

# The Dental Service

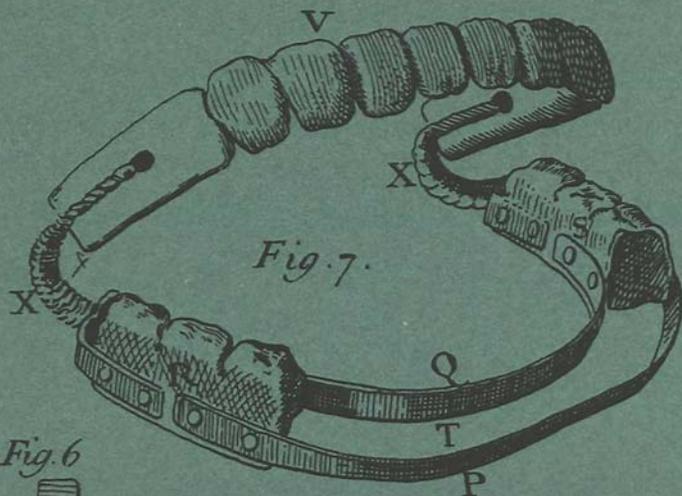


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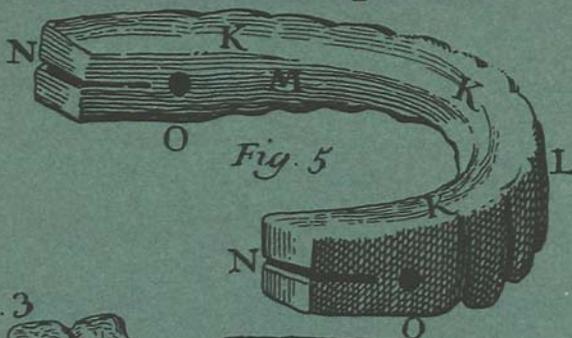


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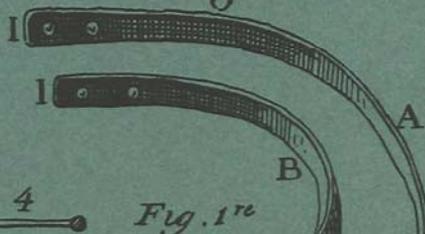
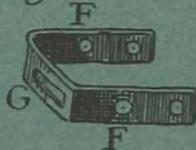


Fig. 4

Fig. 1<sup>re</sup>

Fig. 2



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# The Dental Service

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Office of Health Economics

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THE cost of dentistry now exceeds £100 million a year. In terms of a single specific illness or disease this figure is second only to the cost of mental illness and is greater than direct National Health Service expenditure on conditions such as pregnancy or the treatment of heart disease, bronchitis or tuberculosis.

This comparison, however, over-simplifies; it serves only to underline the relative cost to the community at large of the National Health Service dental services without considering the benefits. It begs the question of how much should be spent upon the care of teeth, and whether current expenditure is excessive or sadly deficient. These questions are at present perhaps unanswerable. Nevertheless, a different perspective of the current £100 million a year National Health Service expenditure upon the dental service can be seen if it is compared to personal expenditures upon, for example, hairdressing services, which in 1967 exceeded £175 million.

This study is concerned with the development and the problems of the dental service in this country. It concentrates upon the structure, size and operations of the service and the means by which it is financed. It considers firstly the main trends of expenditure, relating it to the overall growth in the Health Service during the past twenty years and its demands upon the total national income. It then considers the supply of dental manpower and the changes in demand since the start of the National Health Service. The current position is then examined in detail again in terms of both the supply and the demand for dental care. The conclusion explores the effectiveness of the current system supporting the dental services in relation to technological and other developments and also relative to the demands the community could or should be placing upon the dental services.

## THE ESTABLISHMENT OF THE DENTAL SERVICES

Since 1948 dental treatment has been available to the whole population under the National Health Service at small personal

## Table A

*Professionally employed dentists, 1967, UK.*

Source: British Dental Association

	Number	%
General dental services	11 900	79.4
Local authority services (clinics and school dental service)	1 300	8.7
Private practices only (est.)	500	3.3
Hospital	420	2.8
Armed forces	400	2.7
Universities (teaching)	370	2.5
Administrative	90	0.6
	14 980	100

cost. Under the National Health Insurance scheme prior to 1948, the majority of the insured were entitled to dental benefit although perhaps a half or more of the cost of treatment normally had to be borne by the patient. It is estimated that, of the thirteen million people who were probably eligible for benefit, only 6 or 7 per cent actually claimed it in any one year (Guillebaud Report 1956). Now, the whole population is eligible and, in England and Wales in 1967 some nineteen million courses of treatment were given, under the general dental service.

The dental services are provided in three main ways. Firstly, they are available through the general dental services which are administered by the executive councils. The vast majority of dentists working in this country do so as individual contractors with their own practice providing treatment under the general dental services (*Table A*). Secondly, the local authorities provide dental services in clinics for expectant and nursing mothers and pre-school children through the local health authority maternity and child welfare departments. Thirdly, the local authorities provide services for school children in state maintained schools through the school dental service administered by the local education authorities. In addition to these three main ways of obtaining treatment, specific groups of the population, such as those in the Armed Forces, can obtain dental services via their employment. Treatment can also be obtained in hospital in cases of accident and emergency and also through the dental teaching hospitals; much of this treatment is often complex and outside

## Table B

*Expenditure on the dental services, United Kingdom, 1966.*

*Sources and method: see Appendix.*

	£m
General dental services	75
Hospital services	1
General medical and pharmaceutical services	1
Local health authorities	1
	—
National health service	78
School dental service	8
Armed forces	3
	89

the scope of the general dental services. Finally, treatment can be obtained privately.

The formal ties between dentists and their patients are much less strong than those between general practitioners and their patients. Dentists practising under the general dental services do not have a set 'list' of patients and a dentist and his patient enter into an agreement with each other for a set course of treatment only. Dentists can treat a patient both under the National Health Service and privately although not normally during the same course of treatment; a general practitioner cannot.

## Supply of Dental Services

### EXPENDITURE

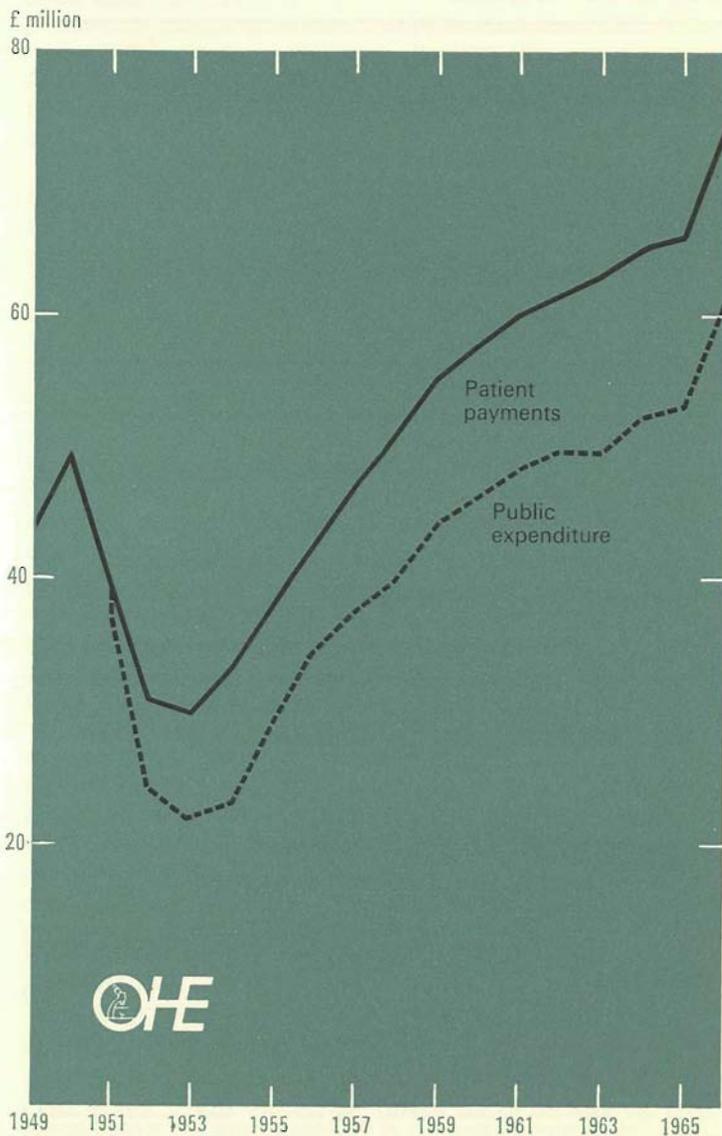
The cost of the dental services in the UK in 1966 totalled approximately some £89 million<sup>1</sup> (*Table B*). The trend in expenditure since 1949 on the general dental services—the major part of the cost and the only part that is officially calculated—is shown in Figure 1.

