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Supplement

Proceedings of the National STD Consensus Meeting

and

National Goals for the Prevention and Control of Sexually Transmitted Diseases in Canada

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INFECTIOUS DISEASES

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EXECUTIVE SUMMARY

The National Sexually Transmitted Disease (STD) Consensus meeting was held in Ottawa, Canada, February 21-22, 1996. This meeting was convened by the Division of STD Prevention and Control, Bureau of HIV/AIDS and STD, Laboratory Centre for Disease Control (LCDC), Health Canada. Participants were STD professionals from the Canadian medical community, non-governmental organizations, provincial and territorial STD and laboratory directors, and LCDC. The meeting was designed as a working forum to explore and develop a national program on STD, as a precursor to setting national goals for STD. The format consisted of an introductory plenary session followed by a provincial round table, then group workshops to address more specific topics. Broadly, these workshops addressed surveillance, targeted research, guidelines/ prevention and control strategies, risk behaviour surveillance and the role of laboratory science in supporting LCDC's public health mandate. The workshops provided valuable perspectives, forecasts and feedback which are summarized in this document. The vast amount of information, discussion and ideas generated precludes them being presented in an executive summary.

The Division of STD Prevention and Control, LCDC, would like to take this opportunity to thank all the participants for their continued support and efforts.

INTRODUCTION

The orientation for LCDC's mandate, which shaped the discussions at this meeting, was the risk assessment/risk management framework. Risk assessment implies that it is insufficient to collect, package, and present information. Risk assessment requires further investigation, targeted research, interpretation, and a communications strategy focussing on the public health relevance of the information. Risk management relates to the use we make of the information, in partnership with those at the provincial and municipal levels, to support initiatives, to provide information, to build consensus, and to have a national overview and approach to STDs in terms of both information and activities.

This meeting had four objectives:

1. to strengthen partnerships with the provinces and territories, non-governmental organizations, and experts in the field of STD to establish a national program that is responsive to the needs of the partners/stakeholders and the public health mandate of LCDC;
2. to seek input on the public health mandate of LCDC;
3. to seek consensus on national activities in the STD program areas of surveillance, targeted research, risk behaviour surveillance, prevention and control strategies/guidelines, and the role of laboratory science in carrying out LCDC's public health mandate; and
4. to explore planning for the next annual consensus meeting to develop national goals for the control of treatable and preventable STDs and their long-term sequelae.

WORKSHOPS

The majority of the meeting was devoted to five concurrent workshops and the subsequent presentation of the workshop findings to the plenary meeting for discussion.

Each participant was randomly assigned to one of the workshops and each workshop had 10 to 12 people in attendance. Discussion at the workshops was in response to questions on each of the five topics.

Following the workshops, a written summary was provided to the organizers by the workshops leaders. These were processed, copied, and distributed to each participant prior to the plenary presentation of the workshop findings as a reference tool to aid discussion. The following section of the proceedings combines the workshop summary with the essence of the plenary discussion.

Workshop 1
STD SURVEILLANCE

Leaders: Dr. David Patrick and Dr. Barbara Romanowski

QUESTION 1:
The Division of STD Control publishes an annual surveillance report. What STDs should be presented? What sequelae should be presented? From what data sources?

Since the reader is often interested in things other than STDs, wherever possible, the annual surveillance report should integrate the reporting of all communicable diseases. This implies that data need to flow quickly and smoothly, presumably electronically, in order to produce relevant information in a timely fashion. Once the information is available, it should be converted to a short, easily understood document for dissemination.

The report should continue to present data on genital chlamydial infection; gonorrhea (including resistant strains); syphilis (primary, secondary, early latent, late latent, congenital, neurosyphilis, cardiovascular and other); and chancroid. There was an inconclusive debate about terminating the reporting on lymphogranuloma venereum (LGV), and granuloma inguinale. Previously standardized case definitions must be reviewed and agreed upon.

To gather standardized data (e.g. site of herpes, first episode), it may be practical to use sentinel clinics, sentinel health units, and sentinel laboratories that already have computerized records and are collecting information in a consistent way. These sentinel sites could follow new cases of human papillomavirus (HPV) or genital condyloma infection, first episodes of herpes simplex virus (HSV), clinically diagnosed pelvic inflammatory disease (PID), and bacterial vaginosis (BV) (because of its linkage with PID). This could also facilitate the collection of some relevant case-based or visit-based denominator information, such as the portion of people with chlamydia who were screened for that infection.

It is important to emphasize the dual purpose of the gathering of these data. At the provincial level, diagnostic goals are dictated by funding. Another goal should be to collect surveillance information to guide public health decisions, often taken at the federal level.

Two points were raised in the discussion of barriers: different diagnostic tests in use and the establishment of common clinical criteria in an environment in which tests differ in terms of specificity and sensitivity.

In terms of covering sequelae, hospital data are still being collected but may be insufficient. It was suggested that LCDC explore the national collation of data from the Canadian Institute for Health Information on hospital separations for PID, ectopic pregnancy and infertility to avoid gathering disparate provincial data.

Reporting variables already being collected include gender, age, province/territory, and date of diagnosis. These should be maintained as the minimal variables.

Since there is a recognized need for a more accurate geographic determinant, the postal code should be added. A generic postal code such as "999" should be created to designate a person with no fixed address instead of entering the postal code of the location at which the data were collected. Where STDs are reportable anonymously, as in Quebec, gathering postal codes may be problematic since the first three digits may correspond with very few housing units. In this case, it is important to identify the general community.

In addition, there is a need to correlate STD findings with behavioural antecedents by geographic determinants and other demographic descriptors, such as socioeconomic status, teen pregnancy, HIV/AIDS information, and ethnicity.

Ethnicity is important in two distinct contexts: first, cultural and socioeconomic; and second, geographic origin of an infection from abroad, especially in the case of diseases which are highly prevalent abroad. It is imperative to standardize the definitions, perhaps, like those established for the AIDS case report form. However, some decision will be made to establish whether the data collected refers, for instance, to race or the country of origin.

Other variables which are desirable to collect include whether the case is pregnant, anatomic specimen site, tests used, and sex of contact (as a proxy for sexual preference). It would also be beneficial to have a separate special section in the reports to feature targeted research, more in-depth correlation of risk and diagnosis from sentinel clinics, cost-benefit, etc. Data on the number of contacts, number of contacts found and treated, and incidence of repeat cases could be included.

QUESTION 2: What are the information gaps that LCDC should address through enhanced surveillance activities? Viral STD? STD in children? Other?

There is a dearth of information about groups with poor access to health care. Those who do not routinely access health care will not likely be captured by passive surveillance. Therefore, consideration has to be given to the types of groups that need to be targeted for specific enhanced surveillance.

There is also little or poor information on the correlation between pregnancy, abortion, and STD; children with STD, street youth and ethno-cultural issues; and on the prevalence of male chlamydia because of "swab fear" related to culture testing.

Different approaches which were discussed to address these gaps included specific projects looking at targeted case-finding based on minimal invasive sampling such as urine tests. In areas difficult to access, one method may be community-based research involving the recruitment of community members, both as investigators and in an advisory capacity, who may have ideas on how to approach the population (although this can backfire). Three groups that may lend themselves to community-based research are street youth, some segments of the incarcerated population, and immigrants from countries of high endemicity. Some ethno-cultural studies, such as those directed towards aboriginal people, may also be appropriately handled as community-based research. In some instances, it is important to target communities where there is a likelihood of finding significant rates of STD, for example, immigrants from African versus Scandinavian countries.

It would be useful to gather additional information on the HIV testing patterns among people who have STD. Given the assumption that those with STDs are at high risk of contracting HIV, is this information best gathered through targeted surveillance or specific research?

QUESTION 3: Should specific populations be targeted for enhanced surveillance (e.g. street youth, the incarcerated, aboriginals)?

Populations to be targeted for enhanced surveillance include many of those discussed under knowledge gaps, i.e., street youth, immigrants from countries of high endemicity, young men, the incarcerated, ethno-cultural groups including aboriginal people, and the "non-professional sex industry" populations. It may be that rural populations should be the subjects of greater study if it is shown that they are less likely to seek routine health care. The workshop also examined barriers to surveillance.

1) Transmission of information from the provinces and territories will be facilitated if agreement can be reached on line listing. Every study does not need to gather the same information in the same system, but researchers can standardize variables, conditions, and format for consistent and easy transmission of the information.

2) In order to activate the collection, analysis, and feed-back loop in a timely fashion, the time to collection at the provincial or territorial level and at the federal level must be close to real time. This will be facilitated by the electronic transmission of line-listed data.

3) Initial human and fiscal resources will be required to standardize the gathering and collection of data and

subsequent rapid transmission. Standard reports could be created as macros to facilitate their generation.

4) Anonymity issues will arise, especially in provinces such as Quebec where reporting is intended to be anonymous. In regions where nominal reporting is the norm and where postal codes are not considered sensitive, this may not present a problem. However, there is a cross association between HIV-related stigma and STD-related stigma.

5) There is sometimes a lack of awareness on the part of data sources (e.g. some laboratories and many physicians) of the value of rapid data transmission since they do not recognize the utility of the data. It is counterproductive to have a lengthy approval process to make published or electronic material available, especially if it is public health intelligence data which are most valuable in real time.

6) Testing methods are not homogeneous.

7) Presumptive versus definitive diagnoses should be noted to avoid the improper mixing of dissimilar data.

8) The provincial trend to the regionalization of health services is leading to skill dilution at the provincial level, where people are expected to be collecting the information, and to declining quality assurance in terms of epidemiologic data that would be forwarded to any national database.

9) In order to facilitate the cross-pollination of ideas, it is important to foster interdivisional communication among epidemiologists, laboratory staff, and the health promotion people, both at LCDC and the provincial and territorial level, and between those levels. The reporting and discussion of issues either in an electronic working format or in a larger communicable disease working format should be considered.

10) How is surveillance linked to action? Although LCDC's mandate does extend towards care and intervention, the Centre can play an important coordinating role with regard to collecting information, achieving consensus, identifying major problems, enhancing available information on which decisions are made, and integrating this information with other communicable disease issues to assist with priorization, and costing matters.

Workshop 2
STD-TARGETED RESEARCH

Leaders: Dr. Michel Alary and Dr. John Sellors

QUESTION 1:
What research questions should be addressed?

QUESTION 2:
What populations should be addressed?

QUESTION 3:
What STDs should be addressed?

QUESTION 4:
Should the emphasis be on research issues related to prevention strategies or control strategies?

QUESTION 5:
Should we address the economic implications of infection and the sequelae of infection (e.g. burden-of-illness, cost-benefit analyses)?

The questions were used only as a general guide to discussion. It was felt that the answer to question **4** should be "both, depending on the situation, population to be addressed, and the research question". The answer to question **5** should be "yes". The workshop decided to focus on questions **1** and **2** and to identify relevant research questions and target populations.

1) What is the cost-effectiveness of amplified nucleic acid detection testing for chlamydia and does this new technology warrant adoption by service laboratories?

TARGET POPULATIONS: TOTAL POPULATION

Perhaps this question may be addressed without resorting to additional data collection.

2) What is the effectiveness, in terms of test accuracy, acceptability, coverage and impact, of new non-invasive STD tests, such as urine-based tests, in screening programs for chlamydia, and gonorrhea?

TARGET POPULATION: SPECIFIC SOCIO-CULTURAL GROUPS

The evaluation of these new technologies for use in community-based research may have a positive impact by identifying a valuable public health measure. These technologies may be of particular use with populations such as prostitutes, certain aboriginal communities and intravenous drug users who are at high risk but who traditionally do not seek health-care interventions.

3) *What is the most cost-effective partner notification strategy (patient referral, provider referral, conditional referral)?*

TARGET POPULATION: STD CLIENTS AND THEIR CONTACTS

A recent literature review found little evidence for the superiority of any method. There may also be an opportunity to evaluate the impact on behaviour of contact tracing as an intervention.

4) *What is the most effective pre-teen/teen reproductive health education intervention (to have an impact on not only knowledge but also attitudes and behaviour)?*

TARGET POPULATION: YOUTH

Evaluate current programs systematically, particularly for those who have not initiated sexual activity. This would probably be school-based research.

Plenary discussion: It is important to determine whether the goal of such research is behaviour modification, protection awareness, or harm reduction. Should one harm reduction focus be on identifying alternatives to condoms, such as Nonoxynol 9? One study, however, suggests that Nonoxynol 9 may promote HIV transmission. Studies currently in progress should clarify the potential role of Nonoxynol 9.

5) *Is there an important variation in health care-seeking behaviour among communities and is this associated with variations in burden of illness?*

TARGET POPULATION: SPECIFIC LOW-HIGH PREVALENCE COMMUNITIES

Both high and low STD prevalence rates can be found in ethnically similar communities. The determinants of the reproductive rate are based on the disease's transmissibility, rate of partner change, and the duration of infection. Given that health care-seeking behaviour can have a marked impact on the duration of infection, this could be an important question to consider.

6) *What is the population-attributable fraction of ectopic pregnancy due to chlamydial and gonococcal infection?*

TARGET POPULATION: WOMEN

Routine surveillance of ectopic pregnancy through hospital discharge database records can provide results. However, data on the attributability of ectopic pregnancy to STD are not so extensive. Moreover, they are relatively old and have not been validated in many settings. It would be possible to conduct such a study through data linkage of STD prevalence in women.

7) *What is the cost-benefit of in-patient versus out-patient treatment of PID?*

TARGET POPULATION: PID PATIENTS

This can add to an existing study funded by the National Institutes of Health and could be conducted with modest financing.

8) *What is the impact of the presence or absence of an STD clinic on STD control in a community?*

TARGET POPULATION: TOTAL POPULATION

Is there evidence that STD clinics are more effective than decentralized treatment? How are quality of care and patient follow-up affected by the absence or presence of a clinic?

9) *What is the cost-effectiveness of free treatment for STDs?*

TARGET POPULATION: NEW BRUNSWICK

This target population was chosen because it is an area where treatment is not currently free. One particularly interesting aspect of such a study would be the effect on compliance with treatment. Where treatment is free, there may be a difference in compliance rate between patients being given a drug treatment and patients being given a prescription to acquire their free drug treatment from a pharmacy.

