to the degree of sustained pulmonary hypertension,[9] which in turn is inversely related to the level of arterial oxygen saturation:[10] so that it seems reasonable to assume that relief of hypoxaemia could reduce pulmonary arterial pressure and pulmonary vascular resistance and so increase life expectancy and reduce morbidity. In an acute exacerbation of chronic bronchitis when a patient develops congestive cardiac failure, the pulmonary arterial pressure may fall considerably, in some cases even to normal, when oxygen is administered for a few hours—presumably because it reverses active pulmonary vasoconstriction caused by hypoxaemia. Sustained pulmonary hypertension may, however, be present in some patients with advanced chronic bronchitis, even in the absence of bacterial infection or bronchospasm. In these cases the pulmonary hypertension is not influenced by short-term administration of oxygen, for presumably it is due to structural changes in the pulmonary arteriole.[11] Nevertheless, it has now been shown that in such cases if oxygen is given for at least 15 hours each day the pulmonary arterial pressure begins to fall after a few weeks and episodes of congestive cardiac failure requiring hospital admission become less frequent.[8 9] Another effect of this treatment is to correct polycythaemia caused by severe chronic hypoxaemia.[12] Claims have been made that patients treated in this way survive longer[2 3] and can lead more active lives.[1 2 8]

If long-term administration of oxygen in sufficient amounts to reduce hypoxaemia and control pulmonary hypertension and its consequences is indeed useful, there are vast numbers of patients with advanced chronic bronchitis who might benefit from it. At present, oxygen is available through the NHS for domiciliary use in 48 ft^3 (1·35 m^3) cylinders; for continuous treatment at a flow rate of 2 l/min, delivered by nasal cannulae for 15 hours per day, about 14 cylinders per week would be required (allowing for wastage). The current cost per cylinder is £1·88 (£3·04 on private prescription). This form of treatment, which usually has to be continued for the rest of the patient's life, will therefore cost the NHS £1372 per year for oxygen for each patient (£2220 per year for a private patient). The cost might be reduced by using larger cylinders, a liquid oxygen supply, or an electrically operated oxygen concentrator,[13] but at present these sources of oxygen raise serious practical problems—and the last two require substantial capital expenditure.

A study of long-term domiciliary oxygen treatment in patients with advanced chronic bronchitis is at present being undertaken by the Medical Research Council, but on the evidence so far available the case for adopting it on a large scale is far from convincing. This form of treatment has not yet been shown to improve survival,[4] except possibly[2] in one small group of patients with moderate to severe hypoxaemia living at an altitude of 5000 ft (1500 m). Undoubtedly the number of episodes of congestive cardiac failure and of hospital admissions is much reduced, but it is less certain whether the quality of life is improved otherwise.

With a well-designed clinical trial it might be possible to compute the net saving in NHS expenditure which would result from the reduced requirements for hospital admission of patients on long-term oxygen treatment. Clearly on strict economic grounds it would be improvident to make this form of treatment universally available until this has been computed. There may already be sufficient evidence for recommending this treatment in carefully selected cases, but the Medical Research Council trial now in progress should eventually provide guidelines for identifying those patients most likely to benefit from it.

[1] Levine, B E, *et al*, *Annals of Internal Medicine*, 1967, **66**, 639.
[2] Petty, T L, and Finigan, M M, *American Journal of Medicine*, 1968, **45**, 242.
[3] Neff, T A, and Petty, T L, *Annals of Internal Medicine*, 1970, **72**, 621.
[4] Stewart, B N, Hood, C I, and Block, A J, *Chest*, 1975, **68**, 486.
[5] Cotes, J E, and Gilson, J C, *Lancet*, 1956, **1**, 872.
[6] Cotes, J E, *Thorax*, 1960, **15**, 244.
[7] Abraham, S, *et al*, *Circulation Research*, 1968, **23**, 147.
[8] Stark, R D, Finnegan, P, and Bishop, J M, *British Medical Journal*, 1972, **3**, 724.
[9] Bishop, J M, *Progress in Respiration Research*, vol 9, p 10. Basel, Karger, 1975.
[10] Segel, N, and Bishop, J M, *Journal of Clinical Investigation*, 1966, **45**, 1555.
[11] Hasleton, P S, Heath, D, and Brewer, D B, *Journal of Pathology and Bacteriology*, 1968, **95**, 431.
[12] Chamberlain, D A, and Millard, F J C, *Quarterly Journal of Medicine*, 1963, **32**, 341.
[13] Stark, R D, and Bishop, J M, *British Medical Journal*, 1973, **2**, 105.

