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# Locality Health Planning: Constructing a Data Base

by

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## **DISCUSSION PAPER 34**



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## Abstract

Family Practitioner Committees (FPCs) became independent health authorities as of 1st April 1985. Their remit was to be more responsive to public demands, be accountable directly to the Secretary of State for service delivery and to ensure comprehensive plans in consultation with the professions and collaboration with health authorities and other organisations.

One year later, in 1986, the Green Paper on Primary Care pointed to "the scope for improving the quality, effectiveness and value for money which the patients and nation get from them" (DHSS, Cmnd, 9771, p1). But whilst no-one would dispute these goals the problem is to measure them.

These two issues - of the need for but almost complete absence of planning and lack of information - were the motivation for this project. Barnsley FPC had been selected as one of the first in the country to be 'computerised' and the Administrator, Keith Houghton, was concerned to find ways in which this enhanced technological power could be used to improve programme planning and contacted the Centre for Health Economics for help.

This paper reports on the results of their joint project. It shows how information of different kinds relating to objectives, resources, outcomes and utilisation can be brought together via the computerised age-sex register and suggests ways in which they can be used to improve the planning of primary care.

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## PLANNING PRIMARY HEALTH CARE.

This paper reports on a pilot project carried out in conjunction with staff of Barnsley FPC. The project was prompted by the simple observation that planning a service for a clientele cannot be anything but haphazard if that information is not brought together in an accessible format which is up-to-date and is capable of being replicated when regained.

### 1.1 Background

Family Practitioner Committees (FPCs) became independent health authorities as of 1st April 1985. Their remit was to be more responsive to public demands, be accountable directly to the Secretary of State for service delivery, and to ensure comprehensive plans in consultation with the professions and collaboration with health authorities and other organisations.

FPCs, traditionally seen as the quartermasters of primary care, therefore acquired in a short space of time both a "planning function" (never clearly specified) and the responsibility to be accountable both to the DHSS and to the population they service. How are their officers to go about planning? What targets should they pursue.

One year later in 1986, the Green Paper on Primary Care claimed

"primary health care services are more fully developed in the United Kingdom than in most other countries ... but although they are good, they could be better still; and, specifically there is scope for improving the quality, effectiveness and value for money which the patients and nation get from them".

(DHSS, Cmnd, 9771, p1).

So, for example, the level and quality of service is known to vary (London Health Planning Consortium, 1981; DHSS, 1982) and there is little or no monitoring; the effectiveness of family practitioners acting alone in

the rare cases where there is outcome data, e.g. for screening programmes, is doubtful (Kingham, 1985); and spending on services like at the interface of primary care and hospital services is rising very rapidly. But whilst no-one would dispute the goals of "quality, effectiveness and value for money", the problem is measuring them.

The two issues - of the need for but almost complete absence of planning and of the lack of information - go hand in hand. It is clear that FPCs cannot plan prescriptively in the same way as Health Authorities. For, despite their new remit, FPCs do not directly manage the service providers - the Doctors, the Dentists, the Opticians, the Pharmacists - who remain independent contractors under the GP Charter of 1965. But although, they have no formal power with which they can directly influence the use of resources, FPC officers can work locally with the contractors to set agreed objectives and assist in the monitoring of service delivery (Fordham, 1986).

Clearly, the difficulties with identifying the outcome of many primary health care services makes it difficult to assess "quality", "effectiveness" and "value for money", however the staff at the FPCs are in a unique position to provide some of the basic data which enables those issues to be addressed. The purpose of this paper is to show how various kinds of information can be brought together to assist in this process of planning primary care.

## 1.2 The Planning Problem

The art of planning is to define desired objectives and to achieve maximum movement towards these objectives within available resource constraints. The difficulties with that formulation are recurrent and ubiquitous : what precisely are the objectives? What kind of resources are

available? and how do we assess the level of achievements?

Objectives

The purpose of the Green Paper was four fold:

- 1 "- to give patients the widest range of choice in obtaining high quality primary health care services;
- 2 - to encourage providers of services to aim for the highest standards and to be responsive to the needs of the public;
- 3 - to provide the taxpayer with the best value for money from NHS expenditure on the family practitioner services;
- 4 - to enable clearer priorities to be set for the Family Practitioner Services in relation to the rest of the NHS" (Cmnd 9771, p.2/3).

Most would agree with all these objectives framed in such broad terms. However specifying precise objectives for primary care will involve disagreement on the relative effort that should be expended for prevention and/or treatment. and the "needs" to which providers should be "responsive".

There is no unique way of defining need for (primary) health care. At a minimum we should distinguish between objective standards of need set by "experts", need as subjectively felt by individuals, and need as expressed in terms of those actually requesting a particular service. The latter, of course, is the only kind of information available to the FPCs (and many other agencies) on a routine basis; such data is collected mainly in order to administer the service activity. But it is not very satisfactory, as expressed demand can be affected by the extent and nature of service provision.

For the purposes of planning, therefore, it is important to be able to make some independent estimate of 'need', to provide a framework within which the objectives and the planning problem can be discussed. This was recognised in the debate around the allocation of resources to the hospital sector over ten years ago (DHSS, 1976), and the eventual formula used Standardised Mortality Ratios (SMRs) as a proxy for the population's 'need' for health care.

For the purposes of planning primary care on a community level, one important dimension is the level of 'deprivation' in an area. For example, the Black Report on Inequalities of Health recommended specifically that the distribution of General Practitioners should be related to the prevalence of (ill-)health and poor social conditions (Townsend and Davidson, 1982, p.153). The problem then becomes the measurement of social deprivation at a sufficiently disaggregated level (see Appendix 1).

#### Resources

It is easier to specify the quantity of resources which are available, than their quality. Indices like qualification and length of service seem to be very poor proxies although Bosanquet and Leese (1986) have argued that a clear distinction can be drawn between 'high investors' and 'low investors' partly with such data.

#### Outcomes

The assessment of outcome of any medical intervention is difficult and has generated considerable discussion throughout the health service. Thus whilst Performance Indicators are used as a league table for comparing activities and services in the hospital context, they are not proper outcome measures and have little relevance to primary care.

It is, if anything, even more complex to measure the impact/outcome of General Practitioner activity although what little evidence does exist suggests that this may be highly cost-effective (Williams 1985). No particular attempt has been made in this pilot project to remedy these defects although data to provide direct measures of "final", health status are being collected - from birth records and from death notifications. Further morbidity data is required for this task and a possible methodology is outlined in the final chapter.

