Trends in paediatric medical admissions

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Abstract

In the Oxford region from 1975 to 1985 the rate of discharge from paediatric departments, when standardised for age, rose by 88%. This increase was studied by using routinely collected data. It occurred in all age groups and was due mainly to an increase in emergency admissions for acute common childhood illnesses, particularly respiratory and gastrointestinal diseases. There was no evidence that increasing morbidity accounted for this rise; the change was due to factors in medical care. Over the 11 years the median length of stay fell from 2·4 to 1·5 days and by 1985 40% of children were discharged within a day after admission.

The increase in admissions was due to lower thresholds for admission resulting in part from the increased availability of beds because of the diminishing lengths of stay.

Introduction

As a result of the pioneering work of Bowlby[1] admissions to hospital in childhood have for many years been popularly associated with long term psychological damage to the child. There seems to be a widespread feeling among health care workers and the public that admissions in childhood should be, and are being, avoided when possible and that rates of admission are being contained. This seems to be far from the case. Rises in rates of admission have been observed in many specialties,[2] and have been attributed to increased demands from the public and primary care teams, to changing technology, and to changing demographic structure.[3] I studied the increase in rates of admission to paediatric departments in the Oxford region from 1975 to 1985, which exceeded that of any other acute specialty.

TABLE I—*Rates of admission per 1000 children aged ≤14 in paediatrics (excluding special care baby units) by age group in Oxford region (excluding Aylesbury Vale and Milton Keynes), 1975 and 1985*

Age group (years)	1975	1985
0	70·5	147·8
1-	28·4	46·6
5-	8·9	17·0
10-14	4·1	9·8

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Methods

All analyses were carried out on routinely collected data. I studied paediatric medical admissions under consultant paediatricians, excluding neonatal services. The term admissions to hospital represents discharges, deaths, and day cases.

The Oxford region covers four counties: Oxfordshire, Buckinghamshire, Berkshire, and Northamptonshire. Many of the data came from the Oxford Regional Health Authority's Hospital Activity Analysis. Data from Aylesbury Vale and Milton Keynes Health Authorities were excluded: Aylesbury Vale because of incompleteness of the clinical data and Milton Keynes because the paediatric unit opened only in 1984. The statistics used therefore covered those children resident and treated in the six remaining districts.

Data on attendances of outpatients within the region were obtained from annual hospital returns (SH3) and in England and Wales from the national returns (Department of Health and Social Security hospital statistics—form SH3, 1975-85). Inpatient data were obtained from the Hospital Activity Analysis for the region, which for paediatrics included neonatal admissions. Admissions to special care baby units were identified by ward on admission and excluded from the analyses of trends. Data on admissions to hospital in England and Wales were obtained from the Hospital In-Patient Enquiry.[4]

Standardised rates of admission and ratios for each year were obtained by direct standardisation against the 1985 population of children aged <1, 1-4, 5-9, and 10-14 in the region and those aged ≤4 and 5-14 in England and Wales. The increase in rates of admission for each age group during 1975-85 was tested by the χ^2 test for trend, and 95% confidence intervals were calculated as described by Armitage and Berry.[5] Significance in the changes in the distribution of admissions by length of stay for 1975 and 1985 was tested with the χ^2 test for contingency tables.

Analyses requiring the use of records based on patients as well as individual episodes of admission were obtained from the Oxford record linkage study.[6] The linked files were used to ascertain the numbers of patients contributing the episodes of admission by age group within each year 1975-85. The files were also used to assess the proportion of admissions and bed days that were accounted for by readmission of infants aged <1 who had been previously admitted to special care baby units in the region up to 1984, the latest year that was linked to the subsequent year at the time of this study.

The contribution to the rise in admissions made by various factors was estimated by determining, for each factor, the difference between the number of admissions for that factor in 1985 and the numbers expected in 1975 when standardising the 1975 data to the 1985 population and then determining the percentage contribution of that difference to the overall age standardised increase.

