. An epidemiological assessment indicates that the Relative Risk of developing pancreatic carcinoma among chronic heavy alcohol consumers compared to non-consumers is 4.0. If the prevalence of chronic heavy alcohol consumption in this urban territory is 20%, what is the Population Attributable Risk Proportion (PARP) for heavy alcohol consumption?

(A) 60%

(B) 37.5%

(C) 50%

(D) 25%

Q9. During a routine investigation of a localized food poisoning outbreak following a community festival banquet, investigators calculated the attack rates for various food items consumed. The attack rate was 75% among those who ate vanilla custard and 10% among those who did not eat it. What is the primary inference regarding vanilla custard?

(A) It is a protective factor with high statistical certainty

(B) It has an attributable risk of 65% among the exposed cohort

(C) It is confirmed to contain Salmonella endotoxins without microbiological culture

(D) The odds ratio cannot be estimated because it represents an open cohort

Q10. A clinical trial evaluates an innovative antihypertensive compound versus standard therapy. The primary endpoint is the reduction of stroke events over 3 years. The absolute risk of stroke in the control arm is 6%, while in the intervention arm it is 4%. What is the Number Needed to Treat (NNT) to prevent one single stroke event?

(A) 20

(B) 50

(C) 100

(D) 250

Q11. A researcher measures the serum cholesterol levels of 45 adult patients before and 8 weeks after initiating a strict vegan diet regimen. The parameter of interest is the mean change in cholesterol within the same group. Assuming data assumptions of normality are satisfied, which statistical test is most appropriate?

(A) Independent samples Student's t-test

(B) Chi-square test of independence

(C) Paired Student's t-test

(D) Wilcoxon Rank-Sum test

Q12. In a randomized control trial investigating a novel anti-arrhythmic medication, the p-value for the primary mortality endpoint is calculated as 0.02. This implies that:

(A) There is a 2% probability that the alternate hypothesis is completely true

(B) The probability of observing a difference as large or larger than the one found, assuming the null hypothesis is correct, is 2%

(C) The drug is guaranteed to reduce mortality risk by exactly 98% in the general clinical population

(D) The power of the test to rule out a false null hypothesis is fixed at 2%

Q13. A systematic review notes that the 95% Confidence Interval for the Relative Risk of a specific treatment intervention across five trials ranges between 0.72 and 1.15. Which of the following conclusions can be definitively deduced from this statistical finding?

(A) The treatment intervention is highly superior and statistically significant

(B) The sample size was too large, introducing systematic selection bias

(C) The null value of no effect is included within the interval, indicating non-significance

(D) The p-value for this specific association must be less than 0.01

Q14. Under the National Tuberculosis Elimination Program (NTEP) guidelines, a patient diagnosed with drug-sensitive pulmonary tuberculosis who relapses after completing a full course of first-line therapy should be initiated on which specific therapeutic regimen?

(A) Repeat the standard 6-month first-line regimen containing HRZE

(B) Promptly initiate an empirical longer oral Mdr-TB regimen containing Bedaquiline

(C) Add Streptomycin to the standard first-line regimen for a total duration of 8 months

(D) Perform drug susceptibility testing (DST) and tailor therapy based on the resistance profile

Q15. Under the National Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCH+A) strategy, the strategic implementation of the "Janani Suraksha Yojana" (JSY) primary goal centers directly upon:

(A) Providing free formula food milk packets to high-risk newborns

(B) Reducing maternal and neonatal mortality by promoting institutional delivery via conditional cash transfers

(C) Mandatory registration of all pregnancies within the first 24 weeks at private corporate hospitals

(D) Subsidizing safe abortion services exclusively in secondary care settings

Q16. Under the National Vector Borne Disease Control Programme (NVBDCDP), the strategy of annual Mass Drug Administration (MDA) using a combination of Diethylcarbamazine (DEC) and Albendazole is explicitly aimed at eliminating the transmission of which parasite?

(A) Plasmodium falciparum

(B) Leishmania donovani

(C) Wuchereria bancrofti

(D) Brugia malayi exclusively in desert terrains

Q17. A 24-year-old primigravida woman tests positive for HBsAg during a routine antenatal screening clinic. According to current national public health guidelines, what prophylactic protocol must be extended to the newborn child immediately post-delivery?

(A) Hepatitis B vaccine monovalent dose within 24 hours of birth

(B) Hepatitis B immunoglobulin (HBIG) alone without the vaccine within 48 hours

(C) Both Hepatitis B vaccine birth dose and HBIG administered at separate anatomical sites within 12-24 hours

(D) Oral antiviral therapy to the infant for the first six weeks of life

Q18. Under the National Programme for Control of Blindness and Visual Impairment (NPCBVI), the standard operational definition for low vision / visual impairment includes which criteria regarding the better eye with best possible correction?