10) *What are the transmission dynamics in specific, isolated communities as elucidated by epidemiologic field work and molecular epidemiologic techniques?*

TARGET POPULATION: ISOLATED, HIGH RATE COMMUNITIES

It is important to study the dynamics of transmission both within and between communities.

11) *What is the burden of viral STD (genital herpes, HPV) in the sexually active Canadian population?*

TARGET POPULATION: TOTAL POPULATION

To begin with, we need basic descriptive information which is not available for viral STD other than HIV.

12) *What are the knowledge, attitudes and behaviours of health-care providers concerning STD?*

TARGET POPULATION: SAMPLE OF FAMILY DOCTORS AND OBSTETRICIANS/ GYNECOLOGISTS

A critical point in STD care is the way that these patients are treated by their health-care provider. In particular, the knowledge, attitudes and behaviours of treating physicians is important to the treatment of STD. Internationally, there is concern, as evidenced by the World Health Organization standardized research protocol, to address these issues in developing countries. The issues can not be studied identically in Canada, but the protocols could be adapted for Canadian use. Perhaps the target population should be expanded to include other selected relevant health-care providers, such as nurses and pediatricians.

An additional aspect of this question, which builds on school-based health education intervention (question 4), is the design and evaluation of physician-delivered (or other health-care provider-delivered) brief intervention in programs of primary prevention. The Canada Youth and AIDS Study indicated that young Canadians have the most confidence in the STD information provided by their physicians. Physicians are having personal discussions and delivering sex education every day and could be used to deploy brief interventions and then study their effectiveness in two different ways.

First, as part of the periodic health examination of adolescents, and building on the physician's authority base, these health-care providers could provide cautionary STD information. Second, given the well-known phenomenon of oral contraception prescription as a marker of STD infection within the following year or two, one could examine the efficacy of physician-delivered cautionary information about STDs at the time of contraceptive prescriptions.

During the discussion period, it was noted that these questions point out the importance for LCDC to amalgamate standardized questionnaires or adapt them so that researchers do not have to "reinvent the wheel". LCDC could also coordinate research, particularly if it is federally funded, to ensure the comparability of study results.

What additional expertise would LCDC have to acquire in order to play a coordinating role, for instance, intervention evaluation, economic evaluation, decision analysis? If LCDC becomes a repository for research questionnaire information, could it also become a repository for model/method and cost information to guide decision making?

Dr. Sutherland reviewed the list of 12 questions from the perspective of LCDC support and indicated that the Centre could conduct and disseminate a literature review based on selected questions; conduct in-house or contract specific work, including the development of research proposals; convene expert working groups to address specific problems or compile a report on certain questions; and assist provinces and territories to enhance their surveillance programs in specific areas. Dr. Sutherland noted that the more often experts indicate the value of particular avenues of support, the easier it is to designate and channel resources into pursuing them.

Dr. Sutherland was encouraged to consider two additional types of activity: a review or repository of currently on-going STD research, similar to that undertaken by Dr. Yeung in the HIV area, and encouraging other parts of Health Canada that conduct dissemination research to consider STD and HIV worthy of being considered as part of their efforts.

There may be other funding sources which, in conjunction with or in addition to LCDC, could facilitate some of the necessary research. Dr. Sutherland encouraged co-funding and other types of collaboration with public and private sector sources.

The session co-chairs identified questions 1 and 7 as those which could be addressed in the very short term (by October 1996), questions 2, 6, 11, and 12 as those which could be addressed in the medium term (by October 1997), and question 8 as one which could be part of a longer term strategy.

Workshop 3
STD GUIDELINES/PREVENTION AND CONTROL STRATEGIES

Leaders: Dr. Bill Bowie and Dr. Noni MacDonald

QUESTION 1:
What national prevention strategies should LCDC and its partners establish/develop?

QUESTION 2:
What are the priorities in national control strategies (e.g., role and ongoing work with STD guidelines for partner notification)?

QUESTION 3:
Should strategies to improve compliance be developed?

QUESTION 4:
Should control strategies emphasize core-group control rather than the traditional "one-on-one" individual-based control strategies?

Rather than attempting to answer the questions separately, the workshop took into account the spirit of the questions in focussing on primary, secondary, tertiary, and quaternary prevention strategies. The potential role for LCDC in supporting the implementation of the strategies was suggested for each category.

PRIMARY PREVENTION STRATEGIES

Education – Traditional and non-traditional health-care workers must work with different segments of the public to develop education programs that will be effective in addressing the needs and conditions of different sub-groups of the Canadian population. Research has shown that education is the most common and the most effective strategy in the prevention of STD. Despite variations in the population, health-care workers are using the same basic educational knowledge and material with all segments of the population. Separate education programs for street youth, the elderly, school-attending adolescents, and middle-aged gay men must each contain clinically relevant information about STD and sexual health. Each must teach the appropriate and relevant behaviours skills needed for both a healthy sexual lifestyle and for STD prevention. For instance, the issue of the prevention of sexual violence is different for street youth than for people in seniors residences, and HIV risk is different for a gay adolescent than for a 35-year-old person in a long-term, monogamous, heterosexual relationship.

There are many non-traditional health-care workers who are active in primary prevention for whom existing public education and health-care worker education may be neither sufficient nor appropriate to assist them to meet their mandate. Many of these people, such as teachers, do not have a medical background. We should be re-thinking their education needs in terms of what and how they are trained. People require education that encompasses both knowledge and behaviour information. Surveillance data can be used to determine deficiencies and needs for focussed education programs. The model currently in use in British Columbia is an excellent starting point.

With specific reference to teachers in classrooms, there is a need to ensure that they are qualified to teach sexual health information effectively. Perhaps health curriculum questions could be included on those examinations set by certain provinces that students must pass to matriculate. This would ensure that the students have the required knowledge and behaviour skills and that teachers are communicating the information well.

Communication – Surveillance and consequence data must be marshalled to support the communication of an important and relevant STD/sexual health message. What we are really trying to communicate should not be a message about STD control, since it doesn't mean anything to most people outside the medical community. What we are really attempting to do is to promote sexual health and to prevent the consequences of STDs, i.e. sexual violence, infertility, and other side effects which have a deleterious impact on women's health. These issues are important to the general public for whom issues like chlamydia control do not seem relevant.

A further communication objective relates to a political function. Data and other information, perhaps in the form of "myth versus reality", must be available to prepare those who deal with political groups such as school boards, parent groups, and boards of health. In order to support their attempts to justify, for example, primary prevention programs, they require not only appropriate data, but also credibility in the form of documents delineating the recommendations and endorsements of LCDC about the importance of primary education. LCDC's support will be critical in developing a campaign to counter the often rabid, effective, and vocal movement against any form of sexual health education. Beyond this, the backing of Health Canada in the form of federal data about the importance of primary prevention programs will help to dispel misconceptions about both public views on and support for this education, and will assist school and health boards to decide among many competing priorities.

Training standards – LCDC should identify the amount of information required to ensure effective case management of the STD client on the street. What is the

minimum that someone needs to know and do in order to ensure a minimum acceptable level of care (detection, treatment) in the office of a general practitioner, public health nurse, or street worker who may be the only contact that the STD client sees? To establish such a compendium of information and standards, we need to know the following: who are the traditional and non-traditional health-care workers from whom STD care is sought, which are the most critical target populations to be served, and what is the minimum care standard needed. Although one suggestion was the establishment of a national training centre by LCDC, such a facility would require people to travel to it to be trained. A travelling "road show" may be both more effective and less expensive since the training can be conducted by a few people, it can be taken to the people who need it, standards can be monitored, and their knowledge appropriately supplemented on site to match needs. At present, medical students and others seeking such training often must access it in the United States where conditions, medical services, social services resources, and values are very different from those in Canada.

Guidelines – To make STD control more effective, we must carefully extract the most important elements of STD prevention, diagnosis, and management from the broad body of STD and sexual health knowledge, re-package them in a digestible format, and disseminate the result to appropriate people. It continues to be important that Health Canada be the repository of a large body of knowledge on STDs, their prevention, and their treatment. However, we must learn from behavioural psychology that health-care workers and the public cannot cope with and will not benefit from having large quantities of that information. This dynamic process of extracting the "Ten Commandments" will require regular revisions that should be based on problem identification from recent surveillance data and the selection of target groups. To date, we have not been diligent and skilled at identifying the essence of the STD and sexual health message and determining how it should be implemented by health-care providers. Impediments to implementation include insufficient research to facilitate the development of an implementation plan, an epidemic of guidelines formulated without reference to the context in which they will be implemented, and guidelines developed in the absence of funding for their implementation and enforcement.

Achievable goals – Although much effort is expended on STD control, the STD community has not identified goals, set target dates for achievement of specific results, agreed on indicators of successful achievement, and determined the methods by which the goals will be accomplished. Many major successes in medical history, such as vaccination against diseases and the eradication of smallpox, have occurred after such goals were established and associated work was planned with a specific vision in mind. We need to examine and set practical, measurable, achievable goals and develop the rationale to gain the support of politicians to realize them. The goals should be expressed in terms of morbidity outcome (reducing infertility) versus organism outcome (reducing chlamydia). Examples of goals which fall into this category are as follows: every laboratory in Canada doing STD testing will have a minimum acceptable standard and turnaround time for chlamydia; and STD-related infertility will be reduced by 50% by the year 2005.

LCDC/Health Canada role – LCDC can make a systematic and concerted effort to distribute data. It needs to reach politicians at many levels, the general public, health-care workers, and the public health community. LCDC can assist in the interpretation of the data in a meaningful way, present it in an appropriate way, use a variety of media to disseminate it, and put sexual health issues on the public agenda by talking about the health and economic consequences of STDs, not just about STDs. LCDC can sponsor or lead an assessment of what messages should be distributed, where they should go, and to whom they should go. This should include a thoughtful approach to correlating high-risk populations with greater resources to address their STD needs.

LCDC can use advertising experts to assist in transforming data into short, relevant, intelligible messages; the identification of appropriate channels to be used to distribute the messages to the media, the target groups, non-government organizations and health units; and the development of training standards, modules, and packages to support the establishment of travelling "road shows".

LCDC can also be instrumental in creating the process by which national goals can be established. It could investigate channels through which the integration of federal and provincial efforts might be maximized.

Dr. Sutherland emphasized that, although LCDC might assist, lead, and sponsor activities, their success will be predominantly dependent on partnerships.

SECONDARY PREVENTION STRATEGIES

Case finding (traditional sources of education and care) – The sources of traditional education and care are clinics and private physicians' offices. In addition to educating people who work there to look for STDs, we also need to train them not to look, i.e. those who run tests and do not discriminate between high-risk and low-risk patients cost the health-care system significant amounts of money for a very small return. However, efforts to refine screening methods should be introduced over time so that they do not have the consequence of ending all screening.

Case finding (non-traditional access) – Not all care has to be provided by medical personnel in clinics and physicians' offices; some procedures can be brought to the streets and other locations where many high-risk people can be found. A high proportion of people at highest risk for STDs are not the people who have a postal code, who have regular health checks, or who have a place to file health

records. Although they may not seek regular health-care, they do access certain types of services and meet certain people on a regular basis: soup kitchen staff, police, shelter staff, and street workers. We need to look at enrolling and training non-traditional health-care providers to disseminate information, collect urine specimens and provide direct access to the health-care system. For instance, someone working with street youth could collect a urine sample and offer to meet the individual, on the same street corner two nights later, with the tests results and the appropriate treatment medication. Research to support this should include the development of non-invasive, easily-administered methods of sample collection (e.g. intravaginal swab).

Case finding (self-administered) – Since a high proportion of people who are at highest risk for STDs currently do not have regular health checks, we need to provide them with the correct information so that they begin seeking regular health checks. Research should be undertaken to determine how to promote an understanding among these individuals of both their own personal risk and the ease with which they can access care and, thereby, convince them to seek regular health checks. Beyond initial STD diagnosis and treatment, the subsequent objective is to teach people about a healthy lifestyle, to get them thinking about it for themselves, and to have them understand the role of regular health checks and treatment in that lifestyle.

We have to be creative and consider new ways of combatting STDs, perhaps including the revival of old ways. For instance, the systematic provision of a dose of erythromycin to all members of high-risk enclosed communities and to all those entering the communities. While the approach may sound extreme, it is similar to the effective inoculation campaign that eradicated polio.

LCDC/Health Canada role – LCDC can play a major role in secondary prevention by providing the right surveillance data so that we can locate the problems; and cost-benefit data so that we can identify the minimum standards, maximum benefits to be achieved with those standards, and the areas on which we should be concentrating our focus. LCDC can help set the training standards and assist with demonstration projects for some of the non-traditional methods of care, as well as conducting cost-benefit analysis on the demonstration projects. In terms of ideas for non-traditional access, Canada may benefit from an examination of some of the work currently being conducted in the United States.

TERTIARY PREVENTION STRATEGIES

Diagnosis and treatment – There is an opportunity to talk about the reduction of other risks, when treating and counselling people with STDs. Diagnosis and treatment should continue to focus on the four Cs: compliance, counselling, contacts and condoms. However, we must act in accordance with our understanding that statistically those being treated are the same people who have other risk behaviours, such as the use of cigarettes, drugs and alcohol, and who have high rates of suicide and sexual violence. Despite this fact, we continue to treat the STDs in isolation instead of dealing with the various issues involved and also treating those who are at risk.

A further challenge involves delivering care and having access to care in small closed communities in which anonymity and confidentiality are major concerns. This situation often delays seeking care until the problem is very serious.

LCDC/Health Canada role – LCDC can look at implementing the best procedure for counselling, at determining minimum standards, at developing the best tools for rapid diagnosis, at creating self-administered tests, and at establishing the cost of diagnosis and treatment. LCDC can conduct research and pilot projects to determine the optimal way to control STD in small enclosed communities.

LCDC could also consider coordinating a national tendering process by which all those accessing therapeutic formularies could do so at a minimum uniform price. In this regard, LCDC could also coordinate the compilation of the list of drugs for which a national price would be sought. It was noted that some drug companies are unable, due to constraints from their parent company, to reduce prices but will provide significant funding for research and development activities. Those planning research may benefit from exploring such funding sources.

