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BMJ 2005;330:825-829
doi:10.1136/bmj.330.7495.825

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Quality improvement report

Prophylaxis and follow-up after possible exposure to HIV, hepatitis B virus, and hepatitis C virus outside hospital: evaluation of policy 2000-3

Gerard J B Sonder, Rosa M Regez, Kees Brinkman, Jan M Prins, Jan-Willem Mulder, Joke Spaargaren, Roel A Coutinho, Anneke van den Hoek

Abstract

Problem Prophylactic treatment and follow-up after exposure to HIV, hepatitis B, and hepatitis C outside hospital needs to be improved.

Background and setting Until January 2000, people in Amsterdam could report exposure outside hospital to either a hospital or the municipal health service. If they reported to the municipal health service, they were then referred to hospitals for HIV prophylaxis, whereas the municipal health service handled treatment and follow-up related to hepatitis B and hepatitis C and traced sources. For cases reported to a hospital, hospital staff often did not trace HIV sources or follow up patients for hepatitis B and hepatitis C.

Key measures for improvement Providing adequate treatment for HIV, hepatitis B and hepatitis C after exposure for all reported exposures outside hospital.

Strategies for change On 1 January 2000, a new protocol was introduced in which three Amsterdam hospitals and the municipal health service collaborated in the treatment and follow-up of exposures outside hospital. Both municipal health service and hospitals can decide whether HIV prophylaxis is necessary and prescribe accordingly. All people exposed in the community who report to hospitals are subsequently referred to the municipal health service for further treatment and follow-up.

Effects of change The protocol is effective in that most people comply with treatment and follow-up. When indicated, HIV prophylaxis is started soon after exposure. In nearly two thirds of cases the municipal health service traced and tested the source.

Lessons learnt Provision of treatment and follow-up in one place enables treatment, tracing and testing sources, and follow-up, including counselling and registration of all reported exposures in Amsterdam, which allows for swift identification of emerging epidemiological trends. Since May 2004 all Amsterdam hospitals have participated in the protocol.

Introduction

Since 1997, in the Netherlands HIV prophylaxis is given to hospital staff as a standard procedure after

occupational exposures to HIV, mainly from needle stick injuries.¹ Use of such prophylaxis after non-occupational or sexual exposure is less widespread, although in 1999 the coordination communicable disease control published national guidelines for such use.²

There are some key differences between exposures within and outside hospital. In hospitals, the source is usually known and can be tested. Outside hospitals, tracing and testing of the source is often more difficult. If the source remains unknown, the exposed person must be treated and followed up for six months after the exposure. In hospitals, members of staff are trained to recognise and report on the incident as soon as possible, whereas outside hospital people may take more time to recognise a risky exposure and to find appropriate treatment.

In many of the world's larger urban centres, where most at-risk exposure outside hospital occurs, efforts are made to implement existing guidelines intended to make treatment available when necessary. In most countries, treatment is provided by some clinics or physicians. In many cases, only HIV risk is considered; hepatitis B prophylaxis, hepatitis C follow-up, and tracing and testing of sources is not provided.³⁻⁷

Background

Amsterdam has a population of 725 000, including an estimated 20 000 homosexual men. The infectious diseases department of the municipal health service routinely sees people who have been exposed to human body fluids that may carry hepatitis B virus, hepatitis C virus, or HIV. Such exposures can be related to care of patients (for example, nursing home nurses, dentists), other occupations (for example, cleaning staff, police officers), or leisure activity (for example, sexual contact, needle stick injuries from abandoned needles).

From 1997 until January 2000, people could report exposure outside hospital to a hospital or the municipal health service. If they reported to the municipal health service, they were referred to hospitals for HIV prophylaxis, whereas the service handled treatment related to hepatitis B and hepatitis C and tracing of sources: therefore in some cases, follow-up for one

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BMJ 2005;330:825-9

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exposure took place in two different clinics. People who reported exposure to a hospital received HIV prophylaxis if necessary, but often hospital staff did not trace HIV sources or follow up patients with hepatitis B and hepatitis C.

