FACILITATING ACCESS TO ANTIVIRAL MEDICATIONS AND INFORMATION DURING AN INFLUENZA PANDEMIC: ENGAGING WITH THE PUBLIC ON POSSIBLE NEW STRATEGIES

Barbara A. Fain, Lisa M. Koonin, Michael A. Stoto, Umair A. Shah, Susan R. Cooper,
Rachael N. Piltch-Loeb, and Arthur L. Kellermann

Antiviral medications can decrease the severity and duration of influenza, but they are most effective if started within 48 hours of the onset of symptoms. In a severe influenza pandemic, normal channels of obtaining prescriptions and medications could become overwhelmed. To assess public perception of the acceptability and feasibility of alternative strategies for prescribing, distributing, and dispensing antivirals and disseminating information about influenza and its treatment, the Institute of Medicine, with technical assistance from the Centers for Disease Control and Prevention (CDC), convened public engagement events in 3 demographically and geographically diverse communities: Fort Benton, MT; Chattanooga, TN; and Los Angeles, CA. Participants were introduced to the issues associated with pandemic influenza and the challenges of ensuring timely public access to information and medications. They then discussed the advantages and disadvantages of 5 alternative strategies currently being considered by the CDC and its partners. Participants at all 3 venues expressed high levels of acceptance for each of the proposed strategies and contributed useful ideas to support their implementation. This article discusses the key findings from these sessions.

DURING AN INFLUENZA PANDEMIC, approximately 30% of the population can become ill over a 12- to 18-month period.¹ To reduce morbidity and mortality during a severe pandemic, public health officials will need efficient methods to distribute prescription antiviral medication (antivirals) to large numbers of ill people. Because influenza

pandemics typically trigger multiple waves of illness, this effort will need to be sustained over an extended period of time. And because antivirals are more effective if taken within 48 hours of symptom onset, distribution must occur quickly. This may be challenging to accomplish through conventional channels if the healthcare system is

Barbara A. Fain, JD, MPP, is Executive Director, Betsy Lehman Center for Patient Safety and Medical Error Reduction, and Senior Adjunct Lecturer, Department of Public Health and Community Medicine, Tufts University School of Medicine, Boston, Massachusetts. Lisa M. Koonin, DrPH, is Senior Advisor, Influenza Coordination Unit/Office of Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia. Michael A. Stoto, PhD, is Professor, and Rachael N. Piltch-Loeb is Research Assistant, both in the Department of Health Systems Administration, Georgetown University, Washington, DC. Umair A. Shah, MD, MPH, is Executive Director, Harris County Public Health and Environmental Services, Houston, Texas. Susan R. Cooper, MSN, RN, is Senior Vice President for Ambulatory Services and Chief Integration Officer, Regional One Health, Memphis, Tennessee. Arthur L. Kellermann, MD, MPH, is Professor and Dean, F. Edward Hébert School of Medicine, Uniformed Services University of the Health Sciences, Bethesda, Maryland. The findings and conclusions in this report are those of the authors and do not necessarily represent the official positions of the Institute of Medicine of the National Academies, the National Research Council, or the Centers for Disease Control and Prevention.

overwhelmed by sick and worried people. A successful response to such a large-scale demand for antivirals requires careful advanced planning, including the development of publicly acceptable alternative strategies both for prescribing and dispensing antivirals and for disseminating information about influenza and its treatment.²⁻⁴

Prior to the 2009 H1N1 influenza pandemic, state and local public health authorities developed preparedness plans to facilitate the rapid dispensing of antiviral medications.⁵ Nevertheless, health departments in several states reportedly lacked sufficient resources to efficiently distribute and dispense antivirals in 2009 for what ultimately was a mild to moderate pandemic.⁶ To improve response efforts for future pandemics, the Centers for Disease Control and Prevention (CDC) and its partners are exploring new prescribing, distribution, and dispensing strategies to ensure that ill people with influenza receive antiviral medications and information in a timely manner. Options under consideration include:

- **Nurse Triage Lines (NTLs)**—Telephone hotlines that people with influenzalike illness could call for advice about when and where to seek care, to find out whether antiviral medications are indicated, and, possibly, to receive a prescription that would be directly transmitted to the caller's local pharmacy for dispensing. These hotlines would be staffed by supervised nurses who would follow a specific protocol.* Nurse triage lines might be built onto an existing hotline infrastructure (eg, 2-1-1 call lines and poison control centers) and could be linked to medical hotlines currently operated by health plans, hospitals, and public health agencies.⁷
- **Antiviral Pick-Up and Delivery by Community Contacts**—An array of strategies could be adopted to encourage family members, friends, or neighbors to pick up antiviral medications on behalf of people with influenzalike illness. In alignment with likely CDC pandemic recommendations, this strategy allows sick people to stay home and avoid contact with others.⁸ Coordinated programs might be set up through local community and faith-based organizations whose staff or volunteers could provide this service for those who have no one to pick up their medications.
- **Pharmacist Prescribing under Collaborative Practice Agreements**—A person sick with influenzalike symptoms could visit a pharmacist who has agreed to follow an approved protocol set forth in a signed "Collaborative Practice Agreement" (CPA) with a sponsoring physician. Most states already provide regulatory authority for delivery of limited patient care services through CPAs.⁹

*Since the conduct of this study, CDC has expanded this model to include telephone triage conducted by nurses and other medical professionals.

Two strategies to enhance communication of information about influenza diagnosis and treatment are also under consideration:

- **A Web-Based Tool**—Using age-specific algorithms,^{10,11} public health agencies could provide internet users with a way to determine if their symptoms are consistent with influenza and to assess their level of risk for developing serious complications of the disease. Those who meet prespecified criteria could be advised to contact a nurse advice line for specific guidance on when and where to seek care, including information about antiviral medications.
- **Text-Messaging Tool**—A voluntary opt-in system could be used to send automated text messages at regular intervals to people who have been prescribed antivirals. Messages would inform people about how to take the antivirals, potential side effects, and when and where to seek care if their condition worsens or if they experience severe side effects. Automated messages also could be sent at timed intervals to remind people to take their medicine.

