

ANALYZING DATA FROM THE NATIONAL IMMUNIZATION SURVEY

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NIS SAMPLE DESIGN

- **Quarterly list-assisted random-digit-dialing (RDD) sample of telephone numbers**
- **78 geographic strata (IAP areas)**
- **Combine 4 adjacent quarters to obtain annualized estimates**

NIS SAMPLE DESIGN (CONT.)

- **Collect information on all age-eligible children in the household (HH)**
- **Stratified single-stage cluster sample design**

SAMPLE WEIGHTING

- **Children with completed household interviews**
 - **Base sampling weight**
 - **Adjustment for multiple voice-use phone lines in HH**
 - **Three level unit nonresponse adjustment**

SAMPLE WEIGHTING (CONT.)

- **Children with completed household interviews**
 - **Poststratify to NCHS Natality File control totals within each IAP area by age category of child, race/ethnicity of mother and maternal education**

SAMPLE WEIGHTING (CONT.)

- **Children with completed household interviews**
 - **Modified poststratification used to compensate for exclusion of nontelephone children (uses NHIS immunization Supplement data on vaccination up-to-date status of nontelephone versus telephone children)**
 - **New method based on telephone households that reported an interruption in telephone service of one week or longer in the past year – recognizes that nontelephone population is dynamic rather than static**

SAMPLE WEIGHTING (CONT.)

- In 2001, 30% of children did not have adequate provider data for use in estimation
- Children with adequate provider data
 - Use response propensity model with socio-demographic predictors from RDD survey
 - Within each IAP area divide children into (5) response propensity quintiles
 - Adjust weights of children with adequate provider data in each response propensity quintile

NIS ESTIMATES

- The 1995 to 2001 NIS PUFs contains two child-level weights
- *HY_WGT* is the household interview weight variable for each child. It should be used to produce estimates for children with completed household interviews.

NIS ESTIMATES (CONT.)

- ***W0* is the child-level weight for the children with adequate provider data**
- **This weight should be used to produce estimates of vaccination coverage rates.**

STANDARD ERRORS

- **Information in the PUF can be used to calculate standard errors of the vaccination coverage rates that reflect the complex sample design and weighting used in the NIS**
- **Software for analyzing complex sample designs includes SAS, SUDAAN and STATA**

SUBGROUP ESTIMATES

- **Demographic and socioeconomic variables in the file can be used to obtain national vaccination coverage rates for subgroups of the population**
- **Data users should, however, be aware that estimates for such subgroups at the state or IAP-area level will have larger standard errors because of the smaller sample sizes**

STRUCTURE OF NIS PUBLIC- USE FILES

- Each PUF consists of two primary levels of data
 - Data for all children with completed HH interviews
 - Data for all children with adequate provider data

STRUCTURE OF NIS PUFs (CONT.)

- **The phrase "children with adequate provider data" refers to children for whom sufficient vaccination history information is obtained from their providers to determine whether they are up-to-date with respect to the recommended vaccination schedule.**

AVAILABILITY OF NIS SAMPLE

Year	Number of Children with HH Interviews	Number of Children with Adequate Provider Data
1995	31,997	16,183
1996	33,305	21,099
1997	32,742	22,806
1998	32,511	21,827
1999	34,442	22,521
2000	34,087	22,958
2001	33,437	22,531

COMPOSITE VARIABLES

Household composite variables Include:

- Up-to-date status on individual vaccinations
- Up-to-date status on selected vaccine series (e.g., 4:3:1:3, 4:3:1:3:3 series)
- Race of child and mother, household income
- Child ever have chicken pox?

COMPOSITE VARIABLES (CONT.)

PROVIDER DATA COMPOSITE VARIABLES INCLUDE:

- Vaccine-specific number of doses
- Up-to-date status indicators for individual vaccines and vaccine series (e.g., 4:3:1:3, 4:3:1:3:3 series)
- Age at vaccination in months
- Age at vaccination in days

GUIDELINES FOR USING NIS PUFs

- **Documentation available -- README, Data User's Guide, Accessing and Analyzing Data from the NIS Public-Use Data, and the Code Book**
- **The data file is available in ASCII format**
- **A program is provided on the NIS web site and CD-ROMs for SAS users to convert the ASCII file to a SAS dataset**

GUIDELINES FOR USING NIS PUFs (CONT.)

- For estimates by geographic area (e.g., Maine) use the entire file and the SUBPOP command in SUDAAN or just select the cases that belong to the specific geographic area (standard errors will be the same)
- If only interested in vaccination coverage estimates, just select children with PDAT = 1
- Combining multiple years of NIS data to increase sample size of children within IAP areas and states – see 2000 or 2001 Data User's Guide for instructions and cautions

GUIDELINES FOR USING NIS PUFs (CONT.)

