



Journal List > J Urban Health > v.84(4); Jul 2007

J Urban Health. 2007 July; 84(4): 615-631. PMCID: PMC2219560
 Published online 2007 June 12. doi: 10.1007/s11524-007-9197-z.

Copyright © The New York Academy of Medicine 2007

Strategies for Improving Influenza Immunization Rates among Hard-to-Reach Populations

David Vlahov,¹ Micaela H. Coady,¹ Danielle C. Ompad,¹ and Sandro Galea^{1,2}

¹Center for Urban Epidemiologic Studies, New York Academy of Medicine, 1216 Fifth Avenue, New York, NY 10029 USA

² Department of Epidemiology, University of Michigan School of Public Health, Ann Arbor, MI USA

David Vlahov, Phone: +1-212-8227382, Fax: +1-212-8766220, Email: dvlahov@nyam.org.

✉ Corresponding author.

Abstract

Other Sections ▼

Whereas considerable attention has been devoted to achieving high levels of influenza immunization, the importance of this issue is magnified by concern over pandemic influenza. Most recommendations for vaccine administration address high risk groups such as the elderly and those with chronic diseases, but coverage for hard-to-reach (HTR) populations has had less attention. HTR populations include minorities but also include other primarily urban groups such as undocumented immigrants, substance users, the homeless, and homebound elderly. Obstacles to the provision of immunization to HTR populations are present at the patient, provider, and structural levels. Strategies at the individual level for increasing immunization coverage include community-based educational campaigns to improve attitudes and increase motivation for receiving vaccine; at the provider level, education of providers to encourage immunizations, improving patient-provider interactions, broadening the provider base to include additional nurses and pharmacists, and adoption of standing orders for immunization administration; and at the structural level, promoting wider availability of and access to vaccine. The planning process for an influenza pandemic should include community engagement and extension of strategies beyond traditional providers to involve community-based organizations addressing HTR populations.

Keywords: Immunization, Influenza, Vaccination, High-risk populations, Hard-to-reach populations, Pandemic

INTRODUCTION

Other Sections ▼

Every year, 10% to 20% of the American population falls ill with influenza, and on average 36,000 persons die from influenza-related complications.¹ Immunization reduces the morbidity and mortality that results from influenza and respiratory tract infections secondary to influenza infections.² Influenza immunization rates among the elderly, the population group that accounts for 90% of influenza-related deaths, rose steadily for a number of years, but have now plateaued between 60% and 70%.^{1,3,4} Data from several sources, including the National Health Interview Survey, suggest that immunization rates are lower in racial/ethnic minority groups than Whites, a disparity that exists for all age groups, including elderly persons covered by Medicare and populations specifically targeted by public health interventions.^{5,6} Although data are limited, hard-to-reach (HTR) groups such as the housebound elderly, disenfranchised groups, people living in disadvantaged urban communities, undocumented

Formats: [Abstract](#) | [Full Text](#) | [PDF \(220K\)](#)

PubMed articles by these authors
Vlahov, D.
Coady, M.
Ompad, D.
Galea, S.

PubMed related articles

- Influenza vaccination and the elderly: pandemic preparedness. [Drugs Aging. 2008]
- Project VIVA: a multilevel community-based intervention to increase influenza vaccination rates among hard-to-reach. [Am J Public Health. 2008]
- Effective, robust design of community mitigation for pandemic influenza: a systematic examination of proposed US. [PLoS One. 2008]
- Review Mass vaccination for annual and pandemic influenza. [Curr Top Microbiol Immunol. 2006]
- Review Survey of vaccine distribution and delivery issues in the USA: from pediatrics to pandemics. [Expert Rev Vaccines. 2007]

» See reviews... | » See all...

Recent Activity
Turn Off Clear
Strategies for Improving Influenza Immunization Rates among Hard-to-Reach Populations

Links
PubMed
Substance

- Mortality associated with influenza and respiratory syncytial virus in the United States. [JAMA. 2003]
- Influenza prevention and control. Past practices and future prospects. [Am J Med. 1987]
- Nonfatal, unintentional medication exposures among young children--United States, 2001-2003. [Morb Mortal Wkly Rep. 2006]
- Pandemic versus epidemic influenza mortality: a pattern of changing age distribution. [J Infect Dis. 1998]
- Racial differences in influenza vaccination among older Americans 1996-2000: longitudinal analysis of the Health and Retirement Study. [Am J Public Health. 2006]

See more articles cited in this paragraph

immigrants, and substance users may be less likely than individuals receiving routine health care services to receive influenza immunization.⁷ Members of these groups may be at increased risk of morbidity and mortality secondary to influenza because of increased incidence and prevalence of medical conditions for which influenza vaccine is recommended (e.g., asthma, diabetes) and reduced immune system activity caused by lifestyle factors.⁸⁻¹⁰

Annually and in pandemic situations, vaccine supply may be inadequate to meet the national need, and ramp-up of production is complex.¹¹ A minimum of 3 to 6 months is needed to design and start manufacturing a vaccine based on a new virus strain and using current production methods, there are insufficient supplies of eggs to make sufficient vaccine to meet the demand.¹²⁻¹⁴ An influenza pandemic would cause particularly acute problems in HTR populations. Even if sufficient vaccine against the pandemic strain could be made, gaining timely access to and rapid immunizations of HTR populations would pose significant challenges.

A number of interventions have been shown to be effective for increasing vaccination coverage among the general population, including provider-based interventions, and interventions aimed at increasing community demand and enhancing access to immunization services.¹⁵ Studies on how best to immunize HTR populations are sparse and suffer from difficulty determining the true size of the populations at risk.¹⁶ Existing research suggests, however, that most interventions are strengthened by multiple approaches, particularly those that are community-based.^{7,17}

DEFINING HARD-TO-REACH POPULATIONS Other Sections ▾

High-risk populations for influenza include the elderly and those with certain chronic diseases. High risk is not the same as HTR, although there appears to be substantial overlap; whereas not all at high risk are hard-to-reach, many in the HTR population are at high risk. While no uniform definition of HTR populations exists, HTR populations have typically been defined from the perspective of linkage with the health care system, i.e., persons who do not seek treatment in traditional care settings such as provider offices or clinics. The size of hard-to-reach populations, whereas hard to estimate, is not trivial; some examples of constituent groups are as follows: 11.5–12 million undocumented immigrants nationwide,¹⁸ 1.5 million injection drug users in 96 large U.S. metropolitan areas¹⁹ and 744,000 homeless persons nationwide,²⁰ as well as a proportion of the elderly and minorities. Overall, the percentage of U.S. residents at high risk for influenza but who are not immunized has been estimated to be as high as 65%.³

