Mumps in Prison: Description of an Outbreak in Manitoba, Canada

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ABSTRACT

Objective: There is a lack of published information on the management of mumps in a prison setting. We describe an outbreak of mumps that occurred in a medium-security correctional centre (Milner Ridge) in Manitoba, Canada.

Methods: A case definition of mumps consistent with that in the document "Guidelines for the Prevention and Control of Mumps Outbreaks in Canada" was adopted. Cell culture, polymerase chain reaction, and serology were used for case confirmation.

Results: Five confirmed cases of mumps infection were identified at the Milner Ridge Correctional Centre between January 12 and February 5, 2009. One additional confirmed case and 3 additional probable cases were identified at a second correctional centre. Outbreak control at Milner Ridge was accomplished by cohorting the affected units of the centre, providing education on mumps, deferring transfers, and monitoring for further cases. Vaccination was offered to inmates and staff on the assumption, based on average inmate age, that the majority of inmates would have previously received, at most, a single dose of mumps-containing vaccine.

Conclusion: An outbreak of mumps in a correctional setting was successfully contained via implementation and tailoring of basic infection control measures, and vaccination of inmates and staff. Given the relatively young age of many inmates and the parallels between prisons and dormitories, it could be argued that inmates may represent another group of individuals for whom a second dose of mumps vaccine (if not received in childhood) would be beneficial as primary prophylaxis.

Key words: Mumps; prison; infection control; vaccination; outbreak

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Can J Public Health 2011;102(5):341-44.

Mumps virus is a moderately to highly contagious enveloped RNA virus belonging to the family *Paramyxoviridae*.[1] Mumps is spread through respiratory droplets and contact with contaminated fomites.[1] Clinical disease manifests as acute, painful parotitis in approximately two thirds of infected individuals. Complications of mumps infection most commonly include meningitis, encephalitis and orchitis. Rare but significant sequelae include deafness or hearing loss, sterility and death.[1] The incubation period for mumps is 12 to 25 days, and cases are considered contagious from 1 to 2 days before parotitis onset until 4 to 5 days after.[2-5]

The annual incidence of mumps in Canadians has declined substantially since the introduction of mumps-containing vaccine.[6] Despite the success of vaccination in preventing mumps, outbreaks continue to occur.[6-9] Transmission of mumps may be facilitated by environments in which there is crowding (e.g., universities).[1,7,10] Indeed, groups identified as at high risk for mumps infection by the Canadian National Advisory Committee on Immunization (NACI) include students at educational institutions and military personnel.[6] While not specifically mentioned, prisoners may represent another population vulnerable to mumps due to crowding and close living conditions. The management of mumps in a correctional setting has not been well documented in the medical literature. This report describes the management of a mumps outbreak in a medium-security correctional centre in Manitoba, Canada from January to March, 2009.

METHODS

Outbreak identification

Outbreak Recognition

On February 5, 2009, Manitoba Public Health was notified of a cluster of mumps cases at the Milner Ridge Correctional Centre (MRCC) in Manitoba, Canada. The first case presented on January 12, 2009 with painful swelling in the parotid area and subjective fevers. Additional clinical cases were subsequently detected on January 31st and February 1st. From 2004-2008, the average annual number of reported mumps cases in Manitoba was 5 (range 2-10). This represents approximately 0.1 cases per week. The cluster of cases at MRCC was well in excess of the background rate of mumps in Manitoba.

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Acknowledgements: The authors acknowledge the assistance and support of all individuals involved in the management of this outbreak, including the staff at Cadham Provincial Laboratory, the National Microbiology Laboratory, Milner Ridge, Headingley Correctional Centre, Manitoba Health, and Manitoba Justice.

Conflict of Interest: None to declare.

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Table 1. Mumps Cases Occurring at Milner Ridge

Case Number	Case Classification	Case Age	Onset Date	Clinical Symptoms	Complications	Lab Testing	Admission to Milner Ridge (Date)
1	Confirmed (epi link + clinical)	28	Jan. 12, 2009	Bilateral parotid gland swelling	None	Negative NB. tested 24 days post symptom onset	Dec. 29, 2008 (Transferred from HCC)
2	Confirmed (laboratory)	34	Jan. 31, 2009	Bilateral parotid gland swelling	None	Positive by culture, PCR	Sept. 26, 2008
3	Confirmed (laboratory)	29	Feb. 1, 2009	Swelling of the left parotid gland	None	Positive by culture, PCR	June 26, 2008
4	Confirmed (laboratory)	32	Feb. 4, 2009	Swelling of the left parotid gland, fever, myalgias	None	Positive by culture, PCR	Nov. 11, 2008
5	Confirmed (laboratory)	24	Feb. 5, 2009	Jaw swelling	None	Positive by culture, PCR	Nov. 5, 2008

HCC = Headingley Correctional Centre

Mumps Virus Laboratory Confirmation

Diagnosis of mumps was verified with appropriate laboratory testing, including cell culture, molecular detection of mumps virus using RT-PCR, and serology.

