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## LEADING ARTICLES

- Hopes and realities in health care ..... 1079  
 Fat and cancer LEO J KINLEN ..... 1081  
 Immunisation policies  
 CHARLES G D BROOK ..... 1082  
 Antidepressant effects of electroconvulsive therapy:  
 current or seizure? J F W DEAKIN ..... 1083  
 Regular Review:  
 Which beta blocker? ALASDAIR BRECKENRIDGE ..... 1085

## CLINICAL RESEARCH • PAPERS AND SHORT REPORTS • PRACTICE OBSERVED

- Correlation between manifestations of digoxin toxicity and serum digoxin, calcium, potassium, and magnesium concentrations and arterial pH MOSHE SONNENBLICK, ABRAHAM S ABRAHAM, ZION MESHULAM, U EYLATH ..... 1089  
 Identification of infants destined to die unexpectedly during infancy: evaluation of predictive importance of prolonged apnoea and disorders of cardiac rhythm or conduction  
 FIRST REPORT OF A MULTICENTRED PROSPECTIVE STUDY INTO THE SUDDEN INFANT DEATH SYNDROME ..... 1092  
 High versus "low" dose corticosteroids in recipients of cadaveric kidneys: prospective controlled trial  
 J PAPADAKIS, C B BROWN, J S CAMERON, D ADU, M BEWICK, R DONAGHEY, C S OGG, C RUDGE, D G WILLIAMS, D TAUBE ..... 1097  
 Trends in mortality among California physicians after giving up smoking: 1950-79 JAMES E ENSTROM ..... 1101  
 Angiotensin converting enzyme: a tumour marker in malignant histiocytosis  
 F BOOMSMA, J J MICHIELS, E PRINS, J ABELS, M A D H SCHALEKAMP ..... 1106  
 Seizures after infusion of factor VIII M SMALL, W F DURWARD, C D FORBES ..... 1106  
 Effect of verapamil on enzyme release after early intravenous administration in acute myocardial infarction: double blind randomised trial LEIF THUESEN, JØRGEN R JØRGENSEN, HANS J KVISTGAARD, JENS A SØRENSEN, MICHAEL VÆTH, EVA B JENSEN, JENS J JENSEN, LEIF HÅGERUP ..... 1107  
 Unilateral somatic symptoms due to hyperventilation J N BLAU, C M WILES, F S SOLOMON ..... 1108  
 Practice Research: Are the problems of primary care in inner cities fact or fiction? JO WOOD ..... 1109  
 General Practice in the Year 2000: Three challenges for the future ROGER HIGGS ..... 1113  
 Law and the General Practitioner: Statutory sick pay: how it works NORMAN ELLIS ..... 1114

## MEDICAL PRACTICE

- Informed consent: ethical, legal, and medical implications for doctors and patients who participate in randomised clinical trials  
 CANCER RESEARCH CAMPAIGN WORKING PARTY IN BREAST CONSERVATION ..... 1117  
 Role of venous sampling in locating a pheochromocytoma D J ALLISON, M J BROWN, D H JONES, J B TIMMIS ..... 1122  
 Letter from Chicago: Hidden dangers everywhere GEORGE DUNEA ..... 1125  
 New Drugs: Calcium antagonists, nitrates, and new antianginal drugs DEREK MACLEAN, JOHN FEELY ..... 1127  
 Aviation Medicine: Medical emergencies in the air I: Incidence and legal aspects F JOHN MILLS, RICHARD M HARDING ..... 1131  
 ABC of Healthy Travel: Infections on return from abroad—1 ERIC WALKER, GLYN WILLIAMS ..... 1133  
 Letters to a Young Doctor: Some hurdles for the overseas doctor PHILIP RHODES ..... 1136  
 Any Questions? ..... 1137  
 Medicine and Books ..... 1138  
 Personal View FLEMMING FRØLUND, OLE MØLLER OLSEN ..... 1141

