Data Analysis on a Shoestring





Data Analysis for Beginners: Web-based Data Query Systems

Laurie Barker, MSPH Division of Oral Health Centers for Disease Control and Prevention

The findings and conclusions in this presentation are those of the author and do not necessarily represent the views of the Centers for Disease Control and Prevention].

SAFER • HEALTHIER • PEOPLE[™]

No, I'm not going to try to teach you SAS in 30 minutes.

Presentation: Overview of resources and issues with available data

Then group/individual practice with data query Web sites

Learning goals...

- Answer questions with data from existing resources
- Familiar with tools for finding data online
- Understand rationale for public release data sets
- Confident to use online data query systems
- Select databases for further analysis
- Use online information to inform development of surveillance or other data collection plans

What do I mean by beginner?

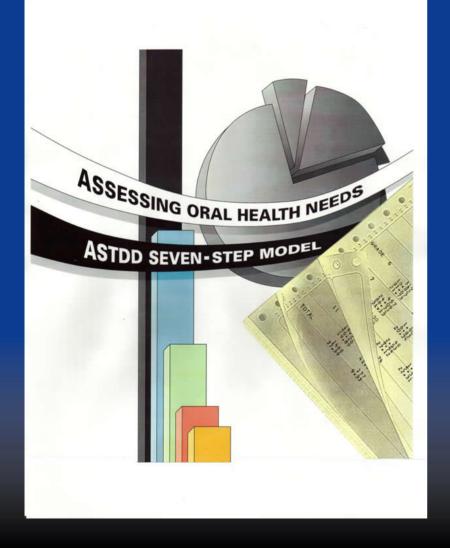
- Maybe someone who has never used statistical software before
 - Maybe never wants to, either!
- Someone who has analyzed data sets, but not this particular data set
- Someone who is in a big hurry responding to a request from the governor's office (or anyone)
- Someone tasked with developing a burden document with little or no analytic support or State data

Before racing to collect new data, find out what's available already.

See handout – Data Resource Cheat Sheet Lots of links in this presentation, but all are on the cheat sheet (let me know if I missed one)

Available from http://www.astdd.org

ASTDD 7 Step Model



 Before primary data collection

- Conduct inventory of available data
- Determine gaps in data

 Then design focused data collection to meet specific program information needs

 Don't collect what won't be used

How or where do I find data for the inventory?

Data access of the past...



Data Tape Library, National Center for Health Statistics





Decayed, Missing, and Filled Teeth Among Persons 1-74 Years United States

This report from the National Center for Health Statistics prosents estimates of deavyal, tanking, and filled (QMF) permanent texth among percents 174 years of age by sign, rea, and altexted demograble characteristics. These estimates are based on esaminations who were selected by a probability semigling represent the oblical noninstitutionalized population of those signd 1-/4 years living in the United States.

Data From the National Health Survey Series 11, No. 223

DHHS Publication No. (PHS) 81-167 U.S. Department of Health and Huma Services Public Health Service Office of Health Service Portable computer Year: 1982 RAM: 64K Weight: 24.5 lb Screen: 3 in?

Data collected: 1971-1974 Report: 1982 Weight: 3 lb Media: trees

Data access now...



Data Report Library, just online

Decayed, Missing, and Filled Teeth Among Persons 1-74 Years United States

This report from the National Center for Hoalth Statistics presents stimutes of dearyed matcing, and filled (QMF) permanent teeth among persons 174 years of age try age, rase, and selected demographic barracteristics. These estimates are based on examinations conducted during 1917-34 cm 20/24 persons who were selected by a probability sampling to represent the visilian noninstitutionalized population of these aged 1-24 years inving in the United States.

Data From the National Health Survey Series 11, No. 223

•Old reports digitized for Web access

•New reports may appear on Web before in print (or not)

DHHS Publication No. (PHS) 81-1673 U.S. Department of Health and Human Services Public Health Service Office of Health Research, Statistics, and Technology National Center for Health Statistics Hyattwile, Md. August 109

