A Statistical Record System in a Local Health Department

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A director of health constantly wants two kinds of statistical information: first, data which will acquaint him with the health needs of the community; and second, figures showing the extent to which the divisions of the health department meet local requirements for service.

Such information can be obtained by analyzing birth and death certificates, reports of communicable disease cases, and reports of the activities of the health department.

The problem, then, is one of finding a technique for handling available source materials so as to provide the most satisfactory statistical reports.

The Louisville and Jefferson County (Ky.) Board of Health introduced a new reporting method January 1, 1948, while Dr. John J. Phair was director of health. Although the basic procedures are established, the details are still changing and expanding to meet the needs of a growing program. It is thought, nevertheless, that the Louisville experience with the new system will be of value to others engaged in the administration of health programs.

Background

The Board of Health of Louisville and Jefferson County has jurisdiction over the county tuberculosis sanatorium, the city hospital, and the department of public health. The department of public health serves the community with the usual activities of a health department, including venereal disease clinics, well-child and maternal health clinics, school health services, a general program of public health nursing services, and sanitation, milk, and meat control services. Medical and nursing services are administered through six districts, three having health centers. Well-child clinics are located in 33 other sections of the city and county. A mobile unit covers less accessible rural areas, and a dental trailer serves the towns and rural communities. Preparation of vital statistics is also the responsibility of the department of public health.

Prior to January 1, 1948, all activities of the department of public health were reported in terms of the activities report code adopted in 1936 by the Public Health Service, the Children's Bureau, and the State and Territorial Health Officers (*1*).

When the activities report code was adopted, many health departments kept few, if any, records. Public health personnel in small communities remembered the history of each case. To convince them of the necessity of maintaining records was difficult. This was especially true of statistical records.

The activities report proved valuable in overcoming this attitude, and it played an important role in training public health workers to maintain and use statistical data. But, as public health activities were centralized in health departments, with a broad concept of public responsibility, serious weaknesses were seen:

1. The activities report gave only a frag-

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mentary idea of the total program of the health department. Since pieces overlapped in some places, and gaps appeared in others, it was impossible to put together a comprehensive picture of the whole.

2. The work of a single division was inadequately summarized. Child health service, for example, was divided into service to infants and service to preschool children. Each of these services was again divided into medical and nursing service. The number of children served was not known, nor was there an accounting of the work actually done for the children in the well-child clinics. There were no correlations—no analysis was made of the relation between any two sets of data (*2*).

3. The code was too rigid. There was no effective way of working into the code changes in the program or additions to the services offered. As a result, many of the department's activities were incompletely reported.

4. There was no possibility of avoiding errors, or of finding them. Each staff member—doctor, nurse, or sanitary inspector—turned in a daily report in code. The daily reports were entered on monthly sheets and totals for each worker were compiled for the month. These totals were then carried forward to a "district summary sheet," and totaled for the district. District totals were carried forward to a "department summary sheet," and totals compiled for the entire department. Because the entries were in code, the original daily reports could not be checked for accuracy. Errors in copying totals did not become apparent because, again, these were in code. So there were no internal checks, and no cross-checking of totals.

5. Special studies, desired from time to time, were outside the framework of the activities report, and could be made only with the application of much time and labor.

The Louisville Card System

The activities report code was discarded in Louisville. A new code was introduced for use on a standard mechanical tabulating card. Each card represents one encounter between an individual and a health department representative. The card carries important facts about the person. It also shows all services received at each clinic visit, home visit from a public health nurse, or sanitary inspection. The cards include all information formerly obtained from the activities report, and, in addition, a quantity of other data is readily procurable (*3*).

By using the mechanical tabulating card, it is possible to ascertain the total number of individuals served by the department for any time period; to learn their age, sex, and race, as well as place of residence. Any desired details about the work can be obtained, with special studies whenever necessary. Routine monthly reports include attendance at each type of clinic, showing the reason for the visit, and a count of the services received (physicial examinations, immunizations, blood tests). Since each card contains information on every service received, the number of each kind of service shown on the monthly report is the actual count of services.

Information for special reports is available. There were, for example, more than 40 centers in Louisville and Jefferson County where child health conferences were held, some semiweekly, some monthly. After studying attendance at each center, using total attendance tables on infants, preschool and school-age children, and the number of new cases in each category, it was decided to decrease the centers to 35, to reduce the frequency of sessions at some, and to institute an appointment system to reduce the number of repeat visits by older children. Data for this study were easily obtainable: a code number for each center, as well as the necessary information on the children, is punched into every card representing a visit to a child health conference.