The new protocol

A new protocol was introduced on 1 January 2000, in which three hospitals in Amsterdam and the municipal health service collaborated in the treatment and follow-up of exposures outside hospital. Both the municipal health service and hospitals can decide if HIV prophylaxis is necessary and prescribe accordingly. The hospitals are open 24 hours a day, whereas the municipal health service has daily office hours with a physician on 24 hour call. If a patient with possible exposure comes to the emergency department of one of the hospitals during municipal health service office hours, he or she is referred to the municipal health service. If HIV prophylaxis is indicated, the patient is given a three day starter kit to start as soon as possible. If a patient reports directly to the municipal health service outside office hours and may need HIV prophylaxis, he or she is sent to one of the hospitals and seen at the municipal health service the next working day. Either way, follow-up appointments are made at the municipal health service and, if necessary, the rest of the 28 day HIV prophylaxis is prescribed. The combination therapy given as HIV prophylaxis in this protocol includes nevirapine 200 mg as a single dose, followed by a 28 day course of zidovudine/lamivudine 300/150 mg twice a day and nelfinavir 1250 mg twice a day, started as soon as possible or at least within 72 hours after exposure.

Assessment of hepatitis B and hepatitis C transmission risk, treatment for hepatitis B with hepatitis B immunoglobulin after exposure, tracing of sources, counselling, and follow-up also takes place at the municipal health service. Hospitals provide back-up for HIV prophylaxis in exceptional cases (evaluation of

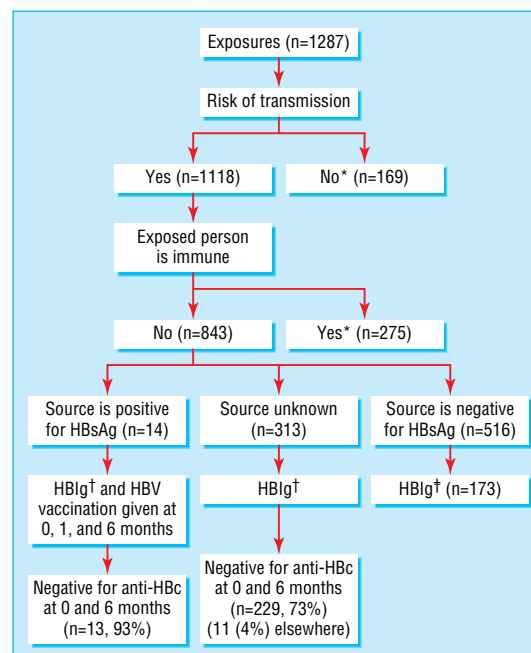


Fig 1 Outcome of tracing of sources, proportion of patients given hepatitis B immunoglobulin, and compliance with follow-up for all exposures with possible risk of transmission of hepatitis B reported to municipal health service in Amsterdam, 2000-3. Hepatitis risk not considered after sexual exposure, except in three cases when the source was known to be positive for hepatitis B surface antigen (HBsAg) (*249 were immune through previous vaccination, 26 through previous hepatitis B infection; †hepatitis B immunoglobulin 500 IU administered within 24 hours; ‡hepatitis B immunoglobulin 500 IU administered within 24 hours, source tested HBsAg negative >24 hours after exposure)

side effects, viral resistance to drugs in the source) and treat serious side effects.

Most people are distressed by the possibility of infection, especially by HIV. Counselling involves careful explanation of the risks of infection. If the risk is considered high, HIV prophylaxis is recommended; if the risk is considered low, HIV prophylaxis is discour-

Table 1 Number of incidents with possible viral exposure reported to the municipal health service in Amsterdam, 2000-3, by year, occupation, and type of exposure. Figures are numbers (percentages) of cases unless stated otherwise

	2000	2001	2002	2003	Total
Total reported exposures/year	322	332	350	377	1381
Total exposures with transmission risk	297	309	331	350	1287
Occupational (care of patients in community)*					
Total	131 (44)	146 (47)	152 (46)	167 (48)	596 (46)
Needle stick	126 (96)	132 (90)	142 (93)	154 (92)	554 (93)
Human bites	1 (1)	4 (3)	2 (1)	6 (4)	13 (2)
Other	4 (3)	10 (7)	8 (5)	7 (4)	29 (5)
Occupational (no care of patients)†					
Total	93 (31)	45 (15)	87 (26)	89 (25)	314 (24)
Needle stick	27 (29)	20 (44)	42 (48)	36 (40)	125 (40)
Human bites	36 (39)	12 (27)	15 (17)	33 (37)	96 (31)
Other	30 (32)	13 (29)	30 (35)	20 (23)	93 (30)
Non-occupational‡					
Total	73 (25)	118 (38)	92 (28)	94 (27)	377 (29)
Needle stick	14 (19)	34 (29)	21 (23)	16 (17)	85 (23)
Human bites	23 (32)	26 (22)	11 (12)	16 (17)	76 (20)
Sexual exposure	28 (39)	44 (37)	50 (54)	50 (53)	172 (46)
Other	8 (11)	14 (12)	10 (11)	12 (13)	44 (12)

*Such as dentists, nursing home nurses, general practitioners.

