

How infectious disease outbreaks affect community-based primary care physicians

Comparing the SARS and H1N1 epidemics

R. Liisa Jaakkimainen MD MSc CCFP Susan J. Bondy PhD Meredith Parkovnick MSc Jan Barnsley PhD

Abstract

Objective To compare how the infectious disease outbreaks H1N1 and severe acute respiratory syndrome (SARS) affected community-based GPs and FPs.

Design A mailed survey sent after the H1N1 outbreak compared with the results of similar survey completed after the SARS outbreak.

EDITOR'S KEY POINTS

- This study asked GPs and FPs after the H1N1 epidemic about how such serious infectious disease outbreaks affected them and compared their responses to a similar survey completed by GPs and FPs after the severe acute respiratory syndrome (SARS) epidemic.
- Compared with the 2003 respondents (after SARS), the 2010 respondents (after H1N1) were significantly more likely to wash their hands between patient encounters; wear masks, goggles, and gowns during patient encounters; and clean work surfaces with antiseptic at least once daily ($P < .01$). Most of the 2003 respondents who provided out-of-office care indicated that during a serious community outbreak, like SARS, psychotherapy or counseling, nursing home, emergency department, and well-baby visits, housecalls, palliative care, and obstetric care would not change. However, the 2010 respondents indicated that these elements of out-of-office care would be affected.
- A significantly higher proportion of 2010 respondents ($P < .01$) were extremely or somewhat worried about infecting their families with an infectious disease during a community outbreak, believed that their families were somewhat worried about being infected by them, and were somewhat worried about dealing with serious outbreaks as front-line doctors.

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Setting Greater Toronto area in Ontario.

Participants A total of 183 randomly selected GPs and FPs who provided office-based care.

Main outcome measures The perceptions of GPs and FPs on how serious infectious disease outbreaks affected their clinical work and personal lives; their preparedness for a serious infectious disease outbreak; and the types of information they want to receive and the sources they wanted to receive information from during a serious infectious disease outbreak. The responses from this survey were compared with the responses of GPs and FPs in the greater Toronto area who completed a similar survey in 2003 after the SARS outbreak.

Results After the H1N1 outbreak, GPs and FPs still had substantial concerns about the effects of serious infectious disease outbreaks on the health of their family members. Physicians made changes to various office practices in order to manage and deal with patients with serious infectious diseases. They expressed concerns about the effects of an infectious disease on the provision of health care services. Also, physicians wanted to quickly receive accurate information from the provincial government and their medical associations.

Conclusion Serious community-based infectious diseases are a personal concern for GPs and FPs, and have considerable effects on their clinical practice. Further work examining the timely flow of relevant information through different health care sectors and government agencies still needs to be undertaken.

Effets de l'écllosion d'une maladie infectieuse sur les médecins de première ligne œuvrant dans la communauté

Une comparaison de l'épidémie de SRAS avec celle du H1N1

R. Liisa Jaakkimainen MD MSc CCFP Susan J. Bondy PhD Meredith Parkovnick MSc Jan Barnsley PhD

Résumé

Objectif Comparer la façon dont les écloisions de l'infection à H1N1 et celle du syndrome respiratoire aigu sévère (SRAS) ont affecté les OP et les MF œuvrant dans la communauté.

Type d'étude Comparaison des résultats d'une enquête postale effectuée après l'épidémie à H1N1 avec ceux d'une enquête semblable effectuée après l'épidémie de SRAS.

Contexte La région du Grand Toronto.

Participants Un total de 183 OP et MF choisis au hasard, qui pratiquaient dans un bureau.

Principaux paramètres à l'étude L'opinion des OP et des MF sur les effets de l'écllosion d'une maladie infectieuse sévère sur leur travail clinique et sur leur vie personnelle; leur niveau de préparation en cas d'écllosion d'une maladie infectieuse sévère; le genre d'information qu'ils voudraient recevoir et de quelle source ils souhaiteraient la recevoir en cas d'écllosion d'une telle maladie. Les réponses à cette enquête ont été comparées à celles d'OP et de MF de la région du grand Toronto qui avaient complété une enquête semblable en 2003, après l'épidémie de SRAS.