All of these strategies are being actively explored by CDC and its partners for their potential utility during future pandemics. Recognizing that the general public's perception of these possible strategies is of utmost importance, the Institute of Medicine's Forum on Medical and Public Health Preparedness for Catastrophic Events (IOM), with technical assistance from CDC, organized and convened a series of public engagement activities ("Community Conversations") to explore the public's perception of the safety, feasibility, and acceptability of potential alternative strategies for dispensing antiviral medications and providing information to the public during a future severe influenza pandemic.² In this article we analyze the results from the sessions that took place in February and March 2012 in Fort Benton, MT; Chattanooga, TN; and Los Angeles, CA.

METHODS

Objectives

The community conversations were designed to engage a geographically and demographically diverse cross-section of the general public—including typically medically underserved and disengaged populations—in deliberations about the 5 strategies under active consideration by CDC and its partners to facilitate access to antiviral medications and information during future influenza pandemics. Our inquiry focused on the general acceptability of each of these strategies under 2 different scenarios: when the supply of antivirals is adequate and when antivirals are in short supply—a distinct possibility during a severe pandemic.¹² Ethical considerations related to these strategies were

touched on but not fully discussed given time constraints and because public perspectives on the allocation of scarce medical resources during pandemics have been the subject of previous investigations.¹³ These sessions were not intended to produce consensus. Rather, they were intended to elicit a wide range of views about these strategies as well as to provide an opportunity for participants to generate their own ideas for public health authorities to consider during ongoing pandemic planning efforts.

This particular method of public engagement was derived from a prior IOM initiative to design a process that state and local public health departments can use to obtain meaningful community input on important policies and strategies during their formative stages.¹² As such, the process must be capable of implementation within the existing capacities of a typical public health agency. The purpose of this type of public engagement is not to test hypotheses about public opinion. Rather, its value lies in its ability to identify priorities defined by the public, as well as points of concern, potential implementation challenges, misunderstanding, or strong disagreement that public health authorities are likely encounter and should be prepared to address when promulgating or implementing policies.

In-depth study of the value of public engagement is beyond the scope of this article, but we would note that the outputs of public engagement processes similar to ours have been used with success to inform other emergency preparedness public health policies. For instance, federal guidelines for allocating pandemic influenza vaccine and for using nonpharmaceutical pandemic mitigation measures reflect the results of public engagement processes.^{14,15}

Session Characteristics

The community conversations took place in 3 geographically and demographically different locations: Fort Benton, MT (frontier rural, Chouteau County population 5,765); Chattanooga, TN (midsize urban/suburban, population 168,075); and Los Angeles, CA (large urban, population 3,797,144).¹⁶ The Fort Benton session drew participants from throughout rural Chouteau County, including men from 2 colonies of Hutterites, an Anabaptist group that lives communally, dresses traditionally, and speaks German in its colonies.¹⁷ Chattanooga's participants were recruited from the city and the immediate vicinity. The Los Angeles session was held in South Central Los Angeles and drew participants from a predominantly low-income African American and Hispanic neighborhood. In each location, the IOM partnered with local public health and community organizations that were charged with recruiting a mix of participants who represented the demographics of their community consistent with current US census data on age, sex, race, and ethnicity. These local partners also recruited table facilitators, note takers, interpreters, and other staff and advised the IOM on logistical considerations and strategies for achieving diverse participation in their communities.

Participant selection was not randomized; local partners employed various recruitment strategies, including outreach to community organizations with links to diverse constituencies, to encourage individuals to preregister and attend. To prevent exclusion of low-income community members, a \$50 stipend was offered to offset participants' out-of-pocket expenses and acknowledge the gift of their time. This process was successful in recruiting participant groups that generally reflected the diversity of each of the 3 communities (Table 1). In alignment with other public engagement efforts, these sessions were not intended to yield randomized or representative samples that could be extrapolated to other populations, but rather to provide a snapshot of sentiments held by those 3 communities on the issues discussed.¹²⁻¹⁵ This study methodology was reviewed and deemed exempt by the Institutional Review Board (IRB) of the National Academy of Sciences as well as IRBs for the local partners.

Agenda and Tools

A mixed-methods approach was used to conduct the community conversations as summarized in Table 2. All 3 venues used the same 4-hour agenda and program materials. (A complete set of these tools are available online at www.liebertonline.com/bsp.) The sessions were directed by lead facilitators, who were IOM committee members with subject matter expertise. Other IOM committee members served as expert presenters who gave participants an overview of influenza pandemics, treatment with antivirals, and potential strategies for overcoming the challenges of getting antivirals and information to the public during pandemics.

Participants used Audience Response System (ARS) handheld keypad devices at several points to respond to: (1) questions about participant demographics, behaviors, and baseline beliefs; (2) a series of opinion statements (reflected in Tables 3-7 below) about strategies for accessing antivirals and information during pandemics; and (3) evaluation questions about the public engagement methods used during the session. The opinion statement survey was administered twice during the session: before any substantive discussion about pandemics and antiviral strategies (the "presurvey") and again near the end of the session (the "postsurvey"). Participants also engaged in facilitated small group discussions about 2 scenarios: the first was designed to elicit opinions on the acceptability of alternative strategies for getting antivirals to the public when supplies are adequate; the second aimed at eliciting opinions about those same strategies when antivirals are scarce.

