Policy Brief: The Rural H1N1 Experience: Lessons Learned for Future Pandemics

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Background: Data have been collected and methods have been developed to estimate the impact of H1N1 prevalence and trends nationally. However, there has been little study of this pandemic for rural communities, where fewer resources for vaccination and care may exist. Caring for rural people impacted by H1N1 influenza in outpatient and hospital settings can further tax already burdened rural health care organizations. Rural needs relative to prevention of H1N1 disease (and in particular vaccination distribution) may not be considered during decision making at the state level. The results of this study can be used to guide policy recommendations for prevention in rural populations during future pandemics.

Study Aims: This study analyzed the rural experience with novel influenza A (H1N1) during the 2009-2010 flu season. The aims of this study were to:

1) determine the incidence of seasonal and H1N1 vaccination in rural versus urban people;
2) determine the incidence of diagnosed seasonal and H1N1 influenza illness reported by rural people;
3) describe point of service patterns for receipt of H1N1 and seasonal vaccination in rural communities; and
4) analyze the impact of rural concerns in decision making at the state and local health department relative to vaccine distribution.

Methods: This study incorporated survey approaches with analysis of existing secondary data sources to characterize the rural H1N1 experience.

For Aim 1, the WV Rural Health Research Center worked collaboratively with the Centers for Disease Control and Prevention (CDC) to analyze rural vs. urban variations in vaccination rates for H1N1 using data from the Behavioral Risk Factor Surveillance System (BRFSS). To help track influenza activity during the 2009-2010 influenza season, modules (an optional set of questions that are asked along with the standard set of BRFSS questions) related to influenza-like illness (defined as an illness with reported fever and a cough and/or sore throat for this survey), and seasonal and 2009 H1N1 vaccines were added to the survey. Questions in BRFSS's influenza vaccination module ask participants if they have gotten the seasonal and 2009 H1N1 vaccines. County code data were collected in the BFRSS system, which allowed

Urban Influence Code (UIC) comparisons. CDC staff conducted the data analysis in collaboration with our Center.

The National 2009 H1N1 Flu Survey (NHFS) was used to answer Aims 2 and 3. In order to monitor and evaluate flu vaccination efforts among adults and children, the Centers for Disease Control and Prevention (CDC) conducted the NHFS in 2009-2010. In addition to questions about H1N1 and seasonal flu vaccination status of adults and children, the survey also asked about flu-related behaviors, opinions about flu vaccine safety and effectiveness, recent respiratory illness, and pneumococcal vaccination status. While county level and ZIP code data were collected in the original data set, these data were not released with the public use file. Alternatively, Metropolitan Statistical Area (MSA) designations were imputed by CDC from the data, and these MSA designations were used as a proxy for rural and urban comparisons by our Center.

For Aim 4, our Center surveyed the director of each State Office of Rural Health (SORH) to analyze the impact of rural concerns in decision making at the state and local health department relative to vaccine distribution. Surveys were conducted online, and included questions on the topics of severity of H1N1 in rural areas of their state, responsible parties for decision making relative to vaccine distribution, most common points of rural distribution of H1N1 vaccines, barriers to rural distribution of H1N1 vaccines, and SORH participation in decision making relative to rural vaccine distribution.

Results

Vaccination Rates: *Seasonal vaccination rates* are consistently higher than *H1N1 vaccination rates*. *Seasonal* and *H1N1 vaccination rates* are evenly distributed among all respondent categories, with no significant variation between urban, micropolitan, small rural, and remote rural areas.

Seasonal and H1N1 influenza illness diagnosis rates: To analyze the incidence of reported *seasonal and H1N1 influenza illness* diagnosed in rural people, our Center used data from the NHFS. After responding to questions about whether the subject had in the last month had an illness that involved fever, cough or sore throat, a question related to diagnosis of influenza illness was included during NHFS interviews. A small portion of the sample (7.8 percent, n=5505) reported illness with fever and cough or sore throat within the previous month. Of these, 5499 reported being treated for that cough or sore throat within the previous month. Of those who reported illness and were treated, 5404 answered that they were diagnosed with either regular influenza or the flu, or they were diagnosed with swine flu, also known as H1N1 or novel H1N1. 6.9 percent of all respondents were diagnosed with seasonal influenza and 4.6 percent were diagnosed with H1N1. There were no significant differences between MSA levels for diagnosis of *seasonal* or *H1N1 influenza* during an illness episode with fever and cough or sore throat in this sample.

Point of service patterns: Rural respondents were significantly less likely than both other MSA categories to receive their *seasonal influenza vaccines* at a doctor's office, hospital, pharmacy, or workplace, and more likely than both MSA categories to receive their vaccine at a health department.

As with the seasonal influenza vaccines, rural respondents were significantly less likely than both other MSA categories to receive their *H1N1 vaccines* at a doctor's office, pharmacy, or workplace, and more likely to receive their vaccine at a health department.

Impact of rural concerns in decision making at the state and local health department relative to vaccine distribution: State Office of Rural Health directors were particularly insightful into the issues and barriers around H1N1 vaccination in their state. Fifty two percent of respondents indicated mild severity of H1N1, while 48 percent indicated moderate severity in the rural areas of their state.

In estimating the availability of H1N1 vaccines in rural areas of their state, no SORH respondents reported that vaccines were unavailable. The majority (52.2 percent) of respondents reported vaccines were readily available in the rural areas of their state. However, 47.8 percent reported limited availability of H1N1 vaccines for rural areas. Respondents were asked the reasons for vaccine shortages in rural areas of their state, with the option to report that they knew of no issues. The most highly reported reason for vaccine shortages in rural areas was limited supplies, followed by limited distribution sites.

