Public health implications of ageing

The Milroy Lecture

ABSTRACT—The National Health Service reforms have placed public health medicine centre stage in controversies over the internal market, rationing of health care, and issues of equity in access to care. One of the key determinants of the need for reform in health services internationally is the demographic transition of post-industrial countries into an ageing population. This paper considers some of the implications of ageing and how public health medicine might respond to these new challenges.

Ageing—a social cachexia

Milroy’s interest in public health started when he worked in the tropics. He stated:

‘No question of public hygiene is perhaps of more importance, in respect alike of individual suffering and the welfare of communities, than that of the aetiology of chronic cachexia’ [1].

Milroy was concerned about the extent of the ‘vast amount of protracted malaise and suffering, disablement, or lessened capacity for industrial work due to cachexiae’. If he were to have practised medicine in the 1990s, he would undoubtedly have been concerned about a new cachexia of ageing.

Ageing of populations

Demographic transition is occurring very rapidly throughout the world, more so in developing than developed countries [2]. In the UK, the rapid rise in very elderly people aged 85+ is only just beginning to become apparent to policy-makers and public health. The oldest old, 85+, will increase in number from half-a-million in 1981 to 1-million by the turn of the century. The number of young old will actually fall a little by the turn of the century, but will increase between the years 2010 and 2030—the post-war baby boomers coming through to claim their pensions.

In other countries, the major concern is not the absolute numbers of elderly people, as these are small, but the speed with which the transition will occur. Changes that occurred over a century in post-industrialised countries will take only 30 years in many newly industrialised or transitional countries in Asia. Life expectancy has risen dramatically. Currently, a year of life is added each decade but there is considerable variation within Europe and the rest of the world. Only sub-Saharan Africa is unlikely to realise WHO targets of an average life expectancy of 65 years by 2020 [3].

Determinants of population ageing

Why do populations age? The determinants of ageing of populations are reductions in fertility and reductions in death rates at all ages. The explanation for both these trends in the UK and other post-industrialised countries is to be found in the improved socioeconomic status of populations and not in the effects of medical care [4]. Over the more recent past, a case has been made that medical care has contributed considerably to gains in life expectancy [5]. However, the evidence to support these claims is patchy, demands many assumptions, and probably overstates the case for the benefits of medical care.

In developing countries it is more likely that preventive health care, rather than medical care, has accelerated the rate of population ageing. Family planning and child health programmes exemplified by the GOBI-A (growth charts, oral rehydration, breast feeding, immunisation, and vitamin A supplementation) programmes promoted by UNICEF are of particular significance [6].

Health needs assessment

Burdens of disease associated with old age

Inevitably, increasing age is associated with greater exposure to risk factors and lessening adaptability, the hallmark of ageing, which results in disease, decomposition and death. Interestingly, there is no point in the age range at which rates of disease or disability or death increase dramatically (Fig 1). It is illogical to define age boundaries in thinking about who is old and who is not old. We are all ageing, but at different rates determined by our genes, our environmental exposures to hazards such as smoking and road traffic accidents, and protective influences such as wealth, status, and social networks.

The major burdens of disease remain the same throughout adult life and do not differ markedly between men and women. Cardiovascular disease,
malignant neoplasms, respiratory disease and injuries are what kill us. The picture for disability is not much different; by the age of 80 years the majority of people have some self-defined disability (Fig 2). The degree of severity is obviously important although even so-called trivial disability may have disproportionate effects on mood and social engagement.

Describing the burdens of disease is the first step in public health needs assessment. The picture is more complex than the simple epidemiological estimates of morbidity and disability. Health need is defined in terms of ability to benefit from health care. Severe disease or disability may be present but ability to benefit from health care may be unproven or impossible. The relationship between presence or absence of disability and the relationships with treatable disease can be examined in a two-by-two Table (see Table 1). Some conditions are treatable and also cause disability. Others are treatable but cause no disability and may therefore be missed because no one will know that anything is wrong. A third group of need is avoidable or remediable but not through health service intervention: this sort of need demands collaborative efforts that go wider than health and social service provision for older people and aim to redress social and environmental disadvantages.

