Hepatitis A vaccination during an outbreak among gay men in Montréal, Canada, 1995–1997

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Abstract

Study objective—To evaluate an intervention designed to curtail an outbreak of hepatitis A among gay men, especially the young and sexually active, by promoting their free vaccination.

Design—The study analysed routine passive surveillance data, carried out questionnaire and serological surveys of vaccinees, and surveys among the target population in non-clinical venues.

Setting and intervention—15 000 free doses of hepatitis A vaccine were made available through clinics with large gay clienteles, or at gay events, and advertised by various means, in Montréal, Canada, from August 1996 to November 1997. Simultaneous vaccination against hepatitis B (always free for gay men) was also encouraged.

Participants—Information was obtained from persons with the disease during the epidemic period, a sample of men requesting vaccination, and five community samples of gay men.

Main results—The outbreak involved 376 gay men and the vaccine was distributed to approximately 10 000. Vaccinees were older than cases, but had many sex partners and comprised more food handlers. Special vaccination clinics at gay events were well attended but did not reach more high risk men than regular medical venues. A self reported vaccine coverage of 49% was achieved, but 26% of vaccinees already had anti-HAV antibodies. Disease incidence declined rapidly during the campaign.

Conclusions—The intervention nearly tripled self reported hepatitis A vaccine coverage but its late start precludes proving that it caused the subsequent drop in incidence. However, it also increased hepatitis B vaccination and it is believed it improved links between gay men, public health, clinicians and community groups.

Outbreaks of hepatitis A in gay communities have occurred frequently in recent decades,1–15 facilitated by oral-anal contacts.2–5 In Montréal, Canada, with over 1 800 000 inhabitants and a well established “gay village”, there was an outbreak of more than 500 known cases over a two year period from 1990 to 1992, mostly among homosexual and bisexual (henceforth “gay”) men,5 resulting in one death. In November 1994 the number of reported cases of hepatitis A among gay men in Montréal again began to increase rapidly. Health promotion messages widely distributed to the gay community and health care providers during the winter of 1995 had no detectable impact on the evolution of the outbreak (fig 1).

Although vaccination programmes have been used with success to stop hepatitis A transmission in closed communities where most cases were among children,16–20 their efficacy is unknown in an open adult community. Nevertheless, with the collaboration of local community clinics, selected private medical clinics and gay community groups, the Montréal Regional Health Board launched a vaccination programme in August 1996 in an effort to end the outbreak.

Methods

As required by law, cases of hepatitis A were reported to public health authorities either by laboratories or by physicians, and could be confirmed either serologically (anti-HAV IgM positive, 95% of cases), or clinically (increase in hepatic enzymes or jaundice, plus a link with a laboratory confirmed case), through a routine interview by a public health nurse with the physician or the patient, or both. The interview also elicited information about possible sources of infection.

The main objective of the intervention (called VaccinAction against hepatitis A) was to vaccinate as many gay men as possible in the younger (and more sexually active) age group living in Montréal’s “gay village” (a small neighbourhood with a concentration of gay residents and gay oriented businesses), so as to shorten the course of the current epidemic and prevent further epidemics. The secondary objective was to increase the vaccine coverage against hepatitis B in the same group. Ten community clinics, 15 private medical clinics and some 40 solo practitioners, all of them in Montréal, were asked to vaccinate eligible men and all agreed to participate. They had been chosen among 250 active providers of free hepatitis B vaccine to gay men. Any gay male Montrealer holding a Quebec government health insurance card (available to all permanent residents) was eligible to receive the free hepatitis A and B vaccines. In practice, vaccinators could infer sexual orientation from the request for the vaccine, without inquiry, and no proof of residency in Montréal was required.

Publicity for the intervention took several forms. (1) A mock postcard was inserted in a widely read, free gay magazine, in July and August of 1996 and 1997, before Gay Pride week. (2) Advertisements appeared regularly in...
nine periodicals widely read by the gay community. (3) Articles by, or interviews with programme personnel appeared in some of these same periodicals. (4) Postcards, flyers and posters were distributed in gay bars and saunas, and among gay community organisations. (5) Promotional material was sent directly to individuals on the mailing lists of some community organisations. (6) Organisations for younger gay men were targeted especially to receive written and oral information (group and individual meetings) about the programme. (7) Information and/or promotional material was regularly mailed to various professionals and organisations. (8) Promotional material was distributed at several AIDS fund raising events (marches and parties) and other gay oriented events (film festival and dances).