<sup>1</sup> This includes government expenditure on the National Health Service dental services plus payments made by patients. It also includes an estimated cost of the school dental service and the dental services obtained in the armed forces (see Appendix). It excludes the cost of private dental treatment and also the cost of personal dental care such as expenditure on toothpaste and toothbrushes.

## Figure 1

*Expenditure on the General Dental Services, UK 1949 to 1966.*

Source: Ministry of Health Annual Reports, various years.



The most notable feature was the high level of expenditure on the services during the early years. Before the commencement of the service estimates were based upon experience under the National Health Insurance scheme. At the start of the National Health Service there was a substantial and unexpected demand for treatment, particularly for dentures, and the cost of the service rose rapidly. In retrospect, this substantial upsurge in the demand for dental treatment may be seen as a striking achievement of the National Health Service in bringing care to those who previously were unable or unwilling to afford the required expenditure.

However, at the time, the rapid upsurge in demand and the concomitant increase in expenditure, particularly the rise in income of individual dental practitioners, was viewed with alarm. Expenditure was running far in excess of estimates, and steps were rapidly taken to curb spending on the service. Less than a year after the inception of the National Health Service the Ministry announced that, from January 1949, half of the dentists' income over and above £400 a month would be retained. From mid-1949 the January measure was replaced and their scale of fees—the method of payment whereby a dentist is paid a set fee for each item of work performed—was reduced in an attempt to curtail the rising cost of the service. In 1951, in pursuit of the same objective, patient charges for dentures were introduced as part of a decision to keep the overall exchequer cost of the National Health Service below a set target figure of £400 million for Great Britain in the financial year 1951/52. A year later a charge of up to £1 was imposed for a course of treatment, although priority classes of patients, namely expectant mothers and young people under the age of 21, were exempted.

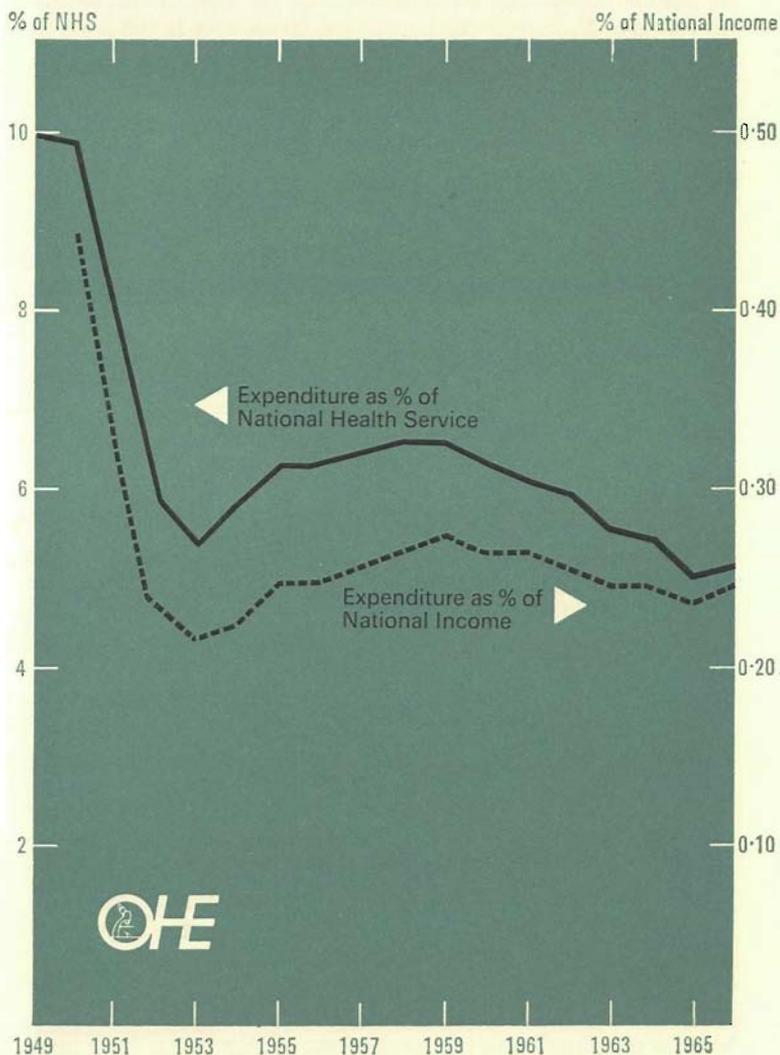
The initial problems surrounding the dental services governed subsequent developments. The early estimates of the cost of dental care under the National Health Service were rapidly falsified by actual experience. Before the start of the service, during its initial years and even up to the present day, no attempt was, or has been, made to estimate the likely demands upon the service in relation to defined standards of dental care or of any minimum acceptable targets given the fixed available resources and a limited number of dental practitioners. In the early years of the service it could be said that the estimate was wrong, not necessarily the rapid rise in spending. But at the time, and subsequently, no attempt has been made to appraise the right level of spending upon the service, and arrangements have been directed to keeping spending within the bounds set in terms of dentists' remuneration.

From the early 1950s, partly as a result of the reduction in the

## Figure 2

*Expenditure on the General Dental Services as a percentage of total expenditure on the National Health Service and as a percentage of National Income, UK 1949 to 1966.*

Source: Ministry of Health Annual Reports, various years.



scale of fees, partly because of the imposition of a charge of up to £5 on a set of false teeth and also because of the exhaustion of the reservoir of unsatisfied demand for dentures, the cost of the general dental service started to decline. It fell dramatically up to 1953, reaching a figure of £30 million, but since then has risen steadily to some £75 million by 1966. In 1949 constant price terms the 1966 figure is equal to £41 million—slightly lower than the cost of the service in 1949.

The fall from 1949 to 1953 can be seen even more markedly when expenditure on the general dental services is measured as a proportion of National Health Service expenditure and as a proportion of National Income (*Fig. 2*). In 1949 the dental service expenditure accounted for 10 per cent of the National Health Service expenditure and by 1953 accounted for only 5.5 per cent. No other branch of the health service has seen such a large proportionate change. Since 1953 this proportion has remained steady and in 1966 the percentage was 5.2 per cent. General dental service expenditure as a proportion of National Income has shown similar changes and in 1966 spending on the dental service amounted to 0.25 per cent of National Income.