CORRESPONDENCE—List of Contents ..... 1142

OBITUARY ..... 1155

## NEWS AND NOTES

- Views ..... 1151  
 Parliament ..... 1152  
 Medical News—GMC's professional conduct committee ..... 1152  
 BMA Notices ..... 1153  
 One Man's Burden MICHAEL O'DONNELL ..... 1154

## SUPPLEMENT

APR 15 1983

- The Week ..... 1157  
 Hope of changes in Police and Criminal Evidence Bill  
 WILLIAM RUSSELL ..... 1158  
 Manpower imbalance in obstetrics and gynaecology  
 J G HILL, R W TAYLOR, H K BASU ..... 1159  
 Rural dispensing: circular issued ..... 1162  
 Correction: Rural dispensing: implementation of  
 Clothier report ..... 1162

# CORRESPONDENCE

<b>Use of blood in elective general surgery</b> J A F Napier, MRCPATH.....	1142	<b>Is weighing babies in clinics worth while?</b> Barbara I Johnson, MB.....	1145	<b>Is serum <math>\gamma</math>-glutamyltransferase a misleading test?</b> J S Dixon, PHD.....	1148
<b>Artificial blood</b> K C Lowe, PHD.....	1142	<b>The Heimlich manoeuvre</b> R W Penny, MRCP.....	1145	<b>Sun beds</b> B Staberg, MD.....	1148
<b>Acquired immune deficiency syndrome</b> M R Farrell, MRCP and others.....	1143	<b>Salmonella gastroenteritis associated with erythema nodosum</b> Hilary M Dobson, MRCP, and R Hume, FRCP.....	1146	<b>Double indemnity in oesophageal carcinoma?</b> A Watson, MD.....	1148
<b>Glucose polymer supplements in very low birthweight infants</b> O G Brooke, MD.....	1143	<b>Endoscopy after gastric surgery</b> N Mortensen, FRCS, and others.....	1146	<b>Screening for fetal malformations</b> R C M Cook, FRCS, and others.....	1149
<b>Letters to a young doctor</b> N Berlyne, FRCPsych; Susan Norman, MB.....	1143	<b>Meningoencephalitis associated with Chlamydia trachomatis infection</b> D A Hawkins, MRCP, and others.....	1146	<b>Effect of genetic counselling on the prevalence of Huntington's chorea</b> J S H Tay, FRACP, and W C L Yip, MRCP; C O Carter, FRCP, and M Baraitser, FRCP.....	1149
<b>Asthma in New Zealand</b> T V O'Donnell, MB, and T Gebbie, MB... ..	1143	<b>Dietary sodium restriction for mild hypertension in general practice</b> G C M Watt, MRCP, and others.....	1146	<b>Missed jaundice in black infants</b> R R M Harman, FRCP.....	1149
<b>Non-insulin dependent diabetes in the young is not linked to the insulin gene</b> I Jialal, MD.....	1144	<b>Ampicillin and alternatives</b> P Cole, FRCP, and D E Roberts, FIMLS....	1147	<b>Medical effects of nuclear war</b> Alison Carroll, MRCP; W Lees, FRCOG... ..	1150
<b>Should doctors use drug companies' starter packs?</b> T J Steiner, MB.....	1144	<b>Pneumocystis pneumonia</b> J Cooke, MPS, and C C Bailey, MRCP.....	1147	<b>Containment of costs in private practice</b> T G Nash, FRCOG.....	1150
<b>Accuracy and value of the Haemocult test</b> J Winslade; D E H Llewellyn, MRCP; R J Leicester, FRCS, and others.....	1144	<b>Failure patterns after total hip arthroplasty</b> J P Alexander, FFARCS, and D W Barron, FFARCS.....	1148	<b>Consultant only service in a district hospital</b> G T Watts, FRCS.....	1150
<b>Acute respiratory distress in diabetic ketoacidosis</b> K M Hillman, FFARCS.....	1145			<b>Voting and the mentally ill</b> N Palmer, PHD.....	1150

