Western Technical College

10530163 Healthcare Stats and Analytics

Course Outcome Summary

Course Information

Description	Explores the management of medical data for statistical purposes focusing on descriptive and inferential statistics including definition, collection, calculation and compilation of numerical data. Examines data analytics, retrieval, presentation and research methodologies.
Career Cluster	Health Science
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	72

Textbooks

Statistics and Data Analytics for Health Data Management. Copyright 2016. Davis, Nadinia and Betsy Shiland. Publisher: Elsevier Science. **ISBN-13:** 978-1-4557-5315-4. Required.

Health Information Management Technology: An Applied Approach with Student Member Package - Bundled with AHIMA/WHIMA Membership. 6th Edition. Copyright 2020. Sayles, Nanette B. Publisher: American Health Information Management Association. **ISBN-13**: 978-1-58426-774-4. Required.

Learner Supplies

Internet and E-mail access, Microsoft Office (Word, PowerPoint, Access, Excel). Free access with Western student email address from https://login.microsoftonline.com/. **Vendor:** To be discussed in class. Required.

Success Abilities

1. Live Responsibly: Embrace Sustainability
2. Live Responsibly: Foster Accountability
3. Refine Professionalism: Act Ethically
4. Refine Professionalism: Improve Critical Thinking
5. Refine Professionalism: Practice Effective Communication

Program Outcomes

1. HIT - Apply data governance principles to ensure the quality of health data
2. HIT - Model professional behaviors and ethics
3. HIT - Apply informatics and analytics in data use

Course Competencies

1. PERFORM basic mathematical computations

Assessment Strategies

1.1. Oral, written or graphic assessment

Criteria

1.1. you perform basic mathematical functions (addition, subtraction, multiplication, division, etc.)
1.2. you apply standard rounding principles
1.3. you convert fractions to percentages

Learning Objectives

1.a. Apply the order of operations in making calculations.
1.b. Apply rounding rules to results of calculations.
1.c. Report numbers as fractions, decimals and percentages.
1.d. Describe the function of rates, ratios and proportions in health statistics.

2. EXAMINE types of healthcare statistics and the ways in which they are applied

Assessment Strategies

2.1. Oral, written or graphic assessment

Criteria

2.1. you identify organizations that collect and maintain statistics
2.2. you describe healthcare statistical terms
2.3. you differentiate between descriptive and inferential statistics
2.4. you recognize the source of healthcare statistical data
2.5. you describe users and uses of healthcare statistics
2.6. you explain the role of the HIM professional in collecting healthcare statistics

Learning Objectives

2.a. Use secondary data sources to retrieve statistical information for decision making
2.b. Describe population, distribution and sample
2.c. Compare categories of variables to to determine appropriate summary statistics, graphs and analyses
2.d. Recognize the differences between descriptive and inferential statistics
2.e. Recognize where health statistics originate
2.f. Identify users and uses of health statistics (eg research organizations, CDC, WHO, AHRQ).

3. ANALYZE data using descriptive statistics to identify patterns and trends

Assessment Strategies

3.1. Oral, written or graphic assessment

Criteria

3.1. you calculate frequency and percentile
3.2. you calculate measures of central tendency
3.3. you calculate measures of variation
3.4. you apply descriptive statistics to identify relationships in data
3.5. you draw valid conclusions about the meaning of the data

Learning Objectives

3.a. Compare measures of central tendency

3.b. Calculate mean, median and mode for a given set of data
3.c. Compare measures of dispersion
3.d. Calculate the range, variance and standard deviation for a given set of data

3.e. Analyze the results of descriptive statistics calculations to draw conclusions about data

4. CONSTRUCT graphical display of data using spreadsheet and statistical software

Assessment Strategies

4.1. Oral, written or graphic assessment

Criteria

4.1. you organize data
4.2. you select the most appropriate graph or table for a given purpose
4.3. you include all necessary elements required by the graphical display type
4.4. you use computerized spreadsheet and/or statistical software to calculate and display data

Learning Objectives

4.a. Determine the most appropriate graph type for the data
4.b. Construct graphs to display data (pie chart, line graph, frequency distribution, etc.)
4.c. Construct a control chart to set a standard for comparison and identify trends
4.d. Analyze data presented in graphic form (frequency distribution graphs, Pareto chart, correlation, control chart, other)

5. CALCULATE inpatient and outpatient utilization statistics (census, occupancy, turnover, LOS, surgical rates, etc.)

Assessment Strategies

5.1. Oral, written or graphic assessment

Criteria

5.1. you calculate statistics using correct data
5.2. you calculate statistics using correct formula
5.3. you apply standard rounding principles
5.4. you label your calculations appropriately

Learning Objectives

5.a. Calculate utilization related statistics (ALOS, percentage occupancy, bed turnover direct and indirect, average daily census).
5.b. Demonstrate the ability to tabulate the daily census.
5.c. Choose the correct label for results of calculations (days, percent, times, patients, etc.).
5.d. Examine the usefulness of utilization related statistics.

