

# Pandemic Influenza Preparedness and Response Among Public-Housing Residents, Single-Parent Families, and Low-Income Populations

During the early stages of an influenza pandemic, a pandemic vaccine likely will not be available. Therefore, interventions to mitigate pandemic influenza transmission in communities will be an important component of the response to a pandemic. Public-housing residents, single-parent families, and low-income populations may have difficulty complying with community-wide interventions.

To enable compliance with community interventions, stakeholders recommended the following: (1) community mobilization and partnerships, (2) culturally specific emergency communications planning, (3) culturally specific education and training programs, (4) evidence-based measurement and evaluation efforts, (5) strategic planning policies, (6) inclusion of community members as partners, and (7) policy and program changes to minimize morbidity and mortality. (*Am J Public Health*. 2009;99:S287–S293. doi:10.2105/AJPH.2009.165134)

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**LARGE CONCENTRATIONS OF** public-housing residents, single-parent families, and poor families living in economically depressed neighborhoods continue to experience poor health status in the United States.<sup>1</sup> Pre-existing social and health conditions will present major obstacles for stakeholders to effectively prepare for and respond to pandemic influenza in such communities.<sup>2</sup>

Few pandemic influenza plans, recommendations, and guidelines have focused on the needs, barriers, concerns, and assets of public-housing residents, single-parent families, and poor populations.<sup>3–20</sup> Data suggest that poverty, in addition to exposing individuals to more acute and chronic stressors, weakens an individual's ability to cope with new problems and difficulties.<sup>21</sup>

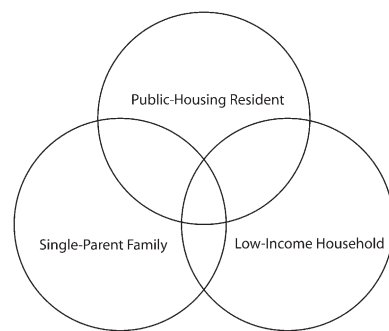
In this article we (1) highlight public health challenges that might differentially affect public-housing residents, single-parent families, and low-income populations; (2) provide specific recommendations for protecting these population groups; and (3) determine measures that public health communities should take to support these populations for the cascading second- and third-order consequences of recommended interventions, such as isolation and treatment, voluntary home quarantine, social distancing, and antiviral medications and vaccines.

## POPULATION CHARACTERISTICS

On September 30, 2007, in the United States there were 3.4 million housing units that received operating funds from the US Department of Housing and Urban Development, and 6.8 million people living in those units.<sup>22</sup> Nearly 1.5 million US residents reside in public housing (affordable housing for low-income people, subsidized by the federal government).<sup>23</sup> Most public housing units usually are located in high-poverty neighborhoods with high unemployment rates.<sup>24</sup> In 2006, there were 10.4 million households headed by a single female parent and 2.4 million headed by a male single parent in the United States.<sup>25</sup> 3.9 million of these single-parent households lived below

the federal poverty level.<sup>26</sup> The populations of public housing residents, single-parent families, and low-income households overlap (Figure 1).

In 2000, US census data revealed that the southeastern United States has a high concentration of counties with high percentages of single-parent-headed households.<sup>27</sup> Further, high percentages were observed in counties containing and surrounding major US cities. This observation was also noted in the percentages of persons living below the federal poverty level. In addition to high poverty in the southeast, high concentrations were also noted in Appalachia (Pennsylvania, West Virginia, Kentucky, Tennessee, and North Carolina)<sup>24</sup> and in states along the southern border (Texas, New Mexico, and Arizona).<sup>24</sup>



**FIGURE 1—Overlapping populations of low-income households, single-parent families, and public-housing residents.**

**CONCEPTUAL FRAMEWORK**

We developed a conceptual framework (Figure 2) to link the contributing and causal factors for preparing these selected populations in the event of an influenza pandemic. This framework was derived from a literature review of electronic databases and convening a meeting of stakeholders to obtain effective ways for stimulating community change.

