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Advisory Committee on Epidemiology

GUIDELINES FOR CONTROL OF MEASLES OUTBREAKS IN CANADA (Revised 1995)

The Advisory Committee on Epidemiology (ACE) issued Guidelines for Measles Control in Canada in February 1991[1]. These Guidelines reflected a concerted approach to the control of measles in Canada based on high levels of measles immunization in the community, national surveillance using standard case definitions, and a focused attack on measles outbreaks. Following a single case of measles, outbreak control measures were initiated. These included laboratory confirmation of the diagnosis, intensified surveillance, and a major effort to identify all susceptible contacts. Defined as susceptible were all those who did not have documented evidence of immunization since 1980, physician-documented measles, or laboratory evidence of immunity. The outbreak control guidelines required that all susceptible contacts be offered immunization and those who refused be excluded from school, day care or college until 2 weeks after the last case.

This very aggressive approach to controlling measles outbreaks required significant resources. Outbreaks of measles have continued to occur in spite of these initiatives and the usefulness of this resource-consuming approach has been questioned. With many unanswered questions about measles control, ACE recommended that a consensus meeting be held to develop national goals and to attempt to resolve many of the issues.

The Consensus Conference on Measles, with participants from all provinces and territories, the federal government, national advisory bodies and organizations, and experts in the field from outside Canada, was held in late 1992 and the proceedings were published in May 1993[2]. This document, therefore, presents the revised guidelines for control of measles outbreaks in Canada based on the recommendations developed at the consensus conference.

Immunization

Primary prevention is the most effective way to prevent and control outbreaks of measles. For successful measles control, immunization of all susceptible individuals is required. Vaccine records should be accessible and allow timely identification and follow-up on non-immune children. All children in day-care centres, nurseries and schools should have age-appropriate proof of immunization monitored annually. Public health departments should give high priority to the development of electronic records in order to achieve this goal. Provinces and territories should move toward a province/territory-wide individual client immunization record system that includes date of birth and age of recipient, lot number and date of administration of all vaccines and all antigen combinations. The long-term goal whereby immunization records are linked to a unique health-care card number should be adopted. This will allow the development of standardized timing and methods for assessment of vaccine coverage, and provide comparable national data for analysis.

The goal for measles control in Canada identified at the national consensus conference was the elimination of indigenous measles in Canada by the year 2005. To address this goal, the National Advisory Committee on Immunization (NACI) recommends a two-dose schedule of routine immunization; vaccination coverage for two doses of over 95%; documented proof of immunity for the population at risk; intensive surveillance and rapid reporting of measles cases; and prompt outbreak control measures to prevent spread from index cases.

The consensus document recognizes that the highest priority should be placed on achieving and maintaining the one-dose coverage. The age at first dose should remain as soon as possible after the first birthday. When a two-dose strategy is implemented by provinces, the second dose should be given before school entry, at least 3 months after the first.

For the full NACI statement on measles vaccine, please refer to the *Canadian Immunization Guide*, 4th edition, 1993, pages 70 to 76.

Surveillance

A. National Surveillance

Measles is a notifiable disease in all jurisdictions of Canada. Therefore, surveillance depends on health-care providers reporting all identified cases of measles to local health authorities. As the incidence of measles declines, aggressive surveillance becomes increasingly important. It is essential that every case be reported so that trends and risk factors can be documented to guide the development of control policy. Effective surveillance can detect inadequate levels of protection, define groups needing special attention and is important in evaluating the effectiveness of control activities. All outbreaks should be reported by provincial authorities to the Laboratory Centre for Disease Control (LCDC).

For effective surveillance it is necessary that each suspect case of measles be thoroughly investigated to confirm the diagnosis. Clinicians should be asked to notify the medical officers of health of all suspect cases so that it may be determined if control measures are warranted. Efforts should be made to find additional cases and identify their contacts.

B. Case Definition

The consensus conference recommended the development of a more sensitive "suspect case" definition. The following case definitions reflect the recommendations and comments made as a result of the deliberations at the conference.

