82 Kubista E, Müller G, Spona J. Behandlung der Mastopathie mit cyclische Mastodynie: klinische Ergebnisse und Hormonprofiele. *Gynäkologische Rundschau* 1986;**26**:65-79.
83 Michaud J. Action d'Apis mellifica et d'Arnica montana dans la prévention des oedèmes post-opératoires en chirurgie maxillo-faciale à propos d'une experimentation clinique sur 60 observations [Dissertation]. Nantes: Université de Nantes, 1981.
84 Mergen H. Therapie posttraumatischer Schwellungen mit Traumeel. Beitrag zur Relation "Dosis:Wirkung" eines Kombinationspräparates. *Münchener Medizinische Wochenschrift* 1969;**111**:298-300.
85 Caspar J, Foerstel G. Traumeel bei traumatischen Weichteilschwellungen. *Therapiewoche* 1967;**17**:892-5.
86 Khan MT. Clinical trials for hallux valgus with the Marigold preparations. *Proceedings of the 40th Congress of the Liga Medicorum Homoeopathica Internationalis (Lyon)* 1985;232-5.
87 Anonymous. The Cantharis study. *Midlands Homoeopathic Research Group, Research Newsletter* 1980;No 3:19-20.
88 Delaunay M. Homeopathie, la maternelle. *Médecines Douces* 1985;Sep:35-7.
89 Heulluy B. *Essai randomisé ouvert de L 72 (spécialité homéopathique) contre diazépam 2 dans les états anxiodépressifs.* Metz: Laboratoires Lehning, 1985.
90 Ponti M. Evaluation d'un traitement homéopathique du mal des transports. Bilan de 93 observations. In: Boiron J, ed. *Recherches en homéopathie.* Sainte-Foy-les-Lyon: Fondation Française pour la Recherche en Homéopathie, 1986:71-4.
91 Vu Din Sao, Delaunay M. Médecine douce et sport dur: un mariage heureux. *Homéopathie Française* 1983;**71**:147-9.
92 Dexpert M. Prévention des naupathies par Cocculine. *Homéopathie Française* 1987;**75**:353-5.
93 Alibeu JP, Jobert J. Aconit en dilution homéopathique et agitation post-opératoire de l'enfant. *Pédiatrie* 1990;**45**:465-6.
94 Davies AE. A pilot study to measure aluminium levels in hair samples of patients with dementia and the influence of aluminium 30c compared with placebo. *Midlands Homoeopathic Research Group, Research Newsletter* 1988;No 18:42-6.
95 Coudert-Deguillaume M. Etude expérimentale de l'action du Caulophyllum dans le faux travail et la dystocie de démarrage [Dissertation]. Limoges: Université de Limoges, 1981.
96 Kennedy CO. A controlled trial. *British Homoeopathic Journal* 1971;**60**:120-7.
97 Paterson J. Report on mustard gas experiments. *British Homoeopathic Journal* 1943;**23**:131-42.
98 Basu TK. Studies on the role of physostigma venenosum in the improvement of simple myopia. *Hahnemannian Gleanings* 1980;**47**:224-31.
99 Hariveau E. La recherche clinique à l'Institut Boiron. *Homéopathie* 1987;No 5:55-8.
100 Kirchhoff HW. Ein klinischer Beitrag zur Behandlung des Lymphödems. *Der Praktische Arzt* 1982;**21**:621-33.
101 Kienle G. Wirkung von Carbo Betulae D 6 bei respiratorischer Partialinsuffizienz. *Arzneimittelforschung* 1973;**23**:840-2.
102 Ventoskovskiy BM, Popov AV. Homoeopathy as a practical alternative to traditional obstetric methods. *British Homoeopathic Journal* 1990;**79**:201-5.
103 Schwab G. Lässt sich eine Wirkung homöopathischer Hochpotenzen nachweisen? Eine kontrollierte Cross-over Doppelblindstudie bei Hautkrankheiten. *Allgemeine Homöopathische Zeitung* 1990;**235**:135-9.
104 Khan MT, Rawal RS. Comparative treatments of verruca plantaris. *Proceedings of the 31st Congress of the Liga Medicorum Homoeopathica Internationalis (Athens)* 1976:265-9.
105 Knipschild P. Changing belief in iridology after an empirical study. *BMJ* 1989;**299**:491-2.
106 Knipschild P, Leffers P. De informatiewaarde van empirisch onderzoek. *Tijdschrift voor Sociale Gezondheidszorg* 1990;**68**(suppl):31-2.
107 Scofield AM. Homoeopathy and its potential role in agriculture. A critical review. *Biological Agriculture and Horticulture* 1984;**2**:1-50.

