



**New York Presbyterian Hospital – Columbia University  
Family Medicine Residency Program \* New York, NY**

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**No. of Residents:** 18  
**Patient Base:** Total: 10,000; Children (0-3): 1757  
**Children Impacted:** 1,000+ (medically underserved ages 19-35 months)

We are fortunate to be practicing in a setting where virtually all children have coverage for immunizations through the Vaccines for Children program. New York City and New York Presbyterian Hospital maintain immunization registries. The hospital registry EZ Vac reports immunizations to the Citywide Immunization Registry. Our practice also has an electronic medical record and a computerized order entry system. The EHR allows easy access to hospital immunization data. These electronic data sources make information about individual patients easily accessible to attending and resident physicians. We have been less effective at using these electronic resources to monitor the practice's performance on immunizations, to provide decision support regarding needed immunizations, to support follow-up and outreach to patients who are missing immunizations, and to promote quality improvement activities.

**Proposed System**

***The system to improve immunization rates at the Farrell Community Health Center is based on the Chronic Care Model for improvement.*** Low immunization coverage rates are caused by physician, patient and delivery system factors. The Chronic Care Model for Improvement was originally applied to asthma and diabetes, the chronic care model has been applied in efforts to improve the delivery of clinical preventive services in community health centers and in managed care organizations. The Chronic Care Model identifies the key components of the health system that contribute to high quality chronic disease (and health promotion/disease prevention) care. These components are the patient and community, the health system, self-management support, delivery system design, decision support and clinical information systems. Improvement efforts in these areas promote effective and efficient care by bringing informed and activated patients and prepared, proactive health care teams together to make efficient use of resources to produce better health outcomes.

***In order to improve immunization rates we will change the way we use the clinical information systems that are available to us now.*** The information systems must evolve to be more than an electronic file cabinet that contains the information that was previously recorded on paper. The information systems should provide decision support to help the physician provide the right services at the right time. The clinical information system should do more than show which vaccines have been given. It should also inform the physicians and health center staff about which vaccines are due and which series are complete. The computerized order entry system can be used to pre-order needed vaccines so that physician and nursing staff can proactively offer them any time the patient comes to the health center.

**Immunization reconciliation between EZ Vac, NYCDOHMH yellow cards and Citywide Immunization Registry (CIR).** Children's immunizations may be recorded in several places. Children who are immunized at the Farrell Health Center will have the information on their yellow immunization cards and in EZ Vac. EZ Vac reports to the Citywide registry. If a child was immunized at another hospital or health center in NYC their immunizations will probably be in the CIR and the yellow card, but not EZ Vac because the CIR does not report to EZ-vac. A child immunized outside of New York City may only have their paper record. Each of these sources has advantages and disadvantages. The yellow cards are usually the most complete, but they sometimes are not legible or easy to interpret. The EZ-vac system is integrated into the Farrell electronic health record. The CIR does an analysis of the vaccines that have been administered and reports which vaccines are due, which series are complete and which immunization events are invalid. At this time the CIR has the most utility as a decision support tool.

**Introduce providers and staff to the New York City Department of Health Citywide Immunization Registry (CIR) and the New York Presbyterian local registry EZ Vac System.** A resident, faculty and nurse meeting will be devoted to teaching clinical staff how to access immunization records in the Citywide and local immunization registries. All clinical staff will be offered login privileges to the Citywide Immunization Registry. Newly trained clinical staff will work with the Farrell clerical staff, nursing staff and nurse practitioner students to obtain the most recent CIR records and reconcile them with the EZ-vac system. CIR immunization assessment will be entered into the Farrell Electronic Health Record so that clinicians can see them when the chart is opened and can have easy access to assessments of needed vaccines. We will select an immunization team of a physician, a nurse practitioner student, a registered nurse and a clerical staff person who will coordinate these efforts. The team will report back on the practice's progress towards meeting the goals.

**A message will be sent to the patient's primary care physician using the EHR messaging system requesting that the doctor review the immunizations and pre-order missing vaccines in EHR** so that vaccine can be administered at any visit to the health center.

**Medical assistants will review orders for children at every visit to determine if there is a vaccine request pre ordered on hold. We expect to offer immunizations at all visits, not just routine health maintenance visits, and immunizations will be available at scheduled appointments or walk-in visits.** If an immunization is ordered on-hold, the medical assistant will speak to the patient's provider or covering physician to confirm that the vaccine is needed. If the vaccine is confirmed, then the patient will be asked to see the nurse who can release the hold and administer the vaccine. This process can occur at regularly scheduled visits, walk in visits or when the child is in the health center with a sibling or other relative visit.