Résultats Après l'épidémie de H1N1, les OP et les MF avaient encore d'importantes inquiétudes au sujet des effets de l'écllosion d'une maladie infectieuse sévère sur la santé des membres de leur famille. Les médecins ont alors apporté plusieurs changements dans leur façon de traiter et d'aborder les patients atteints d'une infection sévère. Ils se sont dits inquiets des effets éventuels d'une telle maladie infectieuse sur la dispensation des soins de santé. En outre, les médecins souhaitaient recevoir une information précise de la part des autorités provinciales et de leurs associations médicales.

Conclusion L'écllosion d'une maladie infectieuse sévère au sein d'une communauté est une source de préoccupations personnelles pour les OP et les MF, en plus d'avoir des effets considérables sur leur pratique clinique. D'autres études devraient être entreprises pour vérifier si les différents secteurs responsables de la santé et les agences gouvernementales émettent de l'information pertinente en temps opportun.

POINTS DE REPÈRE DU RÉDACTEUR

- Dans cette étude, on a demandé à des omnipraticiens (OP) et à des MF, après l'épidémie de H1N1, de quelle façon l'écllosion d'une maladie infectieuse aussi grave les avait affectés, pour ensuite comparer leurs réponses à celles d'une enquête semblable complétée par des OP et des MF après l'épidémie du syndrome respiratoire aigu sévère (SRAS).

- Par rapport à ceux de 2003 (après le SRAS), les répondants de 2010 (après le H1N1) étaient significativement plus susceptibles de se laver les mains entre les patients; de porter des masques, des lunettes protectrices et des chemises d'hôpital en présence des patients; et de nettoyer les surfaces de travail avec des antiseptiques au moins une fois par jour ($P < ,01$). La plupart des répondants qui offraient des soins en-dehors du bureau ont mentionné qu'une écllosion sévère dans la communauté, comme celle du SRAS, n'entraînerait pas de changement au niveau de la psychothérapie ou du counseling, des centres d'hébergement, des départements d'urgence, des visites de contrôle des nouveau-nés normaux, des visites à domicile, des soins palliatifs et des soins obstétricaux. Toutefois, les répondants de 2010 ont indiqué que les soins de ce type seraient affectés.

- Une proportion significativement plus élevée des répondants de 2010 ($P < ,01$) étaient extrêmement ou quelque peu préoccupés à l'idée d'introduire une maladie infectieuse dans leur famille durant une écllosion locale; croyaient que les membres de leur famille étaient quelque peu inquiets d'être infectés par eux; et avaient certaines inquiétudes concernant le fait d'avoir à affronter une écllosion grave comme médecin de première ligne.

Cet article a fait l'objet d'une révision par des pairs.
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The urban area of Toronto, Ont, and its surrounding suburbs, was the second-largest epicentre of the severe acute respiratory syndrome (SARS) epidemic of 2003. In the final tally, this area had 438 probable and suspected patient cases (100 of whom were health care workers) and 44 deaths due to SARS.¹ On March 26, 2003, all health care institutions (including acute care hospitals, nursing homes, and rehabilitation facilities) came under the control of provincial emergency management legislation.² Within days, a code orange was ordered for all greater Toronto area (GTA) hospitals—followed by all provincial authorities (Emergency Management Act)—which included not only isolation of SARS cases, but also visitor restrictions, restrictions on transfer of patients and staff between centres, and cancellation of all nonessential services.

The closure of health care facilities severely limited patients' access to health care providers and services in the hospital setting for a period of 2 months.³ However, there were no specific directives for community-based practices. The Ontario Ministry of Health and Long-Term Care (MOHLTC) and the Ontario Medical Association (OMA) regularly communicated information to physicians via e-mail or fax. However, reaching community-based physicians is not easy. Federal and provincial reports regarding the outbreak described confused lines of communication during the management of the emergency.^{2,4} Primary care and non-hospital-based physicians were particularly identified as disadvantaged with respect to consistent and timely communications.²