**FACTORS INFLUENCING VULNERABILITY TO PANDEMIC INFLUENZA**

Pandemic influenza could cause high levels of illness, death, social disruption and economic loss. Death rates from pandemic influenza may be determined by the number of people who become infected, the virulence of the virus, the underlying characteristics and vulnerability of affected people, and the availability and effective-

ness of preventive measures.<sup>28</sup> Public-housing residents, single-parent families, and low-income populations are likely to be more susceptible to complications from pandemic influenza because of some combination of the following factors: (1) insufficient funds to stockpile medications and supplies, (2) lack of adequate insurance that delays receipt of effective health care, (3) inability to obtain high-quality health care with publicly funded health insurance, (4) unstable employment and inefficient job benefits along with weak social support networks, and (5) lack of awareness of effective personal health interventions or inability to apply them because of competing everyday survival needs.<sup>3–20</sup> These indicators of vulnerability are in turn influenced by underlying factors such as (1) poverty,<sup>29–31</sup> (2) inequities in health status,<sup>32,33</sup> (3) poor access and quality of care,<sup>34–39</sup> (4) limited supply of pandemic vaccine,<sup>17,40</sup> (5) low immunization rates,<sup>41,42</sup>

and (6) environmental factors.<sup>30,43</sup> These social and personal factors are confounded by system, policy, and institutional factors that cannot be readily isolated or critically examined in a short essay focused on practical advice for lay persons.

**Influence of Poverty on Pandemic Influenza**

These populations are more susceptible to complications from pandemic influenza because of poverty. Women, especially single mothers, bear a disproportionate burden of poverty.<sup>29,30</sup> Many low-income people are unable to meet their basic needs of adequate food, water, clothing, shelter, and health care.<sup>30</sup>

During an influenza pandemic, persons with low incomes may be reluctant to stay home from work because of fear of losing income, fear of being unemployed, and lack of flexibility in their jobs to work from home. These population groups may not receive compensated sick leave, may be

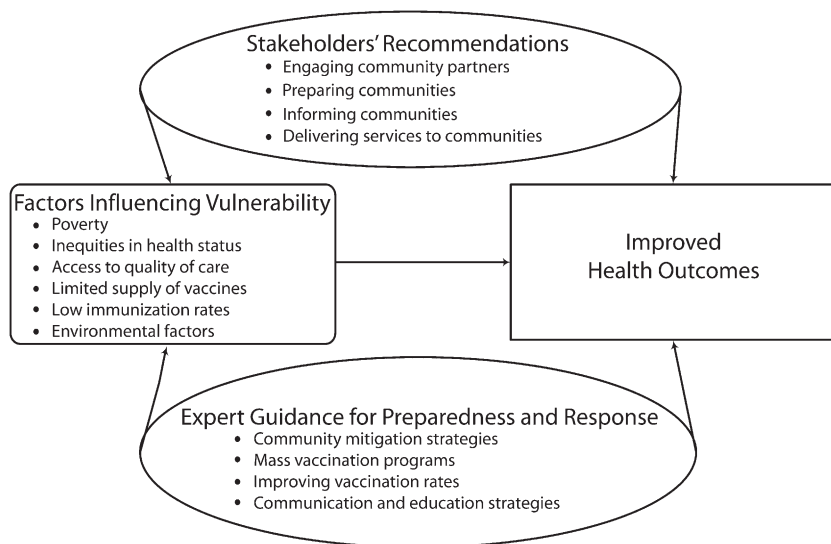
employed in service-related industries in which telecommuting is not an option, or may work in industries with increased numbers of public contacts (e.g., fast-food service). These types of conditions may cause parents to keep their children in communal (unlicensed, unorganized, or informal) child care settings where risk exposures are relatively high.<sup>2</sup>

**Inequities in Health Status**

High prevalence of and excess morbidity from diabetes; chronic diseases of the lung, heart, and kidneys; and acute respiratory infections, including influenza, are among the manifestations of poor health status in these vulnerable populations.<sup>32</sup> Poverty and near poverty play an increasingly important role in determining health status.<sup>33</sup>