Participants were seated at tables of approximately 8, each of which was staffed by a facilitator and a note taker who were not professional researchers but who had been recruited from local health and community organizations. The table facilitators and note takers received training and program materials in advance, including the scenario exercises and highly structured templates for recording qualitative data.¹⁸ They also participated in a 2-hour

Table 1. Key Participant Characteristics for the 3 “Community Conversations”^a

<i>Total Participants (N=232)</i>	<i>Chattanooga, TN (%) n = 49</i>	<i>Fort Benton, MT(%) n = 75</i>	<i>Los Angeles, CA(%) n = 108</i>
Age			
18-24	30	0	16
25-44	15	19	43
45-64	34	51	26
≥ 65	21	30	15
Sex			
Female	56	59	37
Male	44	41	63
Education			
Some school	7	7	15
High school graduate/GED	13	10	30
Some college	42	18	25
College degree	22	47	19
Graduate degree	16	19	11
Have children under age 18	20	24	40
Have a disability	18	17	31
Have health insurance...	83	93	58
...with prescription coverage	83	82	58
Nearest pharmacy	53	55	80
< 2 miles	45	3	18
2-10 miles	2	42	1
≥ 11 miles			
Have ever received a flu shot at a pharmacy	19	13	14
Have ever made calls to any medical hotline	64	62	42
Have sought medical advice on the internet			
Frequently	17	12	16
Sometimes	33	36	37
Rarely or never	50	52	47
At start of session, believed that the normal ways of obtaining prescription drugs would work well for them during a pandemic	73	86	45

^aThe data in this table were self-reported by participants during the presurvey using audience response system (ARS) keypad devices.

orientation session the day before each community conversation during which, through simulated scenario discussions, they received training on small group facilitation and practiced using specially designed data collection templates. In Los Angeles, 20 monolingual Spanish participants were accommodated at Spanish facilitated tables and with simultaneous translation of the large group content.

Data Collection and Analysis

Quantitative Data

The ARS opinion statements and questions were presented to participants on slides and also read aloud by the lead facilitator. Opinion statement response choices were structured on a 4-point Likert scale (strongly agree/agree/disagree/strongly disagree). Using ARS handheld devices, most participants answered most questions; those who did not select an answer to a particular question were noted as nonresponders for that question. The Los Angeles session

had the lowest response rate (72% to 79%) to the post-session statements as compared with response rates of 90% to 97% at the other 2 venues. Table facilitators in Los Angeles reported challenges faced by monolingual Spanish-language participants who struggled to keep up, possibly because of ineffective oral interpretation. Therefore, the views of this group may be somewhat underrepresented relative to other participants.

The primary outcome variable was the proportion of participants who agreed or strongly agreed with each of the opinion statements presented near the end of each session. We used multivariate logistic regression to identify statements for which there were significant intergroup differences among venues, and to identify factors such as age, education level, health insurance status, prescription drug coverage status, and frequency of internet usage associated with differences in these proportions (controlling for venue). *P*-values are not corrected for multiple comparisons. Regression methods similar to these have been applied to data obtained in other public engagement processes.¹²

Table 2. Key Elements of Community Conversations

<i>Element</i>	<i>Purpose</i>
Presurvey	<ul style="list-style-type: none"> • Quickly immerse into concept of distribution/dispensing of antiviral medications in pandemics • Collect data on participant demographics and characteristics • Establish baseline opinions
Introductory Presentation	<ul style="list-style-type: none"> • Inform participants about pandemics, antiviral medicines, and the challenges of getting antivirals to the public • Inform participants about alternative strategies under consideration
Two Scenario Discussions and Report Outs	<ul style="list-style-type: none"> • Develop and elicit participant perspectives on alternative strategies when (1) antiviral prescribing/dispensing channels are overwhelmed, and (2) antivirals are scarce.
Postsurvey, Discussion of Results	<ul style="list-style-type: none"> • Identify changes in participant opinions by end of session
Evaluation	<ul style="list-style-type: none"> • Obtain participant input on program design and value (eg, did they understand materials and issues, did program elements allow them to share views)

Qualitative Data

During the small group scenario discussions, note takers recorded key points on the templates provided. Each table's participants also completed a form listing 3 major points they wanted to share with the room during the report out.¹⁸ Additional note takers recorded the ideas presented during the report out and discussion. At the end of each session, participants were asked to complete a short written evaluation.

Note taker templates from each of the tables where participants were seated (for both the open discussion and the discussion of key takeaways for the report out session) were reviewed and manually coded by a single reviewer for consistency. We used manual coding (rather than coding software) because the number of templates was manageable, and we determined that a manual technique would allow the investigator "to communicate and connect with the data."¹⁹ The particular structure of the templates, on which note takers had received advance hands-on training, resulted in highly organized notes that facilitated the coding process. In all but a few instances, we found that the template data were legible, detailed, unambiguous, and relevant. Note takers occasionally recorded direct quotes without attribution to a particular speaker but, as instructed, usually summarized general ideas and themes.

Data codes were derived from the information provided by the participants. After coding each template, common patterns, categories, and themes were identified and aggregated onto a single template for each of the 3 venues.²⁰ The codes that were mentioned consistently across participants were clustered and identified as either major or minor common themes. Frequency of mention was the main consideration in the identification of themes. Importance of the issue, as indicated by inclusion in a table's report out notes, was also considered in designating a theme as major. All of these sources of data were coded using qualitative methods to identify major and minor themes from each venue and the 3 sessions overall. "Major common themes"

describe similar points expressed by several participants at all 3 venues.

The qualitative data are central to an understanding of what participants thought about the various antivirals strategies and, most critically, why. The IOM previously has described these data in great detail.² Here we analyze the major themes.