†Such as safety personnel, police officers, cleaning staff.

‡Such as abandoned needles, fights, sexual exposure.

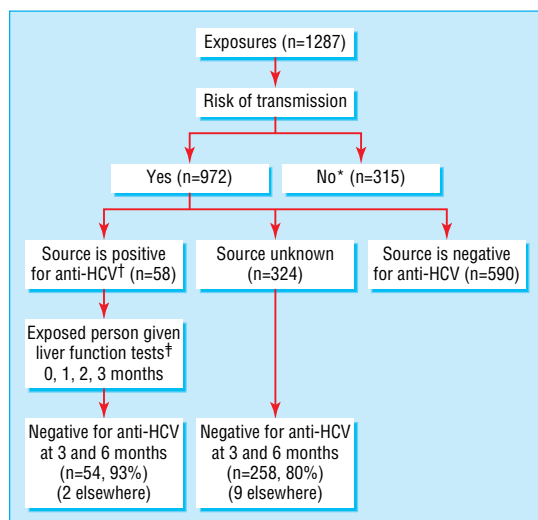


Fig 2 Outcome of tracing of sources and compliance with follow-up for all exposures with possible risk of transmission of hepatitis C reported to municipal health service in Amsterdam, 2000-3 (*risk of transmission of hepatitis C not considered after sexual exposure, after exposure to saliva or mucus, and after bites in which source did not bleed; †anti-hepatitis C antibodies; ‡alanine aminotransferase and aspartate aminotransferase)

aged and counselling can reduce the patient's distress. If there is a risk of transmission, the patient usually makes the final decision about starting HIV treatment. All patients who have started HIV prophylaxis are seen at the municipal health service after three days to ensure they have collected the rest of the course and after two and four weeks for liver and kidney function tests. Any side effects are registered at these visits, and, if necessary, people are encouraged to continue their course.

Process of gathering information

All data on patients are entered in an electronic municipal health service database. We have described treatment, outcome of sources tested, and follow-up of all reported community exposures in Amsterdam between 1 January 2000 and 31 December 2003 to evaluate the efficiency of the new protocol.

Analysis and interpretation

Number of exposures

A total of 1381 exposures were reported over the four years (table 1). The annual number of reported accidents increased gradually. Almost half of the reported incidents involved people in professions dealing with care of patients outside hospital. Of these 93% were needle stick incidents. In other occupations,

needle sticks, human bites, and "other" exposures occurred in about equal prevalence. Half of non-occupational exposures involved sexual contact. The number of reported sexual exposures increased from 28 in 2000 to 50 in 2002 and remained stable thereafter.

Of the reported cases, 35 people reported exposure twice but none reported more than twice. Of these, 26 were repeat needle stick incidents in occupations involving care of patients and three were "other" occupational exposures; six were sexual exposures, all in homosexual men.

Prophylaxis after exposure, source tracing, and follow-up

Figures 1-3 show interventions, results of source tracing, and follow-up for hepatitis B, hepatitis C, and HIV. No seroconversions were seen for hepatitis B or hepatitis C.

All the exposed people tested were negative for HIV except for one man who tested negative at three months but positive at six months. He had reported receptive anal sex without ejaculation with someone who said he was HIV positive and claimed that he had recently been tested and his viral load "undetectable." The exposed man started HIV prophylaxis five hours after that exposure and completed the course. After we explained to him that his reported sexual exposure was unlikely to have caused his infection, he admitted having had unsafe contacts after he had finished the course.

Time between exposure and first dose of prophylaxis

In 189/225 (84%) of the cases, the first dose of HIV prophylaxis was taken within 24 hours (median 12 hour, interquartile range 3-16 hours) (table 2). Of those with occupational exposure, a higher proportion (86%) started within 12 hours than those with non-occupational exposure (54%). After sexual exposure, 53/115 (46%) started within 12 hours.

Side effects of HIV prophylaxis

Reported side effects of HIV prophylaxis were diarrhoea (48%), fatigue (31%), nausea (29%), headache (9%), and rash (1%). Three patients were advised to discontinue the course: one developed a rash, one had raised liver enzyme titres and flu-like symptoms, and one had severe physical dysfunction (extreme fatigue and diarrhoea). All symptoms disappeared after the patients stopped the treatment.

