



# A Review of Barriers to the Secondary Prevention of Sexually Transmitted Infections (STIs)

*Implications for the Military Context and Current Research Gaps*

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Defence R&D Canada  
Director General Military Personnel Research & Analysis

Chief Military Personnel



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**Defence Research and Development Canada – DGMPRA**

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## **IMPORTANT INFORMATIVE STATEMENTS**

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## Abstract

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Historically, sexually transmitted infections (STIs), also called sexually transmitted diseases (STDs), have been considered a problem in militaries (Korzeniewski, 2012). Typical military experiences, such as postings or deployment away from one's family, may explain some of military members' elevated susceptibility to STIs (Kingma & Yeager, 2005; Malone, Hyams, Hawkins, Sharp, & Daniell, 1993). Because STIs are preventable, much emphasis has been placed on developing guidelines for prevention. Many of the effective prevention strategies have relied on secondary prevention by health care providers within the primary care setting (e.g., educating physicians about increasing rates, routine or periodic screening, and expedited partner treatment; Sarbu, 2012). Nevertheless, the responsibility for secondary prevention is shared with individuals, who must seek testing and treatment themselves. This report provides a review of research on barriers to the secondary prevention of STIs from the perspective of individuals and health care providers. This review shows that the success of secondary prevention may depend on the level of knowledge about STIs, perceptions of the level of risk or stigma attached to STIs, the availability of time and resources to seek testing and treatment, and the quality of exchanges between health care providers and their patients. For individuals, additional considerations may include their overall concern for theirs or their partner's health, their apprehension of the possible consequences of a positive diagnosis, and other possible inconveniences associated with the screening process. Because much of the research in the area has been conducted in a civilian context, this report also discusses implications for a military context and underlines existing research gaps. It is recommended that research in the following areas be conducted among military personnel and health care providers: knowledge and perceptions of STI risks, their impacts on health, and ways they can be prevented; the stigma and social norms associated with STIs; the availability and accessibility of testing; and the factors that influence the quality of patient-provider interactions. Such research will help guide the development of policies and programs related to the prevention of STIs in the military.

## Résumé

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Les infections transmises sexuellement (ITS), connues aussi comme maladies transmises sexuellement (MTS), sont considérées depuis longtemps comme étant un problème dans l'armée. (Korzeniewski, 2012). Les expériences militaires typiques, comme les affectations et les déploiements loin de la famille, peuvent expliquer en partie la prédisposition élevée des militaires aux ITS (Kingma et Yeager, 2005; Malone, Hyams, Hawkins, Sharp et Daniell, 1993). Parce que les ITS peuvent être évitées, on a beaucoup misé sur l'élaboration de lignes directrices en matière de prévention. Bon nombre des stratégies efficaces de prévention reposent sur la prévention secondaire par des fournisseurs de soins de santé appartenant au milieu des soins primaires (p. ex., informer les médecins des taux croissants, dépistage systématique ou périodique et traitement accéléré des partenaires; Sarbu, 2012). Néanmoins, chaque personne est responsable de la prévention secondaire et doit demander à passer un test de dépistage ou à recevoir un traitement. Le présent rapport fournit une revue de la recherche sur les obstacles à la prévention secondaire des ITS du point de vue des personnes et des fournisseurs de soins de santé. Cette revue révèle que la réussite de la prévention secondaire pourrait dépendre du niveau de

connaissance concernant les ITS, des perceptions quant au niveau de risque ou à la stigmatisation associés aux ITS, de la disponibilité en temps et en ressources lors d'une demande de dépistage et de traitement ainsi que de la qualité des échanges entre les fournisseurs de soins de santé et leurs patients. Pour ce qui est des personnes, d'autres éléments sont à considérer, dont la préoccupation globale quant à la santé de leur(s) partenaire(s), leur appréhension quant aux possibles conséquences d'un diagnostic positif et les autres inconvénients possibles associés au processus de dépistage. Parce qu'une grande partie de la recherche dans le domaine a été menée dans un contexte civil, le présent rapport traite aussi des incidences dans un contexte militaire et souligne les lacunes existantes en matière de recherche. On recommande que des recherches soient effectuées dans les domaines qui suivent pour le personnel militaire et les fournisseurs de soins de santé : connaissance et perceptions des risques liés aux ITS, incidence des ITS sur la santé et les façons de les prévenir; stigmatisation et normes sociales associées aux ITS; disponibilité des tests de dépistage et accès à ces tests ainsi que facteurs ayant une incidence sur la qualité des interactions entre les patients et les fournisseurs de soins de santé. De telles recherches permettront d'orienter l'élaboration de politiques et de programmes en lien avec la prévention des ITS dans l'armée.

## Executive summary

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### **A Review of Barriers to the Secondary Prevention of Sexually Transmitted Infections (STIs): Implications for the Military Context and Current Research Gaps**

**Kimberley Watkins; Jennifer E.C. Lee; DGMPRA TM 2013-023; Defence Research and Development Canada – DGMPRA; November 2013.**

**Introduction:** Historically, sexually transmitted infections (STIs) have been considered a problem in the military environment (Kozeniewski, 2012). Given the preventable and treatable nature of STIs, much emphasis has been placed on developing guidelines for prevention, including secondary prevention (i.e., services for patients who may already have an STI; WHO/UNAIDS, 1999) by health care providers in a primary care setting (e.g., educating physicians about increasing STI rates, routine or periodic screening, and expedited partner treatment; Sarbu, 2012). This responsibility for secondary prevention is shared with individuals, who must seek testing and treatment themselves. This report provides a review of research on psychosocial barriers to the successful secondary prevention of STIs from the perspectives of health care providers and individuals alike. Based on key findings in the mainly civilian-focused literature, this report highlights some potential implications for secondary STI prevention in the military and existing research gaps.

**Results:** Research has shown that many health care providers in the Canadian general population fail to engage in optimal secondary STI prevention behaviours, including adherence to existing guidelines (e.g., Hansen et al., 2005) and sexual history elicitation (e.g., Maheux et al., 1997). Individuals appear to fare no better in the research: they rarely seek STI screening in the absence of symptoms (e.g., Tebb et al., 2004) and they often refuse testing for STIs when it is offered (e.g., Gotz, 2005). Among both providers (e.g., McClure et al., 2006) and individuals (e.g., Balfe et al., 2012), females tend to be more likely to engage in STI prevention.

Commonly cited barriers to STI prevention among health care providers include a lack of education, training, or knowledge of STIs and their preventive measures (e.g., Thompson et al., 2008); a lack of time to test or counsel patients (e.g., Hocking et al., 2008); low perceptions of patient STI susceptibility (e.g., Sussman et al., 2007); lack of comfort and/or confidence in providing STI care (e.g., McClure et al., 2006); and low perceived patient comfort and high perceived patient STI-related stigma (e.g., Hocking et al., 2008).

Among individuals, the most frequently noted barriers to engagement in prevention of STIs were a lack of time or the inconvenience of obtaining screening (e.g., Chacko et al., 2008); apprehension about the uncomfortable aspects of the screening procedure (e.g., Pavlin et al., 2006); anxiety about a positive STI diagnosis (e.g., Barth et al., 2002); insufficient or inaccurate knowledge about STIs and their prevention (e.g., Branch et al., 2010); low perceived risk of contracting an STI (e.g., Marrazzo et al., 2007); stigma and social norms concerning STIs and STI testing (e.g., Tilson et al., 2007); poor relationships or negative interactions with health care providers (e.g., Goldenberg et al., 2008a); and a lack of concern for one's health (e.g., Balfe & Brugha, 2009) or for one's partner's health (e.g., Goldenberg et al., 2008b).

