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REACH 2010: New York City

Effective Strategies for Integrating Immunization Promotion Into Community Programs

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Most immunization coalitions have originated with health care providers, potentially excluding families without medical homes. This study focused on a community-based approach to providing timely vaccinations. A coalition of 23 organizations developed an immunization program in a low-income community in New York City. Nearly 1,000 community health workers incorporated immunization promotion into social service and educational programs. Outcomes were coverage rates for the 4:3:1:3:3 series at 19 to 35 months, which were compared with national data by ethnicity, as reported in the National Immunization Survey 2002-2006. Parents (n = 10,251) of children <5 years received immunization education and reminders. The 2003-2007 rates of 80% equaled or exceeded the national rates for 19- to 35-month-olds, and the 2007 rate of 96.8% far surpassed the national average. Coalitions can effectively integrate immunization promotion activities into community programs. Immunization rate improvements maintained for a 5-year period, suggesting this approach to be sustainable.

Keywords: immunization; vaccination; health disparities; community-based program; REACH 2010

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Despite progress in nationwide childhood immunization coverage, disparities persist for children in communities of color (AHRQ, 2003; Lawrence Barker, personal communication, April 11, 2002; Coleman, 2004; Institute of Medicine, 2002). The most effective strategies for reducing immunization disparities are multifaceted programs that include provider reminders, tracking, and community outreach (Szilagyi et al., 2000; Wood et al., 1998). Most of these programs have been developed and carried out by health care providers (Browngehl, Kennedy, Krotki, & Mainzer, 1997; Rizzo, 2006).

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If persistent disparities among communities of color are to be addressed, the community needs to play a key role in designing and implementing such immunization-promotion efforts (Rizzo, 2006). Little research has been reported on the process of building and maintaining effective community-driven programs for promoting vaccinations, despite the fact that community-based coalitions have proven a powerful strategy for promoting universally recommended preventive actions such as immunizations (Butterfoss et al., 1998; Frank & Di Ruggiero, 2003; Green & Kreuter, 1999; Heenan, 2004; LeBaron, Starnes, Dini, Chambliss, & Chaney, 1998; Rickert, Shefer, Rodewald, & McCauley, 2003).

In this article, we describe how our Start Right Coalition of 23 organizations implemented a community-driven immunization program in a low-income community in New York City from 2002 to 2007 and its successful contribution to the elimination of immunization disparities.

► **COMMUNITY SETTING**

Located at the northern end of Manhattan in New York City, the Start Right Coalition serves Harlem and

Washington Heights, two of the most disadvantaged neighborhoods in the city and the nation. Almost two thirds of the families in these areas have incomes below 200% of the federal poverty level and a third receive income supplements (U.S. Bureau of the Census, 2001). In 2000, when the coalition was established, the population of these neighborhoods totaled 421,820, of whom 52% were Latino and 38% were African American. Harlem is predominantly African American (77%), whereas Washington Heights is predominantly Latino (74%). Two out of five residents (40%) in these communities are foreign-born from Latin America and West Africa, with the majority from the Dominican Republic (U.S. Bureau of the Census, 2001). Some of New York City's largest multiservice organizations are based in northern Manhattan and have served as leaders in developing innovative strategies for promoting health insurance, housing and community advocacy, community-based schools, and women's health initiatives.

► **THE COALITION PROGRAM**

The Start Right Coalition is a community-based immunization-promotion program that targets children less than 5 years of age in northern Manhattan. Employing a model of health promotion from within, Start Right integrates immunization-promotion activities into existing community programs. The program is organized in accordance with community-based participatory action research principles (Adams, Miller-Korth, & Brown, 2004; Higgins & Metzler, 2001; Israel, Schulz, Parker, & Becker, 1998; Lantz, Viruell-Fuentes, Israel, Softley, & Guzman, 2001; Minkler, 2005; Minkler & Wallerstein, 2003). These principles include community decision making and leadership; collaboration with community social service programs; the use of community health workers (CHWs) as peer educators; parental empowerment through education, reminders, and social support; evidence-based immunization-promotion activities; and linkages with health care providers to promote best provider practices.