(A) Visual acuity less than 6/18 down to 3/60

(B) Visual acuity less than 3/60 down to no light perception

(C) Visual acuity less than 6/60 down to counting fingers at 1 meter

(D) Symmetrical visual field loss restricted to less than 45 degrees around fixation

Q19. The "Pradhan Mantri Jan Arogya Yojana" (PM-JAY) component of Ayushman Bharat provides an annual health insurance cover of how much financial value per eligible family unit for secondary and tertiary care hospitalization costs?

(A) INR 1 Lakh

(B) INR 2.5 Lakhs

(C) INR 5 Lakhs

(D) INR 10 Lakhs

Q20. A community screening program for Type 2 Diabetes Mellitus utilizing a random capillary blood glucose cut-off value is implemented in a region experiencing a sudden influx of a migrant population with a significantly lower baseline prevalence of diabetes. What shift will occur regarding the positive predictive value (PPV) of this screening strategy?

(A) The PPV will increase significantly due to lower false positives

(B) The PPV will drop because a lower prevalence reduces the true positive ratio relative to false positives

(C) The PPV remains unchanged as it is an intrinsic diagnostic parameter of the test

(D) The PPV automatically merges with the sensitivity value of the test tool

Q21. The Universal Immunization Programme (UIP) specifies the administration of the Rotavirus Vaccine in which formulation and schedule sequence for an infant?

(A) Intramuscular injection at 6 weeks and 14 weeks

(B) Oral drops administered at 6 weeks, 10 weeks, and 14 weeks

(C) Subcutaneous injection given concurrently with Measles-Rubella at 9 months

(D) Intradermal administration split into two doses at birth and 6 weeks

Q22. Which of the following vaccine types presents the highest potential biological risk if accidentally administered to an individual with severe acquired T-cell immunodeficiency status secondary to advanced untreated HIV infection?

(A) Whole-virion inactivated Hepatitis A Vaccine

(B) Recombinant Subunit Hepatitis B Vaccine

(C) Live Attenuated Yellow Fever Vaccine

(D) Tetanus Toxoid Conjugate Vaccine

Q23. According to the Bio-Medical Waste Management Rules in India, anatomical waste items consisting of human tissues, organs, and amputated body parts must be segregated into color-coded bags of which type, and treated by which designated process?

(A) Red Bag; Autoclaving followed by shredding

(B) Yellow Bag; Incineration or deep burial

(C) Blue Cardboard Box; Microwaving and chemical disinfection

(D) Translucent container; Hydroclaving and recycling disposal

Q24. In a rural health ecosystem, the primary health care facility that acts as the immediate first referral unit (FRU) equipped to deliver round-the-clock emergency obstetric and newborn care services is designated structurally as the:

(A) Sub-Health Centre (Sub-Centre)

(B) Primary Health Centre (PHC)

(C) Community Health Centre (CHC)

(D) Regional Super-Specialty Medical Institute

Q25. The Sustainable Development Goal (SDG) target 3.1 established by the United Nations aims to accomplish which global threshold regarding the Maternal Mortality Ratio (MMR) by the horizon year 2030?

(A) Reduce the global MMR to less than 70 per 100,000 live births

(B) Reduce the global MMR to absolute zero across all developing territories

(C) Lower the regional MMR to less than 140 per 10,000 live births

(D) Restrict maternal mortality to less than 1% of gross institutional deliveries

Detailed Solutions

Q1.

Solution

Concept:

A cohort study is an observational analytical study design where a group of individuals who are initially free of the disease or outcome under investigation are classified based on their exposure status to a specific risk factor. These individuals are subsequently monitored over a predefined temporal window to observe, record, and compare the development of the outcome in both the exposed and unexposed cohorts.

Solution:

(a) The defining hallmark of a forward-looking cohort design is its ability to directly calculate the incidence of a health outcome among individuals who are exposed compared to those who are unexposed.

(b) By tracking the forward progression from exposure to disease development, researchers can determine how many times more likely the exposed group is to develop the condition.

(c) Relative Risk (RR), also known as the risk ratio, serves as the direct mathematical ratio of the incidence of the disease among the exposed group divided by the incidence of the disease among the unexposed group.

(d) Unlike case-control studies where the absolute incidence cannot be computed directly due to retrospective sampling based on disease status, a cohort study provides a firm basis for evaluating true risk.

