Willingness to volunteer during an influenza pandemic: perspectives from students and staff at a large Canadian university

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Background A future influenza pandemic will require greater demand on numerous essential services and a reduced capacity to meet that demand. Recruitment of volunteers is an important issue for pre-pandemic planning.

Objectives To identify factors and attitudes towards volunteerism in the event of a pandemic of influenza.

Participants/methods A 42-item web-questionnaire was administered to all faculty, staff and students at the University of Alberta. Respondents indicated their willingness to volunteer. Responses were dichotomized and logistic regression models were developed to capture the association between willingness to volunteer and (i) demographic and information source variables, (ii) risk perception and general knowledge, and (iii) volunteering attitudes and priority access variables.

Results Many factors predicted willingness to volunteer and several involved interactions with other variables. Individuals who were older, relied on University Health Centre information and who had past volunteerism experience were generally more likely to be willing to volunteer. Those willing to volunteer were more likely to think spread could be prevented by covering mouth when coughing/sneezing, and treatment would include drinking fluids. Those who thought influenza would be treated by antibiotics were less willing to volunteer. Likely volunteers thought that healthcare students should be encouraged to volunteer if there was a healthcare worker shortage.

Conclusion This study provides guidance for those who are preparing universities to deal with pandemic influenza. The results suggest factors that might be important in the recruitment of volunteers during an influenza pandemic and these factors might be relevant for other sectors as well.

Keywords Disease outbreaks [G03.850.290], hospital volunteers [M01.955.473], human influenza [C08.730.310], voluntary workers [M01.955].

Introduction

Public health emergencies, such as a future influenza pandemic, create a greater demand on numerous essential services and a reduced capacity to meet that demand. Surge capacity in the healthcare system and elsewhere has been raised as a crucial issue to address before such a pandemic strikes. Among various options to deal with a reduction in manpower, recruitment of volunteers is an essential means which deserves attention in this pre-pandemic planning phase.1 There has been considerable planning in Canada at the federal, provincial, municipal and health authority levels for pandemic influenza; however, there has been very little planning for pandemic influenza at our nation’s universities.

Universities have huge potential as a source of skilled volunteers during such a public health crisis. Health sciences faculties, for example, could provide skilled personnel to help combat the pandemic. Prior planning involves recruiting volunteers ahead of time and anticipating barriers. Attitudes of students towards volunteering can also influence their willingness to volunteer.2 Thus, it is very important to understand the level of knowledge regarding pandemic influenza as well as
attitudes towards volunteerism amongst students, staff and faculty at our universities.

**Methods**

A web-based questionnaire on pandemic influenza was developed and distributed to all 40,086 students, support staff and academic staff at the University of Alberta in Edmonton, Canada. The University of Alberta’s Public Health Response Committee has been developing a response plan in the event of a public health crisis and this study was intended to provide evidence that might assist the Committee in pandemic planning. In particular, it was thought that members of the University would be a source of volunteers during an influenza pandemic. An e-mail was sent on 20 September 2006, with a reminder e-mail circulated on 2 October 2006 to members of health sciences faculties. The data collection was closed on 2 November 2006. Thus, the study period was 20 September 2006 to 2 November 2006. Ethics approval for the study was obtained from the Human Research Ethics Board – Panel B, University of Alberta.

The questionnaire included items relating to demographic information; self-reported current health status; source and reliability of healthcare information (e.g. television, doctors); risk perception and general knowledge of pandemic influenza (e.g. prevention, treatment); allocation of healthcare resources during a pandemic (e.g. save children first); closure of the university during a pandemic; and volunteer issues during a pandemic. Variables based on a 5-point scale were collapsed into two categories (e.g. 1, 2, 3 = unlikely, 4, 5 = likely). The primary outcome was willingness to volunteer if healthy and able to (unlikely, likely), called willingness to volunteer. The data were summarized by willingness to volunteer [frequency and odds ratio (OR), or mean and standard deviation (SD)]. Three separate multivariable logistic regression models were developed to capture the relationship between willingness to volunteer and (i) demographics and information sources; (ii) risk perception and general knowledge; and (iii) attitudes and priorities. Age and gender were considered for entry in each model and all other variables were entered using forward selection. Two-way interactions were added and removed from the model via backward selection. Variables significant in an interaction term were included as main effects. Models were assessed by Akaike Information Criterion (AIC) and Sommer’s D. Bivariable ORs, unadjusted for the multivariable model, and multivariable ORs are provided with 95% confidence intervals (CIs). All P-values are two-sided and a P-value less than 0.05 was considered to be significant. Models included all subjects with complete data on the model variables. Statistical analyses were conducted in SAS and Splus.

