

10. Aspects of Epidemiological Study Design

10.1. The candidate will have **sound knowledge** of aspects of epidemiological study design.

10.2. The candidate will be able to do the following with sound expertise:

10.2.1. describe major sampling methods, provide and recognise examples of each method, and compare and contrast the respective strengths and weaknesses of each method.

10.2.2. explain the determinants of sample size and how each affects sample size when:

10.2.2.1. estimating a proportion

10.2.2.2. estimating a mean

10.2.2.3. comparing two independent proportions

10.2.2.4. comparing two independent means

10.2.2.5. detecting disease.

10.2.3. appraise a questionnaire for potential introduction of information bias and selection bias, and propose appropriate improvements to reduce potential biases

10.2.4. describe key principles of data management, and recognise examples of inappropriate data management

10.2.5. identify examples of potential selection bias, information bias and confounding bias, explain why each identified potential bias may have occurred, discuss the respective impact of each on internal validity and external validity (if applicable), and propose alternate methods for controlling each identified form of potential bias.

10.2.6. identify examples of interaction, and interpret results in the presence of interaction.

10.3. design of an Epidemiological Study demonstrated by candidate being able to, for a given scenario:

10.3.1. outline the essential design features of an appropriate epidemiological study (survey, cross-sectional study, case-control study, cohort study or controlled trial)

10.3.2. describe and compare alternate options for essential design features where these exist, and explain justification for choice of particular alternatives.

10.3.3. essential features to be included in the outline of the epidemiological study:

- hypothesis formulation
- setting objective/s
- choice of study type
- unit of study
- target/reference and study populations
- defining outcome and exposure variables

- sampling methods
- sample size estimation
- design strategies to minimise bias.