Recruiting Primary Care Clinicians for Public Health and Bioterrorism Surveillance

Jonathan L. Temte, MD, PhD; Michael E. Grasmick, PhD

ABSTRACT
Context: This study assessed differences in the effort and resources needed to recruit clinicians for a short-term infectious disease sentinel surveillance project.

Objective: Measure differences in recruitment efficiency, time to obtain informed consent, and compliance to a Web-based demographic survey between 3 physician groups.

Design: We recruited Wisconsin clinicians by e-mail, phone, or fax from a primary care practice-based research network (PBRN), an influenza sentinel clinician program, and a state academy of family physicians to participate in a demographic survey prior to a surveillance project.

Results: Successful recruitment of a sentinel clinician required 2-3 hours of staff time. Clinicians affiliated with the PBRN had the highest recruitment efficiencies (1 recruit for every 1.67 contacts; \( P<0.0001 \)). Participants already involved in ongoing influenza surveillance returned consent forms faster than other clinicians (\( P=0.044 \)). We did not identify differences in questionnaire response time between the 3 groups (\( P=0.718 \)).

Conclusions: We observed large and significant differences among 3 primary care groups in the efficiency of recruiting for participation in public health sentinel surveillance. Members of established networks were more approachable and rapidly recruited. Following recruitment, only minimal differences in performance were noted among the groups. Therefore, recruitment for sentinel surveillance is enhanced through the use of established clinic networks.

INTRODUCTION
Surveillance of disease—an essential component of public health practice—has been described as “the systematic collection of data pertaining to the occurrence of specific diseases, the analysis and interpretation of these data, and the dissemination of consolidated and processed information to contributors to the program and other interested persons.”

Emerging infections may require rapid development and deployment of surveillance activities for discrete periods of time in defined geographical locations (eg, Monkeypox). Moreover, the recent focus on bioterrorist events has created new requirements for infectious disease surveillance. To mitigate the potential health and economic effects of covert bioterrorism, surveillance systems must be highly sensitive and extremely timely in detecting bioterrorism-related disease.

Attempts to enhance sensitivity and timeliness, however, may compromise specificity, thus contributing to excessively high rates of false positive detections and associated public panic and excessive associated costs. One possible solution lies in sentinel surveillance by which medical data is interpreted through the lens of context—an operation performed routinely in primary care medicine.

Surveillance for infectious diseases can be divided into 3 general categories. Mechanistic surveillance, such as electronic monitoring of administrative databases for diagnostic codes or composites of codes, is often used for monitoring specific diagnoses or collections of signs or symptoms. Laboratory surveillance typically is focused on specific etiologic pathogens. Sentinel surveillance involves reporting clinical events to a central agency by a physician or other health care professional. Sentinels identify cases according to an
established set of clinical criteria, or they may report presenting symptoms, laboratory use, or other features of clinical care. Case identification is enhanced through clinician involvement and contextual relationships. Moreover, active participation of clinicians results in significantly higher rates of case identification than passive reporting. Attributes of sentinel surveillance include accuracy, sensitivity, and timeliness. This form of surveillance can be limited, however, due to issues related to recruitment, cost, and retention of sentinels.

A previous study alluded to the benefit of using pre-existing networks of clinicians to enhance the timeliness in outbreak response. The desire of generalist physicians to actively participate in public health has been identified as 1 motivating factor for participation in sentinel surveillance. There have been no specific studies, however, directly addressing the process of recruiting primary care clinicians for sentinel surveillance. As a part of a study of clinician performance in sentinel surveillance, we evaluated the process of recruiting participants for brief infectious disease surveillance.

METHODS

Sentinel Surveillance Project

Protocols and reporting tools were developed to assess the ability to rapidly deploy sentinel surveillance in primary care settings. Such protocols could be used for bioterrorism responses. Clinicians were recruited to participate in “future surveillance activities,” but without specific information as to the conditions under surveillance.

Clinicians from 3 provider groups were recruited to participate in the surveillance project. The Wisconsin Research and Education Network (WREN) is a long-standing practice-based research network (PBRN) comprised of Wisconsin family physicians. WREN members form a pool from which participants can be recruited for clinical studies. The Wisconsin Influenza Sentinel Clinician Program (WISCP) is a network of clinicians (including physician assistants and nurse practitioners engaged in reporting influenza-like illness prevalence in Wisconsin as part of the US Influenza Sentinel Provider Surveillance Network). WREN and WISCP are partially overlapping networks engaged in activities that go beyond those that are specifically patient-care oriented. We hypothesized that members of these networks would more quickly respond to requests for participation than control clinicians selected from the general membership of the Wisconsin Academy of Family Physicians (WAFP). We recruited 30 subjects each from WREN and WISCP and 60 control subjects from the WAFP.

