BASIC SCREENING SURVEYS: AN APPROACH TO MONITORING COMMUNITY ORAL HEALTH

Association of State and Territorial Dental Directors
1999, Revised September 2003
This manual supplements the Basic Screening Survey video. It is intended to provide more detailed information than a video permits and to serve as a ready reference for those conducting an oral screening survey. *The manual is not intended to stand alone.*

**Before you view the video:**

There is a pause in the middle of the videotape when you are instructed to hand out the screening forms to those viewing the tape so that they can follow along for the remainder. Please duplicate and distribute pages 12-13 so that all viewers will have a copy available to them.
The development of the Basic Screening Survey was led by the Association of State and Territorial Dental Directors in collaboration with the Ohio Department of Health. Technical assistance was provided by the Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.

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Columbus, Ohio 1999, Revised September 2003

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## Contents

- Introduction ............................................................................................................................................ 1
- Summary of Revisions ........................................................................................................................... 1
- Advisory Committees ............................................................................................................................. 2
- Access to Care Questionnaire ............................................................................................................... 4
  - Recommended Questions ............................................................................................................... 5
- Direct Observation ................................................................................................................................ 7
  - Lighting ............................................................................................................................................ 7
  - Retraction/Visualization ................................................................................................................... 7
  - Removing Debris ............................................................................................................................. 8
  - Instrumentation ................................................................................................................................ 8
  - Infection Control ............................................................................................................................... 9
- Data Management and Analysis ........................................................................................................... 10
- Screening Forms ................................................................................................................................... 12
  - Sampling ........................................................................................................................................ 24
  - Consent ......................................................................................................................................... 28
- Human Subjects Clearance .................................................................................................................. 28
- HIPAA ............................................................................................................................................. 28
- Screener Training ................................................................................................................................. 31
- Scoring System .................................................................................................................................. 33
- Eruption Patterns ................................................................................................................................. 33
  - Screening Criteria .......................................................................................................................... 34
- Contacts/Technical Assistance/Other Resources .................................................................................. 43
- National Oral Health Surveillance System ........................................................................................... 43
Introduction

Recognizing the need for community level oral health status and dental care access data, the Association of State and Territorial Dental Directors (ASTDD) undertook the Basic Screening Survey (BSS) project. Developing training materials for the BSS involved a number of experts in oral health and individuals with experience in health policy. The purpose of the project was to develop simple training materials that could be used by screeners with or without dental backgrounds. This approach was taken because non-dental health professionals, such as public health nurses, sometimes have direct access to some population groups and because some states and communities have few public health dental professionals to assist in screening surveys. No state or community is required to adopt the recommendations made in these materials.

Before embarking on a screening survey, it is important to understand its limitations. A dental screening is not a thorough clinical examination and does not involve making a clinical diagnosis resulting in a treatment plan. A screening is intended to identify gross dental or oral lesions, and is conducted by dentists, dental hygienists, or other appropriate health care workers, in accordance with applicable state law. The information gathered through a screening survey is at a level consistent with monitoring the national health objectives found in the United States Public Health Service’s Healthy People document. Surveys are cross sectional (looking at a population at a point in time), and descriptive (intended for determining estimates of oral health status for a defined population).

The manual is organized in accordance with the two parts to the BSS model: questions asked of, or about, the individual being screened, and direct observation of his or her mouth.

Two advisory committees, whose members are listed on the following pages, made essential contributions to the project. The members of the Policy/Content Advisory Committee determined what items were included in both the direct observation and the questionnaire components. Drs. Deborah Winn and Clemencia Vargas played a major part in developing the questionnaire. The Technical/Criteria Advisory Committee determined the screening criteria for the direct observation portion. In several instances, committee members drafted sections of the manual and of the video script. Their comments on multiple drafts shaped both documents. Special thanks go to Dr. Kathy Phipps for developing the direct data entry and analysis files and documentation, Dr. Rebecca King for the training section, Dr. Amid Ismail for the caries section and the many slides and technical comments he made throughout the process, and Dr. Eugenio Beltran for analyzing data from the pilot test, conducted at Hayes Elementary School in Fremont, Ohio.

Summary of Revisions

The 2003 version of Basic Screening Surveys: An Approach to Monitoring Community Oral Health contains several minor and one major revision. The major revision is an update on the method for collecting information regarding race and ethnicity. The 1999 version had one data element for race and another for ethnicity. Field-testing found two problems with the 1999 method – missing data and the inability to code multi-racial children. The 2003 version combines race and ethnicity into one question (to reduce the amount of missing data) and includes a code for multi-racial children. In addition, slight modifications have been made to the Epi Info data entry files in order to make the data entry process easier.
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Access to Care Questionnaire

The questions on the following pages may be included on a consent form (such as the example found on page 30) for children or may be asked of adults, directly. Coupled with the oral health status information obtained through the direct observation portion of the screening survey, the questions about access provide more population data for use in needs assessment.

When screening young preschool children, you should ask parents, in person or by questionnaire, if the child has had any front teeth extracted because of caries, as opposed to loss secondary to a traumatic injury.

The questionnaire is the best place for collecting demographic information about the people you screen. Such information is useful in stratifying your findings for reporting. Typical items collected are: 1) age and/or date of birth, 2) gender, and 3) eligibility for the free and/or reduced price meal program (schoolchildren).

In addition, race and ethnicity can either be asked on the questionnaire or observed and recorded at the time the individual presents for the screening. The categories for race and ethnicity are: white, black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, and Native Hawaiian/Pacific Islander. For simplicity, the data entry form and software provided with this manual includes one field for race/ethnicity that includes a separate code for multi-racial children. If you want to collect more detailed information on race and/or ethnicity, contact CDC or ASTDD for technical assistance.
Recommended Questions

1. During the past 6 months, did {you/your child} have a toothache more than once, when biting or chewing? [Source: National Health Interview Survey (NHIS), 1989]
   1. No
   2. Yes
   3. Don’t know/don’t remember

2. About how long has it been since {you/your child} last visited a dentist? Include all types of dentists, such as, orthodontists, oral surgeons, and all other dental specialists, as well as dental hygienists. [Source: NHIS, 1997]
   1. 6 months or less
   2. More than 6 months, but not more than 1 year ago
   3. More than 1 year ago, but not more than 3 years ago
   4. More than 3 years ago
   5. Never have been
   6. Don’t know/don’t remember

3. What was the main reason that {you/your child} last visited a dentist? (Please check one) [Source: NHIS, 1986]
   1. Went in on own for check-up, examination or cleaning.
   2. Was called in by the dentist for check-up, examination or cleaning.
   3. Something was wrong, bothering or hurting.
   4. Went for treatment of a condition that dentist discovered at earlier check-up or examination.
   5. Other
   6. Don’t know/don’t remember

4. During the past 12 months, was there a time when {you/your child} needed dental care but could not get it at that time? [Source: NHIS, 1994]
   1. No
   2. Yes
   3. Don’t know/don’t remember

5. The last time {you/your child} could not get the dental care (you/he/she) needed, what was the main reason (you/he/she) couldn’t get care? (Please check one) [Source: NHIS, 1994]
   1. Could not afford it
   2. No insurance
   3. Dentist did not accept Medicaid/insurance
   4. Not serious enough
   5. Wait too long in clinic/office
   6. Difficulty in getting appointment
   7. Don’t like/trust/believe in dentists
   8. No dentist available
   9. Didn’t know where to go
   10. No way to get there
   11. Hours not convenient
   12. Speak a different language
   13. Health of another family member
   14. Other reason
   15. Don’t know/don’t remember

6. Do you have any kind of insurance that pays for some or all of {your/your child’s} MEDICAL OR SURGICAL CARE? Include health insurance obtained through employment or purchased directly as well as government programs like Medicaid.
   1. No
   2. Yes
   3. Don’t know/don’t remember

7. Do you have any kind of insurance that pays for some or all of {your/your child’s} DENTAL CARE? Include health insurance obtained through employment or purchased directly as well as government programs like Medicaid.
   1. No
   2. Yes
   3. Don’t know/don’t remember
Additional questions for survey planners to consider:

8. During the past 12 months, was there a time when you felt that {you/your child} needed MEDICAL CARE OR SURGERY but could not get it at that time? [Source: Modified from NHIS, 1994]
   1. No
   2. Yes
   3. Don't know/don't remember

9. The last time {you/your child} could not get the MEDICAL CARE OR SURGERY (you/he/she) needed, what was the main reason (you/he/she) couldn’t get care? [Source: NHIS, 1994]
   1. Could not afford it
   2. No insurance
   3. Doctor did not accept Medicaid/insurance
   4. Not serious enough
   5. Wait too long in clinic/office
   6. Difficulty in getting appointment
   7. Don’t like/trust/believe in doctors
   8. No doctor available
   9. Didn’t know where to go
   10. No way to get there
   11. Hours not convenient
   12. Speak a different language
   13. Health of another family member
   14. Other reason
   15. Don’t know/don’t remember

For all questions, refused/no response is a coding option but is not listed as a choice on the questionnaire. For one digit variables, 9 is coded, for two digit variables the refused/no response code is 99.
Direct Observation

There are a number of questions you will have to answer as you plan the direct observation portion of the screening survey. This section provides additional information to help you make the necessary decisions.