SUDAAN EXAMPLE 1:

```
NSEQNUMH = 1*SEQNUMHH;  
PROC SORT; BY ITRUEIAP NSEQNUMH;
```

```
PROC CROSSTAB DATA=SUD_FILE  
  FILETYPE=SAS DESIGN=WR;  
WEIGHT W0;  
NEST ITRUEIAP NSEQNUMH;
```

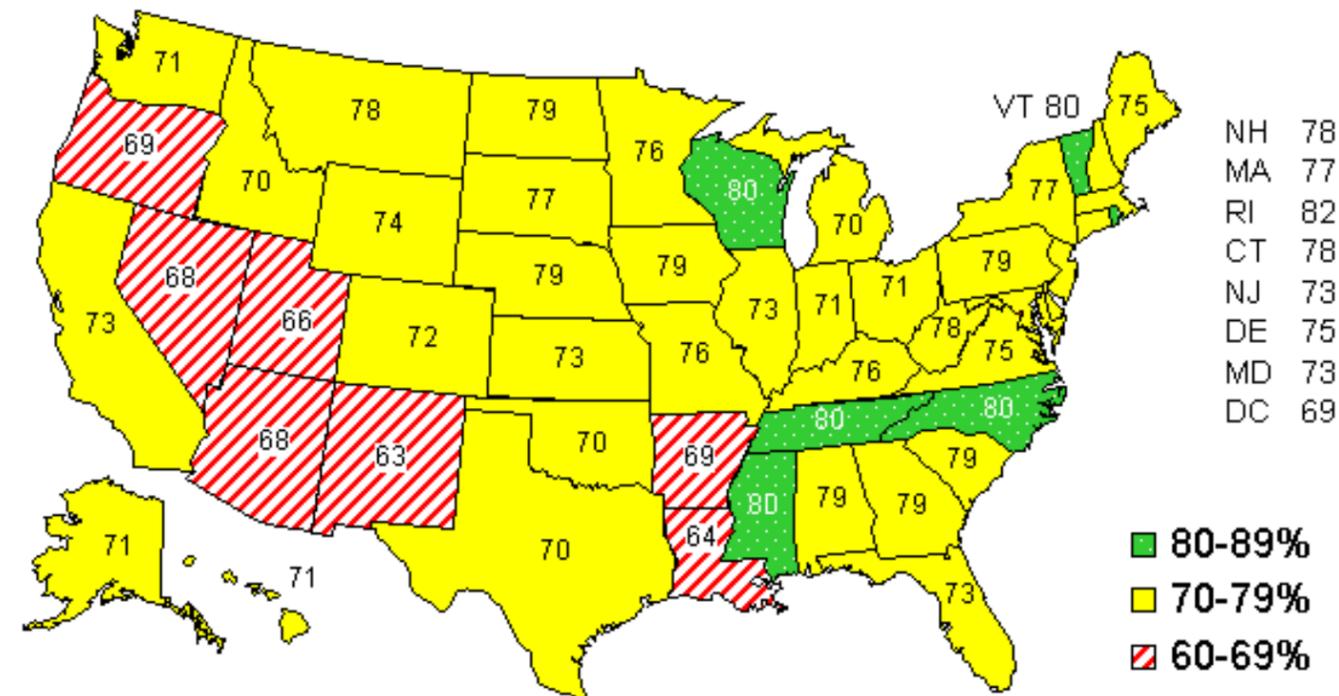
```
SUBGROUP STATE PUTD43133;  
LEVELS      51      2;  
TABLES STATE * PUTD43133;
```

Variance Estimation Method: Taylor Series (WR)
 Q1/2001-Q4/2001: 4:3:1:3:3 ESTIMATES BY STATE
 by: NSTATE, UTD flag for provider 4:3:1:3:3.

NSTATE				
UTD flag for provider 4:3:1:3:3	Sample Size	Weighted Size	4:3:1:3:3 Up-to-Date (ROWPER)	Standard Error (SEROW)

U.S. Total				
Total	23531	5728652.2	100.0	0.00
4:3:1:3:3 Up-to-date	17450	4222148.1	73.7	0.46
Not 4:3:1:3:3 Up-to-date	6081	1506504.1	26.3	0.46
Alabama				
Total	591	90723.6	100.0	0.00
4:3:1:3:3 Up-to-date	464	71759.7	79.1	2.14
Not 4:3:1:3:3 Up-to-date	127	18963.9	20.9	2.14
Alaska				
Total	289	13900.8	100.0	0.00
4:3:1:3:3 Up-to-date	210	9897.3	71.2	2.87
Not 4:3:1:3:3 Up-to-date	79	4003.5	28.8	2.87
Arizona				
Total	590	114289.0	100.0	0.00
4:3:1:3:3 Up-to-date	413	77795.3	68.1	2.18
Not 4:3:1:3:3 Up-to-date	177	36493.7	31.9	2.18

Estimated Vaccination Coverage with the 4:3:1:3:3* Series, by Coverage Level and State National Coverage = 74%



*4+DTP, 3+Polio, 1MCV, 3+Hib, 3+HepB



Source: National Immunization Survey, 2001
Children in the 2001 NIS were born between February 1998 and May 2000

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GUIDELINES FOR USING NIS PUFs (CONT.)