Community Decision Making and Leadership

Consistent with recommendations for successful community-academic partnerships (Minkler, 2005), the program was designed and implemented by a coalition of 23 community organizations (5 community social service organizations, 8 child care providers, 2 housing advocacy organizations, 3 Special Supplemental Nutrition Program for Women, Infants, and Children [WIC] programs, 3 primary care provider networks, one city agency, and one academic partner). We began by examining the community's experiences with immunization promotion by interviewing families

and health care providers. We then conducted a critical review of all strategies that have been used to date to promote vaccinations, building on an earlier review (Rosenberg, Findley, McPhillips, Penachino, & Silver, 1995). Next, we documented the average immunization coverage rate for children of 19 to 35 months of age in our targeted neighborhoods; it was only 57%, well below city and national averages (Findley et al., 2003). Finally, we agreed to use a multipronged educational strategy that combined education, reminders, recall, and reinforcement in our own immunization-promotion efforts.

Leadership was shared between the program's academic and community partners. Two lead community organizations were selected to serve as coalition hubs (Alianza Dominicana and Harlem Congregations for Community Improvement), and they assumed responsibility for oversight of the coalition activities conducted by member organizations in their respective neighborhoods, Washington Heights/Inwood or Harlem. Each member organization implemented the immunization activities within its regular programs, with specific participation targets. Accountability was maintained through monthly activity reports to the hub leaders, consistent with recommendations for shared accountability among partners (Adams et al., 2004; Butterfoss et al., 1998; Israel et al., 2003).

Integration Into Community Social Service Programs

Immunization-promotion programs run by academic-community partnerships have been constrained by the placement of such initiatives within hospital or clinical settings that limit community access (Perez, Findley, Mejia, & Martinez, 2006; Rizzo, 2006). Therefore, we integrated our immunization-promotion program into ongoing community-based social service programs, thereby retaining greater community program control and input. Applying the principle of asset-based programming (Michael, Farquhar, Wiggins, & Green, 2008; Minkler & Wallerstein, 2003; Saunders, Greaney, Lees, & Clark, 2003), we designed our program to build organizational capacity by providing information and assistance about vaccinations through our member organizations' programs for families with young children. This integration of health promotion with community development and social service programs has been proven to generate stronger and longer-lasting health promotion linkages (Cosgrove, 2007; Duggan, 2007; Green & Kreuter, 1999; Heenan, 2004; Rizzo, 2006; Tandon, Parillo, Jenkins, Jenkins, & Duggan, 2007).

We identified six categories of programs where immunization could be incorporated into routine

activities: parenting guidance and assistance, child care, facilitated enrollment for health insurance, housing assistance, clinic referrals, and the Supplemental Feeding Program for WIC. We developed an implementation guide to help program staff tailor their activities to include immunization promotion, identify eligible parents, enroll parents in the program, and send participants immunization reminders. Member organizations implemented the program within one or more of their existing programs.

CHWs as Peer Educators

The coalition used peer educators or CHWs as the prime agents of change, consistent with recommendations regarding effective health communications for immigrant populations (Asrani, 2000; Barnes, Friedman, Namerow, & Honig, 1999; Brach & Fraser, 2000; Briss et al., 2000; Offit, 2002; Perez et al., 2006; Swider, 2002). Each organization selected a number of CHWs to participate in the program, generally using existing staff who added immunization promotion to their other responsibilities. Several multiservice organizations also trained staff to identify and refer potential participants in their programs to the CHWs for immunization promotion. Monthly coalition meetings were used for reporting, sharing promising ideas, problem solving, and planning joint coalition events.

The coalition developed a five-part training curriculum to teach immunization promotion. Training was led by the academic partner with assistance from the hub leaders and the New York City Department of Health and Mental Hygiene's Bureau of Immunization and included modules on Immunization 101, Immunization Card Review, Tips on Educating Parents, and Methods for Reminding and Tracking Families. All CHWs were trained to use immunization education materials with families and address a wide range of questions and concerns. All CHWs also learned how to integrate immunization-promotion strategies into their routine program activities. Pre- and posttests and refresher courses were used to ensure that CHWs retained these skills.