Ethics of care for elderly people

A major preoccupation of policy-makers world-wide is with costs of care: paying for the pensions and long-term care requirements of an ageing population [9]. How much we spend on elder care cannot be determined without reference to our ethical principles. If we place no value on life after economic productivity ceases, then logically we should not waste resources on health services for elderly people.

What are our national values in health care for older people? In some health authorities the growth of a large private sector in institutional care has been associated with large reductions in NHS provision [10]. Most health authorities have not bought contract beds in the private sector but simply asked patients and their relatives to make use of the income support arrangements available through social security [11]. The cost savings generated have not always been ploughed back into community care or the hospital services for elderly people. They were a windfall for general service developments or efficiency savings. Geriatricians and physicians with an interest in elderly people have not been at the forefront in advocacy for the long-term care needs of elderly people.

The transfer of frail, elderly, and often demented
people into independent sector homes to enable the closure of old NHS property is now commonplace. Use of the private sector is not a bad thing in itself. Problems arise when the motives are complicated by a desire to save money, and safeguards on standards of care are not considered. A notable case was the transfer of a group of demented patients with no known next-of-kin from the east end of London to a private sector home in Yorkshire, televised by a BBC Television Panorama programme in 1992. As the patients were demented it was considered to be of no material significance where they were looked after.

Such practices must make us question the national values we hold, our ethical standards, and the rights of elderly people. Until we are clear as a society on these points it is inappropriate to be making plans for how services should operate and how much they should cost [12,13].

*Individualism versus utilitarianism*

Achieving rights for patients may be a result of the current government’s policy of charterism. The Patients’ Charter is intended to give a clear indication of what we as individuals should expect from health services. However, the ethical principle that underpins state provision of any service is that of utilitarianism—the greatest good for the greatest number.

Health care policy should seek not simply to ensure equity of distribution of resources in relation to population burdens of disease but should aim to target resources where they will do most good. However, in the absence of adequate data relating service inputs to health outcomes, the best that can be done is to spend resources in patterns determined by historical precedents and gradually shift the balance by means of resource allocation weighted by proxies for need, such as mortality, deprivation indicators, hospital utilisation, and morbidity rates [14,15].

Clinical ethical values—beneficence, doing the best possible for the individual patient—run counter to the utilitarian ethic. Professionals typically operate using beneficence and no patient would wish it otherwise [16]. One of the major tensions for professionals in management is to juggle these two ethical principles of beneficence and utilitarianism, both of which have validity. Of great concern is the government’s desire to push the balance towards the individual ethic at a time when health care resources are severely stretched and not all individuals’ demands and needs for care can be met. American comment on this conflict suggests that we are in danger of creating an insatiable consumer of health care when what we have now are patients who adopt essentially utilitarian values in their use of health services [17].

*What is a ‘benefit’?*

The ethical stance taken will determine the methods used to determine what is deemed to be ‘benefit’. If the ethical perspective is primarily utilitarian, it implies that the appropriate measures will give a population view of the value of treatment or care. Years of life gained by treatment, or quality adjusted years of life gained, are appropriate indicators of benefit as they embody the overall goals of health services which are to increase the quality and quantity of life [18]. For example, the benefits of a stroke unit would be assessed by comparing the health status and survival among those treated on a stroke unit with those treated conventionally. The difference in the number of quality adjusted life years (QALYs) obtained on the stroke unit compared with traditional care would be the relevant measure for use in cost-effectiveness studies, and a cost per QALY could be calculated.

By contrast, the clinical view emphasises the doctor’s duty to do good for the individual patient. If this ethical standpoint is used, very different methods will be needed to measure benefit. In these circumstances, the views of the general public are irrelevant and all that matters is the individual’s view of the degree of benefit (or harm) obtained from intervention. Such patient-centred approaches to the assessment of benefit obviously emphasise the uniqueness of each person’s response to disease and treatment, and are inherently flexible. Since the clinical environment is largely concerned with treating patients as individuals by adjusting a general type of treatment to the specific requirements dictated by the unique problems and solutions surrounding the patient, such patient-centred measures appear to be most appropriate. Much more work is needed to understand how such flexible, individual assessments of benefit might be aggregated into useful information upon which general policies might be developed.