Failure to be immunized is related to lack of health insurance and to having a regular provider;²¹ this may be a particular concern for specific HTR groups. For example, mobile elderly differ from the majority of the other population groups in that they are covered by Medicare and generally frequent a health care provider. Thus, whereas the elderly as a high-risk group may differ from other groups in terms of access to health care as an entitlement, a proportion is not connected to care and is therefore HTR. The lack of a regular health care provider is correlated with race and ethnicity.⁷ While 80% of White adults have a primary care provider, the percentage is closer to 70% for Asian-Americans and Blacks, and only 57% for Hispanics.²²

As reviewed elsewhere, other barriers to accessing care include culturally derived attitudes and belief systems, negative experiences with past treatment, language and other barriers in patient–provider relationships, and legal status

A global pandemic influenza vaccine action plan.

[Vaccine. 2006]

Review Pandemic vaccines: promises and pitfalls.

[Med J Aust. 2006]

Review Distribution of influenza vaccine to high-risk groups.

[Epidemiol Rev. 2006]

Determinants of influenza vaccination in hard-to-reach urban populations.

[Prev Med. 2006]

Review Reviews of evidence regarding interventions to improve vaccination coverage in children and adolescents.

[Pediatrics. 2000]

Review The estimated prevalence and incidence of HIV in 96 large US metropolitan areas.

[Am J Public Health. 1996]

Nonfatal, unintentional medication exposures among young children—United States, 2001–2006

[Morb Mortal Wkly Rep. 2006]

Prevalence of influenza vaccination in a high-risk population: impact of age and race.

[J Ambul Care Manage. 2005]

Determinants of influenza vaccination in hard-to-reach urban populations.

[Prev Med. 2006]

What affects influenza vaccination rates among older patients? An analysis from inner-city, suburban, rural, and

[Am J Public Health. 2003]

The effect of fear on access to care among undocumented Latino immigrants.

[J Immigr Health. 2001]

Tailored interventions to increase influenza vaccination in neighborhood health centers serving the disadvantaged


[J Gen Intern Med. 2003]

(e.g., undocumented immigrants).²³⁻²⁷ Some groups harbor substantial myths about and distrust of the medical system; previous research has shown that their attitudes appear to be strong predictors of being immunized.²⁸

CHALLENGES IN IMMUNIZING HARD-TO-REACH POPULATIONS Other Sections ▾

Challenges on the Individual Level

Primary reasons for an individual not being immunized may include poor access to immunization services, difficulties in negotiating the health care system, cost, lack of education leading to misconceptions about vaccine risks and benefits, and lack of clear, strong recommendations from health care providers (Table 1).^{6, 17, 21, 23, 25, 27-35} At the individual level, attitudes are important: Zimmerman reported that among unvaccinated individuals, only 59% thought that immunization was wise, and almost all thought it was more trouble than it was worth.²⁸ Among those who were immunized, however, 98% thought it was a wise thing to do. Another study showed that unvaccinated individuals also believed that they were unlikely to get the flu.²³ Other reasons for not receiving immunization include fear of needles and fear of getting sick from the vaccine.^{23, 26, 36} Lack of trust in modern medicine, belief in home remedies, and lack of trust in the government also may discourage immunization.²⁵ The perceived attitudes of peers also relates strongly to likelihood of immunization. In one study, whereas 75% to 80% of immunized individuals thought that their family and friends were in favor of their getting immunized against influenza, only about 40% of unvaccinated people thought so.²⁸

TABLE 1	
	Challenges faced in general and HTR populations with various approaches to raising routine influenza immunization levels ^a

Challenges on the Provider Level

Only about one-third to one-half of health care workers are immunized against influenza and providers who do not believe the vaccine is protective are less likely to recommend it to patients.^{31, 37} In addition, monitoring of immunization status is generally poor. Most providers have little knowledge of how many of their patients are at high risk and especially need influenza vaccine,³² and few providers have systematic methods to assure immunization among their patients (Table 1).^{32, 38} As HTR populations generally have little interaction with providers on a regular basis, opportunities to identify challenges or to identify factors for influence are limited.

Challenges on the Structural Level

Structural challenges can be categorized as challenges inherent to influenza immunization itself and challenges inherent to the immunization distribution system (Table 1). On the vaccine side are problems of unpredictable production and balancing the supply with the demand, whereas challenges inherent in the distribution system are principally logistical (Table 1).^{32, 39} Health care providers often have limited time to provide preventive care and the lines of responsibility for adult vaccination are oftentimes unclear. Legal and regulatory obstacles in coordinating distribution among bordering jurisdictions and handling liability

Racial differences in influenza vaccination among older Americans 1996-2000: longitudinal analysis of the Health and Retirement Study. [J Am Geriatr Soc. 2003]

Review: Reviews of evidence regarding interventions to improve vaccination coverage in children and adolescents. 2000. [Pediatrics. 2000]

Prevalence of influenza vaccination in a high-risk population: impact of age and race. [J Ambul Care Manage. 2005]

What affects influenza vaccination rates among older patients? An analysis from inner-city, suburban, rural, and farm areas. [J Am Geriatr Soc. 2003]

Race, culture, and trust: why should I take a shot if I'm not sick? [Ethn Dis. 2005]

See more articles cited in this paragraph

Attitudes and practices regarding influenza vaccination among healthcare workers providing services to individuals. [J Am Geriatr Soc. 2003]

Attitudes of health care workers to influenza vaccination: are they not vaccinated? [Am J Infect Control. 2007]

Tailoring interventions: understanding medical practice culture. [J Cross Cult Gerontol. 2004]

Ten-year durability and success of an organized program to increase influenza and pneumococcal vaccination rates. [J Am Geriatr Soc. 1998]

Tailoring interventions: understanding medical practice culture. [J Cross Cult Gerontol. 2004]