SUDAAN EXAMPLE 2:

```
NSEQNUMH = 1*SEQNUMHH;  
PROC SORT; BY ITRUEIAP NSEQNUMH;  
  
PROC CROSSTAB DATA=SUD_FILE  
FILETYPE=SAS DESIGN=WR;  
  
WEIGHT W0;  
NEST ITRUEIAP NSEQNUMH;  
  
SUBGROUP INCPOV1R RACEKIDR PUTD43133;  
LEVELS 3 4 2;  
TABLES (INCPOV1R*RACEKIDR* PUTD43133);
```

Variance Estimation Method: Taylor Series (WR)

Table 4B. Q1/2001-Q4/2001

WEIGHT = W0

by: Poverty status(Recode), Race/Ethnicity of child (recode), UTD flag for provider
4:3:1:3:3.

for: Poverty status(Recode) = 1 >= 1.0 (ABOVE).

Race/Ethnicity of child (recode)

UTD flag for provider 4:3:1:3:3

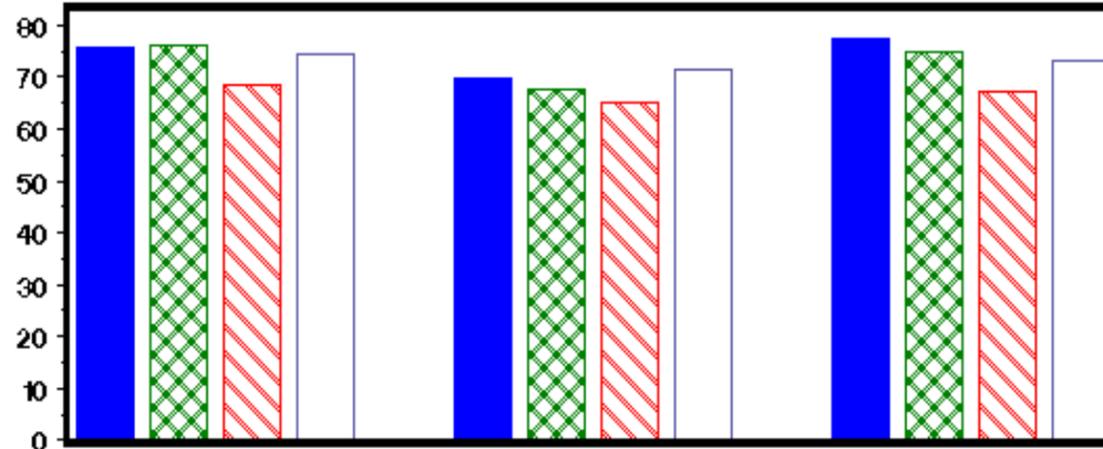
	Sample Size	Weighted Size	4:3:1:3:3 Up-to-Date (ROWPER)	Standard Error (SEROW)

Total				
Total	16742	3805836.2	100.0	0.00
4:3:1:3:3 Up-to-date	12662	2862248.6	75.2	0.52
Not 4:3:1:3:3 Up-to-date	4080	943587.6	24.8	0.52
1 HISPANIC				
Total	2261	583088.8	100.0	0.00
4:3:1:3:3 Up-to-date	1652	441727.0	75.8	1.40
Not 4:3:1:3:3 Up-to-date	609	141361.8	24.2	1.40
2 WHITE, NON HISPANIC				
Total	11714	2600812.4	100.0	0.00
4:3:1:3:3 Up-to-date	9067	1982763.2	76.2	0.60
Not 4:3:1:3:3 Up-to-date	2647	618049.2	23.8	0.60

Q1/2001–Q4/2001

4:3:1:3:3 Up–To–Date for Race/Ethnicity and Poverty Status

4:3:1:3:3 Up–to–date



H	N	N	N	H	N	N	N	H	N	N	N	Race Ethnicity of Child
I	O	O	O	I	O	O	O	I	O	O	O	
S	N	N	N	S	N	N	N	S	N	N	N	
P				P				P				
A	H	H	H	A	H	H	H	A	H	H	H	
N	I	I	I	N	I	I	I	N	I	I	I	
I	S	S	S	I	S	S	S	I	S	S	S	
C	P	P	P	C	P	P	P	C	P	P	P	
	W	B	O		W	B	O		W	B	O	
	H	L	T		H	L	T		H	L	T	
	I	A	H		I	A	H		I	A	H	
	T	C	E		T	C	E		T	C	E	
	E	K	R		E	K	R		E	K	R	
	AT OR ABOVE				BELOW				UNKNOWN			Poverty Status

**TO OBTAIN INSTRUCTIONS,
NIS CODE BOOKS, NIS DATA
USERS' GUIDES, AND SAS
PROGRAMS TO ANALYZE NIS
DATA, VISIT THE NIS WEB
PAGE**

<http://www.cdc.gov/nis>