Compliance with HIV prophylaxis

Of the 225 cases in which post-exposure prophylaxis was started, 41 patients stopped after a few days as the source tested negative and 15 stopped as the risk was reconsidered as low (fig 4). Of the 169 remaining, 121

Table 2 Time between exposure and first dose of HIV prophylaxis for all people exposed outside hospital for whom prophylaxis was prescribed in Amsterdam, 2000-3, by occupation. Figures are numbers (percentages) of cases

	Time to first dose (hours)						Unknown*	Total
	<2	2-12	12-24	24-48	48-72	>72		
Medical occupations	5 (31)	8 (50)	1 (6)	0	0	0	2 (13)	16
Other occupations	19 (33)	32 (55)	5 (9)	2 (3)	0	0	0	58
Non-occupational exposure	17 (11)	65 (43)	37 (25)	17 (11)	7 (5)	1 (1)	7 (5)	151
Total	41 (18)	105 (47)	43 (19)	19 (8)	7 (3)	1	9 (4)	225

*Not registered.

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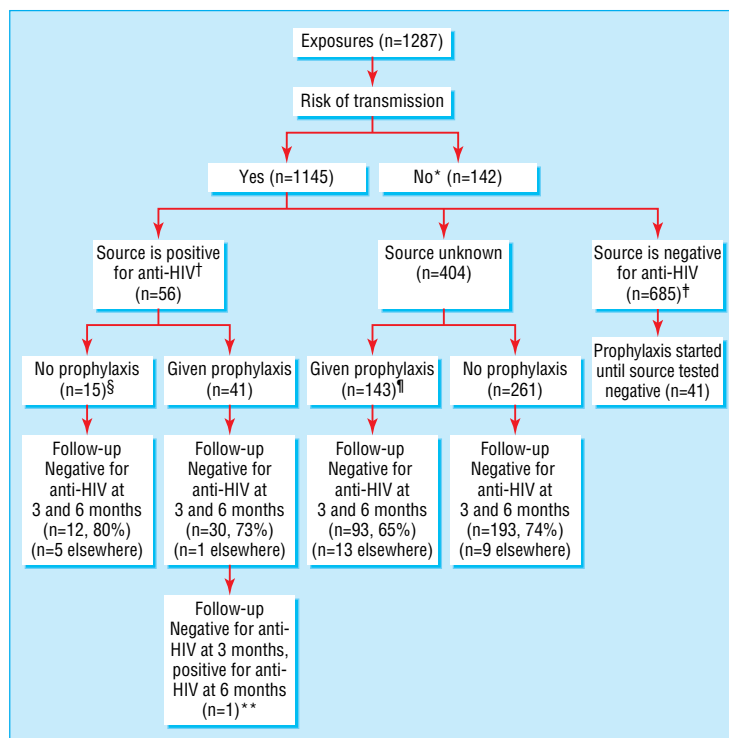


Fig 3 Outcome of tracing of sources, proportion prescribed prophylaxis, and follow-up for all exposures with possible risk of transmission of HIV reported to municipal health service in Amsterdam, 2000-3 (*human bites without blood from source in wound; †four new unexpected diagnoses, 31 confirmed by hospital, 12 reliable because viral load and medication was known, nine cases in which source told the exposed person he was HIV positive; ‡335 tested negative, 350 with negative medical history (elderly people in nursing homes, babies whose mothers tested negative for HIV in pregnancy); §small risk of transmission (for example, penetrative sex, oral sex without ejaculation) or undetectable viral load; ¶high risk of transmission and source belongs to high risk group (injecting drug user, men who have sex with men, African migrants); **probably caused by unsafe sex contacts after HIV prophylaxis was finished)

(72%) finished the treatment and 12 (7%) were lost to follow-up as they lived outside the Netherlands.

Sources

The number of sources identified for those looking after patients outside hospital was high (85%) because the source was usually a patient who could easily be tested. This was also the case for some other professions (safety personnel, police officers). After non-occupational exposure only one in four sources were traced.

For the non-occupational incidents, the prevalence of HIV in the source population, particularly after

sexual exposure, was high: 30/42 (71%) sources were HIV positive (eight of these could not be confirmed). People exposed through sexual contact seem to seek HIV prophylaxis when the perceived risk for HIV infection is high.

International trends in HIV prophylaxis after sexual exposure

When HIV prophylaxis was introduced for use after sexual exposure,⁸ the fear existed that it would be seen as a "morning after pill," leading to more unsafe contacts. As in other studies⁵ we did not confirm that prophylaxis after unsafe sex leads to tremendous increase in demand and unsafe sex.