Lighting

“What type of lighting do I need?”

Although screening for very obvious cavities and fillings can be done with good available light, screening for sealants and smaller cavities can not. The BSS assumes that natural and/or overhead lighting will be available but strongly recommends other light sources. Lighting options include:

• Flashlight/Penlight
• Portable dental light
• Non-dental exam light
• Head lamp

If your choice is to use portable dental lights, non-dental exam lights or head lamps, contact local dental suppliers, portable equipment manufacturers, or camping/outdoor equipment suppliers.

A listing of manufacturers can be found in the American Dental Association, Council on Access, Prevention and Interprofessional Relations publication, Portable and Mobile Dentistry Information.

Retraction/Visualization

The choices you make about how to help screeners visualize the mouths that they are screening will depend largely on what resources are available to you and, to some extent, on personal preference. All of the alternatives that follow are acceptable, but some clearly allow superior visualization. Local clinics, health departments or private dental offices may be willing to loan or donate some of the items.

“How can I get a “good look” in the mouth?”

▶ Tongue Blades
Tongue blades are a relatively inexpensive and common choice for retracting lips and cheeks to gain visual access to the teeth. The cost per tongue blade is approximately 1-2 cents.

▶ Dental Mirrors
As demonstrated in the video, dental mirrors provide much better visibility than tongue blades, particularly for the backmost upper teeth and for detecting sealants. Dental mirrors are sold as either disposable or sterilizable items. Screeners may opt to have a limited number of mirrors available for use in situations where visualization is otherwise inadequate.

• Disposable Mirrors
Disposable mirrors simplify infection control procedures but add cost, approximately 20-45 cents each.

• Steel-Handled/Reusable Mirrors
It may be possible to borrow reusable steel-handled dental mirrors from local clinics, state health departments or local dental offices. Steel-handled mirrors cost approximately $14.00-$17.00 each.

• Fiberglass/Reusable Mirrors
This type of mirror may be less expensive ($2.00-$3.00 each). However, they may not last as long as a steel-handled mirror. Most types of fiberglass mirrors are autoclavable and chemiclavable but may not withstand dry heat sterilizing.
Removing Food Debris from Teeth

“How do I find cavities or sealants when teeth are covered by food?”

If tooth surfaces cannot be visualized because debris obscures the view, a toothbrush is most effective for cleaning away the food. Alternatively, an explorer, a toothpick or the wooden end of a cotton-tipped applicator may be used to dislodge debris. Contact of gloves with mucosa or saliva requires hand cleaning and regloving.

For teeth that are too wet to see the tooth surfaces, screeners can use a long handled cotton-tipped applicator, cotton roll or gauze square to soak up saliva.

Instrumentation

“Do I need to use a dental explorer for the screening?”

While dental explorers (or probes) are not standard equipment for this screening model, they may be incorporated. The BSS protocol recommends that, if included, explorer use be limited to dentists and dental hygienists, primarily for feeling fissured surfaces to determine the presence of sealants.

Explorers should not be used to determine a “stick” or tugback in a suspected carious lesion, although they could be used with very light pressure to feel for discontinuity of the enamel surface. When used in this manner, a finger rest generally is not required. Therefore, explorer use for this purpose need not require contact of gloves with mucosa or saliva.

As with mirrors, explorers should improve the screener’s ability to detect clear or tooth-colored dental sealants but increase the cost of the survey. The cost can be reduced by carrying a limited number of explorers for use when the presence of at least one sealant is not obvious in permanent molars in which the pits and fissures are not filled or decayed.

- Disposable Explorers
  As with disposable mirrors, disposable explorers can add to cost. Each explorer costs approximately 30-50 cents each.

- Steel-Handled/Reusable Explorers
  Approximate cost for explorers range from $5.00-$15.00 each.

Note: A few surveys have successfully used toothpicks to feel for sealants. To do so requires some dexterity and concentration by the screener. Furthermore, contact with mucosa and saliva are more likely, necessitating regloving and hand cleaning between participants. Contact can be minimized by using long-handled toothpicks.
Infection Control

“Do I need to change gloves?”

In general, the screening procedures seen in the video assume that the screener will not touch the person being screened with his or her hands. It is best, however, to wear gloves during this procedure in the event the screener inadvertently comes into contact with saliva or the mouth.

When there is no physical contact, it is not necessary to change gloves between screening individuals. If, however, a gloved hand touches the mouth’s mucous membrane, lips or saliva, gloves must be removed and hands must be washed or rubbed with an antiseptic hand rinse before putting on a new pair of gloves and screening the next person. Although it is not necessary, most school staff will expect you to change gloves between each child.

Published recommendations (see Appendix) for appropriate infection control practices for screening surveys should be your minimum standard. The following table summarizes the levels of infection control recommended.

<table>
<thead>
<tr>
<th>PRINCIPLES OF INFECTION CONTROL</th>
<th>NO ANTICIPATED EXAMINER CONTACT with Mucous Membranes and/or Blood and/or Saliva Contaminated with Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Take action to stay healthy</strong></td>
<td></td>
</tr>
<tr>
<td>A. Immunizations</td>
<td></td>
</tr>
<tr>
<td>1. HBV immunization</td>
<td>As required by state law or regulation</td>
</tr>
<tr>
<td>2. Other immunizations</td>
<td>As necessary</td>
</tr>
<tr>
<td>B. Handwashing</td>
<td>Strongly suggested after each patient when hands are in close proximity to the mouth</td>
</tr>
<tr>
<td><strong>II. Avoid contact with blood</strong></td>
<td></td>
</tr>
<tr>
<td>A. Protective coverings</td>
<td></td>
</tr>
<tr>
<td>1. Gloves</td>
<td>Optional</td>
</tr>
<tr>
<td>2. Facial protection</td>
<td>Optional</td>
</tr>
<tr>
<td>3. Protective clothing</td>
<td>Optional</td>
</tr>
<tr>
<td>B. Avoid injuries</td>
<td></td>
</tr>
<tr>
<td>1. Handling sharps</td>
<td>Not anticipated</td>
</tr>
<tr>
<td>2. Written policy</td>
<td>Available on site</td>
</tr>
<tr>
<td><strong>III. Limit the spread of blood</strong></td>
<td></td>
</tr>
<tr>
<td>A. Control of contamination</td>
<td>Contamination with blood not anticipated</td>
</tr>
<tr>
<td>B. Waste handling</td>
<td>Follow state and local regulations</td>
</tr>
<tr>
<td><strong>IV. Make instruments and equipment safe for use</strong></td>
<td></td>
</tr>
<tr>
<td>A. Instruments</td>
<td>Single-use tongue blade or dental mirror, disposed of promptly</td>
</tr>
<tr>
<td>B. Covered surfaces</td>
<td>Change coverings as necessary</td>
</tr>
<tr>
<td>C. Uncovered surfaces</td>
<td>Clean as necessary</td>
</tr>
</tbody>
</table>

Data Management and Analysis

“How should I record the screening findings?”

In general, data may be recorded in three ways: 1) on paper forms, 2) on scan forms or 3) electronically, using direct data entry software and a portable computer. Each system has its benefits and pitfalls, but the primary determinants of the data collection method used often are the availability of scan form software or a portable computer and the comfort of screeners in using electronic data entry. While using paper forms is often an “easier” method for screeners in the field, it is more time consuming for administrative staff who are usually responsible for subsequently entering the data into an electronic format for analysis. The BSS model provides relatively simple data entry and analysis files for use with free software.

<table>
<thead>
<tr>
<th>Method</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper Forms</td>
<td>• easy for exam staff • does not require computer in field • can be used if electricity is a problem</td>
<td>• requires collection of forms • no method to check for valid values at the time of data collection • time consuming data entry</td>
</tr>
<tr>
<td>Scan Forms</td>
<td>• easy for exam staff • does not require computer in field • can be used if electricity is a problem • quick data entry</td>
<td>• requires scan form software • no method to check for valid values at the time of data collection</td>
</tr>
<tr>
<td>Direct Data Entry</td>
<td>• limits data entry to allowable values • can automatically enter certain variables such as date of exam</td>
<td>• requires a computer • staff must be comfortable using a computer</td>
</tr>
</tbody>
</table>

Data collection using paper forms: Sample data collection forms for the three age-specific versions of the BSS model (preschool, school-children, adult) are found on pages 12-13. When collecting oral health information on paper, it is essential that all data boxes contain an appropriate entry. If you use paper forms, be sure to review forms at the end of each day for:

- correct screening date
- correct site code
- appropriate dates of birth
- completeness (all boxes should contain an entry)

After data are recorded on paper, the forms should be sent to a designated data coordinator who will be responsible for data entry using appropriate computer software. Although oral health data can be analyzed by hand, the availability of free and easy to use software makes it less time consuming to enter the data into an electronic format for use with a software application for simple data analysis.

