marking and measurement of these variables on 10 films taken at least one week apart were 0.7 mm for the length of the hip axis; 0.6 mm for the length of the femoral neck; and 0.7 mm for the width of the femoral neck. All the measurements were made by one observer (KC).

Results were analysed by Student's *t* test with the programmes of the SAS Institute (Cary, North Carolina).

Results

The women had a mean age of 70 (SD 7). The mean lengths of both the hip axis and the femoral neck were significantly greater in the women who had had radiography in the 1990s (table). The mean widths of the femoral neck, however, did not differ between the two groups of women. To rule out a difference in magnification in the two sets of films due to some unrecognised change in radiographic technique, the lengths were also expressed as ratios to the widths measured from the same film. These ratios were significantly greater in the more recent films.

Mean (SD) dimensions of proximal femur* in 52 elderly white women in New Zealand in 1950s compared with those of 52 in 1990s

Dimension (mm)	1950s	1990s	P value
Length of hip axis	124.0 (8.6)	130.5 (8.6)	0.0002
Femoral neck:			
Length	79.4 (7.6)	84.9 (6.3)	0.0001
Width	38.1 (4.1)	38.6 (3.6)	0.49
Length of hip axis/width of femoral neck	3.27 (0.25)	3.40 (0.28)	0.019
Length of femoral neck/width of femoral neck	2.10 (0.24)	2.21 (0.22)	0.015

*Measured from x ray films as described in text.

Discussion

Our data show that the length of the hip axis in elderly white women in New Zealand has increased during 35 years, during which time age specific rates of hip fracture rose about twofold. A similar increase was found in the length of the femoral neck so our finding does not reflect a change over time in the dimensions of the space around the hip joint or of the femoral head. No change occurred in the width of the femoral neck, which indicates that the shape of the proximal femur has changed and that the present findings cannot be attributed to a change in the magnification factor of the films between 1950-62 and 1986-93. Indeed, the change in the radiographic technique between these years would have resulted in a small reduction in femoral dimensions so the present findings may underestimate the true change.

The increase in the length of the hip axis is almost equal to 1 SD of the distribution of this variable within

Clinical implications

- An unexplained increase in age adjusted rates of hip fracture has occurred in many countries in the past 50 years
- The length of the femoral neck has been shown to be an independent risk factor for hip fracture
- This study shows that a significant increase in the length of the femoral neck in elderly women has occurred between the 1950s and the 1990s, which is sufficient to explain the increase in age adjusted rates of hip fracture
- The increase in length of the femoral neck probably results from improved nutrition in childhood
- No single intervention, therefore, can reverse the epidemic of hip fracture

each group of women. Faulkner *et al* found that a difference of 1 SD in the length of the hip axis changed the risk of fracture twofold.¹⁰ This suggests that most of the increase in age adjusted rates of fracture in New Zealand can be accounted for by the change in the geometry of the proximal femur. Our findings thus suggest that improved nutrition before puberty is the underlying cause of the epidemic of hip fractures and that this epidemic cannot be reversed by any single intervention.

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Value of screening for secondary causes of hyperlipidaemia in general practice

Philip Evans, Denis Pereira Gray

The number of estimations of serum cholesterol concentrations being performed has risen dramatically in the past few years. The reason for the rise is partly that general practitioners are increasingly realising the importance of cholesterol and partly that authoritative reports—notably that of the Royal College of General Practitioners¹ and the European Ather-

osclerosis Society²—have encouraged general practitioners to screen for raised cholesterol concentrations.

Leading lipidologists and all the major textbooks emphasise the association between a raised serum cholesterol concentration and diabetes, hypothyroidism, excessive alcohol consumption, and renal failure,^{3,4} and virtually all authorities advise general practitioners to make sure that when hyperlipidaemia is present no treatable cause exists. All patients with hyperlipidaemia should therefore have at least blood tests for glucose, thyroid function, renal function, and liver function. These recommendations, however, have been based on theoretical considerations, and the yield of new diagnoses when these tests are done together in primary care has not been reported.

Institute of General Practice, Postgraduate Medical School, University of Exeter, Exeter EX2 5DW
Philip Evans, research fellow
Denis Pereira Gray, professor

Correspondence to: Dr Evans.

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Patients, methods, and results

We identified 330 out of 2630 patients aged ≥ 15 on our personal lists in general practice* as having a raised serum cholesterol concentration. A raised concentration was defined as a random or fasting cholesterol concentration of ≥ 6.5 mmol/l once during a period of 10 years ending in June 1991. These patients were detected opportunistically during normal surgery consultations according to practice protocols.