(Accepted 4 December 1990)

Acute myeloblastic leukaemia—a model for assessing value for money for new treatment programmes

Patricia J Lobo, Ray L Powles, Angela Hanrahan, Derek K Reynolds

Abstract

***Objective*—To measure the effects of changes in treatment of acute myeloblastic leukaemia that may give better value for money.**

***Design*—Retrospective analysis of patients' notes to identify items of management costing money; prospective costing of these items. The Medical Research Council acute myeloblastic leukaemia 9 trial was used to identify the amount and distribution of these costs when either one or two courses of induction treatment were required to obtain complete remission. These findings were then extrapolated to four published international controlled trials using similarly intense treatment and in which the number of courses of treatment required for complete remission was stated, to compare British costs for treatment with idarubicin and daunorubicin, both in combination with cytarabine.**

***Setting*—Leukaemia unit, Royal Marsden Hospital, London.**

***Subjects*—Data on 10 patients receiving intensive induction treatment for acute myeloblastic leukaemia were used to identify 160 items of cost in four broad groups: general (including accommodation), diagnostic, supportive treatment, and cytotoxic chemotherapy. One newly treated patient was prospectively assessed over one month, including a time and motion study, to cost these items; then costs for 268 patients from the MRC trial receiving moderate induction chemotherapy including daunorubicin were assessed, and costs for treatment of 522 patients in the four international studies comparing daunorubicin with idarubicin were analysed.**

***Main outcome measures*—Cost effectiveness was measured as the overall cost to obtain complete remission in untreated patients with acute myeloblastic leukaemia after treatment with idarubicin or daunorubicin.**

***Results*—The 160 costed items were measured for their sensitivity in varying the total cost of treatment, this being assessed within Britain in other district general and private hospitals to measure the extremes of cost of these items. Overall, idarubicin, although more expensive, showed a substantial saving (£1477 per patient) in total hospital costs, more than offsetting the increased cost (£607) of the new treatment, an overall saving of £870 per patient (5%).**

***Conclusion*—Approaches modelling cost effectiveness may be an essential part of planning new programmes of treatment in the future. This method can be used to estimate the cost effectiveness of the treatments in different environments and countries where costs may vary widely.**

Medical Department, Farmitalia Carlo Erba (UK) Limited, St Albans, Hertfordshire
Patricia J Lobo, PHD, *clinical research scientist*

Leukaemia Unit and Finance Department, Royal Marsden Hospital, Sutton, Surrey SM2 5PT
Ray L Powles, FRCP, *physician in charge*
Angela Hanrahan, BSC, *research sister*
Derek K Reynolds, ACMA, *director of finance*

Correspondence to:
Dr Powles.

BMJ 1991;**302**:323-6

Introduction

After the publication of the government's white paper *Working for Patients* there has been widespread debate on the economic aspects of health care policy. Although in a broad economic analysis total costs and benefits for the whole national economy and for individual patients should be considered, at present only costs and effectiveness within the NHS can be assessed, and it is these that this paper considers.

Improvements in survival of patients treated for acute myeloblastic leukaemia have resulted primarily from the development of more intensive treatment regimens, improved supportive care, and marrow transplantation.[1] The standard initial treatment for induction of remission of acute myeloblastic leukaemia is one or two courses of a combination of an anthracycline (for example, daunorubicin) and cytarabine. Both drugs have been available for many years and are fairly inexpensive. If we use as the end point patients who achieve complete remission (are well and have no detectable disease) on one relatively expensive course of treatment then this may cost less overall and be more cost effective than patients attaining remission in two cheaper courses but requiring extra time in hospital.

A new anthracycline, idarubicin, has been shown to be at least as effective as daunorubicin in inducing complete remission in acute myeloblastic leukaemia in four international randomised phase III studies.[2-5] In all four studies more patients were in remission after one course of idarubicin than after one course of daunorubicin. The cost of idarubicin is about two to three times that of daunorubicin on a course for course basis. No economic measures were built into the four studies, but doses of the drugs and number of courses to obtain remission were reported. To establish the cost effectiveness of this treatment in a British setting, work was required to establish British practices and costs, and this is the basis of this paper. Using this data we wished to determine whether using idarubicin in Britain would result in reduced costs of hospitalisation and supportive care and thereby be more cost effective.

