

A Time Study Method for Public Health

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THE Yale Public Health Personnel Research Project attempted to learn what health workers actually do on the job, in the belief that such knowledge might lead to recommendations for recruitment and training and for realignment of functions, and thus permit more efficient utilization of public health personnel. Time studies were considered essential in quantifying the descriptive information obtained through interviews and observation.

One hypothesis which the project attempted to test was that many highly trained professional and technical workers in public health are spending significant amounts of time in activities for which they have not been trained. Another hypothesis was that some of these activities should be shifted to other workers or the personnel performing them should be given specific training.

Public health work entails recruiting, budget preparation, personnel management, program planning, public relations, community organization, and supporting clerical and accounting work, in addition to technical activities. The Yale time study was constructed for the purpose of determining the allocation of the public

health worker's time to all these activities. To our knowledge, no proved instrument for this purpose existed.

In terms of time and effort, the development of time-study methodology proved to be a major portion of the project. By the time a satisfactory instrument was developed, it was impossible to complete a large-scale, definitive time study, but considerable data were secured and will be reported in separate articles.

Previous Time Studies

Reports of time studies in the public health literature are few. The most prevalent type of time study, and the simplest, allocates the time of public health workers to categorical programs (1-4). This approach is of value in determining whether program emphasis is properly related to the magnitude and importance of public health problems or to the funds that have been allocated for categorical purposes. Implications regarding the education and training of public health workers may be byproducts.

The technique of such studies is simple. The employee is asked to record his activities, usually to the nearest 5 minutes, and to code them in terms of program, such as tuberculosis, maternal and child health, and milk sanitation, according to a previously defined list.

Graning and his associates (5, 6) approached the problem of time studies from a point of view similar to that of the Yale project. They studied a large number of health officers and medical administrators in State and local health departments by questionnaire, in much the same manner as that described by Milne (4). Participants were asked to code each activity by program and by type of activity and to indicate whether, in their opinion, the activity required

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medical judgment. The activity code included many administrative items important to a consideration of adequacy of training and realignment of function, such as program planning, direction and supervision, records and reports, and budget and fiscal matters.

Two major criticisms can be made of the Graning study:

1. The data were gathered by means of a questionnaire, with little direct supervision to minimize differences of interpretation by the various participants.

2. There was no attempt to define "medical judgment." As a result, there is a wide spread in the way presumably similar activities are reported by various respondents as involving medical judgment. The authors defend their procedure by stating that the delegation of an activity by the health officer would depend in part upon whether or not he thought medical judgment was involved. By implication, the activities delegated by one health officer might not be delegated by another, depending upon each health officer's evaluation of the element of medical judgment.

There is some truth in this contention. What it ignores is the fact that any major change in training or realignment of function may require a new set of attitudes and concepts, and that education must precede such an effort, since frequently widely varying opinions can be brought closer together by an effective educational process. Therefore, any conclusion about medical judgment should be made according to clearly defined criteria, applied in a uniform way.

The National Organization for Public Health Nursing developed time-study techniques for the purpose of conducting cost studies. The techniques are similar to those in other studies except for the classification of activities (7). The activities are divided into components (preparation, postactivity, and conferences relative to the activity), "cost center" programs (home visits, clinic activities, or school programs, for example), and services (such as antepartum and acute communicable disease). This study has important administrative implications, and its techniques are applicable beyond the public health nursing field. However, it does not provide the kind of information essen-

tial to a consideration of efficient functional utilization of personnel.

It was thought that industry might have developed techniques relative to time studies of administrative personnel. A review of industrial management literature and conferences with several industrial personnel managers revealed that industry had no relevant experience to contribute to this problem. Industrial time studies have been primarily of the time and motion variety and therefore applicable to manual operation but not to administrative and executive work (8). Only recently has the study of administrators and executives been explored.

Basic Principles and Procedures

There are a number of principles and procedures that are prerequisite to an accurate and effective time study.

The objective of the time study must be clearly identified and the instrument must be constructed with a singleness of purpose. A time study that attempts to get many types of information will usually get none. Time studies designed to allocate time to categorical programs can be relatively simple; those aimed at allocating costs or defining types of functional activity will have to be more complex.

Terms and procedures must be carefully defined and clearly understood by the participants. Not only must instructions and definitions be written clearly, but they must also be discussed with the participants. Even for the simplest of studies, an initial trial run will eliminate many difficulties and facilitate a successful study. After the trial period, it should be possible to delegate the responsibility for the collection and initial checking of reports to a member of the agency's staff.

The length and spacing of the time periods covered by the study should give a representative sample of the year. The recommended pattern is a period of a week 3 or 4 times during the year, or a day or two each month of the year. It is advisable to stagger the weeks of the month and the days of the week. If the time-study data are divided into halves and the results of the two halves are similar, one can assume that a sufficient interval was used to get consistent results. By repeating comparisons, using

smaller segments of time, the minimal period can be determined.