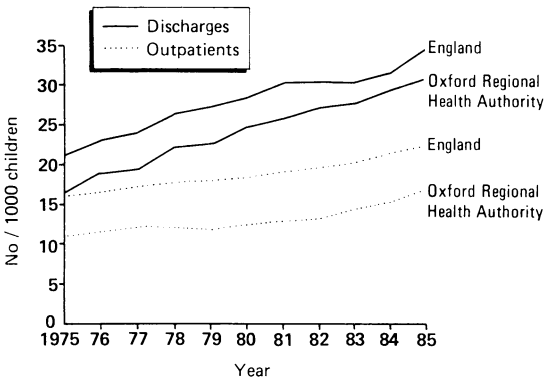
Results

CHANGES IN YEARLY ADMISSIONS

From 1975 to 1985 the number of admissions of children living and treated in the region (excluding Aylesbury Vale and Milton Keynes) rose from 7523 to 13 043, an increase of 73%. Over the same period the number of children aged ≤14 fell by 13%. The rates of admission per 1000 children rose substantially in all age groups (table I). Patients aged over 14 showed an absolute rise of 152% but represented only 1% of admissions in both years. The χ^2 test for trend for admissions over the 11 years showed an average yearly increase of 7·7% in those aged <1, 5·0% in those aged 1-4, 6·3% in those aged 5-9, and 8·5% in those aged 10-14 (all $p<0·001$). The average increases among the groups were different, but in each age group the rises were sufficiently similar to make it appropriate to

standardise for age. Standardised rates of admission, taking into account the age groups <1, 1-4, 5-9, and 10-14, are therefore used throughout this paper.

The age standardised rate of admission increased from 16·4/1000 (95% confidence interval 16·0 to 16·8/1000) to 30·9/1000 (30·4 to 31·4/1000), a rise of 88%. Nationally over the same period the age standardised rate increased by 64% (fig 1). From 1975



Rates of admission standardised in 1985 population and new outpatient rate in paediatrics for children treated in Oxford region (excluding Aylesbury Vale and Milton Keynes) and England from 1975 to 1985

to 1985 the number of available beds rose from 5·5 to 5·9/1000 children aged ≤14 in the region, and with the increased turnover per bed there was a corresponding drop in length of stay (table II). In 1975 the median length of stay was 2·4 days and in 1985 it was 1·5 days. In 1975, 29% of children were discharged within a day after admission and 20% stayed more than one week. In 1985 these figures were 40% and 10% respectively ($p<0·001$). Despite the increased turnover and shorter lengths of stay and the changing population of children the total number of occupied beds in the region increased from only 3·0 to 3·5/1000 children aged ≤14.

TABLE II—*Lengths of stay in paediatric departments in Oxford region. Proportion of children by day of discharge, 1975 and 1985*

Day of discharge	1975	1985
0	8·2	10·2
1	20·8	29·5
2	15·8	20·7
3	11·9	12·2
4	7·8	7·5
5	5·9	4·7
6	4·9	3·2
7	3·9	2·3
8	3·2	1·7
9	2·4	1·3
10	1·9	1·1
11	1·7	0·9
≥12	11·6	4·7

THE INCREASE IN ADMISSIONS

Changes in source of admission

Substitution of other specialties by paediatrics might explain some of the increase (table III). Standardised rates of admission in children aged ≤14 rose by 38%. The rates of admission in general medicine fell by 32%, in ophthalmology by 6%, and in neonatal special care by 18%. The reduction in neonatal special care was due to changing criteria of admission,[7] and that in discharges from ophthalmology was unlikely to have been due to substitution. The fall in admissions in general medicine could have been genuine substitution and if so would account for 2% of the increase in paediatric admissions (table IV). Increased transfer from other specialties to paediatrics or reducing

TABLE III—*Admissions of children aged ≤14 by specialty in Oxford region (excluding Aylesbury Vale and Milton Keynes), 1975 and 1985*

