Smoking cessation in patients: two further studies by the British Thoracic Society

Research Committee of the British Thoracic Society

Abstract

The effects of various smoking cessation strategies were studied in two multicentre trials with new patients attending hospital or a chest clinic because of a smoking related disease. In the first trial (study A, 1462 patients) the effect of the physician's usual advice to stop smoking was compared with the effect of the same advice reinforced by a signed agreement to stop smoking by a target date within the next week, two visits by a health visitor in the first six weeks, and a series of letters of encouragement from the physician. The second trial (study B, 1392 patients) compared (1) advice only, (2) advice supplemented by a signed agreement, (3) advice supplemented by a series of letters of encouragement, and (4) advice supplemented by a signed agreement and a series of letters of encouragement. Patients were reviewed at six months and those claiming to have stopped smoking were seen again at 12 months. Claims of abstinence were checked by carboxyhaemoglobin measurement. In study A 9% of the intervention group had succeeded in stopping smoking at six months compared with 7% of the "advice only" patients (p = 0·17). In study B success rates were 5·2%, 4·9%, 8·5%, and 8·8% respectively. The signed agreement did not influence outcome, whereas postal encouragement increased the effect of the physician's advice. In both studies patients reviewed clinically between the initial and the six month visit were more likely to stop smoking than those not reviewed. Success rates increased with age and men tended to do better than women. The studies suggest that physicians' advice alone will persuade 5% of outpatients with a smoking related disease to stop smoking. Subsequent postal encouragement will increase the cessation rate by more than half as much again. Such small improvements in success rates are worth while, especially if they can be achieved cheaply and on a wide scale.

Studies organised by a subcommittee of the Research Committee of the British Thoracic Society
Dr V H Springett *(Chairman)*
Dr I A Campbell *(Coordinating physician and compiler of the report)*
Dr J H Angel
Dr P V Cole
Dr J A R Friend
Dr R J Prescott
Mr Y Saloojee
Mr C J Vesey

Address for reprint requests: Dr I A Campbell, Sully Hospital, Cardiff CF6 2YA

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The British Thoracic Society's first study of smoking cessation in patients showed a 9·7% success rate but was criticised for the lack of support after initial advice from the physician.[1] Studies by Hjalmarson[2] and Burt *et al*[3] have suggested that such support increases the success rates in patients. In the two trials (study A and study B) described in this report we have tested strategies of support that are within the manpower and financial resources of NHS hospitals and chest clinics and we have tried to identify the important elements in the strategies.

Methods

Newly attending or re-referred outpatients aged 16 years and over who smoked more than one cigarette daily and had diseases related to or aggravated by smoking were entered into two multicentre trials. Patients were not eligible if they had a neoplasm or a terminal or preterminal disease, if they were unlikely to attend for the follow up period, if they had a psychiatric condition in which giving up smoking might be contraindicated at the time, or if they refused to try to stop smoking.

Consultant chest physicians and general physicians with an interest in chest medicine who had taken part in previous multicentre trials organised by the Research Committee of the British Thoracic Society were asked to participate. Those with a health visitor were invited to enter patients into study A and the remainder asked to participate in study B. In some centres consultants in general medicine or cardiology (or both) who were not members of the British Thoracic Society but were known to be interested were also invited to take part. Sixty seven physicians took part in study A, which recruited patients from 1 October 1984 to 30 September 1986. Eighty six physicians participated in study B, the intake running from 1 April 1985 to 31 December 1986.