1) *Confirmed Case*
   One of the following:
   a) a four-fold rise in serum antibody between acute and convalescent serum samples or the presence of measles-specific IgM in cases with compatible clinical or epidemiologic features
   b) clinical measles in a person who is a known contact of a laboratory-confirmed case
   c) detection of measles virus in appropriate specimens
2) *Clinical Case*
   All of the following symptoms:
   a) fever $\geq 38.3^{o}$ C
   b) cough, coryza or conjunctivitis followed by
   c) generalized maculopapular rash for at least 3 days
3) *Suspect Case*
   All of the following symptoms:
   a) fever $\geq 38.3^{o}$ C
   b) cough, coryza or conjunctivitis followed by
   c) onset of generalized maculopapular rash

C. Laboratory Confirmation

Confirmation is required for
1) all sporadic cases
2) the index case and enough cases to establish the existence of an outbreak

Measles-specific IgM antibody is present in about 80% of cases at the time of rash onset and can still be detected up to 60 days later. Although its presence confirms measles, **a negative result does not rule out the diagnosis**. If measles is still suspected, IgM testing should be repeated.

Optimally, blood for measles serology should be drawn 3 to 5 days after the first clinical signs. If results for measles (and rubella) IgM are negative in cases where blood was drawn within 3 days of onset of clinical signs, a further sample should be obtained for repeat testing. Occasionally false positives can occur and, as with any laboratory test, it is important to consider the epidemiologic and clinical information together with the laboratory report.

Alternatively, measles infection can be confirmed serologically by demonstrating a significant rise in antibody titre, with the first (acute) serum sample taken within 7 days of rash onset and the second (convalescent) sample taken 10 days after the first.

For ongoing laboratory surveillance for sporadic cases, consider including a "rash screen" (IgM serology for measles, rubella and parvovirus) when clinical history suggests measles-like illness during a non-epidemic period.

D. History of Cases

It is essential to investigate each case. Information collected should include clinical and laboratory findings, vaccination history, and epidemiologic data as indicated below.

1) *Clinical and laboratory findings*:
   Sufficient information should be collected to assure that the case meets the case definition(s) above.
2) *Vaccination history*:
   a) birth date
   b) date of vaccination (including at least month and year)
   c) province/territory, state or country where vaccinated
   d) manufacturer and lot number of vaccine
   e) dose number (in series) of vaccine
3) *Epidemiologic data*:
   a) date of rash onset and duration of rash
   b) possible source (including travel history in the 8 to 17 days before rash onset to determine if this is an imported case)
   c) laboratory findings
   d) underlying illness
   e) complications
   f) outcome
   g) if unvaccinated, the reason

   A list of contacts should also be completed.

Outbreaks

The consensus conference noted that the 1991 measles control guidelines developed by ACE required selective revaccination program for outbreak control. These are not implemented in most jurisdictions and, in addition, selective revaccination of the pre-1980 group may not have had a significant impact on interrupting outbreaks. This outbreak control measure is aggressive

and experience has shown that it may not be very effective. Although defined control measures in general have had some effect on reducing the size and duration of outbreaks, they are expensive and disruptive. The outbreak control guidelines have, therefore, been modified and reflect the recommendations made at the consensus conference.

Outbreak control measures should be initiated with the identification of a single case clinically compatible with measles. In closed populations, such as schools, investigation and management of cases and contacts should be completed within 10 days of the onset of rash in the index case for at least 80% of cases.

A. Confirm the Diagnosis

As soon as measles is suspected, efforts should be made to ensure that the case meets the clinical criteria for measles described above. Request laboratory testing if this has not already been done. Initiation of control measures cannot wait for laboratory confirmation of the suspect index case. However, the case should at least meet the suspect case definition for measles. Investigation of the source of infection for suspect cases and initiation of outbreak control measures should occur within 1 day of notification.

B. Intensify Surveillance

Efforts should be made to identify every case of measles in the outbreak by implementing active surveillance. Physicians and hospitals should be contacted and asked to report any suspect cases as quickly as possible. There should be active follow-up of all those who have been absent from school in the 2 weeks prior to the onset of rash in the index case. (It may be the second generation that has been reported). Contacts (or their parents, teachers or care-givers) should be asked to report immediately to local public health officials any febrile illness occurring within 14 days of last exposure and to seek medical diagnosis. Such active surveillance measures should remain in place until 4 weeks after the last case occurs.