### Utilisation

Information is recorded about the utilisation of primary and secondary care services: in primary care, for example, the numbers of claims for items of service; in secondary care, for example, the frequency and nature of admission and treatment of both in-patients and out-patients, and the levels of community services. However in primary care the level of detailed achieved in the hospital sector is not available. Little information is known about the processes of general practitioner care e.g. clinical sizes, consultation rates, throughput per doctor etc. outside of individual practices. Still less information is known about the interplay of outpatient - general practitioner treatment and the utilisation of hospital resources by individual GPs and practice.

## SECTION 2: THE ELEMENTS OF A DATA BASE

In order to start planning in a systematic way a data base needs to be created which brings together as many elements of general practice/primary care as possible. Given the micro level at which many decisions have to be taken it this should be based, in the first instance, on individuals. A data base needs to link activities and events which involve individuals and ,if possible, include variables indicating the socio-economic conditions in which they live.

The essential key to such a data base is an index file of the population. There is only one complete enumeration of the population, the Census, which is carried out every ten years. Due to the updating period, and the fact that information is not accessible on an individual basis, this data base cannot be used as the basic population index. The Electoral Register could be considered to be a complete enumeration of the adult population, as individual members of the public are legally bound to comply with the registration procedures.<sup>1</sup> But it only includes individuals of a voting age and access to its information is also limited.

There is, therefore, no complete enumeration of the population which is readily accessible and frequently updated. However, a very good 'second best' alternative is the nominal register maintained by the FPCs for capitation purposes.

### 2.1 The Family Practitioner Committee's Data Base

The Family Practitioner Committee's data base consists of a record of all patients registered on the list of General Medical Practitioners. The completeness of the FPC's records vary throughout the United Kingdom and

---

1 Of course, the registration procedures do miss a few individuals; more seriously because the Register is only updated annually, its accuracy declines by about 15% during the year (Hoinville and Jowell, 1978).

largely depend on the rate of population movement. In particular, they depend on the alacrity with which people register with a General Medical Practitioner and the quality of the FPCs records. Studies of the rate of registration suggest a catchment of 97% (DHSS, 1986a, p. 5). This provides a better coverage of the population than any possible alternative.

Until recently, FPC registers were physical card indexes of names and addresses but all FPC registers are due to be computerised by April 1988. This data base constitutes a neglected but valuable resource especially as eventually the postcoding of all data provides and establishes a possible link to Health Authority data.

The quality of the data is, of course, crucial. As a card index, minor errors of transcription could be tolerated but, with computerisation, the control of errors is much more important. Obviously, built-in error checks can and have been devised, but they are only likely to catch a small proportion of errors, and even manual checking of daily entries is unlikely to be very successful at tracing all errors. There is no simple cheap "solution". The standard method used in other data processing environments of double entry for verification would be expensive and difficult to organise. On the other hand, the daily use of the index means that it will be relatively well-maintained and suffers less from 'decay'.

For each patient registered with a doctor and residing within the Barnsley area the following variables were extracted from the Database.

List of Variables

Patients' NHS Number

Patients' Date of Birth

Sex of Patient

Patients' GMP Code



Patients' Postcode  
Previous FPC (where appropriate)  
Previous GMP (where appropriate)  
Prescription Exemption Details  
Cervical Cytology Test Details (where appropriate)  
Contraceptive (Claim) Details  
Patients' Address (First line only)

## 2.2 Sources of other Data Elements

For the purpose of planning, three kinds of information were identified in section 1 and these are needed to supplement the existing database:

- (i) information concerning needs,
- (ii) information concerning quality and quantity of resources,
- (iii) information concerning activities.

There are obvious lacunae in the kinds of information available to measure quality and quantity of resources and activity levels and a limited attempt to collect extra data is reported in the next chapter. However, the basic concern here is how to measure need.

There are two possible approaches. First via morbidity: in the context of the allocation of resources for hospital services in the UK relative 'need' for health care is assessed in terms of the age-sex distribution of the population weighted by standardised mortality ratios as a proxy for morbidity. It would not be appropriate to use mortality data in the context of planning primary care; for whilst such data can and has been collected (see Section 3.5), given the small number of deaths, they cannot be used to indicate need on the scale of a General Medical

Practitioner list, given the small number of deaths. Ideally, there would be data on individual health status and past morbidity. But no such data are routinely available on a community basis, although some practices are implementing information systems including this kind of data (Kelly, 1987).

Second, the hospital allocation formula is criticised for ignoring the effect of social deprivation on the need for health care and most argue, or assume, that the same should be true of primary care (see, for example, London Health Planning Consortium 1981). The difficulty is to agree on how to measure deprivation among a variety of competing alternatives (compare DoE 1983; Jarman 1983; Scott-Samuel, 1984).

The use of Census data have been criticised for becoming rapidly out-of-date (Carr-Hill, 1987) but, given the embryonic state of planning in the Primary Health Care Sector, this report therefore uses the potential of the 1981 Census Small Area Statistics (SAS) data to generate measures of (relative) social deprivation.

These data are usually organised by area - the smallest unit being the Enumeration district which on average is an area that covers about 150 households. The Small Area Statistics can however, be transformed into data on an individual level and can thus be used to augment the FPC's data base (See Section 3.2).

## SECTION 3 : AUGMENTING THE FPC'S DATA BASE

In order to develop a data base which will be useful for planning, the FPC's patient index needs to be supplemented by information from other data bases. These have been mentioned in the previous Chapter and are considered in full below.

### 3.1 Postcode Data

The postcode is a combination of up to seven alphabetic and numeric characters covering all 23 million addresses in the UK. These are arranged into:

1.5 million postcodes (approx. 16 addresses per postcode)

8900 postcode Sectors

2700 postcode Districts

120 postcode Areas

Apart from the postcode itself, the main variable of interest is the Ordnance Survey Grid Reference Number (OSGR number). For each patient's record with a valid Postcode, the OSGR number was assigned, using a COBOL computer program. Each postcode and therefore each patient's address can be localised by computer on a detailed grid. This has been used to compute average (straight-line) distances between the patients address and the nearest surgery of her or his GP. The same code also means it is much easier to group continuous postcodes and therefore facilitates analysis by (geographical) area. This is important for community planning.

