

Impact of Gulf Hurricanes on the National Immunization Survey

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Today's Agenda

- Basic Elements of the NIS
- Overview of the NIS in 2005
- Sample Distribution in 2005
- Immediate Impacts of Hurricanes on Data-Collection Operations
- Lasting Impact of Katrina
- Estimation for 2005
- Closing

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Overview of the NIS in 2005 – cont.

- Data collection launched in February 2005
- National Survey of Children with Special Health Care Needs (a SLAITS survey) launched in April
- Cut-back to 56 areas in June (due to budget reduction)
- Restoration of budget
- Gulf hurricanes interrupt data collection
- Large sample in 4th quarter finished in February 2006

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Basic Elements of the NIS

- Eligible population = all children age 19-35 months living in the US
- Sampling frame = telephone numbers in 1+ banks
- Sampling design = RDD with geographic stratification by 83 areas (states, cities, and rest-of-state areas)
- Four quarterly samples with continuous interviewing operations throughout the year
- Telephone interview of parent of eligible child
- Provider record check

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Sample Distribution in 2005

Quarter	Completed Household Interviews	Ideal Household Interviews
1	5,054	7,500
2	5,683	7,500
3	5,550	7,500
4	11,340	7,500
TOTAL	27,627	30,000

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Overview of the NIS in 2005

- 83 sampling IAP areas (78 + 5)
- Rotating in
 - San Bernardino County, CA
 - Alameda County, CA
 - Denver, CO
 - St. Louis, MO
 - Clark County, NV
- Rotating out
 - San Diego County, CA
 - Santa Clara County, CA
 - Miami-Dade County, CA
 - Marion County, IN
 - Boston, MA
- 78 estimation IAP areas

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Immediate Impacts of Hurricanes on Data-Collection Operations

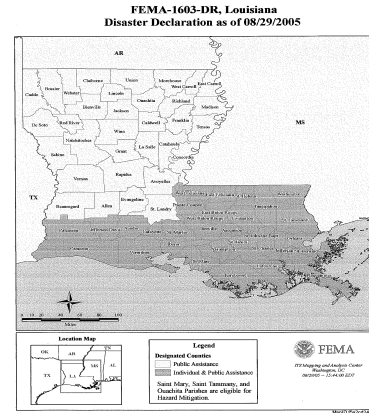
- 2005 Atlantic hurricane season was most active on record
- 26 named tropical storms
- 3 hurricanes reached category 5 intensity
- 4 major hurricanes had substantial impacts on the operations of the NIS

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Immediate Impacts of Hurricanes on Data-Collection Operations – cont.

- RDD operations interrupted by Dennis, Katrina, Rita, and Wilma
- Sources of information
 - Media reports
 - National Hurricane Center
 - Bell South
 - BRFSS managers
- Decisions to suspend and resume telephone interviewing operations

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Lasting Impact of Katrina

- Katrina made landfall August 29 on the Louisiana/Mississippi coast
- Primarily affected 11 IAP areas
 - Orleans Parish
 - Rest of Louisiana
 - Mississippi
 - 2 areas in Alabama
 - 3 areas in Florida
 - 3 areas in Tennessee

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Lasting Impact of Katrina – cont.

- Within a few weeks of the disaster, we resumed Q3 interviewing and began Q4 interviewing in North Mississippi, and North Rest of Louisiana
- Later resumed Q3 interviewing and began Q4 interviewing in South Mississippi and South Rest of Louisiana
- Orleans Parish remained closed throughout Q3, Q4, and Q1/2006
- Doubled the sample size for Rest of Louisiana to compensate for the loss of the Orleans Parish sample

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Lasting Impact of Katrina – cont.

- Louisiana and Mississippi
 - We suspended telephone interviewing operations for Q3
 - Partially resumed telephone interviewing operations in Q4
- FEMA maps used to control closing and opening of telephone operations

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Lasting Impact of Katrina – cont.

- Orleans Parish designated a rotating IAP area for 2006
- Telephone interviewing finally resumed in Orleans Parish in Q2 2006
- Concern about the provider component of the NIS – lost records?
- Beginning in Q2, we ask respondents sampled in Orleans Parish or Rest of Louisiana for consent to contact the immunization registry

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Lasting Impact of Katrina – cont.

- Residence rules
 - Wording of the questionnaire “... living or staying in your household?”
 - Interviewers given instructions to follow passive approach

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Estimation for 2005 – cont.

Complete Interviews	Orleans Parish	Rest of Louisiana
Households	108	732
Children	117	763
Children w Adequate Provider Data	117 = 30 (observed) + 87(imputed)	439 (observed)

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Estimation for 2005

- Standard estimation procedures, except for Orleans Parish and Rest of Louisiana
- Estimation only for statewide Louisiana

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Estimation for 2005 – cont.