**Conclusions:** This review reveals that a number of factors impact individuals' and health care providers' decisions to engage in secondary STI prevention. Some of these factors are subjective in nature, and thus could be modified to increase preventive behaviours. The vast majority of research on barriers to successful prevention of STIs, however, is based on civilian populations, and the research that does exist on STIs among military personnel has focused on determinants of risky sexual behaviour and/or safe sex practices. More research is needed on the secondary prevention behaviours of military personnel to determine the factors that facilitate or hinder such behaviours in this population, with its unique challenges to prevention, such as frequent travel or deployments. Further research in this area could contribute to the reduction of the burden of STIs among military personnel.

## Sommaire

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### **A Review of Barriers to the Secondary Prevention of Sexually Transmitted Infections (STIs): Implications for the Military Context and Current Research Gaps**

**Kimberley Watkins; Jennifer E.C. Lee ; DGMPPRA TM 2013-023 ; Recherche et développement pour la défense Canada – DGRAPM; novembre 2013.**

**Introduction :** Les infections transmises sexuellement (ITS) sont considérées depuis longtemps comme étant un problème dans le milieu militaire (Kozeniewski, 2012). Compte tenu du fait que l'on peut éviter et traiter les ITS, on a beaucoup misé sur l'élaboration de lignes directrices en matière de prévention, y compris la prévention secondaire (c.-à-d. services aux patients qui souffrent peut-être déjà d'une ITS; WHO/UNAIDS, 1999) par les fournisseurs de soins de santé du milieu des soins primaires (p. ex., informer les médecins des taux croissants des ITS, dépistage systématique ou périodique, traitement accéléré du partenaire; Sarbu, 2012). Chaque personne est responsable de la prévention secondaire et doit demander à passer un test de dépistage ou à recevoir un traitement. Le présent rapport fournit une revue de la recherche sur les obstacles psychosociaux à la prévention secondaire efficace des ITS du point de vue des fournisseurs de soins de santé et des personnes. Fondé sur les principales conclusions tirées de la littérature axée principalement sur le milieu civil, le présent rapport fait ressortir certaines incidences possibles ayant trait à la prévention secondaire des ITS dans l'armée et aux lacunes existantes en matière de recherche.

**Résultats :** Les recherches ont révélé que beaucoup de fournisseurs de soins de santé dans la population générale au Canada n'adoptent pas de comportements optimaux dans la prévention secondaire des ITS, notamment en ne respectant pas les lignes directrices existantes (p. ex., Hansen et coll., 2005) et en subtilisant des renseignements des antécédents sexuels des patients (p. ex., Maheux et coll. 1997). Les personnes ne semblent pas faire meilleure figure dans les recherches : elles demandent rarement à passer un test de dépistage des ITS en l'absence de symptômes (p. ex., Tebb et coll., 2004), et elles refusent souvent de passer un test de dépistage des ITS lorsqu'on leur propose (p. ex., Gotz, 2005). Tant chez les fournisseurs (p. ex., McClure et coll., 2006) que chez les personnes (p. ex., Balfe et coll., 2012), les femmes tendent à être plus actives que les hommes en matière de prévention des ITS.

Parmi les obstacles les plus souvent cités chez les fournisseurs de soins de santé, notons le manque d'éducation, d'instruction et de connaissance des ITS et des mesures de prévention qui y sont associées (p. ex., Thompson et coll., 2008); le manque de temps pour faire passer des tests aux patients ou pour conseiller ces derniers (p. ex., Hocking et coll., 2008); les mauvaises perceptions de la prédisposition des patients aux ITS (p. ex., Sussman et coll., 2007); le manque d'aisance ou de confiance dans la prestation de soins liés aux ITS (p. ex., McClure et coll., 2006); et le faible niveau d'aisance et le haut niveau de stigmatisation perçus chez les patients à l'égard des ITS (p. ex., Hocking et coll., 2008).

Chez les personnes, les obstacles les plus fréquemment cités quant à la participation à la prévention des ITS étaient le manque de temps ou les inconvénients liés à l'obtention d'un test de

dépistage (p. ex., Chacko et coll., 2008); l'appréhension quant aux inconforts associés à la procédure de dépistage (p. ex., Pavlin et coll., 2006); l'anxiété quant à un diagnostic positif d'ITS (p. ex., Barth et coll., 2002); des connaissances insuffisantes ou incorrectes sur les ITS et la façon de les prévenir (p. ex., Branch et coll., 2010); le faible risque perçu de contracter une ITS (p. ex., Marrazzo et coll., 2007); la stigmatisation et les normes sociales concernant les ITS et le dépistage des ITS (p. ex., Tilson et coll., 2007); de mauvaises relations ou des interactions négatives avec les fournisseurs de soins de santé (p. ex., Goldenberg et coll., 2008a); et un manque de préoccupation quant à la santé du patient (p. ex., Balfe et Brugha, 2009) ou à celle du partenaire (p. ex., Goldenberg et coll., 2008b).

**Conclusions :** La revue a permis de révéler qu'un certain nombre de facteurs ont une incidence sur les décisions des personnes et des fournisseurs de soins de santé de participer à des mesures de prévention secondaire des ITS. Certains de ces facteurs sont de nature subjective et pourraient ainsi être modifiés de manière à accroître les comportements préventifs. La vaste majorité de la recherche sur les obstacles à une prévention efficace des ITS, toutefois, est fondée sur des populations civiles, et les recherches qui existent sur les ITS au sein du personnel militaire se sont concentrées sur les déterminants des comportements sexuels à risque ou sur les pratiques sexuelles sécuritaires. Il faut mener d'autres recherches sur le comportement lié à la prévention secondaire chez le personnel militaire afin de déterminer les facteurs qui motivent ces comportements ou qui nuisent à ceux-ci au sein de cette population. Il faut également que les enjeux uniques à la prévention en lien avec le contexte militaire soient pris en considération, comme les déplacements fréquents et les déploiements. D'autres recherches à ce sujet pourraient contribuer à réduire le fardeau lié aux ITS pour le personnel militaire.

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# 1 Introduction

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Historically, sexually transmitted infections (STIs), also called sexually transmitted diseases (STDs), have been considered a problem in militaries (Korzeniewski, 2012). Typical military experiences, such as postings or deployment away from one's family, may explain some of military members' elevated susceptibility to STIs (Kingma & Yeager, 2005; Malone, Hyams, Hawkins, Sharp, & Daniell, 1993). Given the preventable and treatable nature of STIs, much emphasis has been placed on developing guidelines for prevention. Many of the effective preventative strategies have relied on secondary prevention, rather than primary prevention through the promotion of reductions in high-risk behaviour.

According to the World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS), secondary prevention involves "the provision of treatment and care for infected and affected persons. The activities should include:

- a. promotion of health care seeking behaviour directed not only at those with symptoms of STDs, but also those at increased risk of acquiring STDs, including HIV infection;
- b. the provision of clinical services that are accessible, acceptable, and effective, and which offer diagnosis and effective treatment for both symptomatic and asymptomatic patients with STDs, and their partners; and,
- c. support and counselling services for both STD and HIV patients." (WHO/UNAIDS, 1999, p. 11)

According to this definition, secondary prevention by health care providers within the primary care setting might include behaviours such as education of patients, particularly those at high risk for acquisition of an STI, routine or periodic screening for STIs, and treatment and/or counselling for infected persons and their partners (Sarbu, 2012). Nevertheless, the responsibility for secondary prevention is shared with individuals, who must seek testing and treatment themselves.

