Epidemiology, Surveillance, Performance and Patient Safety Measures (Part 3)

Davis County Health Department

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Agenda

1. Performance Measures (Chapter 17) - Sarah
2. Qualitative Research Methods (Chapter 19) - Maggie
3. Research Study Design (Chapter 20) - Susan

- We will briefly review some content.
- We will test your knowledge.
- Turn the time over to UDHHS to review a case study to apply these principles.

Performance Measures

Background

A **performance measure** is a quantitative tool that provides an indication of an organization's performance in relation to a specified process or outcome.

When these are tied to evaluate the processes or outcomes of care associated with the delivery of clinical services, they are known as *clinical measures*.

Selecting Performance Measures

1. Determine Priorities

- Review external requirements (like federal and state regulations, accreditation, payer/purchaser expectations, etc.)
- Establish internal requirements (like services in need of improvement, medical staff's concerns, and clinical care that represents high-risk or high-volume services that warrant monitoring)

Selecting Performance Measures

2. Decide if you are interested in measuring an *outcome* or a *process*

- **Outcome Measure** = a measure the indicates the result of the process

- **Process Measure** = a measure that focuses on the process or a step in a process

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Selecting Performance Measures

3. Pick *valid* and *reliable* measures

- **Valid** = does the indicator accurately reflect what you intend to measure?
- **Reliable** = does the indicator consistently identify the measure?

Reliable Not Valid   Low Validity Low Reliablity   Not Reliable Not Valid   Both Reliable and Valid

Selecting Performance Measures

4. Determine the patient population to measure

- **Sample Size** = do you have enough data to interpret and analyze results appropriately
- **Risk Adjustment** = leveling the playing field, i.e. adjusting for confounders

Eat ice cream → Attacked by shark
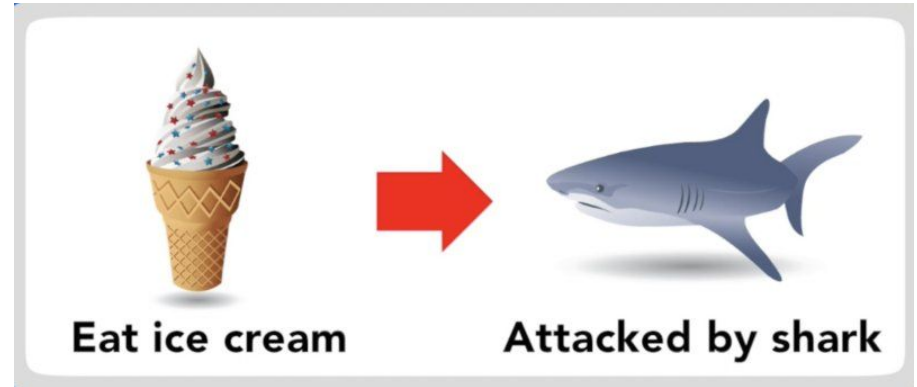
Risk Adjustment

- **Stratification** = classifying data into subgroups based on one or more characteristic, e.g. gender, birth weight, etc.