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Healthy People	Series 11. Data From the National Health Examination Survey, the
	National Health and Nutrition Examination Surveys, and the
Research and Development	Hispanic Health and Nutrition Examination Survey
Research Data Center	Series 12. Data From the Institutionalized Populations Surveys
Press Room	Series 13. Data From the National Health Care Survey
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Publications and	Series 16. Compilations of Advance Data From Vital and Health
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SETS -	Series 21. Data on Natality, Marriage, and Divorce
Listservs =	Series 22. Data From the National Mortality and Mortality Natality
Other Sites	Surveys Series 23. Data From the National Survey of Family Growth
Download:	Series 24. Compilations of Data on Natality, Mortality, Marriage,
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Use published reports -get estimates	PubMed Services Journals Database MeSH Database Single Citation Matcher Batch Citation Matcher Clinical Queries Special Queries LinkOut My NCBI	 Flowable resin used as a sealant in molars affected by dental fluorosis: a compa J Clin Pediatr Dent. 2005 Fall; 30(1):39-43. PMID: 16302598 [PubMed - indexed for MEDLINE] 3: [No authors listed] Our oral health improves. CDC/NIH report cites progress, disparities. Dent Today. 2005 Oct; 24(10):66, 68; discussion 68. No abstract available. PMID: 16278978 [PubMed - indexed for MEDLINE] 	20 - 10 - ¹⁰
-identify data sources-author contact information	Related Resources Order Documents NLM Mobile NLM Catalog NLM Gateway TOXNET Consumer Health	 4: Greer MH. Tengan SL. Hu KI. Takata JT. Early childhood caries among Hawaii public school children, 1989 vs. 1999. Pac Health Dialog. 2003 Mar;10(1):17-22. PMID: 16276937 [PubMed - indexed for MEDLINE] 5: Greer MH. Larson K. Sison S. Comparative analysis of oral health indicators among young children in Hawaii 	Related Articles, Links Related Articles, Links
	E Conserne Health	- A annuarance analysis of oral nearin indicators among voting children in Hawait	Internet

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That's great, but the reports don't have the exact number I was looking for...

Show me the data!

Two conflicting mandates for government data agencies

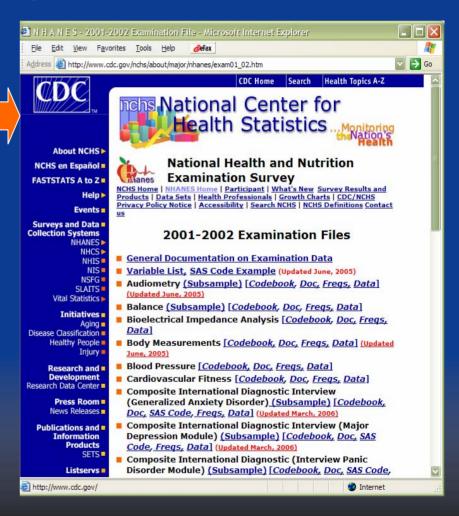
- Make all data collected <u>available to the public</u>, as quickly as possible (within 1 year of collection or publication)
- Protect the privacy of persons and entities providing data and confidentiality of sensitive data provided
- Solution: Public Release data sets
 - Tested (and sometimes altered) to reduce risk of disclosure
 - Users must report to data providing agency if user has been able to identify survey participants

http://www.cdc.gov/nchs

Data set warehouse, just online



- -Public release data sets available by download from Web sites
- -Still requires user to know SAS/SUDAAN or other software to analyze
- -Makes a lot of data more readily available to analysts
- -Still requires special software to analyze properly
- -Some data only available through Research Data Center, or other data use arrangement



Downloading data tips

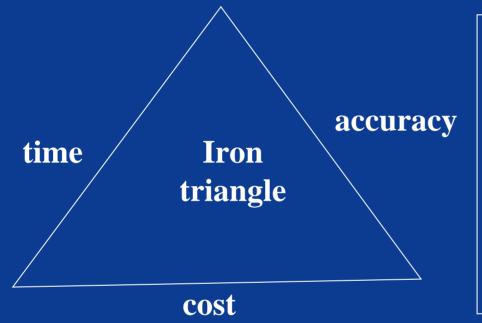
- Check the size of the file

 Dialup may be too slow

 Get the documentation, too

 Check for changes to analytic guidelines
 Read to see content and collection methods
- If you download data, note the date downloaded and the file date (date posted to Web site)
- Check the date of the file, and check for updates
 Data may change, data sets withdrawn

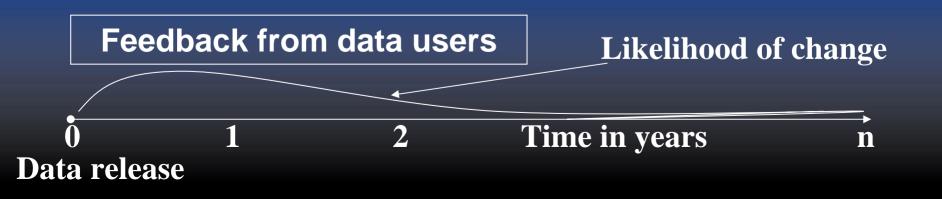
Why would a data set change?