*We may return unduly long letters to the author for shortening so that we can offer readers as wide a selection as possible. We receive so many letters each week that we have to omit some of them. Letters should be typed with double spacing between lines and must be signed personally by all their authors, who should include their degrees. Letters critical of a paper may be sent to the authors of the paper so that their reply may appear in the same issue.*

## Use of blood in elective general surgery

SIR,—Mr J A Smallwood (12 March, p 868) rightly draws attention to the need for tighter controls in surgical blood ordering practice and the wastage of resources that occurs when such practices are lax. The crossmatch to transfusion ratio can provide a valuable guide to efficiency in this respect. Such figures must, however, be interpreted with caution when used as a basis for comparison. This is exemplified by the high figure of 36.25 from Mr Smallwood's survey, which I presume would not be true for surgical practice as a whole at the hospital concerned. The survey did not consist of a representative sample of the operations performed that may require crossmatched blood. When this is done much lower figures should result, which reflect more accurately the efficiency of the blood ordering procedure.

During a survey of practice in hospitals in South Wales crossmatch to transfusion ratios of the order of 2 to 4 were typical for the total surgical workload, the highest figures generally reflecting a larger proportion of obstetric and gynaecological surgery. These ratios are close to the optimum target proposed by Rault and Gruenhagen for hospitals providing a general range of services.<sup>1</sup> From local experience the operations in group I (vagotomy, simple mastectomy, cholecystectomy, and thyroidectomy) comprise less than 10% of all surgical work; thus even if unnecessary cross-matching is performed the high crossmatch to transfusion ratio of this group alone will have less effect on the overall figure for routine surgical practice.

I am not able to agree with the author's calculated overall crossmatch to transfusion

ratio. A total of 2889 units were crossmatched, and of these 485 were used. This gives a crossmatch to transfusion ratio of 6 for the group of procedures studied. I am also not sure how the author's figure of 36.25 was calculated, but it seems close to the average of the crossmatch to transfusion ratios for each of the surgical procedures. This is as statistically misleading as an average of averages when an index of inappropriate crossmatching is required.

High crossmatch to transfusion ratios indicate that blood units have an increased chance of outdating and that blood bank staff are unnecessarily overworked, but there are also more immediate and clinically important disadvantages. The risk of substandard serological performance or even ABO mishaps are much

increased when staff are under excessive pressure. Overordering of blood leads to excessive numbers of crossmatched blood units unavailable for general use. Thus the mean age of blood units actually transfused to patients must increase and the viability and oxygen carrying capacity after transfusion must be reduced.

It is thus in the interests of patients to seek efficiencies in blood ordering practice and the excessive caution that leads to overordering should be discouraged.

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<sup>1</sup> Rault C, Gruenhagen J. Reorganisation of blood ordering practices. *Transfusion* 1978;18:448-53.

## Artificial blood

SIR,—I read with interest the article by Dr P M Jones (22 January, p 246), which summarised some important clinical findings using perfluorocarbon emulsions as blood substitutes. While there is no doubt that the ability to replace the blood with a synthetic substitute would have very profound clinical implications and solve a number of problems associated with conventional transfusion, I believe that it is important to draw attention to two important points related to the use of perfluorocarbon emulsions in blood replacement.

Firstly, while much has been written about the many possible therapeutic applications for these oxygen carrying perfluorochemicals the problem of potentially deleterious responses to such preparations has received little attention.

Vercellotti *et al* reported an adverse pulmonary reaction in an American patient receiving the proprietary emulsion, Fluosol-DA 20% (Green Cross Corporation, Osaka, Japan), to overcome anaemia after surgery.<sup>1</sup> Haematological abnormalities, including neutropenia and thrombocytopenia, were also seen in rabbits receiving either Fluosol itself or one of its components, Pluronic F-68, a nonionic detergent used to maintain emulsion stability. Although these responses could be diminished by treatment beforehand with methylprednisolone, such findings do draw attention to the need for further evaluation of the immunological consequences of using Fluosol and other similar emulsions.

Fluosol-DA contains yolk phospholipids.<sup>2</sup>