- **Multivariate Analysis** = use when several factors are believed to contribute to the outcome and you cannot control for all factors at one time.
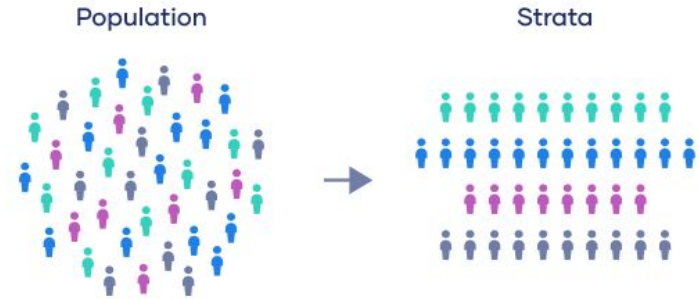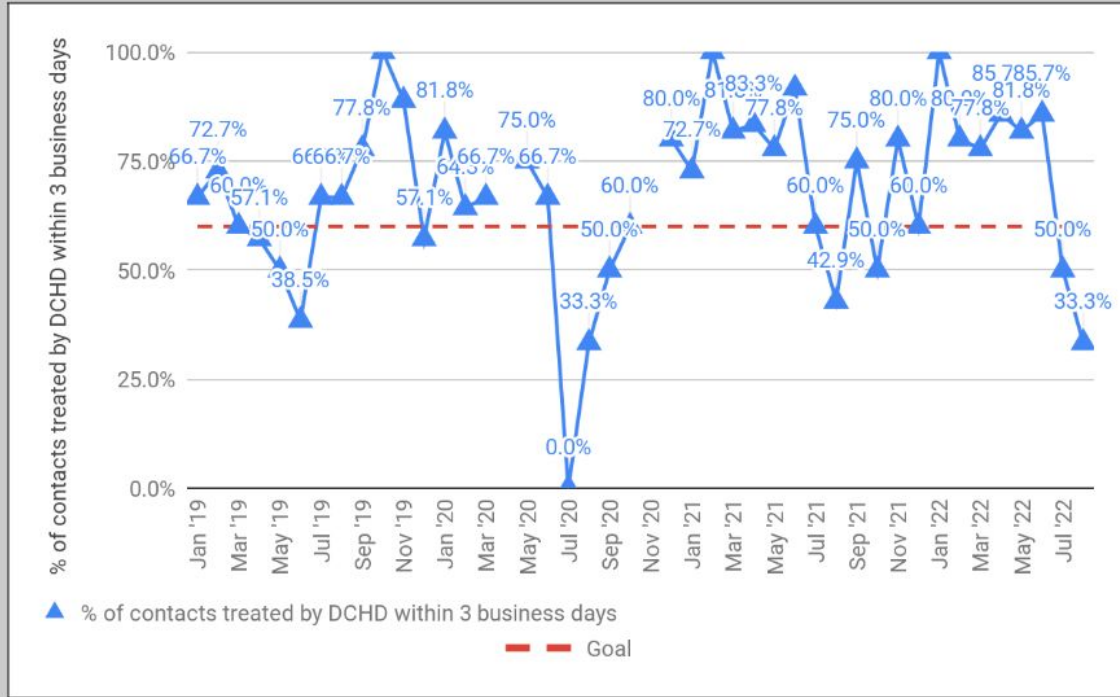
Examples of Measures

% of Contacts Treated by DCHD Within 3 Business Days
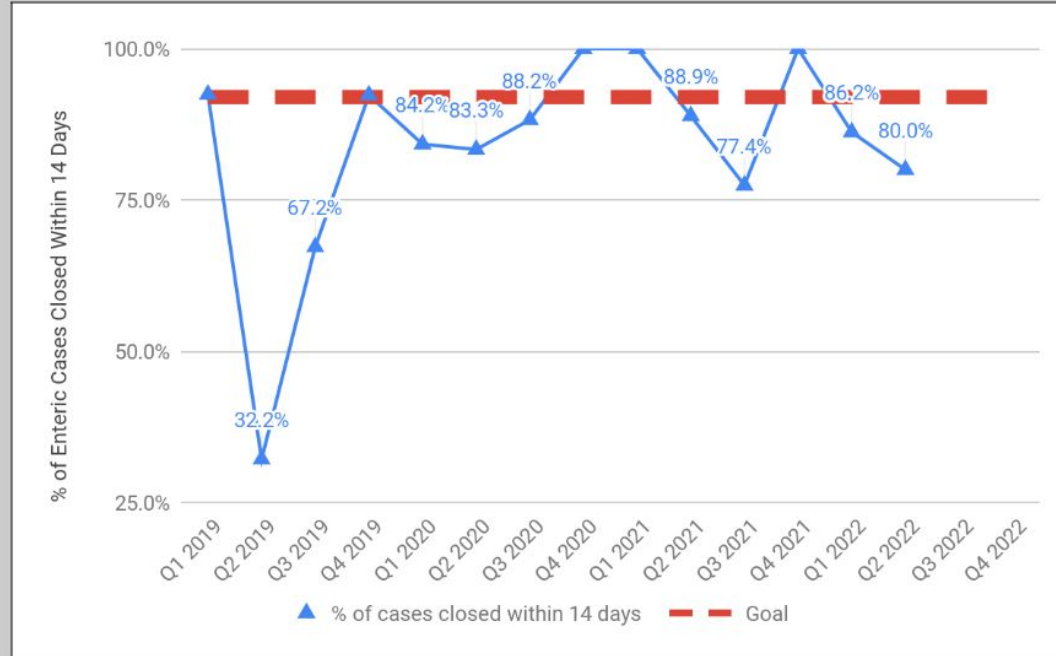
Owner: Nirmal

Program: STD

Examples of Measures

- % of Enteric Disease Cases Closed Within 14 Days

Owner: Tina   Program: Infectious Disease

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Qualitative Research Methods

Qualitative vs. Quantitative Data

Qualitative - descriptive in nature, expressed in terms of language.