As community-based physicians, GPs and FPs in Canada are on the front line in combating any serious community-based infectious diseases. After the SARS outbreak in the GTA, the Public Health Agency of Canada recommended that it have better interconnectivity with health care structures including primary care.⁵ The H1N1 epidemic in 2009 once again increased awareness about the role of community-based physicians during serious infectious disease outbreaks. During that time a vaccine was made available, initially in limited supply, and provided to designated high-risk groups.⁶ The GPs and FPs in the community dealt with patients and staff experiencing flulike symptoms, and protocols were provided by the OMA and the MOHLTC to help community-based physicians.⁷

In 2003, we conducted a study to determine whether community-based GPs and FPs were affected by the SARS epidemic, how their clinical practice was affected, and how they were personally affected.⁸ We also determined what sources they used to get information about SARS.

The purpose of this study was to conduct a repeat survey of community-based GPs and FPs in the GTA after the H1N1 outbreak and compare those responses with the 2003 survey responses about the following: physicians' perceptions about the effects of a serious infectious disease outbreak on their clinical work and

personal lives; their willingness to provide outbreak-related care; and their preferences for sources of information during serious infectious disease outbreaks.

METHODS

Study design and sample size

This study was a survey of community-based GPs and FPs working in the GTA in 2010 (after H1N1). The responses from this survey were compared with the responses from the GPs and FPs who completed the 2003 survey after the SARS epidemic.

To obtain a representative sampling of primary care physicians, including both GPs and FPs certified by the College of Family Physicians of Canada who were active in primary care medicine, we first obtained a simple random sample of physician records from the MD Select online version of the Canadian Medical Directory.⁹ A random selection was completed by MD Select staff with the inclusion criteria of any primary or secondary interest in family practice or community health and practising in the GTA (as defined by the 2006 census of the metropolitan area of Toronto with a resident population of approximately 5.1 million people).¹⁰ The listing obtained was then hand searched to exclude ineligible practitioners including those known by the investigators to be retired, deceased, or not practising in general or family practice (eg, government or research).

A priori sample size requirements indicated a target response of approximately 278 completed questionnaires. This is based on a conservative estimate of 50% among all respondents, with CIs spanning no more than 5 percentage points from the point estimate. We assumed a response rate of 45% and therefore mailed 600 questionnaires.

Data collection

A modified Dillman mail survey technique was employed.¹¹ The first mailing included a cover letter that explained the study, the questionnaire, and a self-addressed stamped envelope. Neither the questionnaire nor its return envelope had the name of the respondent or any number matching physician names. The mailing also included a prestamped response postcard, bearing the individual physician's name, which was mailed separately. This response postcard confirmed a response to the survey and also documented informed consent from the respondent.

A postcard reminding the invited physician to complete the questionnaire was mailed out approximately 3 weeks after the first mailing. The third reminder mailing included a second copy of the questionnaire, cover letter, and other reply materials, and was sent out approximately 6 weeks after the first mailing.

Survey instrument

The previously used SARS questionnaire was developed to address several domains: physicians' use of information about the SARS epidemic; how the SARS epidemic affected their clinical practice; and how the epidemic had affected them personally. For this study, a similar questionnaire was used; however, it did not focus only on SARS but on any serious infectious disease epidemic such as avian influenza, H1N1, or a pandemic influenza. We asked GPs and FPs how a serious outbreak affected their behaviour within office practice and their out-of-office practice, as well as their beliefs about risk of infection to themselves and their family members. Most questions had either categorical responses or used ordinal scales.

The original SARS questionnaire was pretested and used in both the Toronto study and a parallel study in Hong Kong.⁸ However, because some questions were modified to update the questionnaire for this study, another pretest was conducted. This pretest, which examined the questionnaire's face validity, was performed among staff and resident FPs at Sunnybrook Health Sciences Centre (approximately 30 individuals) in Toronto. After the questionnaire was distributed among these physicians, a second questionnaire was provided approximately 3 weeks later to examine the test-retest stability of responses, as well as face validity. There was good test-retest agreement with κ values between 0.82 and 0.92.

Statistical analysis

A descriptive analysis of the categorical and ordinal data was the main focus of this study. Responses to the 2010 questions were also compared with responses from the 2003 survey using the Pearson χ^2 test for association. The Statistix software package, version 8, was used for all analyses.¹²

The study received ethics approval from the Sunnybrook Health Sciences Centre.