Data collection using scan forms: If your agency or organization has scan form software this is a good option for data collection. Data are recorded on specially created paper forms and the forms are scanned (or faxed) for data entry. Data entry is relatively quick if the forms are completed properly. Scan forms generally use predefined “bubbles” for recording data, thereby reducing the number of data recording errors.
Data collection using portable computers and data entry software: If portable computers are available and your screeners are comfortable using them, the most efficient way to record oral health information is to use direct data entry.

The primary benefit of direct data entry is that it forces the recorder to enter appropriate data in every field. For example, if the allowable codes for untreated decay are 0 or 1, the data entry program does not allow the recorder to enter 2 by mistake.

The BSS includes data entry and analysis files. This software can be used for direct data entry at the examination site or for data entry subsequent to recording on paper forms. While there are commercial database software packages that will do the job very nicely, the BSS has opted to use Epi Info 6.04, a free public access program developed by the Centers for Disease Control and Prevention (CDC) and the World Health Organization. Basic instructions for using Epi Info 6.04 in an oral health screening survey based on the BSS model are on pages 14-17.

Epi Info 6.04, along with its manual, can be downloaded from the “Publications, Software, and other Products” area of the CDC website: (http://www.cdc.gov/epiinfo/Epi6/ei6.htm).

The BSS includes a set of direct data entry and analysis files created for this model. These files can be downloaded from the ASTDD website (www.astdd.org). Epi Info 6.04 includes some valuable tutorials that will help more accomplished users create their own direct entry data screens and analyses files, if they prefer.

The advantages of Epi Info are that it is free, it is relatively easy to use and understand, and it allows for direct exportation of the data sets to other software programs such as SAS and SPSS. The disadvantages of the program are that it is not very powerful in terms of skip patterns, checks on data entry (to eliminate or minimize data errors), and analysis within the program (multivariate analyses are limited). More powerful commercial database programs are available for data analysis, as well.

“How do I analyze the data?”

Once the data have been entered into an electronic format (by direct data entry at the examination site or by entry of data from paper or scan forms), the data analysis process begins. As with data entry, data analysis can be accomplished using a variety of different programs. If your agency/organization has an epidemiologist, statistician, or data manager, contact them regarding your data analysis options and develop a plan, including a decision about whether to adjust, or weight, data in accordance with the sampling. You should also discuss whether to adjust for non-response.

For those agencies/organizations with little or no data analysis expertise, we have included an Epi Info 6.04 file for “automated” data analysis that will take your raw data and provide you with general information about your oral health needs assessment.

Instructions for running the automated data analysis are on pages 17-19.

IMPORTANT NOTE: CDC has released a new version of Epi Info, Epi Info 2002. The data entry and data analysis files for the Basic Screening Survey are being updated and will be available for distribution in early 2004. Until then, you can continue to use the Epi Info 6.04 files provided with this manual.
## Oral Health Screening Form/Preschool Children

<table>
<thead>
<tr>
<th>Screen Date:</th>
<th>Site Code:</th>
<th>Screener’s Initials:</th>
</tr>
</thead>
<tbody>
<tr>
<td>__ __ / __ __ / __ __ __ __</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ID Number:</th>
<th>Birth Date:</th>
<th>Age:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>__ __ / __ __ / __ __ __ __</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender:</th>
<th>Race/Ethnicity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1=Male</td>
<td>1=White</td>
</tr>
<tr>
<td>2=Female</td>
<td>2=Black/African American</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Untreated Cavities:</th>
<th>Caries Experience:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0=No untreated cavities</td>
<td>0=No caries experience</td>
</tr>
<tr>
<td>1=Untreated cavities</td>
<td>1=Caries experience</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Early Childhood Caries:</th>
<th>Treatment Urgency:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0=No ECC</td>
<td>0=No obvious problem</td>
</tr>
<tr>
<td>1=ECC</td>
<td>1=Early dental care</td>
</tr>
</tbody>
</table>

| Comments: | |
|-----------| |

**NOTE:** If you are collecting information on date of birth, age and race using a questionnaire, you can delete those fields from this form.

## Oral Health Screening Form/Schoolchildren

<table>
<thead>
<tr>
<th>Screen Date:</th>
<th>School Code:</th>
<th>Screener’s Initials:</th>
</tr>
</thead>
<tbody>
<tr>
<td>__ __ / __ __ / __ __ __ __</td>
<td></td>
<td></td>
</tr>
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<thead>
<tr>
<th>ID Number:</th>
<th>Grade:</th>
<th>Age:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender:</th>
<th>Race/Ethnicity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1=Male</td>
<td>1=White</td>
</tr>
<tr>
<td>2=Female</td>
<td>2=Black/African American</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Untreated Cavities:</th>
<th>Caries Experience:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0=No untreated cavities</td>
<td>0=No caries experience</td>
</tr>
<tr>
<td>1=Untreated cavities</td>
<td>1=Caries experience</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sealants on Permanent Molars:</th>
<th>Treatment Urgency:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0=No sealants</td>
<td>0=No obvious problem</td>
</tr>
<tr>
<td>1=Sealants</td>
<td>1=Early dental care</td>
</tr>
</tbody>
</table>

| Comments: | |
|-----------| |

**NOTE:** If you are collecting information on age and race using a questionnaire, you can delete those fields from this form.
## Oral Health Screening Form/Adults

<table>
<thead>
<tr>
<th>Screen Date: __ __ / __ __ / __ __ __ __</th>
<th>Site Code:</th>
<th>Screener’s Initials:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID Number:</td>
<td>Age:</td>
<td></td>
</tr>
<tr>
<td>Gender: 1=Male 2=Female</td>
<td>Race/Ethnicity: 1=White 2=Black/African American 3=Hispanic/Latino 4=Asian 5=American Indian/Alaska Native 6=Native Hawaiian/Pacific Islander 7=Multi-racial 9=Unknown</td>
<td></td>
</tr>
<tr>
<td>Natural Teeth: 0=No natural teeth 1=Has natural teeth</td>
<td>Untreated Cavities: 0=No untreated cavities 1=Untreated cavities</td>
<td></td>
</tr>
<tr>
<td>Treatment Urgency: 0=No obvious problem 1=Early dental care 2=Urgent care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** If you are collecting information on age and race using a questionnaire, you can delete those fields from this form.
Using the Epi Info Files for Direct Data Entry and Analysis

Before you Start...

The data entry and analysis program provided with this manual uses Epi Info 6.04, a public domain program developed and supported by the Centers for Disease Control and Prevention (CDC). If you don’t have Epi Info 6.04, you can download it, along with detailed download and installation instructions, from the CDC web site (www.cdc.gov/epiinfo/Epi6/epi6.htm). **IMPORTANT NOTE:** CDC has released a new version of Epi Info, Epi Info 2002. The data entry and data analysis files for the Basic Screening Survey are being updated and will be available for distribution in early 2004. Until then, you can continue to use the Epi Info 6.04 files provided with this manual.

If your agency/organization has a data manager, statistician, or epidemiologist, they may be able to help you with this process. Please take the time to have them review these data entry and analysis programs.

Using the Data Entry Form...

1. Turn on your computer.

2. Make sure that Epi Info 6.04 is installed on your hard drive at the following location C:\Epi6. If you use a networked system, please contact your system administrator for the appropriate drive name.

3. Download the Basic Screening Survey data entry files from the ASTDD website (www.astdd.org) to C:\EPI6. There are 12 files on the website: four for preschool children (presch.*), four for schoolchildren (school.*), and four for adults (adults.*). Refer to Table 1, on page 20, for a list of the files and their purpose.

4. Open Epi Info by double clicking on the Epi Info icon on your desktop. If you don’t see the icon, and you have Windows 95 or higher: Click “Start” at the bottom left corner of the computer screen. Click “Run”. Type C:\EPI6\EPI6.EXE Click “OK”.

---

14
5. You should now see the Epi Info main menu screen.

6. Go to the Programs menu (the upper left corner of the main menu screen) and double click on "ENTER data".

7. You should now see the Enter Data menu. From this point forward, your mouse will no longer work. You can move from field-to-field by using the up/down arrow keys.

8. The file name that you type under "Data file (.REC)" is dependent on the age group you are screening. If you are screening preschool children type C:\EPI6\PRESCH.REC, if you are screening schoolchildren type C:\EPI6\SCHOOL.REC, and if you are screening adults type C:\EPI6\ADULTS.REC

   Type 1 at “Choose one:”
   Type Y at “OK” and press the Enter Key to start.
9. The survey form should now be on your screen.