Achieving the national health objective for influenza immunization: success of an institution-wide vaccination program. [J Am Geriatr Soc. 1990]

Determinants of influenza vaccination in hard-to-reach urban populations. [Prev Med. 2006]

Provision of influenza and pneumococcal vaccines to injection drug users at a syringe exchange. [Substance Abuse Treat. 2000]

issues can be barriers to mounting complicated community-based vaccination programs. For HTR populations, these issues are compounded by lack of knowledge, lack of easy access, and lack of insurance coverage.^{7,40}

STRATEGIES TO INCREASE IMMUNIZATION RATES [Other Sections ▾](#)

Strategies at the Individual Level

Community-based campaigns have suggested that targeted, culturally sensitive programs can increase immunization rates in HTR populations; many have emphasized partnering with leaders of community-based organizations to enhance rates in these groups (Table 2).^{28,40-42} In one study, churches were particularly successful collaborators because of that community's well-documented high level of trust in faith-based centers.²⁵ Another successful strategy used in public health programs in general was mobilizing trustworthy spokespeople, for example local sports figures or members of the clergy.⁴³ Other research has shown that community-based campaigns, which involved community or faith-based locations, and which included educational materials that were culturally appropriate, could be successful (Table 2).^{29,44-46} And the message mattered: results from one study suggested that vaccine acceptance was higher if the vaccine was viewed as beneficial for others, such as children and grandchildren.²³

TABLE 2 Strategies to improve routine immunization rates for the general and HTR populations ^a	
1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...
11	...
12	...
13	...
14	...
15	...
16	...
17	...
18	...
19	...
20	...
21	...
22	...
23	...
24	...
25	...
26	...
27	...
28	...
29	...
30	...
31	...
32	...
33	...
34	...
35	...
36	...
37	...
38	...
39	...
40	...
41	...
42	...
43	...
44	...
45	...
46	...

Strategies at the Provider Level

There is evidence suggesting that patient reminders, provider education and prompting, physician incentives, and standing orders are effective ways to increase adult immunization coverage (Table 2).^{17,36} Patient reminders, which can take the form of computer-automated mailings and autodial telephone messages, have resulted in dramatic increases in vaccination rates in high-risk groups.⁴⁷ In Monroe County, NY, vaccine coverage increased by 7% among the elderly when physicians were offered financial incentives.⁴⁸ Standing orders, i.e., a written order stipulating that all persons meeting certain criteria should be vaccinated, thus eliminating the need for individual physician's orders for each patient, have been shown to increase vaccination rates (Table 2).^{38,49,50} Standing orders are not permissible in all states, however, and if available, healthcare providers must exercise the option. One report showed that from 1995 to 1999, in states where pharmacists provided vaccination, rates increased from 58% to 68% vs. 61% to 65% in states that did not explicitly allow pharmacists to vaccinate.⁵¹ This is a strategy that could be particularly helpful for HTR populations. Similar increases have also been reported in settings where nurses were given the authority to vaccinate without the presence of a physician.³⁹

Strategies at the Structural Level

At the structural level, a limited vaccine supply is problematic.⁵² Technological solutions are being sought, for example, shifting the industrial growth of the virus from eggs to cell cultures.⁵³ Technology is also being used to stretch the doses

Tailored interventions to increase influenza vaccination in neighborhood health centers serving the disabled. *Am J Public Health*. 2003

Provision of influenza and pneumococcal vaccines to injection drug users at a syringe exchange. *Abuse Treat*. 2000

Community-based strategies to reduce childhood immunization disparities. [Health Promot Pract. 2006]

Race, culture, and trust: why should I take a shot if I'm not sick? [Ethn Dis. 2005]

Review Media advocacy: lessons from community experiences. [J Public Health Policy. 1996]

See more articles cited in this paragraph

Review Reviews of evidence regarding interventions to improve vaccination coverage in children. *Am J Public Health*. 2000

Factors associated with vaccination of medicare beneficiaries in five U.S. communities: Results from the Facilitator Study. [Am J Public Health. 2006]

A computerized reminder strategy is effective for annual influenza immunization of children with asthma. *Am J Public Health*. 2001

Performance-based physician reimbursement and influenza immunization rates in the elderly. *The Prim Care*. 1998

Ten-year durability and success of an organized program to increase influenza and pneumococcal vaccination rates. [Am J Public Health. 1998]

See more articles cited in this paragraph

Review Planning for the next pandemic of influenza. [Rev Med Virol. 2001]

Influenza vaccines: a main problem in control of pandemics. [Eur J Epidemiol. 1994]

Vaccine manufacturing: challenges and solutions. [Nat Biotechnol. 2006]

Strengthening the supply of routinely recommended vaccines in the United States: a perspective from the Americas. [Am J Public Health. 2006]

Lack of ethnic disparities in adult immunization rates among underserved older patients in an urban public health system. [Am J Public Health. 2006]

An emergency department-based vaccination program: overcoming the barriers for adults at high risk for vaccine-preventable disease. [Am J Public Health. 2006]

Provision of influenza and pneumococcal vaccines to injection drug users at a syringe exchange. *Abuse Treat*. 2000

of available immunizations, including the use of adjuvants or intradermal injection.⁵⁴ Vaccinators also need liability protection.⁵⁵ The Vaccine Injury Compensation Program (VICP) was designed to provide the needed indemnification at the national level. However, the program does not currently include a specific indemnification program for vaccines against a pandemic influenza strain.

At the structural level, increasing health care insurance coverage in the U.S. is crucial to the long-term success on a wider basis (Table 2).^{56,57} For HTR populations, programs have improved access by distributing vaccines in unconventional sites, such as needle-exchange programs.⁴⁰ The findings suggest that people are more likely to go to familiar locations in their neighborhoods that they know and trust, and one study found that most vaccine recipients returned to the same sites where they were immunized the previous year (Table 2).³⁰ Results from a community-based vaccine distribution study in New York City found that vaccine distribution on street corners was more successful than offering the vaccine door-to-door, in terms of sheer number of doses administered.⁵⁸ Weatherill et al.⁴¹ described successful distribution of influenza and pneumococcal vaccine on streets, in alleys, and in single-room occupancy hotels in Vancouver. Many of the community-based programs recognized the importance of easy recognition of the vaccinators and selected bright, distinctive clothing so they were easily identifiable.