RESULTS

There were 600 questionnaires mailed and 253 were returned. Of the 253 questionnaires, 183 were from GPs and FPs practising office-based care. There were 52 questionnaires returned because the physicians no longer worked at the mailing address, and 18 were excluded because the physicians did not work in primary care practices. Therefore, the overall response rate was 31.0%. The demographic characteristics of the 2003 and 2010 respondents, as well as those of all GPs and FPs practising in Ontario in 2011, are provided in **Table 1**.

Of the 2010 respondents, only 6.6% felt confident and 48.1% were somewhat confident that all levels of

government would work well together to ensure the health care system was prepared to respond to a serious outbreak in the community; 63.4% believed the current shortage of FPs would have serious effects on the local health care system's ability to prepare for a serious infectious disease outbreak in the community.

Clinical work and personal life

A comparison of the 2003 and the 2010 GPs' and FPs' responses regarding the effects of a serious outbreak on their behaviour within office care and the precautions taken in the office during an outbreak is provided in **Table 2**. The 2003 respondents were significantly more likely to postpone or cancel surgical procedures, avoid physical examinations, and postpone or cancel specialist appointments ($P < .01$). The 2010 respondents were significantly more likely ($P < .01$) to insist every patient wear a mask, keep a greater distance between

Table 1. Characteristics of the 2003 and 2010 GP and FP respondents, as well as those of all GPs and FPs practising in Ontario in 2011

CHARACTERISTICS	GPs AND FPs		
	2003 RESPONDENTS (N = 707), %*	2010 RESPONDENTS (N = 183), %*	PRACTISING IN ONTARIO IN 2011 (N = 11 385), %*
Age, y			
• ≤ 39	22.1	25.1	23.3
• 40-49	34.6	27.3	24.4
• 50-59	26.3	29.0	32.1
• ≥ 60	15.9	18.0	20.2
Female sex	40.6	57.4	40.0
Location of primary medical education			
• Canada	77.3	84.2	76.7
• United States	1.2	0.5	0.6
• International	19.6	15.3	22.7
Primary practice type			
• Solo practice	32.9	15.3	17.1
• Family health team, family health organization, or family health network	NA	35.0	37.2
• Family health group	NA	31.1	29.1
• Teaching practice	7.2	3.8	NA
• Community health centre	2.2	2.7	NA

NA—not available.

*Percentages might not add to 100 owing to rounding.

themselves and patients, request more blood tests or chest x-ray scans, see some patients faster, measure patients' temperatures as part of their routine, and advise patients not to travel to affected areas.

Compared with the 2003 respondents, the 2010 respondents were significantly more likely to indicate they would wash their hands between patient encounters, always wear a mask during patient encounters, wear goggles for patient encounters, wear gowns for patient encounters, and clean work surfaces with antiseptic at least once daily ($P < .01$). The 2003 respondents were more likely to ask that all staff members have their temperatures taken.

Table 3 compares the out-of-office care among the 2003 and the 2010 respondents. Most of the 2003 respondents who provided out-of-office care indicated that during a serious community outbreak, psychotherapy or counseling, nursing home, emergency department, and well-baby visits, housecalls, palliative care, and obstetric care would not change; this is in marked contrast with the 2010 respondents who indicated these elements of out-of-office care would be affected. There was no difference between the proportions of respondents who indicated that their inpatient care would remain unchanged in an outbreak.

The 2003 and 2010 respondents' concerns about the effects of a serious infectious disease outbreak on their

Table 2. Comparison of how the 2003 and 2010 respondents' office-based care was affected during serious infectious disease outbreaks: Proportion of respondents who indicated yes when asked about behaviour in office practice and precautionary measures in clinic.

