Oral Health Surveillance

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Based on reading:

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The problem and the need

- Since 1930's, important changes in the prevalence and severity of dental caries
  - Also a need to monitor other oral conditions or risk factors
- Our surveillance efforts, however, have changed very little in scope or format
  - Local and state programs face challenges in an increasingly competitive environment for public resources
  - require development and implementation of alternative surveillance tools
- Development of alternative surveillance tools needed

The problem and the need

- Alternative surveillance efforts on state and local level needed in order to:
  - Assess oral health needs
  - Monitor oral health status, including disparities among population groups
  - Plan intervention programs at state and local levels
  - Establish sound health policies
  - Evaluate progress toward state health objectives

Past/current* efforts - Data collection on national level

- National Health and Nutrition Examination Surveys (NHANES)
  - NHANES I (1971-74)
  - NHANES II (1982-84): Hispanic health and nutrition examination survey
  - NHANES III (1988-94)
  - NHANES IV (1999-present)*

Past efforts - Data collection on national level

- National Institutes of Dental Research (now the NIDCR)
  - 1979-80 and 1986-87
    - surveyed children 5-17 yrs
  - 1985-86
    - surveyed employed adults and seniors

Past efforts to collect data on national level

- Systematic collection of data from representative samples
  - mostly at the national level
- One-time or sporadic experiences
  - especially for data at state or local level
- Use of visual-tactile protocols
  - implemented at the tooth-surface or tooth-site level for data collection
- Focus mainly on dental caries and periodontal diseases
- Lengthy time from data collection to publication of results

Past efforts to collect data on national level

- Lowest level of statistical representation = US geographic regions
  - Data collected on representative sample of US population
- Demand high level of human and material resources
  - In case of dental caries, use of visual-tactile assessments
  - of all teeth/surfaces
  - by trained, standardized dentists

Other forms of data collection at national level – besides clinical surveys

- Questionnaires have been used to collect oral health data at national level
- National Health Interview Survey (NHIS)
  - Annual self-reported data
  - Representative sample of US population
  - Face-to-face interviews
  - Core and supplemental modules
  - Since 1983 – Track oral health topics: dental visits, use of fluoride supplements, toothbrushing practices, dental insurance status, screening for oral cancer
    - have been part of basic, periodic, and topical sections

Past efforts – Data collection on state level

States needed state-specific data:

- State and local government agencies tried to implement visual-tactile exams
  - Often tried to use same protocol and dx criteria used by federal agencies
- Usually sporadic experiences
  - with limited ability to evaluate trends/needs at state level on a regular basis

Limitations of past efforts on state level

- Only provided snapshots of oral health status
  - Could not be used to evaluate trends, particularly at the state and local levels
    - Limited use for policy makers
- Required high levels of both human and material resources

Key characteristics of public health surveillance systems

- Key characteristics demanded of data systems for surveillance:
  - Integrated
  - Ongoing
  - Cost efficient
  - Translatable into public health interventions

Key characteristics of public health surveillance systems

- Monitoring activities identified by the term “epidemiologic surveillance”
- Defined as:
  - ongoing
  - systematic collection, analysis, and interpretation
  - of outcome-specific data
  - for use in planning, implementation, and evaluation of public health practice

Key characteristics of public health surveillance systems

Surveillance activities grouped into systems:

- By one or more conditions
  - Oral disease, cardiovascular disease, etc.
- By different aggregates of the population
  - Local, state, national, international

Key characteristics of public health surveillance systems

Two critical elements in this definition:

- Ongoing
  - (regularly occurring, not episodic in nature) use of collected data
- Demands system of efficient analysis and dissemination
  - For public health purposes

Key characteristics of public health surveillance systems

- Centers for Disease Control and Prevention (CDC)
  - Federal agency responsible for monitoring diseases, conditions, and risk factors
  - Provides data to policy makers and decision makers
  - Data to serve as basis for implementing public health interventions