To be successful, the precise methods of immunization distribution need to be tailored to each site and each community.¹⁶ Input should therefore be sought from the target community in the design of services. Planning must be comprehensive and involve all sectors of the community, including residents, business owners, health officials, law enforcement personnel, and neighborhood community board members. Lastly, vaccine programs have historically targeted people at high risk for morbidity and mortality from influenza, including the elderly, and persons with medical indications.¹⁶ There is now increasing interest in expanding immunization to new populations, such as elementary school children, who have a high likelihood of being transmission vectors for influenza.⁵⁹ Limited evidence suggests that such efforts may enhance efforts to reduce morbidity and mortality as compared to programs targeting high-risk individuals only.⁶⁰⁻⁶²

SPECIAL CONSIDERATIONS: PANDEMIC INFLUENZA Other Sections ▼

In a pandemic situation, challenges and strategies for immunization will change (Table 3). Because vaccine stockpiles are limited, months will likely pass before supply can be increased to meet the demand. As priorities must be established in advance, the Health and Human Services Pandemic Influenza Plan and the National Strategy for Pandemic Influenza are beginning to address prioritization issues.^{63,64} Although advance planning and training for distribution are critical, not every contingency can be anticipated on a theoretical basis.

TABLE 3
Challenges faced in general and HTR populations with various approaches to vaccinating during a pandemic situation^a

Attitudinal factors among adult prescription recipients associated with choice of where to be vaccinated. [Vaccine. 2002]
Immunization programs in non-traditional settings. [Can J Public Health. 2004]

Review Distribution of influenza vaccine to high-risk groups. [Epidemiol Rev. 2006]
Strategy for distribution of influenza vaccine to high-risk groups and children. [Am J Epidemiol. 2005]
Effectiveness of influenza vaccination of day care children in reducing influenza-related morbidity among households. [JAMA. 2000]
Population-wide benefits of routine vaccination of children against influenza. [Vaccine. 2005]

Review Mass vaccination for annual and pandemic influenza. [Curr Top Microbiol Immunol. 2006]
Severe acute respiratory syndrome (SARS): the pharmacist's role. [Pharmacotherapy. 2004]
Pandemic influenza planning in New York City. [J Urban Health. 2006]

A number of lessons have been learned from preparedness exercises and from previous epidemics. First, at the individual level, the long wait time required for the large number of persons that will need to be vaccinated in the shortest period poses a major challenge (Table 3).⁶⁵ Second, personnel dedicated to this effort are needed; identifying and locating HTR populations in this situation becomes more difficult if staff are diverted to other venues. Third, at the provider level, long wait times may necessitate the expansion of the provider pool to include additional nurses and pharmacists.^{63,66} And finally, reports have shown that maintaining adequate documentation under crisis conditions, especially for research purposes, may be challenging.^{63,67}

Challenges at the structural level are even more pronounced. The domestic supply of influenza vaccine for A (H5N1) strain of concern is limited; the current annual capacity in the U.S. could manufacture enough vaccine for only 15 million Americans, leaving the vast majority vulnerable to disease.⁶³ Preparedness drills have shown that special consideration should be given to first responders (e.g., health care workers, emergency medical volunteers). In preparedness exercises, providers and their families have requested that they be given prophylactic vaccination ahead of time to increase their ability to participate after an outbreak (Gebbie, K., Columbia University School of Nursing, personal communication). Other high-priority groups include those at risk for severe disease: elderly, children, those with chronic pulmonary disease, diabetes, and immunosuppressed individuals. Points of distribution should be determined in advance based on their ability to handle large numbers of people (Table 3).⁶³ These locations, which will most likely have to be flexible based on the exigencies of the situation and which, of necessity, have to favor access for the easy-to-reach masses, may be challenging for some HTR populations to access, especially those with limited mobility, distrust of government, or other constraints.

A number of strategies have been identified to improve immunization rates during a pandemic situation (Table 4), but most have not specifically addressed the needs of the HTR populations. In general, at the individual level, partnering with faith-based, or other trusted organizations in pandemic preparedness planning, and alerting target populations of the need to be immunized are key.^{67,68} Additionally, utilizing community-based sites or going door-to-door for mass immunization distribution efforts may maximize access to HTR populations, although these may not be realistic options if not planned in advance.⁶⁵ The provider base may need to be expanded to include additional nurses and pharmacists, and immunization protocols to be simplified to be as efficient as possible.

TABLE 4	
Strategies to improve immunization rates for the general and HTR populations during a pandemic situation ^a	
1.	Partnering with faith-based, or other trusted organizations in pandemic preparedness planning.
2.	Alerting target populations of the need to be immunized.
3.	Utilizing community-based sites or going door-to-door for mass immunization distribution efforts.
4.	Expanding the provider base to include additional nurses and pharmacists.
5.	Simplifying immunization protocols to be as efficient as possible.

At the structural level, the Advisory Committee on Immunization Practices (ACIP) and the National Vaccine Advisory Committee (NVAC) have developed guidelines for prioritizing groups to be immunized in the case of a pandemic, guidelines which will have to be communicated to those responsible for the actual immunization.⁶³ Educational materials targeted specifically to HTR populations should be developed in collaboration with community stakeholders and pilot tested in advance. Additionally, state or local distribution programs must

Pandemic influenza planning in New York City. [J Urban Health. 2006]

Seasonal and pandemic influenza: recommendations for preparedness in the United States. [J Infect Dis. 2006]

Review Mass vaccination for annual and pandemic influenza. [Curr Top Microbiol Immunol. 2006]

Review Pandemic influenza: are we ready? [Disaster Manag Response. 2005]

Pandemic influenza planning in New York City. [J Urban Health. 2006]

address the unique needs of underserved populations, which will evolve in response to situational factors.

