

**Effective Health Promotion Strategies for
Middlesex-London Health Unit's
Sexual Health Team**



June 2015

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Cite reference as: Middlesex-London Health Unit (2015).
Effective Health Promotion Strategies for Middlesex-London Health Unit's Sexual Health Team
London, Ontario: Author.

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Table of Contents

Acknowledgements	i
Executive Summary	ii
I. Issue	1
1. Local Context	1
II. Context	2
2. Background	2
III. Research Question	3
1. PICO Question	3
2. Search Strategy	3
3. Search Results	4
IV. Quality Assessment	5
1. Quality Assessment Tools and Strategy	5
2. Results	5
V. Synthesis of Findings	5
1. Summary of findings by intervention type, and significance	5
2. Summary of results of interventions by outcome measures	5
VI. Preliminary Program Recommendation	6
References	7
Appendix A: Public Health Requirements Associated with this Rapid Review	9
Appendix B: NCCMT: Methods for Efficiently Searching Research Evidence	12
Appendix C: Search Strategy	13
Appendix D: Final Search Results	16
Appendix E: Quality Assessment Tool for Systematic Reviews: AMSTAR	17
Appendix F: NCCMT: A Model for Evidence-Informed Decision-Making	19
Appendix G: NCCMT: Applicability and Transferability Tool	21
Appendix H: Blank Data Extraction Table	25
Appendix I: Summary of Findings by Primary Outcome Measure	26
Appendix J: Summary of Findings by Secondary Outcome Measure	28

Acknowledgements

The following Middlesex-London Health Unit Staff for their valued contributions in this Rapid Review process:

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Heather Lokko, Associate Director, *Oral Health, Communicable Diseases and Sexual Health*

Alison Locker, Epidemiologist, *Oral Health, Communicable Diseases and Sexual Health*

Sameena Vandivelu, Program Evaluator, *Oral Health, Communicable Diseases and Sexual Health*

Yvonne Tynl, Public Health Librarian, *Human Resources and Labour Relations Services*

Carolynne Gabriel, Public Health Librarian, *Human Resources and Labour Relations Services*

Our external mentors for sharing their time and expertise:

Donna Ciliska, Senior Knowledge Translation Advisor, *National Collaborating Centre for Methods & Tools (NCCMT)*

Danielle Charron, Library Coordinator, *City of Hamilton Public Health Services*

Peel Public Health

Executive Summary

Purpose

The Sexual Health team at the Middlesex-London Health Unit conducted a rapid review to determine the most current and effective health promotion strategies for reducing sexually transmitted infections (STI's) among youth aged 15-24 in Middlesex-London. The rationale for focusing on this age group was based on the epidemiology of the infection rates from local context (refer 1.1 Local Context for more information).

Research Question

Among youth aged 15-24 years, what health promotion strategies are effective at reducing rates of sexually transmitted infections?

Context

Currently, the Sexual Health team engages in numerous health promotion strategies intended to promote healthy sexuality in the residents of Middlesex-London. Some of these strategies include providing opportunities for education and skill building, creating and fostering supportive environments, raising awareness through mass media campaigns and using social media.

Methods and Results

The original search strategy for this review was replicated from a rapid review completed by Peel Public Health in 2012. For the Middlesex-London Health Unit review, a total of 4 databases (Medline, PsycINFO, Cochrane, and CINAHL) were searched up until March 2015. The search strategy resulted in 276 articles, including best practice guidelines, meta-analysis and systematic review. Six systematic reviews were included after removal of duplicates, relevance assessment, full article review and quality assessment. Reference lists of all articles were also scanned with the inclusion and exclusion criterion.

Key Findings

The literature demonstrates that there are a multitude of effective health promotion strategies available to public health professionals to influence sexual behaviour, sexual health knowledge, condom use, self-efficacy and attitudes of youth. In turn, this may positively impact the incidence of STI rates in our population.

Key findings from this rapid review of the literature are as follows:

- Facilitator-led interventions (e.g., public health professional, teacher) demonstrate a reduced incidence in sexually transmitted infections (STIs) through the use of behavioural interventions.
- Facilitator-led interventions also show improvement in behavioural outcomes and increased knowledge, specifically with regards to an increase in condom use.
- Social media and text messaging interventions are effective in increasing STI knowledge, particularly with respect to increased familiarity with barrier methods and how they reduce the transmission of STIs. There is a positive significant effect in condom use self-efficacy and a reduction in the proportion of individuals reporting multiple or new partners.
- Employing a train-the-trainer method demonstrates some effect in the reduction of the incidence of active syphilis and the prevalence of gonorrhoea.
- Utilizing a peer-led approach is effective in increasing youth sexual health knowledge for HIV/AIDS; changing knowledge for STIs and HIV/AIDS; increasing positive behaviour in regards to the use of condoms; improving prevention skills and youth sexual health knowledge and attitudes of STI prevention methods.
- Interactive-computer-based programs (ICBP) reported demonstrate non-significant improvement in knowledge and self-efficacy, and statistically significant improvement in safe sex intention and behaviour

Recommendation

It is recommended that Sexual Health team members consult with key stakeholders to further consider the above-mentioned key findings, by applying the following NCCMT tools: A Model for Evidence-Informed Decision-Making (Appendix F) and the Adaptability and Transferability Tool (Appendix G). This will facilitate the development of relevant final recommendations for sexual health programming.

I. Issue

The Sexual Health (SH) team conducted a rapid review to determine the most current and effective health promotion strategies for reducing sexually transmitted infections (STIs) among youth aged 15-24 in Middlesex-London. This review was conducted to identify which team initiatives should be changed or discontinued, which should be continued or enhanced, and what new initiatives could be considered for implementation.

As a public health unit operating in the province of Ontario, the Board of Health is required to provide mandatory, and some additional sexual health programs and services (Appendix A). Mandated programs and services are primarily based on the following requirements:

- **Provincial Legislation** - [Health Protection and Promotion Act](#), R.S.O. 1990, c.H.7. (HPPA)
- **Provincial Standards** - [Ontario Public Health Standards](#), 2008 (OPHS), specifically:
 - Principles: Need, Impact, Impact, Capacity, Partnership and Collaboration
 - Foundational Standard
 - Sexual Health, Sexually Transmitted Infections, and Blood-borne Infections
 - Reproductive Health (specifically decreased rate of adolescent pregnancy)
 - Infectious Diseases Prevention and Control
- A **Provincial Protocol** - [Population Health Assessment and Surveillance Protocol](#), 2008 (PHASP)

The OPHS and PHASP, in particular, establish the requirement that health units utilize evidence-informed decision making methodology in the context of their program planning, implementation/delivery, management and evaluation activities. Applying this approach better ensures:

- Health units efficiently and effectively identify and address public health issues in their community.
- Public health programs and services are planned and implemented in such a way as to avoid unintended harm.
- Public health demonstrates accountability through its effective and transparent use of public health resources.

1. Local Context

Before the team could begin looking to the various current and effective strategies, an update on epidemiology of infection rates for Middlesex-London was needed. This update highlighted the following:

- **Chlamydia:** The annual reported incidence rate of chlamydia infections in Middlesex-London was significantly higher than the rate in Ontario as a whole in each year between 2009 and 2013. While this is alarming, the gap between the two rates may be becoming less wide. Between 2009 and 2013, the average annual reported incidence rate in Middlesex-London was 307.4 cases per 100,000 people. Across the five-year time period, an average of 1,414 chlamydia cases were reported annually. The average annual reported incidence rate of chlamydia infections among females for this time period was highest among 20 to 24 year olds, followed by 15 to 19 year olds. For males, the average reported incidence rate of chlamydia infections was also highest among 20 to 24 year olds for this time period, followed by 25 to 29 year olds. Finally the average annual reported incidence rate among females exceeded that for males in all age groups except those 50 years of age and over.
- **Gonorrhea:** The annual reported incidence rate of gonorrhea infections in Middlesex-London was significantly lower than the rate in Ontario as a whole in each year between 2011 and 2013. Between 2009 and 2013, the average annual reported incidence rate in Middlesex-London was 29.8 gonorrhea cases per 100,000 people. Across the five-year time period, an average of 137 gonorrhea cases were reported annually. For this time period, the average annual reported incidence rate of gonorrhea infections was highest among 20 to 24 year olds, followed by 25 to 29 year olds, for both females and males. In the age groups 0 to 19 years and 20 to 24 years, the average annual reported incidence rate among females exceeded that for males. In the remaining age groups, the rate among males exceeded the rate for females.
- **Hepatitis C:** In terms of hepatitis C, the annual reported incidence rate in Middlesex-London was significantly higher than the rate in Ontario as a whole between 2009 and 2013. Although the

Middlesex-London rate decreased in 2013, the decrease is not statistically significant compared to the other years in this time frame. Between 2009 and 2013, the average annual reported incidence rate in Middlesex-London was 53.1 hepatitis C infections per 100,000 people. Across this 5 year period, an average of 244 hepatitis C infections was reported annually. The annual reported incidence rate among females was highest among 25 to 29 year olds, followed by 20 to 24 year olds. For males, the annual reported incidence rate was highest among 30 to 34 year olds, followed by 25 to 29 year olds. Lastly, the reported incidence rate among males exceeded the rate for females in all age groups except among those 19 years of age and under.