**Access and Quality of Care**

The government’s response to Hurricane Katrina showed gaps in the nation’s ability to provide services for public-housing residents, single-parent families, and low-income populations.<sup>34</sup> Public-housing residents are slightly more likely than other US citizens to be without health insurance or report financial barriers to medical care.<sup>35</sup> According to the National Center for Health Statistics (NCHS), unmarried women aged 25–64 years are approximately 60% more likely than married women to lack health insurance coverage.<sup>36,37</sup> Providing health care for the uninsured or underinsured during a pandemic may be a challenge for hospitals and physicians because more than 46 million persons living in the United States do not have health insurance<sup>38</sup> and another 25 million are considered underinsured.<sup>39</sup> In addition, low-income persons are more likely to



**FIGURE 2—Preparing public-housing residents, single-parent families, and low-income households for pandemic influenza.**

obtain regular medical care in emergency rooms, health departments, and community health centers. These locations are becoming increasingly crowded. Patients waiting for care in these settings are likely to have greater exposure to influenza viruses and other pathogens.<sup>31</sup>

### Limited Supply of Pandemic Vaccine

In the event of a pandemic influenza outbreak, a pandemic vaccine may not be available or may be in limited supply because the antigenic details of the evolved pandemic strain of the virus may not be known before the outbreak occurs. This factor may lead to an inability to prepare large numbers of doses of highly effective vaccine preceding an influenza pandemic outbreak.<sup>40</sup> Vaccines will likely be administered in accordance with a prioritization scheme by which groups to be vaccinated first are already identified, including health care workers; homeland security workers, police, firefighters and other first responders; government leaders; and specific population subgroups (i.e., pregnant women, infants, and toddlers).<sup>17</sup>

### Low Immunization Rates

Influenza is responsible for more than 36 000 deaths per year. Some experts believe there will be a relationship between the low rates of seasonal influenza vaccination among low-income populations and the distribution and acceptance of an influenza pandemic vaccine among these groups.<sup>41</sup> Evidence exists of effective measures that have been used to improve rates of seasonal influenza immunization among low-income groups, but there is much to be done to improve those rates.<sup>42</sup>

In 2003, the proportion of persons aged 18–64 years and aged 65 years and older who reported receiving influenza vaccinations during the preceding 12 months fell short of the 2010 Healthy People objectives of 60% and 90%<sup>43</sup>, respectively. Characteristics associated with lower levels of vaccination coverage were race, age, and income below the federal poverty level. For persons aged 65 years and older, the vaccination rate for those below the poverty level among White, non-Hispanic, seniors was 59.5% ± 6.6, which was higher than that for Black, non-Hispanic, seniors (48.7% ± 9.7) and significantly higher than that for Hispanic seniors (38.5% ± 9.7).<sup>42</sup>

### ENVIRONMENTAL FACTORS INFLUENCING PANDEMIC INFLUENZA

Public-housing residents are more likely than the community at large to be poor, and public housing is associated with poorer health. Substandard housing is a major public health issue associated with health conditions such as respiratory infections, asthma, lead poisoning, injuries, and mental health.<sup>44</sup> Many residents of these populations face burdens of unsafe drinking water, absence of hot water for washing, ineffective waste disposal, housing infested by disease vectors (insects, mice, rats), inadequate food storage, overcrowding (from urbanization and landfill waste),<sup>30</sup> and inadequate ventilation, which could cause serious implications during an influenza pandemic.<sup>44</sup>

The results of a meta-regression performed using 4 nationally represented surveys determined that worsening housing instability and economic standing were

associated with poorer health care access: being uninsured (5.4% per unit increase; 95% confidence interval [CI]=1.7%, 9.2%;  $P = .011$ ), postponing needed care (3.3%; 95% CI=1.9%, 4.7%;  $P = .001$ ), postponing medications (6.1%; 95% CI=1.5%, 10.6%;  $P = .035$ ), and having higher hospitalization rates, which is one measure of use of acute health care (2.9%; 95% CI=1.2%, 4.6%;  $P = .008$ ).<sup>45</sup>

### SOLUTIONS FOR PANDEMIC INFLUENZA PREPAREDNESS AND RESPONSE

With limited vaccine and a tiered vaccine distribution plan, public health response activities for these targeted populations during a pandemic will rely on using nonpharmaceutical interventions and influenza antiviral medications, and these interventions will likely include both voluntary and imposed changes in social patterns. Community mitigation strategies include respiratory hygiene and cough etiquette, hand hygiene, isolation and treatment, voluntary home quarantine, school dismissal, and social distancing in the community and workplace.<sup>40</sup> Both public health literature<sup>3–20</sup> and stakeholders suggest that medical countermeasures and community mitigation strategies will be the most commonly used public health measures for protecting public-housing residents, single-parent families, and low-income populations in the event of an influenza pandemic.