(e) Therefore, the primary measure of association derived from this longitudinal design is the Relative Risk, establishing a clear temporal sequence between the exposure and the subsequent outcome.

Final Answer: Relative Risk.

Answer: (B)

Go Back to Question 1

Q2.

Solution

Concept:

The normal distribution, or Gaussian distribution, is a continuous probability distribution that is perfectly symmetrical around its central mean. The shape of this curve is fully characterized by its mean (μ) and standard deviation (σ). Public health data often relies on the empirical rule, which dictates the fixed percentages of data that fall within specific standard deviation boundaries from the center.

Solution:

(a) The empirical rule establishes that approximately 68.3% of all observations lie within one standard deviation ($\mu \pm 1\sigma$) of the population mean.

(b) Extending the boundaries further, approximately 95.4% of all data points fall within two standard deviations ($\mu \pm 2\sigma$) of the central mean value.

(c) For this specific scenario, the population mean systolic blood pressure is given as 120 mmHg, and the standard deviation is defined as 10 mmHg.

(d) One standard deviation covers the range from 110 to 130 mmHg, whereas two standard deviations cover the range from 100 to 140 mmHg (which is $120-20$ to $120+20$).

(e) Since the question asks for the proportion of the population falling between 100 mmHg and 140 mmHg, we are evaluating the area under the curve that corresponds exactly to two standard deviations, which yields a value of 95.4%.

Final Answer: 95.4%.

Answer: (B)

Go Back to Question 2

Q3.

Solution

Concept:

A Receiver Operating Characteristic (ROC) curve plots the true positive rate (Sensitivity) against the false positive rate (1 − Specificity) across all possible diagnostic cut-off thresholds for a screening test. The ideal test approaches the top-left corner of the graph, representing maximum sensitivity and maximum specificity simultaneously. Shifting thresholds along the curve creates an inverse relationship between these parameters.

Solution:

(a) Shifting a diagnostic cutoff value changes how strict the test is when classifying individuals as diseased or healthy.

(b) Point X is situated near the top-left corner of the curve, representing an optimization area where the diagnostic trade-off balances both parameters.

(c) If the threshold moves along the curve toward Point X from the upper-right region, the test becomes more selective, reducing the number of false positives.

(d) This reduction in false positives inherently means an improvement in the test's specificity because more healthy individuals are correctly identified as negative.

(e) However, as the cutoff becomes more selective, some true positive cases are missed, which causes the sensitivity of the screening test to decrease while specificity increases.

Final Answer: Decrease sensitivity while increasing specificity.

Answer: (B)

Go Back to Question 3

Q4.

Solution

Concept:

The iceberg concept of disease is a foundational epidemiological metaphor that illustrates the visible and hidden distribution of illness within a given community. The visible portion above the water level represents the clinically apparent cases, while the vast submerged mass represents the undetected, asymptomatic, subclinical, or undiagnosed individuals who still contribute to the burden of transmission.

Solution:

(a) The water line in this metaphorical model serves as the boundary between clinical visibility and subclinical obscurity.

(b) Segment A, which sits completely above the water line, represents the minor fraction of cases that present to health systems with clear clinical manifestations.

(c) These individuals are symptomatic, properly diagnosed, and actively tracked by formal health surveillance registries.

(d) Conversely, the large submerged section below the water line represents subclinical, unapparent infections, presymptomatic cases, or healthy carrier states.

(e) Because Segment A stands exposed above the water line, it corresponds directly to symptomatic, diagnosed, and clinically manifest cases in the population.

Final Answer: Symptomatic, diagnosed, and clinically manifest cases.

Answer: (C)

Go Back to Question 4

Q5.

Solution

Concept:

Public health communication systems utilize distinct structural network paths to transmit information across different administrative tiers. While traditional surveillance mechanisms rely on vertical channels for top-down mandates or bottom-up reporting, decentralized networks encourage direct information exchange between peer entities operating at equivalent organizational tiers to improve collaborative responsiveness during crises.

Solution:

(a) Vertical communication involves the flow of instructions or reports between superior entities, like a central headquarters, and subordinate peripheral nodes.

(b) In a decentralized health surveillance network, peer entities such as distinct district health offices often face identical localized public health threats.

(c) When these districts share data, insights, or logistical updates directly with one another without routing through the central command, they bypass the vertical hierarchy.

(d) This pattern of communication between individuals or units at the same administrative level is classified as lateral or horizontal communication.

(e) Utilizing horizontal channels enhances speed, decreases bureaucratic lag, and fosters cooperative problem-solving during regional epidemiological outbreaks.

