

## Comment

These consistent rates of increase may be due to the increasing patient workload. Although our statistical analysis was based on crude data, the  $R^2$  values for the variables plotted indicate that between 55% and 65% of the variability in patient turnover and in tests can be attributed to a linear relation with time. We assume that the lack of correlation between the numbers of patients and requests result from the dilution of emergency cases with cold cases. Bed closures during the past three years may have altered this ratio. As there are no data linking an individual request with a particular patient the numbers of emergency cases in which haematology tests are required cannot be studied retrospectively.

Decisions about the future of the out of hours haematology service require precise and more detailed information, which should include the numbers of all types of haematology tests requested for each patient episode or admission. More data than recommended in the Körner report<sup>3</sup> could be collected for this purpose, and local feedback and analysis would be useful. Our guidelines were designed to complement control by clinical audit or education and were expected to improve communication between clinical and laboratory staff. The previous availability of tests depended partly on the experience and compliance of the medical laboratory scientific officer.

The different strategies for reducing demand for

tests have been described.<sup>4</sup> The effectiveness of our guidelines lie in their reducing the numbers of tests to a reasonable minimal level. Budget holders should realise that a reduction in the number of requests for tests does not necessarily mean corresponding financial savings: medical laboratory scientific officers are paid a flat fee for each call regardless of how many tests they do in each call.<sup>5</sup> We suggest that payments should be for sessions and unrelated to numbers of requests or calls. This would ensure fixed but fair remuneration, given that our monitoring system or its equivalent were in force. If admissions cannot be restricted adequate on call staffing or totally automated and foolproof counting equipment will be necessary as demand increases.

We thank Mr A J Girling, department of statistics, Birmingham University, for his advice. Copies of the guidelines, though intended only for local use, are available from us.

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(Accepted 9 February 1989)

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*Br Med J* 1989;298:1292-3

## Fall in association of height with intelligence and educational level

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Recent British studies have shown a continuing difference in height among social classes,<sup>1,2</sup> which apparently contrasts with evidence from Sweden.<sup>3</sup> We report postwar trends in height as a function of two major correlates of social class—namely, intelligence and educational level—in Denmark.

### Methods and results

Our data were derived from the archives of the draft board for eastern Denmark and concerned men born

during 1939-67. On attaining age 18 Danish men are required to appear before a draft board, which assesses their suitability for military service. Less than 8% are exempted, mainly on medical grounds, and for the remainder height, an intelligence test score, and a code to identify educational level (primarily reflecting years of schooling) are recorded. From the archives we obtained these three measures for about 10% of the men born during 1939-58.<sup>4</sup> These we grouped into four cohorts: 1939-43 (n=7332), 1944-8 (n=9182), 1949-53 (n=7466), and 1954-8 (n=6773). To these four cohorts we added a fifth, comprising men who appeared before the draft board in 1985 (n=13226),<sup>5</sup> referred to as the 1964-7 cohort as over 90% of them had been born then.

Although the draft board's intelligence test has remained unchanged since 1957, means of test scores have risen. For analysis of variance we therefore divided each of the five cohorts into those scoring above and below its own median score. The coding for educational level changed between the fourth and fifth cohorts so the fifth cohort was not comparable with the others and was omitted. For analysis of variance educational level for the four cohorts born during 1939-58 was classified according to whether the Danish *studentereksamen* (equivalent to an A level in England, Wales, and Ireland) had been achieved. We also performed correlation analyses with ungrouped scores and codes.

The overall mean heights for the five cohorts increased uniformly from 175.5 cm to 179.8 cm. The table shows the main results. The increasing relative numbers attaining the *studentereksamen* reflected the expansion of higher education over the period. Analysis of variance for the intelligence test score showed a highly significant cohort effect ( $F_{4,43969} = 668.0$ ,  $p < 0.001$ ), a significant difference between the groups scoring above and below the median ( $F_{1,43969} = 1505.6$ ,  $p < 0.001$ ), and a significant interaction between groups and cohorts ( $F_{4,43969} = 6.2$ ,  $p < 0.001$ ). Analysis of variance for the two educational levels also showed likewise a significant difference between the groups ( $F_{1,30745} = 1168.5$ ,  $p < 0.001$ ) and a

Height in relation to intelligence test score and educational level according to year of birth

Cohort	Group	Mean (SD) height (cm)	Difference between groups	Correlation with height*	Multiple correlation†
<i>Intelligence score</i>					
1939-43	Above median (n=3751)	176.9 (6.5)	2.8	0.269	
	Below median (n=3581)	174.1 (6.4)			
1944-8	Above median (n=4574)	177.9 (6.3)	2.7	0.253	
	Below median (n=4608)	175.2 (6.4)			
1949-53	Above median (n=3802)	178.6 (6.4)	2.1	0.206	
	Below median (n=3664)	176.5 (6.4)			
1954-8	Above median (n=3415)	180.0 (6.6)	2.5	0.211	
	Below median (n=3358)	177.5 (6.6)			
1964-7	Above median (n=6404)	180.9 (6.5)	2.1	0.195	
	Below median (n=6822)	178.8 (6.8)			
<i>Studentereksamen</i>					
1939-43	With exam (n=925)	179.1 (6.0)	4.1	0.283	0.297
	Without exam (n=6407)	175.0 (6.5)			
1944-8	With exam (n=1436)	179.6 (6.1)	3.6	0.265	0.278
	Without exam (n=7746)	176.0 (6.4)			
1949-53	With exam (n=1311)	180.2 (6.2)	3.2	0.234	0.241
	Without exam (n=6155)	177.0 (6.5)			
1954-8	With exam (n=1428)	181.1 (6.6)	3.0	0.228	0.238
	Without exam (n=5345)	178.1 (6.6)			

\*All  $p < 0.001$ . †Height with intelligence test score and educational level;  $p < 0.001$ .