STATEMENTS	FPS AND GPs	
	2003 RESPONDENTS WHO INDICATED YES, %	2010 RESPONDENTS WHO INDICATED YES, %
Behaviour in office practice		
• Insist every patient wear a mask	14.1	59.0*
• Keep a greater distance between yourself and patients	27.1	48.6*
• Request more blood tests or chest x-ray scans	9.5	42.6*
• Postpone or cancel family practice appointments	60.6	63.9
• Postpone or cancel surgical procedures	62.6	49.2*
• Prescribe more antiviral medications	NA	84.7
• See some patients faster	19.6	71.0*
• Have long wait times for laboratory and investigation results (eg, computed tomographic scans)	60.0	54.1
• Test patient temperature as a routine procedure	38.5	69.4*
• Avoid physical examinations	62.0	18.0*
• Advise patients not to travel to affected areas	50.3	86.3*
• Postpone or cancel specialist appointments	75.2	49.2*
• Find it difficult, are you unable, to make specialty referrals	63.6	54.6
• Prescribe more antibiotics	NA	48.6
• Perform more nasopharyngeal or throat swabs	NA	76.5
• Overprescribe antibiotics	62.0	NA
Precautionary measures taken		
• Wash your hands between every patient encounter	47.3	68.9*
• Always wear a mask during consultations	29.5	42.1*
• Wear goggles for patient encounters	15.8	79.8*
• Clean work surfaces with antiseptic at least once daily	45.2	59.6*
• Ask all support staff to wear masks	53.9	56.8
• Insist that temperature be measured for all patients	NA	29.0
• Insist staff members wear gowns during patient encounters	20.7	39.3*
• Ask all staff to wear disposable gloves	18.9	23.5
• Ask all staff members to have their temperatures measured	16.6	3.3*

NA—not available.

* $P < .01$.

Table 3. Comparison of how the 2003 and 2010 respondents' out-of-office care was affected during serious infectious disease outbreaks: Proportion of respondents who indicated no change when asked about changes to their out-of-office care.

OUT-OF-OFFICE CARE	FPS AND GPs	
	2003 RESPONDENTS WHO INDICATED NO CHANGE, %	2010 RESPONDENTS WHO INDICATED NO CHANGE, %
Obstetrics	87.7	0.0*
Palliative care	86.5	14.9*
Housecalls	71.4	25.5*
Well-baby visits	70.7	12.6*
Psychotherapy or counseling	68.7	9.4*
Emergency department shifts	68.6	35.7*
Nursing home visits	65.4	40.0*
Hospital inpatient care	33.6	28.6

* $P < .01$.

personal lives are provided in **Figure 1**. Compared with 2003, a significantly higher proportion of respondents in 2010 ($P < .01$) were extremely or somewhat worried about infecting their family members with an infectious disease during a community outbreak and believed that their family members were somewhat worried about being infected by them. However, a significantly higher proportion of 2010 respondents were somewhat worried about dealing with serious outbreaks as front-line doctors in the community compared with 2003 respondents ($P < .01$).

Outbreak-related clinical care

Of the 2010 respondents, 35.0% indicated that they were willing to provide extra clinical care during a serious infectious disease outbreak. Specifically, 37.7% were willing to work in immunization clinics, 42.6% to provide telephone counseling, 21.3% to provide home treatment, 25.1% to perform declarations of death, 26.8% to work in assessment clinics, 20.8% to work in treatment clinics, and 27.3% to provide their names on a contact list for public health.

Sources of information

A comparison of the 2003 and 2010 respondents' perceived value of different sources of information about a serious community-based outbreak is provided in **Table 4**. The 2003 and 2010 respondents placed similar value on most sources of information, with the OMA and the MOHLTC being the most valuable information sources. The 2003 respondents were more likely to rate the OMA and newspapers as extremely valuable or

valuable sources of information. The 2010 respondents were more likely to rate information from medical journals and Internet resources as valuable sources.

The 2010 respondents rated their interest in receiving various types of resources during an infectious disease outbreak in their area (**Table 5**). The top 4 resources identified as being very to somewhat interesting were resources to protect and support the physicians, their staff, and their family members (eg, masks); protocols for the management of screening and treatment of patients; accurate information on protective measures; and e-mail or fax communications describing what public health measures were taking place.