RESULTS

Alternative Antiviral Prescribing and Dispensing Strategies

Nurse Triage Lines (NTLs)

The discussions yielded several major common themes about NTLs as a strategy for facilitating access to antivirals during a pandemic. Many participants noted that NTLs would offer most people convenient access to antivirals and that they could help contain the spread of disease by allowing sick people to secure advice and a prescription without leaving home. Most participants expressed strong confidence in the abilities and trustworthiness of specially trained nurses working under the supervision of a physician. Some participants expressed a preference that NTLs be locally operated and staffed to ensure that those staffing these telephone lines have an awareness of local conditions, culture, and sensibilities. Participants also generated their own ideas for enhancing this strategy, including allowing people to call the NTL on behalf of friends, neighbors, or family members who are too incapacitated to do it on their own. Asked to identify potential disadvantages of NTLs, a major common theme was that these hotlines could become overwhelmed, leaving callers frustrated by busy signals or long hold times.

When the scenario of antiviral scarcity was introduced, participants raised concerns about the efficacy and trustworthiness of NTLs. One major common theme was that

callers might lie about their symptoms or otherwise “game” the system to acquire scarce antivirals for their family members or for resale on the black market. A related concern was the challenges NTL nurses would face in assessing a caller’s honesty, verifying who has influenza, and enforcing any established prescribing priorities. Another major common theme was the possibility that certain populations would receive favoritism or face discrimination by NTL nurses. Notwithstanding these concerns, many participants noted that, even in circumstances of scarcity, the benefits of NTLs would outweigh the risks, given the likely inadequacy of normal prescribing channels during a pandemic.

Consistent with the scenario discussion outputs, the ARS data (Table 3) indicate strong, widespread acceptance of NTLs in a pandemic response. Almost 9 out of 10 participants agreed that they would *trust* an NTL nurse to provide access to antivirals for them. Participants expressed somewhat less—but still high—agreement with a similar statement couched in terms of *feeling safe*. On the question of whether nurses staffing NTLs could safely provide access to antivirals for children, participant agreement dropped off, especially among participants without higher educa-

tion. Likewise, participants at every session expressed lower trust in NTLs at times when antivirals are in short supply, possibly reflecting concerns about the potential dishonesty of callers. Participants who believed that current prescribing systems would not be adequate during a pandemic were even less likely to trust NTLs under conditions of antiviral scarcity. Nevertheless, a majority of participants at all 3 venues agreed that NTLs could be a safe, trustworthy mechanism for providing access to antivirals during an influenza pandemic—to both adults and children and regardless of whether antivirals are plentiful or scarce.

Pharmacist Prescribing under Physician Supervision

Participants were asked whether they would trust a pharmacist’s assessment of whether or not they should take an antiviral. Participants also discussed the pros and cons of collaborative practice agreements, concerns they might have about going to a pharmacy to pick up antivirals during a pandemic, and suggestions for improving the strategy.

Many participants at each venue expressed a high level of regard for the pharmacy profession, referencing pharmacists’

Table 3. Postdiscussion Responses to ARS Statements Related to NTLs

ARS Opinion Statement	Agree/Strongly Agree Postdiscussion		Other Significant Differences ^a Controlling for Venue
Would trust a nurse who works under the direction of a doctor to listen to symptoms over the phone and decide if I need a prescription for antiviral drugs	All sites	87%	Age: Participants (Ps) ≥ age 45 more likely to agree (93%) Have children under 18: Less likely to agree (80%) Insurance Drug Coverage: Ps without drug coverage less likely to agree (74%)
	Chattanooga	87%	
	Fort Benton	91%	
	Los Angeles	84%	
	<i>P</i> -value ^b = 0.38		
Would feel safe taking an antiviral prescribed by a nurse over the phone without first seeing a healthcare provider	All sites	73%	No other significant variables
	Chattanooga	75%	
	Fort Benton	91%	
	Los Angeles	57%	
	<i>P</i> -value = 0.00		
Would be safe for a nurse to provide children with prescriptions for antivirals over the phone	All sites	60%	Education: Highly educated more likely to agree (70% with college degree, 75% with graduate degree). Ps who had completed high school/GED far less likely to agree (33%)
	Chattanooga	57%	
	Fort Benton	83%	
	Los Angeles	42%	
	<i>P</i> -value = 0.00		
If people can get prescriptions over the phone, many will lie about their symptoms.	All sites	82%	No other significant variables
	Chattanooga	87%	
	Fort Benton	70%	
	Los Angeles	88%	
	<i>P</i> -value = 0.01		
When not enough antivirals for everyone, would trust an NTL to get these drugs to the people who should receive them	All sites	56%	Confidence in System: Ps who initially believed that the current system will serve them well in a pandemic more likely to agree (64%); Ps expressing lower confidence in the current system less likely to agree (47%)
	Chattanooga	57%	
	Fort Benton	54%	
	Los Angeles	56%	
	<i>P</i> -value = 0.99		

^aVariables noted are for demographic and other participant characteristics found to be statistically significant (*P*-value ≤ 0.05). All variables noted are significant when controlled for each other.

^b*P*-values ≤ 0.05 indicate statistically significant differences in levels of agreement among venues.

trustworthiness and deep knowledge of prescription drugs. A common major theme was confidence in pharmacists' ability to perform this role if they are trained and provided with clear prescribing protocols. Another common theme was that face-to-face strategies with a pharmacist could lead to more reliable diagnoses and allow people to receive more personalized advice than is likely over the telephone.

One commonly noted disadvantage of the CPA strategy is that it could promote the mixing of sick and healthy people at pharmacies, potentially increasing the spread of disease and the risk that pharmacists themselves might be exposed to influenza and become ill. Another concern was that pharmacies could be "overrun" by people seeking antivirals, impeding dispensing of other critical prescriptions. Participants suggested a variety of strategies to overcome these challenges, including provision of personal protective equipment to pharmacy staff and customers, using drive-through windows or segregated areas to minimize contact between the healthy and the sick, and enlisting retired pharmacists and other medical professionals to expand capacity.