#### MANPOWER

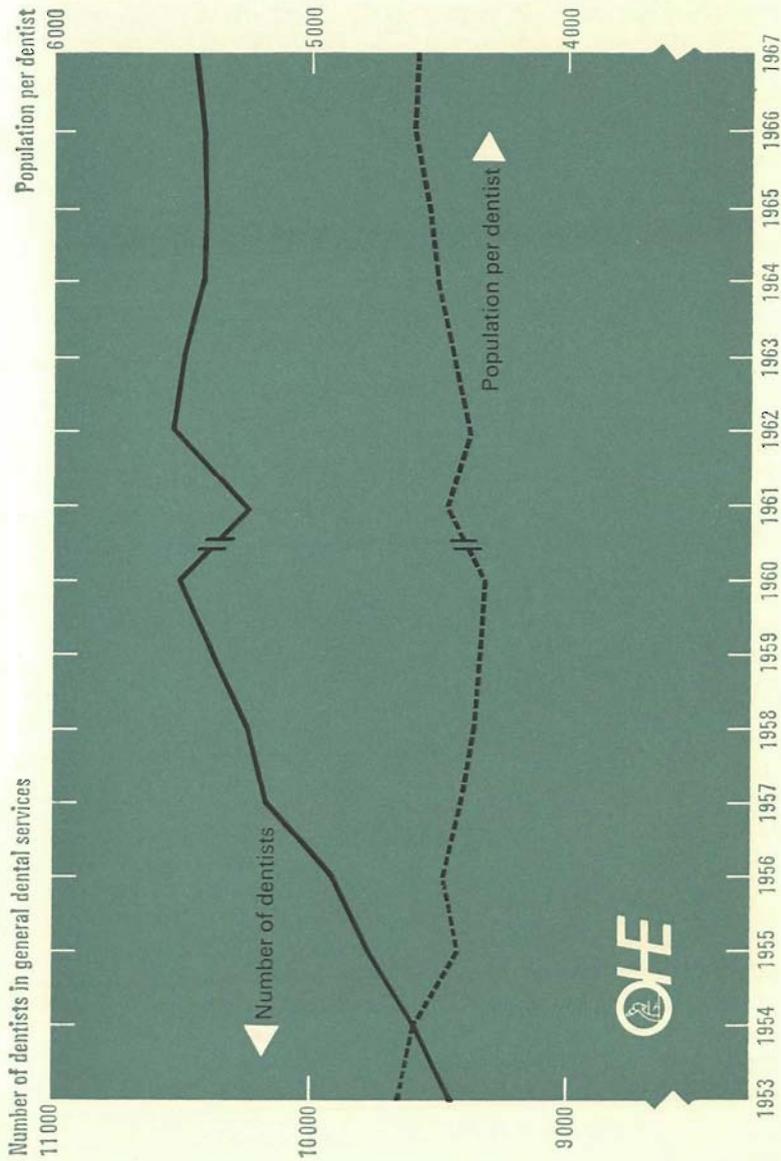
The number of dentists working in the general dental services in England and Wales increased for the first ten years of the service, since when it has levelled out at around 10 500 (*Fig. 3*). In addition to these there are now some 6000 dental technicians and 18000 dental surgery receptionists, assistants or secretaries. The average population per dentist fell until about 1960 and from then to 1966 rose slightly (*Fig. 3*). In 1967, in England and Wales, there were, on average, 4630 persons per dentist. This figure included only those dentists working in the general dental services. For all dentists, the average population per dentist was 3228 in 1966, in the UK. By comparison, the population per dentist in Sweden was 1500 and in Norway 1620. The population per dentist in the UK is 'higher than obtained in the majority of the more socially advanced countries of the world' (*British Dental Journal* 1968).

There were 1134 salaried officers employed by the local authority school dental service in England and Wales in 1965 and a further 696 employed on a sessional basis. In addition to treating school children these dentists spend approximately one eleventh of their time with expectant mothers and pre-school children. The number of dentists employed by the local authorities is now at a higher level than during the early years of the National Health Service.

# Figure 3

*Numbers of dentists practising under the General Dental Services and population per dentist, England and Wales 1953 to 1967.*

Source: Summary of main figures for the National Health Service for England and Wales Ministry of Health Annual Report, 1967.



Note: Prior to 1961, dentists practising in more than one capacity were included under each.

The supply of dental manpower will be discussed again later in relation to its demand and to the country's dental needs but brief comment may now be made concerning two governmental reports which have dealt with manpower. The Teviot Committee reporting in 1946 (Teviot Report) suggested that 'it is not possible to say with any accuracy how many dentists it would ultimately be desirable to have practising in this country'. Nevertheless they were able to state that at least 20000 dentists would be desirable and an annual student intake of 800 or so would be needed to achieve this target within twenty years. After the comparatively high intake in the years immediately after the war due to returning ex-servicemen, the period between 1951 and 1955 saw a substantial fall in the recruitment of dental students. By 1955 there was appreciable discontent among the profession and a committee was set up to examine recruitment (McNair Report 1956). They noted the existing shortage of dentists and commented that, because of the advanced age of many dentists on the register<sup>1</sup> the rate of retirement would accelerate and the true extent of the shortage was yet to make itself felt. They also stated that the profession was failing to attract recruits in sufficient numbers because of the attitude of the public towards dental health and towards dentistry as a career for young people. They agreed with the Teviot target figure of 20000 dentists but thought that the intake should be nearer 1000 per year. The losses due to retirement and the low numbers of students admitted to dental schools between 1952 and 1955 caused the increase in the number of dentists to slow down by the early 1960s (*Fig. 3*). Since 1957, partly as a result of the McNair Report, student intake increased from 600 to 800 by 1966/67 and is expected to reach over 900 in the 1970s, a figure not far removed from that recommended for some 20 years ago in the Teviot Report. Since the mid 1950s, there have been few vacant places in dental schools. There is however a certain anxiety within the profession that the quality of recruitment might not be maintained. It is of interest to note that the Teviot figures were arrived at with little knowledge of the demand for dental care and even less knowledge of the total prevalence of dental disease.

With an increase in the number of dentists, the age distribution of the dental profession is now more balanced. In 1966, in England and Wales, 33 per cent of dentists were under the age of 35 and only 20 per cent were aged 55 and over. In 1953 the position was the reverse with 20 per cent under the age of 35 and 41 per cent aged 55 and over.

<sup>1</sup> Under the 1932 Dentists' Act over 8000 practising dentists without formal qualifications were admitted to the Dentist Register.

While the overall manpower position has improved, the gross regional imbalance in the number of dentists working in the general dental services has grown worse. Figure 4 shows, for three selected areas, the population per dentist ratio from 1949 to 1964, the latest year for which comparable data are available. Cook and Walker (1967) demonstrated that in more than half the executive councils in England and Wales, the ratio of dentists to population decreased between 1952 and 1962, and only in the Metropolitan Region was there a significant increase in the ratio. In 1967 figures for executive councils varied from 1880 people per dentist in Chester to 12250 per dentist in the Hartlepoons. Similar wide variations occur in the school dental service: there were 25000 school children per school dentist in Derbyshire compared with only just over 2000 per school dentist in Inverness-shire (Cook and Walker 1967).

## The Demand for Dental Care

The demand for treatment has continued to increase rapidly since the start of the health service. In 1949 a little under seven million courses were provided under the general dental services and in 1967 over seventeen million. Normally a course of treatment must include all treatment necessary to secure dental fitness in the opinion of the dentist and which the patient is prepared to undergo. In addition, emergency treatment can be given for the provision of individual items of treatment without the dentist embarking on a full course. A little under two million emergency treatments were provided in 1967 (*Fig. 5*). The number of courses has more than doubled since 1949 and this has been achieved with roughly the same number of dentists (*Fig. 6*). This has enabled the cost per treatment to remain relatively constant over the last ten years (*Fig. 7*). Information relating to treatment is collected by the Dental Estimates Board in their capacity of approving estimates. It is probable that no other branch of the health service is as well documented on the volume and pattern of treatment as that of the general dental services. The data, however, refer not to persons but to courses or items of treatment and thus indicate the level of treatment but not the incidence of dental disease.

Although a large and rising proportion of the seventeen million courses given under the general dental services are given to children, children are also treated under the school dental service. School dental services were started in Britain in the early years of the century. In 1965 over four million school children (56 per cent of the total) were inspected although only 53 per cent

of the two million found to require treatment actually received it through the school dentist.

The local authority dental health services only constitute a very small part of the dental services used by the priority classes. Only 20000 expectant or nursing mothers and 73000 pre-school children were treated in local authority clinics in 1967, 2 per cent of those eligible. The number of mothers treated in clinics has been falling over the years and is now about half the number of the peak post-war year of 1956. The number of pre-school children treated has remained relatively constant since 1952. Both of these 'priority' groups have shown large increases in courses of treatment provided through the general dental services. The number of courses of treatment for mothers, 700000 in 1967, has trebled since 1953 and for pre-school children, 500000 in 1967, doubled since 1961 (the earliest year for which data are available). Thus, it is probable that these groups are increasingly obtaining dental treatment but are using the local authority clinics less and their own dentists more.