### 3.2 Small Area Statistics (SAS)

"Small Area Statistics" which have been provided for 1971 and 1981, are aggregates of the basic household Census data. Some of the variables relate to a 10% sample of the population. They have been made available

for each District, Ward and Enumeration District (ED) throughout the country.

An Enumeration District includes about 150 households (about 400 people) and is the area covered by a Census Enumerator on Census night. On average, there are 20 Enumeration Districts in each Ward.

We selected the following SAS variables as most likely to reflect socio economic deprivations. Data was extracted from SASPAC for each Enumeration District in the Barnsley Area.

Table 1 : Small Area Statistics Collected for Barnsley

Values based on 100% Census

	Barnsley Average
1. Resident Population. (All persons present and absent residents).	10,000
2. All residents aged 65 and over.	13.5%
3. All elderly living alone (Females 60+ and males 65+)	5.1%
4. All residents 0 to 4 years old.	5.8%
5. Total number of children aged between 0 and 15 who live within a household of one parent	1.9%
6. Residents aged 16 and over who are unemployed	10.5%
7. Lack of Amenities. (Residents in private households who do not have exclusive use of both an inside W.C. and bath)	2.3%
8. Overcrowding. (Residents in private households with more than one person per room.	8.1%
9. Population Movement. (Residents aged 1 or over with a usual address one year before Census different from present address).	7.7%
10. Ethnic Population. (Residents in private households whose head was born in the New Commonwealth or Pakistan).	0.4%
11. Residents in private households who have no car	50.6%
12. Owner Occupier.	46.8%
13. Not Owner Occupier	53.2%

Values based on 10% Census

14. Residents in Social Class One (determined by class of head of household).	2.0%
15. Residents in Social Class Two	10.0%
16. Residents in Social Class Three Non-Manual	6.0%
17. Residents in Social Class Three Manual	30.0%
18. Residents in Social Class Four	12.0%
19. Residents in Social Class Five	3.0%
20. Residents in Armed Forces and inadequate description for social class to be determined	1.0%

The above SAS variables could be used to describe the main features of each Ward or ED within the area. However, a link can be constructed between individuals and the EDs. In this way, in order to examine the socio-economic characteristics of any group of patients, whether or not geographically defined, for example, patients on a particular GP's list can be examined. A direct link for all individuals could eventually be constructed via the electoral register but, even if access were granted, it would be very time consuming as EDs would have to be mapped onto the electoral register. Moreover, as individuals and households move, obviously the link would have to be between properties and EDs, which would be a further complication.

Instead, advantage was taken of the imminent postcoding of all Barnsley's Health Authority data to develop a permanent link between each Postcode (which covers on average 16 adjacent properties) and the corresponding ED. This link was constructed by hand over a four month period with the help of Barnsley Metropolitan Borough and use of very detailed maps.

Unfortunately, even though postcodes are very much smaller than EDs they do not always fall entirely within one ED. In this exercise about a tenth of postcodes were divided between two EDs and a handful between three. In order to improve accuracy this spread has been taken into account in the linking produced.

Clearly only patients with a valid Postcode can be included in this mapping exercise. In this pilot exercise, individuals on the FPC's patient index who do not have a Postcode (approximately 2 to 3% in Barnsley) have been excluded, although their characteristics will be examined.

By this procedure, it became possible to assign to each patient living within a particular Postcode, the characteristics of the EDs in which the Postcode lies. Such characteristics as, for example, the proportion of one parent families, can be treated as an "expected proportion" for each individual living within that ED; and hence for any group of individuals, the expected number of individuals with the given characteristic out of that group can be calculated. Assignment of the socio-economic characteristics obtained from SAS to the patient was via a suite of COBOL programs; and is illustrated in Chart 1.

#### A Postcode - Enumeration District Link

The "listing" below shows a section of the file which links the Postcode to its corresponding ED(s). The Ordnance Survey Grid Reference Map shows the ED boundaries.

Postcode S73 8TH covers house numbers 1 to 51 on Wolley Avenue, Wombwell. The listing shows that Postcode S73 8TH lies completely within ED AX05 as illustrated by the Ordnance Survey Grid Reference Map.

RELATIONSHIP BETWEEN ADDRESSES AND SMALL AREA STATISTICS

Example 1

Wooley Avenue, Wombwell  
 Odds 1-51 S73 8TH  
 Evens 2-40 S73 8TJ

Example 2

Foley Avenue, Wombwell  
 Odds 1-5 S73 8TG  
 7-23 S73 8PA  
 25-65 S73 8PB  
 Evens 2-6 S73 8TG  
 8-18 S73 8PA  
 20-50 S73 8PB