10. Enter the survey data. The variables Screen Date, School/Site, Screener’s Initials, and Grade are entered the first time you use the program. After that point, they appear automatically (this saves some typing when you are entering data). Simply press [enter] or use the up/down arrows to move to the next field. To change the Screen Date, School/Site, Screener’s Initials, or Grade simply type in a new value and that value will automatically appear until you change it again. The variable IDNUM is automatically assigned by the computer and you cannot alter or change this number. Table 2, on page 21, includes a description of each of the variables along with the valid codes for that variable. Note: There are three fields for recording responses to the access to care question “The last time you could not get the dental care you needed, what was the main reason you couldn’t get care”. Although the question asks for one response, field testing has found that many people provide multiple responses.

**REMINDER:** Your mouse will not work when entering data. You can use the [enter] key or the down arrow to move forward in the data entry form. To backtrack to a previous field use the up arrow.

**GREAT TIP:** If you forget what the codes for a particular variable are, press the [F9] key and all of the legal codes for that variable will appear (your cursor must be in the data entry box for that variable).

11. Save each data record. When you have finished entering data for one person, the program will ask you the following question:

**Write data to disk (Y/N/<ESC>)?**

If you are finished with the person and you don’t want to make any changes type Y for yes. The record will be saved and a new blank form will appear. All of your records are stored in separate “record” files named according to the age group you are screening (PRESCH.REC, SCHOOL.REC, or ADULTS.REC).
If you want to edit the record type N for no and the program will go back to the first variable (Screen Date). You can now edit the data form.

**NOTE:** New records are always added to the end of the record file.

12. Exit the program. When you are finished with entering for the day, press the [F10] key to exit the data entry program. Press [F10] again to completely exit Epi Info.

**OOPS, I entered the wrong number...**

Don’t worry, you can easily correct mistakes. If you have made a mistake, simply use the up or down arrow on your keyboard to move from one field to another (the side-to-side arrows do not work). If you have finished entering the record (but haven’t saved it yet), you can get back to the top of the record when the program asks **Write data to disk (Y/N/<ESC>)?** Type N for no and the cursor will go back to the first variable and you can move the cursor to the variable you want to correct. Change the variable and move the cursor to the end of the data entry form. The program will again ask **Write data to disk (Y/N/<ESC>)?** This time type Y for yes.

If you notice the mistake after you have already saved the record, you can get to previous records by pressing the [F7] key. Advance the cursor to the field you want to correct, make the correction, advance the cursor to the end of the form and save the record. When you are finished you can use the [F8] key to get to a new blank record.

**PLEASE NOTE:** When editing a previous record, the up and down arrows move you from field to field, not the side arrows. You can also move forward in a record by pressing the [Enter] key.

**Backing Up Your Data...**

Making backup copies of your data can be a lifesaver. We suggest that you make a backup copy of your data files at the end of every screening or data entry day. As previously stated, the data record files are named **PRESCH.REC**, **SCHOOL.REC**, and **ADULTS.REC**, depending on the age group you are screening. All you need to do is copy the record file you are using to a floppy disk or CD. For example, if you are screening schoolchildren, copy **SCHOOL.REC** to a disk. If you don’t know how to copy a file to a disk, refer to your Windows manual or online help.

**Analyzing Your Data...**

The Epi Info files that come with this manual include three programs for analyzing your data (**PRESCH.PGM**, **SCHOOL.PGM**, and **ADULTS.PGM**). Running these programs will give you basic oral health status data. If you want more detailed information, refer to the Epi Info manual available at the CDC website. These analysis files do not include any adjustment for sampling design or non-response; therefore, they are most appropriate for self-weighting probability samples. The following instructions assume that all of your survey files are located on your C:\EPI6 drive.

**NOTE:** If data were gathered using several different computers and several different record files, you must combine all of the record files **for that age group** onto one file. You can do this by cutting and pasting the records in the “EPED Word Processor”, or you can merge the files in “ANALYSIS of data.” Do not use a Windows based word processing program to do this (Epi Info is a DOS program).
1. Turn on your computer.

2. Make sure that both the completed survey record file (*.REC) and the analysis program file (*.PGM) are located in the same directory (preferably C:\Epi6).

3. Open Epi Info by double clicking on the Epi Info icon on your desktop.

4. From the main menu, choose Programs, then double click on ANALYSIS of data. Don’t worry if your screen goes blank for a second, this is normal.

5. You should now see the data analysis screen. All commands are typed at the EPI6> prompt on the lower left side of the screen.
6. The first thing you need to do is “read” the record file that you will be analyzing. All of the following commands assume that you are analyzing the data for schoolchildren. Substitute the names of the other record files, as needed, for the preschool children (PRESCH.REC) or adults (ADULTS.REC).

At the EPI6> prompt type: read c:\epi6\school.rec [enter]

If the data were read correctly, the name of the data file and the number of records will appear on the upper left corner of the screen. The figure under number five shows that our record file has 0 records (your files should have a lot more).

7. The next step is to “route” the output file to either the screen, a printer, or a text file. The default route is the screen, so if you don’t change the output route, it will appear on your computer screen. If you change the route to a text file, it will be stored in your Epi Info default directory (C:\EPI6).

EPI6> route <file name.txt> [enter] this will send the results to a text file
EPI6> route printer [enter] this will send the results to your printer
EPI6> route screen [enter] this will send the results back to your screen

8. Now that you’ve “read” the data and “routed” the output, you’re ready to run the analysis program.

EPI6> run c:\epi6\school.pgm [enter]

The results should now appear on your screen, on your printer or be saved in a text file.

9. You can easily select specific records to be analyzed. For example, if you want data for all of the schools with school codes from 100-199, you can run the analysis for only those schools.

EPI6> select school >99 and school <200[enter]

Refer to the Epi Info manual for more detailed instructions on customizing your data analysis.


**GREAT TIP:** You can select analysis commands and the variables you want using a menu. Press [F1] for a list of commands and [F2] for the list of variables.

An example of a data table printed out from the enclosed Epi Info analysis files is found on page 23.
### Table 1

Epi Info Files Included with this Manual

<table>
<thead>
<tr>
<th>File Name</th>
<th>Age-Cohort</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>presch.qes</td>
<td>preschool children</td>
<td>The questionnaire file that contains the actual survey form.</td>
</tr>
<tr>
<td>presch.rec</td>
<td>preschool children</td>
<td>The record file that stores the survey data.</td>
</tr>
<tr>
<td>presch.chk</td>
<td>preschool children</td>
<td>The check file that contains the legal codes for each variable.</td>
</tr>
<tr>
<td>presch.pgm</td>
<td>preschool children</td>
<td>The analysis program used to generate the oral health data.</td>
</tr>
<tr>
<td>school.qes</td>
<td>schoolchildren</td>
<td>The questionnaire file that contains the actual survey form.</td>
</tr>
<tr>
<td>school.rec</td>
<td>schoolchildren</td>
<td>The record file that stores the survey data.</td>
</tr>
<tr>
<td>school.chk</td>
<td>schoolchildren</td>
<td>The check file that contains the legal codes for each variable.</td>
</tr>
<tr>
<td>school.pgm</td>
<td>schoolchildren</td>
<td>The analysis program used to generate the oral health data.</td>
</tr>
<tr>
<td>adults.qes</td>
<td>adults</td>
<td>The questionnaire file that contains the actual survey form.</td>
</tr>
<tr>
<td>adults.rec</td>
<td>adults</td>
<td>The record file that stores the survey data.</td>
</tr>
<tr>
<td>adults.chk</td>
<td>adults</td>
<td>The check file that contains the legal codes for each variable.</td>
</tr>
<tr>
<td>adults.pgm</td>
<td>adults</td>
<td>The analysis program used to generate the oral health data.</td>
</tr>
<tr>
<td>Variable</td>
<td>Age Group</td>
<td>Variable Type</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------</td>
<td>---------------</td>
</tr>
<tr>
<td>Screen Date</td>
<td>All</td>
<td>Date</td>
</tr>
<tr>
<td>Site or School Code</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Screener’s Initials</td>
<td>All</td>
<td>Text</td>
</tr>
<tr>
<td>IDNUM</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Grade</td>
<td>School</td>
<td>Text</td>
</tr>
<tr>
<td>Birth Date</td>
<td>Preschool</td>
<td>Date</td>
</tr>
<tr>
<td>Age</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Gender</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Race</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Natural Teeth</td>
<td>Adults</td>
<td>Numeric</td>
</tr>
<tr>
<td>Untreated Cavities</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Caries Experience</td>
<td>School</td>
<td>Numeric</td>
</tr>
<tr>
<td>Early Childhood Caries</td>
<td>Preschool</td>
<td>Numeric</td>
</tr>
<tr>
<td>Sealants on Perm. Molars</td>
<td>School</td>
<td>Numeric</td>
</tr>
<tr>
<td>Treatment Urgency</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Comments</td>
<td>All</td>
<td>Text</td>
</tr>
<tr>
<td>Toothache</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Last Dental Visit</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Reason for Last Visit</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Could Not Get Dental Care</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Reason Did Not Get Care (1)</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Reason Did Not Get Care (2)</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Reason Did Not Get Care (3)</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Variable</td>
<td>Age Group</td>
<td>Variable Type</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------</td>
<td>---------------</td>
</tr>
<tr>
<td>Medical/Surgical Insurance</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>Dental Insurance</td>
<td>All</td>
<td>Numeric</td>
</tr>
<tr>
<td>F/R Lunch Eligibility</td>
<td>School</td>
<td>Numeric</td>
</tr>
</tbody>
</table>
## Sample Data Tables Using the Epi Info Data Analysis Files