Between 2000 and 2007, the coalition trained 998 CHWs ($n = 516$ completed pre/posttests). At any given time, 150 to 200 CHWs were active. All CHWs were recruited from the community and were highly motivated to "give back to the community." Most (98%) were female, Latino or African American residents in the community, and many were bilingual.

The annual feedback from the CHWs ($n = 175$) about their work and the adequacy of their training was universally enthusiastic and positive. Examples of CHWs comments are as follows:

- It helps me keep on helping the community. Many parents are not aware of the importance of vaccinations.
- Learning how to read the immunization card was one of the best trainings I've ever gotten, because now I can tell parents if their children are up to date or not.
- This helped me to understand things I did not know before. The information is good for informing parents. I learned how to use the calendar to make parents ready for appointments.
- Now, when moms go to the doctor they know what is going on and understand what he tells them. So they come back and thank us for helping them understand.

Parent Empowerment

Consistent with the coalition's mission to reach parents whose children were most at risk for falling behind on their vaccinations, 94% of our outreach was conducted at community organizations that provide social service programs for families with young children (Irigoyen, See, & Findley, 1999). Most outreach was conducted within the 32 programs offered by coalition members. However, additional outreach was also conducted on a rotating schedule at WIC program sites and neighborhood pediatric providers. Half of the parents were recruited through personal contact with organization staff. The most common recruitment programs were WIC (26% of children), programs providing facilitated enrollment for health insurance (20%), child care/Head Start programs including family day care provider networks (20%), parenting programs including home visiting programs (19%), housing/tenant advocacy programs (9%), and community primary care practices or welfare offices (9%).

Once eligible parents were identified, the trained coalition CHWs explained the program, invited parents to participate, and asked for informed consent. (All CHWs eliciting consent were certified in Good Clinical Practices through the Columbia University Medical Center Institutional Review Board.) Almost all parents who were approached chose to participate, with only 2.7% refusing. Between October 2000 and May 2007, the coalition enrolled 10,251 parents of children under age 5, achieving the coalition's enrollment target of 10,000 children.

The coalition developed its own bilingual informational package, from which the CHWs could select materials to address common concerns and fears about vaccinations in the community, such as beliefs that vaccinations can harm babies or introduce AIDS. The coalition also designed its own brochure to assist CHWs with this educational process. Based on

recommendations from the New York City Department of Health and Mental Hygiene, the Advisory Committee on Immunization Practices and the American Academy of Pediatrics, these bilingual brochures included pictorial and factual information about the diseases that are targeted by vaccinations and the inoculation schedule required for school enrollment.

These educational sessions incorporated active learning and peer education principles (Lam et al., 2003; Sherman, Sanders, & Yearde, 1998; St. Pierre & Layzer, 1999). The CHWs sought to elicit common concerns and fears among parents about vaccinations, to explain dangers posed by the diseases for which vaccinations are available, and to discuss why repeated vaccinations are needed for the same disease. The CHWs also shared information about their own experiences and anxieties, thus giving parents the freedom to express their own fears and doubts. The CHWs worked to empower parents by emphasizing the critical role they can play in protecting their children from dangerous diseases. Finally, the CHWs explained the use of vaccination cards and provided parents with written reminders of any upcoming vaccination dates. The CHWs followed up this educational programming by providing personalized reminders to parents 2 weeks in advance of their child's next vaccination date and making sure that these children received the necessary shot(s).

During each year of the program, parents were asked for their opinions about the initiative. Of the 209 respondents, most were very positive about their experiences. Many parents thought the program should reach even more working mothers like themselves, who might not know about the initiative. Parents wrote at length about what they liked most about the program. Examples are as follows:

- Importance of vaccinations:
 - It helped me understand more about the immunization shots.
 - I liked most learning what the shots are for and what diseases they prevent.
 - I like the information we got about the diseases you get when the children do not get vaccinated.
 - Before, I did not know what the shots prevented and when to get them.
 - I like the fact that they even had the program. Some people are not aware of how important it is to keep your child's immunizations up to date.
- Learning about vaccinations:
 - The program made me more aware about my child's immunization and how important it is to have them done on time.
 - My child has some of his shots, but the program helps me to make and keep appointments for the

rest of my child's shots. I think the program did all that they could. The rest is up to me.

