

be appropriately trained according to their position and specialty.<sup>3</sup> Basic life support training was held to be mandatory for all. The working party recommended that a resuscitation training officer be appointed in every acute hospital solely to ensure that training is implemented and cardiac arrests are regularly audited. It has been shown that cardiac arrest survival can be directly correlated with the availability of resuscitation equipment and the expertise of the team called to the arrest.<sup>4</sup>

This sample of 30 MRCP candidates, of whom 63% went on to pass the MRCP examination, were unfamiliar with Resuscitation Council (UK) guidelines. Regular training and familiarisation with the revised (1992) European Council Resuscitation guidelines will save more lives. Resuscitation experience without

feedback increases confidence, not skill.<sup>5</sup> There is no longer a question of whether it is necessary to train medical staff in these skills: it is imperative that they have regular, compulsory training in resuscitation.

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## Semen quality of Finnish men

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A recent report highlighted the worldwide decline in mean sperm counts in semen (from  $113 \times 10^9/l$  to  $66 \times 10^9/l$ ) during the past 50 years.<sup>1</sup> In that report Finnish men were cited as having some of the highest sperm counts recorded.<sup>2</sup> In this paper we review other studies measuring sperm counts in Finland and examine reasons for the decreased sperm counts worldwide.

### Subjects, methods, and results

We traced six Finnish studies of semen quality in a total of 849 men. The men were either of proved fertility or were normal but of unknown fertility. The results are given in the table. Common routine methods of semen analysis had been used throughout.

In the earliest study—of 189 fathers examined because of a congenital malformation in their children—only the total sperm count was given ( $378 \times 10^9/l$ ).<sup>3</sup> Taking 3.4 ml as the presumed mean semen volume,<sup>1</sup> however, we calculate the mean sperm count as  $111 \times 10^9/l$ . Nikkanen reported on 21 men destined for vasectomy,<sup>2</sup> and the 56 men studied by Suominen *et al* were also fertile.<sup>4</sup> Saaranen *et al* reported on 144 normal men who were trying to conceive<sup>5</sup> (category 2<sup>1</sup>). The two most recent studies comprised 300 semen donor candidates<sup>6</sup> and 139 men with proved fertility.<sup>7</sup>

### Comment

The mean sperm count of the Finnish men ( $114 \times 10^9/l$ ) was nearly double that of men worldwide.<sup>1</sup> Even more pronounced was the difference in total sperm count— $456 \times 10^9/l^{2+7}$  compared with  $182 \times 10^9/l$ .<sup>1</sup> No

significant decrease in sperm counts was evident in the last two to three decades.

The worldwide decline in sperm counts reported by Carlsen *et al* was not significant after 1964.<sup>1</sup> Linear regression analysis (BMDP 6D bivariate computer program) of studies in 1965-90<sup>1</sup> gives a regression line of  $y = 62.9 + 0.348x$  ( $n = 13$  180;  $r = 0.140$ ;  $p < 0.001$ ), showing a weak correlation but opposite to that found for the whole period, 1938-90.<sup>1</sup>

Besides possible environmental factors,<sup>1</sup> one reason for the halt in the decline in sperm counts in the 1960s might be the revolution in birth control methods, which allowed more sexual freedom and shorter abstinence periods. The observed decrease in the mean semen volume from 3.4 ml to 2.75 ml<sup>1</sup> accords with this. A Finnish study from 1955<sup>8</sup> indicated considerably longer sexual abstinence than the present four or five days.<sup>2,5,7</sup>

Detailed epidemiological studies are needed to determine whether differences in sperm counts between Finnish men and men worldwide are genetic or environmental. Interestingly, the highest sperm counts recorded in Finland were in men from the rural lake district,<sup>9</sup> and the already low incidence of testicular cancer in Finland is especially low in rural areas (incidence in 1987-91, 10 cases per million inhabitants compared with 30 cases per million in big cities (Finnish Cancer Registry)). These findings strongly suggest that urban lifestyle or other environmental factors may be important in the aetiology of testicular malfunction and disease.

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Reported semen characteristics in fertile or normal Finnish men

Study	Year	No of men	Mean days of abstinence	Mean semen volume (ml)	Mean sperm count ( $\times 10^9/l$ )	Fertility
Takala <sup>3</sup>	1958	189	ND	ND	111*	Fertile
Nikkanen <sup>2</sup>	1979	21	4-4	4-2	131	Fertile
Suominen <i>et al</i> <sup>4</sup>	1983	56	ND	5-0	112	Fertile
Saaranen <i>et al</i> <sup>5</sup>	1986	144	4-0	3-2	145	Normal†
Iirola and Niemi <sup>6</sup>	1991	300	ND	4-1	96	Normal†
Wichmann <sup>7</sup>	1992	139	5-0	4-2	124	Fertile

\*Total sperm count given ( $378 \times 10^9/l$ ), volume approximated (3.4 ml).

†Normal unselected men, fertility not proved.

ND=Not determined.