The pattern of dental treatment has altered considerably since the inception of the National Health Service. The amount of non-denture work has been steadily increasing since 1948 with the exception of a slight fall in 1952 and 1953 after the introduction of treatment charges. Apart from the early demand for dentures (*Fig. 8*) the general movement has been away from extractions towards conservation. Although no comparable figures are available relating to the number of each type of treatment, data are available relating to cost. This, despite alteration in the cost per item of treatment, is indicative of treatment trends. In 1953, extractions accounted for 5.8 per cent of the total cost and conservations for 47.5 per cent. By 1967 the figures were 3.7 per cent and 52.8 per cent respectively<sup>1</sup>. Orthodontic treatment which is concerned with the correction of faulty and irregular positioning of teeth has also increased rapidly. New treatments begun in 1965 totalled 163000 compared with just over 110000 in 1959. Most of these courses concerned children.

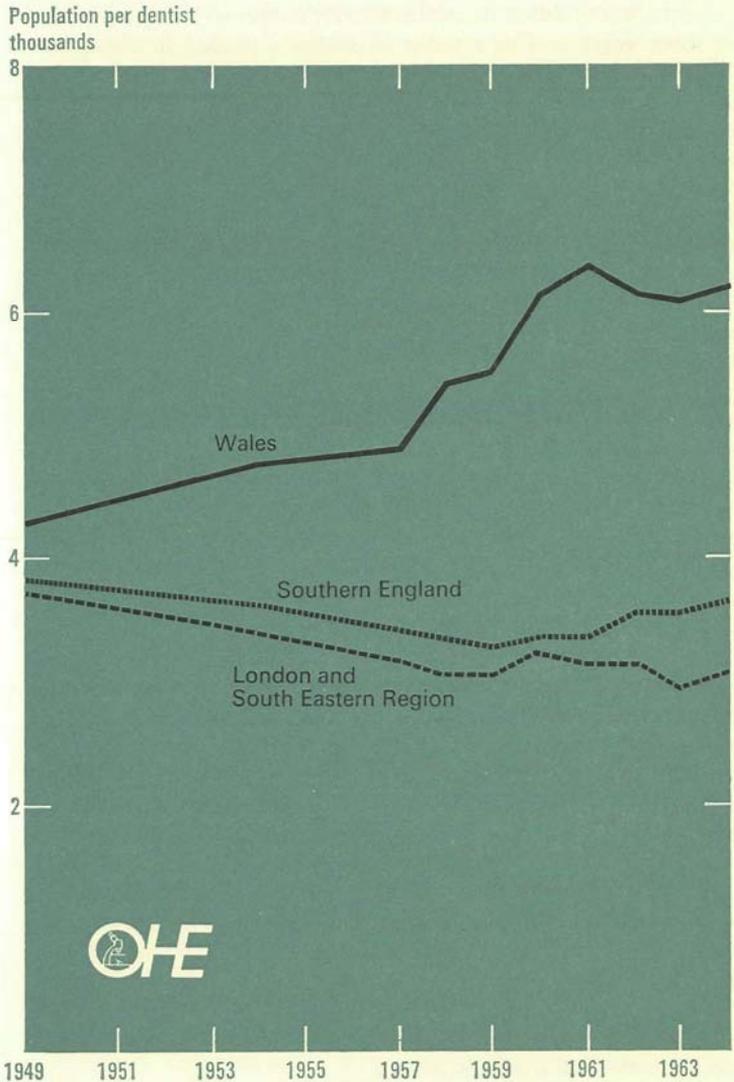
Further evidence of the movement towards 'preventive' dentistry can be obtained from local authority clinic data. For every 100 expectant and nursing mothers treated in 1954, 104 fillings and 302 extractions were given, equal to three extractions for each filling. Ten years later the figures were 164 fillings and 218 extractions, a little over one extraction to each filling. Pre-school children showed similar changes.

<sup>1</sup> In 1953, dentures accounted for a further 35.4 per cent and 'treatment' involving only diagnosis 6.2 per cent. In 1967 dentures absorbed 27.0 per cent of the cost and diagnosis 12.1 per cent.

## Figure 4

*Population per dentist, Wales, Southern England and London and South Eastern Region, 1949 to 1964.*

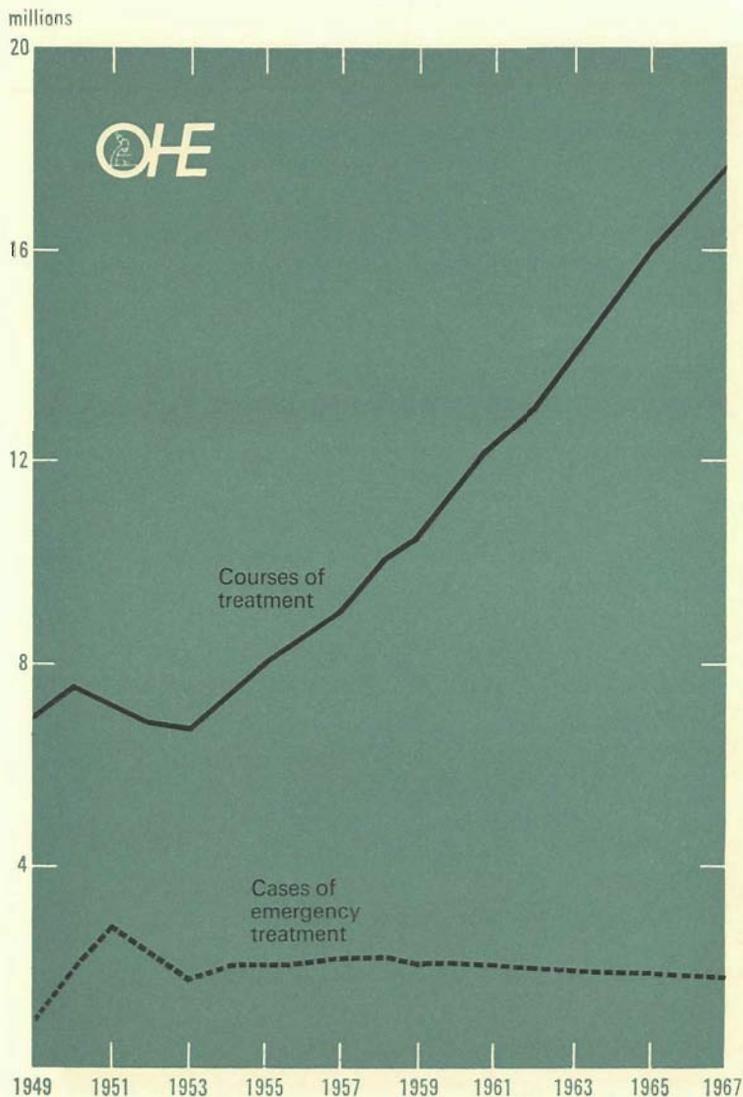
*Source: Ministry of Health Annual Reports, various years.*



# Figure 5

Dental treatment: number of courses of treatment and number of cases of emergency treatment, England and Wales, 1949 to 1967.