Quantitative - any information that can be quantified, counted or measured, and given a numerical value.

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Qualitative - descriptive in nature, expressed in terms of language.

Quantitative - any information that can be quantified, counted or measured, and given a numerical value.

Mixed Methods Studies

- Use both qualitative and quantitative methods to fully explore a subject and give a bigger and all encompassing picture.

Data Collection

- In-depth Interviews - Semi-structured interview with open ended questions where the participant leads the conversation.
- Group Interviews - Normally 6-10 people that can be provided prompts that discuss the topic among themselves.
- Observation - Allow for the study of everyday practices and routines by observing processes.
- Document and audiovisual material review - Compilation of already existing materials such as emails, video, patient charts, etc. can fill gaps in "big picture"

Narrative

- An account of an individual's experience regarding an event or action. This can be spoken or written and should be descriptive.
- The main form of data collection is in-depth interviews or document and audiovisual material review.

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Phenomenology

- Similar to a narrative, but removes the individual aspect to determine the reason for the phenomenon by collecting stories from multiple individuals and finding common themes.

- The phenomenon should be a single term or idea.

- The collection of stories should be from all individuals involved in the process.

- Data collection can be done as in-depth interviews, group interviews, observational, or document and audiovisual material review.

Grounded Theory

- Explains the process to generate theories, explanations, or concepts about the process or series of actions.
- Data collection and analysis is not done all at once do to looking for emerging themes and concepts.
- Data collection can be done as in-depth interviews, group interviews, observational, or document and audiovisual material review.

Ethnography

- Collection of observations and interviews to describe experiences within specific cultures.
- Mainly used in infection prevention to determine what unique cultural influences have of hospital settings.
- Data collection can be done as in-depth interviews, group interviews, observational, or document and audiovisual material review.

Research Study Design

Epidemiological Studies

1. **Observational Studies**
2. **Analytical Studies**
   - Cross-sectional
   - Case-Control
   - Cohort

Epidemiological Studies

## Observational Studies: Case Studies or Case Series

- Description of one case or small number of cases
- Used to report an interesting or unusual case of a patient, or several patients
- **Advantages:** Quick, easy; useful to formulate hypotheses; identify potentially important populations
- **Disadvantages:** No controls for comparison, and risk factors cannot be estimated. Cannot test an hypothesis.

Case Study Example

In 1991, a case was reported of an 88-year-old man who had been eating 20-30 eggs each day for almost 15 years. The man had a normal cholesterol level as his body adapted to his unusual diet.

Cross-sectional (Prevalence, Correlational or Survey)