A number of psychosocial factors may act as barriers to the success of secondary prevention of STIs. This report reviews research on such barriers from the perspective of health care providers and individuals alike. Although much of the research in the area has been conducted in a civilian context, results may provide useful insight into factors that may be considered in future military health research. Thus, the present report reviews research on barriers to the secondary prevention of STIs. Included are studies that investigated facilitators of and barriers to engagement in secondary STI prevention behaviours, specifically STI screening, risk assessment, and patient counselling for health care providers, and those studies that explored correlates of STI-screening seeking and acceptance among individuals. Based on some key findings in studies of civilians, this report highlights some potential implications for the military and existing research gaps.

## **2 Sexually Transmitted Infections in the Military**

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It is estimated that 499 million new infections of curable STIs (e.g., chlamydia, gonorrhoea, syphilis) occur worldwide every year among adults between 15 and 49 years old (World Health Organization [WHO], 2013). Having been linked to a wide range of conditions, including pelvic inflammatory disease, chronic pain, reproductive problems, neurological disorders, as well as an increased risk of human immunodeficiency virus (HIV) infection, STIs can pose a threat to individuals' long-term health and well-being (Bond & Yates, 2000; MacDonald & Brunham, 1997; Nieburh, Tobler, Jordan & Singer, 2006). In the U.S., STIs are considered a significant health challenge, with an estimated cost of close to \$16 billion in health care each year (Centers for Disease Control and Prevention [CDC], 2013). Between 2010 and 2011, the rate of reported cases of chlamydia increased by 8% and gonorrhoea by 4% (CDC, 2013), with more than half of cases among 15-24 year olds. Similarly, there has been an increase in rates of nationally reportable STIs in Canada in recent years, such as chlamydia, gonorrhoea, and syphilis (Fang, Oliver, Gayatri, & Wong, 2010). With the exception of syphilis, the rates have been highest among 15-24 year olds (Public Health Agency of Canada [PHAC], 2010).

Comprised primarily of younger adults, military populations may be at greater risk of STIs (Niebuhr et al., 2006). In addition to age, other aspects of military service, including a culture of machismo, worldwide deployments, leave and holiday travel, and coupling between multiple interrelated communities, have been believed to contribute to “a complex ecology for STI transmission” (Garges, 2013). Not surprisingly, military personnel have been believed to represent a high-risk group for STIs (Korzeniewski, 2012; Niebuhr et al., 2006). There is some evidence supporting this view. A study of U.S. military personnel deployed to Afghanistan and Iraq, for instance, revealed increases in rates of both chlamydia and gonorrhoea from 2004 to 2009 (Aldous, Robertson, Robinson, Hatcher, Hostenhal, Conger, et al., 2011). In the Canadian Armed Forces (CAF), STIs were the most frequently reported communicable diseases in 2011, with rates for chlamydia infection (by far the most commonly reported STI) of 13.4 per 1000 persons among males under 30 years and 23.9 per 1000 persons among females under 30 years. As well, male CAF members under 30 years were found to be at excess risk (by a factor of 1.6) in each year from 2005 to 2009, relative to their Canadian counterparts (Directorate of Force Health Protection, 2012). While important differences in surveillance or reporting of STIs may have partly contributed to observed differences between civilian and military populations, high and increasing STI rates in the military do underscore the need for prevention (Niebuhr et al., 2006).

## **3 Secondary Prevention Behaviours**

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### **3.1 Health Care Providers**

Current Canadian guidelines for the prevention of STIs call for the active involvement of primary care givers through STI risk assessment, patient-centred education and counselling, screening, reporting, and partner notification (Public Health Agency of Canada, 2008). But evidence suggests that adherence to the guidelines may be inconsistent.

Little research on familiarity and adherence to STI prevention guidelines has been conducted in the military context. Research conducted in the civilian domain may nevertheless provide insight into military health care providers' experiences. One study of British Columbian primary care physicians, for instance, found that many physicians did not adhere to the Canadian STI guidelines, even though most possessed a copy and perceived the guidelines to be useful (Hansen, Barnett, Wong, Spencer, & Rekart, 2005). Further, Australian providers have been shown to often fail to comply with certain components of STI prevention guidelines, such as sexual history taking and partner notification (Bangor-Jones, 2011). Among physicians in Hamilton, Ontario, meanwhile, less than half had a copy of federal or provincial guidelines on hand, though those who did were more likely to practise STI care in accordance with these guidelines (Sellors, Landis, Pickard, & Dalby, 1997). Acquaintance with STI guidelines has also been associated with better knowledge of STIs (Wiesenfeld, Dennard-Hall, Cook, Ashton, Zamborsky, & Krohn, 2005); and a lack of official STI screening guidelines has been cited as a barrier to STI testing for providers (Hocking, Parker, Pavlin, Fairley, & Gunn, 2008; McClure et al., 2006).

Aside from adherence to existing guidelines, research has shown that health care providers in the general population often do not engage in STI prevention behaviours with their patients. In one study of family physicians in Quebec, less than half of the participants reported taking a sexual history during a general medical examination, and very few asked patients about their engagement in risky sexual behaviours (Maheux, Haley, Rivard, & Gervais, 1997). Research in the U.S. has found similar results, with providers often only eliciting sexual history among patients in high-risk groups and many failing to include prevention counselling in this discussion (Bull et al., 1999; Montano, Phillips, Kasprzyk, & Greek, 2008). Moreover, even when providers were generally diligent about sexual history taking, a notable proportion still neglect to regularly screen their patients for STIs, such as chlamydia (Torkko, Gershman, Crane, Hamman, & Baron, 2000). Low chlamydia screening rates, particularly among asymptomatic patients, have been reported in other U.S. (e.g., Cook, Wiesenfeld, Ashton, Krohn, Zamborsky, & Scholle, 2001; Marrazzo et al., 2007; McClure et al., 2006; St. Lawrence, Montano, Kasprzyk, Phillips, Armstrong, & Leichter, 2002) and U.K. (e.g., McNulty et al., 2010) research, as well as in a study of family physicians in Nova Scotia (Langille, Naugler, & Joffres, 1997). Finally, even if screening is conducted, physicians may not consistently adhere to reporting guidelines. In one of the few studies that did focus on the military context, it was found that only 14% of the laboratory confirmed cases of chlamydia at a U.S. military medical centre were reported to the Office of Preventive Medicine, as mandated by the U.S. Navy Bureau of Medicine and Surgery (Bond & Yates, 2000). Although STI incidence reporting may not be considered a component of secondary STI prevention, these results still indicate that health care providers may not be engaging in behaviours that increase awareness of STI prevalence, which would in turn assist in creating targeted prevention efforts.

STI prevention practices vary from one health care provider to the next, and trends by demographic characteristics have been noted. Although one study (Maheux et al., 1997) found no notable differences between males' and females' STI prevention behaviours, female providers have generally been shown to have greater knowledge of STIs (Wiesenfeld et al., 2005), feel more confident and comfortable in counselling patients about STIs (Ashton et al., 2002; Torkko et al., 2000), and are more likely to assess patients' level of STI risk (Montano et al., 2008) and to screen patients for STIs (Hansen et al., 2005; Langille et al., 1997; McClure et al., 2006; Torkko et al., 2000). In addition to gender, age and experience may also play a role in health care providers' STI prevention actions, as younger physicians have been shown to report better STI-

related education and training in medical school and residency (Ashton et al., 2002) and, perhaps as a consequence, better knowledge of STIs (Henderson et al., 2007; Wiesenfeld et al., 2005). Older physicians are more likely to fail to counsel patients about STI prevention due to time constraints (Hansen et al., 2005). Additionally, providers with fewer than ten years of primary care practice have been shown to be more likely to assess patients' STI risk levels and offer STI screening than their more experienced counterparts (Montano et al., 2008).