Time must be accurately recorded. In most time studies, the starting time and the total time for each activity are recorded in appropriate columns. Although this technique is satisfactory, the Yale project found that a time bar was simpler for participants to use and worked just as effectively.

Participants must code their own activities. Theoretically, it would be better for participants to record their activities in narrative form and for the research staff to code the activities. In practice, however, it proved impossible in the Yale project to secure narrative time logs from most public health workers in sufficient detail to permit adequate analysis.

The system of classification must be simple.

If the workers are expected to classify and code their own activities, the categories must be relatively few in number and so clearly defined that, after proper instruction and a trial run, the workers can classify their activities with ease and without appreciable error. Further analysis of any one category of activities can be made by the research staff, if detailed activity inventories of the workers are obtained simultaneously through interviews, and if the activity inventory classification is related to the time-study classification. Ultimately, such analyses were possible in the Yale project.

Initial Developmental Efforts

Answers to two questions were fundamental to the conduct of the time study. What infor-

List of Activity Categories

1. Other Agencies. (Not joint program planning, which is No. 9.) Organizing and participating in the planning of relationships with, and securing support for program from, other agencies and officials. Examples: hospitals, voluntary agencies, boards of education, mayor, legislature, civil service, finance department, welfare agencies, health departments at same level.

2. Other Health Departments. (Not at same level, which is No. 1.) Organizing and participating in the planning of relationships and consulting with health departments at different governmental levels. Examples: planning for financial support, exchange of services or personnel, joint programs.

3. Giving Professional Education. (Not inservice, which is No. 17 and No. 18.) Planning, organizing, participating in the giving of professional education. Examples: preparing, organizing and conducting workshops, formal classes in colleges and professional schools, lectures at professional societies.

4. Group Organization. Planning for, organizing, and training specific purpose groups. Examples: X-ray survey committees, fact-finding groups, study groups, volunteers in clinics.

5. Talks to Public. Planning, preparing, and delivering talks to public. Examples: mothers' classes, high schools, service clubs, PTA's, food handlers.

6. Planning Mass Media. (Not its preparation, which is No. 10.) Planning content and employment of mass media of communication. Examples:

audiovisual aids, pamphlets, newspaper publicity, radio scripts.

7. Information Service. (Not as part of case visit, which is No. 10.) Answering individual requests for information and escorting visitors through the health department.

8. Health Department Program Planning. Within the health department, planning research into health needs and planning the initiation, revision, scope, methods of execution, operating policy, and evaluation of health programs.

9. Joint Program Planning. Working with other agencies to plan research into health needs and to plan the initiation, revision, scope, methods of execution, operating policy, and the evaluation of health programs.

10. "Technical." (Not arithmetic computations, posting, adding and transcribing reports, distributing mass media, which are No. 11.) Primary medical, professional, technical activities such as:

Examination and treatment of patients, home visits, environmental sanitation visits, advice to clients and patients, taking medical and social histories, epidemiological investigations.

Laboratory and other test procedures, reading X-rays, preparation of mass media, planning and editing the annual report, preparing budgets and diets, statistical analysis.

11. "Ancillary." (Not giving information to clients, which is No. 7.) Essential supporting activities, such as:

mation was the time study to elicit? How was the desired information to be obtained?

The initial plan was to match with time allocations the detailed activity information obtained from interviews and observation. The time information was to be obtained from time logs kept by participants in their own words.

Toward the end of 1950, the first formulation of time-study content and method was completed. A time-log form was designed to determine what activities a public health worker performs, how the worker performs them, and the approximate time involved. It consisted of three columns: a narrow left-hand column in which fixed time intervals were specified and two broad columns, one headed "What: Job Duty or Activity," and the other, "How: Means Employed." Instructions for the use of the log

suggested simply that each activity be recorded in terms of what, how, and how long. A partial list of activities and the way in which these activities might be performed was furnished as a guide. The list named about 60 possible activities, such as investigation, survey, clinic examination, sample collection, and school visit, and about 50 areas in which these activities could be performed, such as tuberculosis, civilian defense, epidemiology, and venereal disease. Coding and analysis of the completed time logs were to be performed by the research staff in accordance with the basic activity codes developed for the interview part of the project.

A pilot run of this time study, including careful orientation of the participants, was undertaken in one local health department. The inadequacies of this approach were soon appar-

List of Activity Categories—Continued

Preparation for clinic and obtaining identifying information (name, address, etc.) from clients. All record and report keeping, compilation of reports, designing and filling out of forms (includes daily time log), car servicing.

Glassware preparation, media making, issuing of biologicals, taking and developing X-rays.