Methods

COST CENTRES

From a retrospective survey of the notes of 10 patients with acute myeloblastic leukaemia who had previously undergone intensive induction treatment in the Royal Marsden Hospital, 160 specific items associated with their investigation and treatment were identified and assigned to four cost centres: general costs, diagnostic costs, costs of supportive treatment, and costs of chemotherapy. A calculation of all the costs associated with these 160 items, particularly in terms of labour, was made prospectively in a time and motion study over one month on one patient so that a total unit cost for each of these categories could be made. The actual labour costs were calculated pro rata on the basis of total annual employment costs, taking into account holidays, sick leave, lunch breaks, rest periods, etc.

General costs include the costs for accommodation, nurses (bed making, weighing, observations, care plan, etc), and doctors (rounds, minor operations on admission such as insertion of Hickman line). The accommodation costs represent a charge for a single room with a shower and included domestic and portering services and meals but excluded specialised 24 hour nursing. General costs include a proportion of the hospital administration costs that are shared by all patients admitted to hospital regardless of their treatment requirements; they were based on the lowest figure quoted by NHS hospitals for private leukaemia patients. The staff time required for dispensing and reconstitution (pharmacy technician) and administration (nurses) of all drugs were assigned to general costs. The cost of other staff such as dietitians and physiotherapists, carrying out routine procedures were taken into account in the general costs, but those of extraneous staff, such as a dentist or ophthalmologist, were not.

Diagnostic costs include the costs of reagents, consumables, maintenance and depreciation of laboratory equipment, heating and lighting, laboratory staff time, ward clerk time, and blood tests. They also include the costs of routine clinical investigations such as *x* ray examinations but not non-routine investigations such as liver scans and investigations resulting from unexpected events.

Costs of supportive treatment include those for transfusions of blood and platelets, intravenous fluids, antibiotics, anti-infective drugs, antiemetic drugs, anti-inflammatory drugs, analgesics, vitamin and mineral supplements, sedatives, etc, together with the appropriate consumables—for example, gloves, intravenous packs, needles, and syringes. Pharmacy time (to check charts) and nurses' time (to administer the drugs) are also included here.

Chemotherapy costs represent the actual cost of anthracycline plus cytarabine at the full price charged to a British hospital pharmacy.

TABLE I—*Data from MRC 9 trial of adults with acute myeloblastic leukaemia given one and two courses of daunorubicin (50 mg/m²/day) for three days and cytarabine (100 mg/m²/day for 10 days)*

	No of patients achieving complete remission	Mean (SD) No of days in hospital	Mean (SD) blood transfusion (units)	Mean (SD) platelets given (units)	Mean (SD) days given antibiotics
No of treatment cycles:					
1	199	32 (17)	13 (7)	62 (39)	19 (11)
2	69	56 (14)	18 (7)	86 (54)	24 (15)

ECONOMIC ANALYSIS

Using data assigned to each cost centre we calculated the total costs of one and two cycles of induction treatment from the records of the Medical Research Council acute myeloblastic leukaemia 9 trial, in which cytarabine and daunorubicin were given in a British setting in a less intensive form than at the Royal Marsden Hospital; the MRC trial was comparable with the four international studies but included much more detail about the overall management of the patients. The results, in 268 patients, yielded the mean length of stay in hospital, the mean number of transfusions of blood and platelets, and the mean number of days that antibiotics were given during one and two cycles of induction treatment (table I).

We determined the frequency at which each unit of cost occurred during one cycle (32 days) and two cycles (56 days): routine haematological and biochemical tests were done daily, chest *x* ray examination weekly, bone marrow analysis twice per cycle, etc. The total cost of any individual item was thus the unit cost multiplied by the frequency over one or two cycles of treatment. The overall costs of treatment in one or two cycles calculated from the MRC trial were used to determine the relative cost effectiveness of a complete remission for the two induction regimens used in the four international studies. This calculation depended on the distribution of patients requiring one or two cycles of treatment between the idarubicin or daunorubin treatment groups.

SENSITIVITY

A sensitivity analysis examined the effect that changes in the cost of individual items had on the overall costs, including different costs of cytotoxic chemotherapy. The sensitivity to variations in costs was defined as the percentage change that would be required in part or all of a cost centre in order to bring about a change in the overall costs by a fixed amount—for example, 1%. The overall cost is more sensitive to any component of the model that makes a major contribution to the overall total and less sensitive to a minor component. Estimates of costs, as in this study, are subject to error and vary among hospitals. As a guide to determining the likely range of variation for each cost centre the prices charged by other hospitals and laboratories in the NHS and private sector were considered. Thus non-cytotoxic drugs calculated as part of the cost of supportive treatment were costed at the discounted pharmacy contract price, but the published prices quoted in the *Monthly Index of Medical Specialties* were used to estimate the likely variation. If no information was available for determining the variation in a particular cost then the maximum cost variation was assumed to be the calculated cost plus 10% (the current retail price index).