•Faster production means potential sacrifice to accuracy of 1st release

•Possible changes as issues discovered

•Change less likely the longer data set has been available



Managing data files downloaded from Web sites

- Think about file structure in advance
- Protect the original files
 - Don't assume the same file will be available from the Web site, exactly the same as when first downloaded
- Create "working files"
- Save work regularly
- Back up files regularly
 - Some office networks have back-up built in
 - But if it's critical, create your own back-up
 - Store back-up copies in separate places
 - If the building burns down, will both the original and back up be gone?

Data file structure – one I use for NHANES

- NHANES 1999-2000 (similar folder for 2001-2002)
 - Original files
 - Codebooks and documentation
 - ★ XPT files
 - Demo
 - OHXDENT
 - ...
 - ★ SASV8 files
 - Working files

- NHANES 1999-2002
 - Analysis files
 - ★ SASV8 files
 - ★ SASV6 files
 - My own documentation, variable crosswalks, notes
 - Project-specific
 - ⋆ SAS programs
 - Output data sets
 - Project documentation

Well, that's nice, but I don't have SAS or whatever, and I don't really have time or money to get the software and do the analysis from scratch.

OR

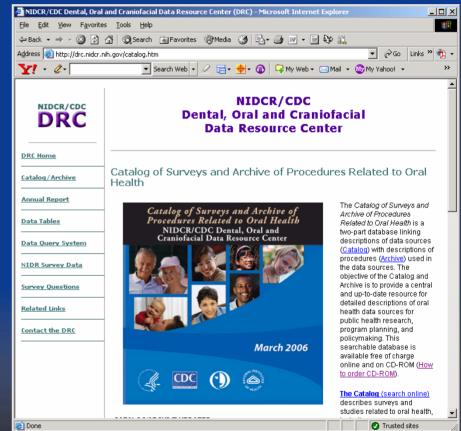
I'd really like to know more about these data sets before I get into it and learn that it doesn't have what I was really looking for.

http://drc.nidcr.nih.gov

A tool to find surveys with oral health information of use to you...

DRC Catalog

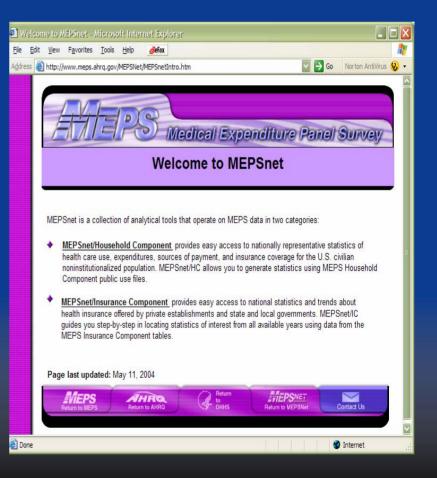
- Searchable data base of meta data about surveys with oral health data
- Includes links to data Web sites
- Contact information for each survey
- Literature search for each survey, updated every 6 months



http://www.ahrq.gov

Online Data Query Systems

- Provide Web-based tools for data analysis
- Requires no knowledge of statistical software required
- Not usually designed for advanced, multivariate modeling
- Do provide tools to create estimates within groups (stratified tables)
- Lower burden on user to protect data



Not all data are on the Web

- Web based systems are a good starting place for an inventory
- Further inquiry into state-held data, and data held by other organizations

You can't always get what you want...

But if you try sometimes you just might find you get what you need...