If it is accepted that resources are scarce and some form of rationing inevitable, the implication is that some individuals will be winners and some will be losers if a utilitarian code is used. The most obvious losers in any utilitarian approach to measuring quality of life (eg QALYs) are elderly people, as they simply do not live long enough to generate as many QALYs as younger people. There has been only limited discussion of the ethical perspectives associated with mea-

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*Table 1. Relationships between treatable disease and functional status*

| Treatable disease | Functional status |
|-------------------|-------------------|
| Yes       | Disabled          | Heart failure |
| No        | Environmental/  | Anaemia,      |
|           | social factors    | Breast cancer |

*Public health implications of ageing*
surement of the benefits of health care, and proponents of the utilitarian approach consider that the goal of health services is to provide the greatest health gain for the lowest cost.

Needs assessment sounds simple but is probably the most complex of public health tasks, as definitions of need depend on one’s viewpoint, ethical principles, and the indicators of disease and benefit used. Recent definitions of health need have provided further qualification of the concept: health need is the ability to benefit from health care provided from within available resources. This last rider to the definition is particularly dangerous but is almost inevitable if we persist in maintaining health services that are more responsive to demand (ie what patients want and what doctors wish to do) and are based on existing patterns of spending; that is, if we wish to pay for inappropriate care. We should rather be moving towards Archie Cochrane’s student banner prepared for a march to support the establishment of a National Health Service: ‘All effective care should be free’ [19].

Commissioning health services for older people

Needs assessment does not appear to have much influence on purchasing health services for elderly people, although it is the logical starting point. Most services for elderly people are starting from so low a level that any concept of meeting the population need is ridiculous. In my own health authority, estimates of population need for dementia services, stroke services, continence services, and long-term care places are enormous (see Table 2) and dwarf current provision and our purchasing budget. A major injection of resources for health services for elderly people is needed, but should it come from other sectors, from increased direct taxation, or from increased personal spending on health care? It is now essential that this question is publicly debated, rather than ignored by politicians.

Knowing what to buy implies a knowledge of what works and is fit for its purpose, that is of quality. Such knowledge is scarce.

Long-term care

Long-term care is no longer a lead responsibility of health services. Health authorities have withdrawn from provision of long-term care in a systematic way over the years. It is only in London that any substantial NHS provision still exists.

Care in the community policy

The care in the community policy is concerned not just with dealing with the perceived inadequacies of care in institutions but more fundamentally with the spiralling costs of care. This is evident from the first page of the policy document which shows a striking graph of the increase in costs of care over the decade, which were of the order of £2-billion [20].

Projecting costs

Projections on health and social care costs for older people are set to rise dramatically as the demographic trends, particularly the rise in the very elderly, begin to bite. The costs of long-term care are the largest part [21]. Needless to say, alternatives to funding out of direct taxation are being sought. The costs of personal long-term care insurance are sufficiently high that few of us will take out policies. Even in the US, the Brookings Institute estimates of the viability of personal insurance for long-term care costs suggest that at best only 9–14% of people will have insurance, and even that may be insufficient for their needs [22].

The role of the NHS

Recently, a patient with a stroke and severe associated disability was considered no longer in need of health care. The patient’s needs were considered social, and consequently he and his family were responsible for paying for care which would not be provided free in an NHS hospital. The case went to tribunal, which found in favour of the patient who continued to have free NHS care [23]. Where should free care end and means-tested social care begin?

New guidance for long-term care in the NHS does not clarify the position greatly because of the political sensitivity of any explicit erosion of the role of the NHS [24]. A key point is that the separation of social and health components of elderly care is not workable in practice and is to the disservice of older people, ultimately leading to perverse care aimed at protecting budgets rather than meeting need [25]. It seems inevitable that some reduction in old style long-term care for patients with modest care needs will be maintained. New criteria must examine how public and private resources can best be used and should be developed in public debate, and not by local quangos. For example, terminal care might reasonably be provided through public resources, as the time taken to assemble packages of care in the community is disproportionate to survival prospects; high cost interventions that demonstrably improve survival and/or quality of

| Table 2. Burdens of disease in older people (85+ years) in a London health district (estimated numbers of people) |
|---------------------------------------------------------------|
|                      | 1993   | 2001   |
| Long-standing disability            | 4,600  | 5,100  |
| Dementia                       | 1,600  | 1,800  |
| Urinary incontinence            | 1,200  | 1,300  |
| New strokes                   | 240    | 260    |

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life should be paid for publicly as a means of sharing costs more fairly.