Final Answer: Lateral or horizontal communication.

Answer: (B)

Go Back to Question 5

Q6.

Solution

Concept:

Incidence density, or person-time incidence rate, is an epidemiological metric that measures the rate at which new health events occur in a population. Unlike cumulative incidence, which uses the total count of at-risk individuals at baseline as the denominator, incidence density utilizes the precise cumulative person-time that the population was at risk and under observation.

Solution:

(a) The total initial population is 10,000, but 50 individuals are already undergoing treatment on January 1st, meaning they are prevalent cases and must be excluded from the initial at-risk pool.

(b) This leaves an initial disease-free at-risk cohort of 9,950 individuals to track over the 1-year timeline.

(c) During this year, 120 new cases develop and 20 individuals die, representing a total of 140 individuals whose full 1-year observation period is interrupted.

(d) Since their average tracking time is exactly 0.5 years, these 140 individuals contribute $140 \times 0.5 = 70$ person-years of observation.

(e) The remaining $9,950 - 140 = 9,810$ individuals are followed for the full year, contributing 9,810 person-years.

(f) Total person-time equals $9,810 + 70 = 9,880$ person-years. Dividing 120 new cases by 9,880 person-years yields 0.01214, or 12.14 per 1,000 person-years.

Final Answer: 12.14 per 1,000 person-years.

Answer: (B)

Go Back to Question 6

Q7.

Solution

Concept:

Selecting an optimal epidemiological study design depends heavily on the characteristics of the exposure and the outcome, including their rarity, the induction period, and logistical constraints. When a rare, catastrophic environmental or occupational exposure occurs suddenly, public health tracking must efficiently link this known exposure to subsequent acute health outcomes.

Solution:

(a) A case-control study is highly efficient for rare diseases, but it is inefficient for investigating rare exposures because finding enough exposed cases by chance is difficult.

(b) In this scenario, the exposure itself is highly localized and rare, but a well-defined cohort of exposed individuals is immediately identifiable due to the spill event.

(c) Because the outcome manifests within a short period, a retrospective cohort study can be mounted quickly by reviewing existing records of exposed and unexposed individuals.

(d) This approach allows investigators to reconstruct the timeline from exposure to the rapid development of transient peripheral neuropathy without waiting years for prospective follow-up.

(e) Therefore, the retrospective cohort design represents the most resource-efficient method to determine the association under these specific parameters.

Final Answer: Retrospective Cohort Study.

Answer: (A)

Go Back to Question 7

Q8.

Solution

Concept:

Population Attributable Risk Proportion (PARP), also known as the population attributable fraction, quantified the proportion of a disease cases in the entire population that can be directly attributed to a specific exposure. This metric is valuable for public health planning because it estimates the potential reduction in disease burden if the risk factor were completely eliminated.

Solution:

(a) The mathematical formula to calculate the Population Attributable Risk Proportion is expressed as $\text{PARP} = [P \times (\text{RR} - 1)]/[P \times (\text{RR} - 1) + 1]$.

(b) In this formula, P represents the prevalence of the exposure in the population, and RR signifies the Relative Risk associated with that exposure.

(c) Substituting the given values into the equation, the prevalence (P) is 20% or 0.20, and the Relative Risk (RR) is 4.0.

(d) The numerator becomes $0.20 \times (4.0 - 1) = 0.20 \times 3 = 0.60$.

(e) The denominator is calculated as $0.60 + 1 = 1.60$. Dividing the numerator by the denominator yields $0.60/1.60 = 0.375$.

(f) Converting this decimal value into a percentage results in exactly 37.5%, which represents the proportion of pancreatic carcinoma cases that could be avoided by eliminating heavy alcohol consumption.

Final Answer: 37.5%.

Answer: (B)

Go Back to Question 8

Q9.

Solution

Concept:

Attributable Risk, or Risk Difference, is an epidemiological metric calculated by subtracting the incidence of disease among unexposed individuals from the incidence of disease among exposed individuals. In an acute outbreak scenario, this value quantifies the excess risk of illness that is directly associated with consuming a specific contaminated food item.

Solution:

(a) The attack rate functions as an incidence measure during localized food-borne outbreaks, reflecting the proportion of individuals who become ill after exposure.

(b) The data reveals an attack rate of 75% among festival attendees who consumed vanilla custard, compared to a 10% attack rate among those who did not.

(c) To determine the excess risk added by the vanilla custard, the baseline risk of the unexposed group is subtracted from the risk of the exposed group.