Case Definition

A case definition consistent with that in "Guidelines for the Prevention and Control of Mumps Outbreaks in Canada" was adopted.[2] A confirmed case was defined as any of the following in the absence of recent immunization:

- Mumps virus detection or isolation from an appropriate specimen (includes molecular detection)
- Positive serologic test for mumps IgM antibody in a person who has a mumps-compatible clinical illness
- Significant rise (≥fourfold) or seroconversion in mumps IgG titre
- Mumps-compatible clinical illness in an individual with an epidemiologic link to a laboratory-confirmed case.

A probable case was defined as an individual with unilateral or bilateral parotitis lasting longer than 2 days without another apparent cause.

RESULTS

Outbreak description

Milner Ridge Correctional Centre

MRCC is a medium-security prison in Manitoba, Canada. All inmates are male. At the time of the outbreak, 135 inmates and 187 staff were present at the Centre. The mean inmate age was approximately 31 and 78% of inmates were under the age of 40 [Marilyn Sloane, Personal Communication]. Approximately 62% of the inmate population was of self-identified Aboriginal ethnicity. The prison consists of 6 separate living areas, designated units 1 through 7 (there is no unit 2). Unit 1 is a dormitory style facility; units 3 and 4 are located together in a single building, with unit 3 upstairs and unit 4 downstairs; units 5, 6 and 7 are each located in a separate building. For units 3 through 7, there are 1 to 4 inmates per room.

Inmates from different units may interact during meals or other activities. Meals are provided in a common dining area, two units at a time. Similarly, recreation activities are scheduled two units at a time. Inmates from all units also interact during work activities as these are skill-based and not unit-based, and during educational courses.

Headingley Correctional Centre

Headingley Correctional Centre (HCC) has one main building divided into 5 subunits, and 3 outer buildings. The Differential Needs Unit is in the main building, and inmates from this unit do not interact with inmates in the outer buildings.

Cases

There were 4 lab-confirmed cases of mumps at MRCC. An additional inmate met the case definition on the basis of a compatible clinical illness and epidemiologic link to the lab-confirmed cases, bringing the total number of confirmed cases at MRCC to 5 (Table 1). All confirmed cases occurred among inmates in units 3 and 4. However, the index case did reside in unit 1 from December 29, 2008 to January 9, 2009. The age range of the affected individuals was 28 to 34 years. All cases were males of self-identified Aboriginal ethnicity.

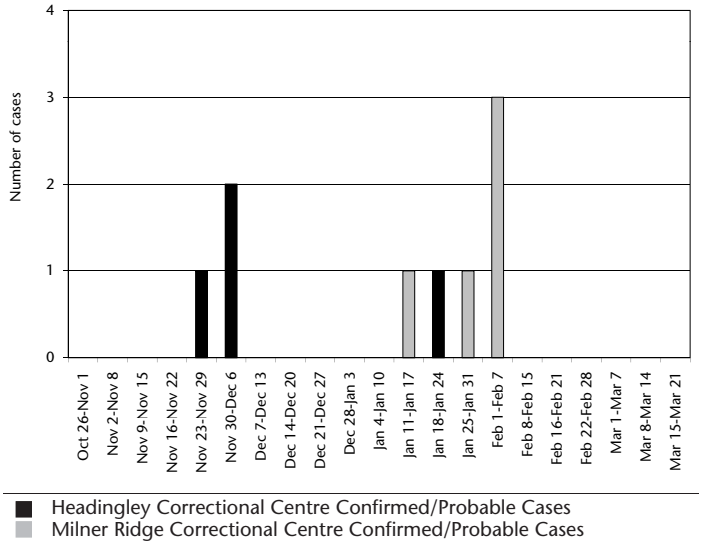
The index case, diagnosed clinically on January 12, 2009, had been transferred to MRCC from HCC two weeks earlier (December 29, 2008). Upon review, it was determined there was a lab-confirmed mumps case at HCC on November 29, 2008, with a positive mumps-specific IgM. Three other inmates at HCC were retrospectively identified as probable cases of mumps on the basis of a compatible clinical illness without another etiology. These individuals developed symptoms on December 1, 2008, December 4, 2008, and January 22, 2009. Laboratory confirmation was not available for these inmates. All of the HCC confirmed/probable cases were from the Differential Needs Unit. An epidemic curve with all confirmed and probable cases at MRCC and HCC is presented in Figure 1.