**Acute care for older people**

We know more about the efficacy of acute care for elderly people than almost any other aspect of health services. A series of randomised controlled trials has been carried out over the past decade to compare the outcomes obtained from comprehensive geriatric assessment and management compared with usual internal medicine services [26]. This meta-analysis of 28 controlled trials included almost 10,000 patients in a diverse range of clinical settings. In Table 3, details from 14 trials of 2,785 patients receiving care in hospitals are summarised. The odds ratio for specific outcomes describes the size of benefits achieved by geriatric assessment units. For example, patients admitted to geriatric units were 22% (i.e., 1 – 0.78) less likely to die than patients managed on an internal medicine unit. Patients were also less likely to be readmitted and more likely to be discharged home. While we have to be careful with meta-analysis, as it may give spurious significance to a collection of bad trials, it remains one of the few ways of gaining enough data upon which to base practical judgments.

Hospital-based schemes of comprehensive assessment and management included in the meta-analysis divide into two broad categories: those services where geriatric medicine teams have control over what happens, and services where they give advice. Having control tended to be more effective! Another factor of importance was having an extended period of follow-up after the acute episode. Follow-up may be of less relevance in Britain where primary care is considerably better developed than in the USA.

It is striking that the majority of these trials were conducted in the USA or Canada. Our own prejudices about efficacy—we believe the services worked—did not allow trials to be conducted in the very place where such services were initially developed. This evidence of efficacy is strong enough to support a purchasing policy of multidisciplinary care based in acute hospitals.

The need to decide between age-related, integrated, or needs-based patterns of service delivery in the British context remains a major issue for some clinicians. Whether services should be age-related or integrated should be of no significance in the 1990s. It is abundantly clear that the general public and the majority of health professions do not feel that age thresholds that determine suitability for a particular form of care, are fair [27]. As age is an inaccurate means of classifying health care need, alternative organisational approaches that avoid age-related admission policies must be rapidly developed to avoid age-rationing of health care [28].

London has lagged behind the provinces in the provision of acute geriatric services, and because of this many services in the capital are still at an age-related stage in their natural history. It is vital that this does not result in the arrested development and stunting of London’s services for older people.

Commissioners of services need clear, unambiguous messages if they are to have any impact: integrated multidisciplinary services where access to care is independent of age but is determined by need for care offer the best value. If geriatricians feel that this will consign them to dealing with ‘second-class’ patients, they should seriously consider why they are in the specialty.

**Rehabilitation care**

Purchasing rehabilitation services, particularly for stroke, is of interest to several commissioning agencies in England. Should commissioners be buying stroke units and what might they get for their money?

**The efficacy of stroke units**

Trials of stroke units have all been small, and this has limited their power to detect even large treatment benefits. The effects reported by several trials were examined in a meta-analysis which compared good and bad outcomes, the latter defined as death or persisting dependency/disability [29]. This meta-analysis showed a clear early benefit from stroke units which persisted but was attenuated by one year (see Table 4).

A recent meta-analysis, including more data from trials published subsequently, showed that mortality was reduced by management on a stroke unit or within a more organised system of stroke care [30]. Descriptions of what currently constitutes a stroke unit [31] are helpful in guiding purchasers in defining what they want. However, it is not clear which components

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**Table 3. Effectiveness of geriatric services expressed as odds ratios (95% confidence intervals) of the outcomes indicated compared with usual internal medical services (from reference 26)**

| Hospital geriatric services | Deaths | Living at home | Hospital readmission |
|----------------------------|--------|----------------|---------------------|
|                            | 0.78   | 1.47           | 0.85                |
|                            | (0.6-0.97) | (1.1-1.9) | (0.7-1.0) |
of stroke units are responsible for the benefits observed in some trials.