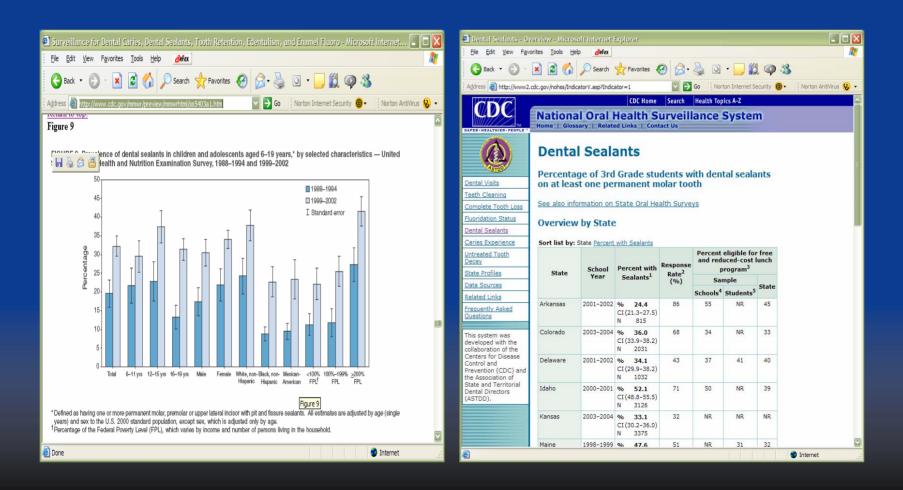
Jagger M, Richards K (1969)

What questions can I answer using online data query systems?

- How many children in my county have sealants by tooth type, grouped by severity of early childhood caries?
 - Ok probably not, unless state has system on Web
- How many children in the US and in my State have dental sealants?
 - How different is my county likely to be from the U.S. average?

http://www.cdc.gov/OralHealth

Prevalence of dental sealants United States and individual states

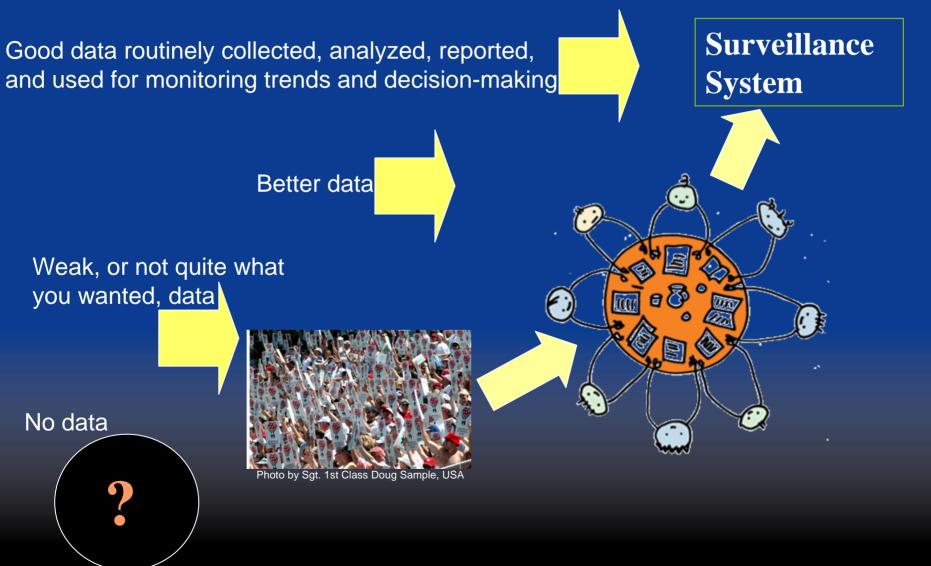


It's easier to criticize than to be correct: anticipate questions

In our sealant example

- Age group differences
 - * NHANES children 6-11
 - NOHSS Basic Screening Survey (BSS) 3rd grade
- Sampling differences
 - NHANES household
 - NOHSS BSS school-based
- Would those differences change the decision made on the basis of these data?

Data progression



http://www.cdc.gov/OralHealth

Using Web systems as a starting point

- Developing information pieces with data
 - Burden document
 - Short pieces
- Planning surveillance activities
 - Choose indicators
 - Design sample
 - Plan analysis

THE BURDEN OF ORAL DISEASE





A Tool for Creating State documents

Burden Document is big...

- It can serve to illustrate gaps in data
- Can document the data inventory, if additional state sources are added that may not be reflected in the tool
- Mostly, serves as a reference from which to prepare shorter, focused information pieces
- Can help focus next efforts for analysis, data collection
- HP2010 indicators and more

Available from http://www.cdc.gov/OralHealth (Burden document tool) and http://www.healthpolicy.msstate.edu/publications/childrensoralhealth.pdf

Example: Mississippi policy brief

- Used information from range of sources:
 - Major reports
 - National and state data sources
 - Epidemiologic and programmatic
 - Partner sources