C. Identify Susceptible Contacts

Measles is highly infectious once any symptoms from the prodromal phase have appeared (usually 3 to 5 days before the onset of rash). Infectiousness declines gradually after rash onset and becomes insignificant when the rash has been present for 4 days. Within 24 hours of reporting of a suspect case of measles, all contacts who have shared the same air space (e.g., home, school, day care, school bus, doctor's office, emergency room, etc.) during the infectious period should be identified and their immunization records reviewed. Ideally, in school and day-care settings, immunization records will have been screened at entry to identify susceptibles. Since measles spreads rapidly, particularly in schools, all students attending the same school or facility should be considered contacts and those attending surrounding schools may need to be included if they are likely to have been exposed. Siblings of contacts should be included as contacts for immunization, but not for exclusion purposes.

In an outbreak, consider as susceptible all persons over 6 months of age born after 1956 who do not have the following:

a) documented evidence of immunization with a live measles vaccine on or after the first birthday; or a
b) documented case of confirmed measles disease meeting the case definition, or laboratory evidence of immunity; and
c) in jurisdictions where there is a routine two-dose immunization policy in force, have only received one dose of measles vaccine at least 3 months previously.

D. Immunize or Exclude Susceptibles

All of the above listed susceptible contacts without medical contraindications to measles vaccine should be offered a measles-containing vaccine. Those with medical contraindications should be offered immune globulin (IG) in recommended doses.

Infants 6 to 11 months of age who are contacts or who are likely to be exposed to measles should receive measles vaccine, or IG. These children should be revaccinated with MMR at age 12 to 15 months. Infants < 6 months of age are likely to be protected by passively transferred maternal antibody. If there is reason to believe otherwise, they may be protected by IG in appropriate doses. Any individual receiving IG must wait at least 5 months before vaccination with live measles vaccine or MMR.

Any susceptible contact of a case of measles who refuses vaccine or IG should be excluded from school, day care or college until protected or until 2 weeks have elapsed since the onset of the last case. This measure should be applied uniformly and should be implemented as soon as possible after measles has occurred in the school or day-care setting.

E. Additional Measures

In certain outbreaks, e.g., where a high proportion of cases occur in a specific population such as adults, there may be a need for alternative strategies. Outbreak control strategies should include implementation considerations such as timing of vaccination clinics, and priorities should be set depending upon the specific circumstances.

F. Analyze the Outbreak

As the outbreak progresses, a descriptive analysis (time, place, person, and immunization status) should be ongoing. Later, the nature of the outbreak can be fully analyzed and reported. The analysis should include an assessment of vaccine efficacy by comparing attack rates in immunized and unimmunized individuals. Cases should be classified as preventable and non-preventable.

A case in a Canadian resident who meets all the following criteria is considered to be a preventable case:

1) at least 13 months of age
2) born after 1956
3) lacking documented receipt of live measles vaccine on or after the first birthday
4) without medical contraindication to receiving the vaccine
5) without laboratory evidence of measles immunity or documented evidence of confirmed measles disease meeting the case definition
6) without valid philosophic/religious exemption from vaccination (applicable only in provinces with legislation requiring vaccination)
7) not having had a second dose of measles vaccine at least 3 months or more after the first one in jurisdictions that have adopted a two-dose measles policy.

Risk factors that might explain vaccine failures may be identified by case-control analysis. In a community with 95%

vaccine coverage and a vaccine efficacy of 90%, there will be more susceptibles among the vaccinated than the unvaccinated.

The source of all cases, particularly the index case, should be identified whenever possible and common exposures should be documented. It is important to determine if the index case was imported. The effectiveness of control procedures should be reviewed.

G. Recommend Control Strategy Changes

Based on the foregoing analysis, any deficiencies in the control strategy should be corrected.

H. Report

Cases of measles and any confirmed outbreak should be reported as quickly as possible to provincial/territorial health authorities. Outbreaks should be reported by provincial/territorial authorities to the Bureau of Communicable Disease Epidemiology, LCDC, and to the other provinces/territories as soon as possible on the LCDC bulletin board system.