Patients were allocated at random within each study to a control or intervention group, a sequence of sealed envelopes being used at each centre. For the purposes of the study all patients were asked to attend again in six months, and those claiming to have stopped smoking by this time were asked to reattend at 12 months. In both studies physicians were free to see patients for clinical purposes at times other than the two reviews for the trial. Claims of abstinence at the six and 12 month outpatient attendances were checked by carboxyhaemoglobin estimations and, in borderline cases, thiocyanate estimations.[4]

STUDY A: VISITS BY HEALTH VISITORS, POSTAL ENCOURAGEMENT, AND A SIGNED AGREEMENT ADDED TO THE PHYSICIAN'S ADVICE

All patients received the physician's usual

advice to stop smoking. In the intervention group the advice was reinforced by (1) a simple signed agreement to stop smoking by a target date within the next week; (2) two visits by a health visitor in the first six weeks; and (3) a series of letters of encouragement from the physician (four in the first six months and, if the subject was not smoking, a further letter at nine months). Figure 1 illustrates the study design.

STUDY B: POSTAL ENCOURAGEMENT OR A SIGNED AGREEMENT, OR BOTH, AS SUPPLEMENTS TO THE PHYSICIAN'S ADVICE

Patients were allocated at random to a control group or one of three intervention groups in a factorial design. All patients received the physician's usual advice to stop smoking. In one intervention group this was supplemented by a signed agreement to stop smoking by a target date within the next week; in the second

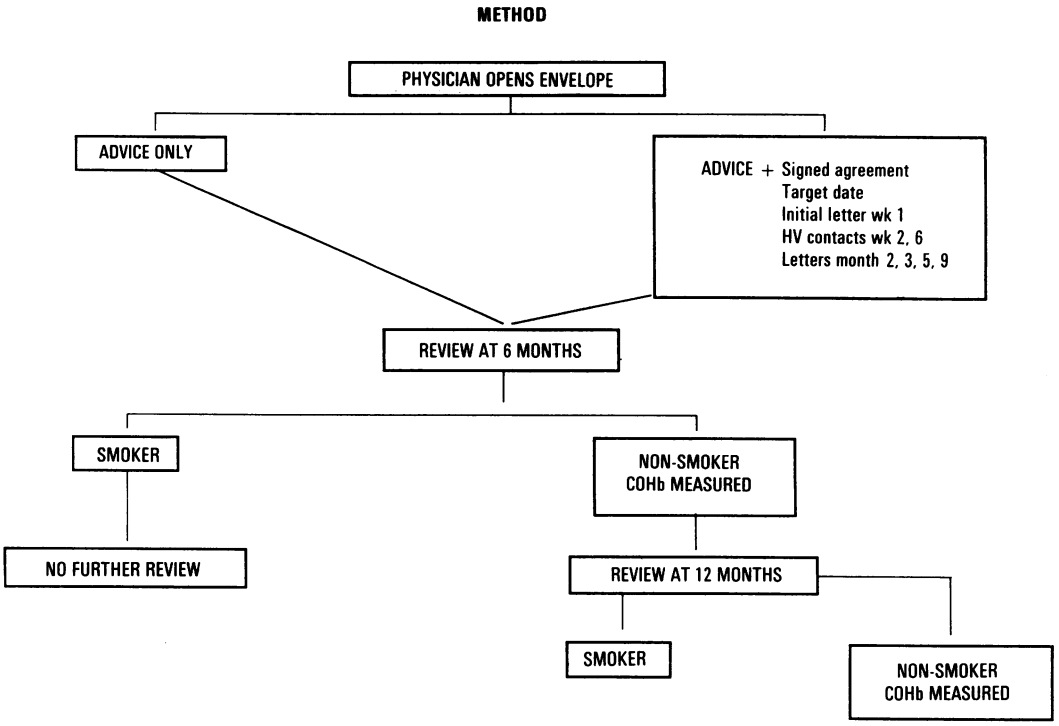

Figure 1 Study design for study A. HV—health visitor.

