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Major article

US university response to H1N1: A study of access to online preparedness and response information

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- Pandemic influenza
- College health
- Emergency operations
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Background: The recent outbreaks of severe acute respiratory syndrome, H5N1 (avian influenza), and, most recently, the novel H1N1 influenza pandemic of 2009 have raised awareness of the danger of new and emerging infections. Preparedness and response plans for such outbreaks are crucial, and given the centrality of the Internet as a source of information on university and college campuses, such plans should be made available at pandemic-dedicated university Web sites. The information on these sites must be comprehensive, accessible, and tailored to the specific circumstances of individual schools.

Methods: An Internet-based search was conducted in September 2009 to evaluate university Web sites for influenza-specific information in a sample of 51 universities. Web sites were assessed by applying a set of key words and a list of 10 indicators used as measures of accessibility and comprehensiveness.

Results: Of the 51 universities evaluated, only 9 (17.6%) either had no influenza Web site or had a university influenza preparedness plan with no dedicated Web site. Only 6 (14.3%) of the schools with influenza specific Web sites had information for parents, with 23 (54.8%) providing information specifically for faculty and staff, and 24 (57.1%) providing information specifically to students.

Conclusion: We found no guidelines for maximizing the access to and effectiveness of online pandemic communications at institutions of higher learning. Until such time as appropriate guidelines are developed, university authorities must carefully assess their needs, taking into account local, national, and international public health circumstances and resources; ease of access; comprehensiveness; and appropriately tailored strategies in their online communications.

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messages. However, studies also have shown that pandemic influenza-specific Web sites are among the least accessible and most difficult to understand compared with Web sites addressing other types of disasters. Poor accessibility can significantly undermine the effectiveness of university pandemic preparedness efforts and limit the ability of individuals to make well-informed decisions during pandemics. This study measures the comprehensiveness and accessibility to the university community of these pandemic-dedicated university Web sites and makes recommendations for improving them.

METHODS

Study sample

Tools for measuring Web site accessibility and usability have been developed primarily to ensure compliance with the Americans with Disability Act and for purposes of online marketing. However, they are not appropriate for measuring these characteristics in disaster-focused Web sites. To assess the comprehensiveness and accessibility of pandemic influenza-dedicated Web sites, a list of US colleges and universities was obtained from the College Navigator function of the National Center for Education Statistics in September 2009. The universities included in this study (1) had a student enrollment of at least 1,000, (2) were classified as 4-year institutions, and (3) provided some form of on-campus housing. A list of 2,768 colleges and universities fitting the inclusion criteria was produced. In an effort to obtain a geographically stratified sample from this list, one university was randomly selected from each US state and the District of Columbia using SPSS version 16.0 (SPSS Inc, Chicago, IL). This selection method takes into account the potential for hierarchical spatial spread of influenza outbreaks among states of differing population sizes.

Selection of influenza-dedicated Web sites

After the selection of 51 colleges and universities, an Internet-based search was conducted to determine whether each school had created an accessible pandemic influenza-dedicated Web site. First, the name of the college or university was entered into the Google search engine, followed by the key words “H1N1,” “pandemic influenza,” “flu,” “student health,” “emergency operations,” and “public safety.” Second, accessibility was measured on the basis of whether the search produced a direct link to the school’s pandemic influenza Web site. Third, if a link was not produced using the Google search, then the school’s Web site was accessed to determine whether a pandemic influenza-dedicated section could be found within 5 “clicks” of the home page. Because there are no definitive guidelines for accessing influenza-specific Web sites, we chose 5 clicks from the home page as a reasonable number to access the desired Web page. Schools were excluded from the analysis if a dedicated influenza Web site could not be found using these search methods, or if the H1N1 pandemic was not specifically addressed using the terms “H1N1,” “swine flu,” or “pandemic influenza.”

Survey tool

A 10-item survey tool was developed to assess the comprehensiveness of university pandemic influenza-dedicated Web sites (Table 1). Domains in the survey instrument were developed specifically for this study using university-specific pandemic influenza recommendations from the CDC and World Health Organization (WHO). This method of exploratory analysis, which uses an a priori set of domains, is one of the most widely used methods for measuring the comprehensiveness of Web site-based health information. In addition to the comprehensive nature of influenza-specific Web sites, accessibility was measured and defined as (1) whether the university had developed an H1N1-dedicated Web site during the survey period or (2) whether this Web site could be accessed using the set of search keywords.

RESULTS

Of the 51 universities included in this study, 21 (41%) were classified as private and 30 (59%) as public. The average size of the student population for this sample was 7,967 students (range, 1,048-51,140). The online search found that >82% (n = 42) of the universities sampled had a dedicated, accessible pandemic influenza Web site. Nine schools did not have an influenza-dedicated Web site accessible via the search keywords or within 5 “clicks” of the school’s home page. The percentage of universities that referenced or included the domains listed in Table 1 was calculated as a measure of overall Web site comprehensiveness. Of the 42 universities with a dedicated influenza Web site, 17 (40.5%) included more than 8 of these measures, 14 (33.3%) included 5-7 measures, 9 (21.4%) included 2-4 measures, and 2 (4.8%) included fewer than 2 measures. The sources of information used to construct these Web sites varied, with a majority using information disseminated through CDC (n = 39; 92.9%), WHO (n = 17; 40.5%), and state health departments (n = 21; 50.0%) Web sites. Access to these sources of information was readily available via links to outside Web sites (n = 41; 97.6%).