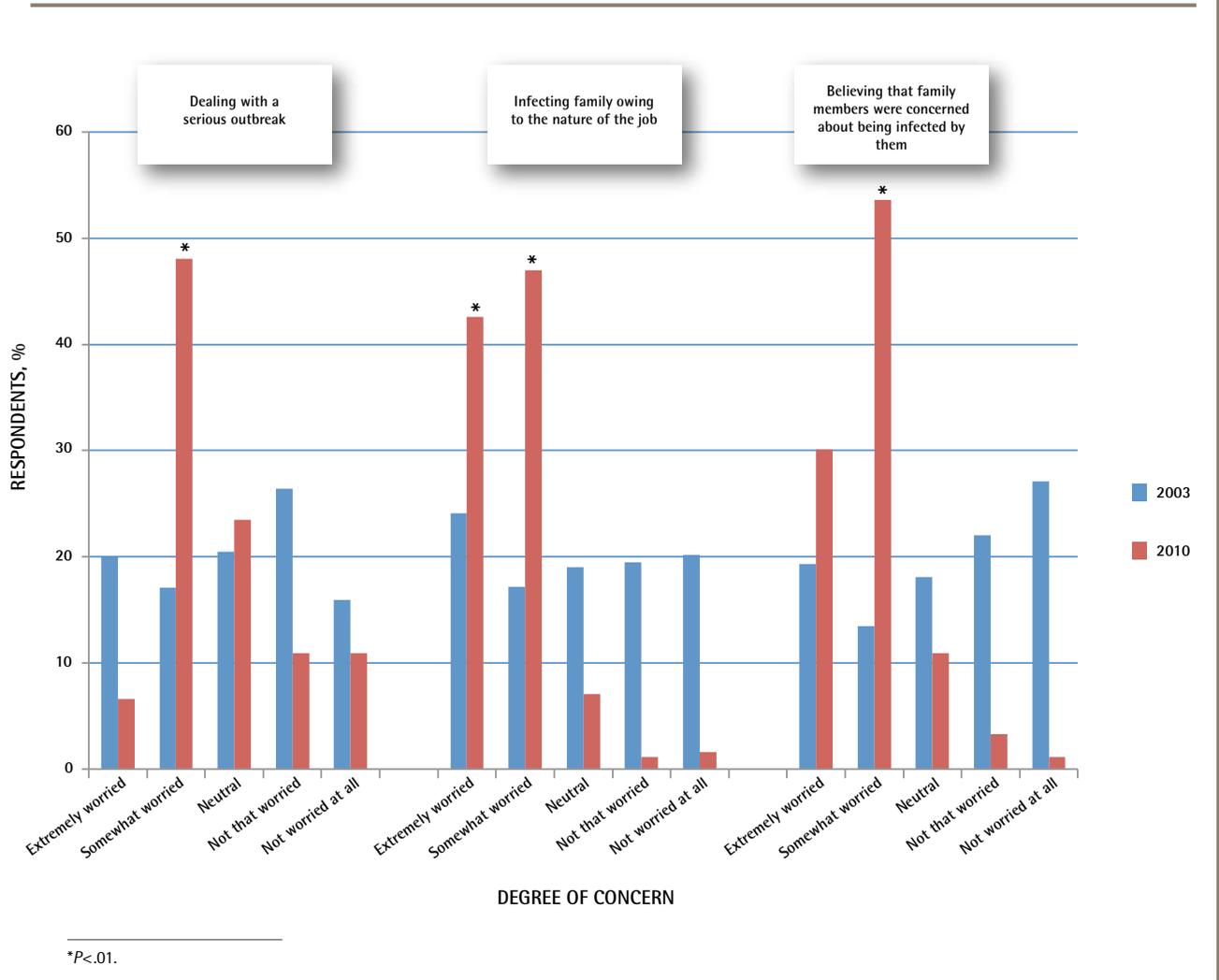
DISCUSSION

Our survey found that after the H1N1 epidemic, GPs and FPs had substantial concerns about how a serious infectious disease outbreak might affect the health of their family members. Respondents indicated they would make changes in their office practice to manage and deal with patients who had a serious infectious disease, and about one-third indicated they would provide extra clinical care during an outbreak. They expressed concern about the effects of an infectious disease on the provision of health care services. Also, they wanted to receive timely and accurate information from the provincial government and their medical association.