### Mass Vaccination Programs

Mass vaccination programs and vaccination intervention strategies mentioned in the literature may prove to be effective methods for

improving vaccination rates among these populations in the event of an influenza pandemic. Federal, state, and local governments are proposing to use mass dispensing and vaccination clinics to swiftly distribute medication during an influenza pandemic. Many of the challenges of delivering medicines on a large scale during an emergency involve the receipt, breakdown, and distribution of the Strategic National Stockpile.<sup>46</sup> Two key considerations in planning for mass vaccination clinics are (1) the capacity of each clinic, measured by the number of patients served per hour and (2) the time, measured in minutes, spent by patients in the clinic.<sup>47</sup> Outreach and targeted communication efforts, as well as community partnerships, may be crucial in informing low-income communities about the location and distribution of pandemic vaccinations and medications.

Even though the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is not a mass vaccination program, strategies to promote immunization among clients in these programs have been effective in improving immunization coverage for low-income preschool children.<sup>48–50</sup> Furthermore, WIC sites in the community could serve as mass vaccination clinics. WIC is the largest point of access to health-related services for low-income preschool children, a population known to have low immunization coverage.<sup>48</sup>

### Improving Vaccination Rates

Several studies have identified interventions that were successful in improving vaccination rates among low-income populations. One study in east Harlem and the Bronx used intervention strategies that included disseminating

information through mailings, education, and targeted advertising; presenting at meetings; and providing street-based and door-to-door vaccination during 2 influenza vaccine seasons. Results from the study show that communities and groups were more interested in receiving the influenza vaccine after the interventions occurred (OR=2.69; CI=2.17, 3.33;  $P < 0.01$ ).<sup>51</sup> Also, findings from the 2003 National Health Interview Survey indicated that among Hispanics, having Spanish-speaking health care providers and culturally specific, linguistically appropriate communication materials is associated with an increase in influenza vaccination coverage and a better response to communication materials about prevention messages and guidelines.<sup>42</sup>

### Communicating Effectively With Targeted Populations

Prepandemic, pandemic, and postpandemic communications require special attention to ensure that public-housing residents, single-parent families, and low-income populations comply with community mitigation recommendations. Communicating effectively with the intended populations requires understanding the cultural context, social environment, and individual cognitions of these groups.<sup>52,53</sup> Communication strategies should be designed to reflect the cultural backgrounds of these communities.<sup>37</sup> Principles that can guide interactions and the development of messages for the targeted populations include the following: (1) build trust among individuals in the community, using gatekeepers, social networks, and lay communication leaders; (2) ensure that messages reach the intended recipient; (3) establish and deliver culturally competent

and sensitive messages; (4) deliver personalized messages; and (5) use interpreters when needed. Because there are cultural differences among these groups, it is imperative that the various styles of communication among these targeted populations are understood. Social marketing and communication theories that help to explain and prepare these communities in the event of a pandemic influenza are described by Vaughn and Tinker<sup>54</sup> in another paper in this issue.

### STAKEHOLDER STRATEGIES AND RECOMMENDATIONS

At a meeting held at the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, during May 1–2, 2008, “Pandemic Influenza Preparedness and Response in Selected Vulnerable Populations,” 26 stakeholders were invited to promote community participation, support, and capacity building for organizing recommendations to protect certain populations—public-housing residents, single-parent families and low-income populations, their families, service providers, and other stakeholders—from the adverse health impact of an influenza pandemic. These external partners represented federal, state, and local departments of Housing and Urban Development; state and local agencies; community-based organizations; faith-based organizations; college officials and instructors; and community members that serve low-income populations.

