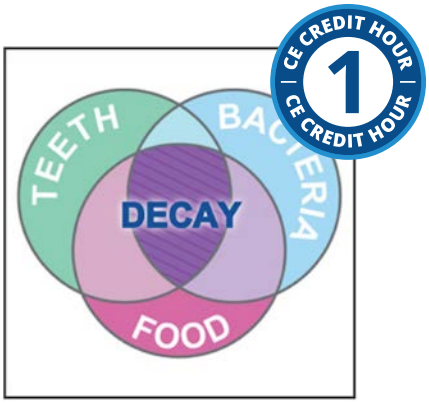
Caries Process and Prevention Strategies: Epidemiology



Course Author(s): Edward Lo, BDS, MDS, PhD, FHKAM
Video Course Presenter: Robert V. Faller
CE Credits: 1 hour
Intended Audience: Dentists, Dental Hygienists, Dental Assistants, Dental Students, Dental Hygiene Students, Dental Assistant Students
Date Course Online: 12/09/2010
Last Revision Date: 10/08/2021
Course Expiration Date: 10/07/2024
Cost: Free
Method: Self-instructional
AGD Subject Code(s): 11

Online Course: *www.dentalcare.com/en-us/professional-education/ce-courses/ce368*

Conflict of Interest Disclosure Statement

- Dr. Lo was a member of the dentalcare.com Advisory Board.

Introduction

This is part 1 of a 10-part series entitled *Caries Process and Prevention Strategies*. Oral epidemiology is the area of public health that deals with the distribution and the impact of oral disease on the human population. In this course, emphasis is placed on the relevance of epidemiology to clinical practice and information about the prevalence, incidence and trends of dental caries in the United States is presented. The term DMF (decayed, missing, and filled teeth) is introduced, along with variations and limitations of the DMF index, and an explanation of how to calculate DMF scores.

Course Contents

- Overview
- Learning Objectives
- Keywords/Definitions
- Video: Epidemiology
- Course Test
- References / Additional Resources
- About the Author

Overview

Oral epidemiology is the area of public health that deals with the distribution and the impact of oral diseases on the human population. In this section, emphasis is placed on the relevance of epidemiology to clinical practice and information about the prevalence, incidence and trends of dental caries in the United States is presented. The term DMF (decayed, missing, and filled) teeth/surfaces is introduced, along with variations and limitations of the DMF index, and an explanation of how to calculate DMF scores.

Learning Objectives

Upon completion of this course, the dental professional should be able to:

- Discuss the need for epidemiological studies.
- Apply the results of oral epidemiology studies to clinical practice.
- Be familiar with the prevalence, incidence, and trends of dental caries in the United States.
- Describe the value of the DMF index in measuring oral disease.
- Use the DMF index to measure the prevalence of dental caries.
- Understand the results of the NHANES surveys that are related to dental caries.
- Identify the factors that may or may not affect the DMF scores in adults.
- Calculate a DMFT, DMFS, dmft or dmfs index score from a patient tooth charting.

Keywords/Definitions

incidence - The number of new cases of a disease or condition over a given time period. It is the rate at which new cases occur in a defined population group (e.g., the incidence rate of lung cancer is 2.5% per year in 25- to 29-year-old Hispanic males in the US). This term is frequently confused with and used interchangeably in error with the term prevalence which describes how common a disease is. In epidemiology of dental caries, it is important to note the denominator – people or individual teeth.

index - A standard numerical measure of a disease or condition. It extends from the proportion of individuals with a disease or condition to the number of millimeters of probing depth around a tooth. Common indices in dentistry are the DMF Index, which is a measure of caries, the O'Leary Plaque Index, which measures plaque/oral hygiene, and PSR (periodontal screening and report), which indicates treatment need for periodontal therapy.

mean - The arithmetical average, a measure of central tendency together with the measures of mode (the most commonly occured value) and median (the value in an order of numbers that is the midpoint – there are as many values above as below).