We used randomized membership lists from WREN (51), WISCP (70), and WAFP (1400) to identify potential recruits. We assigned WREN clinicians participating in WISCP to the WREN group. Recruitment efforts began with weekly telephone contact or by messages left with the clinic front desk or on voicemail. Immediately after the first round of phone contact, we sent an e-mail describing the surveillance project and indicated that participation would involve eligibility for a $100 incentive payment. To enroll the needed number of participants, we asked the directors of WISCP and of WAFP to appeal directly to their membership.

As participants enrolled in the study, we sent an e-mail requesting clarification/verification of their contact information including title, work address, work phone and fax numbers, e-mail address, and participation in either WREN or WISCP in the past 2 years.

After confirming we had the correct contact information for each participant, we sent them a packet containing consent forms, a code number (to be used when providing data to the researchers), and a self-addressed, stamped envelope. Assignment of 3-digit ID numbers occurred in sequential order to enrollment. We asked participants to sign and return the consent form in the envelope provided. We recorded the dates when packets were mailed to participants and when they were returned (postmark date) to track the elapsed time. We provided participants with an incentive payment of $100 upon receipt of their signed consent forms.

Upon receipt of the consent form, we sent an e-mail request to participants to complete a hyperlinked demographic questionnaire posted on a commercially available, Web-based data portal (Zoomerang™). The questionnaire contained fields for participants to enter their assigned 3-digit ID number, mailing address, e-mail address, and phone number. It included 5 personal questions (age, sex, years in practice, ethnicity, and professional designation) and 7 questions pertaining to the demographics of their practice (including type of practice, size of community, number of patients seen per week, and the age and racial composition of their patient populations). Also, participants ranked the importance of bioterrorism preparedness as a medical issue. We tracked the elapsed time to receive this information by recording the date when we sent the e-mail message and the date the participant completed the online questionnaire.

We defined recruitment efficiency as the number of clinicians recruited from a random order group list divided by the total number of clinicians from that group list with whom we made or attempted recruit-
We found a significant difference in the number of reminders required to obtain consent forms among groups ($X^2 = 10.8; \text{df}=2; P < 0.005$). WISCP clinicians required the fewest reminders (13.3\% of clinicians) and only 1 reminder to initial non-responders was required to obtain full compliance. In contrast, WAFP and WREN participants required more reminders (31.7\% and 30\% of clinicians, respectively). We sent $\geq 4$ reminders to 6.7\% of both WAFP and WREN participants in order to obtain signed consent forms.

All groups performed similarly with respect to compliance in submission of the demographic questionnaire ($X^2 = 3.0; \text{df}=2; \text{not significant}$) with approximately 50\% completed within 7 days for all 3 groups. We received demographic data from all participants within 50 days, with the exception of 3 WAFP clinicians (5\% of group) who never completed the questionnaire. We did not note differences among groups in response time for the demographic questionnaire ($P = 0.718$) or in the need for reminders.

**RESULTS**

We achieved recruitment goals for WREN within 5 weeks. Successful recruitment for WISCP and WAFP required an additional 4 weeks (Figure 1). Notable spikes in recruitment success followed each of 3 rounds of communication with membership by organization directors. Approximately 360 hours of staff time was required to reach target goals from all groups, resulting in an estimated 3 hours of staff time per recruit. Enrollment completion by group was in large part driven by accessibility of potential participants and the reliability of contact information databases provided to us by the respective group organizations. Significant differences in recruiting efficiencies existed among the 3 groups ($X^2 = 70.245; \text{degrees of freedom [df]}=2; P<0.0001$) as seen in Table 1, with the highest efficiency noted for WREN. We did not find a significant difference in recruiting efficiencies between WREN and WISCP.

WISCP clinicians returned consent forms faster than the other 2 groups (WISCP<WREN<WAFP: Kruskal-Wallis; $H=6.25; P=0.044$). The median return time was 4.5 days for WISCP clinicians compared to 6.5 days for WREN clinicians and 8.0 days for WAFP clinicians. It took 36 days for all WISCP consent forms to be returned as compared to 72 days for the WREN and WAFP groups.

