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tively. All employees performing exposure prone procedures were asked to provide evidence of immunity to hepatitis B. Those without such evidence were asked to undergo testing for hepatitis B surface antigen and, if positive, for e markers.

Those with a titre of hepatitis B surface antibody > 100 mIU/ml were recorded as being immune. Those with a titre of 10-100 mIU/ml were given a booster dose (20 μg) of hepatitis B vaccine (Engerix B), and their antibody response was measured two months later. Those with a titre < 10 mIU/ml were given another course (at 0, 1, and 6 months) of vaccine, or the alternative recombinant hepatitis B vaccine (H-B-Vax II) if they had already had two courses.

The table shows immunity to hepatitis B in staff in the two health authorities. In Dudley two consultant surgeons refused to provide evidence of immunity or to undergo testing for hepatitis B surface antigen or core antibodies. The mean number of doses of vaccine given was 3·7, with most people developing adequate immunity after three; four surgeons, however, required either six or nine doses of vaccine. In London no employee refused to provide evidence of immunity or to undergo testing for hepatitis B surface antigen when appropriate. Four out of 230 employees (1·7%) who performed exposure prone procedures were positive for hepatitis B surface antigen; one of them, a surgeon, was also positive for the e antigen. Of these four, one was a doctor and three were midwives; three were born outside the United Kingdom.

See editorial by Delamothe

Percentages (proportions) of employees who were immune to hepatitis B in Dudley Health Authority and Hammersmith and Queen Charlotte's Special Health Authority

	Dudley	Hammersmith and Queen Charlotte's
Staff performing exposure prone procedures		
Consultant surgeons	94 (34/36)	65 (35/54)
Junior doctors	64 (48/75)	68 (26/38)
Dentists and surgery assistants	90 (28/31)	81 (13/16)
Midwives	47 (81/171)	90 (110/122)
Others		
Staff in renal dialysis units	74 (23/31)	93 (14/15)
Nurses (grades C to I)	21 (362/1753)	78 (855/1096)
Porters	4 (4/110)	49 (22/45)
Domestic staff	0 (2/550)	27 (70/260)

Comment

An immunity to hepatitis B of 94% among consultant surgeons in Dudley is encouraging. This figure is greater than published seroconversion rates of about 85% in normal adults because some of the staff had had up to three courses (nine injections) of vaccine. In fact, no doctor who was negative for hepatitis B surface antigen or naturally immune failed to respond to vaccine. This observation challenges the notion that 1-4% of those vaccinated will fail to respond to one or more courses of vaccine[3] and supports the concept of slow responders.

Some people will not mount an immune response on vaccination because they are long term carriers of the virus; this applied to 1·7% of health care workers who performed exposure prone procedures in the London authority, but it applies to up to 11% of health care workers in parts of the world where hepatitis B is endemic.[4] A prevalence of 1·7% is higher than that found in blood donors and at antenatal screening but in keeping with a mixed ethnic group of employees in a high risk occupation.[5] For personal reasons a few employees will refuse to be vaccinated or provide evidence of immunity, but the government recommends that these staff are restricted in the same way as staff positive for hepatitis B e antigen.[1] This number can be limited by counselling about the different types of hepatitis B serological markers and by reassuring staff that testing for the surface antigen will be done only with informed consent.

Few domestic staff and porters were immune, which is disappointing because needlestick injuries are regularly reported by them. The provision of occupational health services to NHS staff is, however, patchy, and the amount of budget allocated to the purchase of vaccines is controlled. The ability of occupational health departments to achieve the targets set by the NHS Executive will largely depend on their resources.

1 Department of Health. *Immunisation against infectious disease.* London: HMSO, 1992:114.
2 NHS Management Executive. *Protecting health care workers from hepatitis B.* HSG 40, 1993.
3 Boxall EH. Risks to surgeons and patients from HIV and hepatitis. *BMJ* 1993;306:652-3.
4 Gupta HL, Sebastian M, Sinha VP, Gupta SK, Gupta VK. Hepatitis B positivity among medical professionals. *J Assoc Physicians India* 1989;37: 618-9.
5 Alexander G, Williams R. Antiviral treatment in chronic infection with hepatitis B virus. *BMJ* 1986;293:956.