(d) This calculation (75% − 10%) results in an Attributable Risk of 65% among the exposed individuals.

(e) This statistical finding demonstrates that consuming vanilla custard added a massive absolute risk burden of illness to the exposed cohort, pointing to it as the primary vehicle of the outbreak.

Final Answer: It has an attributable risk of 65% among the exposed cohort.

Answer: (B)

Go Back to Question 9

Q10.

Solution

Concept:

The Number Needed to Treat (NNT) is an epidemiological and clinical metric that quantifies the effectiveness of a medical intervention. It represents the number of patients who must receive the experimental treatment over a specific period to prevent one additional adverse clinical outcome compared to the standard control intervention.

Solution:

(a) To calculate the NNT, clinicians must first determine the Absolute Risk Reduction (ARR) provided by the new treatment strategy.

(b) Absolute Risk Reduction is the simple arithmetic difference between the event rate in the control group and the event rate in the intervention group.

(c) In this clinical trial, the absolute risk of a stroke event in the control arm is 6% (0.06), and the risk in the experimental arm is 4% (0.04).

(d) Subtracting these values yields an Absolute Risk Reduction of $0.06 - 0.04 = 0.02$, or an absolute reduction of 2%.

(e) The Number Needed to Treat is the mathematical reciprocal of the Absolute Risk Reduction, expressed as $\text{NNT} = 1/\text{ARR}$.

(f) Calculating this reciprocal $(1/0.02)$ results in an NNT value of 50, indicating 50 patients must be treated with the new compound to prevent one stroke.

Final Answer: 50.

Answer: (B)

Go Back to Question 10

Q11.

Solution

Concept:

In biostatistics, selecting the correct inferential test depends on the nature of the study design, the type of variables being assessed, and whether data observations are dependent or independent. When evaluating the effect of an intervention within a single cohort across two distinct longitudinal time points, the observations collected before and after the intervention are paired, breaking the assumption of independence.

Solution:

(a) The research parameter evaluates a single continuous variable, serum cholesterol level, across 45 specific adult patients at baseline and exactly 8 weeks after starting a vegan diet.

(b) Because the pre-test data points and post-test data points are obtained from identical individuals, each patient acts as their own internal control, making the two datasets inherently dependent.

(c) When the distribution of these differences satisfies parametric normality criteria, a paired test is required to analyze whether the mean difference significantly deviates from zero.

(d) The paired Student t-test calculates the differences between pairs for each subject, determining if the observed changes are due to the intervention or simple sampling variation.

(e) Alternative options like the independent samples t-test are incorrect because they assume separate groups, while the Wilcoxon Rank-Sum test is a non-parametric alternative reserved for non-normal distributions.

Final Answer: Paired Student's t-test.

Answer: (C)

Go Back to Question 11

Q12.

Solution

Concept:

The p-value, or probability value, is a fundamental statistical metric used in hypothesis testing to quantify the strength of evidence against the null hypothesis. It represents the conditional probability of obtaining a test statistic at least as extreme as the one observed during the study, assuming that the null hypothesis is completely true and no real difference exists.

Solution:

(a) In this randomized controlled trial analyzing anti-arrhythmic medication, the calculated p-value for the primary mortality endpoint is exactly 0.02.

(b) A common misconception is that the p-value represents the probability that the null hypothesis is true, or conversely, that the alternate hypothesis has a specific percentage of being correct.

(c) Instead, the p-value measures the compatibility of the observed trial data with an underlying model where the drug behaves identically to the control treatment.

(d) A value of 0.02 indicates that if the drug had no actual effect on survival, there is only a 2% chance of observing a mortality difference this wide by random luck.

(e) Because this probability falls below the conventional significance threshold of 0.05, public health researchers reject the null hypothesis, concluding that the treatment effect is statistically significant.

Final Answer: The probability of observing a difference as large or larger than the one found, assuming the null hypothesis is correct, is 2%.

Answer: (B)

Go Back to Question 12

Q13.

Solution

Concept:

A confidence interval provides a range of plausible values for an unknown population parameter, calculated from sample data at a specified confidence level. When interpreting a 95% confidence interval for relative metrics such as Relative Risk or Odds Ratios, researchers assess where the interval lies relative to the mathematical value of no difference.

Solution:

(a) The value of no effect for relative measures of association is exactly 1.0, which signifies that the risk of an event is identical in both groups.

(b) If a confidence interval for Relative Risk includes the value of 1.0 within its boundaries, it demonstrates that the data cannot rule out equality of risk.