listing 3.1

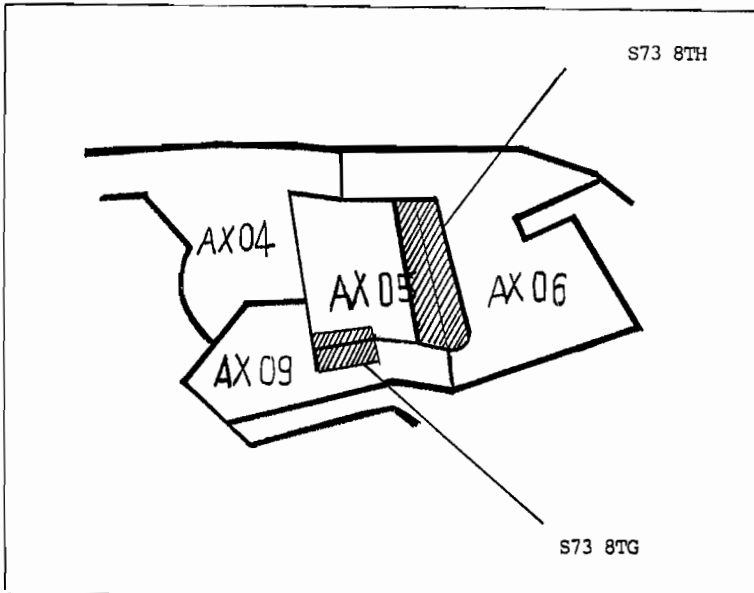
<u>Postcode-Enumeration</u>		<u>District Link</u>	
S73 8SJ	1.0	AW03	
S73 8SL	1.0	AW03	
S73 8SN	1.0	AW03	
S73 8SP	1.0	AW03	
S73 8SQ	0.5	AW03	0.5 AW06
S73 8SR	1.0	AW04	
S73 8SS	1.0	AW04	
S73 8SW	1.0	AW03	
S73 8TA	1.0	AX09	
S73 8TD	1.0	AX05	
S73 8TE	1.0	AX05	
S73 8TF	1.0	AX05	
S73 8TG	0.5	AX05	0.5 AX09
S73 8TH	1.0	AX05	
S73 8TJ	1.0	AX05	
S73 8TL	1.0	AX06	
S73 8TN	1.0	AX05	
S73 8TP	1.0	AX06	
S73 8TQ	1.0	AX05	
S73 8TR	0.4	AX05	0.6 AX07
S73 8TS	0.5	AX06	0.5 AX05
S73 8TT	1.0	AX06	
S73 8TU	1.0	AX06	
S73 8IW	0.4	AX05	0.6 Ax06
S73 8UE	1.0	Ax03	
S73 8UF	1.0	Ax03	
S73 8UG	1.0	AX01	
S73 8UQ	1.0	AX03	
S73 9AA	1.0	AF17	
S73 9AB	1.0	AF17	
S73 9AD	0.2	AF15	0.8 AF18
S73 9AE	0.5	AF15	0.8 AF18
S73 9AF	0.5	AF15	0.5 AF17
S73 9AG	0.5	AF17	0.5 AF17
S73 9AH	0.5	AF12	0.5 AF15
S73 9AJ	1.0	AF15	
S73 9AL	1.0	AF15	
S73 9AN	1.0	AF15	
S73 9AP	1.0	AF15	
S73 9AQ	0.5	AF15	0.5 AF12
S73 9AR	1.0	AF09	
S73 9AS	1.0	AF12	
S73 9AT	0.4	AF12	0.6 AF09
S73 9AU	1.0	AF12	
S73 9AW	0.3	AF15	0.7 AF17
S73 9AX	1.0	AF12	
S73 9AY	1.0	AF12	
S73 9AZ	1.0	AF12	
S73 9BA	1.0	AF12	
S73 9BB	1.0	AF12	
S73 9BD	1.0	AF12	

table 3.1

Small Area Statistics Variables

<u>DIST</u>	<u>WARD</u>	<u>ED</u>	<u>RESIDPOP</u>	<u>OVER65</u>	<u>ELDALONE</u>	<u>UNDERS5</u>	<u>ONEPARNT</u>
CC	AX	02	490	95	36	20	9
CC	AX	02	631	89	29	53	6
CC	AX	03	456	100	17	16	0
CC	AX	04	537	114	51	31	8
CC	AX	05	491	127	54	18	2
CC	AX	06	579	106	23	27	16
CC	AX	07	528	85	23	27	17
CC	AX	08	575	69	28	38	6
CC	AX	09	537	69	12	29	12
CC	AX	10	630	124	29	27	6
CC	AX	11	590	95	34	23	4
CC	AX	12	425	73	31	13	5
CC	AX	13	439	101	27	16	6
CC	AX	14	547	72	36	17	6
CC	AX	15	998	34	11	80	7
CC	AX	16	604	93	23	34	11
CC	AX	17	661	106	39	29	21
CC	AX	18	650	82	24	37	18

Diagram 3.1 Sketch map of correspondence between Postcodes and Enumeration Districts.



The "table" shows that among the 491 who were resident in ED AX05, 2 children were living in a one parent household. Thus the expected proportion of children living in each one parent household within ED AX05 is  $2/491 = 0.04073$ .

Where a postcode falls across two or more EDs, we take a weighted sum of the SAS variables according to the proportion of who fall within each ED. Thus postcode 573 8TG covers only house numbers 1-6 in Foley Avenue but spans two Enumeration Districts AX05 and AX09.

### 3.3 Mortality Data

The FPC is notified of all deaths in the Barnsley population in order to close the patient registration. Notification of death outside the area, but for patients registered on the FPC patient index are received from the NHS Central Register. In the case of a computerised FPC, the registration system transfers the patient's file to a file of "deducted patients".

The original notification of death received via the District Health Authority from the Registrar of Births and Deaths includes the following information:-

1. Date of Death
2. Place of Death
3. Patient's Name and Address
4. Patient's Date of Birth
5. Patient's Sex
6. Patient's Occupation (for married women, husband's occupation is also available).
7. Underlying Cause of Death.



In this pilot study, the characteristics of the 2,931 deaths between 1.10.84 to 31.09.85 were examined.

#### 3.4 General Primary Health Care Information

FPCs hold a variety of information relating to the GP's personal, practice and surgery details. Some of this information is available to the general public and contractors in the form of a Medical List. The following information was collected for each GP under contract with Barnsley FPC: age, qualifications and sex of GP; length of service in area and partnership details; medical practice area and responsible FPC; whether GP is obstetrically approved or a vocational trainer; details of main and branch surgeries and sessions; details of special sessions (e.g. antenatal, child health, smear test examination and numbers of home confinements.

#### 3.5 "Items of Service"

GPs claim for a variety of services they provide to patients - these services are known as "items of service". Information relating to the number of claims submitted within a specific quarter by each GP is readily available from the FPC Finance Department.

In this pilot study, the data on service claims in 1985 by each GP were collected. This yielded data on the numbers of claims for: night visits; deputising services; vaccinations/immunisations claims (broken down by type and reason); temporary residents; cervical cytology tests; emergency treatment; immediate treatment; maternity ante-natal examinations; maternity post-natal examinations; oral contraceptives; IUD contraceptives; dispensing patients; and rural practice patients and units.

More detailed information about the immunisation/vaccination claims was collected over a three month period specifying the reason for treatment.

### 3.6 Referral Data

The major link of GPs to other sectors of the Health Service is through referral to hospitals. Data is not linked to FPC patient records - indeed, it is not usually computerised at all.

Clearly these individual data can be aggregated: for example, to yield the distribution of age/sex groups, specialties for areas of residence, or the average of the waiting time variable of patients for a given doctor. These variables could then be compared between different General Medical Practitioners as part of the background to a practice audit.

For this pilot study, arrangements were made with the District Health Authority for a limited examination of referrals by GPs to specialists within Barnsley District General Hospital. Non-urgent out-patient referrals to the hospital were examined during a two day period in February 1986. Selected details of the individuals being referred were collected. These included details of specialty, GP's code, age and sex of patient, postcode, date of referral, and time already spent waiting for an out-patient appointment.