- Being a new mom, the information I got from the workers was very important for keeping my child safe and healthy. I learned how important it is for my son to be immunized.
- Learning about immunization cards:
 - I got the card read and know what my baby needs.
 - They broke down the information so that it was easier to understand.
- Parent empowerment:
 - I learned how to inquire about the vaccinations my baby should get.
 - I asked my doctor more. I had been anxious that the vaccine has viruses. I felt that giving the virus would be harmful. The doctor told me that it was okay because you get immune to it.
- Networking and social support:
 - They told me about resources available to people like me that I did not know about. I have passed on this information to other people about vaccines.
 - They put me in touch with other women and we shared opinions. That helped me to get stronger and be more independent and got my mind positive before it became negative.
 - I would say that this is a place for moms where you can educate yourself about your children and meet other moms like you. They can benefit from the program when they work together.

Evidence-Based Immunization-Promotion Activities

The coalition's immunization-promotion program incorporated the activities identified as the most effective, evidence-based strategies. These included community-based immunization education (Birkhead et al., 1995; Briss et al., 2000; Chiu, Barata, Unsicker, & Brennan, 1997; LeBaron et al., 1998), reminders of upcoming vaccinations and recalls for missed vaccinations (Bordley, Margolis, & Chelminski, 1996; Clayton, McNutt, Homestead, Hartman, & Senecal, 1999; Irigoyen, Findley, Earle, Stambaugh, & Vaughan, 2000; Jacobson & Szilagyi, 2005), and provider feedback to reduce missed opportunities for vaccinations when children visit primary care providers (Briss et al., 2000; Crawford & Buttery, 2008; Daniels, Jiles, Klevens, & Herrera, 2001; Kroger, Atkinson, Marcuse, & Pickering, 2006).

The coalition intervention revolved around community-based outreach, education, and reminders. Parents interacted with their CHW an average of 5.1 times, with 2.1 reminders or recalls per child. These interactions were in the context of each organization's ongoing program activities in which the parents participated. For example, at the child care programs, reminders were

given directly to each parent by the child care staff, whereas at parenting programs, they were given during a home visit or meeting with staff. Following are examples of what parents had to say about the reminders:

- The program helped me get my child immunized because she kept getting on me about keeping my appointments.
- What made a difference were the constant reminders. They were just persistent!
- Short of taking my child to get her shots, I do not feel that they could have done much more.
- Start Right teaches people how to be up to date with immunizations. They will remind you when the next shots are due.
- It is good to enroll [in Start Right], because if you are busy, you may forget to vaccinate. But being in this program, you will not forget.

The last evidence-based program component was comprised of activities to prevent missed opportunities, namely when a child is seen by their primary care provider but does not receive all needed vaccinations (Crawford & Buttery, 2008; Kroger et al., 2006). To address this problem, the coalition encouraged participants to take their coalition-generated immunization reminders with them to doctors' visits and to specifically request vaccinations for their children (Findley et al., 2003). In addition, in collaboration with the Northern Manhattan Immunization Partnership, the coalition supported regular practice-based assessments and worked closely with clinical sites to implement procedures to improve immunization delivery and reduce missed opportunities. The partnership supported the launch and uptake of the hospital and city immunization registries (Clark, Cowan, & Bartlett, 2006; Irigoyen et al., 2002; Linkins, 2001), which allowed providers to accurately assess immunization status.

Linkages to Health Care Providers

The coalition helped parents maintain connections to their primary care providers (Rizzo, 2006) by making appointments for parents and/or escorting them to appointments. Staff also helped parents choose a primary care provider when enrolling in a health insurance plan. Finally, coalition staff invited other eligible families seen at the clinics to participate in the program.