When asked about the most pressing unmet need for rural areas in the 2009-2010 influenza and H1N1 season, most SORH respondents indicated that initial and continued delays in vaccine receipt and distribution significantly impacted their state's influenza prevention plan. Many indicated that this was not an issue specific to rural areas, but was a statewide issue. Delays from distributors, and then from the state for further distribution to local entities were commonly noted. One state indicated that "some rural county health departments who were the focal points for distribution were ill-equipped to administer vaccine, being staffed to a lesser degree than their urban counterparts". Problems with surveillance were also identified by one SORH respondent as an issue in the rural areas of their state, noting that a lack of participation with influenza surveillance in some rural regions impacted their state's response to H1N1. In considering special populations in rural areas, one respondent indicated that limited school participation with vaccine administration impacted rural areas. Another indicated an unmet concern relative to meeting the vaccine needs of farmers and very small towns. In terms of rural access, one SORH respondent indicated "clinics that were community based, except for school based clinics, were not offered in all areas of the state equitably. Large communities received more opportunities for vaccination clinics". One respondent summed up thoughts about a solution to rural access issues and equitable distribution, stating "it is critical that a representative from the State Office of Rural Health serve on the planning body for H1N1 response strategies to ensure that unique needs of rural residents are met in this regard".

More than half of SORH respondents provided neutral or disagreeing responses to questions about their perceptions of the request for and use of information from their organization in planning their state's H1N1 response.

Policy Implications: During a pandemic, rural resources for prevention and care may be stressed. Understanding participation in vaccine efforts, the reported incidence of influenza among citizens in rural and urban areas, and the most likely points of service in rural and urban areas for vaccine receipt can assist rural planners to develop targeted efforts for prevention and care in future pandemics. Utilization of existing agencies with specific knowledge of rural issues can be especially helpful in planning health care services during a pandemic.

Using existing data, we have been able to document relatively low participation in H1N1 vaccination efforts during the 2009-2010 H1N1 pandemic across the rural-urban continuum.

H1N1 vaccination rates for all UICs were lower than those for seasonal flu vaccination. H1N1 vaccination rates ranged from 18.5 percent to 23.5 percent in respondents to the 2009 BRFSS survey, with seasonal influenza vaccination rates ranging from 36.5 percent to 42.8 percent . The lowest rates of H1N1 influenza vaccination were found in areas designated as "small rural areas adjacent to a metropolitan area". Immunization barriers may have played a role in lower H1N1 vaccination rates. Typical barriers to vaccination found in the literature include the cost of immunizations, lack of insurance coverage, and access to vaccine services[1]. In this pandemic, directors of State Offices of Rural Health noted that limited supplies and distribution sites contributed to lower H1N1 vaccination rates in their state. Rural policy makers can continue to address barriers related to access to and cost of immunizations, and equitable distribution of vaccines to rural areas.

While vaccination rates were relatively low, the reported incidence of diagnosed seasonal and H1N1 influenza in NHFS respondents were also relatively low, and there were no statistically significant differences in diagnosed rates of influenza across the rural-urban continuum. Respondents from non MSAs reported the lowest rates of H1N1 influenza diagnosis and the highest rate of seasonal flu diagnosis. During a pandemic with a new influenza virus, these lower rates of diagnosis in rural populations might be attributed to decreased opportunities for exposure due to low population densities and isolation. A recent historical study of the 1918 Spanish flu pandemic suggests that rural populations may also be protected from certain infectious diseases because older populations who typically reside in rural areas have increased immunity built up over their lifetime. [2] Our study only looked at the adult population, however no age analyses were possible to confirm if there were age differentials in H1N1 diagnosis. Lower diagnosis rates could also be attributed to limited access to health care professionals in rural areas to make the diagnosis of H1N1, or lower awareness of rural providers and the population of the unique symptoms of H1N1. These factors could contribute to lower reporting of symptoms and under-diagnosis H1N1 in rural areas. In future pandemics, rural policy makers may consider ways to maintain the physical isolation of rural dwellers for protective and preventive purposes, such as increased use of technology as opposed to face to face methods for teaching, working, and communicating during an outbreak. For instance, during the 2009-2010 pandemic, one health sciences program used technology for periodic clinical conferences as opposed to bringing students into the health sciences center from rural clinical sites, decreasing the chance of spreading influenza through close contact.[3] Other preventive solutions include the development of hand-washing stations in public gathering places in rural areas, development of social distancing policies related to closures of rural public institutions during flu outbreaks, and enforcement of absence policies that encourage those with flu like illnesses to stay home from schools and workplaces in rural areas.[4]

Rural populations were significantly less likely to have received vaccines at doctor's offices, hospitals, pharmacies, and workplaces than their more urban counterparts. They were more likely to have received their vaccines at the health department. State Office of Rural Health directors also reported similar observations, noting that the most common sites for distribution of vaccine in rural areas of their state were county health departments and health care provider offices. Policy makers can use this information to plan the most appropriate sites for rural distribution of vaccine, deploying personnel to handle the need for increased staffing during times of peak vaccination, and for targeting outreach and education efforts in particular vaccination sites in rural areas, such as rural Health Centers.

State Office of Rural Health directors were particularly insightful into the issues and barriers around H1N1 vaccination in their state. Of note, more than half provided neutral or disagreeing responses to statements about their perceptions of the request for and use of information from

their organization in planning their state's H1N1 response. Because of the unique knowledge about rural health issues held by staff of the state Offices of Rural Health, a representative from the State Office of Rural Health could be an invaluable resource for issues of allocation of preventive resources and to serve on planning bodies for future pandemic response strategies to ensure that unique needs of rural residents are met.

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Additional Information

The accompanying full report on this study can be accessed at
http://publichealth.hsc.wvu.edu/wvrhrc