Specialty	No (%) in 1975	No (%) in 1985	Standardised admission ratio* (95% confidence interval)
Paediatrics	7523 (27)	13043 (38)	188 (185 to 191)
General surgery	4838 (18)	4586 (13)	108 (105 to 111)
Ear, nose, and throat	4829 (17)	6479 (19)	161 (157 to 164)
Orthopaedics	4466 (16)	4507 (13)	117 (113 to 120)
Neonatal intensive care	2974 (11)	2532 (7)	82 (78 to 85)
Ophthalmology	961 (3)	792 (2)	94 (88 to 101)
Plastic surgery	491 (2)	597 (2)	132 (121 to 143)
Dentistry	405 (1)	685 (2)	196 (182 to 211)
General medicine	399 (1)	237 (1)	68 (59 to 77)
Other specialties	728 (3)	776 (2)	119 (110 to 127)
Total	27614 (100)	34216 (100)	138 (136 to 139)

*Percentage difference between actual numbers of admissions in 1985 and numbers expected if 1975 age specific rates are applied to 1985 population.

TABLE IV—*Estimates of contribution to rise in paediatric admissions in Oxford region from 1975 to 1985*

Reason for increase	Estimated contribution (No (%))
Substitution for other specialties	111 (2)
Changes in source of admission	278 (5)
Increase in readmissions of babies from special care baby unit	367 (6)
Increase in underlying disease	660 (11)
Increase in readmissions	1601 (26)
Minimum unaccounted for	3085 (51)
Total increase in admissions (age standardised)	6102 (100)

numbers of transfers from paediatrics to other specialties could be a reason for the increasing rate of discharge. The proportion of children transferred to other specialties was 6% in 1975 and 2% in 1985. This difference was due mainly to transfer of children from paediatric to general surgical departments in one district in 1975. This accounted for about 5% of the rise in admissions (table IV).

In 1975, 85% of children admitted to paediatrics were admitted as emergencies, and this had risen to 91% in 1985. Planned admissions increased from 721 to 1038, though this represented a fall in percentage terms from 9% to 8%. The proportion of children treated as day patients dropped from 4% to 3%. The other sources of admission—that is, transfers into paediatric departments from other hospitals and babies born in hospital—dropped from 6% to 2%. Thus most of the rise was accounted for by an increase in emergency admissions. As no information on self referral can be obtained from the Hospital Activity Analysis the contribution that this made cannot be measured.

Contribution of readmissions

Readmissions to paediatric departments in any one year were examined with files from the Oxford record linkage study. The average number of admissions per child rose from 1·22 in 1975 to 1·28 in 1985. Readmissions therefore represented 18% of all admissions in 1975 and 22% in 1985. The contribution that readmissions made to the overall increase was 26% (table III), this being the difference between the numbers of readmissions in 1985 (22% of 13043) and 1975 (18% of 6941, the expected number of admissions in 1975 standardised to the 1985 population) expressed as a percentage of the overall age standardised increase.

A possible contribution to the rising rate of admission could be the increase in numbers of low birthweight babies surviving and requiring subsequent readmission. Altogether 80% in 1975 and 77% in 1984 of readmissions of babies aged <1 who had been in the special care baby unit were to paediatric departments. The rate of readmission of these babies to paediatric departments rose from 12·9 to 14·4/1000 live births and the total number of readmissions rose over these nine years from 1·47 to 1·58. From 1975 to 1984 these readmissions represented a constant 6% of all paediatric admissions and therefore accounted for 6% of the increase in admissions (table IV). These babies made a substantial contribution to the increase in paediatric workload. From 1975 to 1984 the average length of each admission increased from 7·6 to 8·4 days, which went against the general trend in lengths of stay for other admissions, and the contribution to occupied bed days increased from 6·4 to 10·6%.