**Education and outreach.** The Farrell Center will develop reminder letters for newly enrolled infants to be sent at the first birthday or when the child is found to be missing immunizations. We will develop or use existing material that is available in Spanish and English at an appropriate reading level. These letters will contain tips on infant and child safety, development and health maintenance-including vaccines. Call back letters, phone calls and possibly text messaging will be developed to reach out to patients who have fallen behind. The health center recently started using an automated dial reminder phone system. We will develop specific reminder phone calls for children who are due for immunizations. Increase staff familiarity with immunization registries EZ Vac and CIR. Immunization education will be offered to parents at each well child visit.

**At least two teaching sessions a year will be devoted to immunization updates to help the clinical staff stay up-to-date on the constantly changing immunization requirements.** Many of the

staff have PDAs and smart phones. All rooms have computer work stations. We will introduce decision support tools for immunizations such as the STFM Shots program for PDAs. These training sessions will be case based. We will review various immunization scenarios to teach about immunization indications and contraindications and the importance of adherence to the correct schedule to reduce the number of invalid doses.

### **Goals and Objectives**

**GOAL 1: Increase the proportion of children age 0-35 months who are up-to-date in their immunizations.** We will accomplish this by using a multi-level strategy based on the Chronic Care Model for improvement that addresses provider, patient and systems barriers to completion of immunizations.

Objective 1.1: Increase the up-to-date rate for children 19-35 months (431331) from 72.9% to 80% during the first year of the project, and to 85% during year two.

Objective 1.2: Determine the 2008-2009 baseline influenza immunization rate for children 6-35 months by summer 2009, and set a target for improvement for the 2009-2010 season.

*Outcomes:* Immunization 431331 completion rates, as measured by immunization registry and chart review.

**GOAL 2: Decrease the number of children 19-35 months who are not up-to-date because of "invalid immunizations" or missing DTaP #4 (15-18 month dose)**

Objective 2.1: Perform a review of CIR and EZ vac data to determine the frequency of common invalid vaccine doses (MMR or varicella given before 1 year, hepatitis B dose 3 given before 6 months, or missing 15-18 month DTaP).

Objective 2.2: Based on results of the invalid immunization review, in-service physicians and nurses about invalid immunizations.

Objective 2.3: Build decision support into electronic immunization order entry to prevent common invalid immunizations.

*Outcomes:* There will be a reduction in the percent of children who are incomplete due to invalid immunization administration, as measured by chart review.

**Goal 3: Decrease missed opportunities to vaccinate.** A NYC-DOH immunization assessment done February 2008 revealed that 25 of the 26 children, age 24 months, who were incomplete for the 431331 series had missed opportunities to vaccinate. This included 17 well child visits at which the clinician did not administer a vaccine that was due and 7 visits for mild illnesses.

Objective 3.1 In-service physician and nursing staff about the common reasons for missed opportunities.

Objective 3.2 Implement standing orders or orders on-hold for missing shots so that children will be offered indicated vaccines at all visits.

*Outcomes:* There will be a reduction in the percentage of children who are incomplete and who had missed opportunities. This will be measured by chart review.

## Current Vaccine Rates for Medically Underserved Children Age 19-35 Months

VACCINE	U.S. Overall 2004, NIS Compliance %	Current Compliance Rate %
DTP/DTaP/DT (4 doses)	84.8 (+/-0.8)	74.60
IPV (3 doses)	91.6 (+/-0.7)	90.70
MMR (1 dose)	93.0 (+/-0.6)	95.80
Hib (≥ 3 doses)	93.5 (+/- 0.6)	63.60
Hep B (≥ 3 doses)	92.4 (+/-0.6)	93.20
PCV (3 doses)	73.2 (+/1.0)	93.20
PCV (4 doses)	87.5 (+/-0.7)	80.50
Varicella (≥ 1 dose)	84.8 (+/-0.8)	95.80
<b>VACCINE SERIES</b>		
4 DTP+3 IPV+1 MMR	83.5 (+/-0.9)	72.90
4 DTP+3 IPV+1 MMR+3 Hib	82.5 (+/-0.9)	55.90
4 DTP+3 IPV+1 MMR+3 Hib+3 Hep B	80.9 (+/-0.9)	55.90
4 DTP+3 IPV+1 MMR+3 Hib+3 Hep B+1 Var	76.0 (+/-1.0)	55.90