<table>
<thead>
<tr>
<th>SEALANTS</th>
<th>Grade</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>45</td>
<td>149</td>
<td>282</td>
<td>479</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.0%</td>
<td>31.1%</td>
<td>58.9%</td>
<td>51.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25.4%</td>
<td>54.0%</td>
<td>61.4%</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>141</td>
<td>127</td>
<td>177</td>
<td>445</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31.7%</td>
<td>28.5%</td>
<td>39.8%</td>
<td>48.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>74.6%</td>
<td>46.0%</td>
<td></td>
<td>38.6%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>189</td>
<td>276</td>
<td>459</td>
<td>924</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20.5%</td>
<td>29.9%</td>
<td>49.7%</td>
<td></td>
</tr>
</tbody>
</table>

This table provides information on sealants for all children in grades 1-3. The first line is the number of children examined, the second line is the row percent, and the third line is the column percent. The column percent is the % of students with/without sealants in each grade. In this example, 459 3rd grade students were examined, 61.4% did not have sealants and 38.6% had sealants.

The following two tables account for the 675 of the 924 children who were either white (race=1) or black (race=2). Additional tables could be created to describe the remaining 249 who fell into other racial categories. Similar tables could be created based on other variables such as whether or not a child’s family has third party dental coverage.

<table>
<thead>
<tr>
<th>SEALANTS</th>
<th>Grade</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>10</td>
<td>100</td>
<td>221</td>
<td>331</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.0%</td>
<td>30.2%</td>
<td>66.8%</td>
<td>56.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.8%</td>
<td>67.1%</td>
<td></td>
<td>74.7%</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>136</td>
<td>49</td>
<td>75</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td></td>
<td>52.3%</td>
<td>18.8%</td>
<td>28.8%</td>
<td>44.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>93.2%</td>
<td>32.9%</td>
<td></td>
<td>25.3%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>146</td>
<td>149</td>
<td>296</td>
<td>591</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24.7%</td>
<td>25.2%</td>
<td>50.1%</td>
<td></td>
</tr>
</tbody>
</table>

This table provides information on sealants for children in grades 1-3, stratified by race. Only those children coded as white (race=1) are included in this table. In this example, 296 white 3rd grade students were examined, 74.7% did not have sealants and 25.3% had sealants.

<table>
<thead>
<tr>
<th>SEALANTS</th>
<th>Grade</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>9</td>
<td>11</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25.0%</td>
<td>30.6%</td>
<td>44.4%</td>
<td>42.9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90.0%</td>
<td>34.4%</td>
<td>38.1%</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>1</td>
<td>21</td>
<td>26</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.1%</td>
<td>43.8%</td>
<td>54.2%</td>
<td>57.1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.0%</td>
<td>65.6%</td>
<td></td>
<td>61.9%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>10</td>
<td>32</td>
<td>42</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11.9%</td>
<td>38.1%</td>
<td>50.0%</td>
<td></td>
</tr>
</tbody>
</table>

Only those children coded as black (race=2) are included in this table. In this example, 42 black 3rd grade students were examined, 38.1% did not have sealants and 61.9% had sealants.
Sampling

When it comes to the question of sampling, there is a short answer and a long answer (which circles back to the short answer). The short answer is: “Get Help!”

The following has been adapted from: Oral Health Examination Survey Manual: A Companion Document to “Assessing Oral Health Needs: ASTDD Seven-Step Model,” by Barbara Carnahan, RDH, MS. Dr. Michael Manz provided valuable input into the development of this section.

“How do I decide who to screen?”

The first step in planning a screening survey is to determine the population to be assessed (target population). There are several conceptual approaches to defining the target population. For example, the target population may be a specific age group, a group with a suspected high level of disease, a cross-section of individuals in a specific geographic area, a group of persons for whom a disease prevention and/or treatment program is being considered, or users of dental services.

Unless the size of the target population is very small, a sample of persons representative of the target population will need to be selected for screening. For many surveys, sites are usually selected (e.g., schools, day care centers, Head Start programs, senior centers, nursing homes) yielding volunteers for the sample. At various points in this section, we will use the terms “participant” and “element” to refer to an individual with regard to the sample. “Element” refers to someone who, in the early planning stages, could be surveyed while “participant” is someone who has been selected and agreed to be surveyed. The goal of site selection is to identify sites that will yield adequate numbers of participants who will be representative of the target population. From the data collected on the sample, extrapolations, or estimates, will be made to the target population you wish to describe.

This section should provide enough background information on sampling to give you an appreciation of the questions you should consider and, hopefully, the wisdom to consult someone knowledgeable about sampling to discuss your situation.

“What are some approaches to sampling?”

Initially, it is valuable to distinguish between two approaches, probability sampling and non-probability sampling. In probability sampling, every member of the population has a known, or determinable, non-zero, chance of being selected into the sample. Conversely, non-probability samples have either elements for which probability of selection cannot be determined or, because of the sample design, have no chance of being selected into the sample. The decision about which sampling method you choose will depend on your objectives and resources.

Non-probability samples are best used in situations where resources limit access to sampling consultants or restrict the number of sample selections. The major shortcoming of non-probability sampling is that it is not possible to use statistical methods and theory to estimate the precision of population estimates derived from the sample. Convenience sampling (selection of readily available elements) and purposive sampling (selection based on the expert opinion of investigators who decide which elements represent the population) are examples of non-probability sampling. Brief descriptions of six sampling approaches follow:

1. Convenience Sampling (Non-probability)
   One relatively inexpensive sampling design is a convenience sample. As the name implies, a convenience sample is one in which the sample is drawn from individuals who are readily accessible. For example, children in nearby schools or schools in which other dental programs are currently in operation may be selected. Individuals who receive dental services at nearby clinics or dental offices may be surveyed. Data may be collected at a health fair or other community event where you might expect that people will be available.
2. **Pathfinder Survey** (Non-probability)
This methodology, developed by the World Health Organization, is actually a convenience sample. It was designed for use in developing countries where resources for conducting oral health surveys are typically quite limited. The Pathfinder method has been used in the United States with some modifications to introduce elements of random sampling. The survey method is designed to provide data for program planning purposes.

The sampling design calls for the selection of a few index age groups and sampling sites that represent the geographic distribution of the population. Approximately 20 participants in each of the index groups are examined at each site. Normally, 10-15 sites are selected, thus yielding 200-300 participants in each index group. The publication, WHO Oral Health Surveys: Basic Methods, Fourth Edition, contains detailed information on the Pathfinder methodology.

3. **Simple Random Sampling** (Probability)
A simple random sample is one in which each member of the population has an equal and known probability of being selected. Each element is selected one at a time by a chance process. A random numbers table may be used for sample selection, and details on the process are found in most standard statistics textbooks. Nowadays, it is more common to use computer software packages for this purpose.

Simple random sampling may yield measures that lack precision and cannot be generalized because of inadequate representation of various subgroups within the sample. It is also difficult to employ because a complete list of the target population (e.g., every school-aged child in the state) must be obtained in order to select the sample; this list may not be readily available and would be impractical to generate. Furthermore, to conduct a survey using this type of sample design does not use resources efficiently. For example, a survey of schoolchildren in a state might end up requiring going to a different school for almost every child selected into the sample.

4. **Stratified Random Sampling** (Probability)
Stratification is used to ensure that the sample represents the target population as to population variables considered important and to increase precision of population estimates. Selections are made from every stratum, ensuring that the sample represents all strata in the target population. For example, in an oral health survey of schoolchildren, school districts might first be stratified by geographic region before selection so that a good cross section of districts across all regions of the state is obtained in the sample.

Factors often considered when stratifying the target population include: age (or grade for school-based surveys); geographic location (e.g., urban, rural, suburban); socioeconomic status (as indicated, for example, by the percentage of children eligible for free and reduced cost meals at school); availability of optimally fluoridated water; and ethnic origin and/or race.

5. **Cluster Sampling** (Probability)
Clustering is used to increase the efficiency of the sample design so that the loss of precision which usually results from cluster sampling, is more than offset by the increase in sample size possible. The target population is divided into clusters of associated elements which can be surveyed more efficiently. Cluster sampling differs from stratified random sampling in that not all population clusters are sampled. For example, a city may be divided into regions such as tracts or blocks; a random sample of blocks (clusters) is chosen and information is collected on elements within the selected clusters. Unlike stratified random sampling, cluster sampling is used for sampling efficiency with the hope that clusters are heterogenous within and homogenous between clusters and thus will be representative of clusters not selected.