Changes in diagnoses

The pattern of diagnosis changed between 1975 and 1985. In both years respiratory diseases made the largest contribution to admissions, but by 1985

TABLE V—*Diagnostic groups for principal diagnoses contributing to paediatric admissions in Oxford region (excluding Aylesbury Vale and Milton Keynes), 1975 and 1985*

Diagnosis	International Classification of Diseases code	No (%) in 1975	No (%) in 1985	Standardised admission ratio (95% confidence interval)
Intestinal infections	003-009	462 (6·1)	317 (2·4)	71 (63 to 79)
Malignant neoplasms	140-208	114 (1·5)	95 (0·7)	99 (79 to 118)
Diabetes mellitus	250	127 (1·7)	113 (0·9)	103 (84 to 123)
Epilepsy	345	183 (2·4)	206 (1·6)	129 (111 to 147)
Otitis media	381, 382	88 (1·2)	148 (1·1)	180 (151 to 208)
Acute upper respiratory tract infection	463-465	607 (8·1)	1 584 (12·1)	277 (263 to 290)
Bronchitis/bronchiolitis	466, 490	304 (4·0)	639 (4·9)	214 (197 to 231)
Pneumonia	480-486	162 (2·2)	293 (2·2)	198 (175 to 221)
Asthma	493	356 (4·7)	1 705 (13·1)	552 (526 to 578)
Non-infective gastroenteritis and colitis	558		616 (4·7)	
General symptoms (includes convulsions)	780	476 (6·3)	878 (6·7)	198 (185 to 211)
Other symptoms, signs, and ill defined conditions	781-796	606 (8·1)	1 212 (9·3)	221 (208 to 233)
Intracranial injury of unspecified nature	854	57 (0·8)	356 (2·7)	720 (645 to 794)
Poisoning and toxic effect	960-977, 980-989	840 (11·2)	431 (3·3)	56 (51 to 61)
Total		4 382 (58·2)	8 593 (65·9)	
Total all causes		7 523 (100·0)	13 043 (100·0)	188 (185 to 191)

admissions due to respiratory diseases (International Classification of Diseases, codes 460-519) had risen by 204%, representing an increase from 21% to 35% of all admissions. Discharges with principal diagnoses of diseases of the digestive system (codes 520-579) and symptoms, signs, and ill defined conditions (codes 780-799) both showed a large rise in absolute numbers and a rise in the percentage contribution they made to overall discharges. The rise in admissions for these three groups accounted for 93% of the overall rise from 1975 to 1985.

Though there was an increase in nearly all diagnostic groups, the largest increase was in respiratory diseases (table V). Age standardised admissions nearly trebled for acute upper respiratory tract infection, doubled for bronchitis, and increased nearly fivefold for asthma. Respiratory diseases accounted for over half the overall increase and asthma for more than a quarter. Examination of data from some of the intervening years confirmed these trends. The largest percentage increase was due to head injury. This was because of transfer of care from trauma and orthopaedic departments to paediatric departments in two districts between the two years. Admissions for intestinal infection, malignancy, and poisoning decreased from 1975 to 1985 (table V). The decline in intestinal infections seems to have been due to substitution of the diagnosis of non-infective gastroenteritis.

Looking only at principal diagnoses fails to determine whether there has been a change in admission for underlying chronic illness. For this purpose I explored underlying diagnoses on discharge. For 1975 and 1985 the average numbers of diagnoses per hospital episode (for those admissions with clinical details) were close, being 1·32 in 1975 and 1·35 in 1985. Underlying diagnoses were established by looking at all diagnoses recorded on the Hospital Activity Analysis records. Table VI gives the number of mentions of a diagnosis on discharge for some selected diagnoses. Admissions for malignant neoplasm (codes 140-208) and diabetes mellitus (code 250) showed a similar pattern to those for principal diagnoses. Other groups showed a rise consistent with the general pattern for paediatric admissions. Admissions for underlying chronic disease accounted for about 11% of the increase (table III).