- **Infectious syphilis:** Between 2009 and 2013, the annual reported incidence rate of infectious syphilis in Middlesex-London fluctuated over the five-year period. After being statistically higher than the provincial rate in 2011, the incidence rate of infectious syphilis in Middlesex-London was not statistically different to the Ontario rate in each of 2012 and 2013. Due to the relatively few infectious syphilis cases reported in Middlesex-London, the associated confidence intervals are quite wide. Between 2009 and 2013, the average annual reported incidence rate in Middlesex-London was 4.8 infectious syphilis cases per 100,000 people. Across the five-year time period, an average of 22 infectious syphilis cases were reported annually. During this time period, the majority of infectious syphilis cases were reported among males at 91.8%. Due to the small number of cases reported among females in this time period (n=9), it is not possible to present gender specific rates. Across the five-year time period, the reported incidence rate of infectious syphilis was highest among those 20 to 24 years of age, followed by those 25 to 29 years of age and 30 to 34 years of age.
- **HIV/AIDS:** Between 2009 and 2013, the annual reported incidence rate of HIV and AIDS infections in Middlesex-London was similar to the provincial rate in each year.. Between 2009 and 2013, the average annual reported incidence rate in Middlesex-London was 6.3 cases per 100,000 people. Across the five-year time period, an average of 29 HIV/AIDS cases were reported annually. For females, the average annual reported incidence rate of HIV/AIDS infections between 2009 and 2013 was highest among 35 to 39 year olds, followed by 30 to 34 year olds. For males, the average annual reported incidence rate of HIV/AIDS infections was highest among 30 to 34 year olds, followed by 25 to 29 year olds. The average annual reported incidence rate among males exceeded the rate for females in all age groups except those 35 to 39 year olds, where the gender-specific rates were the same.

II. Context

2. Background

The Sexual Health (SH) team is part of the Oral Health, Communicable Diseases, and Sexual Health (OHCDSH) service area. The Sexual Health team provides clinical services and engages in population health promotion initiatives. Currently, the front-line staff resources allocated to focus on planning, implementation and evaluation of population health promotion initiatives include a 0.4 FTE Program Assistant, 3.5 FTE Public Health Nurses (PHN's), 0.7 FTE Social Determinants of Health (SDOH) PHN and a 1.0 FTE Public Health Promoter. In the near future, a 0.5 FTE Health Promoter will join the team to focus on planning and implementing a comprehensive Community Drug Strategy. The annual programming budget, excluding FTE salaries, totals \$28,000. This budget is primarily used for programming and campaign material expenditures throughout the year.

Currently, the SH team engages in numerous health promotion strategies to promote healthy sexuality in the residents of Middlesex-London. One such strategy includes education and skill building in regards to sexual health. The team provides presentations to community groups and work places, with different education needs, on a variety of sexual health topics. The SH Team uses the principles of health promotion, disease prevention and health protection to educate individuals, groups, networks, and organizations to influence societal norms and raise awareness of sexuality. Topics for these presentations vary but often include an introduction to reproductive health for either men and/or women, background information on STIs, birth control methods, positive space training, the importance of getting tested, how to get tested, healthy relationships, and consent.

Besides community presentations, the SH team is highly active in creating supportive environments for sexual health. Much of this work focuses on Positive Space Training and encouraging organizations and community partners to offer inclusive services and resources for the Lesbian Gay Bisexual Transgender Queer (LGBTQ) population within Middlesex London. The SH team also does a lot of work to increase the societal norms for positive

sexual health and decrease the stigma related to STI testing. The team promotes a supportive environment where all birth control methods are considered beneficial in controlling unintended pregnancies.

Lastly, the SH team develops social media and mass media campaigns to promote various sexual health messages. In the past, the team has used various health behaviour theories to develop online interactive games, engaging social media campaigns and poster displays to spread the importance of STI testing and to promote MLHU sexual health services.

III. Research Question

The research question examined in this review is as follows:

Among youth aged 15-24 years, what health promotion strategies are effective at reducing rates of sexually transmitted infections?

1. PICO Question

P (Population)	15-24 years of age
I (Intervention)	Health promotion strategies including but not limited to: social marketing campaigns, peer to peer programs, internet-computer based interventions, train the trainer, facilitator-led
C (Comparison)	No health promotion strategy
O (Outcome)	Rates of sexually transmitted infections

2. Search Strategy

The original search strategy for this review was replicated from a rapid review completed by Peel Public Health in 2012. A scoping search was performed prior to the initial literature search to verify the health promotion strategies that would be included in the PICO. For the Middlesex-London Health Unit review, a total of 4 databases (Medline, PsycINFO, Cochrane, and CINAHL) were searched up until March 2015. The search was narrowed to published literature from January 2010-present, English only, and only meta-analysis, systematic reviews and rapid reviews.

The inclusion criteria were broken down into 4 separate categories: types of studies, types of participants and settings, types of interventions, and types of outcome measures. To view the inclusion and exclusion criteria utilized in this review, please see Table 1 below.

Table 1: Inclusion and Exclusion Criteria

	Inclusion Criteria	Exclusion Criteria
Types of Studies	<ul style="list-style-type: none"> • Published literature from January 2010-present • English only literature • Studies only including meta-analysis • Studies only including systematic reviews • Studies only including rapid reviews 	<ul style="list-style-type: none"> • Non-English • Non-published studies and guidelines • Single studies • Synopsis if single studies • Textbooks • Specialized registers • Consultations on current contents
Types of Participants and Settings	<ul style="list-style-type: none"> • A location that is similar to Middlesex-London in terms of studies in developed/western/high-resource setting 	<ul style="list-style-type: none"> • Studies that took place in a non-developed country
Types of Interventions	<ul style="list-style-type: none"> • To include the 5 key interventions outlined in the PICO question: <ul style="list-style-type: none"> ○ social media campaigns; ○ peer-to-peer programs; ○ internet computer-based programs; ○ train-the-trainer programs; ○ facilitator-led interventions • The intervention was also to be prevention based and not offer any treatment 	<ul style="list-style-type: none"> • Studies that did not have similar interventions to the 5 key interventions outlined in the original PICO question
Types of Outcome Measures	<ul style="list-style-type: none"> • Primary outcome measures (measureable outcomes): <ul style="list-style-type: none"> ○ reportable infection rates for chlamydia and gonorrhoea • Secondary outcome measures (non-measureable outcomes): <ul style="list-style-type: none"> ○ sexual behaviour; ○ attitudes; ○ knowledge improvement; ○ self-efficacy; ○ safer-sex interventions; • condom use 	<ul style="list-style-type: none"> • Studies with outcome measures that were dissimilar to the primary outcome measure identified in the original PICO question • Studies with outcome measures that were dissimilar to the secondary outcome measures identified in the original PICO question

3. Search Results

Utilizing the National Collaborating Centre for Methods and Tools (NCCMT) method for efficiently searching the literature and the 6S Pyramid methodology (Appendix B), the search strategy (Appendix C) resulted in 276 articles. Six systematic reviews were included after removal of duplicates, relevance assessment, full article review and quality assessment. All articles were also scanned with the inclusion/exclusion criterion that was described in the above section. The final search results are outlined in Appendix D. References for the included studies are available at the end of this report. A list of the excluded reviews may be requested from the authors.

IV. Quality Assessment

1. Quality Assessment Tools and Strategy

A quality assessment of each systematic review was completed to assess the validity and usefulness of the research findings. Each article was appraised using the AMSTAR (Appendix E) and graded on a scale out of 11. A score of seven or greater was viewed as a study of high quality and a score of five or six was considered a study of medium quality. Any study scoring less than five was rated as weak and those reviews were excluded from the review. The quality assessment process was completed by two reviewers and any discrepancies were resolved by consensus.

2. Results

The search results had been narrowed down to six articles before the quality assessment process was started. Four out of the six systematic reviews were of strong methodological quality. The remaining two articles were moderately ranked and were included in the data extraction with the above four articles. In total, six articles satisfied the quality assessment and would move on to data extraction. Copies of the completed quality assessment tools are available from the authors upon request. A blank copy data extraction table can be found in Appendix H. Copies of the copied data extraction tables for all six systematic reviews are also available upon request.