QUATERNARY PREVENTION STRATEGIES

Sequelae – Diagnosis and treatment of sequelae.

LCDC/Health Canada role – LCDC can assist with surveillance data, and the analysis of the costs, and tools required for diagnosis and treatment of sequelae.

Workshop 4
STD RISK BEHAVIOUR SURVEILLANCE

Leaders: Dr. Bill Fisher and Dr. Ian Gemmill

The discussion began with the assumption that a STD occurs because a risk behaviour has taken place in proximity to a pathogen. The function of risk behaviour surveillance is to address that part of the equation relating to the behaviour. Surveillance information should help to do the following: to map the potential risk in a particular group in a particular environment associated with that group's behaviour and in conjunction with pathogen incidence in that group; and to provide as much detailed

information as possible to target where, when and how to intervene.

QUESTION 1: What should be monitored in a surveillance program?

1) The occurrence of the traditional sexual risk behaviours associated with STD transmission, e.g. number of partners, rate of partner exchange, partner density (rate of partner exchange per unit of time), different types of sexual acts, and types of preventive behaviours such as condom use.

2) Incidental sexual risk behaviours not traditionally considered as STD risk behaviours, e.g. oral contraceptive use, alcohol and drug use, delayed marriage, and educational patterns. These may be paradoxical and not intuitively obvious but, on reflection, may be worthy of surveillance because of a tendency to amplify risk. For instance, a young single individual who begins to rely on oral contraception almost inevitably ceases to rely on condom use at about the same time. This is followed by a predictable and rapid increase in STD infections among young oral contraceptive users just beginning to use this method and, therefore, individuals who rely on oral contraceptives are in a high-risk category because of the "incidental STD risk behaviour" of oral contraceptive use.

3) Use the risk behaviour surveillance opportunity to collect information about the determinants of both traditional and incidental risk behaviours with a view not only to mapping risk behaviour, but also to fostering sufficient understanding to translate it into targeted intervention tactics. Rather than formulating best guesses about the determinants of behaviour, we should rely on sophisticated empiric and conceptual work that has been done in the past 10 years and introduce widely accepted theoretic methods as a guide to which determinants of behaviour to assess. These determinants may include information, attitudes, norms, perceived vulnerability, developmental stage, cultural, ethnic, economic factors, and prevention education and services.

4) Non-invasive STD testing, such as PCR analysis of urine, may be able to be incorporated into programs of risk behaviour surveillance. Although there are substantial ethic and logistic issues to be addressed, it is important to pursue this channel of inquiry to clarify people's STD status and provide two important types of information. First, it would provide a new and potentially more representative STD data source because, typically, the people selected for such research are representative or quasi-representative segments of populations with known characteristics. Second, it would enable the determination of the relative impact of different risk behaviours and determinants of risk on the occurrence of identified infection.

QUESTION 2: Who should be monitored in a surveillance program?

1) First priority should be given to broad population surveys of youth aged 12 to 24 years. The usual age range has been lowered to enable the collection, early in the sexual career of young people, of baseline data concerning traditional and incidental risk behaviours, concerning levels of determinants of behaviour, and against which to compare incidence and prevalence data across time. Second and third priority should be given, respectively, to monitoring single adults aged 25 to 29 and selected older persons. One reason for including this latter group stems from the neglect in early HIV studies to analyse the age group most transfused in North America.

2) Focussed core-group surveys must complement the broad-based population surveys. The core groups will differ depending upon the STD involved. Obvious targets are men who have sex with men (MSM), young MSM, minorities, first nations, immigrant youth, street kids, travellers to endemic areas, and the incarcerated.

3) Just as we must be attentive to the occurrence of sexual risk behaviours, we must consider the lack of coordinated and systematic programs of prevention education to be another form of risk behaviour, namely, a public health risk behaviour. We ought to be surveying, in tandem with people's individual performance of risk behaviour, the existence of programs of prevention and related services.

4) Surveillance should be repeated periodically. The judgement about the appropriate frequency of repeating surveys will be related to the pace of the movement of pathogens through populations.

QUESTION 3: How should surveillance be accomplished?

1) It is rather commonly accepted that broad surveys of the population need to be accomplished by self-administered questionnaires.

Various forms include the U.S. AIDS Risk Behaviour Program which routinely uses telephone surveillance, and the Canada Youth and AIDS Survey which used reasonably

economic, classroom-based, self-administered questionnaires. An alternative method of population-based surveys could include the construction of much smaller, nationally representative groups of people who initially would be recruited for research, but whose consent would be sought to participate in sex-related research in order to avoid sample biases. This would replace 38,000 non-selected high school students with 1,240 highly selected students.

2) Focussed core-group surveys, almost certainly, will require participatory and alternative research methods that must first gain the consent, support and wisdom of the group to be studied. The research strategy should include a negotiated agreement as to what will be given back to the group; the incorporation of core questions to ensure comparability to broader surveys; and the use of techniques such as ethnographic analysis, network analysis, and the hiring of key informants to interview members of the group.

QUESTION 4: How should surveillance activities be developed?

1) Past successes have emanated from convening small expert advisory committees, including representatives of the target group, to guide the activities of the risk behaviour surveillance people at LCDC. This method was suggested by the Royal Commission on Reproductive Technology.

2) It is important to develop a LCDC in-house capacity to analyse, present, and disseminate findings. This idea focuses on the trade-offs inherent in contracting out research activity. On the one hand, there exists very effective, highly motivated researchers to collect data. On the other hand they tend to leave the scene once the papers are published. The risk behaviour surveillance databases are exceedingly rich and need to be easily accessible to answer questions that had not occurred to people at the time the data were collected. Furthermore, those who are excellent at collecting data may not be competent to analyse it from a STD perspective.

3) There is an assumption that surveillance should not be conducted in the absence of a commitment to act on the findings. Surveillance of risk behaviours, determinants of behaviour, and STD status should be linked to prevention education and services, and evaluation of their impact. This may imply links not only to STD diagnosis and management goals, but also to available funds.

4) Surveillance activities should be developed with a knowledge of the barriers to getting into a community, having the message understood by the community, and having the message translated into behaviour. For instance, based on a recent needs assessment for the First Nations communities on HIV and AIDS, two common themes emerged: the stronger the religious affiliation, the less success there will be in implementing a STD program; and the unavailability of prevention information in one's first language will reduce the effectiveness of the program. The issue of religion is a sub-set of cultural issues that must be addressed and assessed, particularly in ethnographic research. The issue of language is very important in terms of the translation of both words and concept.

5) Because risk behaviour surveillance focuses on a moving target that behaves differently in different locations, we need Canadian-specific data, not American or European surveillance data upon which to design our programs. Foreign surveillance studies may be useful in developing some of the questions, but not in predicting the answers. Foreign data are also politically bankrupt in terms of influencing the behaviour of Canadians since such data are not regarded as reflecting our conditions and activities. There are isolated gems of information that have emerged from the literature and that can be broadly applied, e.g. risk behaviour is more common within what people consider as relationships than within what people regard as casual sex.

Workshop 5
ROLE OF STD LABORATORY SCIENCE IN SUPPORTING LCDC'S PUBLIC HEALTH MANDATE

QUESTION:
What is the role of laboratory science in carrying out LCDC's public health mandate?

a) Use of laboratory-based data for epidemiologic surveillance goals

High quality laboratory-based data are essential for good epidemiologic surveillance. The most efficient model for satisfying this requirement would have the provincial epidemiologists, working with the provincial laboratory people, collate and analyze line-listed provincial information and forward it to the federal program which, in turn, would share it with the federal laboratory staff. Reference services in federal laboratories should provide national surveillance data within this cooperative model.

The provincial reports presented at this meeting focussed on a very few diseases, including gonorrhea and chlamydia infection. This partially results from the lack of sufficient laboratory and epidemiologic data available on other diseases, namely, the human papillomavirus (HPV), herpes simplex virus (HSV), *Trichomonas vaginalis*, HIV, and chancroid. Gathering more data may require the establishment of sentinel laboratory-based surveillance.

b) Development of new laboratory tools for outbreak investigations

Federal laboratories should develop new laboratory tools, not just for outbreak analysis, but also for diagnosis. Avoid duplication of efforts by knowing what tools are already in the development or evaluation stage.

This should be a collaborative effort involving all levels of laboratories, including hospital, university, provincial, federal and private laboratories, on the assumption that an effective network will promote the availability of good specimens. Any such developments related to STDs should be coordinated with the other related groups, such as the HIV testing and molecular programs at the federal level.

Priority organisms recommended for these collaborative efforts should be the following:

N. gonorrhoeae – molecular typing and antibiotic resistance;

C. trachomatis – molecular typing and antibiotic resistance, and cost-benefit analysis of the nucleic acid test;

HSV – serology, typing, resistance to antivirals;

HPV – perhaps revert back to developing simple tests (e.g. simplified combination of HPV and Pap testing), especially since there are already some hybridization tests available, and soon there will be PCR and perhaps some of the other molecular techniques;

HBV – tests for mutations to the core and surface antigen.

In developing new tests, it is important to use more than the laboratory-based data in evaluating the test and to gather and take into account the epidemiologic or other data.

There was lengthy discussion on the topic of what factors drive, or should drive, the development of tests. Highlights included the following points:

1. In the absence of the medical community indicating which types of testing would be useful for diagnosis and treatment, companies may be guided by a desire to increase market shares.
2. Development of tests is usually based on cases in large urban centres where transportation is readily available and where good specimens are available because there is both time and trained people to take them. Given the variety of conditions (e.g. transportation, training) and requirements (e.g. freezing) facing people across the country, perhaps we should be guided by what information can be gathered at the bedside rather than what is the simplest thing to accomplish in a laboratory. Sensitivity and specificity may have to be determined by what is available in the field, not by what the laboratories want.
3. There is a danger of doing tests because we have the capacity to conduct them (e.g. HPV) rather than because their outcome will be meaningful, particularly in the case of the patient on whom the test is being conducted. We have to be clear about whether the goal of testing is to assist the patient or to enhance scientific knowledge through surveillance.
4. Understanding the surveillance and public health goals may help to focus testing, increase specificity, and reduce testing costs.

Miscellaneous points raised included the following:

1. Some United Nations grant money is available for the development of rapid, simple and inexpensive tests appropriate for use in developing countries.
2. The development and evaluation of effective tests depends on the availability of good samples. Guidelines for gathering specimens could assist those who collect and submit samples.
3. Providing information to patients just because it is available without explaining what to do with it does not alter behaviour, it only promotes anxiety.

4. In terms of benefits to the population, some participants wondered whether money may be spent more cost-effectively for HPV prevention through promoting regular Pap smears than through developing tests and gathering scientific data.

c) Development of links between laboratory testing and risk behaviour research

Laboratory experts and epidemiologists should jointly develop standardized guidelines to link laboratory findings to risk factors. This would include publishing collected data, such as that for female health-seeking behaviour for STD, so that there can be some standardization in data collection across studies.

There was some discussion on the validity of self-reporting versus laboratory testing, based on the recent study of 468 gay and bisexual men in Winnipeg bars and bathhouses.

d) Quality assurance

In the area of quality control, there should be a collaborative effort, for example, between federal STD laboratories and the HIV, molecular, and cancer program. Collaboration should include non-federal laboratories, e.g. the very strong Ontario program for chlamydia could be extended across the country.

Current quality control within federal programs, such as that for syphilis and HBV, should be maintained and consideration should be given to whether such programs should be expanded. There is a need for new quality control programs, especially for *C. trachomatis*, HIV, and HPV. It was noted that either the incorrect use of testing kits or a defective lot of a commercial product can generate either false positives or false negatives.

There was some question as to whether LCDC should take the lead in establishing new national quality control programs or whether provincial authorities, with their licensing mandate and enforcement capabilities, should play a leading role. By contrast, federal programs tend to be educational and would be more effective if they were partnered with other existing programs.

e) Establishment of a biorepository facility

Biorepository facilities are very expensive. Therefore, they should only be established on a project-by-project basis. Each project should have specific goals, have a limit on the number of specimens to be stored, and be adjudicated by an advisory committee.

The National Biorepository Centre (NBC) was established at LCDC in September 1995 and can be used by clients on a cost-recovery basis. Just about any kind of organism, and DNA is considered for banking. The NBC will support the Prostate Specific Antigen (PSA) Screening Trial involving 77,000 male respondents between 55 and 74 years of age. This will result in approximately 400,000 vials of serum which will require about 35 Revco(-70°C) freezers for long-term storage. The secure facility is monitored around the clock by computer and has backup mechanisms. More information can be requested about the facility through Dan McLeod at LCDC.

f) Provision of reference services

Reference services are essential for all STDs. There needs to be a collaborative effort at all levels. Because there is already a Technology Advisory Committee sub-committee for the Bureau of Microbiology to deal with reference services related to non-STD issues, perhaps that mechanism could be used to harmonize the contribution of each level of laboratory in the country, and coordinate STD experts to make recommendations concerning reference services.

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NATIONAL GOALS FOR THE PREVENTION AND CONTROL OF SEXUALLY TRANSMITTED DISEASES IN CANADA

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BACKGROUND

In 1996, the Laboratory Centre for Disease Control (LCDC), Health Canada, began a three-stage process to develop national goals to control the incidence of chlamydia, gonorrhea, syphilis, human papilloma virus, genital herpes, pelvic inflammatory disease (PID) and ectopic pregnancy (EP), high-risk sexual behaviours and to optimize laboratory capacity to diagnose sexually transmitted diseases (STDs).

The first stage involved commissioning a group of experts to write background papers regarding the current situation in Canada with respect to trends, diagnostic capacity, control strategies and evaluations for specific STDs as well as information on current sexual risk behaviours. The second stage consisted of a meeting (November 1996, Toronto) of international STD experts with the authors of the background papers and members of LCDC's Bureau of HIV/AIDS and STD and Division of STD Prevention and Control. STD-specific goal statements were developed, ways to maximize diagnosis of STDs were considered, and trends in high-risk sexual behaviours and how to promote healthy sexual behaviours were identified.

This report of the proceedings of the Expert Working Group to establish national goals for STDs and sexual risk behaviours represents the completion of the second phase. It is designed to serve the third and final stage: a national consensus meeting to engage more partners and stake-holders in adopting these national goals for STD control in Canada.