Although the comprehensiveness of information on university Web sites varied, 85.7% of the schools did not have information specifically directed to the parents of university students. A majority of universities did, however, create Web pages specifically directed at students (57.1%) and faculty/staff (54.8%). Many of the schools had information for students living on campus (66.7%); however, only 14.3% had any information for students studying abroad. Overall, university Web sites promoted prevention (81%) and planning (52.4%) activities, including guidelines for proper hygiene and information on general steps taken by the university to prepare for communicable disease outbreaks on campus. However, the information provided was rarely specific enough to guide any actions, with only 38.1% of sites including details on response efforts, such as social distancing measures or plans for school closures.

DISCUSSION

In preparing this article, we examined 51 US universities (1 in each state and the District of Columbia) to determine the type of pandemic information they made available online. The results of our survey indicate that even as it became clear in early 2009 that H1N1 was taking a heavy toll on the college-age population, 9 universities (17.6%) lacked an influenza-dedicated Web site. Many of those that had such a Web site did not adequately address the domains related to comprehensive H1N1 information listed in Table 1.

Sources of information

The 2009 H1N1 influenza pandemic and the threat of future new and emerging infectious diseases underscore the importance of having access to comprehensive information regarding university preparedness and response efforts. The survey showed that 92.9% of the 42 sampled universities with influenza-specific Web sites
referred directly to the CDC Web site for information. And although
not included in this research, the CDC also offers a downloadable “flu
widget” used to establish a direct link from any Web site to the CDC
influenza-dedicated Web site. The ease of access and reliability of
information has made CDC online materials a virtual default resource
for universities with pandemic information on their Web sites. However,
CDC materials are not institution-specific and cannot replace planning
for the unique needs of individual universities, nor do they promote culturally appropriate and community-sensitive
approaches. Despite this, only 9.5% of the 42 schools with an
influenza-specific Web site referred to more locally appropriate
information from either a county or city health department. Because
response (including vaccine and medication delivery) is largely local,
CDC materials may not fully serve the immediate university community, and instead may act as a resource for
local preparedness and response messages that are customized to
surrounding communities.

Information for parents

Although many universities post information specific to students, faculty, and staff on their Web sites, there is much less information
for parents. Yet many universities expect parents to take sick
students home during a pandemic. Moreover, parents are likely to be
concerned about their children’s well being. Thus, information
specifically addressing parental concerns and university expecta-
tions of parents should have a place on the pandemic Web site. This
not only would cut down on calls and e-mails triggered by fear and
uncertainty, but also would allow the university to enlist parents in
encouraging their children to follow health precautions, receive
vaccinations, and self-isolate when appropriate.

Information for students studying abroad and international students

Another group with poor access to pandemic response information
is students studying abroad. The number of US college students studying abroad has continued to grow at a steady rate
over the past 25 years. Because disease incidence rates vary by
country, and language and culture are likely to pose barriers, these

Table 1
Measures of comprehensiveness and accessibility to assess university Web site information

| Measure                                                                 | n (%)*  |
|------------------------------------------------------------------------|---------|
| Source of information for Web site                                     |         |
| CDC                                                                    | 39 (92.9) |
| WHO                                                                    | 17 (40.5) |
| State health department                                                | 21 (50.0) |
| Local health department                                                | 4 (9.5) |
| H1N1 information based on current CDC information                      | 41 (97.6) |
| Source of university alert levels and triggers†                        |         |
| WHO alert levels                                                       | 3 (7.1)  |
| WHO and university-developed alert levels                              | 2 (4.8)  |
| CDC and university-developed alert levels                              | 1 (2.4)  |
| University-developed alert levels                                      | 3 (7.1)  |
| CDC, WHO, and university-developed alert levels                        | 2 (4.8)  |
| No alert levels                                                        | 31 (73.8) |
| University had a link to their pandemic plan                           | 12 (28.6) |
| Plan/information for students on campus                                | 28 (66.7) |
| Plan/information for study abroad students on foreign campus           | 6 (14.3)  |
| Links to flu specific Web sites (CDC, WHO, state, local)               | 41 (97.6) |
| Recommendations for planning activities for H1N1 or influenza pandemics| 22 (52.4) |
| as part of an annex to the school emergency operations plan            |         |
| or a stand-alone influenza plan                                        |         |
| Recommendations for prevention activities‡                             | 34 (81.0) |
| Recommendations for response activities§                               | 16 (38.1) |
| Vaccine information consistent with current CDC recommendations        | 30 (71.4) |
| Up-to-date information on number of students with H1N1                | 3 (7.1)  |
| Information specific to                                                  |         |
| Faculty and staff                                                       | 23 (54.8) |
| Parents                                                                | 6 (14.3)  |
| Students                                                               | 24 (57.1) |
| Section on frequently asked questions specific to H1N1                 | 31 (73.8) |