V. Synthesis of Findings

This rapid review presents the results of the findings in the following ways:

- A summary of the literature findings, quality assessment and significance (Appendix I)
- A synthesis of the results by the outcome measures selected for the PICO (Appendix J)

1. Summary of findings by intervention type, and significance

Findings are presented by intervention type and comment is provided on their significance in regards to outcome measures (Appendix I). Clarification is provided regarding which research papers talked about each intervention. Furthermore, the main findings of each intervention are separated by author. These findings, and how they are presented, will help to formulate some recommendations at the end of the rapid review and to identify what strategies are most effective for each intervention.

2. Summary of results of interventions by outcome measures

With the six systematic reviews presented in this report, there were a number of outcome measures identified throughout. Findings were summarized based on the outcomes that were most relevant to this program review (highlighted in the PICO question at the start of this review and organized into primary and secondary outcomes based on what they actually measure) (Appendix J). In Appendix J, Table 1 presents primary outcomes in regards to STI rates. Table 2 examines the following secondary outcomes: sexual behaviour, sexual health knowledge, condom use, self-efficacy, and attitudes. This information will be valuable in the future because these outcome measures can be used to meet similar measures identified in the planning process of a new or re-evaluated program.

VI. Preliminary Program Recommendation

The research evidence demonstrates that there are a multitude of effective interventions available to public health professionals to reduce the incidence of STI rates in the community. There is also evidence to suggest that there are a variety of strategies which may influence sexual health behaviour, sexual health knowledge, condom use, sexual health self-efficacy and attitudes in youth. The key findings from this rapid review of the literature include:

- Facilitator-led interventions (e.g., public health professional, teacher) demonstrate a reduced incidence in sexually transmitted infections (STIs) through the use of behavioural interventions.
- Facilitator-led interventions also show improvement in behavioural outcomes and increased knowledge, specifically with regards to an increase in condom use.
- Social media and text messaging interventions are effective in increasing STI knowledge, particularly with respect to increased familiarity with sexual protection methods and how they reduce the transmission of STIs. There is a positive significant effect in condom use self-efficacy and a reduction in the proportion of individuals reporting multiple or new partners.
- Employing a train-the-trainer method demonstrates some effect in the reduction of the incidence of active syphilis and the prevalence of gonorrhoea.
- Utilizing a peer-led approach is effective in increasing youth sexual health knowledge for HIV/AIDS; changing knowledge for STIs and HIV/AIDS; increasing positive behaviour in regards to the use of condoms; improving prevention skills and youth sexual health knowledge and attitudes of STI prevention methods.
- Interactive-computer-based programs (ICBP) were reported to demonstrate statistically significant improvement in their outcomes however this was not demonstrated upon review of the confidence intervals.

It is recommended that Sexual Health team members consult with key stakeholders to further consider the above-mentioned key findings, by applying the following NCCMT tools: A Model for Evidence-Informed Decision-Making (Appendix F) and the Adaptability and Transferability Tool (Appendix G). This will facilitate the development of relevant final recommendations for sexual health programming.

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Appendix A: Public Health Requirements Associated with this Rapid Review

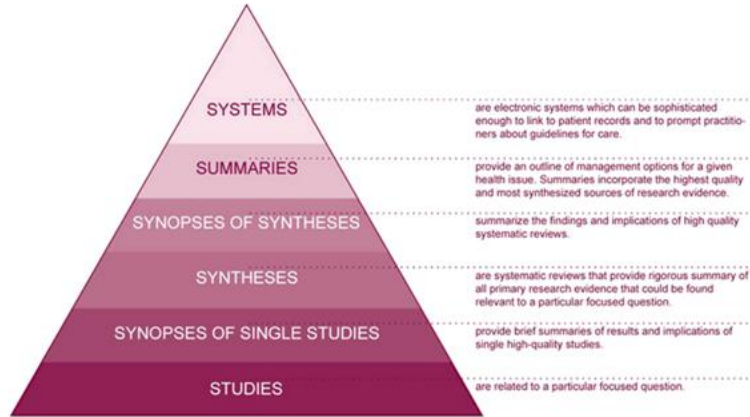
- **Provincial Standards** - [Ontario Public Health Standards](#), 2008 (OPHS), specifically:
 - Principles: Need, Impact, Impact, Capacity, Partnership and Collaboration
 - Foundational Standard
 - Sexual Health, Sexually Transmitted Infections, and Blood-borne Infections
 - Infectious Diseases Prevention and Control
- A **Provincial Protocol** – [Population Health Assessment and Surveillance Protocol](#), 2008 (PHASP)

Governing Documents	Related Requirements
<p>Provincial Legislation: Health Protection and Promotion Act, R.S.O. 1990, c.H.7. (HPPA)</p>	<p>Relevance is associated with the control of infectious diseases and reportable diseases, including the provision of immunization services.</p> <p>Included within HPPA’s mandatory health programs and services: “2. Control of infectious diseases and reportable diseases, including provision of immunization services to children and adults.”</p> <p>“3. Health promotion, health protection and disease and injury prevention, including the prevention and control of cardiovascular disease, cancer, AIDS and other diseases.”</p> <p>Included within HPPA’s optional health programs and services: “9. A board of health may provide any other health program or service in any area in the health unit served by the board of health if, a) the board of health is of the opinion that the health program or service is necessary or desirable, having regard to the needs of persons in the area;”</p>
<p>Provincial Standard: Ministry of Health and Long-Term Care Ontario Public Health Standards, 2008: Principles</p>	<p>“1.Need: The principle of need acknowledges the importance of using data and information to inform decision-making at the local level regarding program assessment, planning, delivery, management, and evaluation.”</p> <p>“2.Impact: Boards of health shall assess, plan, deliver, and manage their programs and services by considering the following: -Is there reasonable evidence of the effectiveness of the intervention in the scientific literature or in reviews of best practices? Boards of health shall draw on relevant research, evidence, and best practices to support integration of the Ontario Public Health Standards’ requirements within their specific context in order to achieve intended outcomes.”</p> <p>“3.Capacity: Understanding local public health capacity and the resources required to achieve outcomes is essential for effective management of programs and services. All boards of health shall strive to achieve the needed capacity and resources required to meet these standards.”</p> <p>“4. Partnership and Collaboration: Boards of health shall foster the creation of a supportive environment for health through community and citizen engagement in the assessment, planning, delivery, management, and evaluation of programs and services. This will support improved local capacity to meet the public health needs of the community.”</p>

Governing Documents	Related Requirements
<p>Provincial Standard & Protocol: Ministry of Health and Long-Term Care Ontario Public Health Standards, 2008: Foundational Standard</p>	<p><i>Population Health Assessment Requirements</i></p> <p>“1. The board of health shall assess current health status, health behaviours, preventative health practices, health care utilization relevant to public health, and demographic indicators in accordance with the Population Health Assessment and Surveillance Protocol, 2008.”</p> <p>“2. The board of health shall assess trends and changes in local population health in accordance with the Population Health Assessment and Surveillance Protocol, 2008.”</p> <p>“3. The board of health shall use population health, determinants of health and health inequities information to assess the needs of the local population, including the identification of populations at risk, to determine those groups that would benefit most from public health programs and services (i.e. priority populations).”</p> <p>“4. The board of health shall tailor public health programs and services to meet local population health needs, including those of priority populations to the extent possible based on available resources.”</p> <p>“5. The board of health shall provide population health information including determinants of health and health inequities to the public, community partners, and health care providers, in accordance with the Population Health Assessment and Surveillance Protocol, 2008.”</p> <p><i>Research and Knowledge Exchange Requirements</i></p> <p>“8. The board of health shall engage in knowledge exchange activities with public health practitioners, policy-makers, community partners, health care providers, and the public regarding factors that determine the health of the population and support effective public health practice gained through population health assessment, surveillance, research, and program evaluation.”</p> <p>“9. The board of health shall foster relationships with community researchers, academic partners, and other appropriate organizations to support public health research and knowledge exchange.”</p> <p>“10. The board of health shall engage in public health research activities, which may include those conducted by the board of health alone or in partnership or collaboration with other organizations.”</p> <p><i>Program Evaluation Requirements</i></p> <p>“11. The board of health shall routinely monitor program activities and outcomes to assess and improve the implementation and effectiveness of programs and services, including collection, analysis, and periodic reporting of indicators related to inputs, resources, implementation processes, reach, outputs, and outcomes.”</p> <p>“12. The board of health shall conduct program evaluations when new interventions are developed or implemented, or when there is evidence of unexpected operational issues or program results, to understand the linkages between inputs, activities, outputs, and outcomes.”</p> <p>“13. The board of health shall use a range of methods to facilitate public health practitioners’ and policy-maker’s awareness of the factors that contribute to program effectiveness.”</p>