Outbreak management – Infection control measures

The inmates with mumps at MRCC were confined to their rooms for the duration of their symptoms. General infection control measures, including hand hygiene, refraining from the sharing of drinks, food, cigarettes and utensils, and cough etiquette, were emphasized. Handwashing employed soap and water. Alcohol-based hand hygiene products were not used. Inmates with appointments scheduled during the outbreak (e.g., court appearance) were permitted to attend provided they were not experiencing symptoms consistent with mumps.

Transfers to other facilities for inmates in units 3 and 4 were suspended for 25 days (one incubation period). Transfer of inmates from unaffected units to other facilities was permitted if the inmate to be transferred was not experiencing symptoms consistent with

Figure 1. Epidemic curve for mumps outbreak in Manitoba – Cases from Milner Ridge and Headingley Correctional Centres



mumps. The receiving institution was notified of the outbreak at MRCC, such that appropriate monitoring for symptoms could occur.

Admissions to unaffected areas of the facility were permitted for inmates who had previous mumps infection or had received 2 doses of mumps vaccine at least 2 weeks prior to admission. Release of inmates into the community continued to occur when their sentence had been completed, as inmates could not be held back against their release date. Prior to release, inmates were provided with information on both infection control measures and symptoms that could indicate mumps infection. A dose of mumps vaccine was also offered.

Strict infection control measures were not implemented at the HCC due to the absence of ongoing disease activity at this location when the outbreak was first detected.

Outbreak management – Vaccination

Vaccination was offered (MMR – measles, mumps, rubella combination vaccine) to all inmates and staff at the MRCC. Verification of previous vaccination was attempted, but records were not available for most inmates. Of the 135 inmates at MRCC, 100 were vaccinated in response to the outbreak. Of the 35 not vaccinated, 4 had documented previous receipt of 2 doses of mumps vaccine, 6 had previous mumps infection, and the remaining 23 refused vaccination. Of 187 staff, 67 received a single dose of mumps vaccine. No significant adverse effects related to vaccination were observed.

Targeted vaccination was also carried out at the HCC. As there was no clear evidence of ongoing transmission at HCC while the outbreak was occurring at MRCC, vaccination at HCC was limited to inmates and staff in the Differential Needs Unit.

Outbreak management – Education

An information bulletin on mumps was circulated to inmates and staff at MRCC, and was posted for visitors. Information was sent to all correctional centres in Manitoba to advise them of the MRCC outbreak and the possibility that additional mumps cases in the correctional system might appear.

Information on mumps and the outbreak was forwarded to inmates who had been released within the preceding 2 months. An additional educational bulletin was sent to all physicians in Manitoba advising them of the ongoing outbreak.

Outbreak management – Surveillance

Enhanced surveillance at MRCC was carried out for a period of 25 days following the last confirmed case.

Outbreak resolution

The last confirmed case of mumps at MRCC occurred on February 5, 2009. Twenty-five days (one incubation period) later, normal activities resumed and enhanced surveillance was discontinued. It is presumed that mumps was introduced into the prison population at MRCC from transfer of an affected inmate from the HCC. It remains unclear how mumps was introduced into HCC.

DISCUSSION

There is little published information on mumps in the prison setting. A review of the English language literature yielded only one additional report of a mumps outbreak in a prison in Doncaster, England.[11] Few details were provided in the report of measures implemented to contain the outbreak. Vaccination was part of the containment strategy.[11]

Our report highlights some of the issues that need to be considered when managing an outbreak in a prison setting. Isolation and cohorting of patients may be difficult for security reasons.[12] Other challenges related to management of an outbreak in a correctional centre include unalterable scheduled release into the community, limited options for hand hygiene, inmate transfer to other facilities, and unalterable scheduled appointments for inmates (e.g., court appearances).[12]