Why goals?

Drs. Judith Wasserheit, Michael Catchpole and Donald Sutherland

Canada has already achieved remarkable reductions in STDs. Expertise in infectious diseases and behavioural sciences is readily available and several provinces have already undertaken goal setting processes independently. Why then, do we need national goals?

National goals for STD control will serve to focus professional and public attention on the need to further reduce STD levels in Canada. National goals provides a political opportunity to broaden and strengthen the coalition of partners involved in STD control including front-line physicians, non-governmental organizations, provincial leaders and the research community.

What should these goals look like? It is useful to consider the acronym "SMART". Goals should be specific, measurable, achievable, resource-sensitive and timed. Having specific and measurable goals to be achieved within a specific time period is what helps to focus efforts and evaluate results. It is important that the goals are technically and politically achievable, but at the same time challenging. There needs to be sufficient resources to realize these goals. Prioritization of goals is essential and should be based on such things as the public health importance of the disease condition, the potential impact of a decline in disease incidence and the feasibility of the control efforts.

There are several things that are needed to translate these goals into action. First, partnerships are essential. Multi-sectorial collaboration at the local, provincial and national levels are needed to operationalize the goals. Not only must we link up with organizations with interests in combatting STDs but also with organizations and those with expertise in related areas, such as reproductive health, women's health, sexual health and behavioural sciences. Finally to support and sustain these efforts we need to have sufficient, cutting-edge, laboratory capacity.

The challenges are great, but the potential benefits are even greater. With the right goals, the right partnerships and sustained action we can decrease morbidity and the psychologic sequelae of stigmatization of STDs. It will also prepare us for future efforts of elimination and eradication.

LESSONS LEARNED

The United States

Dr. Judith Wasserheit

In the United States, considerable effort has been made to set and evaluate national objectives and strategies for STD prevention. Two processes have been useful to focus attention on STD prevention and include the Healthy People (HP) 2000 process and the CDC's Strategic and Operational Planning process. HP 2000 began in 1978 with an attempt to set national health promotion and disease prevention goals for 1990. In 1980, 226 objectives in 15 priority areas were published. However, it was discovered that a number of the objectives were not measurable.

The most current process occurred in the late 1980s with the goal to set objectives for the year 2000. For this process, four goals were set to translate management by objectives to public health, highlight under served areas, emphasize public and private intersectorial partnerships and to provide a model at the national level that could be translated at the state and local level.

Over the past 20 years, it was learned that when 10-year goals are set that it is important to re-examine trends and new advances at least every 5 years with an eye towards determining if the objectives set are appropriate and if more objectives should be set. Also, it was learned that mid-course reviews are important opportunities for advocacy. Subpopulation targets are also important and were added in 1995. It was also learned that the system only works with appropriate data systems and resources.

A mid-course review of HP 2000 progress was undertaken. To begin this process, four questions were asked: (1) Why should STD prevention be a top Public Health Service (PHS) priority? (2) Is STD prevention possible? (3) How is the U.S. doing in STD prevention? (4) What should our framework be for STD prevention between 1995 and 2000?

Answers to these questions included that while it may be obvious, STD prevention is important because it is a strategic common element in health for women, adolescents, children and minorities and in HIV prevention. As shown by most of the industrialized world, which has done a remarkably good job in reducing gonorrhea and syphilis, STD prevention is possible. However, the U.S. remains an outlier in terms of disease trends (see Figures 1 and 2).

There is no reason why the U.S. could not do as well as other countries in creating downward trends in STD incidence but it will not be easy. Contrary to conventional wisdom, STDs are not concentrated in the inner cities. Currently in the U.S., diseases such as syphilis are concentrated in rural areas of the southern states, which points to important access issues. While great progress has been made with some morbidity targets, the behavioural targets including initiation of sexual intercourse have not been reached.

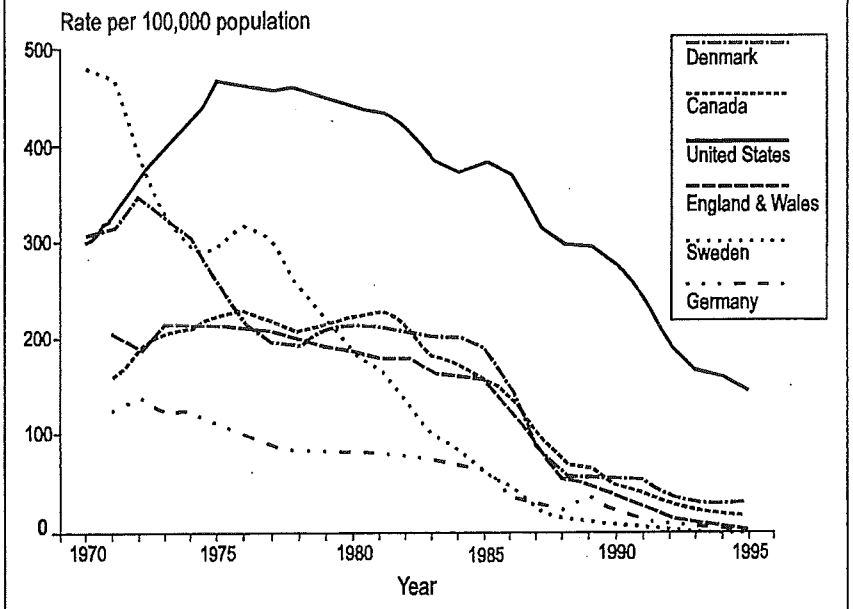
From the review, the framework for STD prevention 1995-2000 was comprised of six key issues including (1) building program and research capacity in the context of health care reform; (2) strengthening behavioural interventions; (3) STD/HIV integration; (4) reaching priority populations: women, adolescents and minority communities at risk; (5) prevention of adult and congenital syphilis; and (6) prevention of STD-related infertility.

While the progress review was useful for setting targets, it did not provide a concrete notion of what the priorities should be with respect to activities or frameworks. One of the first activities in CDC's Strategic and Operational Planning for STD prevention was to discuss our roles and those of our stakeholders. Also, a lot of time was spent discussing factors that would likely affect STD rates and STD prevention efforts for the future. These included socio-demographic and epidemiologic trends, scientific and technologic advances, politics, managed care, welfare reform, partnerships, strategic alliances, the internal CDC environment, and resources.

During the Strategic and Operational Planning, the strengths and weaknesses of various aspects of programs were evaluated including the primary focus, surveillance

and community outreach capacities, advocacy activities, personnel, infrastructure, and resources. For example, CDC programs have been moderately successful with respect to detection and treatment of disease but problems with access to treatment and behavioural intervention remain. The CDC has a good program for surveillance of gonorrhea and syphilis but less so for chlamydia, viral STDs, sequelae and risk behaviours. While there is a large field staff comprised of disease intervention specialists available for community outreach, they use a somewhat narrow paradigm which limits their usefulness.

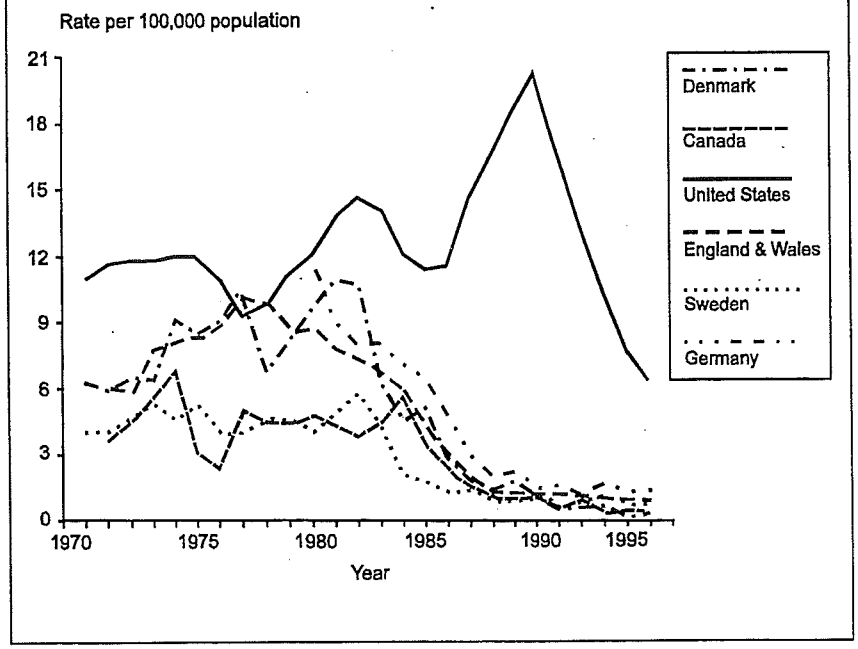
Figure 1
Gonorrhea Trends — International Comparisons



Thinking about opportunities and challenges, we reviewed disease and population characteristics and discussed opportunities for links with HIV but recognized the challenges of persistent stigma and marginalization of groups in the U.S. While declines in morbidity are viewed as opportunities, these are offset by increases in risk behaviour. Also, research advances including new diagnoses, treatment, prevention technologies and behavioural intervention approaches provide opportunities, but the translation of 'science' into programs remains a challenge. Recent changes in the socio-political environment have provided opportunities to focus on women, adolescents, and infants. However, at the same time, political and religious conservatism and increasing poverty have proved to be challenges to STD prevention.

From this process, an attempt was made to create a framework to link core functions in science, policy and programs with specific activities. The goal is to move on all three fronts simultaneously. CDC's job is (1) to develop, synthesize, translate and disseminate timely science-based information, (2) to use science-based information to develop national goals and science-based policy, and (3) to develop and support science-based prevention programs that are linked to community needs. Some of the newly initiated activities include managed care research, behavioural surveillance, and partner notification research. Development of STD/Reproductive Health Clinical Practice Guidelines has been initiated to integrate STD prevention, family planning and antenatal care together. For services capacity, a STD Faculty Expansion Program and a Federal Field Staff Transition Training Program have been initiated. On the horizon, CDC will look towards development of STD program indicators, enhanced information systems for STD surveillance, elimination of domestic syphilis transmission, operationalizing the core group concept, design and evaluation of STD/HIV synergy models, sexual and reproductive health models, and a viral STD prevention program.

Figure 2
Syphilis Trends — International Comparisons



An important concept in developing STD prevention strategies is to recognize that over time, as disease levels change from hyper-endemic to a decline phase to endemic, changes occur in the sexual and social networks that spread or limit STDs. As such, strategies should focus on a balance and combination of strategies for maintenance networks and spread networks recognizing the roles these play in transmission and the implications for prevention efforts.

From the CDC review, it has been learned that process is a key product and tool for internal and external focussing and support. Also, strategic and operational planning are linked but distinct and daily decision making and resource allocation must be tied to both. Finally, annual reviews of progress with staff and partners is critical.

United Kingdom

Dr. Michael Catchpole

In the U.K., target setting was based on a balance of science and informed judgement. Targets had to be pragmatic and based on public health need. Questions that informed the process were 'What will happen if no additional action is taken' and 'What is the potential impact of interventions. In the U.K., analysis and extrapolation from national and international epidemiologic data were used as a basis for setting targets. In addition, evidence of the effects of possible interventions provided further guidance. Monitoring was established to provide a common basis for local and national evaluation.

The broad goals were to reduce all STDs and to enhance their surveillance. One of the great paradoxes we encountered was that the diseases of highest public health priority — HIV and chlamydial infection — were the diseases that presented the greatest difficulty in terms of measuring incidence and effectiveness of public health strategies. Gonorrhea was selected as a proxy for HIV on the assumption that interventions that affected gonorrhea incidence would have a similar effect on HIV transmission.

These goals comprised part of the 'Health of the Nation' (HOTN) strategy for Health. The Department of Health's Policy Research Program provided supporting work in key HOTN areas and commissioned research relevant to potential future key areas. Research was also done to look at variations in health status to provide guidance for setting local goals. The HOTN represents a pan-government strategy and also provides the main context for the National Health Service planning.

The HOTN was established at the national level but local health authorities became responsible for the overview and local coordination of the implementation of HOTN. The health authorities were charged with the responsibility to develop local profiles and health alliances, undertake local research, set local targets, identify local strategies and interventions and arrange for monitoring and evaluation.

We ran into a couple of significant problems. The first was that the target set for gonorrhea was achieved before the 1995 deadline. By 1994, comparison of the rates by gender and region show that the 1995 gonorrhea goals had been met for women and for men in England and Wales. Politically, this meant that the problem was perceived to have been solved; attention and then funding was then diverted away from the STD programs. This points to the necessity of setting challenging targets.

The assumption that trends in gonorrhea could be used as a proxy for HIV turned out to be erroneous. Review of prevalence data shows a dramatic difference between these two diseases. We now plan to set specific HIV targets focussing on London and its surrounding areas, homosexual men under 25, and pregnant women.

When setting targets there are a few factors that must be taken into consideration including the availability of data, at present and in the future. Targets must be related to public health importance which has to do with the credibility of messages. If a proxy is used, you must make sure that it is a good proxy. Also, targets should be relevant to all localities and all service providers. Finally, it is important to consider how many targets should be set because too few may stigmatize some groups and too many loses the focus.

Control strategies can be based on a framework of $\mathbf{R_0} = \beta\ \mathbf{c}\ \mathbf{D}$, where $\mathbf{R_0}$ = STD reproductive rate, β = therapeutic interventions, **c** = health education and negotiating skills and **D** = case ascertainment (screening, partner notification) and treatment. This equation, albeit useful, reflects the tendency to set goals or targets in terms of incidence or prevalence rates. It may sometimes be more appropriate to set detection or treatment rates.

Ontario

Helen Bangura

In 1989, the STD Control Program Requirements and Standards were established as part of the Mandatory Programs Mandate. This established that Ontario's 42 regional Boards of Health would be charged with the responsibility of STD management and surveillance which was to include a system of data collection and reporting, and ensuring or providing appropriate case management and health promotion activities.

To effect this STD control program, a literature review and epidemiologic analysis was conducted for each STD selected, and then objectives were established. Although an attempt was made to establish specific goals

for all STDs, this was not always possible. For example, no numeric goal for chlamydia was established because, at that time, chlamydia had been a reportable disease for only 3 years. In the mid-80s HIV was still a very new disease; the goal was simply to reduce its incidence. Despite these difficulties, we forged ahead with specific program requirements, standards and references to specific protocols for treatment and screening.