Health care providers may also differ in STI prevention practices by type of profession. Nurse practitioners have been shown to be more likely than both physicians and physician assistants to take a patient's sexual history (Torkko et al., 2000) and to test adolescent females for chlamydia (McClure et al., 2006; Torkko et al., 2000). They are also more likely to have enhanced their training and education in STI prevention (Torkko et al., 2000), which may account for some of their increased engagement in STI prevention behaviours. Nurse practitioners are also more likely than physicians to cite barriers to STI preventions, such as insufficient time to adequately counsel patients. But this is likely due to their knowledge of the intricacies of STI care and desire to provide patients with all of its aspects (Mark, Irwin, Sternberg, Anderson, Magid, & Stiffman, 2008). Both nurse practitioners and certified nurse midwives are also more likely than other medical professionals to ask patients STI risk-related questions, to counsel patients about STI prevention and care, and to suggest STI screening to all patients, possibly because of their perceived role in illness prevention (Montano et al., 2008). One study (Thompson et al., 2008), however, found that nurse practitioners are less likely to actively engage patients in sexual-health-related discussion—particularly among non-heterosexual patients—and are more likely to perceive cultural issues as a barrier to these types of conversations, though they were more likely to hand out sexual health education pamphlets during an appointment.

Some studies have compared STI prevention practices by type of physician specialization. Wiesenfeld and colleagues (2005) found that obstetrician-gynaecologists (OB/GYNs), paediatricians, general practitioners (GPs), and internists scored similarly on an assessment of knowledge of STI care. The findings of other researchers, however, have generally indicated that OB/GYNs have greater knowledge of certain types of STIs (Aldrich et al., 2005; Henderson et al., 2007) are more likely to report sufficient STI-related training during residency (Ashton et al., 2002), perceive STIs to be a significant health concern (Sellors et al., 1997), feel more confident and comfortable in providing STI care (Ashton et al., 2002), and cite time constraints as barriers to engagement in complete STI prevention behaviours (Mark et al., 2008). However, other research has shown that although OB/GYNs are more likely than physicians in other specialities to regularly illicit patients' sexual history (Torkko et al., 2000), they may be less likely to screen adolescent females for STIs (Cook et al., 2001; Torkko et al., 2000). Although the trends are not completely clear, provider profession is important to consider when examining secondary STI prevention practices.

### **3.2 Individuals**

As with health care providers, many individuals fail to engage in STI prevention behaviours. For instance, very few people report motivation to be tested for STIs in the absence of symptoms (Tebb, Pauku, Pai-Dhungat, Gyamfi, & Shafer, 2004). Even when convenient STI screening is offered as part of a research project, often, more than a third of individuals recruited do not accept the opportunity to be screened (e.g., Gotz, 2005; Marrazzo et al., 2007).

As with trends among health care providers, patients' STI prevention behaviours may follow patterns according to socio-demographic characteristics, such as gender. Female patients have been shown to have better knowledge of STIs (Balfe et al., 2012; Boyer, Sieverding, Siller, Gallaread, & Chang, 2007; Swenson et al., 2009), and to be more likely to be screened for STIs (Balfe et al., 2012; Boyer et al., 2007; Bradshaw, Pierce, Tabrizi, Fairley, & Garland, 2005; Dickson, Paul, & Herbison, 1998; Fortenberry et al., 2002; Rietmeijer, Bull, Ortiz, Leroux, & Douglas, 1998; Swenson et al., 2009; Wolfers, Kok, Mackenbach, & de Zwart, 2010), though males might be more likely to be tested for STIs with more serious health consequences, such as HIV (McGarrigle et al., 2005). These gender disparities may be due to more convenient opportunities for STI screening among females, such as during their annual Pap test. Alternatively, psychosocial factors may prevent males from seeking screening, such as a greater tendency to take care of their own symptoms rather than seeking assistance from a health care provider (i.e., the need to be self-sufficient), and the desire to be viewed as a healthy, young, "alpha male," without signs of weakness (e.g., Mansfield, Addis, & Mahalik, 2003; Shoveller, Knight, Johnson, Oliffe, & Goldenberg, 2010). On the other hand, males' lower STI screening rates could simply be the result of fear of the testing procedure itself, as males have shown more apprehension to the urethral swab used in some STI tests (Tilson et al., 2007) and, when at-home urine testing procedures are used, males are at least as likely as females to accept screening when offered (Stephenson, Carder, Copas, Robinson, Ridgway, & Haines, 2000). Perceptions of risk may also be a motivator for testing, because females are more at risk for the most commonly reported STIs, chlamydia and gonorrhoea (Centers for Disease Control and Prevention, 2011).

In contrast with gender, there does not appear to be a clear trend for age in STI prevention behaviours. Older individuals have been shown to be more likely to have been tested for HIV (e.g., Fenton, Chinouya, Davidson, & Copas, 2002; McGarrigle et al., 2005; Stolte, de Wit, Kolader, Fennema, Coutinho, & Dukers, 2007; Swenson et al., 2009), but younger age is generally associated with a greater likelihood of screening for more common and treatable STIs, such as chlamydia and gonorrhoea (e.g., Fortenberry et al., 2002; Gotz, 2005; Marrasso et al., 2007; Serlin et al., 2002). This latter finding highlights the importance of risk perceptions in secondary STI prevention behaviours, as adolescents and young adults are most susceptible to these STIs (Centers for Disease Control and Prevention, 2011).

## **4 Barriers to Secondary Prevention**

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In addition to socio-demographic characteristics, there are likely some psychosocial characteristics that affect health care providers' and individuals STI prevention behaviours. The following sections describe the most commonly reported barriers to STI prevention in both groups.

### **4.1 Health Care Providers**

#### **4.1.1 Education, Training, and Knowledge**

As previously mentioned, the availability of STI prevention guidelines and providers' familiarity with these guidelines can influence health care providers' knowledge of STIs. In addition to guidelines, STI knowledge may be impacted by STD-related education and training during

medical school or residency (Wiesenfeld et al., 2005), and many providers perceive this training to be inadequate (Ashton et al., 2002). These findings hold important implications for STI prevention practices, because providers with greater perceived education and training in STI care hold more positive attitudes toward STI prevention (Ashton et al., 2002). They are also more likely to assess STI risk (Montano et al., 2008), screen for STIs (Balfe et al., 2012), and to engage in sexual health promotion activities (Thompson, Casson, Fleming, Dobbs, Parahoo, & Armstrong, 2008). Regardless of the cause, research has identified some deficiencies in knowledge of STIs among health care providers. In multiple studies, for example, a notable proportion of the providers surveyed were unable to correctly identify the strains of human papillomavirus (HPV) that cause genital warts (Aldrich, Becker, Garcia, & Lara, 2005; Henderson et al., 2007). These knowledge gaps, in turn, have frequently shown to act as barriers to STI prevention behaviours, including STI screening (e.g., Hocking et al., 2008; Kapologwe, Kabengula, & Msuya, 2011; McClure et al., 2006; Thompson et al., 2008; Torkko et al., 2000; Wiesenfeld et al., 2005).