The campaign was launched by a press conference on 28 July 1996, resulting in widespread media coverage. Special vaccination clinics were held on 4 August 1996, as part of Gay Pride Week and on 2 November 1996, as a Halloween event. Otherwise, the vaccine was available during vaccinators’ regular business hours.

Our initial intent was to provide only the first dose of hepatitis A vaccine free, this being thought sufficient to interrupt the outbreak. However, in February 1997, with 9500 doses distributed, 5500 remaining and demand waning, the second dose was also made free. This bonus was used to reactivate the publicity campaign, but there was no effort to recall individually recipients of the first dose. Demand picked up and remained stable until all 15 000 doses had been distributed, by November 1997.

We distributed 3010 numbered questionnaires to 38 vaccinators, to be answered anonymously by vaccinees from the beginning of the campaign until the vaccinator’s questionnaire supply was exhausted. They were either returned to the vaccinator’s receptionist or mailed to the investigators in a pre-stamped and pre-addressed envelope. There were 11 questions, on sociodemographics, sex partners, perceptions of the campaign, the vaccine and the vaccination procedure. A similar but shorter questionnaire was administered during the special vaccination clinics. The purpose of this non-random survey was to verify that the target population was being reached and to reorient the campaign if needed.

Among the vaccinators, eight public and private clinics agreed to obtain blood specimens for hepatitis A serology from a predetermined number of consecutive vaccinees answering the questionnaire (600 in all). They were chosen because they were expected to be the largest vaccinators, and the Health Board already had a close working relationship with them. For these, a specimen tube bearing the same number as the questionnaire was provided.

We also conducted a series of surveys (fig 2) on perceptions of the campaign and vaccine coverage in the gay community, between

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**Figure 1**  Epidemic curve for hepatitis A, by month of reporting and risk factor, Island of Montreal, January 1993 to June 1998. Source: Montréal Regional Public Health Department. *Between two and seven weeks before disease onset.
August 1996 and November 1997, in two types of venues: Gay Pride celebrations and gay bars and saunas. Baseline and one year follow up surveys were conducted on Gay Pride days. The respondents were recruited systematically and without reference to vaccination status, with a predetermined sampling fraction, by trained, well identified interviewers, who kept track of the number of men they approached, for response rate estimation. The three surveys among patrons of 10 gay bars and three saunas located mainly in the gay village used a similar sampling method. Bars favoured by younger gay men were especially targeted.

The evaluation of the campaign was approved by the Research Ethics Committee of the Montreal General Hospital. Written informed consent was obtained from participants in the serological survey of vaccinees.

Results

DESCRIPTIVE EPIDEMIOLOGY OF THE OUTBREAK

The reported incidence of hepatitis A for the island of Montréal (equivalent to the Health Board region), which had been 4.6/100 000 in 1993 and 5.0 in 1994, rose to 12.5 in 1995, 19.5 in 1996 and 14.3 in 1997. This increase affected men aged between 20 and 39 years, among whom the incidence reached a maximum of 85.6 per 100 000. A large proportion of cases lived in or near the gay village, and information on risk factors (available for 87% of cases) indicated an increase in the proportion of cases among gay men, which began in December 1994 and ended in February 1998 (fig 1).

There were 376 cases reported among gay men, of whom 331 had had sex with other men between two and seven weeks before the beginning of the illness. Their average age was 33.4 years (range 18 to 59 years). Almost 13% of these cases were hospitalised, for a median duration of four days. Eight per cent of the 139 cases among gay men with known occupation occurred in food handlers or barmen.

Figure 3 shows the geographical distribution of notified incidence rates of hepatitis A among men. Incidence rates were higher in or around the gay village (corresponding roughly to the black areas, especially that on the right panel).

CHARACTERISTICS OF VACCINEES

Fifty five per cent of questionnaires for vaccinees were answered during the first month of the campaign, 85% during the first three months and 100% during the first six months. Of 3010 questionnaires distributed to vaccinators, 235 had not been used by the time the study ended. The overall response rate is thus 71% (1980 of 2775).

