

An Integrated System for the Recording and Retrieval of Medical Data in a Primary Care Setting

Part 5: Implications of Filing Charts by Area of Residence

Eugene S. Farley, Jr., M.D., M.P.H.

Rochester, New York

Although considerable data is collected on each patient by practicing physicians for administrative purposes, much of it has traditionally seen little application to patient care or medical knowledge. If this data is organized systematically, it can increase the efficiency of the practice, improve care, and facilitate analytic studies of the total patient population and/or community served by the practice. The rationale and methods

are described for the collection and retrieval of significant data relating to area of residence of patients and their families. The value of this information is reported in terms of patient care, research and teaching. Filing charts by area of residence adds to the usefulness of other methods previously described in this series of articles dealing with recording and retrieval of medical data in a primary care setting.

The practice of medicine is based on the collection and interpretation of data. In medical school we are taught how to collect data on an individual patient with a specific disease over a limited period of time, i.e., during the doctor's rotation on a service or during the patient's hospitalization. We are taught to develop and integrate this data to arrive at a precise diagnosis. We learn that additional data can be obtained in the laboratory, from the family, or even from a home visit. The latter, however, is often considered frivolous and of little relevance. We may be taught in a course on epidemiology that other data exists that could be collected and interpreted, but many instructors consider this irrelevant to the main thrust of medicine and of little practical value to the doctor or patient. This attitude is a natural one when interest is limited to the individual patient and disease and not concerned with the community from which the patient comes and to which he will return, and where there is no real awareness of the total universe of health and

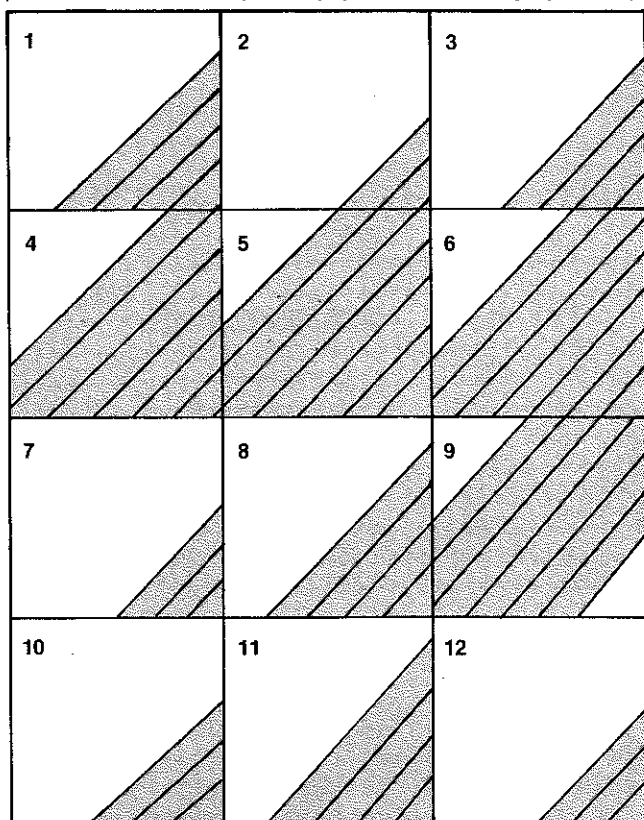
disease. Most hospitals and medical centers emphasize data collection and interpretation, and not data organization and retrieval (which implies constant reuse of the data). Therefore, it is not surprising that very little has been done on the practicalities of organizing data more rationally for the care of the patient and identification of his problems.

Traditionally, much data is collected on each patient for administrative purposes. This includes: patient's name, address, date of birth, sex, family relationships, and a rough estimate of socioeconomic status. This is usually considered of secondary importance to patient care or medical knowledge and most of the time it is little used except in relation to the particular patient, or on rare occasions when someone studies a specific epidemic. But if this data is organized systematically, it can increase the efficiency of the practice, improve care, and permit analytic studies of the total patient population and/or community served by the practice.

There are simple office systems which allow the patient population served to be defined by age, sex, family, socioeconomic status (at times) and area of residence, as well as by symptoms, diseases, or problems. This paper deals specifically with the collection, retrieval and significance of data relating to area of residence.

From the Family Medicine Program, University of Rochester-Highland Hospital, Rochester, New York. Requests for reprints should be addressed to Dr. Eugene S. Farley, Family Medicine Program, University of Rochester-Highland Hospital, 335 Mt. Vernon Avenue, Rochester, New York, 14620.