Prescribing behaviour varies widely among physicians,^{4, 5} especially in response to non-occupational exposures. In France, after the introduction of national guidelines in 1998 physicians were less likely to refuse HIV prophylaxis, especially when patients reported unprotected sex with a partner of unknown HIV status.⁴ Interestingly, reports of partners known to be positive for HIV decreased in France from 78% in 1997 to 40% in 1999, perhaps because people in 1997 feared not getting prophylaxis and thus said their partner was HIV positive when the status was actually unknown. This could explain why, after HIV prophylaxis was publicised in gay magazines in Amsterdam in 2000, the reports of sexual exposures with someone with unknown HIV status increased from 50% in 2000 to 84% in 2001, 80% in 2002, and 78% in 2003 (data not shown).

Recently, a European working group funded by the European Commission, proposed guidelines in which HIV prophylaxis after non-occupational exposure is recommended, discouraged, or considered according to various kinds of exposures and sources. The group notes that, even though most guidelines are based on consensus rather than on evidence, "the availability of guidelines do improve counselling and care to HIV exposed individuals."⁹

Effects of change

Compared with the situation before 2000, the protocol has advantages for hospitals (no need for tracing of sources outside hospitals and no active follow-up), for the municipal health service (collection and monitoring of epidemiological data), and for the exposed people (better tracing of sources, starter kits at every hospital, resulting in shorter delays and follow-up for

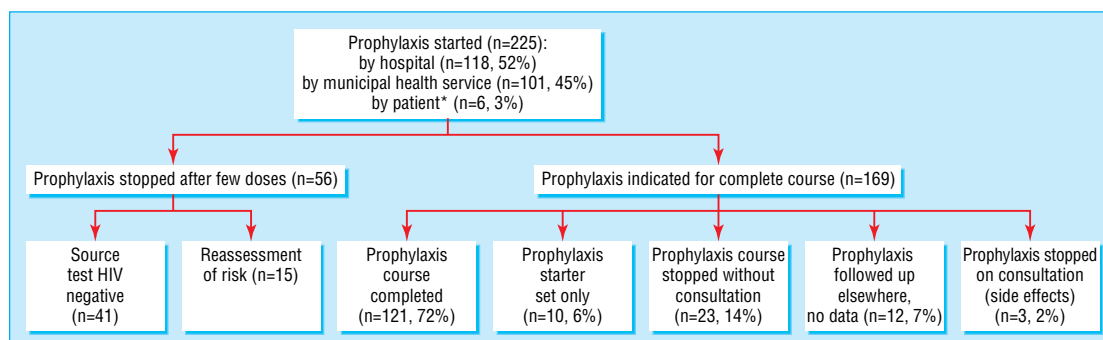


Fig 4 Prophylaxis after HIV exposure, indication, and compliance in all exposures with possible risk of HIV transmission reported to the municipal health service, Amsterdam, 2000-3 (*these patients took medication from their HIV positive sex partner before reporting to municipal health service)

What is already known on this topic

Most countries now have guidelines that recommend prophylaxis after occupational and non-occupational exposure to bloodborne viruses outside hospital

In many cases protocols for prophylaxis are ad hoc and vary between hospitals or clinics, and it is not always clear to patients which clinics may or may not provide treatment

What this study adds

If all hospitals in one city use a single protocol that includes the same treatment for all exposures outside hospital, prophylaxis can be given more rapidly when necessary

The use of this protocol also makes it possible to refer all patients, after initial treatment, for counselling, tracing of sources, and follow-up, which leads to good compliance and registration of epidemiological trends

outside hospital. The municipal health service will continue to monitor all such exposures in Amsterdam.

We thank the public health nurses of the municipal health service department of infectious diseases for collecting and documenting all data, and Lucy D Phillips for editorial review.

Contributors: GJBS collected and analysed data and wrote the article. RMR, KB, JMP, and JWM developed the protocol, collected data, and reviewed the article. JS was responsible for most of the laboratory tests and reviewed the article. RAC developed the protocol, advised on the manuscript, and reviewed the article. AvdH provided advice on the manuscript design, developed the protocol, was responsible for all data collection, contributed to the article, and is guarantor.

Funding: None.

Competing interests: None declared.

Ethical approval: Not applicable.

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all viruses in one place). Therefore, since May 2004 all Amsterdam hospitals have participated in the protocol discussed here.

Next steps

To try to reduce side effects and improve compliance with HIV prophylaxis, as of January 2005 all hospitals and the municipal health service in Amsterdam will replace nelfinavir by atazanavir for all exposures

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- 1 Epic Group. White paper: Blended learning. www.epic.co.uk/content/resources/white_papers/blended.htm (accessed 22 February 2005).