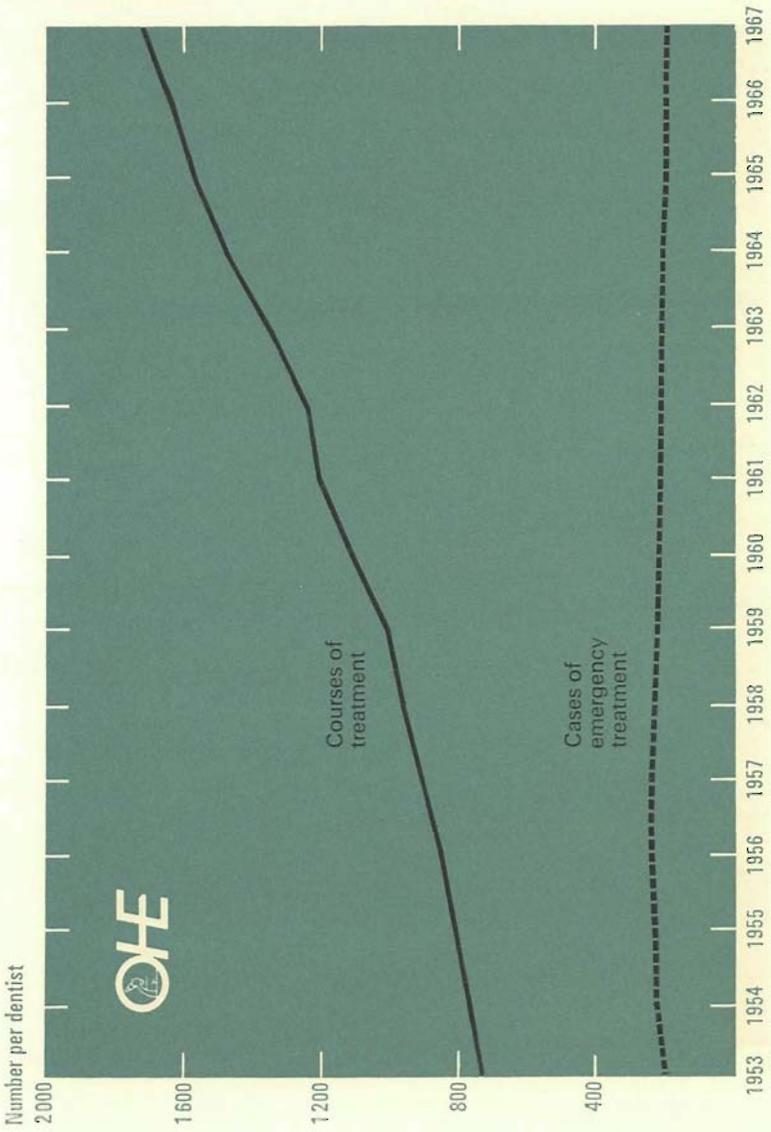
Source: Ministry of Health Annual Reports, various years.



# Figure 6

*Courses of treatment per dentist and cases of emergency treatment per dentist, England and Wales, 1953 to 1967.*

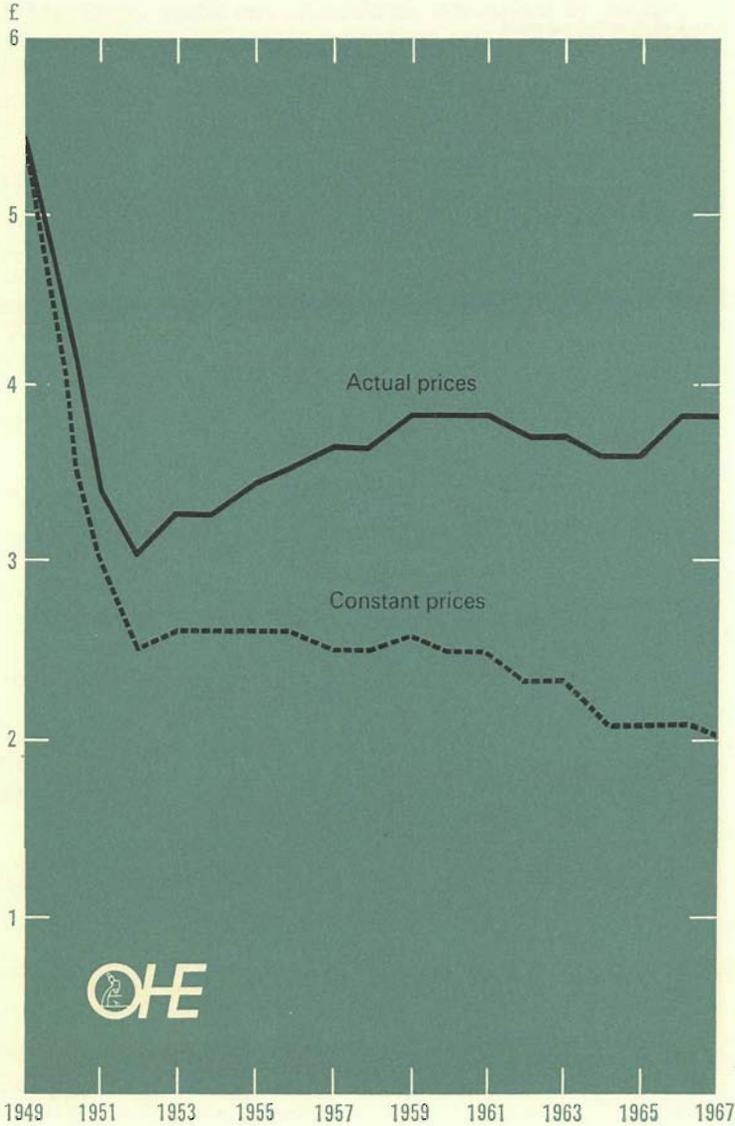
Source: Ministry of Health Annual Reports, various years.



# Figure 7

*Average cost of dental treatment at actual and constant prices, England and Wales, 1949 to 1967.*

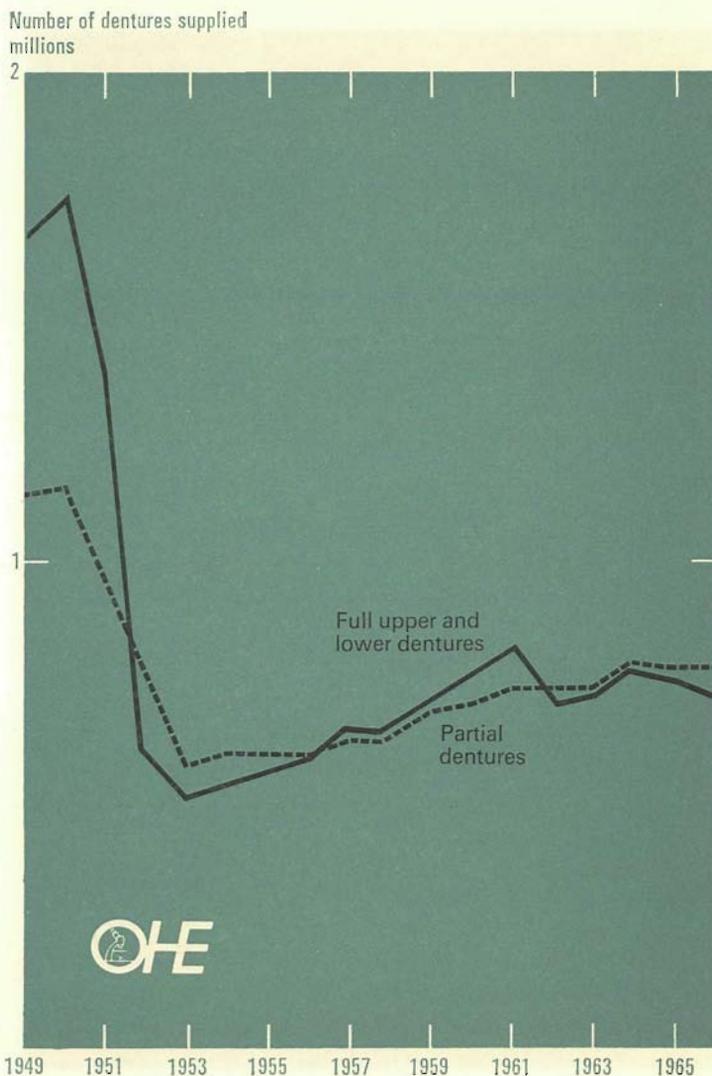
Source: Ministry of Health Annual Reports, various years.



## Figure 8

*Numbers of full upper and lower dentures and partial dentures supplied, England and Wales, 1949 to 1966.*

Source: Summary of main figures for England and Wales for the National Health Service, Ministry of Health.



