

mothers not listed on the register. This should be remembered by doctors when they identify risk indicators and formulate action plans at case conferences.

Our study suggests that the children of women who have been assaulted are in need of increased protection. Staff in accident and emergency departments and general practitioners should be aware of the increased risk to children of victims of assault. When women seek medical treatment for injuries resulting from domestic violence the local child protection register should be checked, and if the victim or the assailant is listed the protection of the children in the family must be ensured.

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Should sewage workers and carers for people with learning disabilities be vaccinated for hepatitis A?

C J M Poole, A T Shakespeare

Occupational Health Department, Central Clinic, Dudley DY2 7BX
C J M Poole, consultant occupational physician
A T Shakespeare, occupational health nurse

Correspondence to: Dr Poole.

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Immunisation against hepatitis A with the newly developed vaccine of inactivated virus is recommended for people visiting parts of the world where the disease is endemic. It has been suggested that sewage workers and carers for people with learning disabilities may also benefit.^{1,2} There is little empirical evidence to support these recommendations apart from two reports of hepatitis in workers in contact with sewage sludge, the organic end product of sewage treatment.^{3,4} We therefore undertook a cross sectional study to compare the prevalence of antibodies to hepatitis A virus in these two occupational groups with the prevalence in controls matched for age and social class.

Subjects, methods, and results

Forty sewage workers (gully cleaners, jettors, drain repairers, and cesspit emptiers) and 53 carers for children or adults with learning disabilities from two local authorities in the west midlands volunteered for the study after we had explained its purpose. The sewage workers' mean age was 42.2 (range 21-58) years and the carers' 41.3 (19-63) years. We recruited 18 road workers (tarmac layers and pavers) aged 38.7 (20-62) years from one local authority as controls for the sewage workers and 20 office workers (in the personnel department) aged 41.0 (23-64) years as controls for the carers. We chose these controls to match the social class of the sewage workers and carers.

We took 10 ml of blood from each subject. This was allowed to clot, and hepatitis A virus IgG was measured in the serum by enzyme linked immunosorbent assay (ELISA) (Syva MicroTrak total anti-HAV assay, Sorin Biomedica SpA, Italy). Cut off values were established according to the manufacturer's instructions by

Presence of antibodies to hepatitis A virus (determined by ELISA) in sewage workers, carers for people with learning disabilities, and controls. Figures are numbers of subjects

	Hepatitis A virus IgG	
	Present	Absent
Sewage workers for local authorities	23	17
Dudley	14	10
Wolverhampton	9	7
Carers for people with learning disabilities	19	34
Carers for adults	13	20
Carers for children	6	14
Controls	13	25
Road workers	6	12
Office workers	7	13

reference to control serum (Syva). Results for the groups were analysed by odds ratios.

The table shows the numbers of subjects who were seropositive for hepatitis A virus. Seropositivity was significantly more prevalent in the sewage workers than the controls (odds ratio 2.60 (95% confidence interval 1.04 to 6.51)) but not in the carers for people with learning disabilities (odds ratio 1.07 (0.45 to 2.58)). The ratio of seropositive to seronegative subjects was the same in both control groups. No subject had been immunised against hepatitis A in the previous six months.

Comment

Although the number of subjects was small, the results indicate a significantly increased risk of infection with hepatitis A virus for sewage workers. Operators of high pressure water hoses used to unblock drains (jetting) may be infected from the aerosols generated since they frequently do not wear the respiratory protection provided. Sewage workers may also be infected from their equipment and protective clothing, which are often contaminated with faeces. Furthermore, they eat food in the sewage wagons and may not remove protective clothing before eating in the canteen. Smoking is also permitted at work. As a result of this study our department is undertaking the health education of sewage workers and the immunisation of those who are seronegative.

Selection bias among the sewage workers was eliminated by including all those employed by the two local authorities. Although most of the carers for people with learning disabilities from one of the authorities took part in the study, a selection bias here cannot be excluded. It would be interesting to test a larger sample of sewage workers for an association between length of employment and infection with hepatitis A virus, but the type of work done may be more relevant to the risk of infection. Infection with hepatitis A virus can now be added to leptospirosis (Weil's disease), giardiasis,⁵ and industrial waste as occupational hazards for sewage workers in Britain. Carers for people with learning disabilities seem to be at no greater risk of infection with hepatitis A virus than the general population.

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