Polycystic ovarian disease: diagnosis and management

Gynaecologists have been familiar with the appearance of enlarged, polycystic ovaries for over a century; their association with the syndrome of menstrual irregularity or amenorrhoea, a history of sterility, masculine type hirsutism, and (less consistently) retarded breast development and obesity was first recognised in 1935 by Stein and Leventhal.[1] All, some, or only one of these characteristics may be present in addition to the ovarian changes, for the syndrome has a wide spectrum. Menstruation is regular in over 10% of cases and ovulation occurs in nearly a quarter.[2] According to the obesity of the patient the ovarian enlargement can be confirmed by pelvic examination, examination under anaesthesia, gynaecography, or laparoscopy. Typically, at laparoscopy there is a pale smooth glistening thick ovarian capsule, and biopsy shows enlarged subcapsular atretic follicles. Occasionally, however, the clinical syndrome may be associated with a single ovarian cyst[3] or, indeed, no obvious histological abnormality.[4]

Polycystic ovarian disease justifies treatment, for functional uterine bleeding is not uncommon and occasionally severe, while the underlying androgen-producing disorder is associated with hirsutism or other virilising effects. There also seems to be an increase in the incidence of endometrial carcinoma[5] and ovarian tumours[6] among these patients, and this risk warrants continued observation. If the main complaint is hirsuties resistant to local treatment the excess androgen production may be suppressed by giving adrenal or ovarian hormones alone or in combination.[7] Well-tried regimens include prednisone, 7·5 mg daily, the larger proportion of the dose being given on retiring to suppress the nocturnal rise in corticotrophin secretion, or one of the oral contraceptives. When choosing an oral contraceptive it is important to avoid one which contains an androgenic progestational agent such as norethisterone, norethisterone acetate, or ethynodiol diacetate. The success of treatment with either class of drug can be assessed by showing a decrease in androgen production: any effect on hair growth will take several months.

If infertility is the predominant problem, ovarian wedge resection or the induction of ovulation with clomiphene should be considered. Wedge resection has yielded widely different results in different hands:[8] fertility is highest in the early postoperative months, but infertility and irregular menstruation frequently recur. Pelvic adhesions may develop, leading to mechanical sterility as a complication.[9] Treatment with 100-150 mg of clomiphene daily for five days is now well established for inducing ovulation in patients with polycystic ovarian disease. Ovulation has been reported[10] in 76% of

patients and pregnancy in 34%. Cycles produced by clomiphene may have a "luteal phase defect," as shown by low levels of progesterone and a shortened cycle, which may be corrected by giving an intramuscular dose of 4500 units of human chorionic gonadotrophin on day 14. Management will, however, remain empirical until the underlying biochemical abnormalities have been completely elucidated.

[1] Stein, I F, and Leventhal, M L, *American Journal of Obstetrics and Gynecology*, 1935, **29**, 181.
[2] Goldzieher, J W, and Green, J A, *Journal of Clinical Endocrinology and Metabolism*, 1962, **22**, 325.
[3] Delahunt, J W, *et al*, *British Medical Journal*, 1975, **4**, 621.
[4] Roberts, D W T, and Haines, M, *British Medical Journal*, 1960, **1**, 1709.
[5] Chamlian, D L, and Taylor, H B, *Obstetrics and Gynecology*, 1970, **36**, 659.
[6] Hutchison, J R, Taylor, H B, and Zimmermann, E A, *Obstetrics and Gynecology*, 1966, **28**, 700.
[7] Ettinger, B, *et al*, *American Journal of Medicine*, 1973, **54**, 195.
[8] Goldzieher, J W, *Clinical Obstetrics and Gynecology*, 1973, **16**, no 4, 82.
[9] Weinstein, D, and Polishuk, W Z, *Surgery, Gynecology and Obstetrics*, 1975, **141**, 417.
[10] MacGregor, A H, *et al*, *Fertility and Sterility*, 1968, **19**, 616.