Governing Documents	Related Requirements
<p>Provincial Standard & Protocol: Ministry of Health and Long-Term Care Ontario Public Health Standards, 2008: <i>Sexual Health, Sexually Transmitted Infections, and Blood-borne Infections</i></p>	<p><i>Assessment and Surveillance Requirements</i></p> <p>“3. The board of health shall conduct epidemiological analysis of surveillance data, including monitoring trends over time, emerging trends, and priority populations, in accordance with the Population Health Assessment and Surveillance Protocol, 2008.”</p> <p><i>Health Promotion and Policy Development Requirements</i></p> <p>“4. The board of health shall increase public awareness of the epidemiology, associated risk behaviours, risk factors, and risk reduction strategies related to healthy sexuality, sexually transmitted infections, and blood-borne infections by:</p> <ol style="list-style-type: none"> a. Adapting and/or supplementing national and provincial health communication strategies; and/or b. Developing and implementing regional/local communications strategies.” <p>“5. The board of health shall use a comprehensive health promotion approach to increase the community capacity regarding the promotion of healthy sexuality, including the prevention of adolescent pregnancies, sexually transmitted infections, and blood-borne infections, by:</p> <ol style="list-style-type: none"> a. Collaborating with and engaging community partners and priority populations; b. Mobilizing and promoting access to community resources; c. Providing skill-building opportunities; and d. Sharing best practices and evidence.” <p>“6. The board of health shall collaborate with community partners, including school boards, to create supportive environments to promote healthy sexuality and access to sexual health services.”</p>
<p>Provincial Standard & Protocol: Ministry of Health and Long-Term Care Ontario Public Health Standards, 2008: <i>Infectious Diseases Prevention and Control</i></p>	<p><i>Assessment and Surveillance Requirements</i></p> <p>“3. The board of health shall conduct epidemiological analysis of surveillance data, including monitoring trends over time, emerging trends, and priority populations, in accordance with the Population Health Assessment and Surveillance Protocol, 2008.”</p> <p><i>Disease Prevention Requirements</i></p> <p>“12. The board of health shall supplement provincial efforts in managing risk communications to the appropriate stakeholders on identified risks associated with infectious diseases of public health importance based on local epidemiology and epidemiological information.”</p>

Appendix B: NCCMT: Methods for Efficiently Searching Research Evidence



6S Pyramid 1

Appendix C: Search Strategy

Date of Search	Source of Search	Search Terms	# of Results
March 2, 2015	Medline	1 adolescent/ or young adult/	1813852
		2 (adolesc\$ or young adult\$ or youth\$ or teen\$ or ((university or college? or post secondary) adj1 student\$)).tw.	287893
		3 or/1-2 [POPULATION]	1904614
		4 exp health promotion/ or exp health education/ or "marketing of health services"/ or social marketing/ or sex education/ or computer communication networks/ or exp internet/ or communications media/ or exp mass media/ or exp telecommunications/ or risk reduction behavior/	336126
		5 (health promotion or strateg\$ or social marketing or communic\$ or outreach or social media or "web2.0" or "web 2.0" or facebook or twitter or myspace or SMS or blog* or vlog* or tumblr or flickr or vine or pinterest or youtube or social bookmark* or text messag\$ or iphone? or ipad? or laptop? or smartphone? or smart phone? or risk reduction or policy or policies or education or community development or advocacy or prevention or intervention\$).tw.	1924803
		6 4 or 5 [INTERVENTION]	2128254
		7 exp chlamydia infections/ or exp gonorrhea/ or exp syphilis/ or exp sexually transmitted diseases/ed, pc, tm	114026
		8 (chlamydia\$ or gonorrhea or syphilis or (sexual\$ adj1 transm\$ adj2 (diseas\$ or infection\$))).tw.	61513
		9 7 or 8 [STI]	139728
		10 (search\$ or systematic review or medline).tw. or meta-analysis.mp.pt. or cochrane database of systematic reviews.jn.	289946
		11 3 and 6 and 9 and 10	272
		12 developing countries/ or exp "africa south of the sahara"/	197345
		13 11 not 12	231
		14 limit 13 to yr=2010-current	124
		15 limit 14 to English	119

Date of Search	Source of Search	Search Terms	# of Results
March 2, 2015	PsycINFO	1 exp health promotion/ or exp health education/ or exp risk management/ or exp sexual risk taking/ or exp social marketing/ or exp sex education/ or exp intervention/	83891
		2 (health promotion or strateg\$ or social marketing or communic\$ or outreach or social media or "web2.0" or "web 2.0" or facebook or twitter or myspace or SMS or blog* or vlog* or tumblr or flickr or vine or pinterest or youtube or social bookmark* or text messag\$ or iphone? or ipad? or laptop? or smartphone? or smart phone? or risk reduction or policy or policies or education or community development or advocacy or prevention or intervention\$).tw.	590158
		3 1 or 2 [INTERVENTION]	596688
		4 exp sexually transmitted diseases/ or exp gonorrhea/ or exp syphilis/	23108
		5 (chlamydia\$ or gonorrhea or syphilis or (sexual\$ adj1 transm\$ adj2 (diseas\$ or infection\$))).tw.	5239
		6 4 or 5 [STI]	24878
		7 meta analysis/ or "literature review"/	1593
		8 (meta analy\$ or search\$ or systematic review? or medline).tw.	

MIDDLESEX-LONDON HEALTH UNIT – Effective Health Promotion Strategies

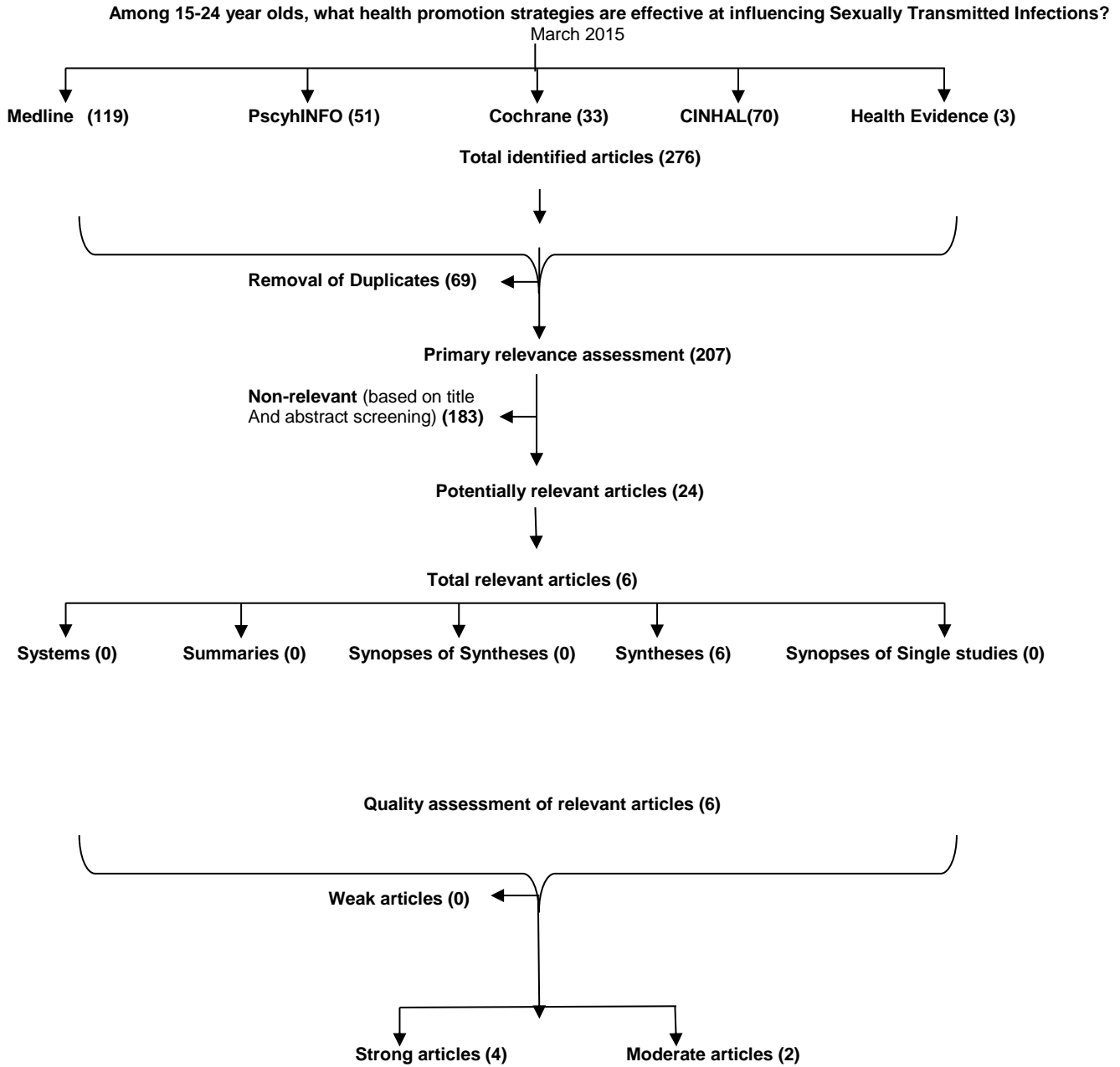
Date of Search	Source of Search	Search Terms	# of Results
			63858
		9 7 or 8 [SR]	64108
		10 (college student* or post secondary student* or university student* or young adult* or adolescen* or teen* or youth*).tw.	180774
		11 exp college students/	31593
		12 10 or 11 [POPULATION]	192849
		13 3 and 6 and 9 and 12	93
		14 exp developing countries/	3185
		15 13 not 14	91
		16 (dissertation or journal article).dt.	1495137
		17 15 and 16	82
		18 limit 17 to (English and yr=2000-current)	51

