Defining research priorities for bacterial sexually transmitted infections in Canada

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ABSTRACT

OBJECTIVES: We aimed to define priority areas for research on chlamydia, gonorrhea, and syphilis in Canada through the use of a consensus method.

METHODS: A modified Delphi method was conducted, consisting of two online surveys and an in-person meeting. Participants included people working in bacterial sexually transmitted infections (STIs) across Canada, including clinicians, policy-makers, public health practitioners, and researchers.

RESULTS: Consensus was achieved regarding the most important priority topics in bacterial STI research in Canada, within five general priority areas: the epidemiology of bacterial STIs, screening, partner notification and contact tracing, antimicrobial resistance, and identification of best practices for the prevention and control of bacterial STIs.

CONCLUSIONS: The findings of this consensus process can be used to inform research efforts, which could contribute to more effective control of bacterial STIs in Canada.

KEY WORDS: Sexually transmitted diseases; chlamydia; gonorrhea; syphilis; consensus

La traduction du résumé se trouve à la fin de l'article.

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Bacterial sexually transmitted infections (STIs) are an important public health issue internationally and within Canada, causing a significant burden of disease and consuming substantial health care resources.^{1,2} In 2009, there were 87,210, 11,178 and 1,683 reported cases of chlamydia, gonorrhea and infectious syphilis, respectively, in Canada.³⁻⁵ The number of reported cases underestimates the true burden, as many of these infections are asymptomatic, not diagnosed clinically, or not tested for, and therefore not captured in reported cases. Despite the existence of a substantial body of international evidence regarding effective interventions at the individual, partnership, and population levels,¹ reported rates suggest that chlamydia, gonorrhea and infectious syphilis have been increasing in Canada over the past decade,³⁻⁵ signalling an inadequacy of current prevention and control measures.

Research is clearly needed to identify ways to better understand, prevent and control bacterial STIs in Canada. Anecdotal evidence suggests that there is relatively little coordination of research efforts focused on bacterial STIs across institutions, regions, and areas of expertise in Canada. Further, there has been a lack of dedicated funding for bacterial STI research at the national level. In this context, this project aimed to define priorities in bacterial STI research in Canada, by harnessing the expertise of policy-makers, clinicians, public health practitioners, and researchers working in this field in Canada.

METHODS

Overview

An iterative process was used to achieve expert consensus regarding priorities in bacterial STI research in Canada, which used principles of the Delphi method with modifications;⁶ similar processes have been used to identify research priorities for other public health and health care issues.⁷⁻¹⁰ We conducted two online surveys with key stakeholders to identify priority areas, and then held an in-person meeting to elaborate on these priority areas and to achieve consensus on specific priority research topics.

We obtained approval for the study from the University of Toronto Research Ethics Board.

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Table 1. Timing, steps, and participation in Delphi process to identify research priorities for bacterial STIs in Canada

Period	Event	Participants	Outcome
August 2011	>200* people invited to participate in first round	46	280 responses provided=31 unique topics
October to November 2011	60 people invited to participate in second round	25	10 priority areas (Table 2)
February 2012	In-person meeting in Toronto, Canada	27	17 priority topics in 5 priority areas (Table 3)

* We e-mailed an invitation to participate to 200 persons. Some of those invited forwarded the invitation to others, and we do not know how many other people were invited through this snowball sampling.

First Delphi round

An initial list of Delphi process participants was generated by investigators in consultation with key stakeholders. In a first round of the Delphi, we invited these individuals by e-mail to participate in an online survey to identify research priorities. We sent a reminder e-mail regarding the invitation to participate. We also used snowball sampling, i.e., we invited participants to forward the survey directly to other stakeholders, or to provide names and contact information for stakeholders to the investigators and we subsequently invited to participate any stakeholders who were not already on our list.

We asked potential participants to indicate their primary type of work, their main place of employment, and the province or territory where they worked, to list 5-10 research priorities in the field of bacterial STIs, and to indicate if they would be willing to participate in subsequent rounds of the Delphi process. Two investigators collated responses to eliminate duplicate suggestions, which involved reviewing all responses and identifying the topic area, e.g., antimicrobial resistance, and then grouping similar suggestions into categories for presentation in the subsequent survey, e.g., diagnosis.