A common example of cluster sampling is seen in school-based oral health surveys. A sample of schoolchildren in a state might involve selection of school districts at the first stage, schools within districts at the second stage, classes within schools at the third stage, and – perhaps – students within classes. In this example, cluster selection is used to reduce time and effort required to select and recruit
children, and to travel to and between schools. Not all schools are sampled, so it is advantageous if children within selected schools vary and represent children from the schools which weren’t selected into the sample. In most large surveys, both stratification and clustering are employed in the sample design, such as in:

6. **Probability Proportional to Size Sampling**
   (Probability)

Probability Proportional to Size (PPS) sampling refers to the approach of selecting clusters in proportion to their size in the early stages of sampling and a set number of elements from each final sampled cluster in the last stage of sampling so that each element in the population ends up with an equal probability of selection. Typically, it involves both stratification and clustering in a multi-stage design. This approach can best be explained through an example, again using a survey of schoolchildren. With a PPS design, schools would be selected with probability proportional to enrollment size of the school; larger schools would have a greater chance of being selected in the first stage of sampling. A set number of children (e.g., thirty) are then selected from within each selected school. In this stage children from larger schools would have a smaller chance of selection than children from smaller schools (e.g., 30/1000 vs. 30/150). The result is that the probabilities of selection even out. Larger schools have a higher probability of selection in the first stage of sampling, but this is offset by the smaller probability of selection for children from within larger schools at the subsequent stage of selection. With this design, all children in the target population end up with the same probability of selection. The sampling for this design involves the use of lists of clusters with their sizes, in which stratification can be incorporated easily. This is a very effective design to ensure that a representative sample of the target population is selected while maintaining a stable number of selected elements at each survey site for survey efficiency.

“How large of a sample do we need?”

Perhaps the most frequently asked question in survey research, sample size is a very important consideration for planners. Surveying more participants than needed results in an unnecessary expenditure of time and resources for little additional information. An insufficient sample size may yield survey findings that are of little value because the information is not collected on enough people to minimize the effect of variation within the group.

Unfortunately, there is not a simple answer to the question of adequate sample size. Several factors must be considered in determining the number of participants to examine. First, the sample size will depend on the variability of the measure of interest in the target population. For example, if the percent of children with one or more dental sealants is thought to vary significantly in a state, surveying a larger number of children helps to minimize the effect of this variation. The survey planner will then have increased confidence that the findings among the survey participants is reflective of those in the target population.

The sample size will also depend on how precise the surveyor wishes the measures of interest to be (i.e., within what interval or bounds of error does the survey planner wish the true value of the measure to fall?). Generally, the larger the bounds of error around the true value of the measure, the smaller the sample can be. For example, if the surveyor wishes a value to be within 5% in either direction of the true value, a smaller sample size will be required than if a more precise value is desired, e.g., within 2% of the true value.

Statistical issues aside, most survey planners find the need to consider a number of practical issues when determining a sample size. For example, resources for conducting the survey will greatly influence the number of participants that can be examined. Questions to ask include, “How much time do I have for conducting the survey?” “How many screeners are available to work on the project?” “How much money do I have for travel, supplies, and other costs?” The answers to these and other pragmatic questions may have the greatest impact on sample size determination. Usually, a balance will need to be struck between statistical rigor and fiscal/time constraints.
Sample size determination should be done with the assistance of a biostatistician or epidemiologist.

“In school surveys, how do I decide which schools and classrooms to survey?”

As mentioned previously, randomly selecting individual students across a large geographic region for inclusion in a survey is not feasible nor desirable. Rather, individual schools are usually selected. State and local boards of education can usually provide directories or data files of school districts and schools in the geographic area(s) of interest. It may be possible to draw down the information from the agency’s website. School health, immunization, and health education programs within state and local health agencies may also be sources of school listings.

Once schools are selected, a standardized process for selecting individual students will need to be developed. Entire classrooms within the desired grade level(s) may be randomly selected for inclusion, or students may be selected randomly from rosters organized by grade. To avoid introducing bias, classrooms and students selected should not be systematically different from remaining classrooms or students. For example, honors or accelerated learning classrooms should not be selected, nor should classrooms of students who are medically compromised or developmentally delayed unless the surveyor is interested in knowing more about the oral health status of these children, as well.

“Can we use the data in their raw form or does a statistician need to adjust them?”

The scope, budget and objectives of your survey will help you decide whether or not to adjust your data, statistically. If you have the budget and value greater precision and confidence in your estimates, adjusted data would be preferred. If you do not have the need or the resources for a biostatistician, yours will not be the first survey to report unadjusted results. You should, however, make this clear in the methods section of your survey report.

Proper analysis of data collected on a sample, which accounts for the sample design, will increase the validity of population estimates and standard errors. For example, sample data (e.g., percent of eight and 14 year olds with dental sealants) may be adjusted statistically using weights to provide a better estimate for the population. The standard error reflects the precision of a calculated population estimate. Generally, standard errors increase with increasing variance of sample data, and decrease with increasing sample size, but are also influenced by other factors in the sample design. The smaller the standard error, the greater the confidence that the estimate calculated from the sample is close to the actual findings had you surveyed the whole target population.

“Where can I get sampling help?”

Sampling help may be available from faculty at schools of public health or community health, community dentistry departments at colleges of dentistry, or biostatisticians/epidemiologists in a state health department. As with other aspects of the BSS model, the Division of Oral Health, Centers for Disease Control and Prevention will provide states and communities either direct technical assistance or will coordinate referrals for assistance with sampling. The Division can be reached at the address found on page 43.
Consent

“Do I need parental permission to screen?”

Your approach to parental consent for children to be screened most likely will influence the participation rate. The standards and traditions of the schools with which you are working are likely to determine which approach you will use. Fearing legal liability, school administrators often require written parental (positive) consent for participation. This will undoubtedly diminish participation. Sometimes, passive consent can be used, whereby notes about the screening survey are sent to parents who must respond only if they do not want their child to participate. Many schools allow non-invasive screenings such as an oral screening survey as part of their routine health screenings without written parental permission for each child. It is always advisable to inform parents that these activities are taking place, notifying them of the purpose of the screening. A sample cover letter and consent form are found on pages 29-30.

Human Subjects Clearance

Survey planners must determine if the survey protocol requires human subjects review by an Institutional Review Board (IRB) within their agency. Agencies will vary in their decision of whether a review is needed. In some agencies, an oral screening survey is perceived as merely part of program planning, and not subject to review. In other instances, the survey is considered research and a review will be required. In some agencies, the source of funding for the activity (e.g., federal, state, or private) or the fact that the survey involves minors may dictate whether a review is required.

If required, approval of the survey protocol should be obtained before making initial contact with school officials. While uncommon, some school officials may question whether a review of the protocol was conducted, and it is to the survey planner’s advantage to be able to report that the protocol was approved. The review process within an agency can take months to complete, so planners should begin the process well in advance of the anticipated start of the survey.

In addition to your agency’s IRB, some school districts and communities have internal or independent review boards. Surveyors should find out in advance if there are such district and/or community IRBs in the areas they plan to survey and what their expectations are with respect to reviewing this type of survey.

HIPAA

The Administrative Simplification standards adopted by the Department of Health and Human Services (HHS) under the Health Insurance Portability and Accountability Act of 1996 (HIPAA) apply to any entity that is:

- a health care provider that conducts certain transactions in electronic form
- a health care clearinghouse
- a health plan

Before beginning the process of planning your survey, you should contact your agency’s HIPAA coordinator to determine if your agency is a covered entity. More information on HIPAA can be found at the HHS, Office for Civil Rights website (www.hhs.gov/ocr/hipaa).
Dear Parent:

Your child’s school has been chosen to take part in the state health department’s “Make Your Smile Count!” survey to learn about the health of children’s teeth in your county and across the state. “Make Your Smile Count!” will help us plan future dental health programs. As you know, a healthy mouth is part of total health and wellness and makes a child more ready to learn.

With your consent, a dentist or dental hygienist will screen your child’s teeth to check for tooth decay and other dental problems. Your child will receive a toothbrush and a letter to take home that tells you about the health of your child’s teeth. This screening does not take the place of regular dental check-ups.

Please be assured that the dental screening will be carried out in a healthy manner. Dental gloves will be worn, and we will use a new, disposable, sterilized mirror and probe for each child, which will be thrown away after one use. The dentist or dental hygienist will follow all guidelines to prevent the spread of disease set by the Centers for Disease Control and Prevention (CDC) for this type of dental survey. Results of your child’s screening will be added to those of other children, and your child will not be named in any “Make Your Smile Count!” report.