The coalition also promoted best practices for tracking vaccinations at provider sites, including the crucial use of immunization registries to track vaccinations (Clark et al., 2006; Kroger et al., 2006; Schaffer, 2002). Registries are especially important in this community because many children are examined by two or more medical providers

(Irigoyen et al., 1999). Unfortunately, despite mandatory reporting of vaccinations to the Citywide Immunization Registry, 17% to 32% of children participating in the coalition's programs had not been enrolled in hospital or citywide registries. In addition, many vaccinations that had been provided were not reported to the registry: 29% to 42% of vaccinations recorded on the children's cards were missing from the registry.

To track vaccinations and minimize the problem of record scatter (Stokley, Rodewald, & Maes, 2001; Yusuf et al., 2002), the coalition established an ACCESS data warehouse that integrated information from the child's immunization card with records from the major hospital registry serving children in Washington Heights/Inwood and the Citywide Immunization Registry. This complete accounting for all vaccinations was critical to maintaining accurate reminders and recalls to families. Without the data warehouse, immunization information would have been incomplete and the coalition would have been unable to compare its program data to that collected in the National Immunization Survey (NIS), which includes all vaccinations recorded on the child's vaccination card (Battaglia, personal communication, May 20, 1997).

The main database was housed at the hospital registry, with copies at each organization that had records for children enrolled through their programs. Each organization entered data on the children enrolled at their site, regularly updating records when additional vaccinations were noted on the child's immunization card. Monthly data exchanges were conducted between the coalition database and the hospital or citywide immunization registries. By 2007, the coalition database had records on more than 185,000 immunizations for the 10,251 enrolled children. The database had features to flag children needing reminders or follow-ups and alerts when the child had completed all vaccinations and was due thank-you gifts.

Coalition Outcomes

Participation and study group. Between October 2000 and May 2007, the coalition provided outreach to 31,156 parents, screened 11,749 parents for eligibility, found 10,539 eligible (with 1,210 ineligible due to age or residence of the child), and enrolled 10,251 children. Across all years, the refusal rate was 2.7%. Each year, the coalition averaged a 5.3% lost to follow-up rate, primarily due to families moving out of the area. For the comparison to NIS data (Zell, Ezzati Rice, Battaglia, & Wright, 2000), we included only records for children aged 19 to 35 months on April 1 of each year from 2002 to 2007 ($n = 6,990$, annual cohorts 1,002, 1,142, 1,502, 901, 859, and 1,585).

The smallest cohort is sufficient to detect a 3% difference from the NIS rates, with 95% confidence and 67% power, with power increasing to 80% or more for cohorts larger than 1,200.

Measures. The primary outcome measure was up-to-date coverage at age 19-35 months as of April 1 of the estimate year for the 4:3:1:3:3 series (4 diphtheria-tetanus-pertussis [DTaP], 3 polio, 1 measles-mumps-rubella [MMR], 3 Haemophilus influenzae b [Hib], and 3 Hepatitis B [Hep B]), as recommended by the Advisory Committee on Immunization Practices (CDC, 2002). Immunization records for the children were assembled from three sources: the child's vaccination card (29%), the citywide immunization registry (18%), and the hospital immunization registry (53%). All data were assembled and analyzed in the coalition data warehouse, using Microsoft Access 2003. Comparison immunization rates for children aged 19-35 months in New York City and the United States (total, Latino, and African American) were compiled from Table 29 of the appropriate year from the NIS and accessed online at the CDC's NIS Web site for each year. Significant differences between the coalition and national rates were assessed using the NIS 95% confidence intervals.

Immunization Coverage Rate Disparities

As shown in Figure 1, in 2002, the coalition's average immunization coverage rate of 63.0% (shown in black) was significantly below all comparison immunization rates. In 2003, the coalition's immunization coverage rate of 80.0% was no longer significantly different from the New York City or national averages and exceeded the national Latino and African American rates. The coalition's immunization rate was constant at 80% for 2004 and 2005, within the 95% confidence interval for city and national averages for total, Latino, and African American coverage rates. In 2006, the coalition's immunization rate increased to 84.1%, still within the confidence interval for the New York City rate but significantly exceeding the national rates for total, Latino, and African American children. In 2007, the coalition's rate increased again to 96.8%, surpassing the New York City rate, as well as the national rates for all three comparison groups.