**Stroke units in practice**

In the North-East Thames region a study was set up to compare the outcomes of two different stroke management systems [32]. One district had a stroke unit with an outreach service and represented the best sort of service one might expect to find anywhere. The other district had a traditional stroke service with patients scattered throughout the hospitals and with no overall direction or leadership. The findings were surprising: the district with the stroke unit did not achieve better outcomes or standards of care than the comparison district.

There are real difficulties in making comparisons of the effects of health services without using random allocation to even out potential biases. Adjustment for factors that might differ between districts and also affect outcome—case mix adjustment—was done but did not explain the lack of effect.

The most likely explanation for the lack of effect is the combined effects of the system—the way in which an effective intervention does not achieve its potential because of how work is done in routine settings. Stroke units may fail to achieve benefits because they fail to treat the right patients (eg taking too many mild or very severe strokes); the treatments are not carried out with sufficient intensity or skill; the enthusiasm of the team is insufficient; community resources are insufficient to provide backup. In general, problems may arise with coverage, compliance (both professional and patient), and the intervention itself.

Achieving the health gains that appear to be possible from randomised controlled trial evidence requires systematic evaluation of each of the steps where problems may arise: coverage, compliance, and nature of the intervention. The proper role of public health in the local scheme of commissioning is to carry out evaluations of these components of implementation of potentially effective interventions. Very little work of this nature is carried out as it is too often assumed that an efficacious intervention will be effective wherever and however it is implemented.

**‘Health of the Nation’ and prevention**

The final aspect of public health work is to do with prevention of disease. The whole prevention area has been dominated by the ‘Health of the Nation’ policy which focuses on cardiovascular disease, cancers, accidents, mental health, and sexual health [33].

Inevitably, elderly people did not get a special priority, and targets were only set up to 75 years of age. In part this was because the scientific evidence on the benefits of prevention was thought to be strong up to this age, and in part due to a view that prevention of disease in old age was potentially a dangerous thing to do as it might increase the population available to suffer from more expensive diseases such as Alzheimer’s disease.

The target for prevention in older age is not simply the extension of life but extension of disability-free life. To use the jargon: we seek to add life to years and not simply years to life. Until recently, we lacked the tools to measure whether our health and social policies were doing this or not.

Survival curves can be constructed using mortality, onset of disability, and of morbidity as the outcomes of interest (Fig 3) [34]. Achievement of the objective of adding life to years requires the areas between morbidi-

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**Table 4. Meta-analysis of the effects of stroke units, odds ratios (95% confidence intervals) (from reference 29)**

| Early outcomes at discharge or three months | Stroke unit | Medical ward | Odds ratio |
|--------------------------------------------|------------|--------------|------------|
| Good | Bad | Good | Bad | |
| Edinburgh, UK | 78 | 77 | 49 | 103 | 2.1 (1.3–3.4) |
| Uppsala, Sweden | 16 | 44 | 17 | 35 | 0.8 (0.3–1.7) |
| Dover, UK | 71 | 41 | 60 | 54 | 1.6 (0.9–2.6) |
| Pooled early outcomes | 1.6 (1.1–2.1) |

| Late outcomes at one year | Stroke unit | Medical ward | Odds ratio |
|---------------------------|------------|--------------|------------|
| Good | Bad | Good | Bad | |
| New York, USA | 28 | 15 | 22 | 17 | 1.4 (0.6–3.5) |
| Edinburgh, UK | 56 | 93 | 52 | 94 | 1.1 (0.7–1.8) |
| Uppsala, Sweden | 19 | 41 | 19 | 33 | 0.8 (0.4–1.8) |
| Dover, UK | 66 | 46 | 54 | 62 | 1.6 (1.0–2.8) |
| Pooled late outcomes | 1.2 (0.9–1.6) |
ity, disability, and mortality to become much smaller—morbidity and disability must be compressed into a smaller part of the life-span. This will result in people living in good health for a longer time, and consequently should offset some of the health and social costs of an ageing population.