**Results**

The e-mail inviting completion of the web questionnaire was distributed to 40,086 individuals and 5225 (13.0%) participated. Females responded more frequently (15.9%, 3657/23,044) than males (8.9%, 1521/17,029). Nearly 95% (4967/5225) of the respondents answered the willingness to volunteer question and 49.2% (2444/4967) were likely volunteers. The proportion of females and males willing to volunteer was nearly identical (49.8% versus 47.7%). Those who expressed a willingness to volunteer were willing to volunteer in a variety of activities: 60–8% (1424/2343) would help feed hospital patients, 79.0% (1859/2353) would provide refreshments in hospital to staff, 73.7% (1781/2418) would volunteer wherever needed in the hospital, 76.0% (1838/2418) would staff community phone lines and 78.6% (1903/2420) would check on neighbours in the community.

**Demographics, information sources and past history of volunteerism**

The most important predictors of willingness to volunteer were age, reliance on information sources, past volunteer activities and Faculty (Table 1, n = 4106). Older respondents were more willing to volunteer (OR for a 25-year-old was 1.4). Respondents who relied on newspapers/magazines or the University Health Centre for health news were also more likely to be willing to volunteer (ORs 1.3 and 1.2 respectively). Individuals with past volunteerism experience with social services were also more likely to be willing to volunteer (OR = 1.5).

The two-way interactions in the model require careful examination (Table 2). Among individuals who placed little reliance on television for health news, respondents with confidence in information from nurses were 1.4 times more likely to be willing to volunteer than respondents with little confidence in nurses. Among business students or academic staff, those who relied on courses/textbooks for health news were 6.8 times more likely to be willing to volunteer than similar individuals who did not rely on such sources.

Past volunteerism (or lack thereof) was an important aspect. Business students or academic staff with past sports and recreation volunteer experience were 3.3 times more likely to be willing to volunteer than those without this experience. Of the respondents without past sports and recreation volunteerism, those who had previously volunteered with schools were more likely to volunteer (OR = 1.3). The same could be said of those without past hospital/healthcare volunteerism. Individuals with a past history of religious volunteerism were 2.6 and 1.4 times more likely to be willing to volunteer for nursing and non-nursing students and academic staff respectively.
Other interaction terms were required for model fit but did not achieve statistical significance. There were few respondents in the Public Health group, although most were willing to volunteer if they did not live off campus with family.

**Risk perception and general knowledge**

When examining the relationship between willingness to volunteer and risk perception and general knowledge variables, the final model \((n = 4623)\) included 13 variables and
five interactions (Table 3). Respondents who believed that they would recover without missing school/work if they developed influenza were more likely to be willing to volunteer than those who believed some school/work would be missed (OR = 1.3). Respondents who thought that the spread of pandemic influenza could be prevented by covering one’s mouth when coughing or sneezing were 1.3 times more likely to be willing to volunteer than those who did not. Those who thought pandemic influenza could be treated by antibiotics were less likely to be willing to volunteer (OR = 0.8) than those who did not think antibiotics were a treatment option. Individuals who believed drinking fluids was a treatment option were 1.2 times more likely to be willing to volunteer than those who did not believe in such treatment.