Issuing supplies, distributing mass media, filing, taking dictation, mimeographing, opening and distributing and sending out mail, transferring and placing telephone calls, making appointments.

12. Financial Management. (Not activities with other agencies or officials, which are No. 1, and not processing purchase orders, keeping accounts, preparing financial statements, performing computations, which are No. 11.) Planning, preparing, justifying, and controlling the budget. Examples: planning initial purchases with vendors, planning cost studies, discussing budget plans, authorizing purchases or adjustments between accounts, allotting funds, reviewing financial statements.

13. General Services Management. Planning and controlling organization "housekeeping" activities. Examples: planning and controlling report, record, and filing systems; space usage, construction and installations; custodial and grounds services; building and equipment repair.

14. Personnel Management. (Not supervising personnel, which is No. 15.) Recruiting, selecting, transferring, counseling personnel; and authorizing vacation, leave, and travel. Examples: interviewing candidates, preparing qualification standards,

reviewing credentials, recommending or giving disciplinary action, counseling re personal problems or vocational guidance, writing letters of recommendation.

15. Personnel Supervision. (Not training, which is No. 17.) Giving immediate personal direction to a staff member. Examples: giving assignments, review through observation, discussions, analysis of records or reports.

16. Receiving Supervision. Receiving the services described in No. 14 or the supervision described in No. 15.

17. Individual Inservice Training. Planning, organizing, and giving inservice training and education for individuals. Examples: conferences, close collaboration, field trips, provision of study outside the department.

18. Group Inservice Training. Planning, organizing, and giving inservice training and education for groups of workers. Examples: lectures, staff meetings, field trips.

19. Own Education and Training. Attending professional meetings, classes, workshops, staff meetings; reading professional literature; field orientation; receiving inservice training.

20. Social Activities. Achieving and maintaining rapport with co-workers, "passing the time of day," social conversations, arranging for office parties.

21. Personal. Meals, coffee hours, rest periods, sick leave, dentist and doctor appointments.

ent. The participants found it extremely difficult to relate their activities to the fixed time intervals on the log and to identify the what and the how of the activities in a few short words or phrases. In addition, the participants attempted to fit their own activities into the suggested list, with resulting distortion and inaccuracy in their reporting.

In an attempt to remedy these faults, the time study was revised early in 1951 in the direction of a more nondirective instrument. The time-log form and the instructions were modified to give the recorders more freedom, and codes were developed especially for the time study. Coding and analysis were still to be done by the research staff. This edition of the study was administered to the personnel of health departments in Michigan, and the returns revealed that the information was adequate only for an analysis of time distribution by program. It was not possible to classify the activities according to the nature of the activity or the persons or organizations with whom the activity was performed, as had been planned. (The method and findings of this portion of the study are reported in a separate article, which appears on p. 577 of this issue.)

Since the primary objectives of the time study had not yet been accomplished, further explorations into content and method were undertaken. One of these was an attempt to develop a code based on classification of public health activities according to level of difficulty. Five levels were established, and an effort was made to allocate the hundreds of individual activity items to these levels. Difficulties were soon encountered. Agreement as to the proper level of difficulty for some of the activity items could not be reached. The number of items which had to be included if coding was to be uniform was tremendous. The most important factor in the decision to abandon this approach, however, was the growing realization that it would probably prove impossible to obtain narrative time records in sufficient detail for accurate classification.

At this stage of the study, it became evident that two major difficulties were blocking its effective execution. One was the emphasis on the differences among the several types of public

health personnel, with the resultant development of a different, very detailed code for each type. The other was the impossibility of obtaining narrative reports of sufficient clarity and in sufficient detail to permit classification into the hundreds of activity code items.

The Final Method

From this experience, the project staff concluded that the narrative time study was not feasible in research of this kind, and that the investigation should be founded on the broad similarities of activity among the several kinds of public health workers. This decision required that the number of categories for classification of activities be relatively small and that the categories be clearly defined. It was felt also that the time study should give promise of yielding new knowledge. Toward these ends, an entirely different instrument was developed.

The new instrument was designed to reveal the distribution of time in accordance with a broad, functional classification of activities which cut across both programs and services. It contained 21 activity categories applicable to all public health personnel (p. 572). For purposes of analysis these categories were grouped into four major classes of activity: technical, category 10; ancillary, category 11; administration, categories 8 and 12 through 19; and community relations and organization, categories 1 through 7, and 9.

Participants were to code their activities according to the list of 21 categories and to enter the code number on a daily time log. The time log is actually a time bar, or time scale, in which time segments are delineated by drawing two vertical lines (see p. 575). The activity list, a sample time log and illustration of its use, and simple directions for recording the time data were included in an instruction booklet, which was given to each participant.