A considerable amount of work has gone into attempting to describe survival free of disease [35,36]. The major problems are the lack of suitable data and agreed criteria for disability. Ideally, large representative cohort studies of long duration are needed to measure the incidence of common diseases and of onset of disability of different types. Such data are scarce worldwide. Data from disability and morbidity surveys can be used but this has many methodological limitations, chief of which are that it is impossible to examine improvements in disability, and that prevalence rates of disability are an amalgam of the experience of different cohorts of people exposed to different levels of risk factors—particularly smoking—and consequently are a less good guide of what will happen in the future.

Monitoring levels of disability-free life expectancy is of fundamental importance in the evaluation of health and social policy at a macro level. The implications of a compression of morbidity (ie an optimistic scenario [37]), an expansion of morbidity associated with increased ageing of the population (ie a pessimistic scenario [38]), or an equilibrium leading to roughly similar levels of morbidity and disability [39] are completely different for future resource requirements.

Prolonging active life

Prevention of disease is a major key to dealing with increasing burdens of disease. Much of the burden is preventable and analysis of the effects of eliminating different categories of disease gives an indication of where our priorities should lie.

The data shown in Figure 4 illustrate the effects of excluding mortality and disability from different disease groups on life expectancy and disability-free life expectancy calculations [40]. The diagnostic information on which these data are based is weak—self-reports, and there may be substantial under-estimates of the importance of some disease groups: in particular, mental illness and dementia may be missed but undoubtedly contribute to disability and mortality.

Prevention of cardiovascular disease is of major importance for both mortality and disease-free life expectancy. This is no surprise. The value of using such an index is that it allows diseases that cause a lot of suffering but little mortality to be compared in the same way. Musculo-skeletal disorders are obviously of great importance too.

Effect of smoking

British doctors who stopped smoking before the age of 35 lived, on average, an extra 7.5 years [41]. The benefits appear to be greater during more recent years than in the 1950s and 1960s. Giving up at older ages has less benefit, not because of age itself but because of duration of exposure to tobacco.

The means of giving up deserve some comment too. Exhortations, increasing knowledge, and advice are not particularly effective. Fiscal measures are, so raising the price of tobacco has a dramatic effect. In 1991, the Hong Kong government doubled the price of cigarettes overnight [42]. What chance is there of our government taking such steps? Legislation to ban smoking in public places has also had a substantial role in reducing the prevalence of smoking.

The prevention paradox was described by Rose [43]; individuals taking part in preventive activities stand to gain little although the population as a whole gains a great deal. This is highlighted in the treatment of high blood pressure to prevent stroke. In the MRC mild
hypertension trial [44], the benefits of treatment were very modest—about 850 people had to be treated for one year to avoid one stroke, and consequently 849 people were exposed to side-effects of treatment for no obvious benefit to themselves. At older ages, the number to be treated to avoid a single stroke is much smaller, simply because older people are at a higher risk of strokes [45]. Consequently, there are strong grounds for targeting prevention to high-risk people, and age is a powerful risk factor in its own right.

**Conclusion**

Public health medicine has major opportunities to use the NHS reforms to the advantage of older people. The massive scale of health needs of older people cannot be ignored or managed within existing resources. New methods must be sought to measure health benefits of relevance to older people and to ensure that older people are included in evaluations of health services. Organisation of services must ensure that older people are not disadvantaged through age rationing of care. The development of new services of demonstrated efficacy requires systematic study of coverage, compliance (both professional and patient), and the quality of intervention if potential benefits are to be obtained in practice. New methods of monitoring healthy active life expectancy and a stronger focus on disease prevention in old age are needed if the goal of health and social services for older people—prolongation of healthy active life—is to be realised. Finally, the framework within which health services for elderly people are developed, the resources available, the values and ethics adopted, require much wider debate.

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ENSURING EQUITY AND QUALITY OF CARE FOR ELDERLY PEOPLE

The interface between geriatric medicine and general (internal) medicine

A report of the Royal College of Physicians

Allocation of resources for health care is under scrutiny and major reorganisation of services is taking place. At such a time it is particularly important to ensure that the more vulnerable members of the community should receive optimal care.

This report is based on the premise that elderly people should receive the same access to and quality of medical care as the rest of the community and should not be discriminated against on grounds of age.

The report considers models of care and makes recommendations for acute emergency services, specialist medical services, including continuing care, and medical training. It also includes specific guidance for commissioners and purchasers of care.

Contents

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