Table 1 presents the principal characteristics of vaccinee respondents. Canada was the country of origin for 89%; 4% came from Europe and 3% from Central or South America. The age range was 18 to 75 years.
254

and 75%, giving 697 respondents. In the

tions of the campaign and vaccine coverage on

Response rates in the surveys about percep-

COVERAGE IN THE TARGET COMMUNITY

1.13).

was 1.09 (95% confidence intervals 1.06, 2.59, 15.03) and the odds ratio per year of age

in the same model, the odds ratio for HAV

seropositivity among subjects born outside of

Canada were positive, while 353 were returned full by the other vacci-
nators. The blood samples were tested for total

antibodies (IgM and IgG, measured together)

against the hepatitis A virus, and 26% (93 of

927) were found positive. Thus, we estimate

that of the persons vaccinated, at least 6798

(9187 × 0.74) were susceptible to the disease

when immunised during the campaign.

Two personal characteristics were signifi-
cantly associated with positivity. The first was
country of birth: 50% (15 of 30) of subjects

born outside of Canada were positive, while

22% (52 of 231) of those born in Canada were.

The other was age: 8% (7 of 83) of subjects less

than 30 years old were positive, 17% (14 of 81)
of those between 30 and 34, 27% (19 of 69) of

those between 30 and 34, and 46% (46 of 99)
of those 40 or over. Logistic regression showed

that these two associations were independent:
in the same model, the odds ratio for HAV

seropositivity among subjects born outside of

Canada was 6.24 (95% confidence intervals

2.59, 15.03) and the odds ratio per year of age

was 1.09 (95% confidence intervals 1.06, 1.13).

PERCEPTIONS OF THE CAMPAIGN AND VACCINE

COVERAGE IN THE TARGET COMMUNITY

Response rates in the surveys about percep-
tions of the campaign and vaccine coverage on

Gay Pride days 1996 and 1997 were 81% and

86%, giving 425 respondents, and those to

the three surveys in bars and saunas were 68%,

76% and 75%, giving 697 respondents. In the

first survey, 92% of Gay Pride respondents,

and 90% of those aged less than 25 years, were

aware of the VaccinAction campaign. Nearly a

month into the campaign, 93% had heard

about it, but only 86% of men aged less than 25

had. Over time, campaign awareness remained

high but did not increase; by campaign’s end,

88% of respondents recalled having heard

about it, but still only 81% of those aged less

than 25 years had. Respondents learned of the

campaign mainly through gay media (30%),

newspapers (18%), television or radio (17%),

and friends (14%). Overall, 89% knew that the

first dose of vaccine was free.

Approval was high: 91% of those aware of

the campaign said they agreed entirely with it

and another 7% mostly agreed. The reason

most often given was the vaccine being free and

easily accessible. That the campaign had been

initiated by “government” with community

involvement was also appreciated, giving gay

men a sense of recognition. However, some 6%

thought the campaign would stigmatise gay

men.

Table 2 presents the self reported vaccine

coverage. There is a clear upward trend for

both vaccines and all doses, but especially for

hepatitis A vaccine. Some relevant results are

not in the table: Among respondents with four

or more sex partners in the previous six

months, reported first dose coverage against

hepatitis A was 56%, compared with 44%

among respondents with three or fewer part-

ners. However, the coverage was only 33% in

respondents aged less than 25 years compared

with 52% in the others, and similarly for hepa-

titis B.

Table 1 Characteristics of vaccinees, by vaccinator or special event

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Gay Pride 1996 (n=496)</th>
<th>Halloween 1996 (n=231)</th>
<th>Community or private medical clinics (n=1253)</th>
<th>Total (n=1980)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (y)</td>
<td>38.2</td>
<td>37.6</td>
<td>36.3</td>
<td>36.9</td>
</tr>
<tr>
<td>Median age (y)</td>
<td>37.0</td>
<td>36.0</td>
<td>35.0</td>
<td>36.0</td>
</tr>
<tr>
<td>Mean number of partners*</td>
<td>10.1</td>
<td>8.7</td>
<td>8.3</td>
<td>8.8</td>
</tr>
<tr>
<td>Median number of partners*</td>
<td>4.0</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Montréal residents</td>
<td>84% (358/432)</td>
<td>84% (186/222)</td>
<td>91% (1031/1127)</td>
<td>88% (1598/1808)</td>
</tr>
<tr>
<td>Canadian born</td>
<td>89% (442/496)</td>
<td>90% (207/222)</td>
<td>89% (1030/1158)</td>
<td>89% (1679/1883)</td>
</tr>
<tr>
<td>Food handler</td>
<td>20% (84/424)</td>
<td>16% (35/225)</td>
<td>17% (166/953)</td>
<td>18% (285/1572)</td>
</tr>
</tbody>
</table>