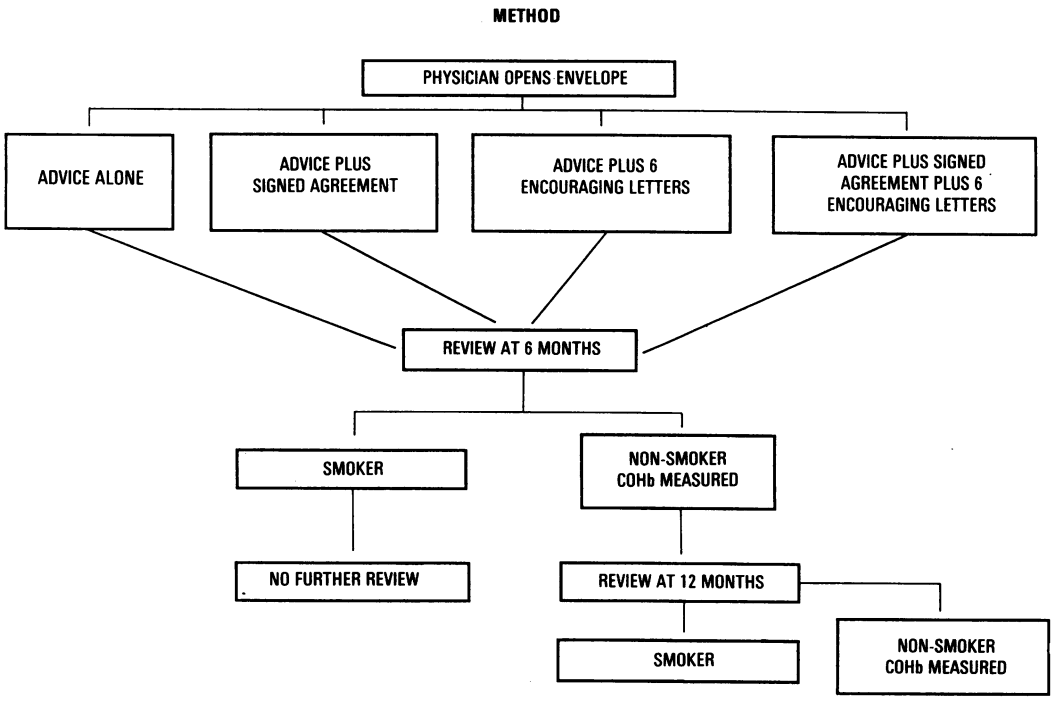

Figure 2 Study design for study B.

group by encouraging letters at 3 days, 2 weeks, and 2, 3, 5, and 9 months; and in the third group by a signed agreement and encouraging letters. Figure 2 illustrates the design.

DEFINITION OF SUCCESS

The patient was classified as successful in giving up smoking if (*a*) he or she claimed not to be smoking at 6 and 12 months and (*b*) not to have smoked between 6 and 12 months and if (*c*) these claims were verified by carboxyhaemoglobin and, if necessary, thiocyanate estimations at 6 and 12 months. If a blood test was omitted at one of these visits a single verification was enough to allow classification as a success. Patients not meeting these criteria, including those who failed to attend at 6 and 12 months despite three requests to do so, were classified as failures.

ANALYSIS

Data from the studies were coded on summary sheets in a standard form by the studies' coordinators. The data were then key punched and verified by data preparation staff of the Edinburgh University computing services. Statistical analysis was undertaken on the university's mainframe computer with BMDP (1987 version). Where the χ^2 test has been applied to 2 × 2 tables Yates's correction for continuity has been applied. The interaction test described in table 2 is a likelihood ratio test, based on fitting a linear logistic model, using BMDP program PLR.

Results

STUDY A

Of the 1498 patients who entered the study, 36 died or moved away, leaving 1462 for analysis (866 male, 596 female). Their mean age was 51 (SD 13) years. The subjects smoked an average of 17 (SD 10) cigarettes a day. A total of 1301 (89%) had respiratory disease, mainly chronic bronchitis and emphysema: 117 (8%) had cardiac problems and 44 (3%) other smoking related conditions. The control group (732 patients) and intervention group (730 patients) were well matched for these factors as well as for marital status and for the smoking habit of the "nearest person."