The openness of the university, and a respondent’s own decision to stay home and avoid public places during an influenza pandemic were linked to likelihood of volunteerism (Table 4). Those who thought that coworkers/coworkers/family members becoming ill would not stop them

### Table 2. Interactions for model A

| First variable                          | Second variable                                           | Willingness to volunteer |          | Multivariable |
|-----------------------------------------|-----------------------------------------------------------|---------------------------|----------|---------------|
|                                         |                                                           | Unlikely (n)              | Likely (n) | OR 95% CI     |
| Student or academic staff in business   | Reliance on course/textbooks for health news              | No                        | Yes (X₈)  | 1348          | 619          | 1.25 | 1.08–1.44 |
|                                         |                                                           | No                        | Yes (X₈)  | 89            | 7            | 1.00 |          |
| Student or academic staff in business   | Past volunteerism with sports and recreation              | No                        | Yes (X₁₁) | 1148          | 819          | 0.90 | 0.72–1.13 |
|                                         |                                                           | No                        | Yes (X₁₁) | 69            | 27           | 1.00 |          |
| Student or academic staff in nursing    | Past volunteerism with religious institutions             | No                        | Yes (X₄)  | 1464          | 458          | 1.41 | 1.16–1.72 |
|                                         |                                                           | No                        | Yes (X₄)  | 114           | 27           | 2.59 | 1.54–4.35 |
| Past volunteerism with sports and recreation | Past volunteerism with schools                        | No                        | Yes (X₁₃) | 700           | 517          | 1.00 |          |
|                                         |                                                           | No                        | Yes (X₁₃) | 262           | 27           | 1.00 |          |
| Past volunteerism with hospital/health care | Past volunteerism with schools                      | No                        | Yes (X₁₃) | 584           | 517          | 1.71 | 0.90–3.22 |
|                                         |                                                           | No                        | Yes (X₁₃) | 176           | 15           | 1.00 |          |
| Student or academic staff in public health | Live off campus with family                       | No                        | Yes (X₉)  | 1164          | 896          | 1.00 |          |
|                                         |                                                           | No                        | Yes (X₉)  | 1164          | 896          | 1.00 |          |
| Student or academic staff in public health | Live off campus with family                       | No                        | Yes (X₉)  | 896           | 896          | 1.00 |          |
| Past volunteerism with religious institutions | Live off campus with family                   | No                        | Yes (X₉)  | 896           | 896          | 1.00 |          |
| Reliance on television for health news  | Confidence in information received from nurses       | Little                    | Yes (X₁₀) | 909           | 669          | 0.90 | 0.77–1.05 |
|                                         |                                                           | Little                    | Yes (X₁₀) | 256           | 229          | 0.64 | 0.35–1.16 |
|                                         |                                                           | Little                    | Yes (X₁₀) | 746           | 746          | 0.94 | 0.49–1.81 |
from going to school/work were 1.5 times more willing to volunteer if they believed that the university should remain open with necessary operations only and two times more willing if they believed that all faculties/departments should remain open, compared to those who felt the university should be closed. Similarly, those who thought that something would stop them from going to school/work during a pandemic were 1.5 and two times more willing to volunteer if they believed that the university should remain open with necessary operations only or that all faculties/departments should remain open respectively.

**Attitudes towards volunteering and priority access to scarce resources**

Those who would assign high priority access to scarce resources to the very young (newborns to 2 years) and to
Table 4. Interactions for model B

