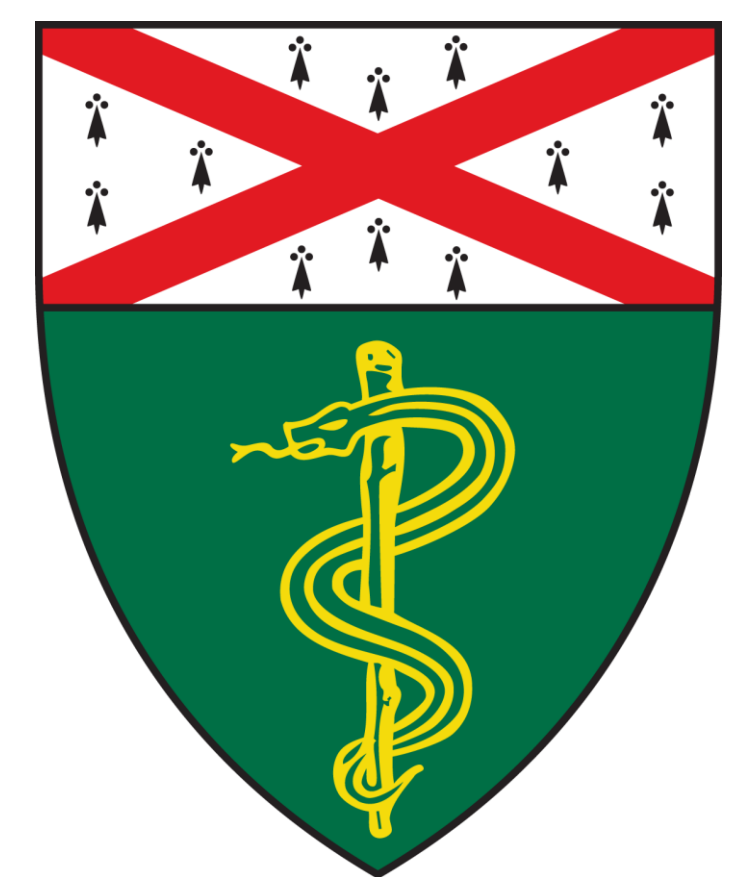




Evaluation of the Vaccination Program for Special Groups, Hospital Infantil Dr. Robert Reid Cabral: October 2009-March 2012.



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Introduction

Due to the burden of *Streptococcus pneumoniae* in children with diseases that place them as high-risk patients for invasive disease, the Department of Infectious Diseases at Hospital Infantil Dr. Robert Reid Cabral (HIRRC), the Dominican Infectology Foundation, and its Florida branch in the United States have made numerous efforts to introduce the pneumococcal conjugate vaccine in the Dominican Republic (D.R.).

Motivated because *Streptococcus pneumoniae* (*pneumococcus*) is the main cause of pneumonia, meningitis, or occult bacteremia which cause the majority of deaths in children under 5, the *Centro de Vacunas para Grupos Especiales* (CEVAGE) program was initiated so that the Ministry of Health (MISPAS) could introduce the vaccine into the Expanded Program on Immunization (EPI) to vaccinate especially vulnerable children.

Wyeth, a manufacturer of Prevnar7®, donated 10,000 doses with the commitment that MISPAS will buy the vaccines. Other vaccines, such as meningococcal conjugate ACW₁₃₅Y (MenACWY), diphtheria, tetanus and acellular pertussis, (DTAP), seasonal influenza and Hepatitis B (Hep B), were included by donations to EPI.

Objectives

- To vaccinate children who present to Hospital Infantil Dr. Robert Reid Cabral with pathologies that induce severe *pneumococcus* disease.
- To create the need for the pneumococcal vaccine in the D.R.
- To evaluate the introduction of the pneumococcal conjugate vaccine into the Expanded Program on Immunization (EPI) in the D.R.

Materials and Methods

All children with pathologies predisposing invasive diseases were referred by the various departments of HIRRC for vaccination. These conditions include (i) pathologies considered to be high-risk for invasive pneumococcal disease, including: heart disease, nephropathy, HIV/AIDS, pneumonopathies, cancer, genetic diseases, and sickle-cell, and (ii) children of health personnel. This category, labeled healthy, is at an increased risk of infection transmitted to them from the hospital by their parents.

We performed an observational, retrospective, analytical, cross-sectional study of the CEVAGE database in the period from October 2009 to March 2012 of children with underlying pathologies predisposed to invasive infections for *pneumococcus*. Our analysis started with and focused primarily on pneumococcal conjugate vaccine, and later included other donated vaccines (MenACWY, DTAP, Hep B, Influenza).

Records were analyzed to find common pathologies among the CEVAGE cases, and how many had received at least one pneumococcal conjugate vaccination. Age groups were analyzed similarly, along with percentages who received Influenza, MenACWY, DTAP, and Hep B vaccinations.