Figure 1. Patient Population of a Practice by Census Tract
(Shaded areas indicate patient population served by a practice)



Dividing the area into subdivisions such as census tracts or towns allows one to determine in which subdivisions the practice has a significant sample of the total population.

Rationale for Geographic Chart Filing

Chart filing has traditionally been a purely mechanical procedure with no function other than easy location of the individual patient's chart. If charts are filed alphabetically or numerically, little can be obtained from the filing system except the chart. But, if one desires, the filing system can be easily modified to represent the geographic territory covered by an individual practice. This can be achieved by filing charts according to the individual's area of residence. Since it is impossible to file charts by specific houses and difficult to file them by streets, the most functional visualization of community distribution in a practice would be to file by neighborhoods. However, in today's world, neighborhoods seem to be in constant flux, their boundaries often overlap or are poorly defined, and the number of inhabitants is difficult to calculate. Therefore, neighborhood filing is impractical.

At the Navajo-Cornell Clinic at Many Farms, in the mid-fifties, we arranged charts by "camps," which comes closest to filing by neighborhoods. Since Navajos do not live in traditional towns but in small, scattered camps or clusters of hogans, with residency determined by family relationship, we had an easy grouping to represent in the filing system. When this approach was first suggested, I opposed it because I feared it would take additional time of clerks,

nurses, health visitors and doctors. However, once it was instituted, I became convinced of its value, since it simplified many of the administrative details of a good epidemiologically-oriented practice with outreach.

When my wife and I later settled in a rural community, we planned to file by area of residence but at first we knew nothing about the community and found it difficult to decide how to divide it. But, after living there for a few years we came upon several ways of dividing a rural community for the filing system. Filing may be done by census bureau enumeration districts, school districts, wards, election districts, towns, other political subdivisions, zip codes, arbitrary quadrants, natural drainage areas or other geologically defined areas as identified on a topographic map.

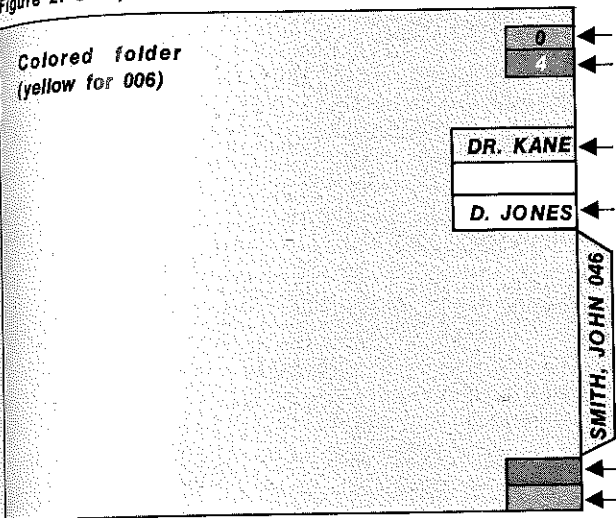
In cities or metropolitan areas, the census tract is the most informative and manageable unit for breaking down a practice geographically. Boundaries of the enumeration districts and census tracts are arbitrarily defined by the Bureau of Census and remain constant. Unfortunately, they may represent no identifiable neighborhood or geologic area. However, the value of defining the population by census tract in a metropolitan area includes:

1. The population of each census tract is regularly enumerated by age and sex.
2. In some cities and some census tracts, considerable socio-demographic information is available regarding the population of the individual census tract, so that one may know such information as the average level of education of the adults, average income, and level of unemployment.
3. Those planning to study their patient population must know whether they have a significant number of patients from the specific census tracts being studied. For example, figure 1 shows which areas within a potential practice area have a significant sample of the total population. It can be readily seen that significant practice studies can be undertaken in areas 4, 5, 6 and 9; areas 1, 3, 8 and 11 may not have a significant number of patients and areas 2, 7, 10 and 12 clearly do not have a significant number of patients within the practice.

The reasons for filing by census tract include simple administrative ones as well as more complex ones:

1. Charts are more difficult to lose if they are color-coded by census tract.
2. Geographic visualization of the patient population served by a practice can be achieved just by looking at the chart racks.
3. Patient identification is easier, i.e., there may be 60 Smiths in a practice, but if they are divided among 30 census tracts, the seven Robert Smiths are more likely to be separated.
4. "Self-help factors" in the practice community may be more easily developed in a geographic area, i.e., a patient who needs neighborly assistance may be helped to find someone from the practice who lives in that area and wants to provide such help.
5. Outreach is more easily provided by the practice if patients from specific areas to be served are easily identified, i.e., community workers, public health nurses, or other home outreach people may look at the charts and make

Figure 2. Sample of Family Chart Folder



Tangerine tab for 0
Green tab for 04

Yellow tape for resident who is patient's doctor.
Color coded tape for precepting doctor who is "team" leader.
White tape if medical student also involved with care of family.