#### **4.1.2 Lack of Time**

In one Irish study (Thompson et al., 2008), many of the health care providers interviewed cited a heavy workload or insufficient time due to other continuing education courses as reasons for not participating in sexual health training. Indeed, lack of time in health care appointments is commonly reported by providers as a barrier to engaging in STI prevention practices (e.g., Ashton et al., 2002), including proposing screening (Balfe et al., 2012; Hocking et al., 2008; Kapologwe et al., 2011; Marrazzo et al., 2007; McClure et al., 2006; McNulty et al., 2010). In particular, time constraints are reported to be barriers to the more time-consuming activities, such as sexual history taking, educating patients on STI risks (Bull et al., 1999; Mark, Irwin, Sternberg, Anderson, Magid, & Stiffman, 2008; Sussman, Helitzer, Sanders, Urquieta, Salvadro, & Ndiaye, 2007; Thompson et al., 2008), and counselling patients with a positive STI diagnosis (Henderson et al., 2007). In addition to individual appointment time constraints, insufficient staff for treating high patient demand also lowers the priority of STI screening and counselling (Kapologwe et al., 2011; Mark et al., 2008).

#### **4.1.3 Perceived Patient Risk**

Because the time constraints on care appointments are often a concern for providers, research has shown that they may limit their STI prevention actions with patients who might be considered more at risk for STIs. For instance, some U.S. care providers of adolescents and young adults have stated that they would be more likely to counsel or test their patients for STIs if risky sexual behaviour was suspected (Sussman et al., 2007), and less likely if they perceived chlamydia to be uncommon in this population of patients (Cook et al., 2001). Canadian health care providers, meanwhile, have been shown to be more likely to educate patients on condom use if they perceive these patients' STI risk to be high (Maheux et al., 1997). Moreover, if the patients do not consider themselves at risk for STIs, U.S. providers are less likely to suggest screening (Balfe et al., 2012; Marrazzo et al., 2007). In addition, providers in Tanzania believed that human immunodeficiency virus (HIV) screening should not be required for low-risk patients (i.e., those without symptoms or whose visit was not related to sexual health; Kapologwe et al., 2011). Because some STIs are asymptomatic (WHO, 2003), however, and because patients may not always be honest with providers about their STI risk-related behaviour, it may not be apparent which patients are at risk

for contracting an STI. As a result, a practice of screening only those patients perceived to be most at risk may fail to meet the secondary prevention objective of detecting, treating, and stopping the spread of STIs.

#### **4.1.4 Provider Comfort and Confidence**

When providing STI prevention and care services to patients, some health care providers may feel uncomfortable in addressing this sensitive subject. Although most providers generally report feeling at ease in discussing sexual health issues with patients (Ashton et al., 2002; Khan, Plummer, Hussain, & Minichiello, 2008; McClure et al., 2006), few actually like conversations of this nature (Ashton et al., 2002), and some feel uncomfortable having them with high-risk patients, such as intravenous drug users and homosexuals (Khan et al., 2008). Providers also tend to feel more comfortable discussing sexual health topics with patients of the same sex (Maheux et al., 1997; Thompson et al., 2008). Provider comfort in STI-related care is important, because feeling uncomfortable talking about sexual health with patients has been shown to be associated with a decreased likelihood of engaging in these discussions (McNulty et al., 2010), of taking sexual histories (Bull et al., 1999; Khan et al., 2008; Torkko et al., 2000), and in suggesting STI screening (Balfe et al., 2012; Hocking et al., 2008; McClure et al., 2006).

Health care providers who feel uncomfortable providing STI care have lower self-perceptions of their ability to affect patients' STI risk-taking behaviour (Khan et al., 2008). Most providers are confident in their abilities to discuss sexual history and STI screening with patients (McClure et al., 2006), but many do not believe they are able to influence patients' risky sexual behaviours (Ashton et al., 2002; McClure et al., 2006). These perceptions can impact providers' STI prevention actions, as providers with lower feelings of self-efficacy in educating patients on STI risks are less likely to counsel patients about condom use (Maheux et al., 1997) and to screen patients for STIs (McClure et al., 2006). Clearly, providers' feelings of comfort and confidence in providing STI care have an effect on their STI prevention practices.

#### **4.1.5 Providers' Perceptions of Patient Comfort and Stigma**

In addition to health care providers' own feelings of comfort in discussing sexual health matters, the level of comfort they perceive in their patients during these conversations also impacts their engagement in STI prevention behaviours. For example, many providers have admitted that they refrain from disclosing the connection between HPV and cervical cancer to their female patients because they believe it would cause them undue anxiety (Aldrich et al., 2005). Furthermore, the anticipation of adverse emotional reactions from patients when discussing sexual health issues has been cited as a barrier to providers' obtaining sexual histories from their patients (Bull et al., 1999) and providing STI diagnosis counselling (Henderson et al., 2007). These negative emotions are related to the stigma surrounding promiscuity and, thus, with the shame often associated with STIs. Consequently, the belief that patients will feel embarrassed or offended at the suggestion that they might be at risk for an STI can deter providers from STI prevention and counselling (Langille et al., 1997; Sussman et al., 2007), including providing STI education materials (Freeman et al., 2009) and screening for STIs (Balfe et al., 2012; Hocking et al., 2008; McClure et al., 2006). Reducing the stigma surrounding STIs has been suggested by providers as a method of improving screening initiation rates among health care providers (Hocking et al., 2008).

## **4.2 Individuals**

### **4.2.1 Lack of Time or Inconvenience**

Some barriers to health care providers' STI prevention behaviour are also significant obstacles for patients. For instance, the time required to visit a clinic for STI testing and to complete the screening procedure has been cited by many individuals as a reason for not getting tested for STIs (e.g., Banikarim, Chacko, Wiemann, & Smith, 2003; Bradshaw et al., 2003; Chacko, von Sternberg, Velasquez, Wiemann, Smith, & DiClemente, 2008; Mimiaga et al., 2009; Serlin et al., 2002; Uuskula, Kangor, & McNutt, 2006). In addition, the time required to access STI services can make STI prevention challenging. Some people, for example, have said that they would be more likely to get tested for STIs if there were a screening site near their home or workplace (Tilson et al., 2007; Wang, Stanton, & McGuire, 2010). Lack of transportation, particularly for patients residing in geographically remote areas, is also a substantial barrier to screening (Branch, Harvey, Zukoski, & Warren, 2010; Goldenberg, Shoveller, Koehoorn, & Ostry, 2008a; Wolfers et al., 2010). Furthermore, the inconvenience of some clinics' hours of operation or waiting times for appointments may prevent some individuals from seeking an STI test (Barth, Cook, Downs, Switzer, & Fischhoff, 2002; Branch et al., 2010; Goldenberg, Shoveller, Ostry, & Koehoorn, 2008b; Spielberg, Kurth, Gorbach, & Goldbaum, 2001; Tilson et al., 2007).

### **4.2.2 Procedure Discomfort**

Aspects of the screening procedure itself have also been shown to inhibit individuals from obtaining an STI test. People who perceive STI testing to be physically uncomfortable or even painful are less likely to undergo screening (Balfe et al., 2012; Barth et al., 2002; Pavlin, Gunn, Parker, Fairley, & Hocking, 2006; Rietmeijer et al., 1998; Serlin et al., 2002; Shoveller et al., 2009; 2010; Tilson et al., 2007), including when the process involves having blood drawn, as in HIV testing (Chacko et al., 2008; Spielberg et al., 2001; 2003). The requirement to remove one's clothing for the physical examination element of some STI testing procedures is also a concern for some patients (Balfe & Brugha, 2009; Chacko et al., 2008; Serlin et al., 2002; Shoveller et al., 2010). The apprehension and embarrassment associated with screening processes, such as urethral swabbing and pelvic examination, appear to be influential in STI testing decisions, because most individuals would be much more likely to screen if more private and less invasive methods were available, such as home-based urine testing procedures (e.g., Balfe et al., 2012; Bradshaw et al., 2005; Graseck, Secura, Allsworth, Madden, & Peipert, 2010; Lippman, Jones, Luppi, Pinho, Veras, & van de Wijgert, 2007; Pavlin et al., 2006; Pimenta et al., 2003; Serlin et al., 2002; Shoveller et al., 2009; 2010; Spielberg et al., 2001; 2003; Stephenson et al., 2000; Tebb et al., 2004; Tilson et al., 2007).