As the data was collected in two days, it was not possible to calculate the waiting time from referral to consultation. These data available, therefore, only permits the calculation of a waiting-time-so-far variable but for comparative purposes these data are adequate. Clearly it would have been preferable to collect data over a longer period, say six to twelve months, yielding a much larger sample as well as a proper waiting time variable.

### 3.7 Possible Configurations of the Data

So far in this section we have shown how postcode data, SAS data, mortality data, referral data, items of service and other information can be linked to the FPC's database. Chart 2 illustrates all the information that is available at a patient or individual level and shows how it can be linked to the basic age/sex register.

In this pilot study, due to machine capacity constraints, only the SAS database was directly linked to the FPC's patient based file using the postcode. In principle, however, all other databases can be joined to the FPC's database at a later date using the patients NHS number or the postcode, although this may not, be the most efficient use of available machine capacity (see Section 5).

The basic data are collected at an individual level and, for the day-to-day purposes of FPC administration. For purposes of audit, for planning and administrative report, however, it may be more useful to analyse the data on a more aggregated level. At that stage, other material can be incorporated related to the GP, their practice or the area.

Any of the data available on a patient basis can be aggregated so long as the variable which is to be the basis for aggregation (and, in particular the GP code and an area code such as the postcode) is collected at the same time as the original data. For example, the Small Area Statistics can be combined so as to give a socio-demographic profile for a given GP's list the referral data can be aggregated to yield the distribution of age/sex groups, of specialties, of the average waiting time of patients in a given area etc.

An illustration of the kind of data which can now be included in a GP profile is shown in Appendix 2. It includes details of the GP herself, of

- MORTALITY STATISTICS**
1. Date of Death
  2. Place of Death
  3. Sex of Deceased
  4. NHS Number
  5. Postcode
  6. Cause of Death
  7. Activity Status at Death
  8. Usual Occupation of Deceased
  9. Usual Occupation of Spouse (where appropriate)
  10. General Practitioner's Code - G.P. Code

**REFERRALS TO BARNSELEY DISTRICT GENERAL HOSPITAL**

1. Speciality Type
2. Specialist Code
3. Referred By
4. When referred by General Practitioner - G.P. Code
5. Sex of Patient
6. Date of Birth of Patient
7. Patient's Postcode
8. Date of Referral
9. Date Coded

- F.P.C. COMPUTERISED PATIENT DATA BASE**
1. Patient's NHS Number
  2. Date of Birth
  3. Sex of Patient
  4. Patient's G.P. Code
  5. Patient's Postcode
  6. Previous F.P.C. (where appropriate)
  7. Previous G.P. (where appropriate)
  8. Prescription Exemption Details
  9. Cervical Cytology Test Details
  10. Contraceptive (G.P.) Details
  11. Address (first line only)

Only Possible to link to Deducted Patients file

**VACCINATION AND IMMUNISATION CLAIMS BY GENERAL PRACTITIONERS**

1. Patient's General Practitioner
2. General Practitioner Providing Treatment
3. Practice Code
4. NHS No. of Patient
5. Reason for Treatment
6. Type of Treatment

Postcode - Enumeration District Link

- SMALL AREA STATISTICS**
- A link between this data and the Patient Based Information is achieved through the Postcode variable. (Refer to Postcode - Enumeration District link).
- It enables one to assign to each patient the characteristics of the area in which they are living. (See Blue Print).
- A list of the Small Area Statistics variables to be used on this occasion are given below; these are available for each enumeration district within the Area of Interest.
1. Enumeration District
  2. Resident Population
  3. Over 65s
  4. Elderly Living Alone
  5. Under 5 Years
  6. One Parent Family
  7. Unemployed
  8. Lack of Amenities
  9. Rate of Population Change
  10. Ethnic Population
  11. Overcrowding
  12. Number of No Car Owners
  13. Type of Tenure
  14. Social Classes SC1, SC2, SC3N, SC3M, SC4 and SC5
  15. Retired Population

Patient's NHS No.

Postcoded

- POSTCODE DATA AVAILABLE**
- One can assign the following variable to the Patient's records using the Postcode variable.
1. Postcode
  2. Date of Introduction
  3. Date of Termination
  4. Ordnance Survey Grid Reference Number
  5. User Type
  6. Grid Reference Indicator
  7. Ward Code
  8. Area Code
  9. Country Code
  10. Area Code Indicator

(Similar for all other Items of Service)

her partnership/practice and of her surgeries as well as aggregated data from the Small Area Statistics, items of service claims, referrals and the age/sex register itself. Creating an area profile is more difficult since it requires the systematic exchange of routinely collected information between different sectors of the NHS (the community and hospital services as well as the GPs). The eventual postcoding of all health data will, in principle, provide this link, but the data can already be examined together if the postcode is used, via the ordnance survey grid reference number as a basis for mapping health data.

## SECTION 4 : ILLUSTRATIVE ANALYSES FOR PLANNING

The purpose of this chapter is to illustrate the kinds of analyses that can be carried out with the data base elaborated in the previous chapter and to comment on their eventual usefulness for planning.

### 4.1 GP or Practice Based Analyses

The first set of analyses are by individual GMP and by practice. The kinds of information which could be included in a typical "Practice Profile" is presented in Appendix 1. Here the focus is on the comparison of the same characteristics as between the practices in the Barnsley area or between three of the different doctors (one doctor from the Eastern, one from the Central and one from the Western Medical Practices Committee Area).

It is well-known that there is considerable variability in the (apparent) work load of the different doctors and practices. For example, in the Barnsley FPC area, the list sizes of 4 GMPs were below 100 and 8 others had more than 4000 on their list, the modal list sizes are between 200 and 3500 and the modal practice sizes are between 8001 and 9000. As background to the other results, Table 2 gives the list sizes in the three Medical Practices Committee Areas. Individual list sizes are largest in the Eastern Area but the largest practices are in the Western Area, and male GPs tend to have the largest list size.

TABLE 2 : AVERAGE LIST SIZES IN THE THREE MEDICAL PRACTICES COMMITTEE AREAS

Average for GPs	Number of GPs	MCP Area	Average for Practices	Number of Practices
2,189	53	Central	8,266	52
2,236	44	Eastern	6,164	44
1,984	7	Western	13,889	7

Data on the age/sex distribution and on the rate of change of the list size are also available. Preliminary analysis of the number of new residents for the three GPs suggests large differences : 35% of GP1's list are new residents; 4% of GP2's and 7% of GP3's list. This will obviously have implications for the workload of the three GPs.