Please complete and sign the attached consent form. This will allow your child to be in “Make Your Smile Count!” Return the form to your child’s teacher tomorrow.

Thank you for working with us to learn how to improve the dental health of the children of our state. If you have any questions about “Make Your Smile Count!,” please contact Susan Smith at 333/555-5555 or via e-mail at ssmith@doh.mystate.us.

Sincerely,

Enc.
Sample Consent Form & Parent Questionnaire

Please complete this form and return it to your child’s teacher tomorrow. Thank you.

Child’s Name: ____________________________________________  Child’s Age: ______________________

___ Yes, I give permission for my child to have his/her teeth checked.

___ No, I do not give permission for my child to have his/her teeth checked.

Signature of Parent or Guardian: ___________________________ Date: ____________________________

Please answer the next questions to help us learn more about access to dental care. Your answers will remain private and will not be shared. If you do not want to answer the questions, you may still give permission for your child to have his or her teeth checked.

1. During the past 6 months, did your child have a toothache more than once, when biting or chewing?
   - No
   - Yes
   - Don’t know/don’t remember

2. About how long has it been since your child last visited a dentist? Include all types of dentists, such as orthodontists, oral surgeon, and all other specialists, as well as dental hygienists. (Check one)
   - 6 months or less
   - More than 3 years ago
   - More than 6 months, but not more than 1 year ago
   - Never has been to the dentist
   - More than 1 year ago, but not more than 3 years ago
   - Don’t know/don’t remember

3. What was the main reason that your child last visited a dentist? (Check one)
   - Went in on own for check-up, examination or cleaning.
   - Was called in by the dentist for check-up, examination or cleaning.
   - Something was wrong, bothering or hurting.
   - Went for treatment of a condition that dentist discovered at earlier check-up or examination.
   - Other
   - Don’t know/don’t remember

4. During the past 12 months, was there a time when your child needed dental care but could not get it?
   - No (Go to Question 6)
   - Yes (Go to Question 5)
   - Don’t know/don’t remember (Go to Question 6)

5. The last time your child could not get the dental care he/she needed, what was the main reason he/she couldn’t get care? (Check one)
   - Could not afford it
   - Health of another family member
   - Not a serious enough problem
   - No insurance
   - Difficulty in getting appointment
   - Dentist hours are not convenient
   - Dentist did not take Medicaid/insurance
   - No way to get there
   - Don’t like/trust/believe in dentists
   - Speak a different language
   - Didn’t know where to go
   - Other reason
   - Wait is too long in clinic/office
   - No dentist available
   - Don’t know/don’t remember

6. Do you have any kind of insurance that pays for some or all of your child’s MEDICAL OR SURGICAL CARE? Include health insurance obtained through employment or purchased directly, as well as government programs like Medicaid.
   - No
   - Yes
   - Don’t know

7. Do you have any kind of insurance that pays for some or all of your child’s DENTAL CARE? Include health insurance obtained through employment or purchased directly, as well as government programs like Medicaid.
   - No
   - Yes
   - Don’t know

8. Which of the following best describes your child? (Check all that apply)
   - White
   - Black/African American
   - Hispanic/Latino
   - Asian
   - American Indian/Alaska Native
   - Native Hawaiian/Pacific Islander

9. Is your child eligible for the free or reduced price lunch program?  
   - No
   - Yes (School children only)

THANK YOU FOR PARTICIPATING IN “MAKE YOUR SMILE COUNT!”
Screener Training

Before the actual screening, prospective screeners should come together for a training and practice session. Screeners may view the BSS video and read the manual, individually, before the session. At the training session, the screeners will view the video as a group and do their best to answer each others' questions. Following the group review of the video and manual, prospective screeners will use their new skills and discuss potential differences in interpretation of screening criteria under field conditions. This will provide practical experience using the BSS model and increase everyone's level of confidence that the screening results are reliable.

In the practice session, each screener will have a recorder and a visibly numbered station, such as a small table or a school desk, to hold her/his screening supplies. The recorder either may be another trainee who will later alternate positions with the screener, or someone who has not been trained to screen. A sample format for recording screening codes for multiple screening trainees is found on page 32. These can be printed as cards or on paper. We recommend that each screener see enough participants to be comfortable with the consistency of their interpretation of the screening criteria compared with the other screeners in their group. When screeners reach the point where their calls on the vast majority of participants are in agreement with each other, they have practiced enough. At a minimum, screeners should look at 10-20 participants in the age range that they will be screening. Ideally, participants would have been prescreened by a dentist or dental hygienist who understands the BSS model to assure a good variety of clinical situations. If prescreening is not possible, a larger number of participants should be screened for practice in order to assure a reasonable representation of those to be screened in the survey. This could require as many as 50 practice screenings, depending on levels of agreement as the training progresses.

The screening stations may be arranged in a circle or semi-circle, far enough apart so that the screeners cannot hear the calls of the adjacent screeners. Each subject being screened in the practice session carries her/his score sheet to each station, consecutively, so that all screeners see each subject. The screener “calls” her/his screening code decisions for the subject and the recorder writes them in the appropriate spaces on the score sheet. Care is needed to assure that the screener is not able to see the scores of the other screeners before making her/his decision. After the person being screened goes to the last station, someone is charged with identifying the participants for whom screeners were not unanimous on all scores. These participants are retained for discussion after all the screenings have been completed. At that time, the group of trainees gets together to discuss and resolve their disagreements by mutually deciding the “best call” for each situation, using the screening criteria.

Questions about conducting training can be directed to the Division of Oral Health, Centers for Disease Control and Prevention (see page 43).
Oral Health Survey Training—Recording Form for Schoolchildren

Child’s Name: ____________________________________

<table>
<thead>
<tr>
<th>Measure</th>
<th>Codes</th>
<th>Screener Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Currently has decayed teeth</td>
<td>0=No 1=Yes</td>
<td>1   2   3   4   5   6</td>
</tr>
<tr>
<td>2. Has ever had a cavity</td>
<td>0=No 1=Yes</td>
<td></td>
</tr>
<tr>
<td>3. Sealants on permanent molars</td>
<td>0=No 1=Yes</td>
<td></td>
</tr>
<tr>
<td>4. Treatment urgency</td>
<td>0=No obvious problem 1=Early 2=Urgent</td>
<td></td>
</tr>
</tbody>
</table>

Record Name of Screener

Screener #1 ____________________________________
Screener #2 ____________________________________
Screener #3 ____________________________________
Screener #4 ____________________________________
Screener #5 ____________________________________
Screener #6 ____________________________________
**Scoring System**

The BSS attempts to make the scoring of screening indicators straightforward. For most indicators, a code of “1” means the condition is present and a code of “0” means it is not. The only exception to the 0/1 scheme is the last indicator, urgency of need for dental care, which has three code choices, 0, 1 and 2. Only one code should be assigned per subject for each of the screening indicators.

**Eruption Patterns**

The following graphic displays the eruption patterns of the primary and permanent teeth. The permanent first molar erupts behind the primary second molar at about 6-7 years of age.
Screening Criteria

There are six oral health status indicators included in the direct observation portion of the BSS. Some are only applicable to specific age groups and others apply to all age groups. Your screening survey should include the following indicators according to the age groups shown:

Preschool Children
- cavities
- children who have ever had a cavity
- children 3 years of age or under with one or more upper front teeth that were ever decayed
- urgency of need for dental care

Schoolchildren (including adolescents)
- cavities
- children who have ever had a cavity
- schoolchildren with sealants
- urgency of need for dental care

Adults
- cavities
- adults with one or more of their own teeth (as opposed to false teeth)
- urgency of need for dental care
Dental Caries Overview

Dental caries is a widespread disease caused by acids produced by bacteria in the mouth. The acids lead to loss of calcium and phosphate compounds (demineralization), the building blocks of teeth. Counteracting the effect of demineralization of tooth surfaces are several protective factors in saliva and the oral environment that contribute to the uptake of calcium and phosphate compounds (remineralization).

Dental caries occurs when the balance between the detrimental process of demineralization and protective process of remineralization shifts towards demineralization. The demineralization-remineralization balance is like a tug-of-war.

Precavitated caries: Early signs of dental caries appear when the process of demineralization progresses to the degree that the color and translucency of the tooth surface are altered.

Cavitated caries: If demineralization continues, the outer tooth structure collapses leading to the formation of a cavity. For the purposes of the BSS model, teeth are only considered decayed at the point in the caries process when enough enamel has been lost from the surface to create a 1/2 mm discontinuity or, more simply stated, a hole (see page 36).

Figure 1 – Precavitated pit and fissure caries

Figure 2 – Precavitated smooth surface caries
**Indicator #1: Cavities**

A cavity is detected when the screener can readily observe two things:

- a loss of at least 1/2 mm of tooth structure at the enamel surface (the ball at the tip of a CPI or PSR periodontal probe is 1/2 mm in diameter)
- brown to dark-brown coloration of the walls of the cavity

Teeth that meet both of these criteria are considered decayed, even if a filling or a crown is also present. The criteria apply to both pit and fissure cavities (Figures 3-4) as well as those on smooth tooth surfaces (Figures 5-6).