# Factors Influencing the Supply of, and Demand for, the Dental Service

## FACTORS AFFECTING SUPPLY

Availability of dental care is not simply determined by the total dental manpower. The most immediate point, and the feature which has dominated the growth of the service, is the output of the individual dentist. It is this that has changed dramatically influenced firstly by improvements in dental technology and practice organisation and also perhaps by the system by which dentists are remunerated.

Dentists are paid on an 'item of service' basis. The dentist is reimbursed a fixed fee for each operation he performs. At present, for example, he receives 8s. od. for each clinical examination and report he makes, 13s. 6d. for a normal scaling and gum treatment (*Table C*). The method of ascertaining the level of the fee per item, however, is complex. Briefly, the government, on the advice of the independent Review Body on Doctors and Dentists Remuneration, sets at regular intervals a target average net

## Table C

*Scale of dental fees, selected items, 1957 and 1966, G.B.*

*Source: Statutory Instruments 57/229 and 66/683, HMSO, London.*

	1957			1966		
	£	s.	d.	£	s.	d.
Clinical examination and report		5	0		8	0
Normal scaling and gum treatment		12	6		13	6
Single surface amalgam filling		15	0		13	6
	to					
	1	2	6			
Inlays	3	10	0	4	0	0
	to			to		
	8	5	0	9	0	0
Crowns	2	15	0	3	10	0
	to			to		
	8	5	0	10	0	0
Extractions: 1 tooth		7	6		11	0
Extractions: 3-5 teeth		11	6		13	6
Extractions: 20 or more teeth	1	19	6	2	0	6
Full upper and lower acrylic dentures	9	19	0	11	10	0

income for a dentist who works for a specified number of hours per year. The Dental Rates Study Group, which comprises representatives of the profession and of the Health Departments under an independent chairman ascertains, from time to time, the level of practice expenses from the Inland Revenue in order to determine average gross earnings and to draw up a scale of fees to produce average earnings of that level.

This method has been termed the 'treadmill' system for, as more treatment is carried out each year by dentists working faster or more efficiently than previously with the help of technological changes, the scale for that treatment will fall, or at least not be increased to the extent that it might. An individual dentist would then have to do more of those treatments the following year in order to earn the same money. Between 1948 and 1968 there have been thirteen changes in the scale of fees. Sometimes individual items have been changed: sometimes a set percentage change for all items has been made. The changes in fees of some selected items between 1957 and 1966 are shown in Table C. Despite rising price levels generally, the fees paid for some treatments have actually fallen.

It can be argued that the scale of fees have in some cases been set in order to direct the type of treatment given. This could have two purposes, firstly to direct away from extractions towards conservation by making the former less rewarding and the latter more so, and secondly to discourage dentists from performing the more expensive forms of dentistry by making them unrewarding financially when related to the time taken to perform the operation.

In spite of the obvious limitations of this method of payment, which has been said to encourage quantity at the expense of quality, it seems to be accepted that 'although the system is not perfect, there is no clear preferable alternative' (Review Body 1968). The Review Body also concluded that any benefit accruing from increased productivity (that is a greater number of treatments per dentist) should be shared between the dentist and the community. This view was consistent with the Royal Commission (Pilkington Report 1960) which did not accept that remuneration should be directly related to the increase in the number of courses per dentist per year.

The British Dental Association set up a committee (Tattersall Report 1964) to consider the method of payment, and which suggested that 'there is no future for the profession or indeed for general dental practice as an art and science, in the system of remuneration as presently operated' and made suggestions for an alternative method which incorporated a capitation fee plus fees by scale for certain items of treatment. These recommendations

were not accepted but in 1965 a survey carried out among dentists (British Dental Association 1965) showed their concern at both the speed at which they had to work to maintain their income and at the falling off of their earnings as they became older. Nevertheless 73 per cent favoured remuneration by scale of fees for treatment.

It would appear that neither the system of payment nor the level of remuneration has, in recent years, restricted the supply of manpower. The Review Body in 1968 felt that there was no justification for improving remuneration as a stimulus to recruitment or retention of dental manpower. They recommended the target average net income from the General Dental Service remain unchanged at £3325.

Apart from remuneration, the dentists' administrative relationship with the health service is a factor which might influence the supply of manpower. At the start of the health service a Dental Estimates Board was set up to approve payment for dental treatment. Payment itself is made by the executive councils. The Board also refers to Regional Dental Officers of the Ministry cases for investigation of the treatment proposed or carried out. The Guillebaud Committee (Guillebaud Report 1956) viewed the Board as the most appropriate and least expensive method for providing a necessary check on the work done in the dental service. Dentists are required to obtain prior approval from the Board for certain of the more complex and expensive treatments. The profession at first felt a certain restriction of clinical freedom and, often, the dentist would substitute treatment which did not require prior approval for that which did. It was, presumably, one of the aims of the Board, to control the supply of certain forms of the more expensive treatments. Figure 9 shows that, as agreed professional standards have evolved, there has been less need to assert control by statutory regulations.

The survey of dentists (British Dental Association 1965) found that by 1965 most dentists considered their relationship with the Dental Estimates Board and the Executive Councils as satisfactory or tolerable and had similar attitudes to the control involved in Regional Dental Officers' examinations.

#### FACTORS AFFECTING DEMAND

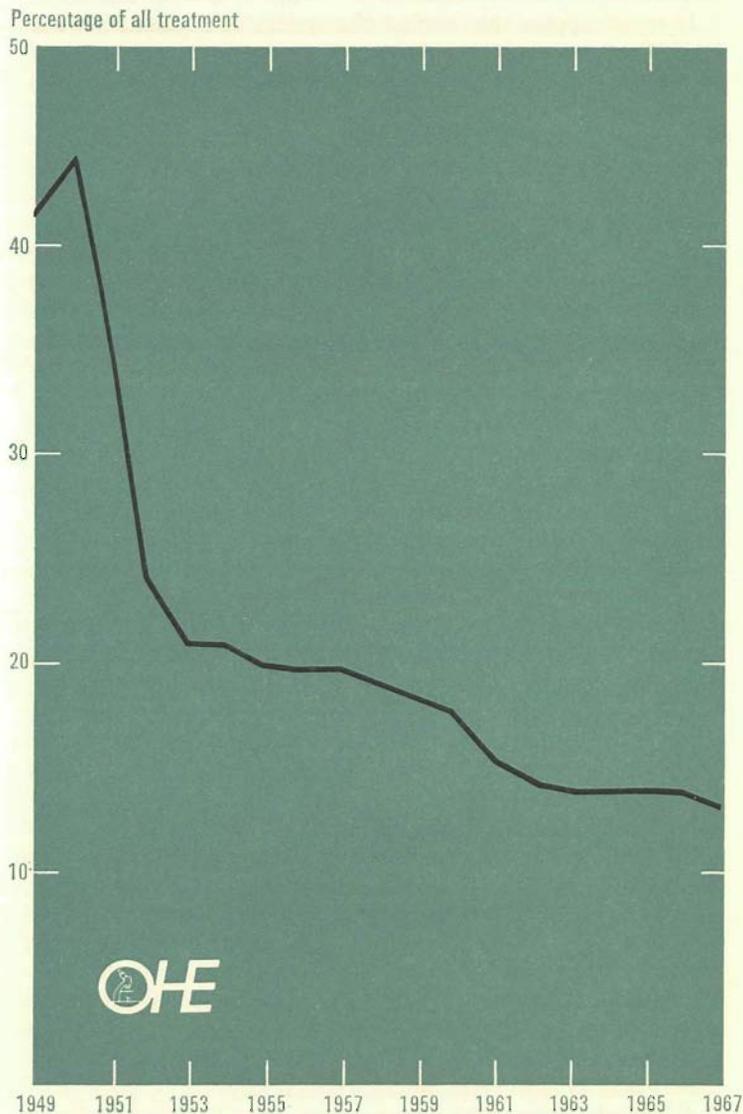
Three main factors influence demand for dental care: the prevalence of dental disease, the accessibility of the patient to dental care and sociological factors which have shaped the attitude of society and its individuals towards dental care.