Key characteristics of public health surveillance systems

- National public health surveillance systems monitored by:
  - the CDC Epidemiology Program
  - the Council of State and Territorial Epidemiologists (CSTE)
  - CDC and CSTE have established a set of standards
- State surveillance systems vary in the number and scope of conditions monitored
- Currently CDC monitors approximately 102 surveillance systems

Key characteristics of public health surveillance systems

To be effective surveillance system needs:

- A functional structure that allows collection, processing and dissemination of information
- Participation of many within health service system, including clinicians and policy makers
- Data obtained from variety of sources
  - Vital statistics
  - Registries
  - Sample surveys
  - Administrative data systems
  - Sentinel surveillance

Limitation of oral surveillance systems

- In oral health, have monitored disease primarily via conduct of clinical surveys
  - on dental caries
  - at both national & state levels
- If basic, desired characteristics are:
  integrated, ongoing, cost efficient, and translatable into public health interventions
- **Infrequent collection of oral health data, using visual-tactile exam, does not make an oral health surveillance system**

Limitations of using visual-tactile exams in oral health surveillance

Rely heavily on primary data collection from calibrated dental professions
- Rationale is that only dental professionals, calibrated to a standard, can make valid diagnoses of oral diseases and conditions

- Very few public health surveillance systems rely so heavily on primary data
  - Almost all surveillance systems accept a certain level of error as a consequence of misdiagnosis, misclassification, or incompleteness of data
- Example – mortality at national level measured with death certificates
  - Filled out by a variety of individuals- physicians, physician assts, midwives, medical coroners – few have received standardization training on how to complete a death certificate

Limitations of using visual-tactile exams (cont.)

- **Protocol developed primarily to measure dental caries**
  - Dental caries continues to be the most prevalent of all oral conditions
  - However its prevalence and severity has declined dramatically during the past 30 years
    - No indication will return to the previous levels of disease
- Because dental caries no longer so universal
  - need surveillance tools to identify, at pop level, those still affected or at risk of dental caries
  - and tools to measure other oral conditions and their risk factors

Limitations of using visual-tactile exams (cont.)

Currently lack appropriate surveillance tool to measure periodontal disease
- Have a large number of indices:
  - Measure soft and hard deposits in the supra- and sub-gingival areas
  - Indices of gingivitis
  - Indices of periodontal involvement alone – loss of attachment (LOA) or pocket depth
    - Or combined with measures of gingivitis
  - Also digital radiography and enzymatic tests to detect specific microorganisms
- None of these measures appropriate to collect surveillance data
  - Issues of validity, reliability, and cost

Limitations of using visual-tactile exams (cont.)

Consumes large amount of human and financial resources to conduct clinical examination surveys:
- Need to recruit, train, and standardize examiners
- Need resources to get & transport portable equipment, instruments, and infection control supplies
- State and local departments need to fund consultation on sampling and data analysis

- Too resource intensive for state and local policy making

Limitations of using visual-tactile exams (cont.)

Difficult to secure participants in oral health surveys
- Risk of response bias
  - If responders differ from nonresponders, risk of response bias
- Nonresponse rates high, especially among older children and adolescents
- Various approaches used to reduce this problem
  - Negative consent – if parent does not return signed consent form, implies implicit consent for child to be examined
  - Monetary incentives

Limitations of using visual-tactile exams (cont.)

- **Most protocols collect information at tooth or surface levels**
  - Tooth/surface levels for dental caries
  - LOA/pocket depth for periodontal disease
- Changes in prevalence and severity for most subjects
  - Most of 32 teeth or 148 surfaces diagnosed and coded as sound
  - Similar situation observed in site-specific assessment of LOA and pocket depth
- Most oral health objectives use person as unit of measurement
  - Therefore may be unnecessary to collect surveillance information on dental caries at tooth or surface level

Limitations of using visual-tactile exams (cont.)