### Comment

The fall in differences in height between groups varying in intelligence and educational level is probably attributable to changing social factors, perhaps specifically a greater homogeneity of nutritional conditions across different social classes. In earlier data we found that the social class of parents correlated with the intelligence (0.32) and educational level (0.42) of their children. In the present data for 1939-58 the correlation between intelligence and educational level was 0.73.

The decline in differences among groups and the corresponding correlations seemed to be most pronounced among those generations who were in their infancy during the 1940s. The decline thereafter was less pronounced. Whether such differences will disappear remains to be seen, particularly as the increases in height seem to be ending. Records of the Danish draft board show the average height of men to have remained virtually stable at about 180 cm for almost the past 10 years.

The differences may, however, never entirely disappear. As there are important genetic contributions to both height and intellectual ability possibly the association between the two results in part from the influence of pleiotropic genes. The relations, however, are not overwhelming. The multiple correlation of height with the score on intelligence testing and educational level for the 1954-8 cohort was 0.238 (table), and thus these two factors together accounted for less than 6% of the variance for height.

We thank the staff of the Danish Department of Military Conscription and the Danish Civil Defence. This work was supported by grant 14-4092 from the Danish Social Science Research Council.

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(Accepted 17 February 1989)

## Value of anteroposterior radiography in cervical pain of non-traumatic origin

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*Br Med J* 1989;298:1293-4

The need for anteroposterior radiography to assess the cervical spine after trauma is well recognised. In many radiology departments an anteroposterior radiograph is obtained routinely as one of a series of radiographs of the cervical spine in patients with pain of non-traumatic origin. These patients constitute a considerable proportion of the workload of a radiology department. We assessed the additional information, if any, gained from anteroposterior radiographs in these patients.

### Patients, methods, and results

The anteroposterior and lateral radiographs of 151 patients were reviewed by three radiologists. Presenting symptoms included neck and shoulder pain, limitation of movement, and neurological deficit. The radiologists worked independently, and the anteroposterior view was assessed before the lateral view. All patients with a history of trauma to the cervical spine within three months of the examination were excluded from the study.

The results of lateral and anteroposterior radiography were normal in 23 (15%) patients. No abnormality was found in either the lung apices or the soft tissues of the neck.

Of the 151 lateral radiographs, 139 showed all seven cervical vertebrae. Narrowing of the disc space was present in 101 patients, most commonly at C5-6 (86 patients). Thirteen of these patients had narrowing of the disc space at more than three positions. A total of 111 patients had osteophytic changes, which were visible in the lateral radiographs of 107 patients. Thirteen patients had minor vertebral malalignment, 12 of whom had other evidence of degenerative disease. Twenty one patients had localised kyphosis. Two patients had erosive changes.

Of the 151 anteroposterior radiographs, 127 showed vertebrae C3-7. A separate projection (with the mouth open) is usually necessary to show C1 and C2. Assessment of narrowing of the disc space was difficult: there was some interobserver variation and poor correlation with the findings in the lateral radiographs (table). Among the 111 patients affected, osteophytes

*Abnormalities seen in anteroposterior and lateral radiographs of the cervical spine in patients with cervical pain of non-traumatic origin. Values are numbers of patients*

Abnormality	Patients affected (n=151)	Patients in whom abnormality was seen in radiographs		
		Anteroposterior view only	Lateral view only	Both views
Osteophytes	111*	4	34	73
Malalignment	13		13	
Cervical ribs	6	5		1
Scoliosis	11	11		
Narrowing of disc space	101*			

\*Assessment of radiographs was difficult: no correlation between anteroposterior and lateral views in 45 patients, some correlation in 38, total correlation in 18.

(in the neurocentral joints) were visible in only the anteroposterior radiograph in four cases, whereas they were seen in only the lateral radiograph in 34. Although the facet joints were best seen in the anteroposterior radiograph, in most cases disease of these joints was also detectable in the lateral radiograph, and in all cases there was other evidence of degenerative change. Six patients had cervical ribs. In four patients these were rudimentary, and two patients had a true unilateral cervical rib, which in one case was seen only in the anteroposterior radiograph. None of these patients had symptoms attributable to the rib, and four of the six patients had evidence of degenerative disease. Eleven patients had scoliosis on anteroposterior radiography, of whom 10 had degenerative changes that were also seen on lateral radiography.

### Comment

The value of radiography in cervical spondylosis is questionable.<sup>1</sup> Oblique radiographs have been