### **4.2.3 Apprehension about Positive Diagnosis**

Other psychological aspects of STI prevention can reduce the likelihood of STI screening. The negative emotions associated with a positive STI test result has been cited as a barrier to engagement in STI screening (Barth et al., 2002; Chacko et al., 2008; Mimiaga et al., 2009; Rietmeijer et al., 1998), especially for potentially life-threatening STIs, such as HIV (Carey, Coury-Doniger, Senn, Vanable, & Urban, 2008; Spielberg et al., 2001; 2003; Stolte et al., 2007).

Waiting for test results (Chacko et al., 2008; Shoveller et al., 2010; Spielberg et al., 2001; 2003) and having to notify sexual partners of an STI diagnosis (Pavlin et al., 2006) are also anxiety-inducing aspects of secondary STI prevention that discourage some individuals from testing. As a result, many people have stated that they would prefer not to know or think about whether they have an STI (Barth et al., 2002; Carey et al., 2008; Stolte et al., 2007).

#### **4.2.4 Lack of Knowledge**

Beyond elective ignorance about STI status, many people lack information about important aspects of STI prevention. Research has shown poor awareness of certain types of STIs, such as chlamydia and genital herpes, particularly about their typically asymptomatic nature (Tilson et al., 2007; Uuskula et al., 2006). Knowledge of the importance of screening to detect asymptomatic STIs is essential in providing individuals with the motivation to be tested. The low public awareness of the facets of common, treatable STIs (due to media attention on HIV and AIDs; Barth et al., 2002), the existence of frequently asymptomatic STIs (Pavlin et al., 2006; Rietmeijer et al., 1998), and the methods of STI transmission and prevention (Branch et al., 2010; Pavlin et al., 2006) have been associated with a reduced likelihood of screening.

#### **4.2.5 Perceived Risk**

Perhaps few people are motivated to be tested for STIs in the absence of symptoms because few people know that some STIs can be asymptomatic (Balfe & Brugha, 2009; Barth et al., 2002; Marrazzo et al., 2007; Mimiaga et al., 2009; Pimenta et al., 2003). Low perceived risk is a commonly cited barrier to STI screening (Balfe et al., 2012; Balfe & Brugha, 2009; Barth et al., 2002; Carey et al., 2008; Fenton et al., 2002; Fortenberry et al., 2002; Gotz, 2005; Hull, 2012; Marrazzo et al., 2007; McGarrigle et al., 2005; Mimiaga et al., 2009; Pavlin et al., 2006; Pimenta et al., 2003; Rietmeijer et al., 1998; Spielberg et al., 2001; 2003; Stolte et al., 2007; Wang et al., 2010; Wolfers et al., 2010). Engagement in risky sexual behaviours, such as having multiple partners, high-risk partners, and unprotected sex have been shown to increase STI testing intentions and behaviour, primarily due to augmented perceptions of susceptibility to STIs (Balfe, Brugha, O'Donovan, O'Connell, & Vaughan, 2010; Balfe & Brugha, 2009; Banikarim et al., 2003; Barth et al., 2002; Bradshaw et al., 2005; Chacko et al., 2010; Gotz, 2005; Marrazzo et al., 2007; McGarrigle et al., 2005; Mimiaga et al., 2009; Pavlin et al., 2006; Shoveller et al., 2010; Spielberg et al., 2001; 2003; Wang et al., 2010). However, those with low perceived risk may still require screening, because many individuals lack accurate knowledge about their actual vulnerability to STIs (e.g., that STI risk may still be high in the absence of symptoms; an underestimation of a partner's STI risk level). Conversely, some individuals who have recently engaged in risky sexual activities may actually be less likely to seek screening, possibly because of the previously mentioned fear of receiving a positive STI diagnosis (Balfe et al., 2010; Chacko et al., 2006; Stolte et al., 2007). In general, however, research indicates that high perceived risk facilitates rather than deters STI screening.

#### **4.2.6 Stigma and Social Norms**

The apprehension surrounding an STI diagnosis is at least partly attributable to the judgment society places on those with an illness of sexual aetiology. The fear of social exclusion and discrimination due to a diagnosis of HIV or AIDS is a relatively common barrier to testing for these illnesses (e.g.,

Kalichman & Simbayi, 2004; Spielberg et al., 2001; 2003). However, there also appears to be a perceived negative stigma associated with more common, treatable STIs (e.g., Balfe & Brugha, 2009; Pavlin et al., 2006; 2008; Uuskula et al., 2006). Even without a positive diagnosis, simply engaging in STI prevention actions seems to imply sexual promiscuity. The anxiety associated with the possibility of others discovering that one has attended a sexual health clinic or that one has been tested for STIs has been shown to inhibit some people from seeking screening (Balfe et al., 2010; 2012; Barth et al., 2002; Fenton et al., 2001; Fortenberry et al., 2002; Goldenberg et al., 2008a; Rietmeijer et al., 1998; Shoveller et al., 2009; Tilson et al., 2007). Many people have indicated that normalizing STI prevention as an overall public health initiative—instead of it being seen as an action exclusively for those most at risk—would make them more likely to be tested (Balfe et al., 2010; Pavlin et al., 2008; Tilson et al., 2007).

#### **4.2.7 Interactions with Health Care Providers**

Because they are often responsible for suggesting STI prevention behaviours, such as STI screening, providers can contribute to the reduction of STI-related stigma. Some patients are hesitant to engage in STI prevention because they are embarrassed about discussing sexual health with health care providers and fearful that the provider will judge their sexual history (Balfe & Brugha, 2009; Branch et al., 2010; Goldenberg et al., 2008a). Indeed, some aspects of the patient–provider relationship have been shown to increase the likelihood of STI screening: trust that the provider will maintain confidentiality (Banikarim et al., 2003; Miller, Tebb, Williams, Neuhaus, & Shafer, 2007; Shoveller et al., 2009), projection of an empathic, non-judgmental attitude (Balfe et al., 2010; Barth et al., 2002; Fenton et al., 2001; Goldenberg et al., 2008a;b; Miller et al., 2007; Tilson et al., 2007), and the insistence that STI prevention is a common, health-promotion practice (Balfe et al., 2010; Mimiaga et al., 2007; Pavlin et al., 2008; Pimenta et al., 2003). In other words, patients seem to be more likely to engage in secondary STI prevention when their provider is perceived as trustworthy, understanding, and concerned about their well-being.