COMPARISON OF ANTHRACYCLINES

Table II shows the key outcomes of the four international studies. For comparative purposes the remission rates were expressed as percentages of the number of patients available for evaluation taking each

TABLE II—*Daunorubicin plus cytarabine versus idarubicin plus cytarabine in acute myeloblastic leukaemia: results of induction treatment in four randomised studies*

	Berman *et al*[2]		Wiernik *et al*[3]		Petti and Mandelli[4]		Vogler *et al*[5]	
	Idarubicin	Daunorubicin	Idarubicin	Daunorubicin	Idarubicin	Daunorubicin	Idarubicin	Daunorubicin
Daily dose of anthracycline (days 1-3)	12 mg/m²	50 mg/m²	13 mg/m²	45 mg/m²	12 mg/m²	45 mg/m²	12 mg/m²	45 mg/m²
Daily dose of cytarabine	200 mg/m² (days 1-5)		100 mg/m² (days 1-7)		100 mg/m² (days 1-7)		100 mg/m² (days 1-7)	
No of evaluable patients	45	41	51	51	124	125	39	46
Median age (years) (range)	35 (17-60)	42 (19-59)	55	56	63 (55-78)	62 (55-76)	58	62
Rate of complete remission (%)	80	58	67	53	40	39	74	57
After one course	60	27	52	35	30	20	56	44
After two courses	20	31	14	18	10	19	18	13
95% confidence interval for difference	2% to 42%		−5% to 33%		−11% to 13%		−4% to 38%	
95% confidence interval for difference after first course	12% to 54%		−1% to 37%		−1% to 21%		−9% to 35%	

TABLE III—*Estimated costs of one and two cycles of induction treatment in acute myeloblastic leukaemia*

Cost centre	Treatment cost per patient (£)	
	One cycle	Two cycles
General	7 207	12 450
Diagnostic	1 673	2 798
Supportive treatment	3 733	5 244
Chemotherapy:		
Idarubicin plus cytarabine (idarubicin dose range 12-13 mg/m²/day for three days)	812-907	1 625-1 814
Daunorubicin plus cytarabine (daunorubicin dose range 45-50 mg/m²/day for three days)	313-359	626-719

treatment in each study. The average costs were weighted according to the number of evaluable patients and the estimated number of cycles of induction treatment received. Standard methods were used to calculate the confidence intervals for the difference between two proportions.

Results

COST ANALYSIS

Table III summarises the estimated general, diagnostic, and supportive costs for one and two cycles of induction treatment in the MRC trial. The costs of cytotoxic chemotherapy are at British prices and are given as a range owing to price differences and a minor variation in the dosages of the two anthracycline regimens described in the four international studies.

SENSITIVITY ANALYSIS

Table IV shows a calculation of the costs of part or all of each cost centre for the standard induction treatment (daunorubicin plus cytarabine) in the four international studies. The sensitivity (per 1%) and the estimated maximum likely cost variation as described earlier were also tabulated. The maximum sensitivity shows the effect on the overall costs that a change in a single component would have if it was at its maximum estimated value. Thus general costs (57·7% of total) would need to increase by 1·7% for the overall costs to increase by 1% and the estimated maximum variation would raise the overall costs by 34·0%. If the accommodation component were to increase to the limit of 69% (the maximum charged by the private sector) the overall cost would increase by 33·3%. Total nursing costs accounted for 11·9% of the overall costs and were

TABLE IV—*Sensitivity analysis of weighted costs for daunorubicin arm of four published studies*