(c) The systematic review yields a 95% confidence interval extending from 0.72 to 1.15, meaning the values span from a protective effect to an increased risk.

(d) Because the value of 1.0 is contained inside this interval, the true population relative risk could reasonably be equal to one, rendering the finding statistically non-significant.

(e) Consequently, the corresponding p-value for this specific treatment intervention must be greater than or equal to 0.05, preventing researchers from declaring treatment superiority.

Final Answer: The null value of no effect is included within the interval, indicating non-significance.

Answer: (C)

Go Back to Question 13

Q14.

Solution

Concept:

The National Tuberculosis Elimination Program in India implements strict algorithms to combat the emergence of drug resistance. A primary strategy is ensuring that treatment failures or disease relapses are not treated with empirical first-line combinations without evaluating the current resistance profile, preventing the amplification of multi-drug resistant strains.

Solution:

(a) A patient who experiences a relapse after completing an entire course of first-line therapy is classified as a previously treated patient under national protocols.

(b) Historically, guidelines added Streptomycin to first-line agents as a re-treatment regimen, but this practice has been abandoned due to poor outcomes.

(c) Modern NTEP protocols dictate that any previously treated case must immediately undergo molecular drug susceptibility testing using tools like CBNAAT or Truenat.

(d) This prompt evaluation determines whether the current Mycobacterium tuberculosis strain has developed resistance to critical first-line agents like Rifampicin.

(e) Rather than repeating empirical therapies or blindly escalating to second-line drugs like Bedaquiline, clinicians must perform drug susceptibility testing to design a tailored therapeutic regimen.

Final Answer: Perform drug susceptibility testing (DST) and tailor therapy based on the resistance profile.

Answer: (D)

Go Back to Question 14

Q15.

Solution

Concept:

The Janani Suraksha Yojana is a safe motherhood intervention under the National Health Mission that targets maternal and neonatal mortality rates. The core philosophy of this public health initiative is to transition deliveries away from unhygienic home environments and into accredited medical institutions by addressing financial barriers for pregnant women.

Solution:

(a) Institutional delivery is a critical determinant in reducing maternal deaths caused by acute obstetric complications such as postpartum hemorrhage and sepsis.

(b) Janani Suraksha Yojana achieves this transition by integrating cash assistance directly with delivery and post-delivery care protocols in eligible populations.

(c) The program functions as a conditional cash transfer scheme, providing direct financial incentives to pregnant women who choose to give birth in institutional settings.

(d) Special focus is directed toward low-performing states with poor maternal indicators, where additional incentives are extended to accredited social health activists.

(e) By reducing out-of-pocket costs associated with institutional travel and care, the program increases supervised deliveries, minimizing preventable maternal and neonatal deaths.

Final Answer: Reducing maternal and neonatal mortality by promoting institutional delivery via conditional cash transfers.

Answer: (B)

Go Back to Question 15

Q16.

Solution

Concept:

The National Vector Borne Disease Control Programme targets multiple parasitic and viral vector-borne infections using distinct elimination strategies. For Lymphatic Filariasis, the primary public health strategy relies on interrupting disease transmission cycles within endemic communities by drastically reducing the microfilarial load in the human reservoir population.

Solution:

(a) Lymphatic Filariasis in India is predominantly caused by the nematode parasite Wuchereria bancrofti, which is transmitted to humans through the bite of infected Culex mosquitoes.

(b) To eliminate this disease, the national program employs a strategy known as Mass Drug Administration, which targets entire eligible populations in endemic areas.

(c) The standard MDA drug combination consists of Diethylcarbamazine, which destroys circulating microfilariae, and Albendazole, which clears intestinal helminths and compromises adult filarial worms.

(d) Administering this combination annually ensures that microfilarial density drops below the threshold necessary to sustain transmission by mosquito vectors.

(e) This preventive chemotherapy strategy focuses on Wuchereria bancrofti, aiming to clear the human reservoir and eliminate the disease as a public health threat.

Final Answer: Wuchereria bancrofti.

Answer: (C)

Go Back to Question 16

Q17.

Solution

Concept:

Perinatal transmission from mother to child represents a primary route of chronic Hepatitis B virus infection. Preventing mother-to-child transmission requires active and passive immunoprophylaxis initiated immediately after birth, providing immediate circulating antibodies alongside an antigen to stimulate long-term active immunity.

Solution:

(a) When an antenatal screening test confirms that a pregnant mother is positive for the Hepatitis B surface antigen, her newborn faces a high risk of vertical transmission.

(b) National public health guidelines dictate that the infant must receive both passive and active immunization to maximize protection against vertical transmission.