(Accepted 28 March 1994)

Outcome of childhood asthma in mid-adult life

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A prospective 28 year follow up of 7 year old children with wheezing and asthma began in 1963 in Melbourne, Australia.[1,2] We aimed to describe the outcome of childhood asthma at 35 and the changes since the last review, at 28.[3]

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BMJ 1994;309:95-6

See editorial by Sears

Subjects, methods, and results

The children who were selected at 7, on the basis of parents' responses to a questionnaire, had been classified in terms of wheeze as those who had never wheezed (controls) (n = 106); those with fewer than five episodes associated with apparent respiratory infection (mild wheezy bronchitis) (n = 75); those with five or more episodes associated with an apparent respiratory infection (wheezy bronchitis) (n = 107); and those with wheezing not associated with respiratory infection (asthma) (n = 113). A fifth group of children, with severe asthma (n = 79), was selected at age 10 from the same age cohort.

During 1992 we followed up 401 of the 480 subjects; 101 answered a telephone questionnaire, and 300 were examined physically. Eleven subjects had died since the study began. The follow up rate was therefore 86%. The subjects were classified as those who had been controls at age 7 (controls) (n = 85); those who had not wheezed in the previous three years (no recent asthma) (n = 132); those who had wheezed in the previous three years but not in the previous three months (infrequent wheeze) (n = 132); those who had not wheezed in the previous three months but less than once a week (frequent asthma) (n = 45); and those who wheezed at least once a week in the previous three months (persistent asthma) (n = 91).

The table shows the pattern of asthma at age 35 in relation to the initial classification. The presence of atopy at age 7 in the children with mild wheezy

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bronchitis or wheezy bronchitis did not influence the outcome.

In all, 330 of the 371 (89%) subjects seen at 28 were reviewed at 35; 60% (46/75) of the subjects with persistent asthma at 28 had persistent asthma at 35, and 77% (70/91) of the subjects with no symptoms at 28 were symptom free at 35. Only 26% (15/59) of the subjects with infrequent asthma and 20% (12/60) of the subjects with frequent asthma remained stable.

Tobacco smoking among the controls and the four groups of subjects was similar in terms of whether they had ever smoked (range 40-46%), the number of pack years (1 pack year = 20 cigarettes/day for 1 year) smoked (> 10 pack years) (28-33%), and those who were current smokers (24-34%). Hay fever at the age of 35 occurred in 57 (85%) of the subjects who had been in the group with severe asthma; 72 (73%) of the subjects who had been in the group with asthma; 51 (59%) of the subjects who had been in the group with wheezy bronchitis; 40 (62%) of the subjects who had been in the group with mild wheezy bronchitis; and 36 (43%) of the controls.

Distribution of asthma in 401 subjects aged 35 according to whether they had had bronchitis or asthma as children. Values are numbers (percentages) of subjects

	Asthma at age 35*				
At age 7*	No recent asthma	Infrequent	Frequent	Persistent	Total
Mild wheezy bronchitis	42 (65)	8 (12)	10 (15)	5 (8)	65
Wheezy bronchitis	54 (63)	10 (12)	9 (10)	13 (15)	86
Asthma	29 (30)	20 (20)	18 (18)	31 (32)	98
Severe asthma†	7 (10)	10 (15)	8 (12)	42 (63)	67
Total	132	48	45	91	401

*85 Controls are excluded. †Subjects entered study at age 10.

Comment

Our results confirm the findings of earlier reviews of this cohort—namely, that many children do not grow out of asthma, and the more troublesome their asthma is, the less likely they are to do so.[3,4] Just over a third of subjects who had had childhood wheezy bronchitis had asthmatic symptoms at 35. Our findings support Williams and McNichol's suggestion that wheezy bronchitis and asthma are different labels for the same disease.[1] By the time their children were 7 some parents might have forgotten a few minor episodes of wheeze; we may therefore have overestimated the percentage of children with wheeze associated with respiratory infection who continued to wheeze as adults.