Workers at immunization sites should be prepared to redirect sick people to health care facilities. Data collection forms must be designed so they can be completed quickly, although this may be at the expense of collecting detailed data used for research purposes. Developing scannable forms may also be warranted.⁶⁹⁻⁷¹

Preparedness exercises sponsored by the New York City Department of Health and Mental Hygiene (NYCDOHMH) found that just-in-time training for vaccinators can be delivered through hospitals or other points of distribution,⁷² but vaccinators need to be taught which groups need vaccination as well as how to vaccinate. Results of a drill in New York showed appropriate patient triage in the range of 90% or better after just-in-time training (Weisfuse, I., NYCDOHMH, personal communication). Interestingly, findings from another study showed that hospitals appeared to have more difficulty after rigid protocols and were less able to adapt quickly to a line-of-command system than other venues (Gebbie, K., Columbia University School of Nursing, personal communication). Because of limited resources and the special efforts needed to reach underserved populations, these populations may be less likely to receive vaccines in pandemic situations. Points of distribution familiar to community members should be favored. Sites may include community-based clinics, senior centers, hospitals, pharmacies, employee health services, migrant worksites, locations where day laborers congregate, homeless shelters, soup kitchens, churches, grocery stores, universities, public schools, and daycare centers.^{63,67,72}

DISCUSSION AND CONCLUSIONS

Other Sections ▼

Key strategies to respond to annual and pandemic influenza should include immunization of HTR populations. The HTR populations are important because of vulnerability⁷³ and transmissibility.⁷⁴ The elderly are the group at highest risk for morbidity and mortality, and rates of immunization are the lowest among racial and ethnic minorities;⁷⁵ demographic projections for the U.S. estimate that the proportion of those over 65 years old will rise faster in the racial and ethnic minorities, suggesting that overall vaccine coverage is unlikely to improve without substantial effort.⁷⁶ Some HTR populations such as undocumented immigrants work in poultry processing, food service, and home health care fields, providing persons potentially at early risk for acquisition of influenza and transmission into other populations.⁷⁷ Immunizing HTR populations is a humanitarian effort of great public health importance.

Expanding immunizations to include HTR populations will require efforts at each stage in program preparation. Early planning phases should include federal agencies and local health departments partnering with community-based organizations to prepare for and promote vaccination in nontraditional settings and at convenient times to HTR populations.^{41,78,79} The expansion of the health care provider base should include additional nurses and pharmacists and the adoption of standing order policies.^{39,80,81} To immunize HTR populations, community-based educational campaigns aimed at individuals and communities through trusted community members such as churches and civic associations should be given higher priority. Strategies in pandemic situations must include active involvement of community-based organizations in planning exercises, and adding HTR populations in statewide preparedness plans.

Review COPD: racial disparities in susceptibility, treatment, and outcomes. [Clin Chest Med. 2006]

Does fear of immigration authorities deter tuberculosis patients from seeking care? [West J Med. 1994]

Who are the elderly who never receive influenza immunization? [Prev Med. 2005]

Review Studying biobehavioral aspects of health disparities among older adult minorities. [J Urban Health. 2005]

The prevalence and correlates of influenza vaccination among a home care population. [Can J Public Health. 2000]

Immunization programs in non-traditional settings. [Can J Public Health. 2004]

Where adults reported receiving influenza vaccination in the United States. [Am J Infect Control. 2005]

Safety of influenza vaccinations administered in nontraditional settings. [Vaccine. 2006]

Achieving the national health objective for influenza immunization: success of an institution-wide vaccination. [Am J Infect Control. 1990]

See more articles cited in this paragraph

Nonfatal, unintentional medication exposures among young children--United States, 2001-2003. [Morbidity and Mortality Weekly Report. 2006]

The current federal recommendations for annual and pandemic vaccine^{3,63} do not prioritize the issue of HTR populations. This problem is an epidemiologic, clinical, and ethical issue. Traditional views of “hard-to-reach” populations should be revised so they are seen as “easy-to-miss”; problem solving to assure adequate coverage for this disenfranchised group is achievable.

Acknowledgments

The authors' contributions are as follows: David Vlahov conceived the project and led with the writing of the manuscript, Micaela H. Coady was the project director for the review and contributed to the writing, and Danielle C. Ompad and Sandro Galea contributed to the writing of the manuscript. We are grateful to Jeremiah A. Barondess, MD for reviewing this manuscript.

Researchers at the Center for Urban Epidemiologic Studies at The New York Academy of Medicine hosted a day-long meeting on optimizing strategies to vaccinate HTR populations in September 2006. Meeting participants made presentations and participated in discussion, but the sole responsibility for the content of this manuscript is that of the authors and does not represent the view of individual participants nor the official position of any of the institutions represented at the meeting. Participants were (in alphabetical order): Deborah Alfano (Merck); Nancy M. Bennett, MD, MS (University of Rochester Medical Center); Gus Birkhead, MD, MPH (New York State Department of Health); Elizabeth Blowers-Nyman (Merck); Nicholas Daniels, MD, MPH (University of California San Francisco); Kristine Gebbie, DrPH, RN (Columbia University); Bruce Gellin, MD, MPH (Health and Human Services); John Grabenstein, RPh, PhD (Merck); Neal Halsey, MD (Johns Hopkins); Patrick Kelley, MD, DrPH (Institute of Medicine); Sarah Landry, MA (GlaxoSmithKline); Arnold Monto, MD (University of Michigan); Stephanie G. Phillips, PhD (Project House); Anne Schuchat, MD (Centers for Disease Control and Prevention); Shelagh Weatherill, BScN, MA (Vancouver Coastal Health); Isaac Weisfuse, MD, MPH (New York City Department of Health and Mental Hygiene); Richard K. Zimmerman, MD, MPH (University of Pittsburgh), and Jane R. Zucker, MD, MSc (New York City Department of Health and Mental Hygiene).

This meeting was convened as part of Project VIVA (Venue-Intensive Vaccines for Adults), a multilevel community participatory intervention developed by members of the Harlem Community and Academic Partnership (HCAP) and the Center for Urban Epidemiologic Studies (CUES). The VIVA Intervention Working Group members are: Ann Boyer (Mt. Sinai Medical Center, Women's Information Network and Birdsong); Robert Brackbill (New York City Department of Health and Mental Hygiene); Brian Brown (Harm Reduction Educators); Jose Caraballo (Palladia, Inc.); Micaela Coady (CUES); Sandro Galea (CUES); Katherine Glidden (CUES); Karyn London (Mt. Sinai Medical Center); Gail Love (Women's Information Network); Pat Monahan (East Harlem Community Health Committee, Inc. and Little Sisters of the Assumption Family Health Services); Danielle Ompad (CUES); Erica Phillips (Weill Cornell Medical College, New York Presbyterian Hospital); Sarah Sisco (CUES); Sharon Stancliff (Harm Reduction Coalition); David Vlahov (CUES), and Linda Weiss (Office of Special Populations at the New York Academy of Medicine). This work was supported by a grant from the National Institute on Drug Abuse (DA017004) and the Merck Foundation.