There is much room for refinement in the methodologies used to establish appropriate goals. When we first attempted this almost a decade ago, we gave ourselves long time spans and consistently underestimated our effectiveness. For example, the objective for syphilis was to reduce the incidence rate to 1/100,000 population by the year 2000. This objective was reached in 1990. By 1995 it had dropped still further to 0.6/100,000. For gonorrhea, an objective of reducing the incidence rate to 50/100,000 population by the year 2000 was set. By 1995, the rate was 29.6/100,000. This points to the need to have shorter time periods for targeting exercises or built-in periodic review and reassessment.

What we have learned about goal setting is that the development of a logical framework is the most important aspect of setting targets. Goal setting must be linked to disease detection and community needs. Although global goals are useful in bringing people with similar interests together, they do not provide guidance for focussing resources. The use of mathematical modelling to set and evaluate goals in different contexts is only possible with sufficient data. In the end, intuitive modelling may be just as valid.

Our penultimate lesson was that goals should be ambitious. For example, we should be aiming for elimination of syphilis. To achieve this, we need to reduce the reproductive rate to 1 and develop strategies targeted towards imported cases.

GOALS

CHLAMYDIA

Dr. David Patrick

Genital infection with *Chlamydia trachomatis* remains the most frequently reported bacterial sexually transmitted disease in Canada. In 1995, the rate of reporting of genital chlamydial infection was 126.8/100,000 population nationwide compared with 162.4/100,000 population in 1992. Reported rates in women have remained approximately three times higher than those in men. This is likely due to incomplete testing of men. When men are systematically screened for chlamydia, rates do not substantially differ. Women (and presumably men) aged 15 to 24 continue to have the highest reported rate of infection.

Although rates of chlamydial infection appear to have fallen over the last few years, this decline has not been nearly as dramatic as that seen for gonorrhea. This is probably due to multiple factors such as a higher initial incidence, superior diagnostic capacity and single dose therapy for gonorrhea compared with a lower initial incidence, mediocre diagnostic capacity and lower cure rates after treatment for chlamydia.

The full impact of the current infection rate becomes clear when one considers the complications of genital chlamydial infections. It is estimated that 20% to 25% of women with untreated genital chlamydia will progress to PID and are exposed to the additional risks of EP and tubal infertility. In countries where chlamydia control has been successful, rates of hospitalization for PID have declined. This has yet to be observed in Canada. Proposed goals for the control of chlamydial infection in Canada is summarized in Table 1.

TABLE 1
Canadian Goals for Chlamydia

By the year 2000:

Detection

- 100% of contacts of all people with a proven genital chlamydial infection will be contacted, screened and, if positive, treated

Incidence rates

- The overall rate of chlamydia will be < 80 per 100,000 population
- The rate in women between the ages of 15-24 will be < 500 per 100,000 population
- The rate of hospitalization or surgical daycare for women between the ages of 15-44 for PID will be < 120 per 100,000 population per year

Case management

- PCR/LCR technology will be available in the majority of provinces
- Single-dose therapy will be available in the majority of provinces

By the year 2010:

Detection

- 100% of contacts of all people with a proven genital chlamydial infection will continue to be contacted, screened and tested

Incidence rates

- The overall rate of chlamydia will be < 50 per 100,000 population
- The rate in women between the ages of 15-24 will be < 200 per 100,000 population
- The rate of hospitalization or surgical daycare for women between the ages of 15-44 for PID will be < 80 per 100,000 population per year
- The EP rate will be < 14 per 1,000 pregnancies

Case management

- PCR/LCR technology will be available in all provinces
- Single-dose therapy will be available in all provinces

Diagnosis

Antigen detection tests for *C. trachomatis* infection are widely available in Canada. False positives are rare, but sensitivity rates remain unacceptably low at 70% to 80%. This means that currently 20% to 30% of screened individuals with infections remain undiagnosed. Switching to PCR/LCR-based testing is urgently needed. In addition to its greater sensitivity, this new testing technique has the added advantage of utilizing urine samples. This may make screening more acceptable to young adult males who may otherwise be deterred from testing because of the need to obtain a specimen by a urethral swab.

When setting the proposed goals for incidence rates it was noted that initially, with improved testing techniques and more concerted testing efforts, incidence rates will rise. As contact tracing and treatment improves, however, this should be short lived and an inexorable downward trend should be established.

Contact tracing and treatment

Protocols for contact tracing and treatment of contacts to persons with known genital chlamydial infection have been variable across Canada. In some jurisdictions, contact tracing for chlamydial infections has been less complete than for gonorrhea or syphilis infections. Given the high-risk of complications, this is unacceptable. All efforts should be made to shorten the length of infectivity by reducing the time between the source contact to treatment from the current average of 3 months down to 4 weeks.

The most common treatment for chlamydia in Canada today is doxycycline 100 mg po bid for a week. Yet, studies have indicated that compliance with this regimen is at 80% at best and that cure rates may be as low as 40% to 60% in those who do not fully comply with this treatment regimen.

Single-dose therapy for genital chlamydial infections with azithromycin should be a goal for all Canadian health jurisdictions. It is presently more costly than doxycycline, but cost-effectiveness studies have indicated that this is offset by full compliance and higher cure rates. LCDC should spearhead a campaign for bulk buying of this drug at the best possible national price.

Control strategies

Two groups should be targeted for an effective control strategy: people between the ages of 15 and 25 and health care providers. Educational campaigns geared towards high-risk youth could inform them about chlamydia and its sequelae as well as promote responsible health-seeking behaviour. Teenagers should be encouraged to delay the onset of sexual activity. Advice to young adults should emphasize safer sex practices, such as barrier methods of contraception and non-penetrative sex, and should identify the relation between infection and number of sexual partners.

Health care providers need up-to-date advice on screening, treatment and counselling strategies for the effective control of chlamydia. Current recommendations from the Canadian Task force for the Periodic Health Examination are not clear, scientifically based or feasible. Screening of individuals at high risk should be a primary control strategy. Women and men between the ages of 15 to 24 who are sexually active should be screened annually, at the time a Papanicolaou (Pap) smear is taken for women and at the time of any other medical service for men. Physicians need continuing medical education programs that present the evidence for single-treatment regimens and provide contact tracing and treatment protocols.

Health care providers need counselling resources. This might include the development of office aids for physicians that would prompt them to take appropriate sexual histories and could provide scripts to use to advise patients about condoms and chlamydia when oral contraceptives are being prescribed. We might also consider similar scripts for pharmacists who dispense oral contraceptives.

Surveillance needs

LCDC, in partnership with the provinces and territories, has a major role to play in providing national surveillance data. Ongoing, timely, age-specific rates will continue to be critical. We need to standardize definitions of hospitalizations for PID and EP and then obtain and analyze hospitalization data for PID and EP using hospital care and billing data systems. Annual reports of the availability of single-dose therapy and PCR/LCR-based diagnostic testing by province and territory should be provided.

We need to develop a sentinel surveillance system for STD that provides behavioural determinants. This would include screening-seeking behaviour among young Canadians and reliable data on sexual risk behaviours.

The use of PID rates as an indicator of chlamydial disease is fraught with difficulty. It is usually impossible to distinguish between gonococcal and chlamydial-induced PID from hospital discharge data. Additionally, movement of care from in-patient to out-patient settings makes the interpretation more difficult. In the latter regard, EP rates are likely to be more accurate; However, having an impact on this will take more time. That is why a goal to reduce the EP rate was identified only for the year 2010.

Ultimately, and in an ongoing manner, surveillance data will tell us if we are reaching our goals. What if technologies and treatments improve to the point that we meet these goals ahead of schedule? Consideration might be given to creating formulas: e.g. reducing the incidence by 30% by 2000 and 60% by 2010. These formula-based goals might also be useful for setting local targets where current rates are lower than the national average. Let us hope to be so fortunate.

GONORRHEA

Dr. Michel Alary

Gonorrhea is the most frequent bacterial STD worldwide. In Africa, *Neisseria gonorrhoeae* accounts for 50% to 70% of male urethritis whereas *C. trachomatis* accounts for less than 25%. In women, 20% to 40% of prostitutes and 3% to 10% of pregnant women are infected. This high incidence reflects the difficulties in developing countries with accessibility to diagnostic tests and appropriate treatments. Inappropriate use of antibiotics has led to the development of resistance. Penicillinase- producing *N. gonorrhoeae* (PPNG) is found in 60% to 80% of isolated strains in Africa, tetracycline resistance is common, and ciproflaxacin resistance has been documented in the last few years.

The epidemiologic data for developed countries are much more encouraging, although not without challenges. Incidence of *N. gonorrhoeae* infections peaked by the 1960s followed by a sharp decline. This decline occurred first in Sweden and last in the U.S. In parallel with this decline, there has been a steady reduction in the male: female ratio of reported cases. These changes can be attributed, at least in part, to improved screening programs for women and enhanced partner notification of STD cases.

Trends in Canada were typical of other developed countries. The number of reported cases of gonorrhea in this country has decreased dramatically over the last 15 years. In 1980 the incidence rate of gonococcal infection was 223 per 100,000; by 1994 it was 21 per 100,000. This 10-fold decrease was similar in men and women. In parallel, the male:female ratio has decreased from 1.59 in 1980 to 1.31 in 1994. Among women, the highest incidence rate was found in those aged 20 to 24 before 1985. Among men, the highest rates have been observed in those aged 20 to 24, followed by those aged 25 to 29.

The highest rates of gonorrhea occur in regions of Canada with high concentrations of first nations communities. For instance, in 1993 in the province of Quebec, 14% of reported cases came from the Nunavik area where the population is predominately Inuit. In 1994, the incidence rate was 10 times higher in the Northwest Territories (NWT) (222 per 100,000) as compared with the national average. Detailed data on reported cases of gonorrhea, by age, sex, and year are available from the Division of STD Prevention and Control at LCDC. Unfortunately in Canada, very little data are available concerning gonorrhea rates among potentially high-risk groups from urban areas and it is thus very difficult to clearly identify additional populations at increased risk for this infection.

Antibiotic resistance of *N. gonorrhoeae* is an increasing problem in Canada. PPNG was first identified at the National Laboratory for STDs in 1976; reporting peaked in 1990 with over 1,000 cases and then progressively declined to a low of 106 in 1994. Tetracycline-resistant *N. gonorrhoeae* strains were first identified in 1986 (two cases) and increased to a high of 1,005 in 1994. Approximately 20% of cases are due to plasmid-mediated resistance; chromosomic resistance is also common.

The Canadian goals for gonorrhea are noted in Table 2. Over the next 10 to 15 years, elimination is a realistic goal for locally transmitted infection. The real challenge over the next decade will be to reduce secondary transmission of imported cases. Currently, half of all cases are imported.

TABLE 2
Canadian Goals for Gonorrhea

By the year 2010:

- Eliminate locally transmitted infection by *N. gonorrhoeae*
- Reduce secondary transmission of imported cases of gonorrhea to less than one per reported case (reproductive rate $R_o < 1$)
- Have free STD clinics in every province

Control strategies

Control strategies should centre around screening, free STD clinics, contact tracing, accurate diagnosis and appropriate treatment of resistant strains, addressing importation of disease and promulgating culturally-congruent sexual health education programs.

We need to develop and implement community-based screening and treatment programs for communities and groups with high incidence rates. Mass screening is not needed – free STD clinics are. We need to extend free STD treatment programs to provinces where they are not currently implemented and further extend free STD treatment to clinic and private physician settings. In these clinics we need to promote recent non-invasive technologies (PCR or LCR on urine) which are more acceptable diagnostic techniques than traditional culture swabs.

Good contact tracing must accompany screening and will help identify resistant strains. There is some evidence that a public health based contact tracing program can effectively reduce resistant cases. In Quebec, all strains of *N. gonorrhoeae* are systematically submitted to the *Laboratoire de santé publique du Québec* for studies on resistance. Following the introduction of this program, the proportion of PPNG among all gonococcal strains in Quebec has decreased from 10% in 1991 to 5.6% in 1994. These observations should be interpreted with caution, however, because they could also be linked to a change in the profile of resistance over time. To further enhance contact tracing efforts, we need to identify feasible

"markers" of core group contact among infected persons (i.e. dual infection status, drug-resistant isolates).

Before education campaigns can be devised, further research is needed. We need to gather background data for the identification of high-risk groups in urban settings. We need to conduct socio-ethnographic studies to assist in understanding the differences in sexual behaviour between first nations people with high and low rates of gonorrhea. When we develop and implement specific, culturally-adapted prevention programs (including condom promotion), this should be done with target group involvement in order to create messages that are effective and culturally congruent. These initiatives may be coupled with similar efforts for control of chlamydial infections.

Continued surveillance of gonococcal infection, especially resistant and imported strains, will be critical for documentation of the elimination of this disease. However, until we find new ways to address imported disease, total elimination will remain an elusive goal.

SYPHILIS

Dr. Barbara Romanowski

Syphilis is one of the oldest and best controlled STDs. Despite decades of public health controls, however, rates peaked in 1984 when an overall rate of 5.6 per 100,000 population was reported. Since then, rates have decreased continuously to reach an all-time low of 0.4 per 100,000 population in 1995. Men accounted for the majority of cases in the 1980s but since that time incidence is more equally distributed between the sexes.

When age-specific incidence rates are examined, the findings are quite different for men and women. In general, during the 1980s, men 25 to 29 years of age had the highest rates. Since 1990, there have been alternating high rates in the 20 to 24 and 25 to 29 age groups. For women, the results have been far less consistent. In the 1980s there was an equal distribution of rates in the 15 to 24, 20 to 24 and 25 to 29 age groups. In the 1990s, 15 to 24-year-old women have had the highest rates. These are all women of reproductive age; it is, therefore, somewhat surprising that only five cases of congenital syphilis have been reported since 1990.

No information is available at the national level on disease occurrence by sexual preference, sexual behaviours or other risk factors such as injection drug use. The latter has been strongly linked to the resurgence of infectious syphilis in the U.S.