MISSISSIPPI HEALTH POLICY

RESEARCH CENTER

HEALTH POLICY BRIEF

November 2003

CHILDREN'S ORAL HEALTH IN MISSISSIPPI: Addressing a Silent Epidemic

A NATIONAL CALL TO ACTION

The first ever Report on Oral Health in America (2000), issued by U.S. Surgeon General Dr. David Satcher, served as a platform to increase public awareness on the importance of oral health. Among the major themes of the report are that oral health is essential to general health and well-being and that profound and consequential oral health disparities exist in the United States. Dr. Satcher stated that what amounts to a silent epidemic of dental and oral diseases is affecting some population groups-restricting activities at schools, work, and home-and often significantly diminishing the quality of life. U.S. Surgeon General Dr. Richard Carmona issued a National Call to Action to Promote Oral Health (2003) as a wake-up call to community and industry leaders, policymakers, health

Linda H Southward, Ph.D. Neva Nicholas G. Mosca, D.D.S. David Stephen L. Silberman, D.M.D. Conni

Neva Penton Eklund, D.M.D. David K. Curtis, D.M.D. Connie Lane, B.S.W.

 Oral diseases are progressive and cumulative and become more complex and costly to treat over time. Therefore, problems that were preventable in early childhood can escalate to irreversible damage over one's lifespan.

Causes of Childhood Dental Caries, or "Tooth Decay"

Dental caries (tooth decay) is an infectious and transmissible, yet preventable, disease. Among infants and toddlers, the newer term "early childhood caries" (ECC) has also been used interchangeably with "baby bottle tooth decay," "bottle mouth," and other similar names; however, research demonstrates that ECC also occurs when bottles are not used (Plat

Some data used in this report were available from online sources.

Others were obtained and analyzed by university partner.

Burden Document indicators: Disease

Caries (NHANES, NOHSS, State data)
 Tooth loss (NHANES, BRFSS, State data)
 Periodontal diseases (NHANES, state data)
 Oral cancer (CDC/NCI US Cancer statistics)

- Special populations
 - Children, adults, women, disabled
- Disparities
- Social impact
- Costs (CMS, Medicaid, state data, MEPS)
 - Direct and indirect

Burden Document indicators: Risk and protective factors

- Water fluoridation (CDC/WFRS, State)
- Topical fluoride and supplements (Synopses, state)
- Sealants (NHANES, NOHSS,)
- Preventive visits
- Cancer screening
- Tobacco control (CDC)
- Oral health education (Synopses)

Burden Document indicators: Provision of services

- Dental Workforce and Capacity
- Dental Workforce Diversity
- Use of Dental Services
 - General population
 - Schoolchildren
 - Pregnant women
- Dental Medicaid and State Children's Health Insurance Programs
- Community and Migrant Health Centers and other State, County, and Local Programs

Burden Document Tool Links to Data Sources

Table III. Proportion of Adults* with Untreated Dental Caries, by Selected Age Groups and Demographic Characteristics

	Age 35-	-44 Years	Age 65-7	4 Years		
Healthy People 2010 Target TOTAL Race or Ethnicity	United States ^a (%)	<state>f (%)</state>	United States (%)	< <u>STATE</u> >f (%)		
	15	15				
TOTAL	26		19			
Race or Ethnicity						
American Indian or	68 ^b					

Table III Sources:

Aged 35-54 years

U.S. Department of Health and Human Services. *Healthy People 2010, Progress Review, 2000.* Available at www.cdc.gov/nchs/ppt/hpdata2010/focusareas/fa21.xls. <These data will be updated in 2006>

<u>Aged 65-74 years</u> Health, United States, 2004. Table 80. p. 267. Available at www.cdc.gov/nchs/data/hus/hus04.pdf.

Burden Document Tool: Data Release Calendar

Appendix b. Data Release Calendar for Oral Health Indicators

‡+

Ŧ	Data Source	Website Location	Frequency of Release	Past Release Date	Future Release Dates	Indicator
	Synopses of State and Territorial Dental Public Health Programs	http://www2.cdc.gov/nccdphp/doh /synopses/index.asp or www.cdc.gov/oralhealth	Annual collection, 6 month lag	FY2004 (2005 Synopses, available from ASTDD June 2005, from Web late	FY2005 (2006 Synopses, available from ASTDD June 2006, from Web late 2006)	System for recording and referring infants and children with cleft lip and cleft palate, all
		or <u>www.astdd.org</u>		2005)	 FY2006 (2007 Synopses, a vailable from ACTOPS have 2007 from 	Oral health surveillance system, all
					ASTDD June 2007, from Web late 2007)	Tribal, state, and local dental programs with a public health trained director, all
-	Behavioral Risk Factor Surveillance System (BRFSS)	http://www.cdc.gov/brfss		2004 data released June.16,.2005	 2004 - released June.16,. 2005 2005 - optional module only, expected June 2006 2006 - expected June 2007 2007 - optional module only, expected June 2008 	Percentage of people who had their teeth cleaned within the past year, <u>visited</u> dentist in past year, and complete tooth loss ages 18 or higher.
	Health Resources and Services Administration (HRSA), Bureau of Primary Health Care (BPHC)	http://datawarehouse.hrsa.gov/				Community-based health centers and local health departments with oral health components, all