The ARS data also indicate very high levels of acceptance of CPAs as an alternative strategy for prescribing and dispensing antivirals during a pandemic. Slight significant differences were seen by venue and by initial confidence in current systems. Although Los Angeles participants expressed lower levels of trust in the CPA strategy, most participants in all 3 venues viewed pharmacist prescribing under the rubric of a CPA as acceptable (Table 4).

Antiviral Pick-Up and Delivery by Community Contacts

Participants generally endorsed the strategy of encouraging community contacts (eg, family, friends, neighbors) to pick up prescribed antiviral medications from pharmacies and

deliver them to ill people at home. Participants also lauded the strategy's potential contributions to disease containment and to strengthening community ties in general. During the scenario discussions, many participants commented that this approach requires that sick people have trusted contacts able to perform this role. Perceived disadvantages included an increased risk to the community contacts themselves (eg, exposure to influenza, security issues, and legal liability). Some participants at each session worried about possibly unreliable or dishonest community contacts, particularly at times when antivirals are in short supply.

Participants shared their own ideas for effective implementation, including organizing antiviral deliveries through existing networks of trusted community groups or first responders; enclosing clear printed instructions about antiviral treatment for people who will not have the benefit of face-to-face consultations with pharmacists; and developing a process to verify and record the identities of those making deliveries to ensure they have permission to pick-up another person's medication. Participant responses to the ARS statement about friends and neighbors picking up prescriptions for ill people were consistent with the discussion data, indicating broad overall support tempered by efficacy and safety concerns (Table 5).

General Findings on Prescribing, Dispensing, and Distribution Strategies

The majority of participants agreed with the notion that during an influenza pandemic, people should be able to obtain antivirals outside normal channels, even if the alternative strategies entail some "risk." Participants with lower levels of education and those who initially had voiced less confidence in existing systems were less likely to support

Table 4. Postdiscussion Responses to ARS Statements Related to Pharmacist Prescribing

<i>ARS Opinion Statement</i>	<i>Agree/Strongly Agree Postdiscussion</i>		<i>Other Significant Differences^a Controlling for Venue</i>
People who cannot get a doctor's prescription should be allowed to get antiviral drugs from a pharmacist who has a formal working relationship with a doctor.	All sites	94%	Confidence in System: Ps who initially believed that the current system will serve them well in a pandemic less likely to agree (88%); Ps expressing lower confidence in the current system more likely to agree (98%). Age: Ps ≤ age 24 less likely to agree (80%) Insurance Coverage: Ps with health insurance more likely to agree (97%) than uninsured Ps (84%)
	Chattanooga	96%	
	Fort Benton	95%	
	Los Angeles	92%	
	<i>P</i> -value ^b = 0.71		
Would trust a pharmacist who has a formal working relationship with a doctor to decide if I should take an antiviral drug if could not get a doctor's prescription	All sites	92%	Confidence in System: Ps who initially believed that the current system will serve them well in a pandemic less likely to agree (88%); Ps expressing lower confidence in the current system more likely to agree (98%).
	Chattanooga	96%	
	Fort Benton	97%	
	Los Angeles	86%	
	<i>P</i> -value = 0.04		

^aVariables noted are for demographic and other participant characteristics found to be statistically significant (*P*-value ≤ 0.05). All variables noted are significant when controlled for each other.

^b*P*-values ≤ 0.05 indicate statistically significant differences in levels of agreement among venues.

Table 5. Postdiscussion Responses to ARS Statements Related to Community Contact Strategies

<i>ARS Opinion Statement</i>	<i>Agree/Strongly Agree Postdiscussion</i>	<i>Other Significant Differences Controlling for Venue</i>
Friends and neighbors should be asked to pick up and deliver prescribed antiviral drugs from a pharmacy for people sick with flu.	All sites Chattanooga Fort Benton Los Angeles <i>P</i> -value ^a = 0.00	81% 87% 96% 66%
No other significant variables		

^a*P*-values ≤ 0.05 indicate statistically significant differences in levels of agreement among venues.

proposals that change how people can get antivirals, at least when the question was posed in terms of *safety* (Table 6).

Strategies to Inform the Public

Participants also deliberated on 2 novel strategies for using information technology—a website and a text-messaging tool—to provide specific information to the public about pandemic influenza.

Pandemic Flu Website

Most participants, especially those with higher levels of education, indicated interest in having access to a website offering self-assessment tools and information about prevention and treatment of pandemic influenza during a pandemic (Table 7). During the scenario discussions, many participants cited the internet's wide accessibility and the fact that websites can be updated frequently with relevant information. Commonly referenced limitations of web-based strategies include the lack of internet service in some rural

localities and the reality that some people do not have access to computers. Participants at all venues noted that it can be difficult to determine the reliability of website content. Several Chattanooga and Los Angeles participants questioned whether members of the general public could reliably self-assess their symptoms. Some Los Angeles participants also expressed concern that sick people who use public internet portals (eg, in libraries) could spread influenza.