DISCUSSION

There is a paucity of research on the process of building and maintaining effective community-driven programs for promoting vaccinations, despite the fact that community-based coalitions have proven a powerful

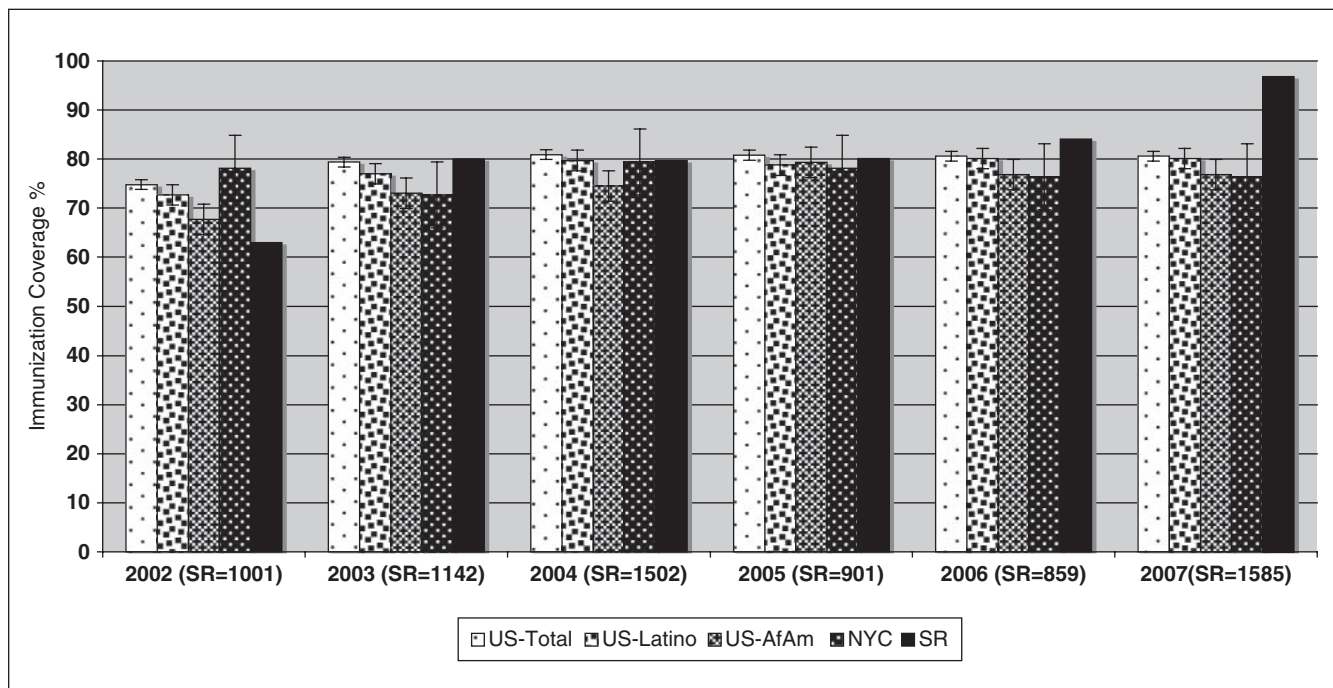


FIGURE 1 Coalition Versus National and NYC Immunization Coverage Rates by Race/Ethnicity, 2002-2007

NOTE: National and NYC estimates from National Immunization Survey, January to December for the reported year, Table 29 (Race and Ethnicity by State and IAP). 95% CI interval shown in braces for national and NYC estimates. National comparison for 2007 is NIS 2006. Results for NIS 2007 were not yet available at the time of analysis.

strategy for promoting universally recommended preventive measures such as immunizations (Butterfoss et al., 1998; LeBaron et al., 1998; Rickert et al., 2003; Rizzo, 2006). In this article, we outlined the guidelines and procedures that were used to implement our truly community-driven program for eliminating childhood immunization disparities in a low-income community of New York City. The careful planning that built the capacity of the community to mobilize parents and facilitate on-time vaccinations paid off on many levels.

