Conducting a Statewide Population-Based Immunization Study in Georgia: Lessons Learned

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Abstract

Background: Annually since 1997, the Georgia Immunization Office has conducted the Georgia Immunization Study (GIS), a non-experimental retrospective cohort study, which determines the statewide and regional immunization coverage rates for 24 month old children born in the state of Georgia. Prior to 2010, the study published both state and local aggregate coverage rates; however, the 2010 GIS Report also presents coverage rates and odds ratios of adequate immunization coverage based on demographic factors.

Setting: State of Georgia

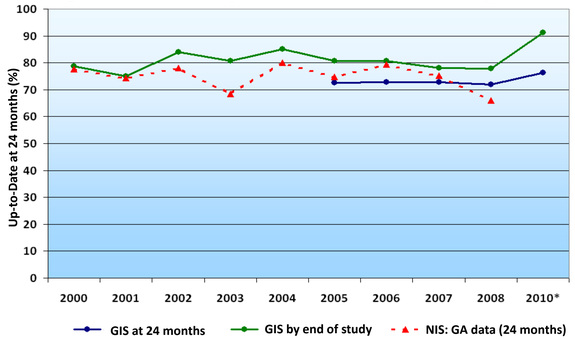
Population: Twenty-four month old children born in Georgia. The annual study sample consists of a stratified random selection of approximately 2500 children.

Project Description: Immunization history data for the sample population were initially obtained from the Georgia Registry of Immunization Transactions and Services (GRITS). For children found to be inadequately immunized (4:3:1:3:3:1:4 level), local health department staff contacted parents/guardians and private providers for additional information. Immunization data were then analyzed in conjunction with demographic variables obtained from the State Office of Vital Records. The effect of demographic characteristics on immunization coverage rates was assessed using multivariate logistic regression using StataSE 10.

Importance of Conducting GIS: Since the sample is population-based and the data collection process involved direct communication with private providers and parents, these data offer a reliable estimate of immunization coverage levels among 24 month olds in Georgia. While the National Immunization Survey (NIS) is a good source of interstate immunization data, the GIS provides immunization data that can be used by the Georgia Immunization Office to plan risk-based outreach campaigns on a state, district, or county level. These data also provide an estimate of how complete GRITS data are relative to provider documentation.

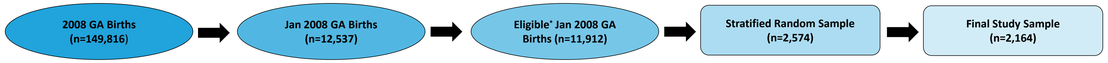
Results: The 4:3:1:3:3:1:4 immunization coverage rate at 24 months for GA was 76.3%. The UTD immunization coverage rate by the end of data collection for GA was 91.2%, a 17 percent increase over a six-month data collection period. When controlling for other demographic factors, children born to married mothers under the age of 27 with previous child(ren) were approximately half as likely to be UTD on their immunizations at 24 months as compared to children born to married mothers under 27 with no previous children (OR=0.53, 95% CI: 0.29-0.97). Maternal education level was positively correlated with likelihood of UTD immunization coverage at 24 months and the results were statistically significant at all levels. Parents with private insurance at the time of delivery were almost twice as likely to have those children UTD on their immunizations at 24 months (OR=1.97, 95% CI: 1.28-2.90). Hispanic mothers were between 3 and 7 times more likely to have 24-month olds UTD at 24 months.

Figure 1: Up-to-Date Immunization Series Coverage in GA According to Georgia Immunization Study and National Immunization Survey, 2000-2010



* A 2009 population-based study could not be conducted due to Principal Investigator vacancy.

Figure 2: 2010 Georgia Immunization Study Sampling Scheme



*Exclusion criteria include child death, child adoption, parent in military, plural birth, and parent living out of state.