#### **4.2.8 Concern for Health**

The decision to be screened for STIs depends on the importance individuals place on their overall health maintenance and the extent to which they believe STIs will impact their well-being. Individuals who view the consequences of even common, treatable STIs as serious are more likely to be tested (Barth et al., 2002; Chacko et al., 2006; Pavlin et al., 2006; Rietmeijer et al., 1998). In addition, people who consider STI screening as part of total health protection are more likely to be screened (Balfe & Brugha, 2009; Chacko et al., 2008; Hullett, 2004; McGarrigle et al., 2005; Mimiaga et al., 2009; Spielberg et al., 2001), because it allows for early detection and treatment (Chacko et al., 2008; Pavlin et al., 2008; Pimenta et al., 2003; Wolfers et al., 2010) and because it could protect their future fertility (Balfe et al., 2010; Balfe & Brugha, 2009; Pimenta et al., 2003). Accordingly, individuals who use health services more often are also more likely to engage in STI prevention behaviours, such as screening (Fortenberry et al., 2002; Wang et al., 2010). In short, people who do not consider the long-term health effects of STIs to be a serious or a crucial component of their health protection may not seek screening for STIs.

#### **4.2.9 Concern for Partner's Health**

In addition to concern for their own well-being, individuals may be less likely to be screened if they are not concerned about the effects of an STI on their partner's health. Married men have

been shown to be more likely to test for HIV than single men (Fenton et al., 2002), and people on brief visits to locations away from home are less likely to be tested for STIs due to a lack of attachment and concern for transmitting STIs to their casual partners, essentially strangers, in this region (Goldenberg et al., 2008b). The desire to protect partners and maintain their trust is a common motivator for screening (Chacko et al., 2008; Hullett, 2004; Mimiaga et al., 2009; Spielberg et al., 2001; 2003; Wolfers et al., 2010), demonstrating that, in the absence of concern for partners' well-being, secondary STI prevention is less likely to occur.

## **5 Implications and Existing Research Gaps**

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Taken together, the results discussed above point to factors that may impact decisions by health care providers and individuals to engage in secondary STI prevention. From both perspectives, the success of secondary prevention may rest on the level of knowledge about STIs, perceptions of the level of risk or stigma attached to STIs, the availability of time and resources for prevention, and the quality of exchanges between health care providers and their patients. For individuals, additional considerations may include overall concern for theirs or their partner's health, their apprehension of possible consequences of a positive diagnosis, and other possible inconveniences associated with the screening itself. These factors may be considered in the development of strategies to improve the secondary prevention of STIs in a military context; however, the majority of the research pointing to these factors was conducted in a civilian context. In this section, results of these studies are discussed in terms of their potential relevance to a military context. Some research gaps are also identified.

Limited research has focused on barriers to secondary prevention in the military context. However, the factors associated with primary prevention practices, such as limiting sexual risk-taking and consistent condom use, have received some attention. Work has also been conducted on primary prevention programs. Russak and colleagues (Russak, Ortiz, Galvan, & Bing, 2005), for instance, conducted a systematic review of HIV/acquired immunodeficiency syndrome (AIDS) behavioural prevention programs aimed at military personnel. Their review identified four prevention interventions that addressed knowledge about risk, high-risk behaviours, and prevention, in addition to providing prevention-skills building. These interventions demonstrated favourable effects by mitigating one or more psychosocial barriers, such as service members' knowledge about HIV/AIDS, their willingness to engage in preventive behaviours and/or their attitudes toward prevention. Other work has examined female U.S. Army personnel's perceptions of a self-administered intervention designed to promote safer sexual practices during travel (von Sadvoszky, Ryan-Wenger, Moore, & Jones, 2009). This intervention also focused on knowledge about risk and STI prevention skills, but specifically targeted women. Though the effectiveness of the intervention was not examined, the intervention was rated favourably by army women.

Even though prevention interventions aimed at improving knowledge and perceived STI risk—factors that could also act as barriers to secondary prevention—hold promise for enhancing the primary prevention of STIs in the military context, the role of secondary prevention must not be overlooked. A recent study of STIs among HIV-positive active duty U.S. military personnel revealed that over a third of individuals (34%) contracted an STI after receiving an HIV-positive diagnosis. In total, 157 individuals accounted for 186 incident cases of gonorrhoea, while 312 accounted for 364 incident cases of syphilis. Thus, a small proportion of HIV-positive service members obtained multiple STI diagnoses after having received HIV-positive diagnoses. These

results show that high-risk behaviours may persist among military personnel, even after they have personal experience and knowledge of the high-risk behaviour (Tzeng, Clark, Garges, & Otto, 2013). Examples like these emphasize the importance of secondary prevention in overall efforts to reduce STI incidence.

Features of the military environment may facilitate secondary STI prevention. Relative to their civilian counterparts, U.S. military personnel have easy access to health care (Garges, 2013). Similarly, CAF military personnel have access to the CAF health care facilities and resources located directly on bases. In addition, routine and periodic medical assessments provide other opportunities for screening and treating STIs among military personnel. Many points of entry for advanced training involve medical exams, screening, or vaccinations (Niebuhr et al., 2006). A few prevention initiatives have tried to capitalize on these aspects of the military environment. For example, in an effort to reduce rates of chlamydia, the U.S. Air Force, Navy, and Marine Corps incorporated screening into the processing of female recruits (Brodine & Shafer, 2003; Jordan, Lee, Nowak, Johns, & Gaydos, 2011). Evidence suggests that screening female military recruits results in significant cost savings (Howell, McKee, Gaydos, Quinn, & Gaydos, 2000). Because screening and treating male personnel for STIs is a necessary component of prevention, some have proposed STI screening for male recruit and active duty populations in the U.S. military (Brodine & Shafer, 2003). A more recent analysis showed that both targeted and universal screening of male recruits could be cost-effective (Nevin, Shuping, Frick, Gaydos, & Gaydos, 2009).

Routine medical assessments and accessible health care could diminish the impact of inconvenience and lack of time on secondary STI prevention among military health care providers and personnel. On the other hand, frequent travel or deployments could make the prompt screening, treatment of STIs, and follow-up more difficult (Brodine & Shafer, 2003). A study of transient workers in north eastern British Columbia—whose work schedules and experiences might be comparable to those of military personnel deployed in remote areas—revealed that limited opportunities to access testing and prevention resources inhibited STI testing (Goldenberg, 2008a). Research is needed to determine the circumstances under which lack of time and access to appropriate health services interfere with STI care in military personnel.

Since frequent travel and deployments have been linked to increased high-risk behaviour (Hamlyn, Peer, & Easterbrook, 2007), it is necessary for military personnel who have engaged in high-risk behaviour to seek testing regularly and actively. As well, it has been argued that routine screening (i.e., at annual periodic health assessments) may not be sufficient because re-infection may be high and may occur shortly after treatment (Shafer, Boyer, Pollack, Moncada, Chang, & Schachter, 2008). Decisions to seek STI testing outside of routine medical assessments may be based in part on military personnel's knowledge of STIs. Yet knowledge about STI risk may be insufficient. One study assessed U.S. Army recruits' knowledge of various STI-related facts as part of an evaluation of the feasibility and short-term effectiveness of a knowledge-based intervention for STIs. Results revealed that 30% of recruits were not aware that chlamydia and gonorrhoea could be treated with antibiotics. As well, 23% of recruits were not aware that oral sex placed them at risk of contracting an STI (Arcari, Gaydos, Howell, McKee, & Gaydos, 2004). Interventions aimed at enhancing knowledge about STIs have been linked to reductions in high-risk behaviours, such as alcohol use and increased use of condoms (Arcari et al., 2004; Russak et al., 2005). However, it remains to be determined whether knowledge about STIs is related to decisions to seek STI testing in military personnel.