TABLE VI—*Selected principal and subsidiary diagnoses on discharge from paediatrics (excluding special care baby unit) in Oxford region (excluding Aylesbury Vale and Milton Keynes), 1975 and 1985*

Diagnosis	International Classification of Diseases code	1975	1985	Standardised admission ratio (95% confidence interval)
Malignant neoplasms	140-208	119	93	92 (74 to 111)
Diabetes mellitus	250	135	133	115 (95 to 134)
Disorders of metabolism (includes cystic fibrosis)	270-275, 277	80	138	186 (155 to 217)
Disorders of blood	280-289	267	297	121 (108 to 135)
Mental retardation	315, 319	112	126	128 (105 to 150)
Infantile cerebral palsy	343	60	90	173 (137 to 209)
Congenital anomalies of heart	745-747	153	358	241 (216 to 266)
Other congenital anomalies	740-744, 748-759	310	559	187 (172 to 203)
Total		1236	1794	158 (151 to 166)

Discussion

Only about a quarter of the rise in paediatric admissions in the region from 1975 to 1985 may be explained by substitution for other specialties, by readmission of babies previously in the special care baby unit, and by admission of children with chronic underlying disease. An increase in readmissions accounted for 26% of the rise, but a number of the children who were readmitted were probably in the above groups. Even if no overlap occurred these categories explain less than half the rise.

Changes in social factors, though not examined in this study, do not seem to have been a contributory factor. In 1977 a study from Nottingham of 399 consecutive emergency paediatric admissions showed that over 20% of children were admitted primarily for social reasons and many of the remainder came from homes judged to be at a disadvantage.[8] This study was repeated in 1985 and, though admissions to the paediatric department had increased by 100%, the proportion of admissions that were primarily for social reasons had dropped to 9%, suggesting that the number of children requiring admission for social reasons had remained fairly constant over the years studied.[9]

The rise in this region occurred in all age groups and was due mainly to an increase in emergency admissions in three categories: respiratory diseases; digestive disorders; and symptoms, signs, and ill defined conditions. Respiratory diseases increased in absolute and relative terms more than any other group. A major contribution to the doubling in rates of admission seen in Nottingham from 1975 to 1985 was the sixfold increase in respiratory diseases.[9] For all diagnostic groups apart from diabetes, pneumonia, and poisoning the numbers of admissions increased from 1975 to 1985, though by different degrees. Much the largest increase was in respiratory diseases: acute upper respiratory tract infection, bronchitis and bronchiolitis, and asthma all increased substantially.

No surveys of the changing occurrence of childhood illness around the period in question were available apart from the national morbidity surveys of 1971-2 and 1981-2.[10,11] As these were surveys of patients presenting to their general practitioners changes over time may reflect changes in behaviour of ill people and diagnostic accuracy rather than changes in incidence and prevalence. Nevertheless, the surveys provide

some useful data on changing trends. From 1971 to 1981 the number of episodes of illness seen in general practice per 1000 children aged ≤14 rose by 23% and the number of children seen per 1000 rose by 10%. Much of the increase was due to diagnoses in four groups in the International Classification of Diseases: infectious diseases (codes 110-139) rose by 35%; diseases of the nervous system and sense organs (codes 320-389) rose by 52%; respiratory diseases (codes 460-519) rose by 12%; and symptoms, signs, and ill defined conditions (codes 780-799) rose by 39%. Much of the rise in respiratory disease was due to the increase (by 14%) in episodes of upper respiratory tract infection. Episodes of asthma rose by 108%, and episodes of bronchitis and bronchiolitis fell by 12%. These trends do not resemble those in paediatric admissions and the rises in admissions for respiratory diseases far exceed any changes occurring in primary care.

Large rises in admissions for asthma have been reported by others,[9 12 13] but changes in diagnostic fashion do not account for this.[12 13] There is little evidence that the prevalence of asthma in childhood is increasing[14] and the rise in admissions for asthma far exceeds any postulated increase in prevalence and must be due to changes in medical care.[12] The rise in paediatric admissions is therefore probably due not to changes in occurrence but to changes in the thresholds for admission. To bring about the rise in admissions there must have been a change in medical practice over the years 1975 to 1985.