In assessing dental caries, we measure both past and "present" episodes of the disease

- Surveillance generally does not measure past events
  - such as past episodes of influenza or active TB
  - or how many of these infections occurred in the lifespan of the individual
- Most clinical presentations of dental caries represent the past
- Restorations and missing teeth not always direct consequence of dental caries
  - Therefore may be invalid in identifying populations at risk for oral diseases

Limitations of using visual-tactile exams (cont.)

Late reporting due to complicated planning and initiation procedures

- Often results reported years after initiation
- Inadequate for timely implementation of public policies and evaluation of outcomes

Weaknesses in the current oral health surveillance system

- Visual-tactile examination has been regarded as gold standard –
- Ongoing belief that oral health surveillance data requires same level of rigor and precision as research related to clinical treatment
  - Virtually no public health surveillance systems conduct primary collection of data with same rigor as researchers conducting randomized clinical trials

Weaknesses in the current oral health surveillance system

- DMF and LOA too resource intensive to be used as primary oral health surveillance tools at state and local level
  - Put programs in undue disadvantage against other public health programs
- Cross-sectional prevalence data have not been used successfully for program planning
  - these efforts often end up with publication of data long after a planning decision should have been made

Alternative methods utilized in oral health surveillance

- Seven-step model for needs assessment
  - Developed in 1995-96 by Health Resources and Services Administration (HRSA)
  - Designed to meet needs to collect oral disease data at state & local levels with limited resources
  - Step-by-step model assumed different levels of resources and proposed data collection methods for each level
  - Methods range from most simple (expert opinion, focus groups) to complex (screenings, surveys, secondary data)
  - Model emphasizes need to start with simpler techniques and to move to more complex ones after initial data generated, and there is justification to move to more complex level

Alternative methods: seven-step model for needs assessment (cont.)

- Model tested in Louisiana and Nebraska
  - Not used extensively
- But helped some public health officials to consider techniques other than visual-tactile exams for obtaining oral disease data

Alternative methods: Use of visual-only screening models

Defined as *intraoral assessment* and reporting of status at the *person level*
- Used to collect data among school children and preschool children in OR
- Later in a state-wide screening of school children in WA

CDC tested visual-only screening protocol that used person-based assessment of oral status
  Assessment included dental caries, presence of sealants, urgency of treatment needs, enamel fluorosis, and injuries
- Protocol designed to require minimal instruction of examiners
  (a dental hygienist and a registered nurse)
- Take little time to conduct
- Require no sophisticated equipment or instruments
- Later used in LA, MA on school and pre-school children, Special Olympics population

Alternative methods: Basic screening survey (BSS) – visual-only exam

- Visual-only model
  - to provide timely data with sufficient validity and reliability
- Less resource intensive
  - less demanding training process and lower time requirements
- Standardized protocol using a video to train screeners
  - Used in 1999 to assess oral health status of approx 21,000 children in grades 1-3 in Ohio at the county level
  - Expected to help identify people at risk as data are collected and analyzed more frequently

Alternative methods: Programmatic and administrative data

- Forms completed by dentists and hygienists in 20 local health agencies in Michigan
  - number of decayed and filled teeth, presence of early childhood caries, presence of sealants, root caries, and presence of two or more teeth in adults
- Medicaid claims data
  - number of children affected by early childhood caries and resultant treatment costs
  - Medicaid data also used in Iowa and NC
- Insurance claims data
  - Michigan to examine trends in dental tx provided to enrollees in a private dental insurance plan

Alternative methods: Self-reports, established surveys

- Self- or parent reports
  - Use of global descriptors (i.e., excellent to fair and poor)
  - Show strong correlation with clinical health status
  - Preliminary results from sample of children in WA with prevalence of ECC of 15%
    - show mothers can accurately assess oral health status of their children's teeth
- Face to face and telephone interviews
  - Optional and core modules included in existing surveys
  - (see following examples)

Alternative methods: Self-reports, established surveys (cont.)