Second Delphi round

We circulated an invitation to participate in a second online survey to persons who had indicated on the first survey that they were willing to participate further, as well as to additional key stakeholders identified by the investigators since the development of the initial list of potential participants. As in the first round, we e-mailed out the invitation to participate, and subsequently sent out a reminder e-mail. We did not ask participants whether they had participated in the first survey, and we did not collect demographic information about participants. Participants were asked to review the list of responses from the first Delphi round and to indicate the importance of each response on a scale of 1 to 10, with 1=not important, 5=somewhat important, and 10=very important, and also to indicate whether they would consider each response to be one of the top five research priorities related to bacterial STI research in Canada. The responses were reviewed and ranked in four ways: 1) by the percentage of participants who had rated the topic as a 9 or 10 on the scale of importance; 2) by the percentage of participants who had rated the topic as 8, 9, or 10 on the scale of importance; 3) by the percentage of participants who had rated the topic as one of the five most important research priorities of all those listed; 4) by the clinical topics most commonly rated as one of the five most important research priorities of all those listed (given investigators' concerns about potential under-representation of people doing clinical work in the two Delphi rounds, in comparison with people doing public health work). Based on the distribution of rankings within and between priority areas using the four methods of scoring, we selected priority areas for further development.

In-person meeting

Next, we held an in-person meeting in Toronto, Ontario on February 13th and 14th, 2012 to elaborate on the priority areas identified through the two Delphi rounds and to try to achieve consensus on the most important topics in each priority area. Prior to the meeting, we developed background papers on each priority area, which were brief summaries of the current state of knowledge, including descriptive and interventional epidemiology and with a focus on data from Canada when available. These papers were intended to provide each participant with a general contextual understanding of each priority area, regardless of their background or area of expertise. We circulated the background papers to meeting participants in advance of the meeting. We also circulated the full list of responses from the first Delphi round, to ensure that the diversity and richness of ideas were preserved in this process.

We invited individuals who had indicated in the first Delphi round that they would like to participate further, and also key stakeholders who represented various provinces and types of employment. Participants were reimbursed for meeting expenses, such as travel and hotel costs.

At the meeting, participants discussed each priority area in small groups with a facilitator. The goal of the small-group discussions was to identify specific topics or research questions within each priority area. We then presented all topics by priority area to the full group of participants, with discussion about certain topics ensuing. We asked each participant to select the most important topics in each priority area in consideration of the importance and feasibility of research on each topic, by placing stickers next to a maximum of three topics in each priority area. We identified the priority topics in each priority area based on the number of participants who rated each topic as most important.

RESULTS

Table 1 summarizes the Delphi process. We invited 200 people to participate in the first Delphi round, and an unknown number of other stakeholders were invited to participate through snowball sampling. Of 46 participants, 43% listed their primary type of work as public health practitioner or staff, while 20% listed researcher, 15% listed clinician, 2% listed policy analyst or advisor, and 20% listed other. Seventy-eight percent of participants indicated that their place of employment was a local public health organization, 29% listed a federal public health organization, 22% listed an STI clinic, 11% listed a provincial public health organization, 16% listed a university, 4% listed a primary care clinic, and 4% listed other (with percentages not adding to 100 because multiple places of employment were permitted). For the province or territory where they worked, 78% listed Ontario, 9% listed British Columbia, 2% listed each of Saskatchewan, Manitoba, Quebec, and Nunavut, respectively, and 4% listed other. A total of 280 priority

Table 2. Priority areas for bacterial STI research priorities in Canada identified in second Delphi round, N=25 participants

	Rankings (percent of participants)			
	Rated 9 or 10 in importance*	Rated 8, 9, or 10 in importance*	Rated as one of top five most important topics	Rated as one of top five most important clinical topics
Antimicrobial resistance	1 (70%)	3 (81%)	1 (92%)	1 (92%)
Expedited partner therapy	4 (56%)	1 (86%)	3 (72%)	
Partner notification and contact tracing	2 (63%)	2 (82%)	2 (80%)	
Alternative models for accessing testing	6 (43%)	5 (70%)	9 (46%)	
Best practices for STI prevention	3 (58%)	4 (73%)	4 (71%)	
Rates and predictors of re-infection	7 (37%)	5 (70%)	6 (52%)	2 (52%)
Point of care testing	6 (43%)	8 (62%)	7 (50%)	3 (50%)
Screening	9 (27%)	8 (62%)	8 (48%)	4 (48%)
Social media	5 (46%)	7 (65%)	5 (62%)	
Prevalence and sequelae of infection	5 (46%)	7 (65%)	12 (33%)	8 (33%)

* On a scale of 1 to 10, with 1=not important, 5=somewhat important, and 10=very important.