Date of Search	Source of Search	Search Terms	# of Results
March 2, 2015	Cochrane Database	1 (chlamydia* or gonorrhea or syphilis or (sexual* N11 transm* N2 (diseas* or infection*)))	61
		2 (ZU "sexually transmitted disease") or (ZU "sexually transmitted diseases epidemiology") or (ZU "sexually transmitted diseases prevention & control") or (ZU "sexually transmitted diseases transmission") or (ZU "gonorrhea epidemiology") or (ZU "gonorrhea prevention & control") or (ZU "gonorrhea control") or (ZU "syphilis transmission") or (ZU "syphilis, congenital prevention & control")	17
		3 S1 OR S2	61
		4 ("health promotion" or strateg* or "social marketing" or communic* or outreach or "social media" or "web2.0" or "web 2.0" or facebook or twitter or myspace or SMS or blog* or vlog* or tumblr or flickr or vine or pinterest or youtube or "social bookmark*" or "text messag*" or iphone# or ipad# or laptop# or smartphone# or "smart phone#" or "risk reduction" or policy or policies or education or "community development" or advocacy or prevention or intervention*)	5212
		5 (ZU "health promotion") or (ZU "health promotion methods") or (ZU "health promotion organization & administration") or (ZU "health education") or (ZU "health education methods") or (ZU "communication") or (ZU "social marketing") or (ZU "intervention") or (ZU "intervention studies") or (ZU "interventions") or (ZU "policy making")	182
		6 S4 OR S5	5261
		7 S3 AND S6	33

Date of Search	Source of Search	Search Terms	# of Results
March 2, 2015	CINAHL	1 (chlamydia* or gonorrhea or syphilis or (sexual* N11 transm* N2 (diseas* or infection*)))	12872
		2 (MH "Sexually Transmitted Diseases+/ED/PC/TM")	19526
		3 (MH "Chlamydia") OR (MH "Chlamydia Infections") OR (MH "Gonorrhea") OR (MH "Syphilis")	4039
		4 S1 OR S2 OR S3	27423
		5 (MH "Health Promotion+") OR (MH "Health Education+") OR (MH "Social Marketing") OR (MH "Social Media") OR (MH "Sex Education") OR (MH "Computer Communication Networks") OR (MH "Telecommunications+") OR (MH "Communications Media")	217348

Date of Search	Source of Search	Search Terms	# of Results
		OR (MH "World Wide Web+") OR (MH "Internet")	
		6 ("health promotion" or strateg* or "social marketing" or communic* or outreach or "social media" or "web2.0" or "web 2.0" or facebook or twitter or myspace or SMS or blog* or vlog* or tumblr or flickr or vine or pinterest or youtube or "social bookmark*" or "text messag*" or iphone# or ipad# or laptop# or smartphone# or "smart phone#" or "risk reduction" or policy or policies or education or "community development" or advocacy or prevention or intervention*)	955365
		7 S5 OR S6	1021897
		8 (MH "Adolescence") OR (MH "Young Adult") OR (MH "Students, College") OR (MH "Students, Undergraduate")	249785
		9 (adolescen* or "young adult*" or youth* or teen* or ((university or college# or "post secondary") N1 student*))	259738
		10 S8 OR S9	260603
		11 (MH "Systematic Review") OR (MH "Literature Review") OR (MH "Meta Analysis")	34736
		12 TI (search or "systematic review" or medline or "meta analy*" or "meta-analy*" or metaanaly*) OR AB(search or "systematic review" or medline or "meta analy*" or "meta-analy*" or metaanaly*)	55282
		13 PT systematic review or meta analysis	37416
		14 S11 OR S12 OR S13	74783
		15 S4 AND S7 AND S10 AND S14	70

Appendix D: Final Search Results



Source: Health Evidence.org. *Keeping Track of Search Results: A Flowchart*. [Retrieved March 10, 2015]

Appendix E: Quality Assessment Tool for Systematic Reviews: AMSTAR

1. Was an 'a priori' design provided? The research question and inclusion criteria should be established before the conduct of the review.

Note: Need to refer to a protocol, ethics approval, or pre-determined/a priori published research objectives to score a “yes.”

- Yes
- No
- Can't Answer
- Not Applicable

2. Was there duplicate study selection and data extraction? There should be at least two independent data extractors and a consensus procedure for disagreements should be in place.

Note: 2 people do study selection, 2 people do data extraction, consensus process or one person checks the other's work.

- Yes
- No
- Can't Answer
- Not Applicable

3. Was a comprehensive literature search performed?

At least two electronic sources should be searched. The report must include years and databases used (e.g., Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found. Note: If at least 2 sources + one supplementary strategy used, select “yes” (Cochrane register/Central counts as 2 sources; a grey literature search counts as supplementary).

- Yes
- No
- Can't Answer
- Not Applicable

4. Was the status of publication (i.e. grey literature) used as an inclusion criterion?

The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc. Note: If review indicates that there was a search for “grey literature” or “unpublished literature,” indicate “yes.” SIGLE database, dissertations, conference proceedings, and trial registries are all considered grey for this purpose. If searching a source that contains both grey and non-grey, must specify that they were searching for grey/unpublished lit.

- Yes
- No
- Can't Answer
- Not Applicable

5. Was a list of studies (included and excluded) provided?

A list of included and excluded studies should be provided. Note: Acceptable if the excluded studies are referenced. If there is an electronic link to the list but the link is dead, select “no.”

- Yes
- No
- Can't Answer
- Not Applicable

6. Were the characteristics of the included studies provided?

In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed e.g., age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported. Note: Acceptable if not in table format as long as they are described as above.

- Yes
- No
- Can't Answer
- Not Applicable

7. Was the scientific quality of the included studies assessed and documented?

'A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant. Note: Can include use of a quality scoring tool or checklist, e.g., Jadad scale, risk of bias, sensitivity analysis, etc., or a description of quality items, with some kind of result for EACH study (“low” or “high” is fine, as long as it is clear which studies scored “low” and which scored “high”; a summary score/range for all studies is not acceptable).

- Yes
- No
- Can't Answer
- Not Applicable

8. Was the scientific quality of the included studies used appropriately in formulating conclusions?

The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations. Note: Might say something such as “the results should be interpreted with caution due to poor quality of included studies.” Cannot score “yes” for this question if scored “no” for question 7.

- Yes
- No
- Can't Answer
- Not Applicable

9. Were the methods used to combine the findings of studies appropriate?

For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e., Chi-squared test for homogeneity, I²). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e., is it sensible to combine?). Note: Indicate “yes” if they mention or describe heterogeneity, i.e., if they explain that they cannot pool because of heterogeneity/variability between interventions.

- Yes
- No
- Can't Answer
- Not Applicable

10. Was the likelihood of publication bias assessed?

An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test, Hedges-Olken). Note: If no test values or funnel plot included, score “no”. Score “yes” if mentions that publication bias could not be assessed because there were fewer than 10 included studies.

- Yes
- No
- Can't Answer
- Not Applicable

11. Was the conflict of interest included?

Potential sources of support should be clearly acknowledged in both the systematic review and the included studies. Note: To get a “yes,” must indicate source of funding or support for the systematic review AND for each of the included studies.