We used graphical analysis to visually assess the sequential recruitment process, and compared recruitment efficiencies using the Chi-square statistic. We used the Kruskal-Wallis statistic to make comparisons of the median response times for consent form return and demographic questionnaire completion. We used Chi-square analyses to compare the distribution of the number of reminders required for consent and demographic questionnaire completion across groups.

**DISCUSSION**

Details on the clinician recruitment processes for public health sentinel surveillance activity have not been reported in the literature. In an era of enhanced interest and significant threats of emerging infections and biological terrorism, efforts to efficiently and rapidly assemble sentinel surveillance networks are of major public health importance. This study examined the process of creating a functional sentinel surveillance network in Wisconsin. Moreover, the study was designed to identify potential differences existing among groups of clinicians with varying experience with cooperative efforts, including a practice-based research network and an existing influenza sentinel surveillance network.

In this study, recruitment of clinicians to participate in a sentinel surveillance project required an average of 3 hours per participant. The amount of effort was not, however, equivalent across groups. This is consistent with our hypothesis that the timeliness and success of recruitment would vary by group. Because both WREN and WISCP are clinician networks with experience in responding to data-gathering protocols that extend beyond those normally associated with standard patient care, we expected these groups to respond more quickly to requests for participation than would non-affiliated clinicians as represented by the general WAFP membership. We believed that WAFP members would be less likely than the other 2 groups to have a clear understanding of the research process and the time
May have lagged behind WREN in joining the study, they performed very well once recruited. The WAFP participants, serving as the control group, were not expected to—and did not—respond as quickly as the other groups to either recruitment efforts or in returning consent forms.

Overall, we found that recruitment efforts with busy clinicians were most effective when using phone, fax, and e-mail in combination, and in contacting potential participants often. Weekly contact did not elicit negative feedback. Possibly the single most valuable recruitment tool was buy-in and direct participation of the directors of each organization. The importance of their participation and endorsement cannot be overestimated.

Once clinicians were recruited and consented to participate in surveillance protocols, few differences in initial performance were noticed among clinicians groups. All 3 groups performed similarly in the response time and number of reminders needed to complete the demographic survey. Potential differences between groups were likely minimized through the selection and voluntary participation process. Clinicians who were not interested in participation were self-excluded. Consequently, the major difference identified in this study centered on rate of recruitment.

Rapid recruitment for sentinel surveillance requires connectivity, an established willingness to participate in data gathering, and the endorsement of organizational leadership. To this end, established networks of primary care physicians, such as practice-based research networks and existing influenza sentinel surveillance networks, offer preexisting conditions that facilitate rapid response to emerging public health threats. Efforts to establish additional networks of practicing clinicians are encouraged not only for translational research, but for unexpected future needs for surveillance activities. Moreover, the demonstrated value of connectivity should serve to prompt state divisions of public health, state medical societies and departments of licensing and regulation to jointly collect and maintain accurate and up-to-date clinician contact information.

Commitment involved in data-gathering efforts. Thus they might adhere to the notion that they are simply too busy to participate in surveillance endeavors. Finally, as this was a WREN study, we expected rapid recruitment among the WREN membership.

As we expected, WREN members tended to respond more quickly to calls for participation, whether willing to participate or not, than WISCP and WAFP. In addition, WREN members were more likely to respond positively to our request for participation, thus resulting in high recruitment efficiency. This response both underscores a limitation within the study and highlights an important conclusion. WREN clinicians are likely to respond to a WREN request for participation, but this may limit the generalizability of this study to other situations. Creating and maintaining established relationships among clinicians within PBRNs, however, serves as a model that can be replicated. For example, >100 primary care PBRNs currently exist in the United States.

WISCP ranked second in time and effort needed for recruitment, followed by the WAFP group. A slower rate of recruitment among the WISCP members was due, in part, to the initial difficulty in acquiring accurate and complete contact information. WISCP contact information was least complete and primarily consisted of phone and fax numbers, with very few e-mail addresses available. Contact information was most complete and accurate for the WREN group. We found that we had the most success contacting clinicians using a combination of phone, e-mail, and fax messages due to advantages and disadvantages of each.