| First variable  | Second variable                                                                 | Willingness to volunteer | Multivariable |
|-----------------|-------------------------------------------------------------------------------|--------------------------|---------------|
|                 |                                                                                 | Unlikely (n)             | Likely (n)    | OR | 95% CI          |
| Age (Z\(_1\))   | Is pandemic influenza spread by touching doorknobs (etc.) previously handled by an infected person? | 2494 (8.71)              | 2615 (10.12)  | 25 years: 1.00 | 0.56–1.77 |
|                 | No                                                                             | 2581 (9.71)              | 2623 (10.22)  | 35 years: 1.00 | 0.49–1.02 |
|                 | Yes (Z\(_2\))                                                                  | 2747 (10.58)             | 2747 (11.03)  | 25 years: 1.00 | 0.82–1.67 |
|                 | Can pandemic influenza be prevented by vaccination?                              | 2474 (8.79)              | 2572 (9.81)   | 35 years: 1.00 | 0.96–1.96 |
|                 | No                                                                             | 781                      | 916           | 1.00          |              |
|                 | Yes (Z\(_3\))                                                                  | 36                       | 49            | 1.28          | 0.82–2.01 |
|                 | Can pandemic influenza be prevented by moving to a province/country with no outbreak? | 1202                     | 1104          | 1.00          |              |
|                 | No                                                                             | 317                      | 218           | 0.75          | 0.32–1.74 |
|                 | Can pandemic influenza be prevented by quarantine?                              | 679                      | 460           | 1.00          |              |
|                 | No                                                                             | 677                      | 460           | 1.00          |              |
|                 | Yes (Z\(_4\))                                                                  | 337                      | 394           | 1.53          | 1.27–1.85 |
|                 | When pandemic hits, should the university remain open?                           | 1174                     | 1156          | 1.98          | 1.41–2.80 |
|                 | No, close it                                                                    | 6                        | 19            | 1.00          |              |
|                 | Yes, only necessary (Z\(_5\))                                                  | 104                      | 172           | 0.75          | 0.23–2.38 |
|                 | When pandemic hits, would coworkers/family becoming ill stop you from going to school/work? | 36                       | 86            | 0.50          | 0.15–1.69 |
|                 | No                                                                             | 508                      | 304           | 1.00          |              |
|                 | Yes, only necessary (Z\(_5\))                                                  | 181                      | 261           | 1.53          | 1.27–1.85 |
|                 | When pandemic hits, would coworkers/family becoming ill stop you from going to school/work? | 645                     | 623           | 1.98          | 1.41–2.80 |
|                 | No, close it                                                                    | 177                      | 175           | 1.00          |              |
|                 | Yes, only necessary (Z\(_5\))                                                  | 260                      | 305           | 1.10          | 0.59–2.05 |
|                 | When pandemic hits, would coworkers/family becoming ill stop you from going to school/work? | 565                     | 619           | 1.20          | 0.54–2.66 |
|                 | Yes, all facs/depts (Z\(_5\))                                                  | 27–1                      | 53–2           |              |              |

Discussion

Past experience in emergency planning shows that the biggest challenge may be the identification and recruitment of volunteers.\(^8\) As a result, a key objective of the questionnaire was to assess the attitudes and associated factors with willingness of the University community towards volunteering during a pandemic. Our first model suggested that willingness to volunteer increased with age (Tables 1 and 7). The literature both supports and contradicts this (Zweigenhaft et al.\(^9\) – the best volunteers were older females; Fothergill et al.\(^10\) – more likely to volunteer if younger). This is important to assess in terms of where to focus recruitment efforts as well as steps that may be taken to alter attitudes in other age categories. Recruitment strategies work better if aimed at the age of a particular group.\(^11\)
Likely volunteers also relied on various sources of health information, although the confidence in these sources did not generally contribute to the willingness to volunteer. One exception was the increased willingness by those who relied on the University Health Centre. This might also provide useful information regarding education efforts and recruitment.

Most of our study participants have a history of volunteering. Past volunteerism was an important predictor and pandemic planners might liaise with existing volunteer organizations. This is supported by the study of Zakour et al., suggesting that planning should include liaising with organizations such as churches.

A belief in preventive measures (such as covering one’s mouth when coughing) was associated with increased willingness. Those respondents also believed in keeping the university open or closing it only to the extent necessary. As household quarantine is effective at reducing attack rates in the community but only if compliance is high, this might indicate a need for education. This is also the case given that school closure causes a small reduction in cumulative attack rates but a more substantial reduction in peak attack rates of up to 40%.

Most of the likely volunteers also felt that health sciences students should be strongly encouraged to volunteer during a pandemic. Indeed, a high percentage felt that there was a moral/ethical/professional obligation on the part of health care students to volunteer. Future research should look at whether education regarding such a duty would lead to an increased willingness to volunteer. The ethics of volunteering