Table 1: Changes Made to Georgia Immunization Study in 2010

2008	2010
Data Collection	
•Data collection form sent to districts to ascertain eligibility, immunization history, and whether or not contact was made with parents.	•Data collection form sent to districts to ascertain eligibility, immunization history, whether or not contact was made with parents, **as well as reasons for incomplete immunization status, if possible.**
•For each immunization, location of administration (private vs. public) was recorded.	•For each immunization, location of administration (private vs. public) **and source of data (GRITS, parent, physician) were recorded**.
Up-to-Date Classification	
•Children were assessed at the end of data collection to determine UTD immunization status.	•Children were assessed for vaccines given **within 2 years of age, as well as by the end of the data collection period.**
Data Analysis & Final Report	
•Data analyzed using Epi Info.	•Data analyzed **using StataSE 10**.
•Aggregate statewide and district-level coverage rates	•Aggregate statewide, district-level **and county-level coverage rates**.
•Statewide, antigen-specific coverage rates.	•Statewide **and district-level** antigen-specific coverage rates.
•District reports showing 4:3:1:3:3:1 & 4:3:1:3:3:1:4 coverage from 2007 to 2008.	•**Antigen-specific and series coverage rates by demographic group**.
	•**Odds ratios of UTD vaccine history by demographic group**.
	•District reports showing UTD immunization series coverage **since 2000 and in comparison with current state average**.
	•**District reports showing antigen-specific rates compared to state average.**

Figure 3: Location of Immunization Administration- Public vs. Private (%)

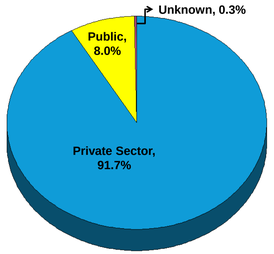
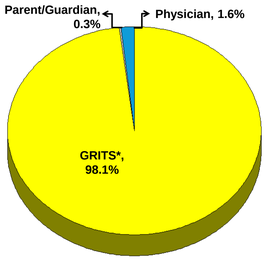


Figure 4: Source of Immunization History Data (%)



* Georgia Registry of Immunization Transactions and Services.

Table 2: Georgia Immunization Study: Odds Ratios and Percentages of UTD Immunization Status at 24 Months by demographic group

	Adjusted Odds Ratios of UTD at 24 months	UTD at 24 months (%)	*UTD by end of Study (%)*
State of Georgia (N=2,164)	-	**76.3**	***91.2***
Maternal Race/Ethnicity†,‡			
White, Non–Hispanic (N=826)	Ref.	75.4	*90.2*
White, Hispanic (N=94)	**7.93****	80.9	*93.6*
Unspecified⊘, Hispanic (N=156)	**3.53****	82.1	94.2
Black(N=813)	0.94	73.6	91.3
Asian (N=50)	2.61	86.0	*94.0*
Multiracial (N=101)	0.99	77.2	*88.1*
Maternal Education†,‡			
Some College+ (N=883)	Ref.	80.1	*91.7*
HS Diploma/GED (N=681)	**0.71***	73.9	*90.5*
9th-11th grade (N=392)	**0.58****	70.9	*90.1*
<9th grade (N=119)	**0.38****	76.5	*93.3*
Medicaid			
Medicaid (N=1,350)	Ref.	74.4	*91.6*
Non-Medicaid (N=814)	0.89	79.4	*90.5*
Maternal Marital Status†, Maternal Age†, & Repeat Birth† Combination			
Married, <27 Years, First Birth (N=177)	Ref.	79.1	*92.7*
Married, <27 Years, Repeat Birth (N=210)	**0.53***	66.7	*85.2*
Married, 27+ Years, First Birth (N=226)	0.69	81.9	*89.8*
Married, 27+ Years, Repeat Birth (N=493)	0.72	78.5	*92.9*
Unmarried, <27 Years, First Birth (N=428)	1.53	79.7	*93.7*
Unmarried, <27 Years, Repeat Birth (N=359)	0.72	68.0	*88.6*
Unmarried, 27+ Years, First Birth (N=56)	1.15	76.8	*85.7*
Unmarried, 27+ Years, Repeat Birth (N=214)	1.26	79.0	*94.4*
Gestational Age†			
<37 weeks (N=279)	0.77	73.1	*91.8*
37+ weeks (N=1,885)	Ref.	76.7	*87.5*
Provider Type			
Public Sector Only (N=84)	Ref.	75.0	*89.3*
Private Sector Only (N=1739)	0.79	77.5	*92.3*
Both (N=269)	0.72	77.3	*94.8*
Payment at Birth†,‡			
Government Assist (N=876)	Ref.	71.8	*90.6*
Private Insurance (N=505)	**1.93****	82.2	*93.3*
Other (N=82)	0.97	73.2	*91.5*
Self Pay (N=109)	0.75	78.9	*86.2*