A Nuffield Report which assessed available data on dental care written six years ago (Moser et al 1962) concluded that 'there is

## Figure 9

*Treatment requiring prior approval as a percentage of all treatment, England and Wales, 1949 to 1967.*

Source: Ministry of Health Annual Reports, various years.



. . . no clear picture of the dental health of the nation . . . little can be said about the need for treatment, nor about the relationship between dental illness and treatment, dental health education, nutrition, environmental factors and so forth'. Although the Dental Estimates Board has collected detailed statistical information since 1948 the data are collected for administrative use and are of little value in assessing dental disease. The data refer solely to treatment and it is not possible to relate this to the individual's dental health over a time period nor even at a given point of time. Further, the data refer only to the selected group of the population who attend a dentist under the general dental services for treatment. They thus exclude persons who do not attend a dentist at all and also those who attend as a private patient, perhaps 10 per cent of the population (Richards et al 1965). The Nuffield Report also suggested that the epidemiological data that had been collected had often failed to be of the fullest use because of the lack of standardisation. As in many fields of medicine, there are problems of measurement in assessing dental health. Measures such as the DMF, which records the total number of teeth for each individual which are decayed, missing or filled, make no attempt to take account of the degree of caries nor do they differentiate between teeth and teeth surfaces. The DMF combines treated past illness with present disease and is of little value in assessing the effectiveness of dental care. There are also difficulties in deciding the clinical extent of tooth disease and consequently large observer variation has often occurred.

Arising out of the Nuffield Report a preliminary conference on dental epidemiology was held at the London Hospital Medical College in 1962 and from that the first major study of a community's dental health and attitudes towards dentistry was conducted in Salisbury and Darlington in 1965 (Richards et al 1965 and Bulman et al 1968). A second conference was held in 1966 and a government sponsored national survey of fifty communities took place in 1968. The results of this latter study are as yet unknown.

Prior to these studies a certain amount of information was known on particular groups of the population, namely children and persons in the armed forces (for example, Starkey 1966). Very high levels of caries had been found from the quinquennial studies of school children (Moser et al 1962) and from the base-line fluoridation studies (Fluoridation studies 1962). The probable extent of dental need among adults was illustrated in the Salisbury and Darlington survey (Bulman et al 1968). It was found that only about half had attended the dentist within a year of interview although, of those with some of their own teeth still present, over

90 per cent were found to be in need of some form of dental attention. They also found that only a third of adults wore no dentures and almost a half wore full dentures. Below the age of 45 fewer than 50 per cent had lost all their teeth, above the age of 45 over 50 per cent had. Without studies conducted over time, it cannot be known whether this median age is being reduced. In England and Wales the probable population without teeth is now about 17 million although only about 80000 full dentures (including replacements) are supplied each year.

Thus although dental treatment has increased considerably since the war it is not known whether disease incidence has changed. It is thought that the incidence of dental caries rose immediately after the war, the hypothesis being a link between caries and dietary habits, particularly the consumption of carbohydrates. Little is known of the incidence of caries since then nor of the incidence of periodontal disease, disease of the gums and underlying bones. Nor is there information on whether more people are now being treated, the extent of the increase in scope of treatment for the individual or, finally, the effectiveness of the treatment.

Unlike some aspects of medicine dental ill-health is of concern solely to the individual: it is rarely, if ever, contagious or of danger to others and evidence relating it to other illness is inconclusive<sup>1</sup>. The McNair Committee (McNair Report 1956) considered the contribution of dentistry to health as fourfold; to prevent and relieve pain, to prevent a loss of efficiency with regard to work, to prevent permanent disability and to prevent permanent disfigurement. It is difficult to assess these factors in economic terms and hence to evaluate the effect of a reduction or increase in expenditure on dentistry. In spite of the existing expenditure dental disease is one of the most common of all kinds of illness and causes a good deal of economic loss. In 1964/65 in Great Britain 67300 spells of sickness due to diseases of teeth and supporting structures for which benefit was paid were recorded by the Ministry of Social Security. These spells caused 740000 days of work to be lost. It was estimated that in 1957 a further one million days were lost due to spells not recorded (Ministry of Health 1957). Spells of sickness and days lost have both been increasing in recent years.

The economic benefits from the primary prevention of dental disease are relatively clear cut. If disease is completely prevented or postponed then this saving can be weighed against the cost of a

<sup>1</sup> In England and Wales over the last 50 years the highest number of deaths from diseases of the teeth and gums in any one year totalled a little over 500. The number of deaths per year was reduced rapidly between the early 1940s and the mid 1950s and by 1965 there were only 11 deaths.

measure enabling prevention. To date, the most important preventive measure in dentistry is undoubtedly fluoridation. The positive effect on teeth has been demonstrated in many studies and, in this country, it has been shown that, among those children who had been 'fluoridated' all their lives, the number of teeth affected by decay was cut by more than half (Fluoridation Studies 1962). By the end of 1968 decisions in favour of the fluoridation of the water supplies had been made by local authorities representing approximately two thirds of the population. However as yet only a small number of these authorities have implemented their decision. The exact theoretical saving of such a measure is difficult to estimate but would run into many million pounds annually. The cost was estimated in 1963 at approximately £2 million per year (Fluoridation 1963).

Another promising avenue of prophylactic research has been the exploration of the possible use of enzymes to prevent tooth decay. Fundamental research on the dental uses of enzymes started about two years ago with experiments on dextranase. It is hoped that this substance will break up existing plaque and prevent new film from forming on teeth. It is beneath this film that caries bacteria proliferate. With such an advance a powerful anti-caries effect would be achieved.

The relative economic cost-effectiveness of the general movement of dentistry towards conservation of teeth and away from extraction and the fitting of dentures is more difficult to determine.

It has been suggested that there might be economic advantages if all adults were fitted with dentures at an early age regardless of the state of the individual's dental health (Craddock 1952). In dental terms, however, the longer natural teeth are maintained the better gum base there is on which to fit dentures. Where dentures are fitted on a poor dental base they are not able to be 'managed' and will lead, in the long run, to higher costs of maintenance and serious non-economic losses in terms of the ability to eat and enjoy eating and also in terms of the person's appearance.

A second factor in influencing demand is accessibility to dental care both in terms of proximity to an available dentist and also the financial ability to obtain treatment. The regional variation of dental manpower has already been discussed. It is difficult to separate the supply of dentists, the incidence of disease and the attitudes to dentistry as causal factors in the maldistribution of manpower. It should be added, however, that there is a clear association between the social class structure of the population within a region and its proportion of dentists. The higher the proportion of persons in the group made up of employers,

managers, etc.<sup>1</sup> the higher is the proportion of dentists and vice versa (Cook and Walker 1967). It might perhaps be reasonable to attempt to improve the distribution of dental manpower in a way similar to that applied to general practitioners.

The removal of an economic barrier to dental care certainly influenced the demand for treatment in the years immediately after 1948 although the appreciation of a need for dental health among those who served in the armed forces may also have influenced demand. The effect of patient charges first introduced in 1951 for dentures is difficult to gauge. Further charges were introduced in 1952 for a course of treatment, increased charges for dentures were imposed in 1961 and increased charges for treatment imposed in 1968. The Guillebaud Committee (Guillebaud Report 1956) stated that it would be unwise to abolish charges so long as the shortage of dentists continued but also stated that such charges were in fact impeding a number of people from making use of the general dental services. They regarded the reduction of charges as having the highest priority when additional resources became available. Among dentists, the vast majority, 93 per cent, considered charges should, at present, continue (British Dental Association 1965).

The third important factor affecting demand is the attitude society and its individuals have towards dental health. Some variables influencing attitudes are deep-rooted and it would appear that dental illness is taken for granted to an extraordinary degree. Pain is one such variable which can affect dental visits. Firstly, pain threshold may be related to the frequency of obtaining dental treatment. Also, unlike visits to the doctor, to seek dental care may involve what has been described as a 'reverse threshold of pain' (Richards and Willcocks 1966), that is by visiting the dentist a patient may initiate pain where none previously existed.

