

# Factors Related to the Receipt of Synagis in a Low-Income, Inner City Population

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## Abstract

**Background:** Monthly Synagis vaccinations during the RSV season has been shown to be effective at preventing hospitalizations related to RSV infections in premature infants. The prevention of RSV has not been well documented in low income, inner city populations.

**Objective:** The purpose of this study is to determine the rate of receipt and factors related to receipt of Synagis during the RSV season in an inner-city, poor population.

**Methods:** We adapted the Andersen Model for Health Care Utilization to identify need, predisposing, enabling and quality of primary care characteristics associated with receipt of Synagis in eligible (per AAP criteria) premature infants. At discharge from the NICU in an inner-city hospital we enrolled 124 infants and followed them through the RSV season. Providers from whom they had received vaccinations during the preceding year were identified and data was abstracted for all outpatient visits for documentation of Synagis shots received and for indicators of the quality of primary care. A ratio of the number of Synagis vaccinations received over the number of Synagis vaccinations indicated was created. We conducted chi-square and logistic regression analyses to identify factors associated with receipt of 0-50% vs 51-100% of indicated Synagis vaccinations.

**Results:** Of the 124 patients enrolled, 3 died during the year of follow up and 89 were both successfully interviewed and had their primary care records abstracted, for a follow rate of 74%. The population is predominantly poor and of African American race (67%). Thirty-nine percent of infants received no Synagis shots, and 64% of infants received less than or equal to 50% of the indicated number of shots. No need factors were associated with receipt of Synagis. Predisposing factors associated with receipt of Synagis included higher maternal education ( $p < .01$ ), two-parent households ( $p=0.04$ ) and fewer number of children ( $p=0.04$ ). Enabling factors associated with receipt of Synagis included more maternal social supports ( $p < 0.01$ ) and fewer barriers within the health care system ( $p < 0.01$ ). Quality of care measures associated with receipt of Synagis include consistent documentation of growth parameters ( $p=0.01$ ) and evidence of one or more missed opportunities to vaccinate ( $p=0.02$ ).

**Conclusions:** We found very low rates of uptake of the appropriate number of Synagis vaccinations in an inner-city, poor population. Predisposing, enabling and quality of care factors are associated with the receipt of the appropriate number of Synagis vaccinations. Policy implications are discussed.

## Background

• Premature infants are at a high risk of developing respiratory syncytial viral infection (RSV). Palivizumab (Synagis) is a monoclonal antibody that has demonstrated efficacy at reducing morbidity and mortality from RSV infection.

• In a preliminary study we reviewed the records of 52 infants attending our inner-city clinic who were indicated to receive Synagis. We found they received only half of the shots indicated.

• We used the Health Utilization Model, which has been used extensively to analyze barriers to utilization of childhood immunizations among inner-city children, as a framework to study access to Synagis.

• In the Jacksonville area, the RSV season in 2004, 2005 and 2006 was September – March defined by the month when RSV viral testing or antigen tests exceeds 10% of all viral tests (both viral culture and viral antigen testing)

## Objectives

• Determine the factors effecting Synagis receipt: Need/Perceived Need; Predisposing factors, Enabling Factors Outside the Health Care System; Enabling Factors Inside the Health Care System; and Quality of Primary Care

• Determine the rate of Synagis receipt in a low-income, inner city population

## Survey/ Methods

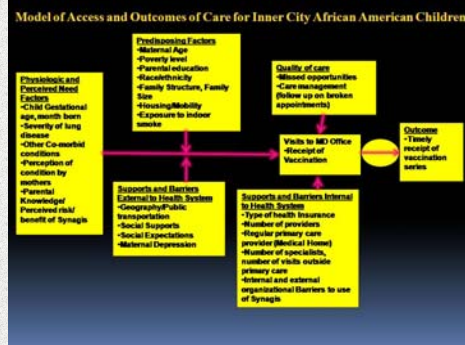
- Prospective Cohort Study
- Baseline Survey completed before infant's discharge from the NICU
- Follow-up Survey completed at 1 yr of age
- Chart Abstraction to determine Synagis receipt

• Enrollment through referrals from the two local hospital's NICUs

- Measurement of Model Components was achieved through the development of multi-question scales measuring:
  - Barriers External to the Health Care System
  - Social Support/Expectations
  - Perceived Threat of RSV
  - Perceived Efficacy of Synagis
  - Depression
  - Barriers Internal to the Health Care System
  - Percent of Well Child Assessments Completed

- Percent adherence was calculated for each child (number of Synagis shots received/number of Synagis shots needed per AAP guidelines)
- An outcome variable was constructed as receipt of 0-50% vs 51-100% of indicated Synagis vaccinations.

• Bivariate analysis assessed differences in Synagis receipt (0-50% vs 51-100%) in relation to scores from Model Component Scales; logistic regression assessed likelihood of Synagis adherence based on Model Components.