Assess outcome and potential risk factors in a population group at a specific point in time. Describe variables.
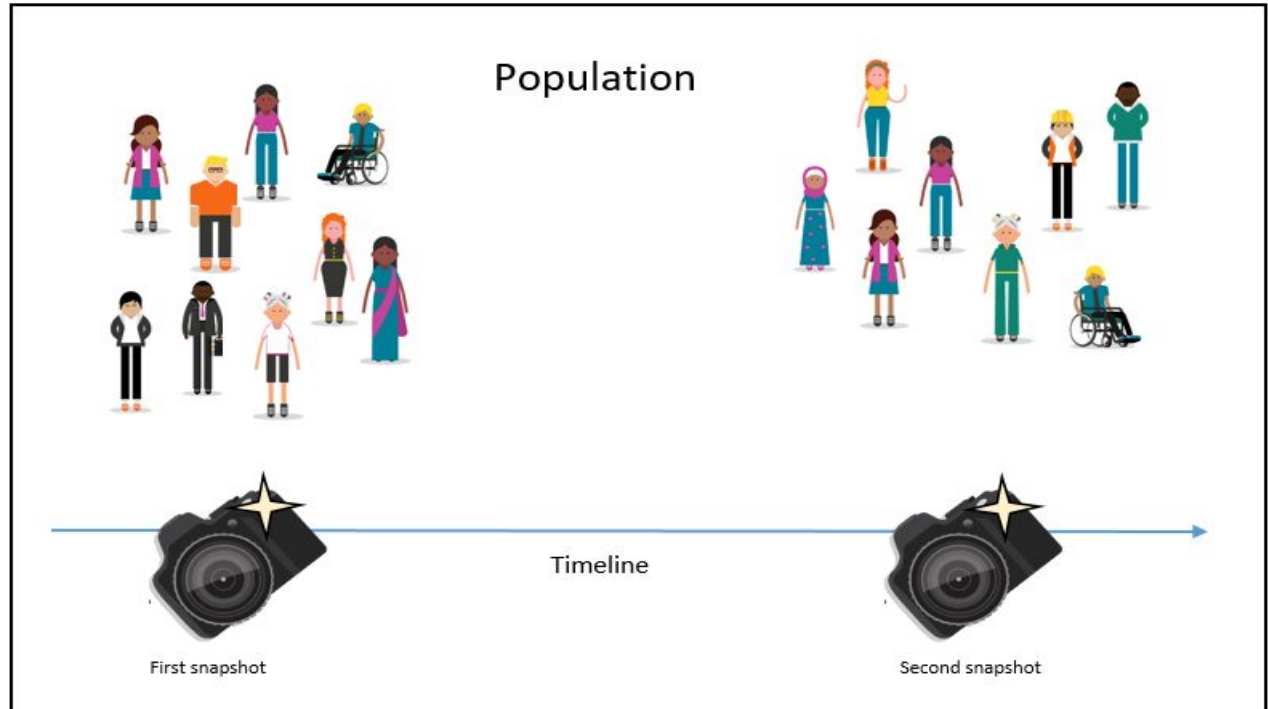
Cross-sectional (Prevalence, Correlational or Survey)

- **Advantages:**
  - Quick, cheap, and easy to conduct as does not require any follow-up with subjects and can be done through self-report surveys
  - Multiple variables and outcomes can be researched and compared at once
  - The data can be a starting point for future research
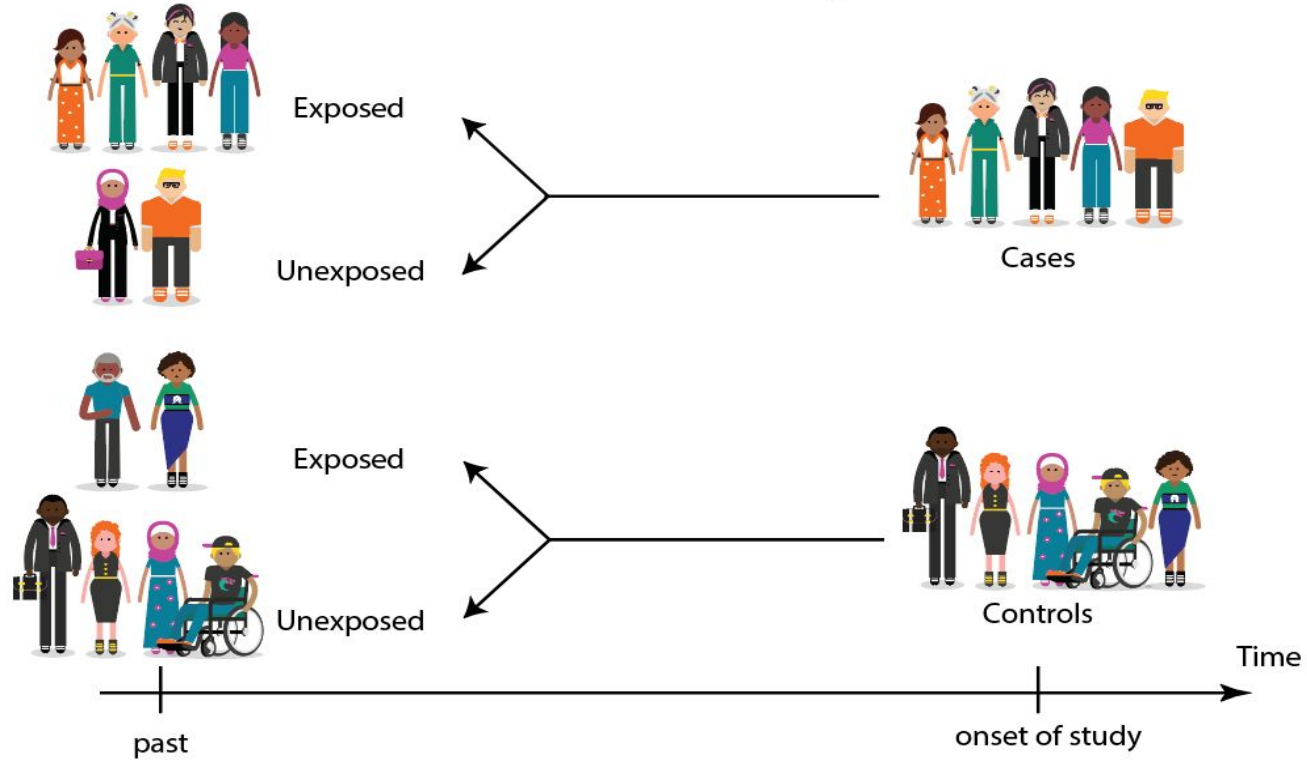- **Disadvantages:**
  - Does not help determine cause and effect
  - Report bias is probable
  - Timing of the snapshot is not always representative
  - Cannot be used to analyze variables over a period to time