In response to the question of whether a website's sponsor would matter, a common theme was that any sponsor must be a trusted broker of reliable information. Although opinion was mixed over preference for a government or private sponsor, more participants favored a government sponsor, while some considered that distinction irrelevant. Participants who preferred a government sponsor often cited the government's public health expertise and access to accurate information in contrast to the commercial and promotional goals of some private websites. Those who preferred a private sector approach noted either a particular trust in the ability of medical organizations (eg, hospitals) to sponsor such websites or a general

Table 6. Postdiscussion Responses to ARS Statements Related to General Attitudes about the Alternative Strategies

<i>ARS Opinion Statement</i>	<i>Agree/Strongly Agree Postdiscussion</i>	<i>Other Significant Differences^a Controlling for Venue</i>
There should be ways for sick people to get prescriptions for antiviral drugs without waiting to see a doctor or nurse.	All sites Chattanooga Fort Benton Los Angeles <i>P</i> -value ^b = 0.00	90% 98% 97% 80%
No other significant variables		
Even if there are small risks to changing the ways people get prescription drugs, it is better for more people to be able to get antiviral drugs in time.	All sites Chattanooga Fort Benton Los Angeles <i>P</i> -value = 0.09	94% 93% 99% 90%
No other significant variables		
Would be safer to stick with the usual ways of getting prescription drugs even if some people won't get antiviral drugs in time	All sites Chattanooga Fort Benton Los Angeles <i>P</i> -value = 0.00	22% 9% 10% 39%
Confidence in System: Ps who initially believed that the current system will serve them well in a pandemic less likely to agree (6%); Ps expressing less confidence in the current system more likely to agree (36%). Education: Ps with college or graduate degrees less likely to agree (7%).		

^aVariables noted are for demographic and other participant characteristics found to be statistically significant (*P*-value ≤ 0.05). All variables noted are significant when controlled for each other.

^b*P*-values ≤ 0.05 indicate statistically significant differences in levels of agreement among venues.

Table 7. Postdiscussion Responses to ARS Statements Related to Pandemic Flu Website and Text Messaging Tool

<i>ARS Opinion Statement</i>	<i>Agree/Strongly Agree Postdiscussion</i>		<i>Other Significant Differences^a Controlling for Venue</i>
Would like to be able to go to a trusted website for advice on whether to seek treatment	All sites	86%	Education: Most highly educated Ps more likely to agree (91% of Ps with college degree, 96% with graduate degree)
	Chattanooga	87%	
	Fort Benton	90%	
	Los Angeles	82%	
	<i>P</i> -value ^b = 0.37		
If given antiviral drugs, would like to be able to sign up to receive cell phone text messages about the flu and my medicine	All sites	86%	Confidence in System: Ps who initially believed that the current system will serve them well in a pandemic less likely to agree (78%); Ps expressing lower confidence in the current system more likely to agree (95%).
	Chattanooga	82%	
	Fort Benton	90%	
	Los Angeles	85%	
	<i>P</i> -value = 0.44		

^aVariables noted are for demographic and other participant characteristics found to be statistically significant (*P*-value ≤ 0.05).

^b*P*-values 0.05 indicate statistically significant differences in levels of agreement among venues.

distrust of government. Despite their relatively low levels of trust in government on other matters, participants at the Los Angeles venue expressed the highest level of support for government-sponsored websites. Their reasoning was similar to proponents of government sponsorship at the other venues but also was grounded in the idea that it is a government *responsibility* to provide free access to reliable information and advice during a pandemic.

Text Messaging System

Participants finally were asked to consider a mobile telephone text messaging system for people who have been prescribed antiviral drugs and have opted to receive an automated series of messages about their treatment. Major common themes were that text messaging would offer people—especially younger mobile phone users—a convenient source of supplementary information and reminders to take the antivirals as well as recorded advice to which they could refer back.

Disadvantages noted by participants were that text messaging is not universally accessible and that high volumes of texting might overload phone systems. To maximize the value of cell phone tools, participants suggested that text messages come from a reliable source and that the service be provided at no charge to recipients. Another participant-generated idea was that the text messages include words of support to alleviate the discomfort and anxiety that sick people might experience during a pandemic. The text messaging strategy was generally very well received. It was particularly popular among participants who initially had expressed lower levels of confidence that the normal methods of prescribing antivirals would serve them well during a severe pandemic.

Evaluation Data

At the end of each community conversation, participants responded to a series of ARS statements that asked them to

evaluate their experience with the public engagement process and tools themselves. For all venues, 90% to 98% of respondents agreed with the following statements:

- “My table had productive discussions about the 2 scenarios.”
- “By the time of the [ARS] post-survey, I had a better understanding of the issues.”
- “Overall, the program gave me a chance to share my ideas.”

DISCUSSION

These community conversations were designed to engage the public in an inclusive and collaborative exchange of ideas about the alternative antiviral strategies early enough in the process for the CDC to consider the outputs in its policy deliberations. Unlike polls and other public opinion surveys, this method provides general public participants with a foundational understanding of a pressing public health policy challenge. Once informed, participants interact through deliberative exercises that help elicit shared priorities and values as well as the points on which they differ and *why*. The ultimate value of this research is the efficacy and credibility it can lend to final policies, which, in turn, may boost the public confidence and acceptance essential to cooperation during future pandemics.^{21,22}

Across all 3 of our venues, large majorities of participants voiced strong support for each of the 5 alternative strategies for increasing access to antivirals and information about influenza during future pandemics. Participants also contributed suggestions for fine tuning these strategies and for overcoming obstacles to implementation—ideas that had not previously been considered by the “experts.” It bears mention that participants’ optimism about the usefulness of NTLs in particular is consistent with the strongly positive experience reported by callers to the Minnesota FluLine during the 2009 H1N1 pandemic, the only

statewide NTL that has ever been implemented in response to a pandemic.^{23,24}

An important theme voiced by participants across all sessions relates to using several simultaneous strategies—a “layered” approach—to facilitate access to antivirals. Participants recognized that no single strategy can solve the full range of problems that might emerge during a severe pandemic.²⁵ They could foresee the potential limitations of each strategy—for instance, the possibility that telephone triage lines could become overwhelmed, a situation that Minnesota’s FluLine had to address during the H1N1 pandemic.²³ Yet, they understood that several of these strategies combined could enhance their efficacy. This realization may have been responsible for the high overall acceptability of the alternative strategies despite the noted deficiencies of each.