The rationale for offering vaccination to the entire prison population was based on effectiveness data for mumps vaccine and extrapolation from existing guidelines for management of a mumps outbreak. Data from previous mumps outbreaks demonstrate that 2 doses of mumps-containing vaccine are more effective than a single dose.[5,10,13-15] In Canada, mumps vaccination began in approximately 1969 (single dose vaccination). The introduction of a second dose of mumps-containing vaccine to the vaccination schedule occurred in 1996.[6] Hence, a cohort of individuals born between 1970 and 1996 (people currently between the approximate ages of 13-18 and 40 years) have received only one dose of MMR.[6] These individuals lack optimal protection against mumps. Close to 80% of the inmate population at MRCC fell into this age category. Persons born before 1970 are presumed immune to mumps on the basis of exposure to circulating virus prior to the introduction of vaccination.[6]

The Canadian National Advisory Committee on Immunization (NACI) recommends that during a mumps outbreak, a dose of mumps-containing vaccine be administered to susceptible (includes those born after 1970 who only received one dose of vaccine) at-risk populations.[6] It is further stated that "at-risk populations" will need to be defined by the specifics of the outbreak. Prison inmates are not specifically identified. Similarly, in an outbreak, the United States Centers for Disease Control (CDC) recommends that vaccination be offered to those who lack evidence of immunity.[5] Immunity is defined as: birth prior to 1957 (assumed immune), lab

evidence of previous mumps infection, prior physician-diagnosed mumps infection, receipt of one dose of MMR (low-risk groups). For high-risk groups, immunity is defined as previous receipt of 2 doses of MMR due to the greater efficacy conferred by 2 doses (versus 1).[5,16] The high-risk groups specified by the CDC include health-care workers, school-aged children, and students at post-high school educational institutions.[5,16] Again, inmates are not specifically identified as a high-risk group. Our decision to offer vaccination to the entire correctional centre (inmates and staff) was considered given that a prison has some similarities to a student dormitory, both in terms of living/sleeping arrangements and interaction among residents. In this regard, inmates and staff of a prison were considered to represent an "at-risk/high-risk" population, hence subject to the recommendation proposed by NACI and CDC for a second dose of mumps vaccine.[5,6,16]

In summary, this report described an outbreak of mumps in a prison setting that was successfully contained with tailored practical infection control measures and vaccination of the inmate population. Given the relatively younger age of inmates and the parallels between correctional centres and dormitories, we propose that inmates represent another group of individuals for whom a second dose of mumps vaccine (if not received in childhood) might be of benefit.

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Received: January 25, 2011
Accepted: May 1, 2011

RÉSUMÉ

Objectif : Il manque d'informations publiées sur la prise en charge des oreillons en milieu carcéral. Nous décrivons une éclosion d'oreillons survenue dans le centre correctionnel à sécurité moyenne de Milner Ridge au Manitoba (Canada).

Méthode : Nous avons adopté la définition d'un cas d'oreillons trouvée dans les *Lignes directrices pour la prévention et le contrôle des éclosions d'oreillons au Canada.* La culture cellulaire, la réaction de polymérisation en chaîne et la sérologie ont été utilisés pour confirmer les cas.

Résultats : Cinq cas confirmés d'infection ourlienne ont été identifiés à Milner Ridge entre le 12 janvier et le 5 février 2009. Un autre cas confirmé et trois autres cas probables ont été identifiés dans un second centre correctionnel. On a maîtrisé l'éclosion de Milner Ridge en répartissant en cohortes les unités affectées du Centre, en donnant de l'information sur les oreillons, en retardant les transferts et en surveillant la manifestation de nouveaux cas. On a offert le vaccin aux détenus et au personnel en partant de l'hypothèse que d'après la moyenne d'âge des détenus, la majorité d'entre eux n'avaient déjà reçu, au plus, qu'une seule dose du vaccin combiné contre les oreillons.

Conclusion : Une éclosion d'oreillons en milieu carcéral a été endiguée par la mise en œuvre et l'adaptation de mesures de base pour le contrôle des infections et par la vaccination des détenus et du personnel. Étant donné l'âge relativement jeune de nombreux détenus et les parallèles entre les prisons et les dortoirs, on peut soutenir que les détenus représentent un autre groupe de sujets pour qui une seconde dose du vaccin anti-ourlien (si non reçu durant l'enfance) serait bénéfique en tant que mesure de prophylaxie primaire.

Mots clés : oreillons; prison; contrôle des infections; vaccination; flambées épidémiques