*Table 1 Study A: Success in stopping smoking**

No of patients	*Control group*	*Intervention group*
Total	732	730
Failed to attend	138	144
Continued to smoke	543	520
Total failures	681	664
Total successes	51 (7·0%)	66 (9·0%)

$\chi^2 = 1{\cdot}9$, p = 0·17.
*See under "Methods" for definition of success.

Table 2 Study A: Percentage of successes related to intervention and outpatient visits made before the six month review

	% stopping smoking		
*Outpatient visits**	*Control group*	*Intervention group*	*Total*
None	4·2 (12/283)	10·4 (29/280)	7·3 (41/563)
One or more	12·3 (38/310)	11·9 (37/311)	12·1 (75/621)

Interaction test (none *v* one or more): $\chi^2 = 5{\cdot}5$, p = 0·02.
*Information on whether outpatient visits were made in the first six months was not available for 278 patients.

At 12 months 51 (7·0%) of those receiving advice only had stopped smoking compared with 66 (9·0%) in the intervention group (table 1). Just under half of the patients were seen between the initial visit and the six month visit for purposes of clinical management; further analysis taking account of this factor showed a significant interaction, the benefit of intervention being concentrated in those who were not reviewed between the initial visit and the six month visit (table 2). In the control group those who were reviewed in an outpatient clinic for other reasons during the first six months had three times the success rate of those who were not seen between the two visits.

In the intervention group the health visitors saw 584 of the 730 patients, made telephone contact with 56, and did not achieve contact with 90. The success rate among the patients who were visited was 9·1%, much the same as in those who were not (8·9%).

The number of cigarettes smoked per day bore no relation to success in stopping smoking. Success rates were greater in men than women (10·2% *v* 4·9%, $\chi^2 = 12{\cdot}7$, $p < 0{\cdot}001$) and increased with age (under 30 years 2·4%; 30–49 years 5·2%; 50–64 years 8·6%; 65 years and over 16·0%: $\chi^2 = 26{\cdot}6$, $p < 0{\cdot}0001$). Patients with heart disease did better than those with lung or other diseases (14·4% *v* 7·5% *v* 8·3%: $\chi^2 = 6{\cdot}6$, p = 0·04). Marital status affected outcome, with the married or widowed achieving higher success rates (9·1% and 8·2%) than the divorced or separated (3·0%) or the single (3·9%) patients ($\chi^2 = 8{\cdot}6$, p = 0·04). If the person closest to the patient was a non-smoker the patient was more likely to stop smoking than if this person was a smoker (10·3% *v* 6·0% success: $\chi^2 = 8{\cdot}4$, p = 0·004). There was no interaction between any of these factors and the association between intervention and outcome.

STUDY B

Of the 1415 patients who entered the study 23 died or moved away, leaving 1392 for analysis (814 male, 578 female). Their mean age was 50 (SD 14) years. The average number of cigarettes smoked daily was 17 (SD 9). A total of 1197 (86%) had respiratory disease, 111 (8%) cardiac disease, and 84 (6%) other smoking related conditions. The four treatment groups were well matched for these factors as well as for marital status.

The outcome at 12 months is shown in table 3. The signed agreement was of no value but postal encouragement clearly increased the effect of the physician's advice by more than half as much again. Those who came to an out-

*Table 3 Study B: Success in stopping smoking**

	Advice	*Advice plus agreement*	*Advice plus letters*	*Advice plus agreement plus letters*	*Total*
No of patients					
Total	343	347	351	351	1392
Failed to attend	72	80	90	86	328
Continued to smoke	253	250	231	234	968
Total failures	325	330	321	320	1296
Total No (and %) of successes	18	17	30	31	96
($\chi^2 = 7{\cdot}1$, df = 3, p = 0·07)	(5·2)	(4·9)	(8·5)	(8·8)	(6·9)
Successes					
No letters *v* letters		35		61	
($\chi^2 = 6{\cdot}5$, df = 1, p = 0·011)		(5·1%)		(8·7%)	

*See under "Methods" for definition of success.