- **The Behavioral Risk Factor Surveillance System (BRFSS)**
  - State health departments
  - Telephone surveys, using random-digit selection
  - Generates prevalence estimates of chronic disease risk factors
  - Core set of questions and number of optional modules
  - States allowed to add their own questions
- In 1995 optional module of oral health-related questions was introduced
  - Over a 4-year period, 48 states used the module
- In 1999 three oral health-related questions were included on the BRFSS core questionnaire
  - Thus data available for every state for that year and included again in 2002

Alternative methods: Self-reports, established surveys (cont.)

- **Pregnancy Risk Assessment Monitoring System (PRAMS**)
  - Conducted by CDC
  - Collects state-specific information
  - On health-related behaviors and experiences
  - Representative sample of mothers who delivered live infants
    - About one-third of mothers reported dental visit during pregnancy
    - Of those who said that they needed to see a dentist for a problem:
      - only about half had dental visit during their pregnancy

Alternative methods: Self-reports, established surveys (cont.)

- **Youth Risk Behavior Surveillance System (YRBSS)**
  - Has potential for tracking oral health information in youth
  - School-based survey – CDC system
  - Administered biennially through state Depts. of Education
  - Assesses prevalence of health risk behaviors among high school students
  - Data on tobacco use and other behaviors and trends obtained

Alternative methods: Important characteristics - summary

- These procedures have important characteristics for use in surveillance of oral diseases, conditions, and risk behaviors:
  - 1) integrated into existing data collection mechanisms
  - 2) data collection is frequent and systematic, thus providing timely data
  - 3) data do not rely on visual-tactile examinations
  - 4) when clinical data needed, secondary data sources or visual screenings used

Other alternative methods

- Geographic Information System (GIS)
  - To identify geographic areas, administrative areas, counties, or census tracts with populations at higher risk of disease
  - Used to examine distribution of dentists by aggregate measures of factors associated with caries
    - percentage of schoolchild population eligible to receive free and reduced-cost lunch

Other alternative methods

- Sentinel surveillance
  - Collects data from sites such as hospitals, clinics and health centers, and schools where patients at risk receive care
    - Routinely used to monitor multiple conditions including influenza, HIV, and cancer
  - Due to low national prevalence and association with poverty, Early Childhood Caries (ECC) could be monitored by sentinel surveillance
    - Most children with ECC are treated at pediatric dental offices, dental schools

National Oral Health Surveillance System (NOHSS)

- First step in development of comprehensive state and local surveillance systems
- Includes exiting surveillance data from
  - BRFSS, NHIS, and WFRS
- Calls for use of BSS to collect person-based data for set of oral health disease indicators
- Is expected that more state programs will be able to generate their own data for action
  - technical support would be available from ASTDD (Assoc of State and Territorial Dental Directors)

National Oral Health Surveillance System (NOHSS)

- Developed by the ASTDD and the CDC's Division of Oral Health
- User-friendly, resource-sparing, and integrated oral health surveillance system
- Includes eight basic oral health indicators obtained from existing surveillance systems, BSS, CDC Water Fluoridation Reports, and cancer registries
  - Adult dentals visits
  - Adult tooth cleaning
  - Adult tooth loss
  - Fluoridation status
  - Child caries experience
  - Child untreated caries
  - Child dental sealants
  - Oral and pharyngeal cancer
- Also provides data on state demographics, oral health program infrastructure, administration, and activities at the state level
- www.cdc.gov/nohss

Utility of surveillance data

- Most state, local, national agencies recognize need for timely data
  - Useful for generating support for their dental public health programs
- States have been able to survive administrative reorganizations and increase funding after documenting statewide needs

Challenges for the future for oral health surveillance

- Testing the validity of self-reporting and visual assessment in seniors
- Developing a screening protocol for periodontal diseases
- Implementing standardized codes for treatment claims data
- Process of exchange with research community on validation of new surveillance tools
- NIDCR/CDC Dental, Oral, and Craniofacial Data Resource Center has been developed to promote access to surveillance data and collaboration among researchers
- Envision system that will generate data from the local level to the state, regional, national levels