NHANES - National Health and Nutrition Examination Survey (NHANES) is a survey conducted by the US National Center for Health Statistics, part of the Centers for Disease Control & Prevention (commonly referred to as CDC), which investigates and publishes reports on the health and nutritional status of Americans. Currently, approximately 5000 people are examined each year.

prevalence - The proportion (%) of individuals exhibiting the disease or condition (e.g., dental caries, TB, lung cancer) in a defined population group (e.g., the prevalence of dental caries is 50% in children aged 6 to 11 years). This term is frequently confused with and used interchangeably in error with another term incidence which reports on the occurrence of new disease cases.

Video: Epidemiology

Click on image to view video online.

Course Test Preview

To receive Continuing Education credit for this course, you must complete the online test. Please go to: *www.dentalcare.com/en-us/professional-education/ce-courses/ce368/test*

1. Oral epidemiology studies provide information on the following topics, EXCEPT:

A. The data is used to identify populations at risk of oral disease.
B. The data compare regional similarities.
C. The data compare differences in dental care between populations.
D. The data is used to assess average salivary pH.

2. What is the correct term for the proportion of individuals with a disease in a population at a specific point in time?

A. Incidence
B. Prevalence
C. Trend
D. Index

3. What is the correct term for the changes in prevalence or incidence of disease with respect to time, location, or socioeconomics?

A. Validity
B. Ordinal
C. Trend
D. Index

4. All of the followings are types of measurement scales for indices EXCEPT:

A. Ordinal
B. Mean
C. Interval
D. Reversible

5. An index must be designed to measure the aspect of disease it is intended to measure, corresponding to the clinical stages of the disease. This statement defines which of the following terms?

A. Quantifiability
B. Reliability
C. Objectivity
D. Validity

6. Which of the following is true about the DMF index?

A. It is expressed as the total number of teeth or surfaces that are decayed, missing, or filled.
B. It is expressed only as the total number of teeth that are decayed, missing, or filled.
C. It is applied to permanent and primary dentition.
D. It is a new measure of caries experience.

7. What is the score range of the DMFS index?

A. 0 to 20
B. 0 to 28 or 32
C. 0 to 128 or 148
D. 0 to 88

8. Which index calculates the number of surfaces that are decayed, missing, or filled in primary dentition?

A. DMFS
B. dmft
C. dmfs
D. DMFT

9. Which of the following are types of teeth not counted in calculating DMFT and DMFS?

A. Unerupted teeth
B. Congenitally missing teeth
C. Supernumerary teeth
D. Erupted teeth

10. Which of the following is a limitation of DMF indices?

A. They do not account for sealed teeth.
B. They only count five surfaces on the posterior teeth.
C. They do not count unerupted teeth as missing.
D. They count a defective filling as an F.

11. What types of oral health data was NOT collected with the NHANES surveys?

A. Dental history
B. Periodontal status
C. Caries
D. Average number of patients seen daily by each dentist and hygienist.

12. Which statistic accurately reflects the percentage of caries-free children in 2011-2016?

A. 21.8% of children aged 2 to 5 are caries-free.
B. 75.8% of children aged 2 to 5 are caries-free.
C. 28% of children aged 6 to 11 are caries-free.
D. 50.1% of children aged 12 to 15 are caries-free.

13. Which of the following statements about the findings of the NHANES survey with regards to dental caries in children is true?

A. Caries prevalence differs significantly based on gender.
B. There are no differences in caries prevalence based on race.
C. Untreated decay is highest in children living below the federal poverty line (FPL).
D. The prevalence of untreated decay rose significantly between 1988–1994 and 1998–2004.

14. What was one of the key similarities noted with regard to adult caries when comparing data from 1999–2004 to 2011-2016 reports?

A. About 18% of men have no increase in caries.
B. About 35% of men and 43% of women had untreated decay during each time period.
C. Women and men continue to have an equal prevalence of coronal and root caries.
D. About 1 in 4 adults aged 20–64 years and 1 in 6 older adults aged 65 years or older had untreated tooth decay.

15. Which of the followings is a likely reason for women to have higher DMF scores?

A. Female hormones make them more susceptible to caries.
B Women seek dental care more frequently than men.
C. Women tend to not take good enough care of their teeth.
D. Women experience later tooth eruption patterns.