† Indicates that this variable corresponds to conditions at the time of child's delivery.
‡ Indicates that the sample numbers for this variable may not add up to 2,164 because the information was missing in some cases.
⊘ In some cases, the maternal race field was left empty, but if the *White, Hispanic* field and *Unspecified, Hispanic* field were combined, the OR of UTD at 24 months would be 4.10 with p-value<0.01.
* Indicates statistical significance, p-value<0.05.
** Indicates statistical significance, p-value<0.01.

Figure 5: UTD Immunizations at 24 months by Maternal Race/Ethnicity & Medicaid Enrollment

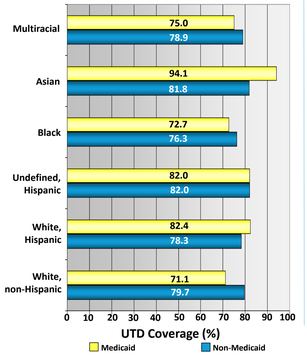
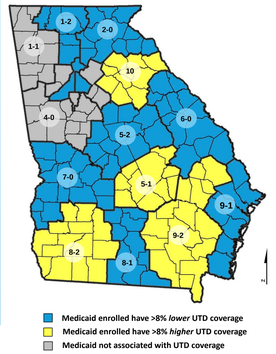


Figure 6: UTD Immunizations at 24 months by Public Health District & Medicaid Enrollment



Conclusions & Lessons Learned

- Prior to the 6-month data collection period, the immunization rate for children 24 months of age was 78.6%. Direct contact with providers and letters sent to parents prompted actions to bring the child up-to-date, raising the immunization rate for the study sample to 91.2%.
- The majority of immunizations (91.7%) were administered in the private sector (Figure 3), but local public health staff had a marked impact through parent and physician notification, evident in the 17% increase of UTD immunization coverage from 24 months to the end of data collection (Figure 1).
- Children born to Hispanic mothers are between 3 and 7 times more likely (p-value<0.01) to be UTD on their immunizations at 24 months than children born to white, non-Hispanic mothers (Table 2).
- For women who were under 27 at the time of childbirth, first-born children in the sample were more likely (p-value<0.05) to be UTD at 24 months than those who were repeat births (Table 2).
- Higher maternal education levels were associated with higher UTD immunization coverage (Table 2).
- Medicaid-enrolled children born to white, non-Hispanic mothers were *less* often UTD on their immunizations at 24 months than those of the same race/ethnicity but not enrolled in Medicaid (Figure 5).
- In some Public Health Districts, Medicaid enrolled children showed higher UTD coverage at 24 months, while in other districts, Medicaid enrolled children showed lower UTD coverage (Figure 6).
- GRITS* provided 98% of the study population's immunization history (Figure 4).
- WIC enrollment information was not available in 2010, but every effort to include WIC will be made in 2011 in light of the findings resulting from the Medicaid enrollment variable.

* Georgia Registry of Immunization Transactions and Services.

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