In paediatrics several changes in diagnostic and therapeutic techniques have taken place in recent years. For many conditions, however, particularly acute respiratory diseases, there have been few changes in either; assuming that there has been no change in morbidity, the rise in admissions must reflect changing thresholds for admission. The other major change in medical practice has been the rapidly decreasing lengths of stay. Possibly shorter stays are due to increasing demand, resulting in increasing pressure of admissions. Demand rose with increasing numbers of outpatient referrals and a rise of 14% in referrals of children to all specialties from 1971 to 1981.[10 11] In addition, self referral increased because of changes in criteria for admission for chronic, prolonged, or recurrent illness, though information on the extent of this increase cannot be obtained from routine data sources. In particular, criteria for admission for asthma have changed with an increasingly open door policy. A paediatric bed occupancy consistently below 60% in the region in 1975-85, however, does not suggest pressure on beds. In addition, bed crises, so common in the adult acute specialties, do not seem to have been a feature of most paediatric wards, and the fact that there is open access to certain patients suggests that the need to ration beds has decreased.

An alternative argument could therefore be that stays are shorter not because of pressures on beds but because of changes in medical practice. Lengths of stay are dropping in all acute services, and evidence, both observational and experimental, shows that short stays in many instances are both efficient and effective. This is most apparent in the move to day surgery in the United Kingdom and abroad.[15] The reason for the decreasing lengths of stay in paediatrics can only be postulated. Knowledge of the adverse effects of hospital admission on children must have encouraged shorter stays, and, concomitantly, the severity of childhood illness in the community may have been reduced.

Rates of admission correlate with the supply of beds within any one year.[16] The number of available beds per child remained nearly constant in the region during 1975-85, and the rises in paediatric admissions were not, therefore, due to increasing numbers of available beds. Another way of increasing availability is by freeing occupied beds. If stays become shorter as a result of medical practice this will free beds, which will in turn be available for further admissions.

Whatever the underlying reasons for the increase in hospital admissions, the role that paediatricians, general practitioners, and parents expect of admission has changed, the model now being one of brief spells of admission and rapid discharge. With shorter stays and parents having ready access to their children the concern about the adverse effects of admission has diminished, and this in itself may be a further factor contributing to the rising admission rates.

The relentless and unexplained rise in admission rates in the NHS in recent years is an important reason for the current financial problems in the acute services. Reducing thresholds for admission in paediatrics seems to be making a substantial contribution to the rise that has occurred, and possibly this is arising from reducing lengths of stay resulting in increased bed availability. This may also apply to other specialties. The rise has many implications for children, their families, nursing and medical staff, and hospital managers. An understanding of the rise and, if necessary, ways of controlling or coping with it must be sought.

This rapid rise in admissions has parallels with variations in rates of referral and admission that have been noted for many conditions and in many specialties.[17] Asthma, bronchitis, upper respiratory tract infection, and gastrointestinal diseases made the greatest contribution to the increase in paediatric admissions; hospital admission rates in children with these conditions vary greatly.[18]

Understanding the rise in admissions and reducing this variation must come from a better understanding of the referral and admission process. In a study from the United States 13% of patient days in general paediatrics were judged inappropriate.[19] Such a study should be undertaken in this country to assess whether this is a problem in paediatrics. The appropriateness of self referrals and referrals from general practitioners also require assessment. Ways of influencing referral practice need to be examined, particularly the use by paediatricians of protocols and other educational strategies targeted at general practitioners. More needs to be known about the effect of open door policies on children and their families and on general practitioners. New models of acute paediatric care such as day care, intermediate nursing units, and paediatric community nurses are emerging in response to the rapid increase in admissions: these must be evaluated. Perhaps most important of all is the need to understand the costs and benefits of hospital admission to the child and his or her family. Finally, to gain a better understanding of the health care needs of children and the interface between primary and secondary care systematic monitoring of child health is required.[14 20]