Head of household name label.

Green tape will be placed here as soon as chart used in '73.
Red tape placed here as soon as chart used in '72.

Another color will be placed over the red as soon as chart used in '74. This will give us instant manual retrieval of all charts ac-

tive in any one year so that all inactive charts can easily be removed to an inactive file.

several house calls at once.

6. Outbreaks of certain diseases, such as rubella, rubeola or diphtheria, in a specific census tract may be more easily recognized and controlled. Other patients from that area can be easily identified and brought in for immunization or prophylactic procedures.

7. Patient populations served can be evaluated on an epidemiologic basis. This approach is necessary if we are to define the epidemiology of those diseases for which it is obscure.

5. Rotary File and File Cards — Needed for cross reference. Since charts are filed alphabetically once they are placed in a census tract, a rotary file is needed in which all patients are filed alphabetically. The census tract number, telephone number, address and family members are listed on this card for easy location of patient and family.

Methods for Geographic Filing

B. Color Coding

The materials and methods used to develop the chart filing system now in use by the Family Medicine Program at the University of Rochester will be described in sufficient detail to facilitate the development of similar systems elsewhere.

A. Supplies

1. Census Tract Directories — In Monroe County these are obtained from Monroe County Planning Council. Federal Bureau of Census in Washington, D.C., should be able to send them to you or tell you where they can be obtained.

2. Maps — Census tract maps of city or county can be obtained from the Federal Bureau of Census. In Monroe County we have been able to get them from the County Planning Council.

3. Demographic Data — This is available from Federal Bureau of Census. County Planning offices or boards, or local university sociology departments may have them also.

4. Charting Supplies — We use "Spacefinder" files by TAB Products. These files are open shelf with removable pocket-like sections which hold the charts upright in an easily removable suspended unit. They are ideal for census tract or geographic filing and for easy access to the files for removing groups of charts for review.

The Family Medicine Group uses a three-digit number code. There are ten chart folder colors and ten tab colors; each color represents a number. The folder color represents the terminal digit, the lower tab represents the middle number and the top tab represents the first number.

Each family chart is assigned by color on the basis of the census tract in which the family lives. All families living in that census tract are filed together, by family folder, alphabetically.

The color code used is:

0—tangerine	5—gray
1—white	6—yellow
2—blue	7—orange
3—manila	8—brown
4—green	9—red

Each family chart has an alphabetically color-coded label on it with the family's name. This color code is of little additional value to us and is seldom utilized in locating the chart. To distribute the colors and alphabet, the color represents the second letter in a name and is:

ABCD—orange	OPQRST—blue
EFGH—yellow	UVWXYZ—purple
IJKLMN—green	

C. Sample of Family Chart Folder (Figure 2)

All members of the immediate family are filed in the same folder. When the family moves to another area they are assigned another colored folder for their new census tract. If they do not tell us they have moved we do not lose the chart as it remains indexed in its old place. When a member

of the family marries and moves out, a new folder is started for those who have moved and it is filed by their new area of residence. A Household History Sheet should be inside the front of the folder to tell who else is in the household, such as relatives, and who has left the household.

All the colored charts, tabs and labels are available from TAB Products.

D. Practice Distribution by Census Tracts

Figure 3 represents the resultant distribution of patients in the existing practice of the Family Medicine Program at the University of Rochester.

Implications of Geographic Filing

A. Practical Value of Geographic Filing

In the Navajo-Cornell Clinic at Many Farms, Arizona, filing by camps gave us immediate access to all the charts of camp members. This was important when a new case of tuberculosis was identified, as it allowed us to review, before someone went out to the camp, who had not had such procedures as skin tests and X-rays. Outreach work involving skin testing, chest X-rays and other care could then be carried out more efficiently. We were able constantly to see who was at risk to someone with infectious diarrhea, streptococcal infection or other contagious disease without having to make field trips every time. It also allowed us to use our Health Visitors and Public Health Nurses most effectively, since they could go to the camp equipped with their charts and know what needed to be done on a very specific population as well as an individual patient. This procedure probably cut the cost of this kind of outreach while increasing its effectiveness.