Web-based Data Query Systems

- NIDCR/CDC Data Query System
- National Oral Health Surveillance System
- Behavioral Risk Factor Surveillance System
- Youth Risk Behavior Surveillance System
- Medical Expenditure Panel Survey
- National Survey of Children's Health

•Start at CDC home page

•Go to NOHSS

•Caries Experience

•Some states have data for grades other than 3rd

•And, there is untreated decay, and sealants.

•But, state data only for this indicator

•So let's look for national data

🎒 State Oral Health Surv	eys - Verm	ont -	Microsoft In	ternet Expl	orer								
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				Heal	th Sur	veys							
Dental Visits	Vermont 2002–2003 School Year												
Teeth Cleaning													
Complete Tooth Loss	oss Back to State Oral Health Surveys												
Fluoridation Status						Data Submit	ted 2/27/2003						
Dental Sealants	Grade	Ν	Adjusted for Non-	% (95%CI)	Sealants	Caries Experience	Untreated Decay						
Caries Experience			response	,									
<u>Untreated Tooth</u> <u>Decay</u>	к	NC	No	% CI		NC NC	NC NC						
<u>State Profiles</u> Data Sources			Yes	% CI		NC NC	NC NC						
Related Links	1st	417	No	% CI	12.5 (9.5-16.1)	35.7 (31.2-40.6)	17.5 (14.1-21.6)						
Frequently Asked Questions			Yes	% CI	12.5 (7.9-17.1)	35.5 (28.8-42.1)	17.2 (11.9-22.6)						
This system was developed with the	2nd	412	No	% CI	42.7 (37.9-47.7)	40.0 (35.3-45.0)	13.8 (10.7-17.6)						
collaboration of the Centers for Disease Control and			Yes	% CI	42.3 (33.9-50.6)	40.1 (34.3-45.9)	14.2 (10.1-18.4)						
Prevention (CDC) and the Association of State and Territorial	3rd	409	No	% CI	66.3 (61.4-70.8)	44.3 (39.4-49.2)	16.1 (12.8-20.1)						
Dental Directors (ASTDD).			Yes	% CI	66.1 (59.4-72.9)	45.1 (39.0-51.1)	16.2 (12.9-19.5)						
	% Perc CI 95% NCNot (Conf	idence Inte	rval				•					

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🛛 🔠 Local intranet

Let's try google

Search: Caries Experience Surveillance

August 2005 MMWR

Caries experience and untreated decay by primary or permanent teeth, sealants

Healthy People, Data, Data2010

Promotion Statistics

3311 Toledo Road

🐑 * 21-*^Oral Health has been selected *

Hyattsville, MD

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4	Asian only		#4	1993-94	3,4\90%									42%	
	Native Hawaiian or	Other Pacific													
	Islander only			1999	3,5\79%	NA	NA							42%	
	Black or African Ame	erican only		1988-94						1\DNA				42%	
	White only			1988-94	•					1\DNA				42%	
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	Female		# 16	1988-94	54%					1\48%				42%	
			1988-94						1\53%				42%		
	Education level (head	l of household)	<i>n</i> = ·												
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	At least some colleg			1988-94						1\DNA				42%	
	Disability status														
	Persons with disabil	ities	#21	1988-94	DNA					1\DNA				42%	
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	Division of Health														

DATA2010 Home

Data by data source

🔠 Local intranet

Future systems

- NHANES system in development by NCHS
- NHIS system in development by NCHS
- Extension of NIDCR/CDC Data Query System
- NOHSS workgroup meeting to review existing indicators, choose additional, evaluate NOHSS



Questions

Web Query Practice

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Web-based Data Query Systems

- NIDCR/CDC Data Query System
- National Oral Health Surveillance System
- Behavioral Risk Factor Surveillance System
- Youth Risk Behavior Surveillance System
- Medical Expenditure Panel Survey
- National Survey of Children's Health