Health expenditure

For the remainder of the 'seventies the National Health Service faces a bleak financial future. Any doubts on this score have now been dispelled by the Government's 1976 Public Expenditure White Paper,[1] which sets out its spending plans for the rest of this decade. Between 1971-2 and the current financial year the real resources of the NHS increased by £550 million, a rise of 14·5%. Between 1975-6 and 1979-80 the projected growth is only £250 million, a rise of just under 6%. Even so, compared with some other public services, the NHS has done well: spending on education, for example, is planned to fall. Mrs Barbara Castle can rightly claim to have persuaded the Cabinet to give more priority to health than to most other social programmes in an era of austerity for public spending as a whole. This is, however, small consolation for those working in the NHS, for it is not the percentage of the national income or of total public expenditure devoted to the Health Service which determines the quality of the care provided: it is the actual resources available.

There may, perhaps, be some slight hope that the spending plans will once again be revised upward, for White Papers are not tablets of stone but are written on some extremely friable political clay. The Chancellor's figures show that the present financial year has been far less catastrophic, financially at any rate, than the dire predictions made at its start: in real terms spending on the NHS went up faster in 1975-6 than in either of the two previous years. But it would be extremely rash to count on getting another such bonus. Inevitably, the budgets of public services must reflect the country's economic circumstances; while Britain's prospects are uncertain, so are those of the NHS. Although the recommendations of the Royal Commission on NHS Resources and Manpower may make a difference in the 'eighties, it is unlikely that they will be published in time to have any influence on the 'seventies. Indeed, the existence of the commission may freeze all discussion of measures, such as increasing the scope of charges, which might help to relieve the Service's immediate financial problems.

The current challenge is, therefore, how best to adapt to stringency: how the limited resources available to the NHS can be used most effectively. The Government's detailed strategy is not yet clear; perhaps further illumination will be offered next month by the Department of Health and Social Security's much-postponed consultative document on priorities. The White Paper does offer some clues. Firstly, the emphasis is being put on current spending—on people and equipment—at the expense of capital investment. The hospital building programme is being run down gradually from a peak of £450 million reached in the early 'seventies to £300 million at the end of the decade. Secondly, within the capital priority, spending on health centres will be protected from cuts as part of a general emphasis on primary care. Thirdly, any extra funds for current spending will be channelled to the worst-off regions: Mrs Castle has adopted, in a slightly modified version, the Resource Allocation Working Party[2] recommendations for redistributing resources. In 1976-7 this will mean a nil rate of growth for the four metropolitan regions and Mersey, while Wessex, Trent, and East Anglia will get an increase of 4%.[3] Lastly, the community services are to be developed in order to relieve the pressure on the NHS.

It is on this last point in particular that the White Paper raises as many questions as it answers. Current spending on the personal social services is to grow at a slightly faster rate than NHS expenditure, but the cut-back on capital investment is even more savage, proportionately to the sums concerned. While it may be sensible to put more emphasis on domiciliary care, the cut in the building allocation will mean postponing yet again the hopes of providing sufficient community hostels and homes to cope with the mentally handicapped and others who could, to everyone's benefit, be transferred from NHS institutions. Again, the White Paper takes a welcome but only tentative step in the direction of joint planning by the Health Service and local authorities. What the White Paper describes as "a modest sum, rising possibly to about £20 million by 1979-80," is to be set aside for the joint financing of personal social service projects "where it is accepted by both health and local authorities concerned that this would yield a better return in terms of total care." Clearly there is still a long way to go before the DHSS plans the allocation of resources on the basis of a comprehensive review of all the services available, both in the NHS and in the community, to any particular area. At present this still seems an aspiration rather than a reality, though one of the main objects of reorganisation was to create coterminous authorities which would make this sort of planning exercise possible.

Unfortunately reorganisation has so far compounded, not eased, the effects of financial stringency. It has made it more difficult, not less so, to reallocate resources to where they are needed most desperately. It has added to the numbers of administrative authorities and consultative committees which, apart from being expensive in themselves, create delay and frustration. A crisis of morale—aggravated by Mrs Castle's doctrinaire and insensitive handling of such issues as private practice—has thus been superimposed on a crisis of finance. In turn, each reinforces the other. So, while it is probably useless in the present economic climate to call on the Government to increase the resources available to the NHS, it is all the more important to press for measures designed to create for those providing the care more freedom and flexibility. Otherwise the gap between what is desirable and what is possible could grow dangerously wide.[4]

[1] Chancellor of the Exchequer, *Public Expenditure to 1979/80*. London, HMSO, 1976, Cmnd 6393.
[2] *British Medical Journal*, 1975, **4**, 66.
[3] Department of Health and Social Security, *Financial Allocations to Regional Health Authorities*. Circular to regional chairmen 18 February 1976.
[4] Klein, R, *British Medical Journal*, 1976, **1**, 353.