References

1. National Health Expenditures 2017 Highlights. Accessed October 4, 2021.
2. ADA. ADA Health Policy Institute Finds Uptick in Dental Spending. New report examines key trends and shifts in dental industry. 2020 Feb 04. Accessed October 4, 2021.
3. Burt BA, Eklund SA. Dentistry, Dental Practice and the Community. 6th ed. Philadelphia, PA. WB Saunders. 2005.
4. Chattopadhyay A. Oral Health Epidemiology: Principles and Practice. Sudbury, MA. Jones and Bartlett Publishers. 2011.
5. Larmas M. Has dental caries prevalence some connection with caries index values in adults? Caries Res. 2010;44(1):81-4. doi: 10.1159/000279327. Epub 2010 Feb 2.
6. Cappelli DP, Mobley CC. Prevention in Clinical Oral Health Care. St. Louis, MO. Mosby Elsevier. 2008.
7. Lesaffre E, Mwalili SM, Declerck D. Analysis of caries experience taking inter-observer bias and variability into account. J Dent Res. 2004 Dec;83(12):951-5. doi: 10.1177/154405910408301212.
8. Broadbent JM, Thomson WM. For debate: problems with the DMF index pertinent to dental caries data analysis. Community Dent Oral Epidemiol. 2005 Dec;33(6):400-9. doi: 10.1111/j.1600-0528.2005.00259.x.
9. Burt BA. How useful are cross-sectional data from surveys of dental caries? Community Dent Oral Epidemiol. 1997 Feb;25(1):36-41. doi: 10.1111/j.1600-0528.1997.tb00897.x.
10. Dye BA, Tan S, Smith V, Lewis BG, Barker LK, Thornton-Evans G, Eke PI, Beltrán-Aguilar ED, Horowitz AM, Li CH. Trends in oral health status: United States, 1988-1994 and 1999-2004. Vital Health Stat 11. 2007 Apr;(248):1-92.
11. Dye BA, Li X, Beltran-Aguilar ED. Selected oral health indicators in the United States, 2005-2008. NCHS Data Brief. 2012 May;(96):1-8.
12. Dye B, Thornton-Evans G, Li X, Iafolla T. Dental caries and tooth loss in adults in the United States, 2011-2012. NCHS Data Brief. 2015 May;(197):197.
13. CDC. Oral and Dental Health FastStats. Accessed October 4, 2021.
14. Ferraro M, Vieira AR. Explaining gender differences in caries: a multifactorial approach to a multifactorial disease. Int J Dent. 2010;2010:649643. doi: 10.1155/2010/649643. Epub 2010 Mar 16.
15. Lukacs JR. Sex differences in dental caries experience: clinical evidence, complex etiology. Clin Oral Investig. 2011 Oct;15(5):649-56. doi: 10.1007/s00784-010-0445-3. Epub 2010 Jul 21.
16. Shaffer JR, Wang X, McNeil DW, Weyant RJ, Crout R, Marazita ML. Genetic susceptibility to dental caries differs between the sexes: a family-based study. Caries Res. 2015;49(2):133-40. doi: 10.1159/000369103. Epub 2015 Jan 22.

Additional Resources

- No Additional Resources Available.

About the Author

Edward Lo, BDS, MDS, PhD, FHKAM

Dr. Lo is a professor and the Director of the Postgraduate Program in Dental Public Health in the Faculty of Dentistry at the University of Hong Kong. He is a past president of the Southeast Asian Division and the Asian Pacific Region of the International Association for Dental Research.

Dr. Lo holds several honorary and visiting professor positions in key Chinese dental schools. He has delivered invited presentations at major international dental conferences and published more than 170 scientific journal articles and book chapters.

Email: edward-lo@hku.hk

Video Course Presenter

Robert V. Faller, BS

Robert Faller has in excess of 40 years in the Oral Care Research field. He retired from P&G after more than 31 years in Oral Care, where he focused on caries and enamel related research as P&G's chief cariologist. He is editor of *Volume 17 – Monographs in Oral Science: Assessment of Oral Health – Diagnostic Techniques and Validation Criteria*. He has written 3 book chapters, published 34 papers in peer-reviewed journals and has over 100 published abstracts on fluoride, caries, dental erosion, and various oral care technologies, along with 5 patents related to Oral Care and 6 Continuing Education courses. He currently resides in the UK and is a consultant to the Oral Care industry.

Email: rvfaller01@yahoo.com