The goals for syphilis may be seen to be quite modest: to maintain current disease rates and prevent endemic congenital syphilis (Table 3). This is due to the fact that we have met the lowest rate that can realistically be set unless global eradication is attempted.

TABLE 3
Canadian Goals for Syphilis

By the year 2000:

- Maintain disease rates for infectious syphilis below 0.5 per 100,000 population
- Prevent all cases of endemic congenital syphilis

Control strategies

Quick identification and response to outbreaks will remain the cornerstone of syphilis control. Immediate outbreak investigations should be instituted when rates in any jurisdiction exceed 0.5 per 100,000 population. In order to do this, we need to have enhanced surveillance in target groups. To better understand high-risk groups, and target control and prevention strategies, we will need to collect information on risk behaviours and risk factors.

In light of the low rates of this disease, routine pre-natal syphilis serology is unlikely to be cost effective. The same applies for screening of blood donors. Syphilis may be a disease where resources previously attached to screening would be better used in research to determine the origin of the remaining cases.

HUMAN PAPILLOMA VIRUS

Drs. John W. Sellors and Alice Lytwyn

The prevalence of human papilloma virus (HPV) infection among women and men in Canada is unknown. American and European studies, using laboratory methods with varying sensitivities, have shown that from 10% to over 40% of sexually active women are infected by HPV at any one point in time. HPV-associated disease may be the most common viral sexually transmitted disease encountered in clinical practice in the U.S. It has been implicated in a number of diseases including cervical cancer and dysplasia, vaginal, vulvar and penile cancers, external genital condylomata, and respiratory papillomatosis; yet surprisingly little is known about its natural history.

Cancer of the cervix is the second most common cause of cancer death in women worldwide. Recent studies offer strong evidence that certain types of HPV cause over 95% of cancers of the uterine cervix. In Canada, four decades of screening for pre-neoplastic cervical lesions using the Pap smear has halved the incidence of invasive cervical cancer, reducing it to 10th place among the most common cancers in Canadian women. However, over the

past two decades, the rate of decrease in this preventable disease has been declining.

Among specialized population groups in Canada, the incidence of invasive cervical cancer substantially exceeds the national average. Cervical cancer is the first and second most common female cancer in Saskatchewan Indians and Canadian Inuit, respectively. Women of low social economic means and recent immigrants from countries where cervical screening is not well developed are at high-risk for cervical cancer. Cervical cancer is more common and may be more aggressive in women infected with HIV.

Vaginal, vulvar, penile and anal cancers are relatively rare in Canada. Vaginal and vulvar cancers are more frequent in women who smoke and have a history of cervical dysplasia and cancer. Anal cancers appear to be on the increase. Homosexual men practising receptive anal intercourse, particularly those who are HIV-positive, are at high-risk for this malignancy.

The prevalence of external condylomata or genital warts is estimated to be 2% in young, sexually active Canadian women. The vast majority of cases are transmitted by sexual contact; however, occasionally transmission may occur via common skin warts, fomites or during delivery by infected mothers. External warts are distressing psychosexually and difficult to eradicate.

The incidence of recurrent respiratory papillomatosis in Canada is unknown. Its incidence in the U.S. is estimated to be 4/100,000 children and 1/100,000 adults. Patients are primarily children who are exposed during birth to HPV found in the birth canal and external warts; they often require multiple surgical procedures and mortality rates are high. Laryngeal papillomatosis may also occur in children from exposure at the time of birth.

Screening and diagnosis

The Canadian Task Force on the Periodic Health Examination (1995) has stated that there is not enough evidence to recommend HPV screening of asymptomatic women. HPV testing has been technically difficult, and even when identified does not necessarily predict disease. Only a proportion of individuals exposed to HPV acquire the infection and only a minority of them develop clinical disease. When clinical disease does not occur, a proportion of people are able to clear non- and precancerous lesions spontaneously. Susceptibility factors are being studied and include HPV type, viral load, persistence of infection, human leukocyte antigen type, cell-mediated response, drug- or disease-induced immunosuppression. The effects of smoking , parity and co-infection with other STDs remain controversial.

Increasingly, commercial kits are becoming available, with and without nucleic acid amplification. Newer assays are able to detect more oncogenic types of HPV and quantitative assays may offer increased specificity.

One strategy that may be useful is to link HPV screening with Pap smears. However, it will be important to recognize that there will be a need to shift resources. To do so, it might be wise to recognize that some women are vastly over-screened and others are under-screened with Pap smears, and resources and guidelines should be revised and followed as appropriate. It is also important to recognize that, as yet, there isn't enough known about HPV to set definite guidelines.

Self-testing for HPV infection is becoming an attractive alternative to Pap smears. The necessity for a pelvic examination prevents some women from complying with Pap smear screening. Specimens for HPV testing, on the other hand, can be self obtained through vaginal swabs, vulvar wipes and urine samples. In the future, if such a method can be shown to have acceptable sensitivity and specificity, it could be used either alone or as a step down to Pap smear in areas where barriers to conventional Pap smear screening exist.

HPV testing may be most useful in the management of women who are diagnosed as having low-grade squamous intra-epithelial lesions on Pap smear. Fifteen to 20% of these women have an underlying high-grade cervical lesion. It is postulated that testing for oncogenic HPV-DNA could be used as an alternative to repeat Pap smear and to colposcopy for identifying those women who are harboring a high-grade lesion. Two Canadian randomized controlled trials are currently under way to examine this issue.

Screening high-risk groups for anal carcinoma has been suggested, and is being investigated in HIV-seropositive men. Anoscopy and exfoliative cytology are being used to identify premalignant anal lesions. Improved screening for anal epithelial lesions in this high-risk group should be a research priority.

Control strategies

There is currently no direct treatment of HPV, only its sequelae. Pap smear screening of cervical cancer, along with treatment, has been successful in decreasing the incidence of cervical cancer, the most common malignancy induced by HPV. Treatment of anogenital dysplastic lesions, particularly those of the cervix and anus, is ablation or resection. Treatment of cervical dysplasia is associated with over 90% success rate. Treatment and follow-up of low-grade lesions remain controversial and new guidelines in this area are needed. Treatments for genital warts include antimitotics (podophyllum; podophyllous home treatment), physically-destructive agents and procedures (liquid nitrogen, trichloroacetic acid, electrocautery, laser vaporization), and surgical excision. These treatments usually require multiple visits; side effects are common and latent infection by HPV usually persists in surrounding tissues. Recurrence rates range from 10% to 40%. A new topical immune modulator, imiquimod, stimulates the production of interferon-alpha and other cytokines and has been shown to be effective in eliminating genital warts; however,

follow-up is limited and long-term recurrence rates need to be determined.

Barrier contraceptives, which have been successful in reducing transmission of most sexually transmitted diseases, do not appear to be effective in preventing HPV infection. Vaccines against HPV infection are being developed, and early clinical trials are in progress. Preliminary trials of the vaccine in women with invasive cervical cancer have demonstrated that the vaccine elicits antibody production, but more definitive study is needed. Another promising avenue of research is the development of spermicidal agents effective against this virus.

If the focus of research and prevention is on oncogenic strains of HPV, it may be important to also investigate circumcision as a method of reducing cancer of the cervix.

Surveillance needs

To make any significant progress in the control of HPV-related disease we need to determine HPV prevalence in the general population and high-risk groups, including the prevalence of latent, subclinical and overt infection at all sites. We need to collect baseline information on rates of respiratory and laryngeal papillomatosis (see Table 4). The first step towards this would be the establishment of registries. The U.S. has recently established such a registry.

TABLE 4
Canadian Goals for Human Papilloma Virus

By the year 2000:

- Determine the prevalence of HPV in Canada in the general population and among high-risk groups including Aboriginal peoples, recent immigrants and HIV-seropositive individuals
- Monitor mortality data on anogenital disease involving the cervix, vagina, vulva, anus and penis
- Determine the prevalence and incidence of laryngeal and respiratory papillomatosis

Numerous professional and provincial Canadian organizations are working on issues in cervical screening. In 1995, Health Canada convened several working groups, including the Cervical Cancer Prevention Network, to establish liaisons with provincial representatives and to formulate recommendations for decreasing the incidence of cervical cancer in Canada. Working in collaboration with the Cervical Cancer Prevention Network is indicated. This network is working on the standardization of nomenclature across Canada and the development of a registry to provide data to assist in developing future policy and identifying areas for research.

GENITAL HERPES

Drs. Marc Steben and Stephen L. Sacks

The incidence of genital herpes is increasing worldwide and is now the most common cause of genital ulceration. One measure of genital herpes infection is the seroprevalence of antibodies to herpes simplex virus type 2 (HSV-2) in a population. However, this misses the increasing number of cases of genital herpes caused by HSV-1.

In a variety of studies, the seroprevalence of HSV-2 is higher in the U.S.(13% to 40%) than in Europe (7% to 16%) and highest in Africa (30% to 40%). Direct comparison among studies is difficult because of the different study populations, which have included blood donors, pregnant women and their partners and men in a fertility clinic.

Not surprisingly, there is a higher seroprevalence of HSV-2 among people attending STD clinics and among sex workers than in the general population. For example, in the U.K. 17% of heterosexual male, 27% of homosexual male and 25% of female attendees at an STD clinic were HSV-2 seropositive compared with 10% of female and 3% of male blood donors. The seroprevalence of HSV-2 varied from 12.8% of men attending an STD clinic in Spain to 73% among attendees at an STD clinic in Peru. In STD clinics in the U.S., the HSV-2 seroprevalence was 38.3% to 56.8%. Among sex workers, the seroprevalence was as high as 95% in HIV-positive and 75% in HIV-negative sex workers in Zaïre.

Multivariate analysis from large U.S. seroprevalence studies shows that social/economic factors, age, sexual history and HSV-1 antibody status influence the seroprevalence of HSV-2. HSV-2 seroprevalence is higher among blacks than whites; prevalence increases with age, history of other STDs and number of sexual partners. Surprisingly, there is a lower HSV-2 seroprevalence among HSV-1 seropositive individuals than those who are HSV-1 seronegative.

The Canadian situation is not well known. Two studies give some initial indication of the extent of seroprevalence. In an unpublished study by Sacks in 1987, the HSV-2 seroprevalence of pregnant women in Vancouver ranged from 4.6% in those with only one partner to 55% in those with more than 10 partners. Western blot test was used. The second study by Rawls, done on an unspecified population in Toronto, showed by neutralizing antibody that 17% of women and 12% of men were HSV-2 positive.

There are indications that genital herpes is increasing worldwide. For example, from the late 1970s to 1990, there was a 4% to 10% increase in the age- and sex-specific prevalence of HSV-2 in the U.S. In a Swedish cohort study only 0.4% of 14- and 15-year-old girls had HSV-2 antibody, but 15 years later 22% of this group had sero-

converted to HSV-2. Yet, no country has taken steps to implement control strategies or surveillance programs, except for attempts to prevent neonatal infection.

Why has genital herpes largely escaped public health attention? Although HSV-2 has reached such widespread seroprevalence, it is often underreported as an STD. The clinical manifestations of genital herpes are very diverse, and are difficult to confirm without laboratory testing. Diagnostic techniques for herpes viruses are not widely available. Even when such diagnostic techniques are available, they are insensitive.

Screening and diagnosis

Screening, contact tracing and education programs need to be developed and evaluated. The first priority should be the screening of high-risk neonates. For example, all HIV-positive infants should be screened for HSV-1 and HSV-2.

Without adequate diagnosis, this disease will continue unabated. Better and cheaper laboratory diagnostic tests are needed.

Control strategies

Prevention of transmission is key to controlling this disease. A number of studies have examined the horizontal transmission of genital herpes, e.g. transmission from a symptomatic individual to a seronegative partner. In one such study of 144 heterosexual couples, after receiving routine prevention counselling, approximately 10% of seronegative partners acquired genital herpes in the following year. There was a higher risk of acquisition among female-exposed partners with annual rates of 16.9% versus 4.5% in men. Prior HSV-1 antibody protected against acquiring HSV-2 with an annual rate of transmission of 7.2% in HSV-1 seropositives compared with 16.0% in seronegatives. The rate of transmission was lower among couples who used condoms regularly than among those who did not. There did not appear to be any difference in sexual activity between transmitting and non-transmitting couples. The partners transmitting genital herpes had more frequent symptomatic recurrences and more lesion days per month than those who did not transmit genital herpes to their partners. There was less contact with lesions among the exposed partners who did not seroconvert.

Unfortunately condoms alone cannot prevent the transmission of this disease. A study in Costa Rica showed that condom use reduced the rate of acquiring HSV-2. Over 2 years, the acquisition rate for HSV-2 was 28.9% in those who used condoms compared with 44.3% in those who did not. Other studies have had similar results.

There may be a relationship between acquisition of HSV-1 before puberty and the subsequent development of genital herpes. In populations with a low HSV-1 seroprevalence at puberty there are more cases of symptomatic clinical genital herpes. In populations with a higher HSV-1 seroprevalence at puberty, subclinical and asymptomatic HSV-2 infections are more frequent.

Prevention strategies could be developed by the establishment of a prevention cohort to evaluate the feasibility of different prevention modalities. Multiple sexual partners should be discouraged. The effect of spermicidal agents, the use of suppressive therapy in the infected partner in sero-discordant couples, and modification of certain sexual behaviours (such as oral sex) need to be assessed.

Currently the only treatment available is suppressive therapy with acyclovir and the use of suppressant topical agents. As with any viral infection, vaccine development is an attractive option. Vaccines currently being developed have incomplete effectiveness. Before pursuing this further, we need to quantify the burden of genital herpes to determine if the investment in vaccination will be cost effective.

Surveillance needs

The number one public health goal for genital herpes in Canada should be to establish baseline data for both HSV-1 and HSV-2 seroprevalence (Table 5). This is likely best established by unlinked serum surveys or cohort studies that could be done in conjunction with the Canadian Blood Agency. Alternatively, a few sentinel centres could provide baseline data. In addition, we should study special populations, such as youth, pregnant women and gay men, to evaluate the attack rate in different population groups and assess the effect of different sexual practices, such as oral sex, non-penetrative sex and the use of condoms.