After the SARS outbreak, GPs and FPs were more likely to indicate a disruption in their ability to refer patients or obtain timely care from specialists, whereas after the H1N1 outbreak, GPs and FPs were more likely to indicate a change in their office management of infectious patients (eg, see patients faster, take temperatures). A report about the effect of SARS on health care services in Ontario and specifically in the GTA found a decrease in elective services throughout the province, with a greater reduction in the GTA.³ However, the 2010 GPs and FPs who were surveyed after the H1N1 outbreak were much more likely to think that psychotherapy or counseling, nursing home, emergency department, and well-baby visits, housecalls, obstetric care, and palliative care would be affected. This might reflect an opinion about the potential effect on these services by another and more serious outbreak than the H1N1 epidemic.

The SARS epidemic had a direct effect on the morbidity and mortality of health care professionals.² The 2003 physicians who completed the after-SARS survey were much more likely to be concerned about themselves getting an infection than the 2010 physicians who completed the survey after the H1N1 epidemic. The H1N1 virus was not localized to health care institutions. The physician respondents after H1N1 were more concerned about infecting their families, which might reflect

Figure 1. Percentage of respondents who reported various concerns about the effects of a serious infectious disease outbreak on their personal lives: Comparison between 2003 and 2010 respondents.



the fact that H1N1 was more widespread in the community and that it had a particular effect on young children and adolescents.⁷

An advisory panel for Health Canada after SARS made specific recommendations to support public health funding and infrastructure and improve the coordination of information especially to the institutional or hospital sectors.² But little mention was made of the effect on community-based care or the lack of coordination among health care providers working outside of institutions. The Ontario Expert Panel on SARS, supported by the OMA, recognized the lack of coordination with community-based providers including GPs and FPs, and recommended better dissemination through MOHLTC-funded public health units and the OMA.⁴ Our survey found that the MOHLTC and OMA were the most valued sources of information, but respondents also recognized the value of information provided by their local hospitals.

Being prepared for a serious outbreak, such as the pandemic flu, must include structures and processes for infection control and communication.¹³ Health care planners should provide information on how health care services should be organized, including the role of GPs or FPs.^{14,15} In our study, the cohort of GPs and FPs in 2010 indicated that they were more likely to use office precautions during an outbreak (eg, wearing goggles and gowns). Developing the processes for providing quick information about new infectious diseases and getting office supplies to community physicians were strong recommendations from the OMA submission to the Ontario Expert Panel on SARS and Infectious Disease Control.⁴ A survey of US FPs about the H1N1 outbreak found that they believed they were prepared for a surge in H1N1 in that they were educating patients, getting the appropriate diagnostic tests, and receiving the appropriate supplies.¹⁶ Our survey suggests that GPs

Table 4. Comparison between the 2003 and 2010 respondents' perceived value of various sources of information about serious community-based outbreaks

SOURCES OF INFORMATION	EXTREMELY VALUABLE		VALUABLE		SOMEWHAT VALUABLE	
	2003 RESPONDENTS, %	2010 RESPONDENTS, %	2003 RESPONDENTS, %	2010 RESPONDENTS, %	2003 RESPONDENTS, %	2010 RESPONDENTS, %
Ontario Ministry of Health and Long-Term Care	23.0	23.5	42.3	48.6	14.6	17.5
Ontario Medical Association	32.0	14.2*	43.6	43.2	15.2	21.9
Ontario Agency for Health Protection and Promotion	NA [†]	9.3	NA [†]	20.2	NA [†]	16.4
Telehealth Ontario	6.3	3.8	14.9	9.3	17.1	12.0
World Health Organization	6.6	11.5	20.3	25.1	18.9	26.8
Medical journals	5.2	7.1	16.9	33.3*	20.9	25.7
Internet medical resources (eg, UpToDate)	7.5	12.6	20.0	31.1*	17.1	21.9
Television news or programs	7.4	9.3	28.1	20.2	36.2	33.9
Local hospital	19.3	13.1	27.4	31.1	16.1	16.4
Newspapers or magazines	6.9	4.9	28.7	18.6*	34.5	29.5

NA—not available.