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Case-Control (Case-referent or Comparison)

- **A case-control study requires 2 groups:**
  - **Cases:** a group of participants who have the outcome (eg. diseased individuals)
  - **Controls:** a group of participants who do not have the outcome (eg. non-diseased individuals)
- Used to look into past records of cases and controls in order to determine if the development of the outcome (eg. disease) has to do with an exposure to some risk factor

Example: A study compared 67 cases of adolescent suicide with 67 controls (adolescents who were demographically similar to the cases but did not commit suicide) and found that depression, bipolar disorder, substance abuse and conduct disorder were important predictors of adolescent suicide.

Case-Control Study

Case-Control Study

Advantages:

- Helps you find the source of an existing illness or epidemic.
- Cheap and quick to conduct this type of study. The health issue has already occurred, you don't need a lab or special equipment.
- Few ethics issues as the patient already has the health condition
- Looks at multiple risk factors in a patient's life (environment, work, diet).

Disadvantages:

- Patient recall about their history can be inaccurate (recall bias).
- Patients aware of certain risk factors may focus on those and ignore other exposures.
- No randomisation is possible, lowering internal validity of the study.
- Finding a Control group that matches the Case group appropriately can be difficult.
- This study type does not prove a clear causal relationship between risk factors and illness, only calculates the odds.

Cohort (Prospective or Longitudinal)

Population of individuals with and without exposure to potential risk factors are identified and followed to compare the incidence of the outcome in each group

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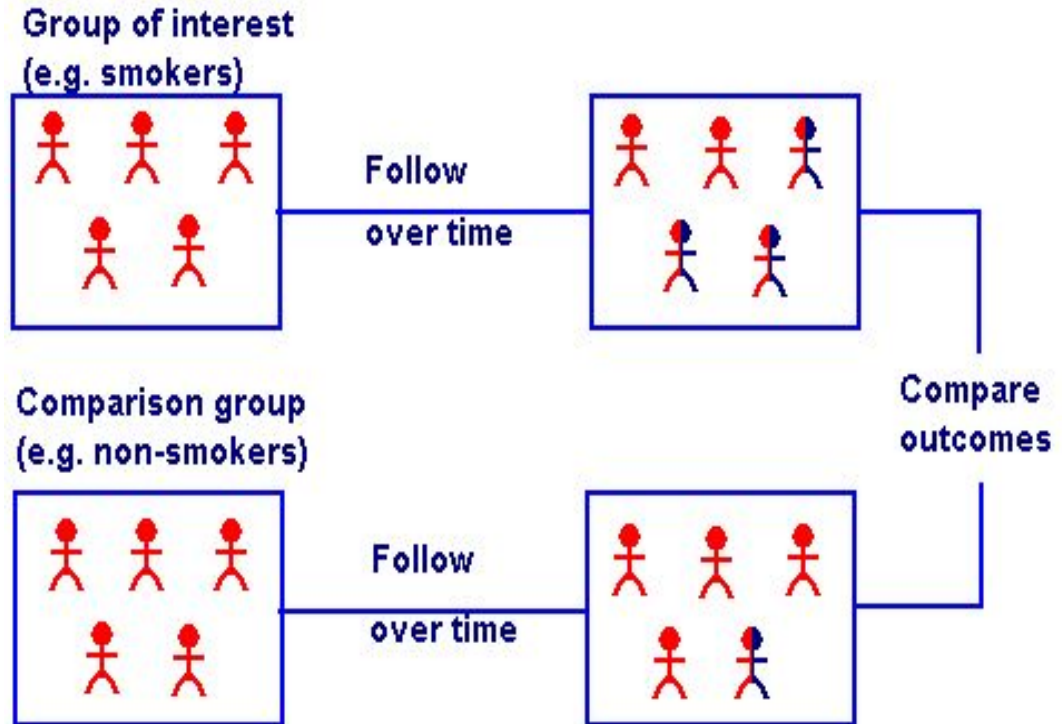
Cohort Study