*Over previous six months. Includes respondents without partners.
Table 2  Self reported vaccine coverage at gay venues, by time, vaccine and dose

<table>
<thead>
<tr>
<th>Survey</th>
<th>Hepatitis A first dose</th>
<th>Hepatitis A complete</th>
<th>Hepatitis B first dose</th>
<th>Hepatitis B complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 August 1996</td>
<td>17% (±5.3)*</td>
<td>not asked</td>
<td>not asked</td>
<td>not asked</td>
</tr>
<tr>
<td>Gay Pride (n=130)</td>
<td>22% (±5.9)</td>
<td>8% (±3.9)</td>
<td>36% (±6.8)</td>
<td>20% (±5.7)</td>
</tr>
<tr>
<td>23–27 August 1996</td>
<td>43% (±6.1)</td>
<td>19% (±4.8)</td>
<td>46% (±6.1)</td>
<td>21% (±5.0)</td>
</tr>
<tr>
<td>14–18 March 1997</td>
<td>49% (±6.5)</td>
<td>34% (±6.1)</td>
<td>not asked</td>
<td>not asked</td>
</tr>
<tr>
<td>Gay Pride (n=232)</td>
<td>49% (±6.1)</td>
<td>39% (±6.0)</td>
<td>49% (±6.1)</td>
<td>25% (±5.3)</td>
</tr>
<tr>
<td>21–25 November 1997</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bars and saunas (n=255)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*95% confidence limits.

Discussion
The recruitment strategy yielded vaccinees who were almost all gay men, mostly living in the area of the outbreak. Twice as many vaccinees were over age 40 compared with cases, therefore having a relatively high probability of being already immune. Vaccination clinics at important gay events were well attended but did not help recruit higher risk men.

The proportion of vaccinees already anti-HAV seropositive was low compared with that observed in the general population of the Montréal region21 or among gay men in San Francisco.22 However, as participating physicians had been instructed not to test (or vaccinate) gay men known to have had hepatitis A, our results suggest that a sizable proportion (26%) of gay men who consider themselves susceptible to hepatitis A have in fact been infected, especially if they are older and/or born outside of Canada. Furthermore, testing for total anti-HAV antibodies is not routinely available in Montréal at present. It cost us $C 12 per specimen and the vaccine costs $64 for both doses. Roughly, then, prevaccination testing becomes cost effective when the proportion of those requesting the vaccine who have already been infected reaches 19% ($12÷$64). Our results therefore suggest that preimmunisation testing of gay men born outside of Canada and/or aged 30 years or over might be cost effective, a result compatible with previous ones.23

Did the campaign shorten the outbreak? Conclusive evidence is difficult to provide for several reasons. (1) Vaccine coverage of susceptibles was not very high, although it is known only imprecisely. (2) Free vaccine became available relatively late in the outbreak, so that the decrease in hepatitis A cases which occurred shortly after the intervention began may be interpreted as the natural downslope at the end of the outbreak. (3) The small increase in hepatitis B vaccine coverage among gay men associated with the campaign was followed by a decrease in the yearly number of hepatitis B notifications among gay men in 1997 and 1998 compared with 1993 to 1996. However, there was no detectable decrease in notifications during the campaign or in the months following it, so that the temporal association between the two events is not close, and the causal relation remains unclear.

Still, there is evidence of partial success: (1) Self reported vaccine coverage increased nearly threefold to 49% among gay men sampled, the largest gains occurring during the first eight months of the campaign. (2) Over a few months, the intervention reached at least 8500 (9500 × 0.89) gay men living mainly in and around Montréal’s gay village, site of the majority of cases. (3) Vaccinees included a relatively high proportion of food handlers, with increased potential for disease transmission. (4) Since this outbreak in Montréal, Vancouver has also experienced a large outbreak among gay men. Using a similar intervention and evaluation strategy, a vaccine coverage comparable to ours was achieved, and a steep decline in the incidence of hepatitis A was observed three months later (P Daly, 3rd National Immunization Conference, Calgary, Canada, 1998). Other evaluations of interventions similar to ours but more timely may provide a definitive answer about their effectiveness. However, we would rather see the question become moot as jurisdictions move toward routine hepatitis vaccination of high risk communities before outbreaks occur.

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Conflicts of interest: none.
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