Costed items	Cost per 100 patients (£)		Contribution (% of overall costs)		Sensitivity (per 1%) (%)		Maximum cost variation (%)		Maximum sensitivity in overall costs (%)	
General		977 372		57·66		1·7		59		34·02
Accommodation		818 087		48·27		2·1		69		33·30
Nurses' routine		100 633		5·94		16·8		10		0·59
Doctors' routine		18 996		1·12		89·2		10		0·11
Ancillary staff		9 304		0·55		182·2		10		0·05
Surgical routine		22 448		1·32		75·5		10		0·13
Reconstitution and administration of all drugs		7 904		0·47		214·5		10		0·05
Diagnostic		222 404		13·12		7·6		150		19·68
Haematology and biochemistry		41 401		2·44		40·9		165		4·03
Routine haematology*	24 062		1·79		55·8		73		1·31	
Biochemistry	11 024		0·65		153·7		180		1·17	
X matching blood grouping	1 141		0·07		1 485·5		160		0·11	
Bone marrow	5 174		0·31		327·6		360		1·10	
Thrombosis risk profile		25 812		1·52		65·7		925		14·9
Immunology		7 821		0·46		216·7		250		1·15
Cytogenetics (priced)		9 500		0·56		178·4				
Microbiology		105 656		6·23		16·0		6		0·37
Urine plus stool	17 672		1·04		95·9		20		0·21	
Swabs	11 898		0·70		142·5		130		0·91	
Antibiotic levels	7 472		0·44		226·8		180		0·79	
Blood culture	68 613		4·05		24·7		30		1·21	
Clinical investigations		32 214		1·90		52·6		26		0·49
Supportive treatment		447 290		26·39		3·8		19		5·01
Staff time		36 667		2·16		46·2		10		0·22
Transfusions		190 252		11·22		8·9		2		0·28
Blood	45 860		2·71		37·0		3		0·08	
Platelets	144 392		8·52		11·7		2		0·21	
Intravenous fluids plus supplements		5 890		0·35		287·8		11		0·04
Antibiotics		94 400		5·57		18·0		53		2·95
Anti-infective drugs		99 100		5·85		17·1		11		0·67
Acyclovir	96 549		5·70		17·6		11		0·66	
Other anti-infectives	2 551		0·15		664·7		11		0·02	
Antiemetic drugs		16 213		0·96		104·5		56		0·54
Anti-inflammatory drugs		614		0·04		2 762·0		23		0·01
Sedatives		42		<0·01		40 640·2		7		<0·01
Analgesics		968		0·06		1 751·4		39		0·02
Others		3 144		0·19		539·1		90		0·17
Chemotherapy		47 876		2·82		35·4		150		4·24
Nursing		201 743		11·90		8·4		13		1·55

*Full blood count, differential white cell count, erythrocyte sedimentation rate.

TABLE V—*Estimated costs per patient and percentage saving of induction treatment with idarubicin and daunorubicin*

	Berman *et al*[2]	Wiernik *et al*[3]	Petti and Mandelli[4]	Vogler *et al*[5]	Weighted average
General costs (£):					
Idarubicin	9 200	8 675	8 354	8 675	8 791
Daunorubicin	10 877	9 670	9 101	9 042	9 774
Savings (%)	15	10	8	4	10
Diagnostic costs (£):					
Idarubicin	2 101	1 988	1 916	1 988	2 013
Daunorubicin	2 461	2 202	2 073	2 067	2 224
Savings (%)	15	10	8	4	10
Costs of supportive treatment (£):					
Idarubicin	4 307	4 156	4 014	4 156	4 190
Daunorubicin	4 791	4 443	4 196	4 262	4 473
Savings (%)	10	6	4	2	6
Costs of chemotherapy (£):					
Idarubicin	1 144	1 161	999	1 040	1 086
Daunorubicin	612	460	432	422	479
Savings (%)	−87	−152	−131	−146	−127
Overall costs (£):					
Idarubicin	16 751	15 981	15 283	15 860	16 080
Daunorubicin	18 740	16 777	15 803	15 974	16 950
Savings (%)	11	5	3	−0·4	5
Costs per complete remission (£):					
Idarubicin	20 939	23 852	38 208	21 432	28 021
Daunorubicin	32 310	31 655	40 521	27 709	35 442
Savings (%)	35	25	6	23	21

calculated as the minimum nursing time required within each cost centre. Even if some patients need more nursing time it would require an 8·4% increase in nursing to give a 1% rise in overall costs. The costs of cytotoxic chemotherapy (2·8% of total) would need to increase by 35·4% for there to be an increase of 1% in the overall cost.

COMPARISON OF ANTHRACYCLINES

The average general, diagnostic, and supportive treatment costs of the four international studies are projected to be lower in the idarubicin than the daunorubicin arm (table V), giving an aggregate decrease of £1477 per patient in return for the higher costs of the cytotoxic chemotherapy (£607 per patient). Thus the overall saving would be £870 per patient (5%). The greatest potential savings arise in general costs (£983 per patient; 10% saving) and in supportive treatment costs (£283 per patient; 6% saving), while diagnostic costs could show a saving of £211 per patient.