References

Other Sections ▼

1. Thompson WW, Shay DK, Weintraub E et al. Mortality associated with influenza and respiratory syncytial virus in the United States. *JAMA*. 2003;289(2):179–186. [[PubMed](#)]
2. Fedson DS. Influenza prevention and control. Past practices and future prospects. *Am J Med*. 1987;82(6A):42–47. [[PubMed](#)]
3. Smith NM, Bresee JS, Shay DK, Uyeki TM, Cox NJ, Strikas RA. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep*. 2006;55(RR-10):1–42. [[PubMed](#)]
4. Simonsen L, Clarke MJ, Schonberger LB, Arden NH, Cox NJ, Fukuda K. Pandemic versus epidemic influenza mortality: a pattern of changing age distribution. *J Infect Dis*. 1998;178(1):53–60. [[PubMed](#)]
5. Centers for Disease Control and Prevention. National Health Interview Survey 2006; Accessed on December 1, 2006. Available at: <http://www.cdc.gov/nchs/nhis.htm>.
6. Ostbye T, Taylor DH, Lee AM, Greenberg G, van SL. Racial differences in influenza vaccination among older Americans 1996–2000: longitudinal analysis of the Health and Retirement Study (HRS) and the Asset and Health Dynamics Among the Oldest Old (AHEAD) survey. *BMC Public Health*. 2003;3(41):41. [[PubMed](#)]
7. Bryant WK, Ompad DC, Sisco S et al. Determinants of influenza vaccination in hard-to-reach urban populations. *Prev Med*. 2006;43(1):60–70. [[PubMed](#)]
8. Centers for Disease Control and Prevention. Influenza and pneumococcal vaccination coverage among persons aged > or =65 years and persons aged 18–64 years with diabetes or asthma—United States, 2003. *MMWR Morb Mortal Wkly Rep*. 2004;53(43):1007–1012. [[PubMed](#)]
9. Zimmerman RK, Middleton DB. Vaccines for persons at high risk due to medical conditions, occupation, environment, or lifestyle, 2005. *J Fam Pract*. 2005;54(1 Suppl):S27–S36. [[PubMed](#)]
10. Regidor E, Calle ME, Navarro P, Dominguez V. The size of educational differences in mortality from specific causes of death in men and women. *Eur J Epidemiol*. 2003;18(5):395–400. [[PubMed](#)]
11. World Health Organization. Global pandemic influenza action plan to increase vaccine supply. Accessed on: December 1, 2006. Available at: <http://www.who.int/vaccines-documents/DocsPDF06/863.pdf>; 2006.
12. Kieny MP, Costa A, Hombach J et al. A global pandemic influenza vaccine action plan. *Vaccine*. 2006;24(40–41):6367–6370 September 29. [[PubMed](#)]
13. Nichol KL, Treanor JJ. Vaccines for seasonal and pandemic influenza. *J Infect Dis*. 2006;194 (Suppl 2):S111–S118. [[PubMed](#)]
14. Booy R, Brown LE, Grohmann GS, Macintyre CR. Pandemic vaccines: promises and pitfalls. *Med J Aust*. 2006;185(10):S62–S65. [[PubMed](#)]
15. Centers for Disease Control and Prevention. Vaccine-preventable diseases: improving coverage in children, adolescents and adults. *MMWR Morb Mortal Wkly Rep*. 1999;48(RR-8):1–15.
16. Ompad DC, Galea S, Vlahov D. Distribution of influenza vaccine to high-risk groups. *Epidemiol Rev*. 2006;28:54–70. Epub 2006 May 17.:54–70. [[PubMed](#)]
17. Briss PA, Rodewald LE, Hinman AR et al. Reviews of evidence regarding interventions to improve vaccination coverage in children, adolescents, and adults. The Task Force on Community Preventive Services. *Am J Prev Med*. 2000;18(1 Suppl):97–140. [[PubMed](#)]
18. Passel JS. The size and the characteristics of the unauthorized migrant population in the U.S. Pew Hispanic Center; March 2006.
19. Holmberg SD. The estimated prevalence and incidence of HIV in 96 large US metropolitan areas. *Am J Public Health*. 1996;86(5):642–654. [[PubMed](#)]
20. Homeless Research Institute. Homelessness Counts. Accessed January 31, 2007. Available at: <http://www.endhomelessness.org/content/general/detail/1440>; 2007.
21. Figaro MK, Belue R. Prevalence of influenza vaccination in a high-risk population: impact of age and race. *J Ambul Care Manage*. 2005;28(1):24–29 January. [[PubMed](#)]
22. Collins KS, Hughes D, Doty M, Ives B, Edwards J, Tenney K. Diverse Communities, Common Concerns: Assessing Health Care Quality for Minority Americans. The Commonwealth Fund; March 2002.