- Yes
- No
- Can't Answer
- Not Applicable

Shea et al. BMC Medical Research Methodology 2007 7:10 doi:10.1186/1471-2288-7-10

Appendix F: NCCMT: A Model for Evidence-Informed Decision-Making

fact sheet



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A Model for Evidence-Informed Decision Making in Public Health



Evidence-informed decision making involves integrating the best available research evidence into the decision-making process. Additional factors – community health issues and local context; community and political preferences and actions; and public health resources – create the environment in which that research evidence is interpreted and applied.

This model for evidence-informed decision making in public health is particularly relevant at the fifth step of evidence-informed public health: Adapt the information to a local context. (see diagram on reverse)

This model recognizes that important evidence can come from a variety of sources. Evidence considered in the decision-making process could include the following possible examples:

Sources of Evidence	Examples of Evidence for Consideration
Evidence from research	The most relevant, high-quality qualitative or quantitative evidence available Research findings from a variety of disciplines and sectors relevant to public health
Evidence about the frequency, causes, and modifying factors of local community health issues	Surveillance data and community health status reports to determine the magnitude of the health issue in the local setting Significance and importance of the issue in comparison to other community health concerns
Evidence from people about community and political preferences and actions	Needs and interests of community members Support or opposition from the public and/or government officials Current political climate (local, regional, provincial, federal) Current organizational/corporate climate
Evidence from various governments and programs about public health resources	Financial resources Human resources (personnel/staffing, administrative support, support from management) Materials (workspace, computers, supplies)

No two public health situations are identical. The weight and influence that each factor will have on the decision-making process will depend upon the specific circumstances, as well as the skills and values held by the individuals and groups involved in the process. The placement of Public Health Expertise at the centre of the model is intentional. Ultimately, decision makers must draw on their explicit and tacit public health knowledge and expertise to incorporate all the relevant factors into the final decision, conclusion or recommendation.

Faced with a lack of time, limited access to peer-reviewed journals, inadequate critical appraisal skills and conflicting evidence, public health professionals may not always use high quality, relevant research to inform their public health program and policy decisions. Sources of synthesized and methodologically strong research evidence can overcome some of these barriers. These sources save time and increase confidence in the value of the research findings. Evidence may include quantitative and qualitative research findings from a variety of disciplines relevant to public health (for example, epidemiology, allied health, social sciences and education). However the *best* research evidence available will be different for each public health situation.

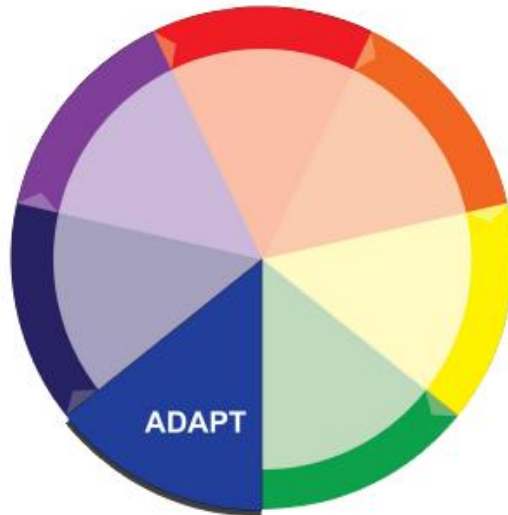
Evidence-informed decision making in public health offers several potential benefits:

- adoption of the most effective and cost-efficient interventions;
- prudent use of scarce resources;
- better health outcomes for individuals and communities.

The NCCMT has developed a resource to help public health practitioners implement this model of evidence-informed decision making whether considering starting a new program or stopping an existing program : It worked there. Will it work here? Tool for Assessing Applicability and Transferability of Evidence.

Two versions of the tool are available on the NCCMT website: A. When considering starting a new program. [<http://www.nccmt.ca/pubs/A&Trevised-startEN.pdf>] and B. When considering stopping an existing program. [<http://www.nccmt.ca/pubs/A&Trevised-stopEN.pdf>].

For more resources and information on evidence-informed decision making in public health, visit our website: www.nccmt.ca.



The National Collaborating Centre for Methods and Tools is funded by the Public Health Agency of Canada and affiliated with McMaster University.

General References:

Ciliska, D., Thomas, H., & Buffett, C. (2010). *An introduction to evidence-informed public health and a compendium of critical appraisal tools for public health practice* (Revised). Retrieved from the National Collaborating Centre for Methods and Tools: http://www.nccmt.ca/pubs/IntroEIPH_compendiumENG_web.pdf

DiCenso, A., Ciliska, D., & Guyatt, G. (2005). Introduction to evidence-based nursing. In A. DiCenso, D. Ciliska, & G. Guyatt (Eds.), *Evidence-based nursing: A guide to clinical practice* (pp. 3-19). St. Louis, MO: Elsevier Mosby.

How to cite this resource :

National Collaborating Centre for Methods and Tools. (2012). *A Model for Evidence-Informed Decision-Making in Public Health*. [fact sheet]. Retrieved from http://www.nccmt.ca/pubs/FactSheet_EIDM_EN_WEB.pdf.

Appendix G: NCCMT: Applicability and Transferability Tool

It worked there. Will it work here? a tool for assessing Applicability and Transferability of Evidence

A: When considering starting a new program

Purpose and target audience

To help public health managers and planners use evidence to choose appropriate programs for their community.

Where does this fit?

This tool helps you with the fifth step in the evidence-informed public health process: **Adapt** the information to a local context.

You may have found evidence about an intervention that worked, but can you apply that evidence to your situation? Do you need to adapt the intervention for your population? ... your community? ... your team?

This tool gives you a process and criteria to assess the applicability (feasibility) and transferability (generalizability) of evidence to public health practice and policy.

How to use this tool

At this stage, you will have already completed the first four steps in the evidence-informed public health process. You have defined your question (step 1), found (step 2) and appraised (step 3) the research evidence relevant to your question. You have also formed some recommendations based on the evidence that you found (step 4). (See www.nccmt.ca/eiph for more information.) These are all necessary steps, but you are not yet ready to decide whether to introduce, continue, or end a program or intervention in **your** local community.

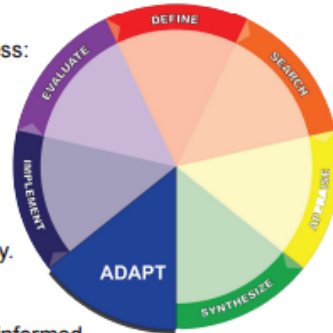
1. Decide who will be involved in the decision. Consider including partners from other sectors, disciplines and client groups. (*The remaining steps are done in collaboration with this entire group.*)
2. Orient group members to the process; establish time lines.
3. From the following list of criteria, choose the most important applicability and transferability assessment questions for the intervention of interest and the local context. Are these criteria equally important or should they be weighted differently? If so, choose what weights to assign. Not all criteria are relevant all the time. The group may decide that some criteria are more important than others at a particular time period and in a particular community.
4. Decide how final scoring will be done: Will you discuss each criterion to achieve consensus or add ratings from all group members? In that case, you would individually rate the importance/relevance of each question on a scale of 1 to 5, where 1 is low and 5 is high. Priority would then go to the highest scoring program.
5. Be sure to document the scoring process used.

How to cite this resource

Buffet, C., Ciliska, D., & Thomas, H. (2011). *It worked there. Will it work here? Tool for Assessing Applicability and Transferability of Evidence (A: When considering starting a new program)*. Hamilton, ON: National Collaborating Centre for Methods and Tools.

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Assessment of Applicability & Transferability

Construct	Things to consider	Questions to Ask
Applicability (feasibility) <i>Can the intervention we found work for us?</i>	Political acceptability or influence	<ul style="list-style-type: none"> • Will the intervention be allowed or supported in the current political climate? • Is there a potential public relations benefit for local government? • Will the public and target groups accept and support the intervention in its current format? • Is this intervention allowed/expected or required by local or provincial legislation /bylaws?
	Social acceptability	<ul style="list-style-type: none"> • Will my target population be interested in the intervention? • Is the intervention ethical?
	Available essential resources (human and financial)	<ul style="list-style-type: none"> • Who / what is essential for the local implementation? • Who will do the work? Are these people available (or are they too busy with other projects)? Do they know how? If not, is training available (and affordable)? • How much will the intervention cost? Can we afford to deliver the program (or is our budget already committed to other projects)? • How do we need to change the intervention to suit our local situation? • What are the full costs (include supplies, systems, space requirements for staff, training, technology/administrative supports, etc.)? How much will this intervention cost per unit of expected outcome? (total cost divided by number of people we expect to help) • Are there any other incremental health benefits to consider that could offset the costs of the intervention?
	Organizational expertise and capacity	<ul style="list-style-type: none"> • Does the intervention fit into the organization's current strategic and operational plans? • Does the intervention fit with the organization's mission and local priorities? • Does the intervention overlap, or will it compliment, existing programs? • Will this program enhance the reputation of the organization? • What barriers/structural issues or approval processes within the organization need to be addressed? • Is the organization motivated and open to new ideas? Is it a learning organization?
Transferability (generalizability) <i>Can we expect similar results?</i>	Magnitude of health issue in local setting	<ul style="list-style-type: none"> • Does the need exist? • How many people in my local population does this issue affect now? (i.e., what is our baseline prevalence?) How does this compare to the prevalence of the issue (risk status) described in the intervention we are considering?
	Magnitude of the "reach" and cost effectiveness of the intervention	<ul style="list-style-type: none"> • Will the intervention effectively reach a large proportion of the target population?
	Characteristics of target population	<ul style="list-style-type: none"> • Is the local population comparable to the study population? • Will any differences in characteristics (ethnicity, socio-demographic variables, number of persons affected) influence the effectiveness of the intervention locally?