The material from the Small Area Statistics of the 1981 Census has also only been analysed so far for the same three GPs. Table 3 compares the socio-demographic make-up of their three lists. There is no consistent rank order as between even these three GPs in these indicators of possible workload (cf. Jarman, 1983). GP1 has the highest percentage of single parents but the lowest proportion of each of the other characteristics; GP2 has the highest percentage of elderly and the lowest percentage of single parents, but is intermediate in everything else; and GP3 has intermediate proportions of elderly and of single parents but is highest for everything else. The classic indicator of socio-economic status, the ratio of Registrar General's Social Classes IV and V to I and II varies from 0.28 for GP1 to 1.65 for GP2 and 2.20 for GP3, that is by a factor of eight; and another popular indicator of economic status, the proportion of car owners, varies from 24% with GP1 to 46% for GP2 and 51% for GP3, that is by a factor of two.

TABLE 3 : ESTIMATED NUMBER AND PROPORTION OF EACH SOCIO-DEMOGRAPHIC GROUP ON THE LISTS OF THREE GPs.

	GP1		GP2		GP3	
	N	% of List	N	% of List	N	% of List
Elderly	77	4.6	214	6.0	101	4.8
Single Parent	118	7.0	37	1.0	31	1.5
Unemployed	72	4.2	183	5.1	119	5.6
Lacking Amenities	33	1.9	89	2.5	102	4.8
Overcrowding	76	4.5	280	7.8	183	8.7
Ethnic Minority	2	0.1	22	0.6	3	0.1
No Car	414	24.2	1,636	45.5	1,077	51.2
-----						
Ratio of Social Classes IV+V : I+II; and % who recorded a RGSC	0.28		1.65		2.20	
	83.1		71.8		62.9	
Total on List	1,696		3,593		2,102	
-----						

Whilst such variation is not unexpected, it means that the rank order between the GPs of any summary index (combining more than one indicator) will be affected by the method of combination. For this reason, neither the Department of the Environment index (DoE, 1983, Irving and Rice, 1984) nor the Jarman index (Jarman, 1983) have been calculated for comparative purposes. This underlines the importance of deciding which are the crucial characteristics and weighting factors for distinguishing the relative need of patients on different GMPs lists, a priori, and not relying on a statistical procedure. The same data base can be used for computing distances; this is presented in Table 5 and shows the relative spread of patients of a GP around the nearest surgery. A breakdown by mode of travel would require more detailed information.



TABLE 4 : DISTANCES OF PATIENTS FROM SURGERIES

	GP1	GP2	GPs
Average distance (miles)	0.56	0.73	0.53
Percentage over 1 mile	9.00	16.00	4.00
Percentage over 1.5 mile	5.00	5.00	1.00

The material on referrals is sparse with GP2 making many more referrals (39 out of 51) and the only one providing any clients for surgery but suggestive of wide variation.

Table 5 presents the analysis of mortality over one year for these same three GPs. Very few conclusions can be drawn from these data because the numbers are small, but again there are clear differences between GPs.

TABLE 5 : CHARACTERISTICS OF DEATH OCCURRING AMONGST THE THREE GP LISTS  
(Percentages by row)

	N	Percent Manual	Place of Death			Cause of Death	
			% Barnsley DGH	% Patients Home	% Heart Blood	% AV Cancers	% Respiratory
GP1	4	50	0	75	25	50	25
GP2	37	35	70	19	49	14	32
GP3	24	63	17	46	46	17	25

Two kinds of analyses are presented for the level of activity in Table 7: by practice, and for the three GPs. First, whether or not larger practices have other advantages, the level of measurable GMP activity, as indicated by their claims for items of service such as numbers of

deputising night visits, of dispensing patients, of cervical cytology, use of temporary residents or of vaccinations does not seem to vary with practice list size (see Table 6).

Second, the distribution of items of service between the three GPs is shown in Table 7.

#### 4.2 Area-Based Analyses

Socio-demographic variables available in the Small Area statistics can be tabulated for the different electoral Wards and Table 8 shows the range for selected variable. It is clear that the socio-demographic characteristics of the Wards vary widely about the average for Barnsley. But this area-based analysis becomes more interesting if we look at the average age at death of those who died in different Postcode Districts (Table 9). These vary by more than five years for both men and for women.<sup>2</sup>

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(2) One could argue that the calculations should be in terms of statistically significant differences between values for different Postcode Districts. By that criterion, only the extreme values are different from the overall average. But the number of deaths in a geographical region in any one year are too few to treat in this manner.

TABLE 6

Average Levels of GMP activity by Practice List Size.

	Number of GMPs in Night practices of this size		Night Visits	Deputising Night Visits	Vaccinations and Immunisation	Cervical Cytology	Maternity Visits	Contraceptive Claims
1- 1000	2	16	2	14	6	23	27	
1001- 2000	-	-	-	-	-	-	-	
2001- 3000	12	30	15	27	26	21	56	
3001- 4000	5	14	5	18	5	12	67	
4001- 5000	11	27	20	31	29	20	63	
5001- 6000	9	33	38	27	22	24	89	
6001- 7000	6	42	43	28	21	11	58	
7001- 8000	3	29	0	49	16	24	71	
8001- 9000	19	37	6	26	28	21	67	
9001-10000	9	31	26	40	45	21	89	
10001-11000	10	31	35	17	12	22	53	
11001-12000	9	25	23	38	28	17	68	
12001-13000	15	19	14	18	23	9	64	
	110	29.0	19.4	27.0	24.5	18.4	66.3	

TABLE 7 : ITEMS OF SERVICE BETWEEN THREE GPs (per thousand)

	GP1	GP2	GP3
N	1696	3593	2102
Prescription Exemption	58	47	65
One Cervical Cytology Test	111	91	103
Two Cervical Cytology Tests	73	73	68
Contraception Claims	68	33	50
N	1858	3673	2133
Night Visits	-	26	11
Claim for Temporary Residence	2	37	11
Vaccination and Immunisation Claim	9	7	6
Rural Practice Patients	-	17	31
Maternity Period 1 Treatments	-	14	21
Maternity Period 2 Treatments	519	-	-
Dispensing Patients	479	-	-