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Table 5. Multivariable model based on attitudes and priorities (model C)

| Variable                                                                 | Willingness to volunteer | Bivariable* | Multivariable† |
|-------------------------------------------------------------------------|--------------------------|-------------|---------------|
|                                                                         | Unlikely (n) | Likely (n) | OR  | 95% CI | OR | 95% CI |
| Volunteers should be given monetary compensation                        |             |             |     |       |    |       |
| Disagree                                                                 | 1426         | 1614        | 1.00|       |    |       |
| Agree (W1)                                                               | 825          | 564         | 0.60| 0.53–0.67 |    |       |
| Volunteers should be given monetary compensation only if ill            |             |             |     |       |    |       |
| Disagree                                                                 | 1851         | 1677        | 1.00|       |    |       |
| Agree (W2)                                                               | 400          | 501         | 1.38| 1.19–1.60 |    |       |
| Families of volunteers should be compensated only if death results       |             |             |     |       |    |       |
| Disagree                                                                 | 1753         | 1582        | 1.00|       |    |       |
| Agree (W3)                                                               | 498          | 586         | 1.30| 1.13–1.49 | 1.18| 1.01–1.37 |
| Volunteers should not be compensated                                     |             |             |     |       |    |       |
| Disagree                                                                 | 1970         | 1681        | 1.00|       |    |       |
| Agree (W4)                                                               | 281          | 497         | 2.07| 1.77–2.43 |    |       |
| Should healthcare students be strongly encouraged to volunteer if health care worker shortage? |
| No                                                                       | 682          | 258         | 1.00|       |    |       |
| Yes (W5)                                                                | 1569         | 1920        | 3.23| 2.76–3.79 | 2.80| 2.35–3.29 |
| Do healthcare students have a moral/ethical/professional obligation to volunteer during a pandemic? |
| No                                                                       | 811          | 502         | 1.00|       |    |       |
| Yes (W6)                                                                | 1440         | 1676        | 1.88| 1.65–2.15 | 1.21| 1.04–1.41 |
| If not enough volunteers, government justified in requiring people to work? |
| No                                                                       | 800          | 583         | 1.00|       |    |       |
| Yes (W7-1)                                                              | 931          | 1180        | 1.74| 1.52–2.00 |    |       |
| If penalty for refusing to aid, should jail time be a penalty?           |             |             |     |       |    |       |
| No                                                                       | 2167         | 2120        | 1.00|       |    |       |
| Yes (W8)                                                                | 84           | 58          | 0.71| 0.50–0.99 | 0.58| 0.41–0.83 |
| Access to scarce resources for newborns to 2 years                      |             |             |     |       |    |       |
| Low priority                                                             | 632          | 461         | 1.00|       |    |       |
| High priority (W9-1)                                                    | 1619         | 1717        | 1.45| 1.27–1.67 | 1.25| 1.07–1.47 |
| Access to scarce resources for vulnerable people due to pre-existing illness |
| Low priority                                                             | 982          | 794         | 1.00|       |    |       |
| High priority (W10-1)                                                   | 1269         | 1384        | 1.35| 1.20–1.52 | 1.21| 1.05–1.38 |

*Unadjusted for other variables.
†Adjusted for all other variables in the model.
‡Variable involved in an interaction. OR provided in Table 6.
during a pandemic lead necessarily to a debate regarding an ethical duty to care. It is important to engage in this debate before a pandemic occurs and to make societal expectations explicit.14 This is particularly so as there is evidence of the erosion of this sense of duty.15 Such a duty was much more explicit in previous decades during infectious disease outbreaks.16 It has been asserted that immediate action is required to make such a duty explicit to healthcare professionals and set it out once again in codes of ethics.17 This might affect not only the attitudes of healthcare workers, but also those who will be asking them to volunteer in the midst of such an outbreak. During the 1918 pandemic, senior medical students were pressed into service;18 by contrast, medical students at the University of Toronto were removed from clinical service rotations during the SARS outbreak (D. Low, personal communication).

While our results identified key factors influencing the decision to volunteer, further study is needed. Some of the most interesting results were factors that did not provide evidence of an effect on willingness to volunteer (i.e. gender, children). While the respondents were predominantly female, each gender was nearly equal in terms of willingness to volunteer. Crucial to education and recruitment strategies is knowledge about factors that motivate individuals and groups. The answer is clearly complex. Functions that may provide an incentive to volunteer include values (one's values provide the motivation); understanding (volunteer seeks to gain knowledge); enhancement (the individual can grow and develop psychologically); career (volunteering to gain career-related experience); social (volunteering promotes social relationships); and protective (volunteering addresses feelings of guilt or personal issues).19 A psychological sense of community can enhance