Table 3. Final priority topics for bacterial STI research in Canada identified by Delphi process, N=27 meeting participants

Priority area	Topic	N indicating most important*
Epidemiology of bacterial STIs	Identify risk factors for transmission and transmission dynamics.	17
	Distinguish between re-infection and treatment failure.	13
	Define incidence and prevalence rates.	11
	Conduct surveillance of outcomes.	10
Screening	Examine effectiveness of universal compared with targeted screening.	16
	Define impact of point of care testing in populations that are hard to reach, and define a minimum prevalence threshold for use.	12
	Identify strategies to optimize screening, in both high- and low-risk groups.	12
Partner notification and contact tracing	Define effective strategies for partner notification.	19
	Assess innovative partner notification methods.	15
	Determine the effectiveness of expedited partner therapy.	12
Antimicrobial resistance	Obtain access to and aggregate data from testing done across settings, i.e., public health laboratories, private laboratories, hospitals.	12
	Use advanced genomics approaches to determine molecular epidemiology, antimicrobial resistance profiles, and typing.	11
	Gather information on antimicrobial resistance of gonorrhea and chlamydia isolates by anatomical site of infection.	9
	Define the rates of antimicrobial resistance of gonorrhea and chlamydia at extra-genital sites of infection.	9
Identification of best practices for the prevention and control of bacterial STIs	Develop and evaluate prevention activities that are targeted to those individuals and populations with the major burden of disease.	13
	Evaluate novel technologies for impact on outcomes, e.g., use of text messaging in contact tracing.	13
	Evaluate the need for testing and education in schools.	12

* The number of participants who indicated that this topic was most important. Each participant could rate up to three topics as most important within each priority area.

research topics were listed, representing 31 unique topics (e.g., 28 participants listed antimicrobial resistance as a response). Thirty-six participants indicated that they would like to participate further in the Delphi process.

We invited 60 people to participate in the second Delphi round, of whom 25 people participated. There was convergence in the priorities identified by the different ranking methods for five priority areas, as shown in Table 2, which shows the rankings and percentages for the 10 top priorities. We decided on 10 priorities to develop further based on this convergence and the distribution of responses; with 10 priorities, the five most highly ranked topics using each ranking method and all four clinical topics were included, and there was a notable gap in each ranking method between the lowest ranked topic included and the highest ranked topic not included in terms of the percentages. For the purposes of background papers and meeting discussions, we combined priority areas that had a similar or overlapping focus. Specifically, expedited partner therapy was included in partner notification and contact tracing; prevalence and sequelae of bacterial STIs over time and place were combined with rates and predictors of re-infection to make a general epidemiology of bacterial STIs priority; point of care testing, alternative models for accessing testing, and effectiveness of

various screening methods were combined into a screening and testing priority; and social media and social network were integrated into identification of best practices for the prevention of bacterial STIs at the individual and community levels.

Twenty-seven people participated in the in-person meeting, including persons from British Columbia, Alberta, Ontario, and Quebec; public health practitioners, researchers, and clinicians; and people who worked in local, provincial, and federal public health organizations, universities, and STI and primary care clinics.

Between 10 and 27 specific priority topics were identified in each of the five general priority areas, some of which overlapped in part within and across priority areas. Participant opinion converged on which priority topics were most important; there was a clear break in the distribution of topics which were rated by many participants as most important and those that were rated as most important by only a few participants; for example, for the general priority area “epidemiology of bacterial STIs,” 10 priority topics were identified, and between 10 and 17 people rated the top four priority topics as most important, whereas only between one and six people rated the next six topics as most important. The priority topics identified as most important and the number of meeting participants who identified the topic as most important are shown in Table 3.

DISCUSSION

This consensus process resulted in the identification of priority topics for research on bacterial STIs in Canada through the use of three rounds of a modified Delphi method with people working in the field of bacterial STIs across Canada. The consistency of results across rounds and the distribution of responses in the final round suggests that this process was successful in achieving consensus, and therefore that these priority topics are some of the most important areas for research on bacterial STIs in Canada. Moreover, the priority areas and topics identified in this study are consistent with focus areas articulated in other studies and by other organizations,^{1,11,12} which corroborates our conclusion that these are valid priorities.