TABLE 8 : CENSUS VARIABLES AT WARD LEVEL

	Resident Population	Over 65	One Parent	Unemployed	Lack of Amenities	Over-Crowding
-----						
Barnsley Average		13.5	1.9	10.5	2.3	8.1
-----						
Minimum	6943	9.3	1.1	6.4	0.2	4.0
Ward	Wombwell North	Athersley	Centre/ Penistone East	Penistone East	Athersley	Penistone East
-----						
Maximum	12098	18.7	2.9	15.7	5.3	14.6
Ward	Dearne South	South West	Athersley/ Cudworth	Athersley	Central	Athersley
-----						

TABLE 9 : AVERAGE AGE AT DEATH BY SEX AND POSTCODE DISTRICT

Postcode District	Male		Female	
	Average Age/Years	Number Of Cases	Average Age/Years	Number of Cases
S30	69.6	(55)	76.1	(74)
S63	69.7	(161)	71.6	(121)
S70	75.1	(254)	74.9	(267)
S71	69.6	(265)	76.1	(237)
S72	71.2	(125)	74.1	(116)
S73	72.3	(135)	75.0	(144)
S74	71.2	(102)	78.2	(109)
S75	74.5	(192)	76.2	(207)
-----				
TOTAL	71.0	(1,289)	75.3	(1,275)
-----				

A comparison of the results presented in Table 9 with socio-demographic data of the kind displayed in Table 8 shows how, of the 8 Wards with more than 12% unemployment, two fall into postcode district S63 where the population die earliest and 2 others into S72 which is the area where the women also die early. Of course, death rates have been proposed as a measure of social deprivation for -example, in the original RAWP report (DHSS, 1976, page 16, Chapter 1) - but the patterns are not that close.

This argument leads to relating the level of resources or of activities to the characteristics of the areas. Table 10 shows the distribution of patients on the lists of three of the GPs in the Barnsley area. Whilst GP1

and GP2 are concentrated in specific areas, the patients of GP2 are more scattered, though there is an interesting overlap between GP1 and GP2 in district S75.

TABLE 10 : DISTRIBUTION OF PATIENTS OF THREE GPs BETWEEN THE POSTCODE DISTRICTS (Row Percentages)

	N	S30	S63	S70	S71	S72	S73	S74	S75
GP1	1696	93	-	0	-	-	-	0	7
GP2	3593	0	-	55	31	0	0	-	13
GP3	2102	-	99	-	-	1	0	-	-

The same 'scatter' of GPs across the postcode districts occurs for all the GPs in the Barnsley area: yet the incidence and 'throughput' of referrals vary systematically. In particular, the average waiting time for referrals provide an interesting breakdown (Table 11). Although one would not expect any substantial variation between districts, it is clear that the patients in S30 and S75 are outside the range of chance variation.

TABLE 11 INCIDENCE OF REFERRALS BY POSTCODE DISTRICT

Postal District	No	Rate per 1000	Average Waiting Time (in weeks)
S30	111	8.6	8.9
S63	122	4.3	10.9
S70	473	9.1	10.8
S71	634	12.6	10.5
S72	348	14.4	10.5
S73	251	9.0	10.4
S74	172	8.2	10.7
S75	438	11.0	11.3
-----			
TOTAL	2549	11.0	10.4

## SECTION 5 : A WAY FORWARD FOR PLANNING

Most agree that there is a need for a more flexible and effective primary care provision. But there are good reasons for the lack of planning and policy formulation in this area; General Practitioners are independent contractors established by the Charter of 1966. Control over their activities has been limited to specific targetted areas; the immediately responsible administrative body - the Family Practitioner Committee - has more usually concerned itself with allocating the various fees and allowances.

As a corollary, there is no incentive to plan for a need-orientated development. The Green Paper due to lack of objective means avoided this basic problem: in consequence, subsequent debate has been more in terms of what it omitted rather than what it proposed (Clark, 1986; Maynard et al, 1986). But assuming that an element of planning is introduced in to the Family Practitioner Services, the problem is to specify the objectives, to quantify the resources and to assess the outcomes.

### 5.1 Using the Data Base

Despite these difficulties of determining effects on outcome, the existing data base can already be used in several ways. Two examples are considered briefly here: describing the characteristics of a practice and increasing the take up of vaccination and immunisation services.

#### i) Describing Characteristics of a Practice

Thus, one of the ways the FPC can influence the nature of the primary care service in the area can be influenced is through appointments to replace vacant single-handed practice posts. In the absence of systematic

information about the practice, the only method is to choose the "best" applicant by interview and qualifications. But with the data base, it is now possible to provide an extensive socio-demographic description of the practice list, previous activity rates and overlaps with other practices which will enable more appropriate appointments. Similarly, the data base can also be used to promote the rationalisation of practice areas.

## ii) Increasing Take Up

Another way the GP behaviour can be influenced is by using the incentives that exist. Of course, much of the incentive structure for GPs is perverse (Dowson and Maynard, 1986) but the issue here is the extent to which the FPC can influence GP behaviour. For example the fee-for-service for immunisations and vaccinations can be used to increase the coverage of those services to appropriate target groups. In the absence of an up-to-date data base GPs who were concerned to improve and target take-up had to act opportunistically; with a data base, precise lists of names can be produced regularly.

## 5.2 Gaps in the Data Base

The question of what other data should be collected depends, once again, on the uses to which the data base will be put and therefore on the planning objectives for planning care. Whilst we can all speculate, the basic problem is that debates about planning and policy formulation within the NHS have tended to concentrate on the hospital sector: in particular, discussion about the appropriate information base for planning has focussed almost exclusively on the meaning and utility of Performance Indicators - and sometimes, on how the RAWP formula should be modified - but again only with reference to the hospital services.



There are, apparently, considerable disparities in the provision of primary care services within the UK. At the most superficial level, the resources vary: thus, per capita, England receives less than either Scotland, Wales or Northern Ireland (Birch and Maynard, 1986); within England, the percentage of GPs with lists over 2000 varies from 44% in South Western to 66% in Trent (1983 figures). The variations are much wider than those which have been subject to resource allocation formulae within the hospital sector over the last 12 years. But, within Regions there are still problems with access to services (for example, Exeter CHC, 1986).

On a very different level, it is clear that any move towards preventive primary care requires detailed information on the population in order to identify the target population and assess the impact of any interventions (and the recent emphases on community care, and, in particular, on community nursing with the Cumberledge Report (DHSS, 1986b) will also need the support of a detailed data base).