The National Collaborating Centre for Methods and Tools is affiliated with McMaster University and funded by the Public Health Agency of Canada

It worked there. Will it work here? a tool for assessing Applicability and Transferability of Evidence

B: When considering stopping an existing program

Purpose and target audience

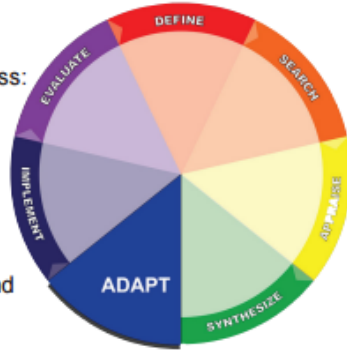
To help public health managers and planners use evidence to stop doing a program when there is evidence that the program or intervention may not be effective.

Where does this fit?

This tool helps you with the fifth step in the evidence-informed public health process: **Adapt** the information to a local context.

You may have found evidence of low or no effect about an intervention that you currently do, but can you apply that evidence to your situation? What would ending that intervention mean for your population? ... your community? ... your team?

This tool gives you a process and criteria to assess the applicability (feasibility) and transferability (generalizability) of evidence to public health practice and policy.



How to use this tool

At this stage, you will have already the first four steps in the evidence-informed public health process. You have defined your question (step 1), found (step 2) and appraised (step 3) the research evidence relevant to your question. You have also formed some recommendations based on the evidence that you found (step 4). (See www.nccmt.ca/eiph for more information.) These are all necessary steps, but you are not yet ready to decide whether to introduce, continue, or end a program or intervention in your local community.

1. Decide who will be involved in the decision. Consider including partners from other sectors, disciplines and client groups. (*The remaining steps are done in collaboration with this entire group.*)
2. Orient group members to the process; establish time lines.
3. From the following list of criteria, choose the most important applicability and transferability assessment questions for the intervention of interest and the local context. Are these criteria equally important or should they be weighted differently? If so, choose what weights to assign. Not all criteria are relevant all the time. The group may decide that some criteria are more important than others at a particular time period and in a particular community.
4. Decide how final scoring will be done: Will you discuss each criterion to achieve consensus or add ratings from all group members? In that case, you would individually rate the importance/relevance of each question on a scale of 1 to 5, where 1 is low and 5 is high. Priority would then go to the highest scoring program.
5. Be sure to document the scoring process used.

How to cite this resource

Buffet, C., Ciliska, D., & Thomas, H. (2011). *It worked there. Will it work here? Tool for Assessing Applicability and Transferability of Evidence (B: When considering stopping an existing program)*. Hamilton, ON: National Collaborating Centre for Methods and Tools.



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Assessment of Applicability & Transferability

Construct	Things to consider	Questions to Ask
Applicability <i>(feasibility)</i> Can the intervention we found work for us?	Political acceptability or influence	<ul style="list-style-type: none"> • Will stopping the intervention be allowed or supported in current the political climate? • Is there a potential public relations benefit for local government to stopping this intervention if its lack of effectiveness became generally known? • Will the public and target groups accept and support the end of the program in its current format? • Is this intervention expected or required by local or provincial legislation /bylaws?
	Social acceptability	<ul style="list-style-type: none"> • Will my target population miss the intervention? • Is it ethical to stop the intervention?
	Available essential resources (human and financial)	<ul style="list-style-type: none"> • Who/what resources will be saved by stopping the program? • What are the financial and human costs of stopping the intervention? • What other options will be offered if this intervention/program is stopped? • How might people who are doing this project be redeployed?
	Organizational expertise and capacity	<ul style="list-style-type: none"> • Does the intervention fit into the organization's current strategic and operational plans? Will we miss an opportunity to support the strategic plans by taking away this program? • What steps will we need to take if we decide to stop this program? • What barriers/structural issues or approval processes within the organization need to be addressed? • How will using the evidence to stop the current program affect the reputation of the organization? • What is the emotional attachment of the staff to this program and how will we deal with that?
Transferability <i>(generalizability)</i> Can we expect similar results?	Magnitude of health issue in local setting	<ul style="list-style-type: none"> • Are there other (more effective) ways to achieve the same goals?
	Magnitude of the "reach" and cost effectiveness of the intervention	<ul style="list-style-type: none"> • Will we miss the opportunity to interact with a large proportion of the population if we stop doing this intervention?
	Characteristics of target population	<ul style="list-style-type: none"> • Is the local population comparable to the study population? • Will any differences in characteristics (ethnicity, socio-demographic variables, number of persons affected) influence the effectiveness of the intervention locally?

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The National Collaborating Centre for Methods and Tools is affiliated with McMaster University and funded by the Public Health Agency of Canada

Appendix H: Blank Data Extraction Table

Title	
Author	
Publication Date	
Quality Rating (AMSTAR Tool)	

Factors		Assessment			Comments
Research question identified?	Yes	Unclear	No		
Population					
Are 15-24 year olds included?	Yes	Unclear	No		
Occur in developed countries?	Yes	Unclear	No		
Intervention					
Social Media campaign	Yes	Unclear	No		
Peer-to-peer program	Yes	Unclear	No		
Train-the-trainer program	Yes	Unclear	No		
Interactive computer-based program	Yes	Unclear	No		
Mass media campaign	Yes	Unclear	No		
Comparison					
Was a comparison included?	Yes	Unclear	No		
Outcome					
Primary	Decrease in STI rates?	Yes	Unclear	No	
	Improved sexual behaviour?	Yes	Unclear	No	
Secondary	Increased knowledge?	Yes	Unclear	No	
	Increased condom use?	Yes	Unclear	No	
	Improved self-efficacy?	Yes	Unclear	No	
	Improved attitudes?	Yes	Unclear	No	

Conclusion of the Literature	
Limitations of the Literature	
Additional Comments	

Appendix I: Summary of Findings by Primary Outcome Measure

Table 1: Primary Outcome Measure

Outcome Measured	Intervention Reference	Effectiveness on Outcome Measured	Comments
STI reduction	<i>Sadovszky et al.</i> <i>(2014)</i>	<ul style="list-style-type: none"> Of the 6 studies in this systematic review that looked at biological evidence for STI reduction, all 6 found that the behavioural interventions introduced reduced the incidence of STIs (reported OR: 0.88; 1.72; 0.74) 	<ul style="list-style-type: none"> In 4 out of 8 studies, tailoring to gender or culture was found to be effective. Skills training that included condom application, building assertiveness, enhancing self-efficacy or communicating with a partner was found to be effective in decreasing risky behaviour in 4 studies. (reported OR 0.63, 1.81) Length of exposure, defined as either length of session or number of times the session was offered, was found to be effective in 3 studies as well. Sessions with longer durations were more effective. In terms of cost-efficiency, teacher-led interventions cost less than peer-led interventions. In conclusion, <i>Sadovszky et al.</i> suggest that tailoring content based on ethnicity, gender and culture to reflect person and interpersonal skill building exercises and exposure to content as the most important components in obtaining the outcomes noted in the review.

Outcome Measured	Intervention Reference	Effectiveness on Outcome Measured	Comments
<p>STI reduction</p>	<p><i>Lopez et al.</i> (2013)</p>	<ul style="list-style-type: none"> • Four trails in this systematic review assessed the incidence or prevalence of HIV and HSV-2 <ul style="list-style-type: none"> • The investigators did not find any statistically significant differences in HIV outcomes between the study groups. • Three other trails in this review examined other STIs besides HIV <ul style="list-style-type: none"> • 1/3 study found that the incidence rate of active syphilis (95% CI 0.35 to 0.96) was lower with the intervention group that had the STI program • The same study above found the prevalence of gonorrhea was also lower for the intervention group (95% CI 0.11 to 0.70) 	<ul style="list-style-type: none"> • This STI program focused on the Behavioral Change Theory of Interventions and offered community monthly meetings that incorporated group and individual activities as well as educational videos and pamphlets for distribution. • This program was comprised of 16 topics that included condom use, STI information and family planning.