23. Zimmerman RK, Santibanez TA, Janosky JE et al. What affects influenza vaccination rates among older patients? An analysis from inner-city, suburban, rural, and Veterans Affairs practices. *Am J Med.* 2003;114(1):31–38. [[PubMed](#)]
24. Nowalk MP, Zimmerman RK, Tabbarah M, Raymund M, Jewell IK. Determinants of adult vaccination at inner-city health centers: a descriptive study. *BMC Fam Pract.* 2006;7(2):2 January 10. [[PubMed](#)]
25. Burnett M, Genao I, Wong WF. Race, culture, and trust: why should I take a shot if I'm not sick? *Ethn Dis.* 2005;15(2 Suppl 3):S3. [[PubMed](#)]
26. Armstrong K, Berlin M, Schwartz JS, Probert K, Ubel PA. Barriers to influenza immunization in a low-income urban population. *Am J Prev Med.* 2001;20(1):21–25. [[PubMed](#)]
27. Berk ML, Schur CL. The effect of fear on access to care among undocumented Latino immigrants. *J Immigr Health.* 2001;3(3):151–156. [[PubMed](#)]
28. Zimmerman RK, Nowalk MP, Raymund M et al. Tailored interventions to increase influenza vaccination in neighborhood health centers serving the disadvantaged. *Am J Public Health.* 2003;93(10):1699–1705. [[PubMed](#)]
29. Daniels NA, Juarbe T, Rangel-Lugo M, Moreno-John G, Perez-Stable EJ. Focus group interviews on racial and ethnic attitudes regarding adult vaccinations. *J Natl Med Assoc.* 2004;96(11):1455–1461. [[PubMed](#)]
30. Grabenstein JD, Guess HA, Hartzema AG, Koch GG, Konrad TR. Attitudinal factors among adult prescription recipients associated with choice of where to be vaccinated. *J Clin Epidemiol.* 2002;55(3):279–284. [[PubMed](#)]
31. LaVela SL, Smith B, Weaver FM, Legro MW, Goldstein B, Nichol K. Attitudes and practices regarding influenza vaccination among healthcare workers providing services to individuals with spinal cord injuries and disorders. *Infect Control Hosp Epidemiol.* 2004;25(11):933–940. [[PubMed](#)]
32. Silverman M, Terry MA, Zimmerman RK, Nutini JF, Ricci EM. Tailoring interventions: understanding medical practice culture. *J Cross-Cult Gerontol.* 2004;19(2):47–76. [[PubMed](#)]
33. Lindley MC, Wortley PM, Winston CA, Bardenheier BH. The role of attitudes in understanding disparities in adult influenza vaccination. *Am J Prev Med.* 2006;31(4):281–285. [[PubMed](#)]
34. Nichol KL, Lofgren RP, Gapinski J. Influenza vaccination. Knowledge, attitudes, and behavior among high-risk outpatients. *Arch Intern Med.* 1992;152(1):106–110. [[PubMed](#)]
35. Hebert PL, Frick KD, Kane RL, McBean AM. The causes of racial and ethnic differences in influenza vaccination rates among elderly Medicare beneficiaries. *Health Serv Res.* 2005;40(2):517–537. [[PubMed](#)]
36. Winston CA, Wortley PM, Lees KA. Factors associated with vaccination of medicare beneficiaries in five U.S. communities: results from the racial and ethnic adult disparities in immunization initiative survey, 2003. *J Am Geriatr Soc.* 2006;54(2):303–310. [[PubMed](#)]
37. Takayanagi IJ, Cardoso MR, Costa SF, Araya ME, Machado CM. Attitudes of health care workers to influenza vaccination: why are they not vaccinated? *Am J Infect Control.* 2007;35(1):56–61. [[PubMed](#)]
38. Nichol KL. Ten-year durability and success of an organized program to increase influenza and pneumococcal vaccination rates among high-risk adults. *Am J Med.* 1998;105(5):385–392. [[PubMed](#)]
39. Nichol KL, Korn JE, Margolis KL, Poland GA, Petzel RA, Lofgren RP. Achieving the national health objective for influenza immunization: success of an institution-wide vaccination program. *Am J Med.* 1990;89(2):156–160. [[PubMed](#)]
40. Stancliff S, Salomon N, Perlman DC, Russell PC. Provision of influenza and pneumococcal vaccines to injection drug users at a syringe exchange. *J Subst Abuse Treat.* 2000;18(3):263–265. [[PubMed](#)]
41. Weatherill SA, Buxton JA, Daly PC. Immunization programs in non-traditional settings. *Can J Public Health.* 2004;95(2):133–137. [[PubMed](#)]
42. Findley SE, Irigoyen M, Sanchez M et al. Community-based strategies to reduce childhood immunization disparities. *Health Promot Pract.* 2006;7(3 Suppl):191S–200S. [[PubMed](#)]
43. Jernigan DH, Wright PA. Media advocacy: lessons from community experiences. *J Public Health Policy.* 1996;17(3):306–330. [[PubMed](#)]

44. Hanna JN, Young DM, Brookes DL, Dostie BG, Murphy DM. The initial coverage and impact of the pneumococcal and influenza vaccination program for at-risk indigenous adults in Far North Queensland. *Aust N Z J Public Health*. 2001;25(6):543–546. [[PubMed](#)]
45. Barker WH, Bennett NM, LaForce FM, Waltz EC, Weiner LB. "McFlu". The Monroe County, New York, Medicare vaccine demonstration. *Am J Prev Med*. 1999;16(3 Suppl):118–127. [[PubMed](#)]
46. Kicera TJ, Douglas M, Guerra FA. Best-practice models that work: the CDC's Racial and Ethnic Adult Disparities Immunization Initiative (READII) Programs. *Ethn Dis*. 2005;15(2 Suppl 3):S3. [[PubMed](#)]
47. Gaglani M, Riggs M, Kamenicky C, Glezen WP. A computerized reminder strategy is effective for annual influenza immunization of children with asthma or reactive airway disease. *Pediatr Infect Dis J*. 2001;20(12):1155–1160. [[PubMed](#)]
48. Kouides RW, Bennett NM, Lewis B, Cappuccio JD, Barker WH, LaForce FM. Performance-based physician reimbursement and influenza immunization rates in the elderly. The Primary-Care Physicians of Monroe County. *Am J Prev Med*. 1998;14(2):89–95. [[PubMed](#)]
49. Lawson F, Baker V, Au D, McElhaney JE. Standing orders for influenza vaccination increased vaccination rates in inpatient settings compared with community rates. *J Gerontol A Biol Sci Med Sci*. 2000;55(9):M522–M526. [[PubMed](#)]
50. Dexter PR, Perkins SM, Maharry KS, Jones K, McDonald CJ. Inpatient computer-based standing orders vs physician reminders to increase influenza and pneumococcal vaccination rates: a randomized trial. *JAMA*. 2004;292(19):2366–2371. [[PubMed](#)]
51. Steyer TE, Ragucci KR, Pearson WS, Mainous AG III. The role of pharmacists in the delivery of influenza vaccinations. *Vaccine*. 2004;22(8):1001–1006. [[PubMed](#)]
52. Gust ID, Hampson AW, Lavanchy D. Planning for the next pandemic of influenza. *Rev Med Virol*. 2001;11(1):59–70. [[PubMed](#)]
53. Ghendon Y. Influenza vaccines: a main problem in control of pandemics. *Eur J Epidemiol*. 1994;10(4):485–486. [[PubMed](#)]
54. Ulmer JB, Valley U, Rappuoli R. Vaccine manufacturing: challenges and solutions. *Nat Biotechnol*. 2006;24(11):1377–1383. [[PubMed](#)]
55. Tan L. Strengthening the supply of routinely recommended vaccines in the United States: a perspective from the American Medical Association. *Clin Infect Dis*. 2006;42(Suppl 3):S121–S124. [[PubMed](#)]
56. Appel A, Everhart R, Mehler PS, MacKenzie TD. Lack of ethnic disparities in adult immunization rates among underserved older patients in an urban public health system. *Med Care*. 2006;44(11):1054–1058. [[PubMed](#)]
57. Rimple D, Weiss SJ, Brett M, Ernst AA. An emergency department-based vaccination program: overcoming the barriers for adults at high risk for vaccine-preventable diseases. *Acad Emerg Med*. 2006;13(9):922–930. [[PubMed](#)]
58. Coady MH, Weiss L, Galea S, Ompad DC, Glidden K, Vlahov D. Rapid vaccine distribution in non-traditional settings: lessons learned from Project VIVA. *J Community Health Nurs*. 2007 (In press).
59. Longini IM Jr., Halloran ME. Strategy for distribution of influenza vaccine to high-risk groups and children. *Am J Epidemiol*. 2005;161(4):303–306. [[PubMed](#)]
60. Hurwitz ES, Haber M, Chang A et al. Effectiveness of influenza vaccination of day care children in reducing influenza-related morbidity among household contacts. *JAMA*. 2000;284(13):1677–1682. [[PubMed](#)]
61. Glezen WP. Herd protection against influenza. *J Clin Virol*. 2006;37(4):237–243. [[PubMed](#)]
62. Weycker D, Edelsberg J, Halloran ME et al. Population-wide benefits of routine vaccination of children against influenza. *Vaccine*. 2005;23(10):1284–1293. [[PubMed](#)]
63. US Department of Health and Human Services. HHS pandemic influenza plan. Accessed on December 1, 2006. Available at: <http://www.hhs.gov/pandemicflu/plan>; 2005.
64. U.S. Homeland Security Council. National Strategy for Pandemic Influenza. Accessed on November 15, 2006. Available at: <http://www.whitehouse.gov/homeland/nspi.pdf>; 2005.
65. Schwartz B, Wortley P. Mass vaccination for annual and pandemic influenza. *Curr Top Microbiol*