Notwithstanding the potential importance of improving knowledge of STIs, doing so may not impact individuals' perceptions of their own level of risk. Perceived invulnerability has been widely observed among young adults (Millstein & Halpern-Felsher, 2002). Since military personnel consist primarily of this age group, perceived invulnerability to STIs may be prevalent. A recent study found that female U.S. Marine Corps recruits demonstrated an optimistic bias regarding their perceived risk of contracting an STI and generally perceived themselves to be invulnerable. In turn, those who reported never using condoms reported lower perceived risk relative to occasional users (Pollack, Boyer & Weinstein, 2013). Research has shown that perceptions of invulnerability may be greater in young men than in young women (Courtenay, McCreary, Merighi, 2002). Recent screening-based prevention efforts, which have largely focused on female personnel in the U.S. (e.g., Brodine & Shafer, 2003), are likely to have had limited impact on male personnel's recognition of their risk. Little research to date has explicitly examined perceptions of STI risks among male military personnel who comprise the majority of the military population (86% of CAF Regular Force effective strength; DND, 2013). Furthermore, no studies have examined the relationship between perceptions of STI risk and STI testing decisions among military personnel.

Beyond knowledge and perceptions of risk, the perceived stigma surrounding STIs and a positive STI diagnosis may be especially important in decisions to seek STI testing among military personnel. Military personnel must often work and live in close quarters with colleagues, and coupling between interrelated communities may occur (Garges, 2013). At the same time, health care providers in military facilities may have multiple relationships with patients: as providers, colleagues, and friends. Because of the close proximity and ties with colleagues, concerns about confidentiality could result in a reluctance to be screened for STIs among military personnel. Pre-existing relationships with health care providers could also interfere with patient-provider interactions and affect the quality of discussions concerning sexual history and symptoms.

Finally, STIs may not be viewed by military personnel as an important health issue, because physical symptoms may not always occur and serious health impacts may be delayed. It has been noted that STI programs have not been prioritized by military leaders, due to other priorities and budgetary restrictions (Gaydos & Gaydos, 2008). While the most prevalent STIs may not interfere with the ability of military personnel to carry out their duties (Gaydos & Gaydos, 2008), some STI sequelae (e.g., pelvic inflammatory disease) could have serious ramifications for the health of female service members during deployments, especially because they may not have ready access to health care (Brodine & Shafer, 2003). It remains to be determined, however, whether military personnel are aware of the potential impacts of STIs on their health and operational readiness.

## **6 Conclusion**

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A considerable amount of research has focused on identifying barriers to the secondary prevention of STIs in civilian populations from the perspectives of individuals and health care providers. The bulk of research with military personnel has focused on determinants of risky sexual behaviour and the use of condoms. Efforts to enhance the secondary prevention of common STIs (such as chlamydia) in the U.S. military are believed to hold promise in reducing the burden of STIs among military personnel (Howell et al., 2000). Still, it is necessary that at-risk military personnel regularly and actively seek STI testing. Given the dearth of research on

secondary prevention behaviours among military personnel, little is known about factors that may facilitate or hinder such behaviour. The importance of developing STI prevention interventions that are culturally-sensitive and tailored to the target population has been noted by several authors (Russak et al., 2005). In order to guide the development of such interventions, however, additional research is desperately needed. Specifically, research in the following areas is needed: knowledge and perceptions of STI risks, their impacts on health, and ways they can be prevented; stigma and social norms associated with STIs; and the accessibility of testing. Further research into the factors that influence the quality of patient-provider interactions among military personnel and their health care providers would help with identifying the best policies and programs for improving the secondary prevention of STIs in the CAF.

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Historically, sexually transmitted infections (STIs), also called sexually transmitted diseases (STDs), have been considered a problem in militaries (Korzeniewski, 2012). Typical military experiences, such as postings or deployment away from one's family, may explain some of military members' elevated susceptibility to STIs (Kingma & Yeager, 2005; Malone, Hyams, Hawkins, Sharp, & Daniell, 1993). Because STIs are preventable, much emphasis has been placed on developing guidelines for prevention. Many of the effective prevention strategies have relied on secondary prevention by health care providers within the primary care setting (e.g., educating physicians about increasing rates, routine or periodic screening, and expedited partner treatment; Sarbu, 2012). Nevertheless, the responsibility for secondary prevention is shared with individuals, who must seek testing and treatment themselves. This report provides a review of research on barriers to the secondary prevention of STIs from the perspective of individuals and health care providers. This review shows that the success of secondary prevention may depend on the level of knowledge about STIs, perceptions of the level of risk or stigma attached to STIs, the availability of time and resources to seek testing and treatment, and the quality of exchanges between health care providers and their patients. For individuals, additional considerations may include their overall concern for theirs or their partner's health, their apprehension of the possible consequences of a positive diagnosis, and other possible inconveniences associated with the screening process. Because much of the research in the area has been conducted in a civilian context, this report also discusses implications for a military context and underlines existing research gaps. It is recommend that research in the following areas be conducted among military personnel and health care providers: knowledge and perceptions of STI risks, their impacts on health, and ways they can be prevented; the stigma and social norms associated with STIs; the availability and accessibility of testing; and the factors that influence the quality of patient-provider interactions. Such research will help guide the development of policies and programs related to the prevention of STIs in the military.

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Les infections transmises sexuellement (ITS), connues aussi comme maladies transmises sexuellement (MTS), sont considérées depuis longtemps comme étant un problème dans l'armée. (Korzeniewski, 2012). Les expériences militaires typiques, comme les affectations et les déploiements loin de la famille, peuvent expliquer en partie la prédisposition élevée des militaires aux ITS (Kingma et Yeager, 2005; Malone, Hyams, Hawkins, Sharp et Daniell, 1993). Parce que les ITS peuvent être évitées, on a beaucoup misé sur l'élaboration de lignes directrices en matière de prévention. Bon nombre des stratégies efficaces de prévention reposent sur la prévention secondaire par des fournisseurs de soins de santé appartenant au milieu des soins primaires (p. ex., informer les médecins des taux croissants, dépistage systématique ou périodique et traitement accéléré des partenaires; Sarbu, 2012). Néanmoins, chaque personne est responsable de la prévention secondaire et doit demander à passer un test de dépistage ou à recevoir un traitement. Le présent rapport fournit une revue de la recherche sur les obstacles à la prévention secondaire des ITS du point de vue des personnes et des fournisseurs de soins de santé. Cette revue révèle que la réussite de la prévention secondaire pourrait dépendre du niveau de connaissance concernant les ITS, des perceptions quant au niveau de risque ou à la stigmatisation associés aux ITS, de la disponibilité en temps et en ressources lors d'une

demande de dépistage et de traitement ainsi que de la qualité des échanges entre les fournisseurs de soins de santé et leurs patients. Pour ce qui est des personnes, d'autres éléments sont à considérer, dont la préoccupation globale quant à la santé de leur(s) partenaire(s), leur appréhension quant aux possibles conséquences d'un diagnostic positif et les autres inconvénients possibles associés au processus de dépistage. Parce qu'une grande partie de la recherche dans le domaine a été menée dans un contexte civil, le présent rapport traite aussi des incidences dans un contexte militaire et souligne les lacunes existantes en matière de recherche. On recommande que des recherches soient effectuées dans les domaines qui suivent pour le personnel militaire et les fournisseurs de soins de santé : connaissance et perceptions des risques liés aux ITS, incidence des ITS sur la santé et les façons de les prévenir; stigmatisation et normes sociales associées aux ITS; disponibilité des tests de dépistage et accès à ces tests ainsi que facteurs ayant une incidence sur la qualité des interactions entre les patients et les fournisseurs de soins de santé. De telles recherches permettront d'orienter l'élaboration de politiques et de programmes en lien avec la prévention des ITS dans l'armée.

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sexually transmitted infection; health; prevention; screening; literature review