(c) Passive protection is achieved by administering Hepatitis B Immunoglobulin, which provides immediate neutralizing antibodies to clear any virus transmitted during delivery.

(d) Active immunization is initiated simultaneously by administering the monovalent Hepatitis B vaccine birth dose to stimulate the infant's immune system.

(e) These two biological agents must be injected within 12 to 24 hours of birth at separate anatomical locations to prevent physical mixing or neutralization.

Final Answer: Both Hepatitis B vaccine birth dose and HBIG administered at separate anatomical sites within 12-24 hours.

Answer: (C)

Go Back to Question 17

Q18.

Solution

Concept:

The National Programme for Control of Blindness and Visual Impairment standardizes diagnostic criteria to categorize visual loss within population surveys and clinical services. These operational definitions ensure accurate epidemiological data collection and guide the distribution of public health resources to vulnerable groups.

Solution:

(a) Visual impairment is categorized based on objective visual acuity measurements obtained from the better eye using optimal refractive correction.

(b) According to NPCBVI guidelines aligned with international classifications, low vision or visual impairment is defined by a specific range of visual acuity loss.

(c) This range includes individuals with a best-corrected visual acuity of less than 6/18 down to 3/60 in their functional eye.

(d) Visual acuity drops below 3/60 down to no light perception are classified as economic or total blindness under the program's framework.

(e) Identifying individuals within the 6/18 to 3/60 range allows health systems to deliver targeted interventions, including low-vision aids and surgical corrections.

Final Answer: Visual acuity less than 6/18 down to 3/60.

Answer: (A)

Go Back to Question 18

Q19.

Solution

Concept:

Ayushman Bharat is a landmark national health policy designed to achieve universal health coverage across India. A core component of this strategy is the Pradhan Mantri Jan Arogya Yojana, a government-funded health insurance scheme that protects low-income families from catastrophic health expenditures.

Solution:

(a) Out-of-pocket health expenditure remains a major cause of financial hardship and poverty among vulnerable families in developing nations.

(b) PM-JAY targets the bottom 40% of the population, identified via socio-economic data, to mitigate these financial risks during severe medical crises.

(c) The scheme provides health cover up to a maximum financial value of INR 5 Lakhs per family unit per year.

(d) This insurance coverage is entirely cashless and covers secondary and tertiary care hospitalization costs across a network of empaneled public and private hospitals.

(e) By establishing this 5 Lakh annual threshold, the program provides a financial safety net, improving access to advanced medical treatments and surgical procedures.

Final Answer: INR 5 Lakhs.

Answer: (C)

Go Back to Question 19

Q20.

Solution

Concept:

The performance of a community screening program depends on both the intrinsic characteristics of the diagnostic test and the epidemiological patterns of the target population. While sensitivity and specificity are stable intrinsic properties, predictive values are dynamic metrics that are directly influenced by the baseline prevalence of the condition in the screened population.

Solution:

(a) Positive Predictive Value is the probability that an individual who tests positive on a screening tool actually has the disease under investigation.

(b) The mathematical formula for PPV is calculated as True Positives/(True Positives + False Positives).

(c) When a screening test is applied to a population with a lower baseline disease prevalence, the absolute number of true positive cases drops.

(d) However, because the test's specificity remains constant, the number of false positives generated from the large healthy population remains high.

(e) As a result, the ratio of true positives relative to false positives decreases, causing the Positive Predictive Value to drop significantly in low-prevalence settings.

Final Answer: The PPV will drop because a lower prevalence reduces the true positive ratio relative to false positives.

Answer: (B)

Go Back to Question 20

Q21.

Solution

Concept:

The Universal Immunization Programme in India continuously updates its preventative strategies to reduce infant mortality from severe diarrheal diseases. Rotavirus is a leading cause of severe, dehydrating diarrhea among young infants globally, and its vaccine is integrated into the programmatic scheduling routine alongside other essential primary childhood immunizations.

Solution:

(a) Rotavirus vaccines utilized within public health channels are formulated as live-attenuated viral strains intended to mirror natural mucosal immunization processes.

(b) Because the natural mechanism of protection relies on stimulating local secretory immunity within the intestinal mucosa, the vaccine is administered entirely via the oral route.

(c) According to the national immunization registry guidelines, the standard administration schedule consists of a three-dose series given during infancy.

(d) These sequential doses are scheduled at 6 weeks, 10 weeks, and 14 weeks of age, matching the timeline for Pentavalent and Oral Polio Vaccine doses.