Table 4 Study B: Percentage of successes related to intervention and outpatient visits made before the six month review

	% stopping smoking				
Outpatient visits	*Advice*	*Advice plus agreement*	*Advice plus letters*	*Advice plus agreement plus letters*	*Total*
None	5·7 (8/141)	5·4 (7/130)	6·6 (9/136)	9·2 (12/131)	6·7 (36/538)
One or more	7·0 (9/128)	6·9 (10/144)	14·3 (18/126)	13·2 (18/136)	10·3 (55/534)

*Information on whether outpatient visits were made in the first six months was not available for 320 patients.

patient clinic between the initial visit and the six month visit had a higher success rate than those who did not (table 4). The effect of postal encouragement was greater in the reattenders than in those who were not seen again in outpatients between the initial and the six month review dates, though this possible interaction was not statistically significant.

Success rates rose with age (under 30 years 4·9%; 30–49 years 4·8%; 50–64 years 7·9%; over 65 years 10·7%: $\chi^2 = 8{\cdot}9$, p = 0·03). Men tended to do better than women (7·7% *v* 5·7% success: $\chi^2 = 1{\cdot}9$, p = 0·17). Outcome did not appear to be affected by marital status, site of disease, or daily cigarette consumption. The association between intervention and outcome was independent of age.

STUDIES A AND B

The benefit of intervention was restricted to those who did not attend an outpatient clinic between entry to the study and the six month review in study A, whereas in study B the intervention appeared less effective in these patients than in those who did reattend. When linear logistic models were applied to the data from both studies, clear effects of the intervention and of outpatient reattendances were evident, but there was no evidence of an interaction. Table 5 gives possible "population" success rates that are compatible with the results of both studies and lie within the confidence limits for success rates in the subgroups from each study.

Table 5 Combined results of studies A and B: estimates of the effects of outpatient visits and intervention on success rates

	% stopping smoking	
Outpatient visits	*Control*	*Intervention*
None	5	9
One or more	9	13

Discussion

The British Thoracic Society's first smoking withdrawal study showed that just under 10% of hospital inpatients and outpatients would stop smoking when advised to do so by their physician.[1] The results of the current studies are disappointingly similar, with overall cessation rates of 8·0% (study A) and 6·9% (study B) in outpatients with smoking related diseases. The low success rates may be a reflection of how poor the hospital doctor is at giving advice on stopping smoking but could well be a function of the type of patient to whom the advice was given.

These patients were still smoking despite symptoms that had led to their referral to a hospital outpatient clinic or chest clinic. They are likely to be a group of committed smokers because less heavily committed smokers would have given up smoking at an earlier stage, either as a result of the general increase in awareness of the importance of smoking as a cause of symptoms and illness or as a result of specific advice from their general practitioner. Even if such advice had not been given, such patients are likely to have had some inkling that their symptoms were related to smoking, and some of the less committed smokers would have stopped. Only those heavily dependent on smoking would continue under these conditions and thus become eligible for entry to these studies. This population therefore is very different from the clients voluntarily attending smoking cessation groups or clinics and from those responding to smoking cessation programmes advertised in the media.

The smokers in this study are also strikingly different from smokers attending their general practitioners and subsequently recruited to smoking cessation trials. Comparisons with results in such other groups are clearly invalid. Possibly better results might be achieved in committed smokers with self support groups that would meet frequently during the first few weeks after the initial advice to stop smoking, as Hjalmarson has shown in Sweden.[2] Dedicating medical or other skilled personnel to lead such groups makes them an expensive form of treatment.[5]