Advantages:

- Disease outcomes and prevalence are easy to calculate.
- Multiple disease and conditions can be studied at the same time.
- Researchers don't have to deal with ethical issues like who receives which treatment (or none at all).

Disadvantages:

- Cohort studies can be expensive and time consuming.
- Confounding variables can be a larger problem with this type of study.
- Sample sizes are typically very large.
- Selection bias may be an issue.

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Experimental Studies

Controlled Trial or
Randomized Clinical Trials (RCT)

Investigator assigns interventions to:

- Experimental (or treated) group
- Control group (placebo or standard care)
- Randomized allocation, preferred
- Experimental and control groups treated similarly
- Blinded or double blinded
- Followed to compare the incidence of the outcome in each group

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Controlled Trial or Randomized Clinical Trials (RCT)

Advantages:

- Randomization minimizes bias
- Double-blinding minimizes bias in determining outcomes
- RCT provides better evidence for a direct causal association than do other study designs
- Best design to use to establish efficacy of treatment or intervention

Controlled Trial or Randomized Clinical Trials (RCT)

Disadvantages:

- Expensive and difficult to conduct
- Artificial
- Select subgroup of individuals are included
- Randomization does not guarantee similar comparison groups
- Limited generalization to other population groups

Systematic Review and Meta-Analysis

- Used to identify, collect, analyze, and summarize empirical evidence related to a specific research question.
- Compilation of data and results from multiple sources.
- **Advantage:** Review of existing research studies
- **Disadvantage:** Compiled from existing research and limited by the research data and design of other studies.

Evaluating Published Studies

- Is the design appropriate for the study question?
- Is the population studied appropriate?
- Does the study sample represent the population and is the size adequate?
- Are the statistical tests appropriate for the study design?
- Does the data presented provide answers to the study question?
- Are the conclusions reasonable and justified?

Practice Questions

The IP is reviewing the facility's performance measures, which are used to benchmark against national data. The IP ensures that each performance measure includes which of the following characteristics:

1) Measure is reliable
2) Measure targets improvement in a health population
3) Measure is defined according to physician preference
4) Measure can be easily interpreted by the users of the data

a. 1, 2, 3
b. 1, 2, 4
c. 2, 3, 4
d. 1, 3, 4

B.   1, 2, 4

Performance measures focus on outcomes or processes. They are used for internal improvement purposes, intra- or interorganizational comparisons, and by various external entities for making decisions about care. Performance measures should be designed to address improvement that is likely to have a significant impact to the health of a specified population. The measure should consistently track the events within an organization or across organizations and over time. The resulting data should be easily understood by the end-users.

Which of the following is an example of an effective performance measure?

a. A measure that has been developed based on observation of practices in a facility.
b. A measure that is based on a definition that can easily be understood and applied in a facility.
c. A measure that demonstrates a return on investment (ROI).
d. A measure that takes into consideration customer satisfaction.

B.   A measure that is based on a definition that can easily be understood and applied in a facility.

Performance measures should be evidence-based, well-defined, clinically important for patient populations, and broadly applicable in different types of facilities. Selection of performance measures will be based on both external and internal measurement requirements.