Table V also shows the relative increase in cytotoxic chemotherapy costs incurred by the use of idarubicin compared with daunorubicin. There is a variation from 11% (Berman *et al*) to −0·4% (Vogler *et al*) in the overall savings likely to be achieved according to each of the study outcomes. The study by Vogler *et al* is the only one of the four to show no overall cost savings and is therefore close to the break even point, where the savings in aggregate hospital costs (general, diagnostic, and supportive treatment costs) are compensated for by an increased expenditure on cytotoxic chemotherapy. Table V also compares costs and cost effectiveness of the two regimens: idarubicin resulted in an improvement of between 6% and 35% in the cost of complete remission over daunorubicin.

Discussion

At present it is not possible within Britain to look at the cost benefit of a treatment programme, taking into account all the benefits to the individual and society such as income, taxes, pensions, salvage medicine, and, of course, inevitable death from some cause. This paper therefore did not look at cost-benefit but only costing and cost effectiveness, with the relatively simple end point of complete remission.

The economic analysis shows that overall costs are relatively insensitive to an increase in the cost of cytotoxic chemotherapy. The cost of treatment with idarubicin is on average 127% higher than that with daunorubicin. On the null hypothesis of no difference in efficacy between the two anthracyclines this would result in a projected increase of 3·6% in overall costs. In fact, because of the improvement in efficacy the overall costs are likely to be reduced by 5·1%, a result that might otherwise be achieved by, say, a 10% reduction in hospital accommodation costs or a 20% reduction in the cost of supportive treatment.

The comparisons of cost effectiveness reported in this study were based on the assumption that all costs are variable. It is important to realise this as although there may be savings to a clinical unit that "buys" bed days from its hospital, the hospital overall would not enjoy any economic benefit unless the available bed was used for another patient. This is because accommodation costs are wholly or partly fixed: one empty bed will not produce savings in heat, light, etc, and it is unlikely to lead to a reduction in staffing in the short term. This is also true of the diagnostic department. Most of its costs consist of staffing, equipment, maintenance, and capital charges. These costs will not change until the demand has fallen to a level at which it is possible, for example, to save a staff post or eliminate a machine.

Medical economic analysis is a fairly new concept but one that is assuming growing importance as aging populations and increasingly sophisticated medical approaches place even more demands on health care budgets. New products will certainly be evaluated not just for clinical but also for economic advantages. In future, preregistration studies may well have to have an economic element built into their protocols, but as the present study has shown, it is possible retrospectively to assess the cost effectiveness of a particular treatment. Certainly such a retrospective approach has its limitations, but it may well be a useful adjunct to planned prospective randomised studies with evaluation of cost effectiveness as an integral part of the investigation. In addition, this method of analysis has the flexibility to allow evaluation of studies in different environments or even other countries where factors such as labour costs may have a profound effect.

We thank Dr Charles Horth, biomedical consultant, for his advice and help with the economics; Mrs Margaret Hewetson, pharmacist, and Mr Stan Blake, biochemist, for help in providing the pharmacy and laboratory costs; and the Cancer Research Campaign, Leukaemia Research Fund, and the Bud Flanagan Leukaemia Fund for financial support.

1 Powles RL, Morgenstern G, Clink H, *et al*. The place of bone marrow transplantation in acute myelogeneous leukaemia. *Lancet* 1980;i:1047-50.
2 Berman E, Raymond V, Gee T, *et al*. Idarubicin in acute leukaemia: results of studies at Memorial Sloan-Kettering Cancer Centre. *Seminars in Oncology* 1989;**16**(suppl 2):30-4.
3 Wiernik PH, Case DC, Periman PO, *et al*. A multicentre trial of cytarabine plus idarubicin or daunorubicin as induction therapy for adult nonlymphocytic leukaemia. *Seminars in Oncology* 1989;**16**(suppl 2):25-9.
4 Petti MC, Mandelli F. Idarubicin in acute leukaemias: experience of the Italian Cooperative Group GIMEMA. *Seminars in Oncology* 1989;**16**(suppl 2):10-5.
5 Vogler WR, Velez-Garcia E, Omura G, Raney M. A phase III trial comparing daunorubicin or idarubicin combined with cytosine arabinoside in acute myelogenous leukaemia. *Seminars in Oncology* 1989;**16**(suppl 2):21-4.

(Accepted 27 November 1990)