*aThis section uses Web sites multiple times. For example, at least 39 of the 42 H1N1 Web sites use information from the CDC as well as additional sources, such as local health departments.
†Of the 42 schools with H1N1-specific Web sites, 31 did not use CDC, WHO, or campus-specific trigger levels; 3 used only a campus-specific level; 2 used both campus-specific and WHO levels; 1 used both campus-specific and CDC levels; 3 used only WHO levels; and 2 used WHO, CDC, and campus-specific event levels.
‡University provides a list of preventative measures for students, faculty, or staff to minimize transmission and spread of the virus, such as proper handwashing techniques.
§University lists such strategies as campus closures.
students might not understand the risks they face or know where to turn for assistance and resources. They may be quarantined and unable to return to the United States, and they and their parents might not be able to rely on local public health authorities to assist them. A section on the home university’s pandemic Web site dedicated to the needs of these students could provide the necessary updated information, as long as cooperative relations between the home university and health and education authorities abroad are maintained.

Although US students travel abroad in increasing numbers, an even greater number of international students choose to study at American colleges and universities.\textsuperscript{18} They too face language and cultural challenges. Arguably, they are at greater risk than their peers in the United States because they have more limited access to health services and family support. In the event of school closure or restriction of essential services, many of these students might be stranded and would become the responsibility of the university. Providing a culturally and linguistically appropriate section on the pandemic Web site for these students and their parents would alleviate many of these problems.

\textit{Information for faculty and staff}

During a prolonged influenza pandemic, implementation of social distancing measures or even school closures may result in cancellation of classes or a shift to Web-based learning. As a result, faculty and staff must be kept well informed about the status of the pandemic, school preparation, and response strategies. E-mail, Twitter, and other forms of communication will play an integral role in transmitting information, but influenza-dedicated Web sites can provide more in-depth and tailored material. General discussions also may be linked to these sites to allow faculty to work together on planning without the need to meet face to face, risking disease transmission.

\textit{Recommendations}

The CDC recommends that each college or university provide information about the institution’s pandemic preparedness and response plan to the school community.\textsuperscript{15} Given the inevitability of future pandemics, schools should engage students, parents, faculty, and staff in pandemic influenza preparedness and response planning efforts to ensure that the needs of all are addressed. Each group should have an appropriate section on the Web site. As noted earlier, parents are generally disregarded on university pandemic Web sites. Because these Web sites play an important role in the health of students, and the university as a whole, we recommend that they contain information intended specifically for them. Public information officers should work with emergency response officials to provide this information and timely updates on preparedness and response for all users of the Web site.

Faculty and staff should also have access to university sick leave policies through the Web site. This should be accompanied by messages encouraging sick persons to stay home and explaining where they should go for vaccination or treatment if it becomes available through the university. Information should be included for students living both on or near campus. A public version of this information that does not contain personal contacts or sensitive security material also can be released to the general public through an online link.

General information derived from the CDC, WHO, and state and local authorities should augment online information tailored to the needs of the university. For example, regular updates regarding national pandemic status and global disease spread could be directly accessed via a link to the CDC or WHO pandemic-dedicated Web sites, and supplemented by reports from state and local authorities. The same site would inform all members of the campus community about what health services are available and where, and update class cancellations and campus closings.

Finally, we recommend a section specifically addressing the needs of students studying abroad. This will require coordinating with public health, study abroad, and university systems in other countries. Information then can be made available on the home university’s Web site under a heading for students studying abroad, as well as their parents. The needs of international students studying in the United States should be addressed in a culturally appropriate fashion. For example, in the event of a campus closure or restriction of international travel, these students will need information about housing, health care, and other essential services. The pandemic Web site should include multilingual instructions for these students and their parents. A link to the CDC Travel Web site will provide information on international travel restrictions and recommendations, as well as on the severity and geographical locations of outbreaks. The link can be easily integrated into the university’s Web site, along with information for students and faculty returning from these hot spots.

In conclusion, new and emerging infectious disease outbreaks and pandemics have raised awareness of the ramifications of disasters on university campuses. As a result, many institutions have developed preparedness and response plans. These plans vary widely in comprehensiveness and accessibility to the communities they serve. The 2009 novel H1N1 pandemic has been a true test of university public health procedures, which has shown that much remains to be done. The relative ease of use and popularity of online resources, such as CDC influenza Web sites, has made it possible for nearly all universities to provide influenza-specific information somewhere on their Web sites. However, relying primarily or even solely on the CDC online sites for in-depth information on pandemics as many universities do leaves significant gaps in preparation and response capabilities. CDC checklists do not provide the detailed and institution-specific information necessary to field adequate and appropriate responses. University authorities must take into account local public health circumstances and resources, and work toward transparency and specificity in their online communications. Information must be targeted to university audiences and made easily accessible to the entire university community.

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