TABLE 5
Canadian Goals for Genital Herpes

By the year 2000:

- Obtain baseline data for both HSV-1 and HSV-2 from unlinked serum surveys or cohort studies
- Reduce the incidence/attack rate of genital herpes to under 2% of women
- Stabilize prevalence rate
- Gather neonatal data by retrospective analysis of positive cultures for HIV among infants < 3 months old

PELVIC INFLAMMATORY DISEASE AND ECTOPIC PREGNANCY

Drs. N.E. MacDonald and R. Brunham

Pelvic inflammatory disease (PID) is a serious syndrome of the female reproductive system resulting from the spread of infection from the vagina and endocervix to the upper reproductive tract. PID most commonly manifests itself as endometritis (infection of the lining of the uterus) or salpingitis (infection of the fallopian tubes) and, less commonly, as pelvic peritonitis.

Clinical diagnosis of PID is difficult because of the wide variation in symptoms and signs and the high rate of asymptomatic infection, particularly among adolescents. Considering the limitations of clinical evaluation, at the present time laparoscopy is the only tool that can provide definitive diagnosis. Unfortunately, this is an operative procedure and thus not a useful tool for routine diagnosis.

The consequences of both symptomatic and asymptomatic "silent" PID can be long term and severe. At least one in four women with PID experience one or more serious sequelae including EP, infertility, recurrent infection and chronic abdominal pain.

The microbial source of PID comes from two major groups of pathogens: STDs — *N. gonorrhoeae* and *C. trachomatis* — and endogenous flora of the lower genital tract. In North America, chlamydia has been isolated in about 50% of PID cases. The incidence of PID from *N. gonorrhoeae* depends on the population; it is common among urban American blacks and much less common among Scandinavians. Broadly-based multi-centred studies of the etiology of PID in Canada are not available.

The major risk factors for PID include sexually active youth who smoke, douche, and have a previous history of PID. Barrier contraceptives decrease the risk while intrauterine device (IUD) use is associated with increased risk, especially in the first month after insertion.

Since PID is not a notifiable disease in Canada and given the inherent difficulties in clinical diagnosis, estimates of total PID cases per year in Canada are hard to determine. A study in Calgary found that 6.5% of women aged 14 to 50 presenting to physicians for contraceptive advice had a history of PID. In the U.S., an estimated one in 10 women had PID during her reproductive years. Currently in Canada, hospital separation data are the most reliable sources regarding incidence and prevalence of PID, albeit skewed towards more serious, symptomatic PID. Unfortunately, only 10% to 15% of all PID cases in Canada are thought to be treated in hospital and this estimate may be "generous" given the recent sharp decrease in hospital beds and pressure to move care to the outpatient setting as much as possible.

The LCDC STD Division has reviewed the Statistics Canada hospital morbidity data regarding the number of hospitalizations for PID in the 10 Canadian provinces and by selected age groups for the fiscal years of 1983-84 to 1993-94 (Table 6). Between 1983-84 and 1993-94, 2.3% of all Canadian women of reproductive age (15 to 44) experienced PID of sufficient severity to be hospitalized. In the 11-year period, there was a decrease in the rate of hospitalization by approximately 60% in most age groups. Decreases in hospitalization for PID in the latter part of the 1980s and onward have also been noted in Holland, Sweden, and the U.S. with differential decreases occurring among specific age groups. However, asymptomatic PID is not identified by these studies. Thus, the total PID cases reported is an underestimate. Chlamydial infection is more likely to present as "silent" PID than gonorrhea, for example. The estimated direct and indirect hospitalization costs of gonococcal PID (up to $13,000,000) and of chlamydia PID (up to $21,000,000) total a staggering $34,000,000 per year in Canada (unpublished data, LCDC).

TABLE 6
Age-specific Rates of Hospital Separations for Pelvic Inflammatory Disease, Canada, 1983–84 to 1993–94

Year	Rate per 100,000 by age group				
	15 to 19 years	20 to 24 years	25 to 34 years	35 to 44 years	Total
1983-84	269.6	386.0	323.1	154.7	281.8
1984-85	280.2	385.9	319.5	155.0	281.2
1985-86	267.2	373.4	306.0	151.9	269.7
1986-87	273.1	351.5	298.5	147.8	261.1
1987-88	247.2	319.7	286.3	140.9	243.3
1988-89	236.2	286.8	252.7	130.4	218.7
1989-90	210.0	245.3	226.6	109.2	190.5
1990-91	190.5	219.3	210.5	120.4	180.0
1991-92	166.5	196.4	192.7	116.0	164.3
1992-93	147.0	171.6	172.1	114.5	149.2
1993-94	110.1	141.7	147.9	100.7	125.5

EP, the implantation and growth of a fertilized ovum in the fallopian tube, one of the most serious sequelae of PID, causes severe abdominal pain which sometimes leads to rupture of the fallopian tube and a surgical emergency. It is estimated that prior tubal infection with STD agents cause about 50% of the cases of EP, although this rate will be affected by the incidence rates of chlamydia and gonococcal infection in a community.

Currently in Canada, as in many other developed countries, EP rates are increasing. This appears to be due to a number of factors. Because EP is a delayed sequela of tubal infection, the proportion of EPs attributable to STDs likely reflects STD incidence rates 5 to 10 years prior to case recognition. Since EP has multiple causes, non-STD-related EP rates may be increasing while those cases due to STDs may be declining. Older maternal age, tubal ligation, prior tubal surgery, IUD use may all play a causal role in non-STD-related EP and important changes in these risk factors are occurring among pregnancy-seeking/vulnerable women. Further research into the epidemiology of "cause-specific" EP and its relationship to control of chlamydial and gonococcal infection is required.

Control strategies

PID can be viewed as a sequela of infection with STDs and a precursor to serious problems, such as tubal infertility, chronic abdominal pain and EP. Opportunities for control of PID are therefore intimately linked to STD control. A nationwide aggressive chlamydia control program aimed at early diagnosis and treatment especially in high-risk targeted groups may reap large benefits by decreasing chlamydia-associated PID and its sequelae. Behavioural intervention programs that increase barrier contraceptive use and frequent testing for silent chlamydial infection in high-risk populations, such as street youth, have the potential to decrease PID. To be most effective, PID control programs will need to include targeted programs that change the social and geographic factors which influence spread of STD within the population, e.g. survival sex among street youth and the urban homeless. Control will also require improved treatment of both inpatient and outpatient PID to minimize inflammatory damage as well as to detect early a recurrence. The Canadian goals for PID are listed in Table 7.

TABLE 7
Canadian Goals for Pelvic Inflammatory Disease

By the year 2002:

- Decrease endemic Chlamydia by 25%

By the year 2007:

- Decrease PID and ectopic pregnancy by 50%
- Decrease endemic Chlamydia by 50%

To reduce effectively the incidence of PID a multi-pronged approach is needed. A better understanding of the differential causes for EP is indicated; perhaps in younger groups it is due more to STDs and in older groups more to changes in the fallopian tubes. Research to determine the optimal therapeutic regimen of antibiotics and anti-inflammatory agents is required.

Since duration of infectivity plays a pivotal role in the development of PID and EP, development of methodologies to estimate the duration of infectivity are important.

To reduce the number of sequelae it is important to also focus on STDs in young men in order to reduce transmission. The most effective way to reduce the duration of infectivity may be to consider targets for partner notification.

A nationwide, aggressive chlamydia control program aimed at early diagnosis and treatment, especially in high-risk targeted groups, may reap large benefits by decreasing chlamydia-associated PID and its sequelae. Increased testing for silent chlamydia infection in high-risk populations, such as street youth, has the potential to decrease PID.

In terms of program needs, targeted programs that change the social and geographic factors which influence the spread of STD within the population, e.g. survival sex among street youth and the urban homeless, are indicated. This should include intervention programs that increase barrier contraceptive use.

Surveillance needs

The single most important thing we need to do to evaluate our progress in decreasing the serious sequelae of STDs is to make PID a reportable disease.

In order to determine the breadth and extent of this STD problem, surveillance data on gonorrhea and chlamydia by age, gender, region, and targeted high-risk populations are needed as well as PID and EP rates by age and region. To improve the quality of the estimates for PID, both hospital separation and outpatient billable diagnosis codes need to be used. A difficulty in assessing the epidemiology of EP is determining the most appropriate denominator. Using number of pregnancies by age group as a denominator, rather than the total population, might provide an appropriate early warning system.

Partnerships with STD networks will help to address this disease. It will also be important to join forces with people studying and working in the infertility field. By combining forces, rates for PID, and its serious sequelae, are bound to decline.

HIGH-RISK SEXUAL BEHAVIOUR

Dr. Eleanor Maticka-Tyndale

Three behaviours which correlate with STD rates have been noted: number of sexual partners, age of first sexual intercourse (most typically vaginal intercourse), and condom use. There is a dearth of Canadian data to permit clear conclusions about the extent and relationships among these and other factors. The data we do have come from a few national studies that, unfortunately, contain few in-depth questions on sexual behaviour, and a small number of local studies that attempt to identify the social and behavioural factors that may affect STD rates.

This position paper is based on the assumption that two factors are directly related to STD rates: the probability of sexual contact between infected and susceptible individuals and the probability of infection of the susceptible individual once such contact has been made. Existing data are reviewed to identify where future efforts should be placed to decrease both of these probabilities in light of the three sexual behaviours correlated with STDs.

Three national health surveys conducted by Health Canada, the 1995 National Population Health Survey (NPHS) and the Canada Health Monitors of 1994 and 1995 (CHM94 and CHM95) provide the most recent national data on sexual behaviours. The Canada Youth and AIDS study (CYA) of 1988 provides more detailed information on sexual behaviours and STD profiles from the late 80s. Several other studies funded under the National AIDS Strategy provide information for specific population subgroups such as the Men Who Have Sex With Men (MSM) study in 1992, the Ethnocultural Communities Facing AIDS (ECFA) study (1994) and the First Nations (FN) study (1991).

Probability of exposure to STDs

The two predictive factors of STDs related to the probability of sexual contact between infected and susceptible individuals are the number of sexual partners and the age of first intercourse. Although these two factors may be closely related (i.e. earlier age of first intercourse likely predicts a greater number of sexual partners), data related to them will be considered separately.

Number of sexual partners

Recent research suggests that the contemporary normative pattern for sexual relationships in Canada is one of serial monogamy, particularly among young women. Such a pattern typically results in a population modal number of one partner in any one-year period but more than one lifetime partner. The impact of this behaviour is shown in the NPHS data (Table 8).

TABLE 8
National Population Health Survey of Canadians Reporting Number of Sexual Partners in the Past Year, by Age and Gender (percentages are weighted to show Canadian population percent prevalences)

Age	15 to 19 years of age		20 to 24 years of age		25 to 29 years of age		30 to 39 years of age	
Number of partners	Sex							
	M (%)	F (%)	M (%)	F (%)	M (%)	F (%)	M (%)	F (%)
0	54.6	56.3	21.8	18.7	7.3	6.6	6.8	7.6
1	22.4	28.5	49.2	64.4	6.9	83.6	83.9	86.3
2+	20.2	13.1	26.7	16.2	20.3	9.2	6.2	5.3
N	431	474	489	566	529	667	1,246	1,610

In the NPHS study the proportions of men and women who reported more than one partner in the past year peaked in the 20 to 24-year-old group, then decreased with age. For people aged 15 and 19 years who had been sexually active in the past year, about 20% of men and 13% of women had more than one partner. This compares to 27% of men and 16% of women between 20 and 24 years, and 6% or less for those 30 years and older. The same general trend was found in CHM94.

In the CYA study, of those with sexual intercourse experience, 27% of males and 15% of females reported six or more lifetime partners. The proportion was highest for school drop-outs (48% of males and 30% of females) and street youth (65% of males and 58% of females).

Age of first intercourse

The age of first intercourse is often considered a salient behaviour to target in order to reduce STDs. From an examination of studies conducted between 1974 and 1995 in Canada (Table 9), it appears that the proportion of young men who report sexual intercourse by Grade 9 (approximately 15 years of age) has remained relatively stable. For women this proportion decreased in recent years. This pattern is repeated for women in Grade 11 (approximately 17 years of age); however, the proportions of young men reporting sexual intercourse by this age has been increasing.

What is apparent from the most recent data is that the majority of Canadian men and women initiate sexual intercourse between 16 and 19 years of age. Unfortunately, the use of broad age categories (i.e. 15 to 19 years) or of indirect questions in the national studies make it difficult to be more precise about the age of first intercourse.

TABLE 9
Percent of Grade 9 and 11 Students Reporting Previous Sexual Intercourse: 1974-1995

	Grade 9 (15 yrs)		Grade 11 (17 yrs)	
	M (%)	F (%)	M (%)	F (%)
Hundleby, 1974 (Ont)[a]	22	15		
CYA, 1988[a]	31	21	49	46
Warren and King, 1992 (4 provinces)[a]	27	20	49	47
CHM, 1994[b,c]	38	25	48	47
CHM, 1995[c]	27	7	56	22

[a] In-school samples, Grades 9 and 11
[b] The question asked to 15 to 19-year olds for age of first sexual intercourse
[c] Ages 15 and 17 for random-digit dialing samples (potentially in- and out-of-school)

Research from small-scale studies and studies in other countries suggests that the very youngest ages of first intercourse (i.e. under 15 years, and in particular 13 years and younger) are related to sexual coercion, 'street' involvement, low socioeconomic status, specific racial and ethnic groups, survival sex, and alcohol use.

Probability of infection

There are both biologic and behavioural aspects to the probability that infection will occur after sexual contact between a susceptible and infected partner. It is known, for example, that different STDs have different degrees of infectivity and women are biologically more susceptible to infection than men. Behaviourally, different sexual acts carry different degrees of risk for infection (e.g. penetrative vs. non-penetrative activity). In terms of modifiable risk factors, however, condom use is the most important.

Condom use

While condom use is less likely in first intercourse when the partners are younger, those who are younger report higher rates of condom use overall (see Table 10) or during the last sexual encounter. The data on condom use and the factors influencing the very youngest age of first intercourse suggest that it is not age per se which carries heightened risk for STDs, but rather the full social context within which the very youngest intercourse often occurs. Targeting age in itself would not necessarily have the desired effect of decreasing STDs.