For some of these topics, there is a lack of relevant data or information, and new research and infrastructure (e.g., lab and information technology) may be required, for example, to further characterize antimicrobial resistance in Canada. For other topics, there is already some evidence but it may not be adequate, or else there is uncertainty about whether the evidence is generalizable to specific populations and regions in Canada or about how to translate knowledge into relevant programs and policies, e.g., about point of care testing¹³ or to define best practices for STI control.^{1,14} Finally, for some topics, there is already research currently underway in Canada, for example to assess innovative technologies in screening¹⁵ and to assess partner notification approaches.¹⁶ A tailored approach will be required to address each priority topic, which may include environmental scans and literature reviews to define the current state of knowledge and research.

That notwithstanding, there are several general steps that can be taken to strengthen research on bacterial STIs in Canada overall, which would putatively support the achievement of all of these priorities. These steps are: supporting training in bacterial STI research, including graduate and postgraduate opportunities in epidemiology, behavioural sciences, and microbiology; the development of interdisciplinary research teams and networks that include researchers and decision-makers; and the creation of specific funding opportunities (beyond STI research incorporated into funding proposals for HIV¹⁷), including from the Canadian Institutes of Health Research.

There are multiple advantages to the traditional Delphi as a consensus method,¹⁸ including anonymity of participants, use of expert opinion, efficiency, and reliability.¹⁹ The validity of this method is contingent on key components, such as the appropriate selection of participants and management of information.²⁰ In this study, we diverged from the traditional Delphi method in several ways. The group of experts who participated in each round was not consistent, as described above. We used an internet-based survey for the first two rounds of the Delphi, which is a relatively new innovation.¹⁹ We held the final round of the Delphi at an in-person meeting, since we also wanted to elaborate identified priorities and work on developing focused collaborations and programs of research. We do not feel that these modifications would have affected the integrity of the process or the validity of the results.

Regarding the group of participants in particular, a large proportion of those invited did not participate in the online surveys (see Table 1). The group of participants was, however,

diverse in terms of geography, areas of expertise, and type of work, and the large number of topics identified and the consistency of topics selected as priorities across rounds suggests that these findings are likely valid. In retrospect, we would have included advocates for groups at high risk of STI infection, such as commercial sex workers,^{21,22} or people who are infected with or affected by the sequelae of these infections, which may have further diversified the pool of responses.

Of note, in the final stage of the Delphi, we did not ask participants to assess the relative importance of topics in different priority areas, e.g., whether it would be more important to address the top-ranked priority topic in screening: “examine the effectiveness of universal compared with targeted screening”, or the top-ranked priority in partner notification and contact tracing: “define effective strategies for partner notification” (see Table 3). We also did not assess the potential impact of addressing each topic for bacterial STI control, as this is beyond the scope of this study, though we note that a prior review identified that population-level interventions tend to have the greatest potential impact.¹ We hypothesize that there would be synergy in addressing different priorities simultaneously, and also that some priorities are instrumental to achieving other priorities; for example, it would be difficult to understand the population-level impacts of partner notification strategies without knowing the true incidence and prevalence of bacterial STIs.

The research priorities identified in this study can be used to inform a coordinated research agenda for bacterial STIs in Canada. We hypothesize that a focus on these areas should lead to the more effective and timely characterization and control of bacterial STIs in Canada, with implications for public health.

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RÉSUMÉ

OBJECTIFS : Nous avons tenté de définir des axes prioritaires d'intervention pour la recherche sur la chlamydie, la gonorrhée et la syphilis au Canada par la méthode du consensus.

MÉTHODE : Nous avons employé une méthode Delphi modifiée, avec deux sondages en ligne et une réunion en personne. Les participants (cliniciens, responsables des politiques, praticiens de la santé publique, chercheurs) travaillaient au Canada dans le domaine des infections transmissibles sexuellement (ITS) d'origine bactérienne.

RÉSULTATS : Les participants se sont entendus sur les thèmes prioritaires les plus importants de la recherche sur les ITS bactériennes au Canada, à l'intérieur de cinq axes prioritaires d'intervention généraux : l'épidémiologie des ITS bactériennes; le dépistage; la notification des partenaires et le retraçage des contacts; la résistance antimicrobienne; et l'identification des pratiques exemplaires en matière de prévention et de lutte contre les ITS bactériennes.

CONCLUSIONS : Les constatations de ce processus consensuel peuvent servir à éclairer les efforts de recherche, lesquels pourraient contribuer à un contrôle plus efficace des ITS bactériennes au Canada.

MOTS CLÉS : maladies sexuellement transmissibles; chlamydia; gonorrhée; syphilis; consensus