The age-sex distribution of the patients on both lists was similar to the national average, and the practice protocol advocated screening patients with established cardiovascular disease, family history, or clinical signs of hyperlipidaemia, obesity, diabetes, or hypothyroidism. The clinical records were then audited to determine whether each patient had been investigated for a secondary cause of their hyperlipidaemia with tests to determine concentrations of random blood glucose; serum thyroxine and thyroid stimulating hormone; and serum creatinine and γ -glutamyltransferase. Patients whose results were abnormal were either managed accordingly or tested again if the diagnosis was uncertain.

Of the 330 patients with a raised serum cholesterol concentration (range 6.5 to 10.6 mmol/l; mean 7.4) 156 were male. The patients were mainly in the older age groups with 127 aged >65 and 50 aged >75 (range 23 to 87). Strenuous efforts were made to achieve complete coverage with each of the screening tests but

by July 1993 we had achieved rates of only 86.6-95.5%. The full set of tests, however, was performed in 79% (262) of the patients.

The table shows the results of the tests. The 1542 screening tests yielded six new definitive diagnoses based solely on the screening tests: subclinical hypothyroidism (1); newly diagnosed diabetes mellitus (2); and raised γ -glutamyltransferase (3, who were also dependent on alcohol). Two further patients who had persistently raised concentrations of γ -glutamyltransferase needed further investigation. Eight patients had slightly raised serum creatinine concentrations, four of whom may need further investigation.

Comment

The total yield of new diagnoses reached on the basis of this series of blood tests was only 6 (1.8% of the patients). At 1993-4 prices this exercise would have cost about £5000 for the tests alone and probably at least as much again for staff time in our practice. We therefore question the place of such biochemical screening for causes of secondary hyperlipidaemia in primary care.

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Results of 1542 screening tests for secondary hyperlipidaemia in 330 patients with raised serum cholesterol.* Values are numbers of patients

Blood test	Total tested	Abnormal result at first test		Normal result at repeat test	New diagnosis	Further investigation needed
		Total	No expected†			
Thyroxine	311	2	2			
Thyroid stimulating hormone	286	12	9	2	1	
Glucose	321	29	19	8	2	
γ -Glutamyltransferase	309	20	10	5	3	2
Creatinine	315	26	14	8		4
Total		89	54	23	6	6

*Random or fasting cholesterol of ≥ 6.5 mmol/l.

†Patients known to have disorder already or who were receiving treatment that could have led to observed abnormal result.

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Gamete intrafallopian transfer in older women: effect of limiting number of gametes transferred

C J Redgment, T Al-Shawaf, J G Grudzinskas, I L Craft

London Gynaecology and Fertility Centre, London W1N 1AF
C J Redgment, research fellow
T Al-Shawaf, consultant
I L Craft, director

Academic Department of Obstetrics and Gynaecology, Royal London Hospital, London E1 1BB
J G Grudzinskas, professor

Correspondence to:
Dr C J Redgment, Panaga Hospital, c/o Brunei Shell Petroleum Sbn Bhd, Seria 7082, Brunei Darussalam, North Borneo.

The Human Fertilisation and Embryology Authority and its predecessors have restricted the maximum number of oocytes and embryos that can be transferred in gamete intrafallopian transfer and in vitro fertilisation to minimise the risk of multiple pregnancy. The current maximum of three practically eliminates the risk of quadruplet or higher order pregnancies.

Women in their fifth decade have reduced fecundity and an increased risk of miscarriage after spontaneous or assisted conception.^{1,2} Because of this and the current restrictions we are concerned that such women might use donor oocytes from young women to overcome infertility, although they might have an acceptable chance of pregnancy if a flexible number of their own oocytes could be used. We therefore retrospectively assessed the effect of the restrictions on the outcome of gamete intrafallopian transfer in older women.

Subjects, methods, and results

We reviewed treatment cycles of gamete intrafallopian transfer of known outcome in women aged 40 or older that had occurred between 1 January 1987 and 31 July 1993. Of these, 151 were performed before 7 October 1987 (group 1) and had a flexible number of oocytes transferred based on age and other factors. After that date, 731 cycles were performed under the restrictions of the licensing authorities (group 2); the maximum number of oocytes transferred was four until 1 August 1991 (625 cycles) and three after that (106 cycles).

The technique and selection of patients for treatment at this unit have not changed,¹ and the mean age was 41.4 and 41.9 years in groups 1 and 2 respectively. Cycle management—notably, the introduction of analogues of gonadotrophin releasing hormone and the preparation of sperm—has, however, improved considerably. Pregnancy was defined as a serum β human chorionic gonadotrophin concentration ≥ 25 IU/l within 16 days of the procedure, and its rate was expressed per transfer. Multiple pregnancy was assessed by ultrasonography in the first trimester.

The pregnancy rate fell from 23% in group 1 (flexible policy) to 16% in group 2 (restricted) (table). Twin pregnancies occurred in four out of 34 pregnancies (12%) in group 1 and in 10 out of 113 pregnancies (9%) in group 2. One triplet pregnancy occurred in group 1