### Preparing the Community for Pandemic Influenza

Participants provided an overview of their community’s perceptions on health and crises

situations; the importance of cultural values; patterns of using health services; and community mitigation risks. Even though the federal, state, and local governments have been engaged in extensive pandemic influenza preparedness efforts, many of the meeting participants were unaware of a possible pandemic influenza outbreak. Participants were concerned about how knowledgeable and aware public-housing residents, single-parent families, and low-income populations were regarding a potential pandemic influenza and their involvement in preparedness activities. During the meeting, participants suggested that a community risk assessment be conducted using participatory action research to (1) place community members in the lead role to conduct the assessment; (2) determine perceptions of needs, risks, and values in the communities; (3) determine strengths and weaknesses of the communities; and (4) obtain listings of resources in the community for developing effective strategies and recommendations for protecting these populations in the event of a pandemic influenza.

Participants concluded that communications and educational strategies are integral public health components for preparing these communities in the event of an influenza pandemic, acknowledging the distinctions in lifestyles, beliefs, behaviors, and cultures of these groups. The design (including practical, scientific, and ethical issues), planning, implementation, and evaluation of educational and communication strategies should include community organizations, community participants, and gatekeepers in the community to provide individual and community change.

### Recommendations for Pandemic Influenza Preparedness and Response

External partners considered the existing data on the impact of influenza, effectiveness of different measures to lessen the burden of influenza, and barriers and strategies to implement measures to decrease the burden of influenza among communities. The following recommendations were suggested to help public-housing residents, single-parent families, and low-income populations comply with community-mitigation measures in the prepandemic and pandemic stages of an influenza pandemic (Table 1).

*Mobilization, partnerships, and networks.* Establish community mobilization, partnerships, and networks with faith-based organizations, community-based organizations, neighborhood planning units, and key informants to help educate the community; provide mobile clinics, distribution centers, culturally and linguistically appropriate education information; and deliver food, medication, goods, and services.

*Risk-communications plans.* Establish a multifaceted, emergency risk-communications plan that is culturally specific and has relevant education messages.

*Appropriate education and training programs.* Offer culturally specific and linguistically appropriate education and training programs for adults and children on signs and symptoms of pandemic influenza; how to prepare for school closures, respond to public gatherings, and use good hygiene; and offer resources to help meet the needs of these target populations that use WIC and other programs.

*Evidence-based measurement and evaluation system.* Establish an evidence-based measurement and

**TABLE 1—Suggestions for Effective Pandemic Influenza Containment and Community Mitigation Strategies for Public-Housing Residents, Single-Parent Families, and Low-Income Populations**

Recommendations	Needs	Barriers	Solutions
To prepare for recommendations about the use of vaccines (prepandemic, pandemic, and antivirals)	Community Mobilization	Lack of awareness, education, information	Engage and educate
	Culturally and linguistically appropriate education information	Limited supply of vaccine and antivirals	Develop culturally specific communication methods
	Easy access to familiar and trusted distribution centers	Language barriers	Provide financial incentives
	Enough vaccine for the community Community involvement in an effective distribution plan	Transportation and financial needs	Establish partnerships
To prepare and respond to recommendations about hygiene	Personal items necessary for staying at home	Not engaging stakeholders early	Culturally competent communication methods
	Resources and manpower to provide education about pandemic influenza	Lack of knowledge or understanding issues	Engage faith-based organizations, CBOs, and neighborhood planning units
	Effective communication methods Early engagement of the community	Limited resources Mixed or competing messages	Identify community liaisons
To prepare and respond to recommendations about school closures	Clear policy on school closures	No alternatives for child care	Defined school policies
	Health education and event preparedness	Increased financial burden	Voucher, waived fees for child care
	Trained staff	Lack of information	Community engagement
	Alternate daycare and after-school care solutions	Reluctance to accept services	Stockpile necessities using food banks, churches, community resources
To prepare and respond to recommendations about workplace policy during an influenza pandemic	Workplace pandemic plan	Lack of social support	Social and psychological support systems
	Means to offset personnel loss and absences	Fear of loss of jobs or profits	State and Federal mandates for assistance
	Employer and employee educational support	Unclear expectations	Alternative compensation packages
	Federal legislation on workplace closure and policies	Lack of adequate communications	Government freeze on prices, wages, and so on
	Education for employers and employees	Political influence	Flexibility (work from home)
To prepare and respond to recommendations about avoiding public gatherings	Social interaction	Resistance to policies for fear of job loss	Community involvement in workplace plan
	Purchase of goods and services	Difficulty enforcing isolation	Education and training
	Policies that are evidence based and explanatory	Varying definitions of public gatherings	Home-structured activities and programs
	Education regarding the definition of public gatherings and need for postponement or cancellation of events	Economic challenges	Delivery of goods and services
To prepare and respond to recommendations about pandemic status, affected communities, risk, and recommended action	Stay-at-home alternatives	Inability to communicate with others	Culturally competent messages
	Right message, right time, right people	Inability to acquire personal needs	Mobile clinics and distribution centers
	Action-based planning	Misinformation	Keep it simple
	Education and buy-in	Apathy toward messages	Culturally sensitive and specific communications
	Honesty and transparency	Messages not targeting the audience	Action-based educational messages
To identify signs and symptoms of pandemic influenza	Resources	Messenger should know community	Use of existing mechanisms
	Knowledge, training, education	Messages too wordy	
	Simplistic, culturally relevant messages	Lack of community coordination	Education and training
		Limited resources	Checklist for home
	Community involvement	Lack of realistic expectations for identification and prevention	Available personal protective equipment
	Spiritual/religious restrictions/beliefs	Hotline case management	
	Lack of trust and fear of being ostracized	Community resources	