In a rural community, Trumansburg, New York, we reported 100 percent of the hepatitis in the county during one year. Because this was a rural community, it was easy to see that all these cases lived along the stream flowing through the center of town. This stream served as an open sewer for some buildings alongside of it on the main street where there was no land for septic systems. However, these patients were all related — the stream seems not to have played a part in the spread of the disease, but it easily could have. This small epidemic put extra pressure on the citizens of the town to pass a bond issue for a sewage plant to clear up the stream and reduce the potential for epidemics by enteric pathogens (the stream runs into Lake Cayuga in an area where shore wells were being planned as a new source of water for the village).

In the family medicine practice of the University of Rochester and Highland Hospital we were able to screen those children in the practice at most risk for lead poisoning by doing blood lead levels on all those children who lived in the census tracts identified by the health department as having highest incidence of old homes with lead paint. Venereal disease, diphtheria, typhoid, amoebic dysentery, streptococcal infections, polio (if it recurs), and many other infectious diseases whose epidemiology is known can be better and more rapidly controlled if each doctor's office is able to see clearly where they are clustering. More easy outreach to control them is also possible.

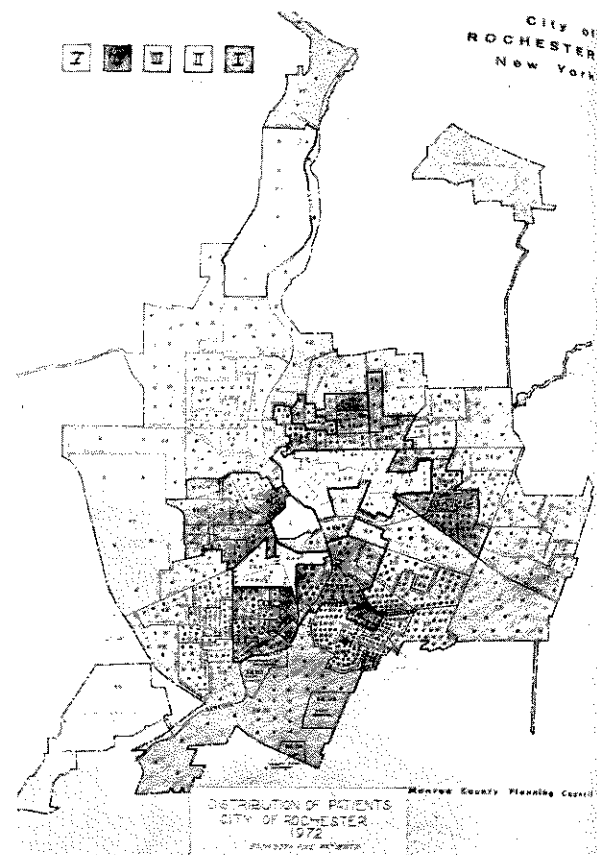


Figure 3. Each dot=five patients. Shaded areas indicate socioeconomic level; I is the highest level and V the lowest. These socioeconomic statistics were prepared by the United States Census Department and are based on many factors including type of dwelling, number of inhabitants and their ages, number of dependents, number of people contributing to income, and income level.

B. Simple Observational Value of Geographic Filing

A classic description of the epidemiology of measles was easily seen in our rural community of Trumansburg. The regular, predictable measles epidemics of two central school districts approximately ten miles apart were always separated by one or two years. In spite of crossing of the school line by trade area, social groupings, church attendance and doctors' offices, the school district boundaries seemed impregnable to the spread of measles. With the advent of measles vaccine this is no longer seen, but it served as a clear reminder of the interest and potential significance of identifying where one's patients live.

Fluoridation of some water systems makes dental caries another simple example of the importance of area of residence. The Family Medicine Group at the University of Rochester does Headstart physicals in the inner city and in two rural communities forty miles east of Rochester. Significant and severe caries are constantly seen in children from those rural areas which have no fluoride in the water, while few caries are seen in children from the inner city where the water is fluoridated. It is a readily discernible difference seen by anyone doing physicals on both groups of children.

C. Informational and Research Value of Geographic Filing

1. Administrative and Developmental Information. If a doctor or group of doctors is serving an area and is considering relocating the office or opening up a satellite, the place where the practice is most highly concentrated can be easily identified and the new unit placed there. This same approach can be used to develop nurse-practitioner outposts, outreach programs and cooperative programs with health department personnel (P.H.N.'s) who serve the area. If all the doctors in an area use this type of chart filing, they can pool their information and quickly identify "medical vacuum" areas, i.e., those areas not being fully served. They can then pool their resources to help serve those areas or recruit personnel for them. This allows rational response to a clearly identified need rather than vague response to an impression.