A tabulation made of nursing visits to new prenatal patients showing census tracts where the patients lived is another illustration of a special study. The study was used to determine where a new prenatal clinic would be of most value.

To obtain an accurate record of the incidence of disease, it has been the custom to count every attack as a new case. At a staff meeting, it was suggested that the high incidence of gonorrhea might be due not so much to an increase of infection as to a repetition of infection among a comparatively small group of people. To discover the truth, the statistical department suggested that the venereal disease clinics count as "new re-infections" any newly diagnosed cases pre-

viously reported as infected. A new code number was added to include a count of such cases with the result that monthly reports show not only the "new re-infections" of gonorrhea but also the occasional "new re-infection" of syphilis.

As the work of the divisions expands, the codes used are changed, and additions are made. The system's flexibility was illustrated when a new series of preventive antigens was introduced in the well-child clinics. When the change was made, the tabulating card code for immunizations was completely revised without disturbing the nurses or clerks. All cards are coded in the statistical office.

Mechanical tabulating cards are used for recording vital statistics. Resident and nonresident births and deaths are recorded on tabulating cards. From the cards reports of death causes can be made by age, sex, and race, and by residence. Births can be shown by age, race and sex, and residence of mother. Infant death rates in the city can be computed by census tract, and the causes of infant deaths can be shown in detail. Other studies can be made as desired. The new International Statistical Classification of Diseases, Injuries, and Causes of Death was adopted in 1950 by the Department of Public Health in Louisville and Jefferson County. Each death was coded, then, according to both the old and new classifications. Tables were presented according to both, for comparison with previous years as well as with future years.

Preparation of Source Material

To show best how results were obtained by the department of public health in Louisville and Jefferson County, it might be well to describe the steps taken in the gathering and tabulating of source material. Too many statistical studies and reports have been invalidated by carelessness in treating the original data. In order to insure the closest homogeneity of material, careful definitions of terms were established before the new method was instituted. Wherever possible, the definitions of the activities report code were retained, but they were clarified. New terms were introduced after definitions were agreed upon by the statistician and doctors and nurses, or by the statistician and sanitary engineer. Once established, the definitions are adhered to and have universal application. As borderline cases occur, the defined terms may be expanded to include the new problem.

New staff nurses undergoing orientation visit the statistical department for instruction on the work under way. All staff members concerned with the records are encouraged to discuss the clarification of definitions with the statistical department. Every effort is made to keep source material accurate and uniform.

Home visits of public health nurses and field visits of sanitary and milk inspectors are recorded in the field directly on the tabulating card. Clinic visits are recorded on the "daily register and service analysis sheets" of the clinic. For each visit shown on the daily register sheet, a card is punched, similar to that used for the home nursing visit.

The card carried in the field by the nurse is precoded so that she has only to check an item beside the code. When a patient visits a clinic, his name, age, sex, and race are recorded on the daily register sheet. The clinic clerk locates his name in the master index card file, where, if he is a former case, a card is kept with his case number at the top. This number is entered on the register sheet. At the end of the day, the clerk numbers the new cases and prepares an index card on each for the master file. The clerk reviews the medical record of each patient, entering on the register sheet the services rendered the patient, such as X-rays, blood tests. Daily register sheets are prepared in duplicate; the original is sent to the statistical office; and the second copy remains in the clinic where it becomes an important source record.

Statistical Procedures

When the field visit cards and clinic registers are received in the statistical office, receipt is recorded on a check sheet. Then they go to the code clerk who checks for obvious discrepancies. Birth dates in the well-child clinics are given special attention so that the categories "infant," "preschool," and "school-age" will be correctly marked. The code clerk then codes all items not precoded. After the sheets have

been coded, they go to another staff member who checks for coding errors.

Field visit cards and clinic register sheets next go to a key-punch operator where a card is punched for each visit recorded on the register sheet. When the cards are completed, they go to the verifier who repeats the card punching as a check on the first operator.

Care in securing the accuracy of the original data is emphasized. The foundation of this accuracy lies in the reports prepared by nurses, sanitary inspectors, and clerks. The value of the final reports rests on the accuracy of the original material. Every effort is made by the statistical department to guarantee that the information will be tabulated as received.

Procedures for Sanitation Reports

The reports of the sanitation division are treated somewhat differently from those of the nursing division, although the underlying method is the same. Because of the complexity of the activities of sanitary and milk inspectors, it was impossible to devise a precoded card, or to have the coding done in the statistical office.