Participants’ strongest reservations about the alternative strategies emerged in 2 contexts: when treating children, and when antivirals are in short supply. Concerns about children arose mainly in connection with the NTL strategy and were most often framed as uncertainty about the safety of antivirals for children—especially without an in-person medical assessment. Concerns about alternative strategies when antivirals are scarce related to the perceived difficulty of preventing worried or dishonest people from “gaming” the system, particularly if the assessment was conducted over the telephone without face-to-face verification of the person’s identity and condition. Some participants foresaw the potential for dishonesty by unscrupulous community contacts charged with the responsibility to pick up and deliver an ill individual’s medication. Participants’ desire for built-in safeguards to prevent gaming of the system were expressed both in terms of the practical need to prevent systemic breakdowns and the ethical imperative to promote fair allocation of resources.

We noted statistically significant differences in opinion between different venues and also across subsets of participants with common demographic characteristics, behaviors, and baseline beliefs. The ARS data revealed lower levels of acceptance of certain strategies by those participants with lower levels of education or less confidence in normal prescribing and distribution systems, particularly at the Los Angeles venue. These quantitative findings are consistent with the qualitative results. For instance, in Fort Benton, strong overtones of trust in the ability of community members and leaders to execute a fair and effective response to a pandemic were evident throughout the discussion. In contrast, Los Angeles participants repeatedly expressed a general sense of distrust of authorities, including fears and expectations that their community would be neglected and therefore fare worse in a future pandemic. The opinions of the Chattanooga participants fell somewhere in between. This was an exploratory study, so the quantitative results derived from this effort should be interpreted cautiously and in context with qualitative findings. As already noted, the quantitative data and the

regression analyses were not intended to test hypotheses but to identify when and how respondents tended to give similar or divergent responses.

During the end-of-session evaluation, most participants agreed that the community conversations methodology had allowed them to share their opinions about the issues at hand. Although not conclusive, these high marks suggest that participants’ actual views are reflected in the data.

LIMITATIONS

None of the opinions, conclusions, and recommendations reported above should be construed as reflecting group consensus or representing views of the whole community where the discussions were held. Likewise, the presence or absence of discussion about any particular idea does not indicate support or opposition by an entire group.

The ARS presurvey data are not included here because the main purpose of the presurvey was to quickly engage participants and focus them on the issues at hand. The ARS postsurvey data, collected after participants had been provided with information and discussion opportunities, are included because they more likely reflect participants’ informed opinions about the proposed strategies. They also contribute to an understanding of the substance and weight of the opinions expressed during the scenario discussions. These quantitative data should not, however, be viewed as more important than the qualitative discussion data, which often explain the “why” behind participants’ viewpoints.

The views of monolingual Spanish-speaking participants in the Los Angeles session may be somewhat underrepresented in the ARS postsurvey data given their relatively lower response rate to those questions. We do not report data associated with several ARS questions that touched on ethical considerations related to the antiviral strategies in the context of scarce resources. Time constraints prevented deep deliberation on these issues, and no significance should be attached to the results. Finally, our data were not drawn from a random sample of the US population and thus should not be generalized beyond the specific participants of each session.

CONCLUSION

The value of community engagement lies in its ability to elicit and surface a range of attitudes, concerns, and areas of potential misunderstanding about strategies or policies that might be used during a future scenario or event. Findings from these community conversations are now being used by CDC and its partners to inform development of contingency plans for facilitating access to antivirals and information during a future severe influenza pandemic. Strategies that take community concerns into account and are consistent with community norms are more likely to be

accepted by the public and successfully implemented when the need arises.

ACKNOWLEDGMENTS

The authors would like to acknowledge the many contributions of the staff and members of the IOM Planning Committee on Public Engagement for Distribution and Dispensing of Antiviral Medications: Workshop Series. The authors also wish to thank the IOM's local community partners in Fort Benton (Montana State University, Chouteau County Extension, and Chouteau County Public Health), Chattanooga (Chattanooga-Hamilton County Health Department), and Los Angeles (Healthy African American Families II and the Department of Public Health, Los Angeles County) for their tremendous on-the-ground support, without which these community conversations would not have been possible.