Society also, at the moment, still emphasises curative rather than preventive aspects of ill-health and it is difficult to maintain a contrary attitude for dentistry. Individuals are discouraged from attending their doctor for a regular check-up although they are often encouraged by individual dentists to go at six monthly intervals for dental inspection.

Within a society attitudes towards dental health and dental services vary between groups of the population. Preliminary findings (Richards et al 1965) suggest that age, sex and social class are important factors. About one in three non-manual

<sup>1</sup> The Registrar General's five standard socio-economic groups are: Social Class I: Professional and managerial; Social Class II: Supervisory; Social Class III: Skilled workers; Social Class IV: Intermediate—semi-skilled workers; Social Class V: Unskilled workers.

workers were found to have lost all their teeth compared with about one in two manual workers. Relatively fewer men than women had dentures. About a quarter of the sample said they had not visited a dentist for over ten years although the vast majority of those were full-denture wearers. It was also found that as age increased so the proportion who had recently visited the dentist decreased. This may be due to changing attitudes over generations or may be related to the wearing of dentures. Also persons in the non-manual groups tended to visit the dentist more often than those in the manual groups and this pattern is probably related to denture-status and the degree of toothlessness.

The way in which factors affect changes in attitude are still largely unknown. Obviously changes take time, as for example in the case of the social stigma which attached to the wearing of false teeth. This is probably diminishing as the proportion wearing at least part dentures increases. The role of the family and of the school are important as is the attitude towards dentists themselves. In the early years of the National Health Service it was thought that the status of the profession was low compared with other professions. In a recent survey, however, dentists were regarded well ahead of architects and solicitors although behind doctors (*British Dental Journal* 1968). This was a preliminary study and until more is known about present attitudes and how they change successful dental health education will continue to be difficult and preventive measures such as fluoridation will continue to meet with emotive argument.

## Conclusions

The lack of factual information concerning dental need has been stressed throughout this paper since without further data it is difficult to assess or to regulate the service. The failure to make any estimate of needs caused considerable difficulties about the level of expenditure during the early years of the service. The difficulties were however overcome by a system of remuneration which was unique in the National Health Service. This system was intended to ensure that expenditure did not exceed the estimate by continual revaluation of the scale of fees<sup>1</sup>. These fees may be subject to reduction as the average work accomplished increases. The system is such that income is in fact related to the total number of courses an individual practitioner undertakes since the more the profession accomplishes, the lower the income per course. Thus if an individual dentist maintains only a constant

<sup>1</sup>In a sense it parallels the restriction of income established by the 'capitation' system for general practitioners.

performance, his income falls. In practice, this system has been able to function as it has done because of continual improvements in technology and organisation which have enabled dentists to increase their productivity. The system has, in fact, stimulated technology and innovation for those able and willing to offer the necessary investment. However, the system of remuneration has operated to the disadvantage of the older dentist or those unable to invest in new, and often expensive, equipment.

As well as the method of dental remuneration, the failure to identify need may lead to an inequitable use of limited dental resources. Although dentistry is not unique in its lack of knowledge of need, dental ill-health is probably both easier to measure and more limited than medical care generally. Precise standards may be difficult to obtain but definitions of targets, expressed according to a variety of criteria, could be laid down and a 'national dental programme' defining the extent of work of the service in the immediate future could be made. Such a programme would be possible only after systematic epidemiological research into the current patterns of usage of the services related to the existing standards of dental health. This information is now being prepared. Such an investigation would provide the basis upon which a new system of professional remuneration could be established, the main elements of which might be firstly, a scale of fees modified to reflect the target performance established by the programme and secondly, supplementary payments for meeting more precise objectives such as a more equitable regional distribution of dentists and the rapid implementation of technological improvements.

This research would also set a base-line for future studies to gauge the response to dental treatment over a time period. In spite of prolonged bacteriological research, the aetiology of dental disease is still far from clear. Clearly further epidemiological studies are needed. Dietary habits, the practice of oral hygiene and the fluoride content of water supplies are three factors affecting dental health and more information is required about these and other possible causes of dental illness. Related to this type of epidemiological research is clinical research into possible preventive measures. Prophylactic research into, for example, fluoride preparations and enzymes is still at an early stage although the latter particularly holds much promise. Resources going into dental research in general and prophylactic dental research in particular are still, however, minute compared with expenditure on dentistry as a whole.

There would also seem to be a need for operational research into the working methods and conditions of dentists and into the

organisation of the dental service as a whole. For example, there are undoubtedly differences in dental care between groups of people and between different parts of the country. There also seems to be a duplication of services between the general dental services and the local authority dental services (clinics and the school dental service); the latter may well be under-utilising valuable resources. Also the function and role of the hospitals in dentistry may need to be re-examined.

Finally, there are enormous gaps in sociological research into dental attitudes. This is needed to indicate the factors which translate latent need into perceived need and demand as measured by a visit to the dentist. One facet of relating latent need to perceived need will involve the critical examination of pain threshold levels.

It is suggested that there is a serious shortage of dental manpower and dental resources. There does not appear to be a shortage in relation to demand as measured by present usage, although as the population grows and ages and as attitudes towards dentistry improve, demand will continue to rise. There may well be, however, a very real shortage in relation to the needs. What these needs are and to what extent it is decided to meet them will require evaluation of the amount of dental disease and the quality and success of dental care. It may then require decisions on the relative priority within the health service of an expenditure on dental care which already amounts to £100 million.

# Appendix

## Sources and method for Table B

THE total costs shown include National Health Service expenditure by Central and Local Government and also payments made by patients. It also includes an estimated cost of the school dental service and the dental services obtained in the armed forces. The following is a brief description of the method and sources used for each of the services shown; further details can be obtained from the Office of Health Economics.

### General Dental Services

Data direct from the 1967 Annual Abstract of Statistics (HMSO 1967).

### Hospital Services

These estimates have been based generally on time spent by patients suffering from diseases of the teeth and supporting structure in various types of hospital. Costs were equated with bed-days which were obtained by multiplying the number of discharges and deaths from hospital by the average length of stay. These data were obtained from the 1965 Hospital In-patient Enquiry, Part 2 (HMSO 1968) and adjusted to 1966. The data were then weighted by hospital type from information contained in the 1960 Hospital In-patient Enquiry, Part 2 (HMSO 1963). The proportionate expenditure by hospital type was derived from the 1968 Hospital Year Book (Institute of Hospital Administrators, 1967). These proportions were then applied to the 1966 total United Kingdom expenditure figure for the hospital services as given in the 1967 Annual Abstract of Statistics (HMSO 1967).

### Pharmaceutical Services and General Medical Services

The sources for allocating the expenditure on general medical and pharmaceutical services were the 1966 British Medical Index and British Pharmaceutical Index. The publications are part of a medical research service provided by Intercontinental Medical Statistics Limited (IMS). For the pharmaceutical services each of the six categories of diseases of the teeth and supporting structure was analysed separately. For each, the number of prescriptions written was percentage out of the number of prescriptions written for all causes. The prescriptions were weighted by therapeutic group. These data were then applied to the 1966 total United Kingdom expenditure figure for the pharmaceutical services as given in the 1967 Annual Abstract of Statistics (HMSO 1967). This latter source was also used to give total United Kingdom expenditure on the general medical services. From the IMS British Medical Index, consultations for diseases of the teeth and supporting structure were obtained and expressed as a proportion of consultations for all causes. This percentage was then applied to the total United Kingdom expenditure.

### **Local Health Authority Service, the School Dental Service and the Dental Service of the Armed Forces**

Expenditure on each of these services was based on an estimated gross income per dentist multiplied by the number of dentists serving in each service. This method was used in the absence of any more detailed data.

The gross income per dentist was obtained by dividing the total expenditure on the general dental service by the number of dentists. Data were obtained from the 1967 Annual Abstract of Statistics (HMSO 1967). Dentists employed by the local authority divide their time approximately in the ratio of 9:1 between the school dental service and the local authority maternity and child welfare clinics. This ratio was applied to the British Dental Association's estimate of the number of dentists employed by the local authorities. An estimate of the number of dentists employed in the Armed Forces was also obtained from the British Dental Association.

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