The sanitation code was set up in four parts: A. Type of premise, B. Origin of inspection, C. Problem to be investigated, and D. Action taken. The card has a space for each of the four code sections, and every field visit must be coded for all four. The inspector codes his own card, attaching it to his report. After reviewing the report, his supervisor sends it to the sanitation division's code clerk, who works in close cooperation with the statistical department. Her task is to check the code against the inspection sheet for correctness and consistency. For example, if a visit is coded as an "official call" in "B," it cannot be coded as "general inspection" in "C."

When the cards have been received in the statistical office, their receipt is recorded; they are key-punched and verified. Because only a few columns are necessary to record a sanitation or milk visit, the card has been set up as a "tumble card," and can be used again.

Preparation of Reports

For the monthly reports, all cards are run through a card-counting machine which sorts them into pockets, according to the holes in the column on which the sort is made, and counts the number of cards in each pocket. After the first sort, each group of cards can be re-sorted on another column, and again re-sorted, so that a detailed correlation table can be obtained if desired.

Types of correlation tables are illustrated in tables 1 and 2. All data for table 1 were obtained by sorting the same cards according to different categories. In table 2 will be seen one of the many counts obtainable from the cards—in this instance, a correlation of sanitation services from the sanitation cards will provide valuable information to the administrators of a sanitation division in a health department. For sample correlation tables, as in table 1, the totals must be counted two ways: to obtain clinic visits by classification the cards are first sorted by "type of visit," and then each group is sorted by "classification." The figures obtained in this sort must add to the figures obtained when all of the cards are re-sorted by "classification." If a number has been put in the wrong cell, the error will be found, where merely checking the arithmetic cross totals would not have revealed it.

By placing all work on mechanical tabulating cards, each one representing one visit—to a home, to a clinic, or as an inspection—the department of public health can obtain from the first card sort totals unobtainable from the activities report. From these totals a summary of the work of each division is made as soon as the reports for a given month have been received and processed. By sorting the home visit and clinic cards by case number, it is possible to know how many individuals have been served by the health department.

Upon completion of the summaries, any information desired can be obtained by re-sorting the cards. The fact that a patient is new to a clinic, for example, is punched into the card, and this punch will always count as one new patient whether the cards are sorted by classification, by separate clinics, by X-ray services, or for any other category. Since a clinic service, such as urinalysis, is punched into the card representing that clinic visit, the total number of such services counted on the card-counting sorter must be the actual number reported by the clinic.

The number of individuals given any particular service, such as field visits for prenatal care, can be obtained by counting the "new" and "first this year" visits. When the cards have been sorted by case number, the number of cards bearing one case number represents the number of times that case was served by the department of public health. Similarly, to get the number of premises served by the sanitary inspectors, the number of "applications" and "first inspections" can be counted. By relating this number to the total inspections made, the average number of inspections per premise can be obtained. This can be done for total premises, or only for premises of a certain type, such as restaurants or nursing homes.

As the work of the health department expands, new code numbers for new services are added to the key-punch code.

In the sanitation division, "type of premise" is coded in 2 digits, the first representing the broad classification into which a premise fits. For example, all numbers beginning with "1" represent premises on which food is served.

Table 1. Report of Tuberculosis Clinics, October 1949

[Sample correlation tables]

Clinic visits by classification	Total visits	Type of visit		
		New cases	Old case (first visit this year)	Subsequent visits
All classifications	2,639	1,054	449	1,136
Active	130	24	10	96
Inactive	270	2	34	234
Suspects	33	2	1	30
Contacts	400	95	82	223
Other forms of tuberculosis	3			3
Other pulmonary disease	43	7	3	33
Negative	564	19	159	386
Not diagnosed	524	437	18	69
Case finding	672	468	142	62
Attendance at each clinic				
Total at all clinics	2,639	1,054	449	1,136
Waverly Hills clinic	2,204	962	384	858
West End clinic	67	28	18	21
Central Louisville clinics:				
Diagnostic	321	62	47	212
Pneumothorax	47	2		45

Type of service at each clinic	Total	Waverly Hills	Central Louisville	West End
X-rays	619	410	196	13
Fluorographs	1,222	1,222		
Total X-rays and fluorographs	1,841	1,632	196	13
Active cases	54	41	8	5
Inactive cases	128	93	30	5
Contacts and suspects	260	214	45	1
Other diagnoses	740	625	113	2
Case finding	659	659		
Fluoroscopic examinations	614	323	229	62
Mantoux tests	21	8	13	
Pneumothorax treatments	46		46	
Physical examinations	71	32	38	1