Assuming, however, that systematic planning is introduced into the Family Practitioner Services, the issues are the measurement of need and outcome. It should be emphasised that whatever measures are chosen, they need to be applicable at several different administrative levels; in particular, given that GPs are working over relatively small areas, any proposed systems should be applicable at the community or even at the neighbourhood level.

### 5.3 Measuring Need and Outcome

There is a wide variety of approaches to measuring need. This pilot project, has concentrated on the possibility of exploiting Census SAS data. We have shown how the SAS data can be linked to the FPC patient index file, together with information on quality and quantity of resources and the

utilisation of services to generate an integrated data set which can be used as a basis for the planning of Family Practitioner Services.

However, it would obviously be useful to have much more direct measurement of need and some GPs have proposed for standardised protocols to monitor certain conditions (Read, 1987). A complementary approach would be aimed at introducing a direct and simple (questionnaire) measure of morbidity which could be administered by, for example, the receptionist.

The next important but difficult step is the development of outcome ("performance") indicators to give an indication of the quantitative value of service provision and to assess any shortfall in the delivery of care. There is no obvious outcome measure when those consulting with GPs cannot always be diagnosed as suffering from an identifiable medical condition and where there is no measure of morbidity among the population who are the potential patients.

The development of a measure of morbidity which could be used as a routine starting diagnosis would be very useful. Meanwhile, this pilot project has collected data on birthweight and causes of death. These obviously cannot be interpreted directly as outcome data. Indeed, according to the logic of RAWP, they should be treated as proxy measures of need which only emphasises the importance of developing a validated measure of need.

#### 5.4 Concluding Remarks

The Gren Paper on Primary Health was concerned to improve the match between the population and the services provided to them. The issues are complex but, increasingly health service managers are realising the importance of understanding local conditions and variations between

localities in order to best assess ways of providing care and meeting needs. This project describes a way in which currently available data held by FPCs can be brought together with other data in the public domain. Such information can then be presented in the form of detailed profiles whether of localities or practice populations so as to point the way to enhancing service provision and quality of care.

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Table 12 : Percentage of Elderly Living Alone Compared Between Electoral Wards and Between Enumeration Districts

Ward within Barnsley		% of Elderly Living Alone	Enumeration Districts Within Ward AA	% of Elderly Living Alone
Ardsley	(AA)	4.1	AA01	6.0
Athersley	(AB)	3.4	AA02	5.2
Brierley	(AC)	4.0	AA03	11.9
Central	(AD)	5.9	AA04	3.5
Cudworth	(AE)	4.0	AA05	1.1
Darfield	(AF)	4.8	AA06	5.8
Darton	(AG)	4.4	AA07	5.2
Dearne South	(AH)	4.2	AA08	6.6
Dearne Thurnscoe	(AJ)	4.9	AA09	2.8
Dodworth	(AK)	4.9	AA10	7.6
Hoyland East	(AL)	4.9	AA11	6.6
Hoyland West	(AM)	6.5	AA12	2.1
Monk Bretton	(AN)	4.5	AA13	6.2
North West	(AP)	5.5	AA14	0.8
Park	(AQ)	6.6	AA15	0.9
Penistone East	(AR)	5.4	AA16	3.8
Penistone West	(AS)	4.8	AA17	3.1
Royston	(AT)	5.3	AA18	3.2
South West	(AU)	7.8	AA19	2.4
Wombwell North	(AW)	5.9	AA20	4.1
Wombwell South	(AX)	5.1		
Worsbrough	(AY)	5.0		
Range		3.4 to 7.8		0.8 to 11.9

Source: 1981 Census Small Area Statistics, extracted from data tapes released from ESRC Data Archive.

APPENDIX I : THE MEASUREMENT OF SOCIAL DEPRIVATION FOR HEALTH SERVICE  
PLANNING ON A LOCAL LEVEL.

The suggestion that Census Small Area Statistics should be used for health service planning on a local level has been made several times (see, for example, DoE, 1983; Irving and Rice, 1984; Jarman, 1984). The difference here is the application to non-geographically defined groups.

Most analyses of the SAS in England and Wales have, in fact, used the electoral Ward as the basic unit. The argument is that Districts are diverse, and that Wards are relatively homogeneous. But this is not very convincing, for the argument about Wards compared to Districts applies with equal force to Enumeration Districts (EDs) compared to Wards. Table 1 shows how the variation between EDs within a Ward is considerably larger than the variation between Wards. The logical conclusion of that argument on its own, therefore, is to conduct analysis only on the individual level. Obviously given confidentiality of the Census, precise data of the kind we require is not available at the individual level; but it is possible to assign street level data to each individual living in that street (see section 3.2).

10.(a) Out-patient referrals.

(b) Number of Referrals to each Specialty:

general medicine, etc.

11. Practice Mortality by Cause of Death.

12. Average Age of Death for Male and Female Patients.

13. Immunisation and Vaccination by Reason:

prctice, specific exposure, traveller.

14. Immunisation and Vaccination by Type:

DPT, Polio, Smallpox, Measles, Rubella.

15. Details of Certival Cytology Tests:

whether by GMP, by HA or not tested; by Age (20-34/35-64);

whether test satisfactions, repeat test advised, medical follow-up.

16. Items of Service:

number of temporary residents, number of prenatal maternity treatments, number of post-natal maternity treatments.

17. Prescribing Details:

number of items prescribed, gross prescribing cost.

18. Number of patients holding Exemption or Pre-Payment Certiciates from prescribing charges.



APPENDIX 2 : POSSIBLE ITEMS IN A GP PROFILE

1. List Size:  
each year for last four years.
2. List Size by Age Group.
3. Age, Sex Distribution in the List.
4. Rate of Change in Practice List:  
births, deaths and patient movements.
5. Practice Elderly:  
whether or not living alone.
- 6.(a) Socio-Demographic Characteristics of the List:  
RG social class breakdown.  
  
(b) Socio-Economic Characteristics of the List Proportions:  
lacking amenities, households w/o car, overcrowded, elderly  
living alone, one parent families.
7. Estimated Number and Percentage Attending Each Surgery.
- 8(a) Distance from nearest Surgery to patients' address.  
  
(b) Distance from nearest Chemist to patients' address.
9. Special Surgery Session:  
ante-natal, child health, family planning, maternity, linear  
examination, vaccination/immunisation.