evaluation system guided by federal, state, and local governments to assess the progress, level of preparedness, and effectiveness

of intervention strategies targeting low-income populations. *Planning policies.* Establish strategic planning policies, in

partnership with faith-based organizations, community-based organizations, neighborhood planning units, and other

partners for social distancing, containment, and the distribution of antiviral medications and vaccine.

**Community partners.** Ensure community members are partners—sooner rather than later—in the strategic planning process.

**Advocacy.** Advocate for policy and program changes at the federal, state, and local levels to minimize morbidity and mortality among low-income populations, such as policies for school closures, compensation packages, and state/federal mandates for assistance.

### Stakeholder Suggestions

Stakeholders also suggested the following actions for public health practitioners, health care providers, and emergency managers to enhance the community's compliance with mitigation interventions:

- Use mobile units to deliver health care services;
- Provide transportation to health care facilities;
- Distribute and ensure access to vaccine and antiviral medications;
- Provide culturally and linguistically appropriate educational information, materials, and messages about pandemic influenza; and
- Provide trained staff to handle inquiries and problems about school closings, workplace policies, public gatherings, alternatives for childcare, social support, and distribution plans for vaccine, antiviral, food, and other supplies.

These suggestions will enable governments, organizations, and associations to reach public-housing residents, single-parent families, and low-income populations with the appropriate information, adequate training, and awareness of disaster preparedness. Governments and community groups will benefit from sharing ideas on how best to collaborate to reach these groups

and build trust among their communities.<sup>54</sup> In addition, research is needed to prevent or minimize racial and ethnic disparities in vaccine distribution and acceptance, respond to mitigation strategies, and address factors that influence influenza-related diseases.<sup>2</sup>

### CONCLUSIONS

Public health strategies for mitigating pandemic influenza among public-housing residents, single-parent families, and low-income populations are crucial for protecting these populations. Early diagnosis and timing of community mitigation strategies during a pandemic is critical for public safety, health, and treatment. Low-income populations often delay treatment and care because of issues with access and financial constraints, and being poor is one of the characteristics that has often been associated with lower influenza vaccination coverage. Planning and coordination efforts during an influenza pandemic require collaboration at all levels (federal, state, and local governments) and involves cooperation of leaders from the public and private sectors. National and homeland security, health care providers, community support groups, and planners of critical infrastructure should include the needs of vulnerable populations in planning activities for the potential worldwide threat of an influenza pandemic. Because of the uncertainty of the capacity of the federal, state, and local governments, there may be challenges in moving these recommendations forward to ascertain actions. ■

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K. Bouye was responsible for formulating the paper, conducting the literature review, writing and revising each draft document, and reconciling contributions to the final draft from co-authors and reviewers. B. I. Truman helped conceptualize and organize the article, reviewed the drafts, and provided important insights. S. Hutchins and C. Brown contributed to the literature review, read the drafts, and provided important insight. R. Richard contributed to the literature review and provided important insight. J. A. Guillory and J. Rashid read the drafts and provided important insights.

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