TABLE 10
NPHS on Reported Condom Use in Canada by Age and Sex for Those with ≥ 1 Partner in Last 2 Years (percentages are weighted to show Canadian population percent prevalences)

Used Condoms (%)	15 to 19 years		20 to 24 years		25 to 29 years		30 to 39 years	
	M	F	M	F	M	F	M	F
each time	66.3	46.9	53.8	46.3	42.6	31.6	44.1	37.2
sometimes	19	32.3	25	24.5	20.6	27.2	16.6	18.5
never	NR	15.8	17.4	28.1	28.9	40.1	28.6	42.2
N	213	220	200	297	223	189	248	253

With the introduction of oral contraception, condom use began to decline in Canada. This trend quickly reversed in the late 1980s, likely due to AIDS prevention programs. However, there is a concern in more recent studies that there may be a normative bias. Condom use has become a socially responsible norm, placing a great deal of pressure on survey respondents to endorse and claim condom use.

NPHS and CHM94 data demonstrate that condom use is most frequent for those who have more than one partner (from a low of 32% of women 25 to 29 years of age to a high of 66% of males 15 to 19 years of age), in sex with 'non-regular' partners (e.g. 85% of males 15 to 19 years of age reported they used a condom always or most of the time with their non-regular partner compared with 41% with their regular partner, and for those who are younger (for those with more than one partner in the past 2 years, 66% of males 15 to 19 years compared with 48% of 20 to 24 years, 46% of 25 to 29 years and 44% of 30 to 49 years used a condom each time). This pattern was replicated in all communities participating in the ECFA study. Smaller studies have noted that condom use appears to vary with factors other than age and gender, such as socioeconomic status, race and ethnicity, education, as well as marital and relationship status.

Control strategies

Of the three behaviours suggested for targeting, number of partners, age of first intercourse and condom use, only one — condom use — appears efficacious for broad-scale, population-wide targeting. The social and behavioural dynamics associating number of partners and age of first intercourse with STD rates have not been adequately elaborated and therefore population-wide targets set in these areas may not be effective in reducing STDs. Promoting condom use has the added advantage of being congruent with AIDS; therefore, programs to realize a target of increased condom use can be collaborative with those on HIV/AIDS prevention.

The need to promote condom use is only the beginning of a behavioural approach to decreasing the incidence of STDs. A second salient target is encouraging health-seeking behaviours in high-risk groups. The goal here is to decrease duration of infectivity and thereby decrease the likelihood of contact between infected and susceptible people. Little research has been done on the factors that influence individuals to seek out diagnosis and treatment. The following are some factors that have been suggested: age, gender, socioeconomic status, ethnicity, presence, type and persistence of symptoms, sex education that normalizes STDs as an appropriate concern for all who are sexually active and not just certain 'types' of people, prior experience with STDs, vicarious experience through friends or partners who have had STDs, and perception of vulnerability.

Education that promotes healthy sexuality is also an important behavioural approach. The use of sex education in the schools has received mixed reviews. School-based sex education programs have been associated with post-ponement of first intercourse for in-school populations. However, many of those at risk leave school before sexual health education occurs. Research shows that most parents are supportive of sexual health education but teens prefer receiving sexual health information from friends and the mass media. Use of peer educators may be a valuable alternative. The focus of these programs should be healthy sexual practices including condom use, non-penetrative activities and sexual health screening.

Improving our surveillance capacity is critical to any public health approach. Surveys should include specific questions on the number of partners (lifetime and recent), context of partnerships, age at first intercourse, condom use, life circumstance factors and geographic region. All national surveys should include questions to obtain a sexual history.

Research needs

Before we can begin to have an impact on the other two behavioural predictors of STDs — young age at first intercourse and multiple sexual partners — we need to understand more about sexual networks. Networks can be defined either by behaviour or by disease; we need to establish which is more appropriate. While sexual networks drive transmission, social networks drive prevention. We need to understand the relationship between sexual and social networks. And we know little about the effectiveness of some of the proposed prevention strategies, such as outer-course, or sexual intimacy without penetration. Behavioural scientists should be able to address these questions.

In the absence of more detailed analyses, it is impossible to identify any patterns or targeted population subgroups beyond the very broad age group of those under 30. The three recent studies of specific population subgroups (ECFA, FN and MSM), as well as many smaller-scale studies all support the conclusion that there are pronounced variations in the number of sexual partners across different population subgroups, which may or may not coincide with STD rates. More detailed analyses to examine the relationship of number of partners and marital status and years since first sexual intercourse, the shape and dynamics of the association between number of partners and STD rates, and these factors for specific population subgroups are important if salient behavioural targets are to be set. Research on sexual networks, particularly among and between population subgroups or communities with different rates of infection, would also make a substantial contribution to efficacious behaviour targeting.

Ultimately, all public health strategies using a behaviour-based model should be evaluated. Specifically, we need to look at the populations targeted, the program content and delivery, and reliable outcome measures. Only then will the real value of a behaviourally-based approach become apparent.

DIAGNOSTIC CAPACITY

Dr. Jo-Anne R. Dillon

High quality laboratory performance is essential for the diagnosis and epidemiologic surveillance of STDs, yet diagnostic capacity in Canada is under siege. Expertise for the laboratory diagnosis of STDs at all levels is not being sustained in many parts of Canada. Coupled with budget cut-backs and cost-recovery initiatives major referral laboratories have been reduced to primary testing. Thus, the sustainability of laboratory capability across Canada to support public health initiatives to decrease STDs is a major issue.

There are several levels of service that operate within the Canadian laboratory infrastructure. These range from primary centres that have minimal personnel, capital and operating resources, to tertiary laboratories with advanced equipment and highly trained personnel charged with developing advanced molecular diagnostic methods and high-end surveillance initiatives. A major problem facing our STD laboratory network in Canada is that tertiary reference laboratories are obliged to compete with laboratories offering primary diagnostic services. At the same time, front-line primary laboratory services are being reduced in number in the interests of deficit reduction. This has the effect of compressing the entire laboratory capability so that work with the potential to give added value, such as national surveillance, the development and evaluation of diagnostic tests and national quality control programs, is becoming increasingly difficult.

Time and again, Canadian STD laboratories are faced with many important issues such as selecting the best methods for primary diagnosis, insufficient resources to

effect continuous quality improvement, and the capability for reference activities. The ability to address these issues has been hampered by unsatisfactory communication patterns among laboratories resulting in unnecessary isolation and duplication of effort. To overcome some of these difficulties, and to capitalize on the pathogen-driven informal networks that already exist, a series of pathogen-specified networks, comprising and documenting all levels of laboratory capability in Canada, should be created.

STD networks

Networks should be established for all STD pathogens. The overall management of the networks should be centralized and each network should clearly define its mandate. We should begin with networks for gonorrhea, chlamydia, syphilis and HPV and consider the formation of other STD pathogen-specific networks, such as for herpes simplex virus and hepatitis B. These networks should build on existing strengths in all sectors of the diagnostic and research community including local hospitals and universities, regional, provincial and federal groups as well as any other stakeholders.

These networks should be directed as a consortia of laboratories with leadership determined by the network members and reporting to a central network co-ordinating centre, possibly within the federal government. This will also address the need to integrate basic researchers into STD networks to provide a continuum between clinical diagnosis, laboratory investigation and behaviourally-based prevention initiatives. A directory of network expertise, resources, and capability is essential. Due to the trend towards privatization, it will be necessary to include all private laboratories in the networks. It will also be the most effective way to address some of the pressing issues we face in laboratory science today. STD-specific initiatives for these networks are identified below.

Major upcoming diagnostic issues for *N. gonorrhoeae* include the performance of non-culture tests and surveillance of the antimicrobial susceptibility of gonococcal isolates to monitor trends of emerging resistance. In addition, the transport of specimens remains a major problem in remote areas because current transport media and modes are not optimal. The trend to non-culture testing will reduce the availability of cultures for antimicrobial susceptibility testing, a potential problem for surveillance. There is a need to develop new simple tests for the diagnosis of gonorrhea, especially for use in resource-limited areas.

A number of new, non-culture DNA amplification methods for the non-invasive diagnosis of chlamydial infection have been recently marketed. These tests are more sensitive than culture and are also highly specific; however, they are costly and require well-trained personnel. Many of these tests will be used in a variety of clinical laboratories with different capabilities. There is a need to evaluate these new tests, both for their diagnostic performance and cost, and to disseminate information on these findings. There is a need to develop simple, specific and inexpensive tests for the diagnosis of chlamydial infections. There have been sporadic reports of the development of resistance of *C. trachomatis* to antimicrobial agents. An initiative to establish methods for antimicrobial susceptibility testing in this species was started in federal laboratories and should be continued. Simple methods to distinguish different strains of chlamydia have not been developed. Given that chlamydia infection is the most predominant curable STD in Canada, molecular typing methods to monitor dissemination of specific strains should be developed.

Although laboratory tests for syphilis have not changed significantly in the last decade, their interpretation, especially for the non-treponemal tests, remains problematic. DNA-based tests will be introduced to the market shortly. These tests, which will have the advantage of being specific treponemal tests, should be simple, sensitive and specific. Only a few laboratories will be able to complete the stringent evaluations of these tests which are required for their acceptance. Therefore, there is a need to establish a syphilis test evaluation centre in Canada which can provide the appropriate level of analysis. The laboratory diagnosis of neurosyphilis is problematic as the present CSF VDRL test is positive in only 22% to 69% of patients. Thus, there is a need to develop sensitive and specific tests for the diagnosis of syphilis.

Currently, the best way to detect HPV is by using a DNA amplification method. Sensitive and specific serologic tests, useful in discriminating persons with active disease, are being developed. The ability of provincial and federal laboratories to maintain an adequate HPV diagnostic network is currently problematic. Thus, a laboratory-based network for HPV diagnosis should be created to tackle all laboratory problems related to diagnosis. Research to develop better serologic and simple tests, including tests using amplification technologies which distinguish HPV types, should be encouraged.

There is a need to develop better laboratory networks for HSV and hepatitis B virus (HBV) to determine the extent and types of testing currently performed in Canada, and to assess needs. Thus, working groups or networks for the diagnosis of HSV and HBV should be established. Specific tests should be developed for these agents. There is a need to develop serologic tests to distinguish HSV types, to improve the performance of current serologic test formats and to develop better DNA-based diagnostics for HSV. There is also a need to develop HBV tests for mutations to core and surface antigens.

Other STD networks could also be formed. For example, vaginitis caused by *Trichomonas vaginalis* and bacterial vaginosis, are inadequately diagnosed and investigated. No Canadian data exist on the frequency, sensitivity or specificity of wet mount examinations for protozoa or clue cells, or for the diagnosis of bacterial vaginosis by Gram stain. Tests to detect microbial products in vaginal fluids and standardized criteria for the diagnosis

of bacterial vaginosis by Pap smear might be developed. Some tests are amenable to office and home testing.

Policy implications

To maintain strong laboratory capacity critical to the control of STDs investment in quality control programs, research and ongoing surveillance must be maintained. Networks are resource intensive and, as such, it might be advantageous to look towards other sources of funding including private industry. With adequate funding, support and communication networks the following issues could be addressed.

Some provinces conduct excellent quality control programs for the identification of microorganisms — this needs to become the norm within each STD network. Strong provincial quality control programs should be assessed as a function of network activities and the best programs should be incorporated as a network activity. At present, either no or limited quality control programs are in place for chlamydia and HPV diagnostics. Therefore, appropriate new quality control programs for these micro-organisms should be started. There is also a need to integrate various quality control programs for their more efficient management. A need for quality control programs for other STD pathogens may be identified.

Research priorities must be established. An urgent area of study is strain identification. STD laboratory specialists are sometimes required to provide evidence in sexual abuse cases on whether isolates from victims and the accused are in fact identical. Aside from the requirement to culture bacteria and, in some cases, to perform phenotypic strain typing, there are no criteria for establishing that strains are identical. Molecular criteria for establishing that two isolates are identical should be developed for legal purposes.

Pathogen-specific basic/applied and risk behaviour research is generally conducted outside the diagnostic laboratory framework. Some investigators have not been involved in the broader STD laboratory science issues in Canada. Thus, there is a need to integrate basic researchers into STD networks to provide a continuum between clinical diagnosis, laboratory identification, reference activities and applied and basic research.

Home and office testing is an issue for the 1990s and early 2000s. Already, home testing kits have been suggested or developed for STDs, such as HPV and bacterial vaginosis, and may be feasible for diagnosing pathogens from syndromes such as urethritis. Thus, the development of sensitive and specific home testing kits, preferably for multiple STD pathogens, is strongly encouraged.

Surveillance needs to be maintained on a number of different fronts. Surveillance protocols of STD pathogens including *N. gonorrhoeae*, *C. trachomatis*, *T. pallidum* and selected viral pathogens should be reviewed. Monitoring emerging antibiotic resistance and the dissemination of these strains using molecular typing methods are indicated. Finally, surveillance of physician patterns in using laboratory services are needed. All of these initiatives would be greatly facilitated by the formation of STD-specific networks. Their time in Canada has come.

CONCLUDING COMMENTS

During the last decade we have witnessed important progress in controlling STDs; however, there are many challenges ahead. Chlamydia reservoirs remain in asymptomatic men; gonorrhea and its sequelae persist in high-risk populations; syphilis has yet to be eradicated; the prevalence of HPV and genital herpes in Canada is unknown; and PID is not yet a reportable disease. Antibiotic-resistant strains are becoming increasingly difficult to treat and track and diagnostic technology has been developing more quickly than it can be evaluated. We have only a very preliminary understanding of the underlying motivations for high-risk sexual behaviours let alone effective means to curb them. And although we have the potential to have world-class diagnostic technologies, our capacity to realize this is compromised by budgetary constraints and communication breakdowns.

Canada's capacity to meet the challenges of STD control will depend on our ability to create partnerships. We need to bring together different levels of government from the regional to the national level. We need to bring together government with universities and business. We need to bring together different disciplines as well, such as epidemiologists, microbiologists, health care workers, and behavioural scientists.

A powerful way to bring different people and groups together is with a common vision and common goals. That has been the purpose of the present exercise. We know the problems. We have set our sights. Now and in the coming months, let us proceed to work together to realize these goals for the next millennium.

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