Table 6. Interactions for model C

| First variable | Second variable | Willingness to volunteer | Multivariable |
|----------------|----------------|--------------------------|--------------|
|                |                | Unlikely (n)             | Likely (n)   | OR  95% CI |
| Volunteers should be given monetary compensation | Volunteers should be given monetary compensation only if ill | 1098 | 1210 | 1.00 |
| Disagree       | Disagree       | 328 | 404 | 1.11 0.93–1.33 |
| Agree (W1)     | Agree (W1)     | 753 | 467 | 1.00 |
| Agree (W2)     | Agree (W2)     | 72  | 97  | 1.89 0.97–3.67 |

Table 7. Mathematical formula for multivariable models

For all models, \( p = \Pr (Y = 1) \) where \( Y = 1 \) if willing to volunteer and \( Y = 0 \) otherwise

Model A:

\[
\ln \left( \frac{\hat{p}}{1 - \hat{p}} \right) = -1.258 + 0.013X_1 - 1.193X_2 + 0.593X_3 + 2.583X_4 - 0.106X_5 + 0.092X_6 + 0.240X_7 + 0.22X_8 + 0.174X_9 + 0.350X_{10} - 0.108X_{11} + 0.731X_{12} + 0.230X_{13} + 0.345X_{14} + 0.403X_{15} + 1.703X_{16} + 1.292X_{17} + 0.606X_{18} + 0.306X_{19}X_{13} - 0.33X_{12}X_{13} - 2.687X_1X_5 - 0.340X_{14}X_5 - 0.407X_{10}X_{15}X_{17}
\]

Model B:

\[
\ln \left( \frac{\hat{p}}{1 - \hat{p}} \right) = -0.881 + 0.009Z_1 + 0.299Z_2 + 1.620Z_3 + 0.497Z_4 + 0.427Z_{51} + 0.685Z_{52} + 0.148Z_5 + 0.244Z_7 + 0.238Z_6 - 0.218Z_4 + 0.250Z_{10} - 0.172Z_{11} + 0.196Z_{12} - 0.147Z_{13} + 0.106Z_{14} + 0.014Z_8 + 0.016Z_9 - 0.541Z_{10}Z_{16} - 0.720Z_2Z_{13} - 1.376Z_5Z_{12} - 0.336Z_3Z_{14} - 0.502Z_4Z_{15}
\]

Model C:

\[
\ln \left( \frac{\hat{p}}{1 - \hat{p}} \right) = -1.565 - 0.386W_1 + 1.044W_2 + 0.163W_3 + 0.823W_4 + 1.029W_5 + 0.192W_6 + 0.141W_{11} + 0.423W_{12} - 0.544W_9 + 0.223W_5 + 0.186W_{10} + 0.533W_7 - 0.774W_{15} - 0.057W_{16}
\]
willingness to volunteer. These are important factors for post-secondary institutions to be aware of.

The study limitations include respondent self-selection and focus on one university. Our response rate of 13% provided 5225 responses. Mailed questionnaires tend to have higher response rates than questionnaires provided by e-mail, and often have better response rates than Internet-based questionnaires. This questionnaire was Internet based and the e-mail sent to students and staff contained a link to the web questionnaire. There is some evidence that web-based questionnaires might have response rates similar to that of mailed questionnaires and be more effective than the latter in settings where the study population has access to e-mail and the Internet. The large number of responses provided a sample size sufficient for narrow confidence intervals and model development; however, the non-responders might differ from the responders on important characteristics and these characteristics are not captured in the study. The aspects surrounding volunteerism are complex and this study was not specifically designed to assess all factors or a specific conceptual model of volunteerism. A model was fit with all significant main effects and two-way interactions, but was not easily interpretable and understandable. The results are based on an expressed willingness to volunteer and, in the event of an influenza pandemic, it is not clear how many individuals would become actual volunteers. The specific circumstances of an influenza pandemic would likely influence whether or not respondents indicating a willingness to volunteer would actually volunteer. The likelihood of volunteering might diminish with an increasing mortality rate. Studies have shown that self-predictions in this regard are often overly optimistic. The model coefficients are not easily interpretable and understandable. The results are significant main effects and two-way interactions, but was not adjusted for multiple testing; however, with the large sample size most of the coefficients are highly significant.

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