- Standard data products
 - Public use file
 - Internal file used by CDC analysts
- Child weights and both reported and imputed data appear on standard data products

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Estimation for 2005 – cont.

- Orleans Parish
 - Q1 & Q2 only
 - 30 children with reported provider data
 - 87 children with missing provider data
- Imputed missing provider data for the 87 children
 - Log-linear model used to predict provider up-to-date status on the basis of household up-to-date status
 - Matching to donor pool of children in Louisiana with adequate provider data
 - Hot deck imputation for all specific provider-record-check items

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Estimation for 2005 – cont.

Vaccine Series	Difference in Estimated Coverage (in percentage points): LA w/o Imputation – LA w Imputation
4+DTP	-0.3
1+VRC	1.3
4:3:1:3:3	0.5
4:3:1:3:3:1	0.8

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Closing

- *General Point:* At the very time of society's greatest need for good information, our capacity to produce such information is the most impaired
- *Specific Point:* Katrina highlighted a limitation of RDD surveys in natural disasters characterized by interruption of telephone service and displacement of the population
- *Other Methods of Data Collection:* Immunization registries and face-to face enumeration

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Keywords: NIS, National Immunization Survey, Immunization, Survey, RDD, Katrina, Imputation, Log-Linear Model

Table 1. Estimated Vaccination Coverage with Individual Vaccines and Selected Vaccination Series Among Children 19-35 Months of Age by State and Immunization Action Plan Area US, National Immunization Survey, PROVWT, Q1/2005-Q4/2005*

	Kids with Adequate Provider Data	3+DTP [†]	4+DTP [‡]	3+Polio [§]	1+MMR	3+Hib [¶]	3+HepB ^{**}	1+Var ^{††}	3+PCV ^{‡‡}	4:3:1 ^{§§}	4:3:1:3	4:3:1:3:3 ^{¶¶}	4:3:1:3:3:1 ^{***}
Louisiana (with imputation)	556	96.2 (93.6, 97.8)	80.5 (76.0, 84.3)	91.7 (88.5, 94.1)	89.2 (85.8, 91.9)	94.3 (91.4, 96.3)	93.0 (90.0, 95.1)	89.0 (85.7, 91.7)	84.8 (80.9, 88.0)	78.2 (73.5, 82.2)	77.1 (72.4, 81.2)	76.0 (71.2, 80.1)	74.1 (69.4, 78.4)
Louisiana (without imputation)	469	95.9 (92.9, 97.6)	80.2 (75.3, 84.3)	91.9 (88.5, 94.4)	89.9 (86.3, 92.7)	93.9 (90.7, 96.1)	92.4 (89.0, 94.8)	90.3 (86.8, 92.9)	85.3 (81.1, 88.7)	79.0 (74.1, 83.2)	77.8 (72.8, 82.1)	76.5 (71.5, 80.9)	74.9 (69.8, 79.3)
Difference	87	-0.3	-0.3	0.2	0.7	-0.4	-0.6	1.3	0.5	0.8	0.7	0.5	0.8

* Children in the Q1/2005-Q4/2005 National Immunization Survey were born between February 2002 and August 2004.

† Three or more doses of any diphtheria and tetanus toxoids and pertussis vaccines including diphtheria and tetanus toxoids, and any acellular pertussis vaccine (DTP/DTaP/DT)

‡ Four or more doses of any diphtheria and tetanus toxoids and pertussis vaccines including diphtheria and tetanus toxoids, and any acellular pertussis vaccine (DTP/DTaP/DT)

§ Three or more doses of any poliovirus vaccine

|| One or more doses of measles-mumps-rubella vaccine

¶ Three or more doses of *Haemophilus influenzae* type b (Hib) vaccine

** Three or more doses of hepatitis B vaccine

†† One or more doses of varicella at or after child's first birthday, unadjusted for history of varicella illness

‡‡ Three or more doses of pneumococcal-containing vaccine

§§ Four or more doses of DTP, three or more doses of poliovirus vaccine, and one or more doses of any MCV.

||| Four or more doses of DTP, three or more doses of poliovirus vaccine, one or more doses of any MCV, and three or more doses of Hib

¶¶ Four or more doses of DTP, three or more doses of poliovirus vaccine, one or more doses of any MCV, three or more doses of Hib, and three or more doses of HepB

***Four or more doses of DTP, three or more doses of poliovirus vaccine, one or more doses of any MCV, three or more doses of Hib, three or more doses of HepB,