Table 2. Action taken on complaints by problem to be investigated (sanitation division)

Action taken	Total complaints	Buildings	Plumbing and water supply	Sewage	Surroundings	Rat control	Other nuisances	Rabies control	General inspection visits	Non-inspection visits
Total complaints	212	10	32	36	65	2	25	30	3	9
Total actions taken	214	10	33	36	65	2	25	31	3	9
Reinspection recommended	22	2	3	5	6	-------	2	2	2	-------
Referral recommended	9	1	1	1	3	-------	3	-------	-------	-------
Action regarding water and sewage	2	-------	1	-------	-------	-------	-------	-------	-------	1
Order issued	101	2	11	14	42	2	6	24	-------	-------
Condition abated	6	-------	3	1	2	-------	-------	-------	-------	-------
Instructions given	28	-------	9	3	3	-------	4	4	1	4
Survey and report	6	-------	1	4	1	-------	-------	-------	-------	-------
No cause for action	32	3	3	7	8	-------	10	-------	-------	1
No response	8	2	1	1	-------	-------	-------	1	-------	3

The second code digit represents the specific kind of premises, as "11" means restaurants and cafeterias, and "12" means school cafeterias.

Much information is available from the cards which will not be tabulated monthly. The "daily register sheet" for the prenatal clinics has a space for toxemia symptoms. These are coded and punched routinely, but are tabulated only every 6 months. If a special study is desired for which the information is not on the cards, new codes can be devised for the required information, and within a short time the study can be made. When the tabulating cards are at hand, moreover, they can serve other purposes.

Variations of the System

Health departments in smaller communities may feel that their workload does not justify using a mechanical tabulating system.

The same results are possible by hand-recording the information on file cards, and sorting and counting the cards by hand. Since human error is more frequent than mechanical error, all internal checks of the material should be carefully made, and, if possible, two people working independently should complete the analysis.

There are key-sort cards available with holes punched around the edges, each hole or group of holes labeled for specific information. A hand or mechanical punch cuts out a **V** at the point for the relevant datum, and when a long needle is plunged through a group of cards at that point, and the cards lifted on the needle, those with the **V** cut-out remain in the sorting tray. After the sort has been made, the cards can either be counted by hand or run through a counting machine.

A card-counting sorter like that used in Louisville may not be adequate for tabulating cards in larger communities. However, similar cards may be run through a printing tabulator after they have been sorted on one major classification. That machine counts the cards according to the desired correlations and prints the results.

The new electronic tabulating printer is even more adaptable. Also, there is a "mark-sensing" card which is filled out with a heavy graphite pencil and then run through a machine for automatic punching. The mark-sensing card does not have, however, the same room for expansion and variation available on an ordinary tabulating card.

The particular tabulating method chosen by any health department will be determined by the use intended for the material. One weakness of the activities report code was that it attempted to set up a uniform code to satisfy the requirements of all health departments, regardless of size. But each health department serves its community according to need, and just as the needs of communities differ, so too will the methods of satisfying those needs.

Summary

The statistical reports which are prepared in the Louisville and Jefferson County Department of Public Health are far more than mere counts of activities. Instead, they represent an analysis of the services provided by the health department to the citizens of the community. Just as the financial statement of a business enterprise shows the performance of its various departments, so the statistical reports of the health department show the functioning of its divisions. These reports are indicators pointing out changing situations and directing toward developing needs. They are, in the fullest sense, aids in planning and evaluating the program of the health department. They are all of these things because they are based on a unit card, one which includes only one unit of activity and carries the complete story of that unit of activity. The same card contains all requisite information about the characteristics of the individual served as well as full details of the services given. From such cards, it is possible to obtain full and accurate reports.

The author will supply copies of the tabulating cards and of the daily register and service analysis sheets to those needing further details.

REFERENCES

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Vocational Rehabilitation for Civilians

An average $457 was spent in the fiscal year 1951 on each handicapped civilian helped under the State-Federal vocational rehabilitation system, according to the recent annual report of the Office of Vocational Rehabilitation, Federal Security Agency. A total of 86,000 disabled men and women left beds, sickrooms, and wheelchairs under this 31-year-old program and took self-sustaining jobs. In addition, another 13,000 received all necessary medical help, guidance, and training and were ready to work at the right job.

Last year the States contributed over $9 million to the rehabilitation program; the Federal Government, $21 million. A study in 10 of the States indicated that about 20 percent of the disabled receiving specific training are being prepared for defense work.

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