In study A the group given support in addition to the physician's advice achieved 9% success, compared with 7% with the physician's advice alone, an improvement that might have been a chance effect. But for patients who were not reviewed in the outpatient clinic for six months after the initial visit the intervention strategy more than

doubled the success rate. The association between reattendances and increased success rates was not as strong in study B as it had been in study A and, in contrast to study A, the effect of postal encouragement tended to be greater in those who reattended. When the two studies are taken together, the results are consistent with an association of success with intervention and reattendance, each independently adding around 4% to the success rate. A return visit to the outpatient clinic in the first six months would therefore seem to have boosted the chances of success, but those asked to attend in such a way were likely to have been more seriously ill and thus more motivated; they were also likely to have been subjected to further advice and pressure to stop smoking when they were reviewed in the outpatient clinic. These limitations to the interpretation of the effect of return visits are examples of the limitations usually applicable to any analyses based on post hoc stratification.

Information about return visits between entry and the six month review was not available for 278 patients from study A and 320 patients from study B, mainly defaulters at six months. Probably most would have fallen into the group whom the physician would not have planned to see between the initial consultation and the six month visit. They were classed as failures and had we been able to include them in the comparisons in tables 2 and 4 the success rates in the "no visit" groups would have been even lower.

Further analysis of the results in the intervention group in study A suggests that the health visitor component of the strategy may not be crucial to its success but we cannot be firm about such a conclusion: within the intervention group patients were not randomly allocated to the no contact and telephone contact categories.

Although the rates of recruitment may appear to have been slow, the number of newly attending chest clinic patients eligible for trials such as these is often relatively low: many new attenders do not have smoking related diseases and many with smokers' diseases have stopped smoking shortly before their first hospital attendance. Busy physicians may choose not to enter patients in a trial when the additional time required for trial procedures threatens to delay clinic schedules further.

The link between success and age has emerged again but the effect of sex, clear in study A and in our previous report,[1] was not significant at the 5% level in study B. The association of success with heart disease and with stable marital status shown in study A and in previous work[1] did not emerge in study B. The hospitals and chest clinics were different in that those in study A were centres with a health visitor attached, whereas those in study B did not have a health visitor; it is difficult, however, to believe that this difference could account for the different findings.

The effective factor in the intervention strategies was the postal encouragement. The letters were simply phrased but each was slightly different from the others, adapted to the time they were sent out. This method should be within the manpower and financial resources of the NHS, and could easily be applied on a wide scale. Our participating physicians were supplied with the letters at the appropriate times by the trial coordinator, but it should not be difficult for physicians to organise a postal encouragement system as a routine in their own clinics.

A simple method based on advice followed by postal encouragement to stop smoking has been shown to be more effective in hospital outpatients than advice alone. Stopping smoking is so important to patients with cardiac and respiratory diseases that even these modest increases in cessation rates are worth while. We recommend that the method should be adopted as standard practice until further research produces a better strategy.

The Research Committee of the British Thoracic Society thanks the participating physicians and their staff, who all worked hard to make the trials a success.

STUDY A

Drs R A L Agnew (Liverpool), A G Arnold (Hull), A T Axford (Aberystwyth), J Ayres (Birmingham), J T Baker (Wrexham), J R M Bateman (Derby), R J Bibby (Blackpool), G Boyd (Glasgow), D J Brewer (Hartlepool), I A Campbell (Cardiff), S S Chatterjee (Manchester), H Clague (Bishop Auckland), A G Chappell (Bridgend), M P Chopra (Ashton-under-Lyne), J B Cookson (Leicester), I I Coutts (Truro), J Cowie (Plymouth), D Davies (Nottingham), R G Dent (Hertford), A J Dorward (Paisley), D Ellis (Gt Yarmouth), J A R Friend (Aberdeen), J Gaddie (Galashiels), P H S Gillam (Salisbury), R Godfrey (Southampton), J Hadfield (Chesterfield), P Handslip (Nuneaton), J Hartley (Brighton), R Harrison (Stockton-on-Tees), N G Hodges (Bangor), A M Hunter (York), P B Iles (Birmingham), A J Johnson (Canterbury), D J Jones (Haverfordwest), O G Jones (Hull), G K Knowles (Kingston-upon-Thames), A G Leitch (Edinburgh), D R Lewis (Chesterfield), J Macfarlane (Nottingham), D McIntyre (Glasgow), C McGavin (Plymouth), G J R McHardy (Edinburgh), J Meadway (London), J W Millard (London), E Neville (Portsmouth), J O'Reilly (Blackpool), S Pearson (Leeds), W Perks (Shrewsbury), G S Khuraijam (Isle of Man), J B Ridyard (Prescot), A O Robson (High Wycombe), D Shale (Nottingham), B A Sims (Ballymena), C Skinner (Birmingham), D H Stableforth (Birmingham), B H R Stack (Glasgow), N N Stanley (Hitchin), G M Sterling (Southampton), R A Stockley (Birmingham), M F Sudlow (Edinburgh), G O Thomas (Abergavenny), N C Thomson (Glasgow), C Turton (Brighton), D R H Vernon (Glasgow), J Wales (Leicester), J F Waller (Epping), J P Warren (Harlow), I Williams (St Albans), and J B Wood (Hereford).