Individuals with at least one decayed tooth, whether a permanent or a primary tooth, receive the code “1” for this indicator.

*A good rule of thumb in a screening survey is — when in doubt, be conservative. That means that if you are not sure that a condition is present, assume it is not.*

Broken or chipped teeth are considered sound unless a cavity is found.

If the screener notices a retained root (Figure 7), assume that the whole tooth was destroyed by caries and code the individual as having a cavity, Code 1.

Code 0 classifies the individual as having a sound dentition because no teeth meet the caries criteria. There may be missing teeth or teeth with fillings, crowns, or even fractures, but none with untreated cavities.
Indicator #2: Children who have ever had a cavity

This indicator, also known as “caries experience,” is determined by the presence of an untreated cavity, a filling (which presumably was once a cavity), or a permanent molar tooth that is missing because it was extracted as a result of caries. The BSS records this measure for children only, because few individuals reach adulthood without experiencing dental caries.

If a child was found to have at least one decayed tooth in Indicator #1, he/she automatically will be coded “1” for Indicator #2. If not, you must look for fillings, crowns or missing teeth before selecting a code.

The video shows three basic types of fillings that may be seen during a screening: amalgam (Figure 8), tooth-colored (Figure 9) and temporary (Figure 10).

Figure 8 – Amalgam filling

Figure 9 – Tooth-colored fillings

Figure 10 – Temporary fillings

For the purpose of the screening, crowns, which cover the whole tooth or most of the tooth, are akin to fillings. The presence of at least one will categorize an individual as having had a cavity. The most common type of crown seen in children is a stainless steel crown, usually found on the back primary teeth. Tooth colored crowns, however, may be seen on the front teeth of young children with ECC.

The other two types of crowns, gold and tooth-colored, may be seen in adolescents, but only rarely. Tooth-colored crowns often have metal on the back of the tooth.

A crowned front tooth in an adolescent may be the result of injury rather than caries. Therefore, you should question the adolescent about their recollection of injury and code the child accordingly.

The third way that a child can be categorized as having caries experience is if he or she is missing one or more permanent molars, specifically the six-year or the twelve-year.
Indicator #3: Dental Sealants (Schoolchildren)

Dental sealants are either transparent (Figure 11) or opaque (Figure 12). While opaque sealants are relatively easy to identify visually, other shades, including tooth-colored sealants may be very difficult to identify visually.

Even a partially retained sealant (Figure 13) will cause an individual to be categorized as having sealants (Code 1).

Figure 11 – Transparent sealant

Figure 12 – Opaque sealant

Figure 13 – Partially retained sealant

Remember, only permanent molars are considered for this indicator. If there are only sealants on teeth other than permanent molars, the child is coded “0,” as if he or she had none at all.

As stated previously, adjuncts such as explorers or toothpicks can help dental (dental hygienist and dentist) screeners confirm the presence of sealants. The BSS model does not recommend that explorers be used by non-dental screeners. Some surveys have experimented with non-dental screeners using toothpicks to feel for sealants. When feeling for sealants, a distinction is made between a smooth area and an area made rougher by the pits and fissures.
Indicator #4: Early Childhood Caries (children through age three)

For this indicator, you will most likely be screening three year olds in a setting such as an Early Start or Head Start classroom.

In order to see the upper front teeth, someone will have to “lift the lip.” With cooperative children, you can ask them to push up their lip with their finger or to “smile big” to show you their teeth. Otherwise, you will have to either retract the lip with a mirror or tongue blade or use your finger, necessitating regloving and hand cleaning between children.

Any child age three or under found to have one of his or her six upper front teeth either decayed, filled or missing due to caries will receive a code of “1” (Figure 14).

Missing front teeth in this age group are most likely due to caries or to traumatic injuries. Therefore, the cause of missing front teeth must be identified by questioning the parent or guardian, if present, or including a question on the consent form.

If you are screening one or two year olds you may need assistance and a knee-to-knee approach with the child reclining in the parent’s lap with the child’s head in your lap (Figure 15). You will have to retract the lip with your gloved fingers in this instance.

Figure 14 – Early childhood caries

Figure 15 – Knee-to-knee position
Indicator #5: Natural Teeth (Adults)

Adults who have one or more of their own teeth (natural, as opposed to false teeth) receive a code of “1.” If they have no natural teeth, they receive a code of “0”.

Don’t confuse dentures with natural teeth. You may want to ask adults, either in person or on a questionnaire, if they wear a set of false teeth.

In some cases, adults may have what are commonly called “overdentures”. This type of denture “sits” on top of either two natural teeth or two dental implants. Adults with overdentures should be classified as having no natural teeth and receive a code of “0”.

Figure 16 – Full dentures
## Indicator #6: Urgency of need for dental care

After categorizing an individual according to his or her caries status, assign one of three treatment urgency codes to estimate how soon he or she should visit the dentist for clinical diagnosis and any necessary treatment.

<table>
<thead>
<tr>
<th>Category</th>
<th>Recommendation for next dental visit</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code 2 Urgent or emergency need for dental care</td>
<td>As soon as possible</td>
<td>Signs or symptoms that include pain, infection, swelling, or soft tissue ulceration of more than two weeks duration (determined by questioning)</td>
</tr>
<tr>
<td>Code 1 Early dental care is needed</td>
<td>Within several weeks</td>
<td>Caries without accompanying signs or symptoms, individuals with spontaneous bleeding of the gums, suspicious white or red soft tissue areas, or an ill fitting denture are coded “1”</td>
</tr>
<tr>
<td>Code 0 No obvious problems</td>
<td>Routine dental care (next regular checkup)</td>
<td>Any patient without above problems</td>
</tr>
</tbody>
</table>

*Figures:*
- Figure 17 – Infection – Code 2
- Figure 18 – Moderately large caries – Code 1
- Figure 19 – Small caries – Code 1
Overriding a treatment urgency code

Those individuals with no cavities or other obvious dental or gum problems requiring early attention are given a Code 0. This means that they should receive routine dental checkups as recommended by their dentist.

However, you may override a Code 0 and assign a Code 1 if there is some reason that you feel they need to see a dentist sooner than their next routine checkup. For example, you may observe questionable areas on teeth, (i.e. white or brown spots that do not meet the 1/2 mm criterion but you suspect are precavitated caries) that would benefit from a sealant or strategies to promote remineralization (Figure 20).

Individuals who are found to have caries will receive treatment urgency codes of “1” or “2”, depending on accompanying signs and symptoms.

If, in your judgment, a condition presents that you feel requires immediate treatment but doesn’t meet Code 2 criteria, you are free to override Code 1 with Code 2. For example, you might code multiple large cavities, such as those in Figure 21, as Code 2 even though they do not have associated pain or infection.

Figure 20 – Precavitated carious lesion that may benefit from a sealant

Figure 21 – Multiple large cavities

A special thank you to the individuals and agencies who provided the photographs found in the BSS manual.

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Contacts/Technical Assistance/Other Resources

Division of Oral Health
Centers for Disease Control and Prevention
Atlanta, Georgia

The Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention will provide states and communities with either direct technical assistance in various aspects of using the BSS model or will make referrals for assistance. If you need assistance in any aspect of data collection, contact the Division at:

Phone: (770) 488-6054
Fax: (770) 488-6080
or at
http://www.cdc.gov/oralhealth

Association of State and Territorial Dental Directors
Jefferson City, Missouri

ASTDD will provide states and territories with technical assistance in the various aspects of using the BSS model including assistance with sampling and survey design. In addition, a detailed model for conducting needs assessments, Assessing Oral Health Needs: ASTDD Seven-Step Model, is available for downloading from the ASTDD website. Contact ASTDD at:

Phone: (573) 636-0453
Fax: (573) 636-0454
or at
http://www.astdd.org

National Oral Health Surveillance System

The National Oral Health Surveillance System (NOHSS) is a collaborative effort between CDC's Division of Oral Health and ASTDD. For clinical data (caries experience, untreated decay, and dental sealants) to be included in NOHSS it must meet the following criteria.

- The data must be from a **statewide probability sample** of public elementary schools. If a complex sampling scheme is used, the data must be weighted for the sampling scheme.
- The clinical examiners must be trained and standardized within one year of data collection. Examiners may be dentists, dental hygienists, or non-dental health professionals.
- The diagnostic criteria outlined by either NIDCR or the Basic Screening Survey model must be used.
- At a minimum, third grade children should be screened. Grades K-2 may also be screened and will be included in the Surveillance System database.
- The data must be stratified by grade rather than age.
- Data will be submitted by school year – NOT calendar year.
- While it is not mandatory that data be adjusted for non-response, states are encouraged to adjust for non-response whenever possible. Both unadjusted and adjusted data may be submitted.