The Start Right Coalition changed the “immunization culture,” with community leaders, staff, and parents all doing their parts to encourage parents to immunize their children. The coalition created a cadre of almost 1,000 CHWs who incorporated immunization promotion into their work, regardless of their own program’s core goals. The coalition made vaccination reminders and follow-ups a routine part of program activities. Because the coalition members each had access to an immunization database, they did not need to wait to hear from a provider that a child had fallen behind. They proactively sent out reminders before vaccination due dates, tracked whether the child received the

immunization, and quickly contacted parents who had missed appointments. Indeed, the coalition members had an advantage over medical providers as they could check the child’s vaccination card whenever they saw the parent at their program.

Most important, the coalition changed the nature of the conversation between parents and doctors about vaccinations. With the support and reminders provided by the coalition, parents were no longer passive recipients of information and appointment cards for vaccinations. Many parents who had never understood or were afraid of vaccinations had their questions and fears addressed and could further raise questions with their providers. And, when their health care provider failed to initiate the vaccination process at a visit, the parent could prompt the provider, making sure that the visit would not become a missed opportunity.

The coalition’s “bottom-up,” community-driven approach proved quite successful. The coalition attained its ambitious enrollment and immunization goals. More than 10,000 children participated in the program, and by the 3rd year of operation, the coalition had eliminated immunization disparities for children whose parents

participated in the program. From 2003 to 2006, 80% or more of the children who should have completed the basic immunization series had done so. The children's immunization rates matched or exceeded the rates for New York City and for children nationwide. In 2007, further gains were made, with 96.8% of the children aged 19 to 35 months being up to date with their vaccinations.

As with other assessments of community-based initiatives, this study has its limitations. First, the staff and parents who provided feedback were not selected from a structured random sample. Although every attempt was made in annual evaluations to obtain feedback from both satisfied and dissatisfied individuals, it is likely that the responses that were received were positively biased, and we interviewed only 2% of all parents. Second, even though we used all available sources, the incomplete reporting by providers to the registry increased reliance on the children's vaccination cards for approximately one fourth of the vaccinations. If parents delayed bringing their children's cards to their CHW, their children's vaccinations could go unreported. This would tend to downwardly bias our immunization coverage rates, compared to the rates reported by the NIS, which includes vaccinations from all sources listed on the child's vaccination card.

In addition to the community ownership of the immunization-promotion process, four design features were crucial to our success. First, the intervention was offered throughout the community, regardless of a family's connection to a medical provider or health insurance. Therefore, the project was able to reach low-income, minority, and immigrant parents, many of whom may not have a regular medical home for their children.

Second, the intervention worked by using peer-based education and empowerment. As documented in the feedback received from families, this peer outreach and educational process helped parents focus on vaccinations on their own terms. Through candid conversations with CHWs, parents could raise their fears and concerns knowing they would be understood and respected. With the ongoing support from the CHW, they were able to see immunization as one of the things that they could and should do for their children. This normative shift laid the foundation for the improved communication with doctors that was reported by parents in their feedback to the coalition.

Third, the community-based approach to providing reminders to parents not only facilitated their delivery but also assured that they were delivered in a culturally appropriate manner. The parents received the reminders

from the program staff they saw regularly. When these staff also called or sent cards to the parents, they were more likely to recognize that the reminders were meant for them and that someone was concerned about their family's welfare.

Last, the immunization-promotion activities were integrated directly into routine social service and educational programs in the community so that immunization promotion complemented other critical social services that families already obtained. This design explicitly recognized that parents are busy and have multiple priorities among which health is only one. By linking immunization promotion to other priority activities, the coalition made it possible for the parents to meet two needs at once—their children's health and other basic needs.

Although the Start Right Coalition focused on childhood vaccinations, its principles can be applied to other arenas of health, both for children and adults. The model could be readily adapted to maternal and child health programs, integrating health promotion for both mother and child. Similarly, it could be adapted for working with families challenged by one or more chronic conditions, such as asthma or obesity. The possibilities are unlimited as long as the community maintains its vision and participation.

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