STUDY B

Drs P B Anderson (Sheffield), J Ayres (Birmingham), P Beck (Cardiff), J Barclay (Oldham), A Bhoomkar (Chesterfield), M F Bone (Dudley), G Boyd (Glasgow), G W Bradley (Ashford), J L Bradley (Edgware), S Brennan (Sheffield), M Britton (Chertsey), I A Campbell (Cardiff), J Choo-Kang (Kirkcaldy), A Clague (Bishop Auckland), D N Cooper (Mexborough), P Corris (Newcastle), R A Clark (Dundee), Professor T J H Clark (London), R B Cole (Stoke-on-Trent), C K Connolly (Darlington), I I Coutts, (Truro). B H Davies (Cardiff), P Dhillon (Dundee), A C Douglas (Edinburgh), A J Dorward (Paisley), P A Emerson (London), C C Evans (Liverpool), R J Courtenay-Evans (Thornton Heath), W V Evans (Merthyr Tydfil), A D Ferguson (Exeter), D J Fisher (Cardiff), S Fisher (Milton Keynes), D H Franklin (Inverness), J A R Friend (Aberdeen), J R Govan (Uxbridge), R A Grande (London), D R Hall (Ipswich), M Hall (Caerphilly), S P Hanley (Manchester), R N Harrison (Stockton-on-Tees), D Hendrick (Newcastle), M Hetzel (London), L S Hill (Warwick), A M Hilton (Manchester), K R Hine (Haywards Heath), D Honeybourne (Birmingham), J Hopkin (Oxford), J A Hughes (Tonbridge), B J Hutchcroft (Sheffield), A J Johnson (Canterbury), C E Johnson (Burnley), O G Jones (Hull), Professor G S Kilpatrick (Cardiff), P Lawford (Coventry), J Lazarus (Cardiff), C McGavin (Plymouth), D McIntyre (Glasgow), D A F McGill (Winchester), A C Miller (Thornton Heath), J Millard (London), J W Millar (Poole), A Mir (Cardiff), A Mithal (Lincoln), D G Model (Eastbourne), R D H Monie (Glasgow), W D Murray (Inverness), C P Mustchin (Carlisle), E Neville (Portsmouth), M R Partridge (London), E T Peel (Wallsend), M D Peake (Pontefract),

W D Riding (Bedford), P Routledge (Cardiff), D Seaton (Ipswich), M J Serlin (Southport), S G Spiro (London), J E Stark (Cambridge), M Stevens (Cardiff), R D Stevenson (Glasgow), G D Summers (Kidderminster), J A McM Turner (Bournemouth), J A Utting (Maldon), D R H Vernon (Glasgow), E H Walters (Newcastle), A Woodcock (Manchester), J Webb (London), P Wilkinson (Ashford), R F Willey (Lancaster), W J Windebank (Derby), and R J Wolstenholme (Wigan).

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