6. CALCULATE inpatient and outpatient morbidity and mortality statistics (death, autopsy, infection)

Assessment Strategies

6.1. Oral, written or graphic assessment

Criteria

6.1. you calculate statistics using correct data
6.2. you calculate statistics using correct formula
6.3. you apply standard rounding principles
6.4. you label your calculations appropriately

Learning Objectives

6.a. Calculate statistics related to hospital deaths and autopsies (fetal death, neonatal death, maternal death, induced terminations of pregnancy, net death, gross, death, post-op death, anesthesia death, adjusted autopsy, net autopsy, gross autopsy).
6.b. Calculate vital statistics mortality rates (fetal, neonatal, post neonatal, infant, perinatal, maternal, induced termination of pregnancy).
6.c. Choose appropriate formula for given data (institutional, vital rates, etc.).
6.d. Choose correct label for results of calculations (percent, per 1000, etc.).
6.e. Examine the usefulness of death, mortality and autopsy related statistics.

7. CALCULATE epidemiological statistics (incidence and prevalence)

Assessment Strategies

7.1. Oral, written or graphic assessment

Criteria

7.1. you calculate statistics using correct data
7.2. you calculate statistics using correct formula
7.3. you apply standard rounding principles
7.4. you label your calculations appropriately

Learning Objectives

7.a. Calculate incidence rate for given health issues.
7.b. Calculate prevalence rate for given health issues.
7.c. Choose the correct label for results of calculations (percent, per 1000, etc.).
7.d. Examine the usefulness of epidemiological statistics.

8. EVALUATE data analytics and the ways in which it is used in healthcare

Assessment Strategies

8.1. Oral, written or graphic assessment

Criteria

8.1. you identify the types of data analytics in healthcare
8.2. you determine how data analytics are used in making healthcare decisions
8.3. you examine the ways data can be organized
8.4. you examine the ways data can be validated for reliability and accuracy
8.5. you examine the ways data can be analyzed
8.6. you examine retrieval methods for data

Learning Objectives

8.a. Summarize descriptive, diagnostic, predictive and prescriptive analytics.
8.b. Use spreadsheet tools to capture and extract data
8.c. Use spreadsheet tools to organize/wrangle data
8.d. Use speadsheet tools to analyze data
8.e. Use data visualization tools to present data and make it meaningful to users
8.f. Examine the role of data analytics in health care
8.g. Explain the importance of data quality in data analytics

9. EXAMINE research methodologies used in healthcare

Assessment Strategies

9.1. Oral, written or graphic assessment

Criteria

9.1. you compare different research methodologies
9.2. you investigate the research process
9.3. you differentiate the types of research
9.4. you identify biases and misinterpretations in research
9.5. you identify ethical guidelines and regulatory requirements which protect the rights and promote the welfare of human subjects involved in research

Learning Objectives

9.a. Explain the purpose of basic and applied research
9.b. Summarize the differences between quantitative and qualitative research methodology
9.c. Summarize the components fo a research plan
9.d. Summarize federal regulations surrounding human subjects in medical research
9.e. Evaluate informed consent for human subjects research
9.f. Examine ethics to protect the rights and promote the welfare of human subjects involved in research
9.g. Summarize the steps in a research study
9.h. Determine study design appropriate for research aims
9.i. Examine the impact of validity, reliability and bias on research results
9.j. Explain the purpose of setting a confidence level in research
9.k. Explain the importance of variation and sample size in confidence interval calculations
9.l. Calculate confidence interval for populations whose standard deviation is known or unknown
9.m. Explain the significance of the standard error of the mean and margin of error in calculating the confidence interval
9.n. Recognize the difference between hypothesis and null hypothesis

9.o. Determine appropriate hypothesis test to use (tests that measure a mean, proportions or relationships).
9.p. Apply appropriate statistic to test a hypothesis
9.q. Describe the significance of errors that may occur in hypothesis testing (Type I, Type II)
9.r. Calculate significance level in testing a hypothesis
9.s. Apply a decision rule for rejecting the null hypothesis
9.t. Evaluate the HIM role in collecting and analyzing statistical data