2. Definition of Disease Epidemiology. Much that is presently known about disease has been discovered by doctors who developed their own systems for organizing data for interpretation. Many of these men came from rural areas and had worked with limited populations covering geographic areas familiar to them or with otherwise confined or definable populations (Pickles and hepatitis, James Lind and scurvy, Panum and measles). Some have had to organize data collected by others and add to it, so that it could be interpreted (Snow and cholera, Goldberger and pellegra, Hammond and cigarette/lung cancer relationships). Since most practices, especially in the United States, are not as well-defined or confined as that of Pickles or Lind, special techniques must be developed to allow the practice population to be identified by age, sex, race, family socioeconomic status, problems, and area of residence. To facilitate interpretation of the data, the patients' area of residence must become a simple but important part of record-keeping and chart-filing. This is especially true in large geographic areas, cities, and towns.

The practicing doctor, particularly the primary-care doctor, is in an ideal position to be aware of the nature of disease in the community, to have access to the "universe of health and disease" and to be able to see the natural history and epidemiology of disease. For example, coronary artery disease is an ailment whose epidemiology is not completely known. Many factors seem to increase its incidence or, when modified, seem to make it less prevalent. Careful keeping of records and identifying persons by geographic areas may help determine which factors are most important or whether there are others as yet unidentified. If groups of doctors reporting incidence of the disease find there is a particularly high or low incidence in specific census tracts or areas, then someone must look at those tracts to see what makes the difference.

D. Teaching Value of Geographic Filing

1. The community served can be identified. In most teaching centers the students learn no real concept of community. They see the patient out of context with little knowledge of where he comes from. Filing by census tract allows the student to become familiar with a community

area for which there is some description and which he can even walk or drive through. One use of census tracts would be to assign a student or resident several specific census tracts as his "community." Any patient coming into the practice from those census tracts would automatically be his patient. These census tracts can be selected to allow the student access to people of all socioeconomic groups. This should give the student a better sense of "community" than is usually available in a big-city teaching program.

2. Geographic shifts within the practice can be identified. These shifts, when combined with socio-demographic factors of the area and some input from sociologists, can help make a medical student, intern or resident more fully aware of the mobility of our society and the instability of people belonging to all socioeconomic groups.

3. Classification of cohorts of patients by where they live indirectly allows study by socioeconomic status.

4. Records filed by census tracts can allow medical center doctors and medical students to appreciate better the role of the practicing doctor in providing medical care.

Those providing care for an area filed by census tract become more aware of the number of patients cared for elsewhere and learn to respect the role of others. This should facilitate recognition of the practicing physician as an extremely important part of the system. Many of these practicing physicians can be part of a "community faculty." They can teach many things not easily taught in the medical center and be considered as fellow workers in the provision of service and research. Each practicing doctor is important in research because he can help define the "universe of health and disease" in which the medical center exists. It is hoped that such an approach will help break down many of the barriers between teacher and practitioner and lead to the development of a "medical university" which includes all those who work in the medical care system giving service, doing research, teaching, or all three. The conceptualization of geographic areas of service which overlap, intertwine, and are somewhat free, forces one to think in terms of the whole system, rather than just those patients who present themselves in the doctor's office or medical center.

References

1. Fry J. Profiles of Disease — A Study in the Natural History of Common Diseases. Edinburgh & London, E. & S. Livingstone Ltd., 1966.
2. Panum PL. Observations made during the epidemic of measles on the Faroe Islands in the year 1846. New York, Delta Omega Society, 1940.
3. Morris JN. Uses of Epidemiology. Baltimore, Williams and Wilkins Co., 1964.
4. Snow J. Snow on Cholera. New York, Hafner Publishing Co., 1936.
5. Pemberton J. Will Pickles of Wensleydale — The Life of a Country Doctor. London, Geoffrey Bles, 1970.
6. Adair J, Deuschle KW. The People's Health — Medicine and Anthropology in a Navajo Community. New York, Appleton-Century-Crofts, 1970.
7. Paul JR. Clinical Epidemiology. Chicago, University of Chicago Press, 1966.
8. Burnet FM. Natural History of Infectious Disease. Cambridge, Cambridge University Press, 1969.