WISCP members responded more quickly and required fewer reminders in returning signed consent forms. WISCP clinicians may have performed better than the other groups in returning consent forms because retention in this group is based on consistently high compliance; noncompliant sentinels are replaced annually. In contrast, WREN has a longstanding core membership who would be expected to comply quickly, as well as a number of newly recruited, relatively untested members. Hence, while WISCP participants may have lagged behind WREN in joining the study, they performed very well once recruited. The WAFP participants, serving as the control group, were not expected to—and did not—respond as quickly as the other groups to either recruitment efforts or in returning consent forms.

Overall, we found that recruitment efforts with busy clinicians were most effective when using phone, fax, and e-mail in combination, and in contacting potential participants often. Weekly contact did not elicit negative feedback. Possibly the single most valuable recruitment tool was buy-in and direct participation of the directors of each organization. The importance of their participation and endorsement cannot be overestimated.

Once clinicians were recruited and consented to participate in surveillance protocols, few differences in initial performance were noticed among clinicians groups. All 3 groups performed similarly in the response time and number of reminders needed to complete the demographic survey. Potential differences between groups were likely minimized through the selection and voluntary participation process. Clinicians who were not interested in participation were self-excluded. Consequently, the major difference identified in this study centered on rate of recruitment.

Rapid recruitment for sentinel surveillance requires connectivity, an established willingness to participate in data gathering, and the endorsement of organizational leadership. To this end, established networks of primary care physicians, such as practice-based research networks and existing influenza sentinel surveillance networks, offer preexisting conditions that facilitate rapid response to emerging public health threats. Efforts to establish additional networks of practicing clinicians are encouraged not only for translational research, but for unexpected future needs for surveillance activities. Moreover, the demonstrated value of connectivity should serve to prompt state divisions of public health, state medical societies and departments of licensing and regulation to jointly collect and maintain accurate and up-to-date clinician contact information.

### Table 1. Recruiting Efficiency for Groups of Primary Care Clinicians

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of Sentinels Recruited</th>
<th>Number of Clinicians Contacted</th>
<th>Recruiting Efficiency</th>
<th>Clinicians Contacted Per Recruited Sentinel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisconsin Academy of Family Physicians</td>
<td>17a</td>
<td>169</td>
<td>0.10</td>
<td>9.94</td>
</tr>
<tr>
<td>Wisconsin Influenza Sentinel Clinician Program</td>
<td>30</td>
<td>68</td>
<td>0.44</td>
<td>2.27</td>
</tr>
<tr>
<td>Wisconsin Research and Education Network</td>
<td>30</td>
<td>50</td>
<td>0.60</td>
<td>1.67</td>
</tr>
</tbody>
</table>

a Recruitment procedure changed after the 17th WAFP recruit due to low efficiency.
tion to facilitate rapid response to public health urgencies and emergencies.

Funding/Support/Acknowledgments: We thank Larry Pheifer, David Olson, MD, and Wisconsin Academy of Family Physicians; Thomas Haupt, MS, and the Wisconsin Influenza Sentinel Clinician Program; the Wisconsin Research and Education Network clinicians; Jeff Davis, MD, Lorna Will, RN, MS, and the Wisconsin Division of Public Health; and Lynette Brammer, CDC Influenza Branch for support and comments on this manuscript. This study was supported by a grant from the Agency for Healthcare Research and Quality (#1 RO3 HS014417-011) and by the Community-Academic Partnerships core of the University of Wisconsin Institute for Clinical and Translational Research (UW ICTR), funded through an NIH Clinical and Translational Science Award (CTSA), grant number 1 UL1 RR025011.

Financial Disclosures: None declared.

REFERENCES

The mission of the *Wisconsin Medical Journal* is to provide a vehicle for professional communication and continuing education of Wisconsin physicians.

The *Wisconsin Medical Journal* (ISSN 1098-1861) is the official publication of the Wisconsin Medical Society and is devoted to the interests of the medical profession and health care in Wisconsin. The managing editor is responsible for overseeing the production, business operation and contents of *Wisconsin Medical Journal*. The editorial board, chaired by the medical editor, solicits and peer reviews all scientific articles; it does not screen public health, socioeconomic or organizational articles. Although letters to the editor are reviewed by the medical editor, all signed expressions of opinion belong to the author(s) for which neither the *Wisconsin Medical Journal* nor the Society take responsibility. The *Wisconsin Medical Journal* is indexed in Index Medicus, Hospital Literature Index and Cambridge Scientific Abstracts.

For reprints of this article, contact the *Wisconsin Medical Journal* at 866.442.3800 or e-mail wmj@wismed.org.

© 2009 Wisconsin Medical Society