(e) Alternative delivery methods such as intramuscular, subcutaneous, or intradermal injections are incorrect because they fail to stimulate the necessary local gastrointestinal immune response.

Final Answer: Oral drops administered at 6 weeks, 10 weeks, and 14 weeks.

Answer: (B)

Go Back to Question 21

Q22.

Solution

Concept:

Vaccine safety assessments depend heavily on matching the biological platform of an immunizing agent with the host's functional immune baseline. Live attenuated vaccines contain weakened but replication-competent pathogens that rely on a functional immune system, particularly T-cell-mediated pathways, to control replication while establishing memory.

Solution:

(a) Individuals with advanced untreated HIV infection experience a severe drop in helper CD4 positive T-lymphocyte counts, causing a significant cellular immunodeficiency.

(b) Inactivated vaccines, subunit formulations, and toxoids pose no risk of replication or systemic pathogen dissemination, making them biologically safe for immunocompromised hosts.

(c) Conversely, live attenuated vaccines, such as the Yellow Fever vaccine, retain the ability to replicate inside human tissues after administration.

(d) In a patient with severe T-cell immunodeficiency, the host immune system cannot control this replication, which can lead to uncontrolled replication and serious disease.

Final Answer: Live Attenuated Yellow Fever Vaccine.

Answer: (C)

Go Back to Question 22

Q23.

Solution

Concept:

The Bio-Medical Waste Management Rules in India dictate strict legal guidelines for segregating, color-coding, and treating distinct categories of clinical waste. These regulations minimize environmental contamination and prevent public health hazards associated with exposing communities to infectious material and anatomical waste items.

Solution:

(a) Human anatomical waste, which includes tissues, organs, placenta, and amputated body segments, represents highly sensitive and potentially infectious biological material.

(b) The regulatory framework mandates that all human anatomical waste must be segregated at the point of generation into non-chlorinated yellow plastic bags.

(c) The yellow color coding designates material reserved for specific thermal destruction methods to guarantee complete bio-burden elimination and structural degradation.

(d) The mandated final treatment processes for waste inside yellow bags are high-temperature incineration or deep burial in authorized, isolated locations.

(e) Other disposal pathways like autoclaving, shredding, or microwaving are incorrect because they are reserved for solid plastics or sharps categorized under red or blue streams.

Final Answer: Yellow Bag; Incineration or deep burial.

Answer: (B)

Go Back to Question 23

Q24.

Solution

Concept:

The rural healthcare delivery infrastructure in India is organized as a three-tiered system designed to maximize coverage and manage patient progression. Each tier possesses specific operational mandates, staffing patterns, and diagnostic capabilities, with specific facilities designated as First Referral Units to provide comprehensive emergency services.

Solution:

(a) Sub-centres and Primary Health Centres provide basic preventative and curative care, but they lack the structural capacity for complex emergency interventions.

(b) A First Referral Unit must have specific capabilities, including an operating theater, a blood storage facility, and specialized medical personnel.

(c) The primary health care structure designed to meet these criteria and function as an FRU is the Community Health Centre.

(d) CHCs are 30-bedded secondary care facilities that serve as a referral point for four Primary Health Centres, providing round-the-clock emergency obstetric care.

(e) Therefore, when a patient requires specialized emergency obstetric or neonatal interventions in rural regions, the Community Health Centre serves as the immediate FRU.

Final Answer: Community Health Centre (CHC).

Answer: (C)

Go Back to Question 24

Q25.

Solution

Concept:

The Sustainable Development Goals established by the United Nations outline clear global health targets to reduce maternal mortality. Target 3.1 focuses on improving maternal health outcomes globally by reducing disparities in obstetric care quality and ensuring access to safe delivery practices across all nations.

Solution:

(a) The Maternal Mortality Ratio measures maternal deaths per 100,000 live births, serving as a key indicator of health system performance.

(b) Avoidable maternal mortality remains high in developing regions due to gaps in emergency obstetric care and skilled birth attendance.

(c) SDG Target 3.1 establishes a clear international standard, aiming to reduce the global Maternal Mortality Ratio to less than 70 per 100,000 live births by 2030.

(d) This target requires nations to strengthen maternal care, scale up institutional delivery networks, and implement effective postpartum monitoring systems.

Final Answer: Reduce the global MMR to less than 70 per 100,000 live births.

Answer: (A)

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Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	B	3	B	4	C	5	B
6	B	7	A	8	B	9	B	10	B
11	C	12	B	13	C	14	D	15	B
16	C	17	C	18	A	19	C	20	B
21	B	22	C	23	B	24	C	25	A