Appendix J: Summary of Findings by Secondary Outcome Measure

Table 2: Secondary Outcome Measures

Outcome Measured	Intervention Reference	Effectiveness on Outcome Measured	Additional Comments
Sexual behaviour	<i>Sadowszky et al.</i> (2014)	<ul style="list-style-type: none"> • 4 out of 13 articles reported a decrease in the frequency of sexual intercourse (reported OR 1.2) <ul style="list-style-type: none"> • These 4 articles were also the articles that reported a statistically significant decrease in STI incidence rates. • 3 out of 13 articles saw a decrease in the average number of sexual partners 	
	<i>Picot et al.</i> (2012)	<ul style="list-style-type: none"> • 2 out of 5 studies reported a statistically significant difference for the intervention group. <ul style="list-style-type: none"> • The participants were less likely to have initiated sexual intercourse compared to the control group • When a meta-analysis was done on 4 out of the 5 articles, the pooled odds ratio was 1.03 (95% CI 0.74-1.43), indicating no significant change overall • 6 studies looked at intervention effects on the number of sexual partners and found no significant difference between the intervention and comparison groups. 	
Sexual behaviour	<i>Shepherd et al.</i> (2010)	<ul style="list-style-type: none"> • 5 studies examined initiation of sexual intercourse as an outcome. <ul style="list-style-type: none"> ○ Three of the five studies found that there was no significant difference between the intervention and comparison group in the initiation of sexual activity among those who were virgins at baseline. ○ The other two studies did report a statistically significant difference between groups <ul style="list-style-type: none"> ▪ These two studies found that 	

Outcome Measured	Intervention Reference	Effectiveness on Outcome Measured	Additional Comments
		<p>young people in the control group were nearly three times more likely to have initiated sexual activity than students in the intervention group.</p> <ul style="list-style-type: none"> Overall, the fixed-effect pooled odds ratio was 1.03 (95% CI 0.74 to 1.43), with no statistically significant difference. 	
	<p>Lazarus et al. (2010)</p>	<ul style="list-style-type: none"> 3 out of 10 studies reported a statistically significant improvement in behaviour change. 2 out of the overall 13 school based interventions reported having any positive effect on behaviour. 	<ul style="list-style-type: none"> 2 out of 3 studies used peers as the implementers of the sexual health education program while the other study was delivered by a teacher. Youth preferred interventions led by peers and health professionals.
Sexual health knowledge	<p>Sadovszky et al. (2014)</p>	<ul style="list-style-type: none"> 4 out of 13 articles had an increase in STI/HIV knowledge. 	
	<p>Picot et al. (2012)</p>	<ul style="list-style-type: none"> All 12 studies attempted to measure participants' knowledge (the test for knowledge varied due to the focus of the educational components of each intervention). 10 out of the 12 included studies reported that the intervention had a statistically significant effect on increasing knowledge. 	
	<p>Jones et al. (2014)</p>	<ul style="list-style-type: none"> 7 studies examined the effectiveness of social media or text interventions on STI knowledge. All 7 studies demonstrated significant increases in STI knowledge, particularly an increase in the understanding of sexual protection methods and transmission. 	<ul style="list-style-type: none"> It was noted that the highest level of knowledge increase was around the understanding of sexual protection methods and transmission.

Outcome Measured	Intervention Reference	Effectiveness on Outcome Measured	Additional Comments
Sexual health knowledge	Shepherd et al. (2010)	<ul style="list-style-type: none"> • 10 of the 12 included studies reported that the intervention group had a statistically significant effect on increasing knowledge. • Only 2 studies did not demonstrate a statistically significant difference in knowledge between young people in the intervention and comparison groups. 	
	Lazarus et al. (2010)	<ul style="list-style-type: none"> • 11 out of 19 studies reported improvements in the sexual knowledge of the participants. Most of the peer-led interventions and teacher-led interventions improved participants' sexual health knowledge and attitudes. 	<ul style="list-style-type: none"> • Most of the peer-led interventions and teacher-led interventions improved participants' sexual health knowledge and attitudes
Condom Use	Sadovszky et al. (2014)	<ul style="list-style-type: none"> • 11 out of 13 reviews examined condom use • They concluded that condom use is a positive health outcome of behavioural interventions to promote safer sex and reduce sexual risk behaviours. 	<ul style="list-style-type: none"> • A major strength of their findings is that behavioral interventions were found to be effective in a wide variety of populations even when there was variation in the way the interventions were implemented.
	Picot et al. (2012)	<ul style="list-style-type: none"> • 11 out of 12 studies contributed information on condom use. • Statistically significant effects in favour of the intervention group were only reported by two of the studies for the condom use in terms of condom used at last sex and frequency of condom use. • When data was available from 6 studies to be included in a meta-analysis, the fixed-effect pooled odds ratio was 1.07 (95% CI 0.889-1.30). 	<ul style="list-style-type: none"> • Overall no statistically significant difference was found between the intervention group and the control.
	Jones et al. (2014)	<ul style="list-style-type: none"> • Overall, 6 studies examined interventions effects on condom use. <ul style="list-style-type: none"> ○ 2 found statistically significant effects; ○ 2 studies had mixed effects; ○ 2 found no statistically effects at all 	<ul style="list-style-type: none"> • Overall no statistically significant difference was found between the intervention group and the control.

Outcome Measured	Intervention Reference	Effectiveness on Outcome Measured	Additional Comments
Condom Use	<i>Shepherd et al.</i> (2010)	<ul style="list-style-type: none"> • Reported on 14 out of 15 studies that had condom use as an outcome • Only 2 studies had statistically significant results for the intervention group versus the control <ul style="list-style-type: none"> • One study found that participants in the intervention group had an increase on the outcome of condom use at last sex (there was no statistically significant difference in condom use at first sex and frequency of condom use for this study). • The second article reported on a statistically significant reduction in unprotected sex, likely from an increase in frequency of condom use. Otherwise, the remaining studies reported that there was no significant difference in condom use 	<ul style="list-style-type: none"> • Otherwise, the remaining studies reported that there was no significant difference in condom use outcomes between groups or did not report on the statistical difference. • Overall, the fixed-effect odds ratio was 1.07 (95% CI 0.88 to 1.30), with no overall statistical significance.
Self-efficacy	<i>Sadowszky et al.</i> (2014)	<ul style="list-style-type: none"> • 3 out of 13 articles reported an increase in self-efficacy in the intervention group compared to the control. 	<ul style="list-style-type: none"> • Skills training, such as building assertiveness, enhancing self-efficacy, and communication techniques with a partner were all part of the sexual education given in these sessions.
	<i>Picot et al.</i> (2012)	<ul style="list-style-type: none"> • 8 out of 12 studies measured self-efficacy when paired with a skills component • The self-efficacy outcomes did not always correlate with the included skills component in each intervention <ul style="list-style-type: none"> ○ Two studies reported a statistically significant outcome on a single self-efficacy measure. ○ Four other studies found statistically significant results for a self-efficacy measure but it was restricted to a subgroup analysis of young women. 	<ul style="list-style-type: none"> • The skills component varied with each intervention but included decision making, risk avoidance, condom use skills, sex refusal and communication.

Outcome Measured	Intervention Reference	Effectiveness on Outcome Measured	Additional Comments
	<i>Jones et al. (2014)</i>	<ul style="list-style-type: none"> • 4 studies that included participant self-efficacy and/or intentions • Two studies reported significant increases in condom use self-efficacy and intention <ul style="list-style-type: none"> ○ One study additionally reporting an increase in participant’s self-efficacy for delaying engagement in risky sexual encounters. • Another study reported an increase in intentions to use condoms with 23% of the participants. • The last study looking at self-efficacy as an outcome reported no significant effects on intentions to use condoms. 	
Attitudes	<i>Shepherd et al. (2010)</i>	<ul style="list-style-type: none"> • 8 studies that had an assessment of participants’ attitudes among their outcomes. <ul style="list-style-type: none"> ○ 6 investigated participants’ attitudes towards risky sexual behaviour or sexual intercourse ○ 2 specifically focused on attitudes towards waiting to have sex 	<ul style="list-style-type: none"> • A greater number of interventions that were assessed in relation to a control group, rather than those interventions assessed in comparison with standard sex education or to teacher-led interventions, found statistically significant effects.