* $P < .01$.

[†]Not available because the Ontario Agency for Health Protection and Promotion did not exist at this time.

Table 5. Proportion of 2010 respondents who rated their interest in various types of resources during infectious disease outbreaks in their community

VARIOUS TYPES OF RESOURCES FOR GPs AND FPS	VERY INTERESTED, %	INTERESTED, %	SOMEWHAT INTERESTED, %
Resources to protect and support you, your staff, and your family (eg, masks)	74.9	19.7	3.3
Protocols for the management of screening and treatment of patients	73.2	21.3	3.8
Accurate information on protective measures	69.9	24.6	1.6
E-mail or fax communications describing what public health measures are taking place	69.4	22.4	5.5
Ongoing disease status reports	63.9	26.8	7.1
Patient information sheets	57.4	32.8	6.6
Information to align efforts with public health (eg, fact sheets)	55.7	32.2	9.3
List and location of emergency vaccination clinics	54.6	33.9	7.1
Recipient groups recommended for vaccinations	54.6	32.2	8.7
Collective purchase and secure distribution of supplies	50.8	28.4	11.5
Physician hot-line	50.3	28.4	15.3
Additional nursing resources for your clinic	47.0	26.2	15.8
Advice on developing a work flow plan for yourself and your staff during an outbreak	44.8	31.1	15.8

and FPs are receiving adequate information during community outbreaks. It is also possible that GPs and FPs remember the SARS experience and are therefore more vigilant about preparing for a serious outbreak. The US survey also found that FPs increased their surveillance of flu symptoms, provided vaccines to targeted groups, and worked with public health agencies.¹⁶ They also had patients with flulike illnesses wear masks, rearranged clinics to accommodate patients more quickly, removed magazines from the waiting rooms, and provided educational material to patients about avoiding the flu. Further work about how Canadian GPs and FPs should work with public health, including getting supplies such as masks and gowns, is needed.

One of the recommendations made by the National Advisory Committee on SARS and Public Health was that a collaborative framework be developed among different levels of government.² It is interesting that only 6.6% of GPs and FPs in 2010 felt confident that all levels of government would work well together during a serious infectious disease outbreak. Further work examining the flow of information through different health care sectors and government agencies still needs to be undertaken.

Limitations

While our response rate is low and we did not receive our a priori sample size numbers for completed questionnaires, it is in keeping with response rates for mailed questionnaires to physicians.¹⁷ Our survey was conducted in a very specific geographic area that was initially upset by SARS and also affected by H1N1. Responses from GPs and FPs from another area that was not so affected by both outbreaks might have different responses.

Conclusion

Community-based GPs and FPs are considerably affected by serious infectious disease outbreaks both on a personal level and in their clinical practice. Emergency response systems must include the role of primary care providers during serious outbreaks and ensure the dissemination of timely and accurate information and supplies to support them.

Dr Jaakkimainen is Associate Professor in, and holds a Clinician Investigator award from, the Department of Family and Community Medicine at the University of Toronto in Ontario. **Dr Bondy** is Associate Professor at the Dalla Lana School of Public Health at the University of Toronto. **Ms Parkovnick** was a research assistant with the Primary Care Research Unit in the Department of Family and Community Medicine at Sunnybrook Health Sciences Centre in Toronto. **Dr Barnsley** is Associate Professor at the Institute for Health Policy, Management and Evaluation at the University of Toronto.

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Contributors

All the authors were involved in the conception and design of the study. **Dr Jaakkimainen** prepared the first and final draft of the article. **Dr Jaakkimainen, Dr Bondy,** and **Ms Parkovnick** were primarily responsible for the data collection and analysis. **Dr Bondy, Dr Barnsley,** and **Ms Parkovnick** revised the article critically for its content. All of the authors reviewed the article and approved the final version for publication.

Competing interests

None declared

Correspondence

Dr R. Liisa Jaakkimainen, Institute for Clinical Evaluative Sciences, 2075 Bayview Ave, G Wing, Toronto, ON M4N 3M5; telephone 416 480-4055, extension 3868; fax 416 480-6048; e-mail liisa.jaakkimainen@ices.on.ca

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