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Trial of support treatment with human chorionic gonadotrophin in the luteal phase after treatment with buserelin and human menopausal gonadotrophin in women taking part in an in vitro fertilisation programme

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Abstract

***Objective*—To evaluate the effect of support with human chorionic gonadotrophin in the luteal phase in women taking part in an in vitro fertilisation programme after buserelin and human menopausal gonadotrophin were used to hyperstimulate their ovaries.**

***Design*—Controlled group comparison.**

***Setting*—Outpatient department of a private hospital.**

***Patients*—115 Women with indications for in vitro fertilisation, all of whom had at least one embryo transferred.**

***Interventions*—After suppression of the pituitary with buserelin the ovaries of all the women were stimulated with human menopausal gonadotrophin on day 4 of the luteal phase. Human chorionic gonadotrophin (10 000 IU) was given to induce ovulation, and oocytes were recovered 34 hours later. Embryos were transferred 46 to 48 hours after insemination. Women who had received the 10 000 IU of human chorionic gonadotrophin on a date that was an uneven number (n=61) were allocated to receive support doses of 2500 IU human chorionic gonadotrophin three and six days after that date. The remaining 54 women did not receive hormonal support.**

***End point*—Determination of the rates of pregnancy.**

***Measurements and main results*—Support with human chorionic gonadotrophin did not significantly alter the progesterone or oestradiol concentrations in the early or mid-luteal phase. The mean (range) progesterone concentrations in the late luteal phase in women who did not become pregnant were, however, significantly higher in those who received support (16 (9-110) nmol/l *v* 8 (4-46) nmol/l), and the luteal phase was significantly longer in this group (14 days *v* 12 days). The rate of pregnancy was significantly higher in the women who received support than in those who did not (25/61 *v* 8/54).**

***Conclusions*—When buserelin and human menopausal gonadotrophin are used to hyperstimulate ovaries support with human chorionic gonadotrophin in the luteal phase has a beneficial effect on in vitro fertilisation.**

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Introduction

The value of providing hormonal support in the luteal phase after hyperstimulation of the ovaries and aspiration of follicles for in vitro fertilisation has been much debated. Adequate production of progesterone by the corpus luteum is necessary for implantation of a zygote and early maintenance of pregnancy.[1] This may not be achieved either because of follicular aspiration, which by removing granulosa cells during recovery of oocytes may reduce the production of progesterone in the luteal phase or, alternatively, because the dose of human chorionic gonadotrophin given to induce ovulation may not adequately stimulate the corpus luteums. Varygas *et al*, however, showed that follicular aspiration does not lead to lower progesterone concentrations[2]; indeed, because of the presence of multiple corpus luteums progesterone concentrations after in vitro fertilisation and transfer of an embryo are higher than in a natural cycle.[3]

Cycles in which conception occurs are associated with higher progesterone concentrations in the luteal phase,[4] and in vitro fertilisation regimens often include empirical hormonal support during the luteal phase in an attempt to mimic this hormonal profile. Hyperstimulation regimens consisting of human menopausal gonadotrophin alone or in combination with clomiphene citrate have been followed by supplementation during the luteal phase with progesterone[5,6] or human chorionic gonadotrophin,[7,8] or both.[9] Rates of pregnancy showed no significant improvement with these regimens, although in two studies human chorionic gonadotrophin prolonged the luteal phase,[10,11] which was thought to exert a beneficial effect as poor rates of pregnancy have been associated with regimens that lead to short luteal phases.[12] Acceptable rates of pregnancy are achieved without hormonal supplementation in the luteal phase.[13,14] Thus there is no clear evidence for a beneficial effect of supplementation.

Treatment with both gonadotrophin releasing hormone agonists and gonadotrophins is an effective