REFERENCES

1. US Department of Health and Human Services. *HHS Pandemic Influenza Plan*. Washington, DC: US Department of Health and Human Services; 2005. <http://www.flu.gov/planning-preparedness/federal/hhs-pandemic-influenza-plan.pdf>. Accessed January 15, 2014.
2. Fain B, Viswanathan K, Altevogt B; Forum on Medical and Public Health Preparedness for Catastrophic Events; Board on Health Sciences Policy; Institute of Medicine. *Public Engagement on Facilitating Access to Antiviral Medications and Information in an Influenza Pandemic: Workshop Series Summary*. Washington, DC: National Academies Press; 2012. <http://www.iom.edu/Reports/2012/Public-Engagement-on-Facilitating-Access-to-Antiviral-Medications.aspx>. Accessed January 15, 2014.
3. Stroud C, Nadig L, Altevogt B; Forum on Medical and Public Health Preparedness for Catastrophic Events; Board on Health Sciences Policy; Institute of Medicine. *Medical Countermeasures Dispensing: Emergency Use Authorization and the Postal Model: Workshop Summary*. Washington, DC: National Academies Press; 2010. <http://www.iom.edu/reports/2010/medical-countermeasures-dispensing-emergency-use-authorization-and-the-postal-model.aspx>. Accessed January 15, 2014.
4. Davis M, Kammersell M, Altevogt B; Forum on Medical and Public Health Preparedness for Catastrophic Events; Board on Health Sciences Policy; Institute of Medicine. *Dispensing Medical Countermeasures for Public Health Emergencies: Workshop Summary*. Washington, DC: National Academies Press; 2008. <http://www.iom.edu/Reports/2008/Dispensing-Medical-Countermeasures-for-Public-Health-Emergencies-Workshop-Summary.aspx>. Accessed January 15, 2014.
5. Fiore A, Fry A, Shay D, Gubareva L, Bresee J, Uyeki T; Centers for Disease Control and Prevention. Antiviral agents for the treatment and chemoprophylaxis of influenza—recommendations of the Advisory Committee on Immunization Practices. *MMWR Recomm Rep* 2011 Jan 21; 60(1):1-24. <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6001a1.htm>. Accessed January 15, 2014.
6. Trust for America's Health. *Pandemic Flu Preparedness: Lessons from the Frontlines*. Washington, DC: Trust for America's Health; 2009. <http://healthyamericans.org/assets/files/pandemic-flu-lesson.pdf>. Accessed January 15, 2014.
7. Koonin L, Hanfling D. Broadening access to medical care during a severe influenza pandemic: the CDC Nurse Triage Line Project. *Biosecur Bioterror* 2013;11(1):75-80.
8. What to Do If You Get Sick: 2009 H1N1 and Seasonal Flu. Centers for Disease Control and Prevention website. January 10, 2010. <http://www.cdc.gov/h1n1flu/sick.htm>. Accessed January 15, 2014.
9. Giberson S, Yoder S, Lee M. *Improving Patient and Health System Outcomes through Advanced Pharmacy Practice: A Report to the U.S. Surgeon General*. Rockville, MD: Office of the Chief Pharmacist, U.S. Public Health Service; 2011.
10. Kellermann A, Isakov A, Parker R, Handrigan M, Foldy S. Web-based self-triage of influenza-like illness during the 2009 H1N1 influenza pandemic. *Ann Emerg Med* 2010; 56(3):288-294.
11. Anhang Price R, Fagbuyi D, Harris R, et al. Feasibility of web-based self-triage by parents of children with influenza-like illness: a cautionary tale. *JAMA Pediatr* 2013;167(2): 112-118.
12. Hanfling D, Altevogt BM, Viswanathan K, Gostin LO, eds.; Committee on Guidance for Establishing Crisis Standards of Care for Use in Disaster Situations; Institute of Medicine. *Crisis Standards of Care: A Systems Framework for Catastrophic Disaster Response*. Washington, DC: National Academies Press; 2012. <http://www.iom.edu/reports/2012/crisis-standards-of-care-a-systems-framework-for-catastrophic-disaster-response.aspx>. Accessed January 15, 2014.
13. Bernier R, Marcuse E. *Citizen Voices on Pandemic Flu Choices: A Report of the Public Engagement Pilot Project on Pandemic Influenza*. 2005. http://ppc.unl.edu/documents/PEPPI_FINALREPORT_DEC_2005.pdf. Accessed January 15, 2014.
14. US Department of Health and Human Services; US Department of Homeland Security. *Guidance on Allocating and Targeting Pandemic Influenza Vaccine*. Washington, DC: US Department of Health and Human Services; US Department of Homeland Security; 2008. www.flu.gov/images/reports/pi_vaccine_allocation_guidance.pdf. Accessed January 15, 2014.
15. Keystone Center, Association of State and Territorial Health Officials, Centers for Disease Control and Prevention. *The Public Engagement Project on Community Control Measures for Pandemic Influenza: Findings and Recommendations from Citizen and Stakeholder Deliberation Days*. 2007. <http://stacks.cdc.gov/view/cdc/12171>. Accessed January 15, 2014.
16. 2010 US Census Bureau. *2006-2010 American Community Survey*. <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>. Accessed January 15, 2014.
17. Hutterian Brethren. <http://www.hutterites.org/>. Accessed January 15, 2014.
18. Facilitating Access to Antiviral Medications and Information during an Influenza Pandemic: Engaging with the Public on Possible New Strategies—Online Supplement. www.liebertonline.com/bsp. Accessed February 28, 2014.

19. Basit TN. Manual or electronic? The role of coding in qualitative data analysis. *Educational Research* 2003;45(2):143-154.
20. Creswell JW. *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. 3rd ed. Thousand Oaks, CA: Sage Publications; 2009.
21. Timbie J, Ringel J, Fox S, et al. *Allocation of Scarce Resources during Mass Casualty Events: Evidence Reports/Technology Assessments, No. 207*. Rockville, MD: Agency for Healthcare Quality and Research; 2012. <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0047529/>. Accessed January 15, 2014.
22. Timbie J, Ringel J, Fox S, et al. Systematic review of strategies to manage and allocate scarce resources during mass casualty events. *Ann Emerg Med* 2013;61(6):677-689.
23. Spaulding A, Radi D, Macleod H, et al. Satisfaction and public health cost of a statewide influenza nurse triage line in response to pandemic H1N1 influenza. *PLoS One* 2013;8(1):e50492. <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0050492>. Accessed January 15, 2014.
24. Spaulding AB, Radi DR, Macleod H, et al. Design and implementation of a statewide influenza nurse triage line in response to pandemic H1N1 influenza. *Public Health Rep* 2012;127:532-540.
25. Centers for Disease Control and Prevention. *Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States*. Atlanta, GA: Centers for Disease Control and Prevention; 2007. www.flu.gov/planning-preparedness/community/community_mitigation.pdf. Accessed January 15, 2014.

*Manuscript received August 1, 2013;
accepted for publication January 29, 2014.*

Address correspondence to:
Barbara A. Fain, JD, MPP
Tufts University School of Medicine
Public Health and Community Medicine
135 Harrison Ave.
Boston, MA 02111

E-mail: barbara.fain@tufts.edu