Results

From October 2009 to March 2012, there were 3,337 children between the ages of 2 months and 16 years of age, of both sexes, who were referred by corresponding departments of HIRRC.

The age group 1-4 years contained the most cases with 1,632 (49%), followed by less than 1 year with 1,063 (32%). The pneumococcal conjugate vaccine (PnC) corresponded to the largest number of applied doses with 4,657. Second was influenza with 3,361 doses, followed by meningococcal conjugate vaccine ACW₁₃₅Y with 420.

Most age groups had high PnC rates (>85%), except for younger than 1 year (78.2%). Influenza vaccination rates ranged from 62.8% to 79.8%, and MenACWY, DPAT, and Hep B were variable across all age groups. 8,604 total doses were administered (Table 1).

Healthy children at risk comprised the largest subgroup (20.1%), while 2,670 children (79.9%) had underlying diseases which put them at risk for infection. Sickle cell disease was the most frequently reported pathology, with 640 cases (19%), followed by invasive diseases (pneumonia, meningitis and pleural empyema) with 445 cases (13.3%), followed by cardiopathies and recurring wheezing with 6% each. Nephropathies, cancer, and genetic pathologies, mostly Down's Syndrome, were less common (<3%).

Most pathologies shared similar PnC rates of greater than 90%. Cancer (80.3%), trauma (66.6%), and rare (other) pathologies (85.7%) had lower PnC rates. 3,076 total children (92.2%) received at least one pneumococcal vaccination (Table 2).

Table 1: Children vaccinated (%) per age group, CEVAGE (10/2009 to 03/2012)

Age group	No. cases	Prevnar	Influenza	MENC-ACWY	DPAT	HEP B	Total doses
<1 year	1063	831 (78.2%)	668 (62.8%)	222 (20.8%)	50 (4.70%)	19 (1.79%)	2603
1-4 years	1632	1552 (98.8%)	1302 (79.8%)	129 (7.9%)	33 (2.0%)	30 (1.84%)	4536
5-8 years	389	340 (87.4%)	243 (62.5%)	51 (13.1%)	21 (5.4%)	9 (2.3%)	857
9-12 years	156	133 (85.3%)	121 (77.6%)	10 (6.4%)	1 (0.6%)	0 (0.0%)	360
13-16 years	67	67 (100.0%)	51 (76.1%)	3 (4.5%)	1 (1.5%)	0 (0.0%)	180
>16 years	26	26 (100.0%)	17 (65.4%)	2 (7.7%)	1 (3.9%)	1 (3.9%)	58
Total doses	3337	4657	3361	420	107	59	8604

Table 2: Reported pathologies of children in CEVAGE (10/2009 to 03/2012).

Reported pathology	NO.	%	Prevnar vaccinated (%)
Healthy child with risk	684	20.1	644 (94.7%)
Sickle cell disease	640	19.2	601 (93.9%)
Invasive diseases	445	13.3	421 (94.6%)
Dengue	218	6.6	209 (95.9%)
Cardiopathies	215	6.5	213 (99.1%)
Recurrent wheezing	208	6.3	204 (98.1%)
Recurrent URI	180	5.4	176 (97.8%)
Nephropathy	81	2.5	78 (96.3%)
Cancer	76	2.3	61 (80.3%)
Genetic pathologies (Down's, others)	68	2.08	68 (100.0%)
HIV/AIDS	45	1.4	41 (91.1%)
Infected chickenpox	20	0.7	19 (95.0%)
Pulmonary tuberculosis	13	0.4	12 (92.3%)
Splenectomy/abdominal pain	12	0.38	12 (100.0%)
Spherocytosis	7	0.22	7 (100.0%)
Traumatic brain injury	6	0.18	4 (66.6%)
Other	357	10.69	306 (85.7%)
Total	3337	100	3076 (92.2%)

Conclusions

- 8,604 vaccinations were administered to 3,337 children at-risk for severe pneumococcal, influenza and meningococcal disease.
- MISPAS fulfilled its commitment to supply vaccines for CEVAGE and continues to do so to this day.
- In September 2013, EPI enthusiastically introduced the conjugate vaccine against pneumococcus 13 for children under one year with a 2+1 scheme.

Recommendations

- Increased PnC vaccination attention for patients younger than 1 year old, with cancer, and/or with rare diseases.
- Vaccinate all children under 5 years old with one dose of PnC, in order to impact the reduction of invasive diseases in children and transmission to older adults, another high risk population.
- Maintain the current CEVAGES and open new centers in regional pediatric hospitals until the PnC achieves universal introduction across the D.R.
- Create a Vaccination Law to allocate fixed funding from the national budget to EPI, such that there will not be a lack of vaccinations.