Immunol. 2006;304:131–152. [\[PubMed\]](#)

66. Chin TW, Chant C, Tanzini R, Wells J. Severe acute respiratory syndrome (SARS): the pharmacist's role. *Pharmacotherapy*. 2004;24(6):705–712. [\[PubMed\]](#)

67. Weisfuse IB, Berg D, Gasner R, Layton M, Misener M, Zucker JR. Pandemic influenza planning in New York City. *J Urban Health*. 2006;83(3):351–354. [\[PubMed\]](#)

68. Whitley RJ, Bartlett J, Hayden FG, Pavia AT, Tapper M, Monto AS. Seasonal and pandemic influenza: recommendations for preparedness in the United States. *J Infect Dis*. 2006;194(Suppl 2):S155–S161. [\[PubMed\]](#)

69. Cinti S. Pandemic influenza: are we ready? *Disaster Manag Response*. 2005;3(3):61–67. [\[PubMed\]](#)

70. Webby RJ, Webster RG. Are we ready for pandemic influenza? *Science*. 2003;302(5650):1519–1522. [\[PubMed\]](#)

71. Health Systems Research, Inc. Providing mass medical care with scarce resources: a community planning guide. Accessed on January 31, 2007. Available at: <http://www.ahrq.gov/research/mce/mceguide.pdf>; 2006.

72. New York City Department of Health and Mental Hygiene. NYCDOHMH Pandemic Influenza Preparedness and Response Plan. Accessed on January 31, 2007. Available at: <http://www.nyc.gov/html/doh/downloads/pdf/cd/cd-panflu-plan.pdf>; 2006.

73. Dransfield MT, Bailey WC. COPD: racial disparities in susceptibility, treatment, and outcomes. *Clin Chest Med*. 2006;27(3):463–471. [\[PubMed\]](#)

74. Asch S, Leake B, Gelberg L. Does fear of immigration authorities deter tuberculosis patients from seeking care? *West J Med*. 1994;161(4):373–376. [\[PubMed\]](#)

75. Sambamoorthi U, Findley PA. Who are the elderly who never receive influenza immunization? *Prev Med*. 2005;40(4):469–478. [\[PubMed\]](#)

76. Whitfield KE. Studying biobehavioral aspects of health disparities among older adult minorities. *J Urban Health*. 2005;82(2 Suppl 3):iii103–iii110. [\[PubMed\]](#)

77. Russell ML, Maxwell CJ. The prevalence and correlates of influenza vaccination among a home care population. *Can J Public Health*. 2000;91(6):441–444. [\[PubMed\]](#)

78. Singleton JA, Poel AJ, Lu PJ, Nichol KL, Iwane MK. Where adults reported receiving influenza vaccination in the United States. *Am J Infect Control*. 2005;33(10):563–570. [\[PubMed\]](#)

79. D'Heilly SJ, Blade MA, Nichol KL. Safety of influenza vaccinations administered in nontraditional settings. *Vaccine*. 2006;24(18):4024–4027. [\[PubMed\]](#)

80. Larson E. Racial and ethnic disparities in immunizations: recommendations for clinicians. *Fam Med*. 2003;35(9):655–660. [\[PubMed\]](#)

81. Grabenstein JD, Guess HA, Hartzema AG, Koch GG, Konrad TR. Effect of vaccination by community pharmacists among adult prescription recipients. *Med Care*. 2001;39(4):340–348. [\[PubMed\]](#)

Articles from *Journal of Urban Health : Bulletin of the New York Academy of Medicine* are provided here courtesy of
New York Academy of Medicine

[Write to PMC](#) | [PMC Home](#) | [PubMed](#)
[NCBI](#) | [U.S. National Library of Medicine](#)
[NIH](#) | [Department of Health and Human Services](#)
[Privacy Policy](#) | [Disclaimer](#) | [Freedom of Information Act](#)