Between the ages of 28 and 35 no substantial changes occurred in the pattern of asthma. Subjects with infrequent or frequent asthma were less stable in their pattern of asthma than those with no recent asthma or with persistent asthma, which may reflect less precision in the classification of the groups in the mid-range of the severity scale.

1 Williams HE, McNicol KN. Prevalence, natural history and relationship of wheezy bronchitis and asthma in children: an epidemiological study. *BMJ* 1969;4:321-5.
2 McNicol KN, Williams HE. Spectrum of asthma in childhood—1, clinical and physiological components. *BMJ* 1973;4:7-11.
3 Martin AJ, McLennan LA, Landau LI, Phelan PD. The natural history of childhood asthma to adult life. *BMJ* 1980;280:1397-400.
4 Kelly WJW, Hudson I, Phelan PD, Pain MCF, Olinsky A. Childhood asthma in adult life: a further study at 28 years of age. *BMJ* 1987;294:1059-62.

(Accepted 7 April 1994)

FOR DEBATE

The Hippocratic Oath updated

The Hippocratic Oath enunciated about 2200 years ago was almost certainly a temple oath written by various Asclepiads (medical priests) rather than by Hippocrates himself.

Despite vast changes in medical and social structure during the past 22 centuries, the original oath has been passed unmodified from generation to generation of doctors.

I suggest the following updated version for discussion.

In the name of suffering humanity, with humility, compassion and dedication to the welfare of the sick according to the best of my ability and judgment, I will keep this oath and stipulations.

I will be honest with my patients in all medical matters. When this honesty reveals bad news I will deliver it with understanding and sympathy and tact.

I will provide my patients with acceptable alternatives for various forms of diagnosis, and medical and surgical treatment, explaining the risks and benefits of each alternative as best I know it.

I will allow my patients to make the ultimate decision about their own care. In circumstances where my patients are incapable of making decisions I will accept the decision of family members or loved ones, encouraging these surrogates to decide as they believe the patient would have decided.

I will not sit in moral judgment on any patient, but will treat their illness to the best of my ability regardless of the circumstances.

I will be empathetic to patients suffering from illnesses caused by substances such as alcohol or drugs, or other forms of self abuse usually believed to be under the voluntary control of humans.

Knowing my own inadequacies and those of medicine generally, I will strive to cure when possible but to comfort always.

I shall perform medical tests only if I believe there is a reasonable chance that the results will help produce an improved outcome for my patients.

I will not perform any tests or procedures or surgery solely to make money. I will freely refer my patients to other physicians if I am convinced that they are better able than I to treat a given patient problem.

I will freely furnish copies of medical records to patients or their families upon request.

I will do unto patients and their families only what I would want done unto me or my family. I will not experiment on patients unless the patients give truly informed consent. I will strive to instruct patients fully so their truly informed consent is possible.

I will remain a student all my professional life, attempting to learn not only from formal medical sources but from my patients as well.

I will attempt to function as a teacher for my patients so that I can care for them more effectively and can apply the lessons they provide to the care of other patients.

I will provide care to all patients seeking it, regardless of sex, race, colour, creed, sexual preference, lifestyle, or economic status. In particular, I will volunteer some of my time to providing free care to the poor, the homeless, the disadvantaged, the dispossessed, and the helpless.

I will turn away no patient, even those with dreaded contagious diseases like AIDS.

I will encourage my patients to seek medical opinions other than my own before agreeing to accept my opinion.

I will treat my professional colleagues with respect and honour; but I will not hesitate to testify openly about physicians and medical institutions that are guilty of malpractice, malfeasance, cupidity, or fraud.

I will defend with equal fervour colleagues who are unjustly accused of malpractice, malfeasance, cupidity, or fraud.—EUGENE D ROBIN *is professor emeritus of medicine and physiology, Stanford, California*