## Results

**Outcome Variables: Adherence to AAP guidelines for RSV Prevention**

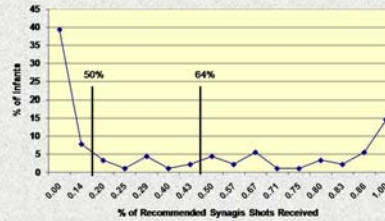
• Over half (53%) of all infants were discharged from the NICU prior to the start of the RSV season and therefore were indicated to receive a full series of Synagis shots during the RSV season. Of these only 4.5% of actually received all indicated shots.

• 39% of infants received no Synagis shots while only 15% of infants received all of the Synagis shots indicated per AAP guidelines

• Overall, the entire cohort of 89 children was indicated to receive 512 Synagis shots. However, a total of 189 or 36% were actually received.

## Results (con't)

Percent of Premature Infants by Their Percent Compliance with Their Recommended Number of Synagis Shots during the September to March RSV Season 2005/06 & 2006/07



### Reasons for Lack of Synagis Receipt in a Low-Income, Inner-City Population

- Low levels of Synagis adherence (0-50%) were associated with:
  - ER visits (P = 0.08)
  - Mothers reporting no male living within the household (P = 0.04).
  - Infants having 2 or more siblings (P = 0.043).
  - Mothers with 8-12 years of schooling (P = 0.000).
  - Mothers reporting more barriers to care at their infant's primary care office (P = 0.01)
  - Infants receiving care at a public clinics (P = 0.06)

### Quality of Primary Care Visits and RSV Prevention

• Children who always had their height, weight, and head circumference plotted on their growth chart were more likely to be in the 51-100% group than those whose growth parameters were not always plotted (P = 0.01)

• Those in the 51-100% group were much less likely to have had a missed opportunity to vaccinate than those in the 0-50% group (P = 0.02)

• Those in the 51-100% group were more likely to have had a structured developmental assessment by a specialist before 6 months of age than those in the 0-50% group (P = 0.05).

Quality of Primary Care Physician Visits	0-50%	51-100%	P value
Well child visit assessments completed (height, weight, head circumference plotted on growth chart)			0.05
Never Plotted	33.3%	9.7%	
2 items plotted	9%	13%	
All items plotted	58%	77%	
Missed Opportunities			0.02
At least 1 missed opportunity documented	29.8%	9.4%	
No missed opportunities documented	70.2%	90.6%	
Evidence of a Structured Developmental Assessment by 6 months of age by a Specialist			0.05
Yes	42.1%	62.5%	
No	57.9%	37.5%	
Documentation Parents were Educated on Environmental Tobacco Smoke (ETS)			0.08
Yes	50.9%	68.8%	
No	49.1%	39.3%	

## Results

### Logistic Regression Results

- Significant predictors of adherence include
  - the *Need/Perceived Need* factor of Emergency Room visits
  - the *Predisposing* factors of Maternal Education and the Number of Children in the Family
  - the *Enabling* factors *Outside the Health Care System* of Social Support/Social Expectations,
  - the *Enabling* factors *Inside the Health Care System* of Barriers Internal To The Health Care System, and
  - the *Quality of Primary Care* factor of Missed Opportunities

### Logistic Regression Model

Variable	OR	95% CI	P value
Maternal Education (8-12 years vs. 13+ years)	4.7	1.34, 16.4	0.005
Number of Children (3 or more children vs. 1 or 2 Children)	4.94	1.3, 18.7	0.019
Child had an emergency room visit in the past year (yes vs. no)	2.97	0.9, 9.9	0.075
Any documented missed opportunities to receive indicated Synagis shot at health care visits (yes vs. no)	3.9	0.71, 21.0	0.12
Social support scale	1.42	1.09, 1.84	0.009
Barriers Internal to the Health Care System	1.39	1.08, 1.79	0.009

## Conclusions/Discussion

• Synagis is under-utilized by low income, inner-city populations in Jacksonville, FL.  
 • Almost 2/5ths of the cohort received no Synagis shots.

• If these findings are similar to other inner-city populations, the under-utilization of Synagis nationally is a significant public health threat and puts these newborns unnecessarily at risk for morbidity from RSV.

• The first recommendation is that the rate of utilization of Synagis for newborn infants from inner-city poor populations be systematically assessed in multiple US cities.

• Intervention programs to increase the use of Synagis, staffed by knowledgeable nurse care coordinators, could help families navigate the complex health system required for premature infants. The nurses could also help clinics and provider's offices understand the challenges faced by families of premature infants and help these practices provide culturally effective and family centered care in a medical home.

## Limitations

• This study was completed in one inner-city population. Future studies should be repeated in other US cities to ensure generalizability.

## Disclosure

• This study was funded by MedImmune. The authors had complete independence over all aspects of the study including its design, management, data analysis and interpretation of the results.