When the analysis of the outbreak is completed, it should be provided to other jurisdictions and published in an appropriate publication such as the *Canada Communicable Disease Report* and *Measles Update.*

Ongoing Education

The importance of continual feedback of surveillance data to those in the field will increase as measles control goals are reached. The consensus conference recommended the following approaches to ongoing education:

- as fewer cases of measles occur, the importance of vaccination and the responsibility of parents for vaccination of their children and for maintaining accurate immunization records must be reinforced;
- ways should be developed to exchange information on how to reduce measles incidence in populations that are hard-to-reach or resistant to immunization, which will enhance programs targetting these populations;
- with fewer opportunities to learn to recognize cases of measles, visual material should be made available to assist in identification of cases; and
- physicians will benefit from information on testing for measles, and the timing and interpretation of IgM testing and results.

References

1. Advisory Committee on Epidemiology. *Guidelines for measles control in Canada*. CDWR 1991;17:35-40.
2. LCDC. *Consensus conference on measles*. CCDR 1993;19:72-9.

Announcements

NATIONAL EDUCATION CONFERENCE
Community and Hospital Infection Control Association — Canada (CHICA-Canada)

PACIFIC TRANSFORMATION: IDEAS INTO ACTION

Vancouver, British Columbia, Canada
16–18 April, 1996

Ideas into Action address current information/motivational strategies in the context of hospital, community and long-term care in Canada; emerging and re-emerging infection problems and their control will also be discussed. Abstracts are solicited for oral and poster presentations, **due by 15 January, 1996.**

For applications and information, contact: **Mrs. Gerry Hansen**, **Conference Planner**, **P.O. Box 46125 RPO Westdale**, **Winnipeg**, **Manitoba**, **Canada R3R 3S3**, **Telephone: (204) 897-5990**, **FAX: (204) 895-9595**.

A Workshop on
RAPID BIOTECHNOLOGICAL METHODS FOR DETECTING BACTERIA IN FOODS

11-15 March, 1996
Ottawa, Ontario

This five-day workshop, sponsored jointly by the Food Directorate, Health Protection Branch and industry, will enable the transfer of both the theory and practical application of specific biotechnological methods to participants from industry. Specific technologies will include the use of antibodies, DNA probes, and polymerase chain reaction (PCR). Hands-on sessions on methods specific for pathogens of most concern in the Canadian food supply, such as *Salmonella* species, *Listeria monocytogenes* and verotoxigenic *Escherichia coli*, will be given priority. Commercial methods will be assessed by the participants. Manufacturers of commercial methods will be invited to demonstrate, supply, and/or exhibit their products. Due to the technical nature of this workshop, it will be given in **English only**.

The workshop will be held at the Department of Microbiology and Immunology, University of Ottawa, 451 Smyth Road, Ottawa, Ontario. The number of participants will be limited to **48** but the Canadian Industry, notified through industry associations, and private laboratories will be given priority to participate. Registration will be limited to **2** participants per company.

The closing date for registration is **15 December, 1995**. The fee for this workshop is $700.00. Accommodation and meals will be the responsibility of the participants. For additional information on the workshop contact **Don Warburton**, **Telelphone: (613) 957-1746**, **FAX: (613) 952-6400**, **Internet: dwarburt@hpb.hwc.ca.** To register, forward the following registration form to **Diane Bergeron**, **Evaluation Division**, **Bureau of Microbial Hazards**, **4th Floor**, **Sir Frederick Banting Research Centre (2204A1)**, **Ottawa**, **Ontario K1A 0L2**. Cheque must accompany registration and should be made payable to the **Receiver General of Canada**.

Registration Form

BIOTECHNOLOGY AND RAPID METHODS

Surname

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Company Name

Street Address

City Province

Postal Code

Telephone No.

Fax

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Scientific Advisors	Dr. John Spika	(613) 957-4243
	Dr. Fraser Ashton	(613) 957-1329
Editor	Eleanor Paulson	(613) 957-1788
Assistant Editor	Nicole Beaudoin	(613) 957-0841
Desktop Publishing	Joanne Regnier	

Submissions to the CCDR should be sent to the Editor at the following address: Laboratory Centre for Disease Control, Tunney's Pasture, Ottawa, Ontario K1A 0L2.

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