All of the following are examples of risk-adjusted stratification *except:*

a. CLABSI rates by birth weight in the NICU
b. Needlestick injuries by profession
c. CAUTI rate for the ICU
d. CLABSI rates by type of line

C. CAUTI rate for the ICU

Stratification is a form of risk adjustment that involves classifying data into subgroups based on one or more characteristics, variables, or other categories. For example, a measure's population might be stratified by gender before calculating rates, resulting in separate rates for males and females. Each subgroup becomes a separate denominator (population of interest), with the numerator event of interest the same for the subgroups; separate rates are then calculated for each subgroup.

A hospital IP has seen an increase in SSI in the ICU. They decided to do a study to determine what the cause of this increase is attributed to. What would be the best qualitative study design?

a. Phenomenology
b. Narrative
c. Retrospective Cohort Study
d. Case-Control Study

A. Phenomenology

The IP would be looking at the cause of the disease event. It could not be a Retrospective Cohort Study or a Case-Control Study because they are looking for a qualitative research study. A narrative would only give you a single individual's perspective where to find the root of the problem you will need more perspectives.

What form of data collection can be used by all qualitative research designs?

a. Surveys
b. Group Interviews
c. Observational
d. Document and Audiovisual Material Review

D. Document and Audiovisual Material Review

Document and Audiovisual Material Review can be used in narrative, phenomenology, grounded theory, or ethnography studies.

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The main difference between a prospective study and a retrospective study is that the prospective study:

a. Requires a relatively small number of subjects
b. Is usually less-expensive
c. Is usually used for testing an initial hypothesis
d. May require a long follow-up period

D. May require a long follow-up period

A retrospective study looks backwards and examines exposures to a suspected risk or protective factor in relations to an outcome that is established at the start of the study. Retrospective studies can be undertaken in a more timely and and less--expensive manner. Much information may be available through medical records.

A prospective study watches for outcomes, such as development of disease, which may take years or even decades to reach the outcomes investigated.

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The IP learns from Employee Health that nine employees have tested positive for *P. aeruginosa* folliculitis. Initial investigation reveals that eight of the nine cases belong to the same health club. The IP hypothesizes that the hot tub at the health club is the source of the infections. The IP decides to conduct a case-control study using two controls for each case. Which of the following groups is the most appropriate control?

a. Non-ill members of the health club matched for age and gender
b. Non-ill family members of the ill employees
c. Hospitalized patients with *P. aeruginosa* folliculitis, matched for age and gender
d. Non-ill hospital employees matched for age and gender

A. Non-ill members of the health club matched for age and gender

Case-control studies begin with the identification of persons who have the outcome of interest. Then a control group of persons without the outcome is selected for comparison. They are often matched by attributes, like age, health and gender. Each case should matched to one or more control cases. The most appropriate controls would be non-ill health club members matched by age and gender.

Subjects are said to be randomly assigned when:

a. They are assigned to the experimental or control groups from a sample representative of the larger experimental group
b. Both the researcher and the subject are blinded as to who belongs to the experimental or control group
c. They have an equal chance of being assigned to the control or experimental group
d. They are assigned to control or experimental group by specific attributes.

C.   They have an equal chance of being assigned to the control or experimental group

Participants are assigned to experimental or control group at random, each has an equal chance of of being assigned to either group. The groups are selected to have similar attributes. The two groups are treated the same, except for the treatment being studied.

Which part of a published research article contains a brief summary of the purposes of the study, and its methods, main findings and conclusions?

a. Discussion
b. Method
c. Introduction
d. Abstract

D. Abstract: Brief summary of the purposes of the study, and its methods, main findings and conclusions

C.   Introduction: Justification and purpose of the research within the context of the existing problem and current research

B.   Method and Materials: Describes the study population and design. Includes inclusion criteria, methods used to determine the sample size, and methods used to collect and analyze data.

Results: Directly addresses the research question. Presents data in text, tables and figures

A.   Discussion: Includes interpretation of major findings, statement of limitations, suggestions for applications

Which of the following is not an advantage of a cohort study?

a. Multiple disease and conditions can be studied at the same time.
b. Disease outcomes and prevalence are easy to calculate.
c. The data are more accurate because it is prospective
d. Quicker, easier and cheaper than cross-sectional studies

D. Quicker, easier and cheaper than cross-sectional studies

Cross-sectional studies are a snapshot in time and are quick and easy.

Cohort studies are usually longer and more expensive to conduct. Often a larger study size is needed.