Following a pretest in a local health department, in which difficulties encountered were remedied, the time study was administered to personnel in the State health department and selected county health departments in Maryland during the fall and winter of 1952-53. The participants were asked to keep the time study daily for 2 days each month for 5 months.

Sample Daily Time Log and Illustration of Its Use

Name R.C. Burr, MD. Department Orange H. D. Date June 13, 1952

AM

12 - 2	12:00	15	30	45	1:00	15	30	45	2:00
2 - 4	2:00	15	30	45	3:00	15	30	45	4:00
4 - 6	4:00	15	30	45	5:00	15	30	45	6:00
6 - 8	6:00	15	30	45	7:00	15	30	45	8:00
8 - 10	8:00	15	30	45	9:00	15	30	45	10:00
10 - 12	10:00	15	30	45	11:00	15	30	45	12:00

PM

12 - 2	12:00	15	30	45	1:00	15	30	45	2:00
2 - 4	2:00	15	30	45	3:00	15	30	45	4:00
4 - 6	4:00	15	30	45	5:00	15	30	45	6:00
6 - 8	6:00	15	30	45	7:00	15	30	45	8:00
8 - 10	8:00	15	30	45	9:00	15	30	45	10:00
10 - 12	10:00	15	30	45	11:00	15	30	45	12:00

The following activities have been placed on the time log above:

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| <p>8:45- 9:00 Sorting the mail, straightening desk, signing letters secretary typed previous afternoon (11).</p> <p>9:00- 9:25 Phone calls to manufacturers' representatives to decide type of refrigerator to purchase for lab (12).</p> <p>9:25- 9:45 Letter to president of PTA about talk she wants given at organization's next meeting (5).</p> <p>9:45-10:00 Visiting various sections of department (20).</p> <p>10:00-10:10 Coffee (21).</p> <p>10:10-11:30 Travel to mayor's office, meeting with him to discuss getting several agencies together to plan for medical defense service, return to office (1).</p> <p>11:30-12:00 Meeting with division heads to plan civil defense program (8).</p> | <p>12:00- 1:00 Lunch (21).</p> <p>1:00- 1:25 Holding educational staff conference to report on new drug (18).</p> <p>1:25- 1:45 Interviewing candidate for staff nurse position (14).</p> <p>1:45- 3:10 Travel to Lincoln School and filling in for physician at well child conference (10).</p> <p>3:10- 3:15 Phone call from staff sanitarian seeking advice on closing restaurant (15).</p> <p>3:15- 4:05 Continuing well child conference and return to office (10).</p> <p>4:05- 5:30 Outlining TB pamphlet with health educator (6). Then left for home.</p> <p>6:45-10:35 Travel to and attending medical society meeting to give talk on school health program, travel home (3).</p> |
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The days were assigned so that each part of the month and each part of the week were represented.

The time study was administered in the following manner. One or two days prior to the scheduled beginning of the first 2-day period, two of the project's staff workers, who were interviewing members of the department, held a time-study orientation session with all selected participants. These sessions lasted approximately an hour and consisted of a presentation and explanation of the time-study code, a review of samples of completed time logs, and a "dry run" in which the participants coded and recorded activities for a typical day. Discussion and questions were encouraged. Then, on the first day of the time study a member of the research staff visited each participant in order to check on procedure and to answer any questions which might have arisen.

Secretaries of health department units were made responsible for the mechanics of administering the time study after the first month. They distributed the daily time logs, collected them after they had been completed, and forwarded them to the project headquarters. This procedure helped to keep the information confidential.

The cooperation of the participants was gratifying. More than 85 percent of the people who were asked to execute the final time-study instrument did so until completion of the study.

The time-log data were transferred to punch cards by the clerical staff of the research project and then machine tabulated. The research staff made analyses, for the State and the local health departments separately, of the average daily working time, of the proportion of time spent in the several major categories of activity, and of the relative number of individuals participating in these activities by service and by administrative level. In addition, the relationships between type of activity and level of education, public health training, and salary (as revealed in the interviews) were studied.

Conclusions

After a number of false starts, a method for a time study of public health personnel was developed. Experience with this method in one

State and in several local health departments indicates that the coding concepts involved are, with minor exceptions, sufficiently clear-cut to enable participants to keep accurate daily time logs with a minimum of effort and that, as a consequence, the time study can be easily and successfully administered. It was found, furthermore, that the accumulated time-log data lent themselves to expeditious analysis and yielded knowledge not heretofore available.

The present time study differs from previous similar studies of public health personnel in two important respects. The daily time log is a time scale, or time bar, which simplifies the mechanics of recording. The system of classification employed is built upon broad, functional categories of activity which are not limited to either specific programs or specific services.

It is believed that this time-study method can serve as an important instrument in public health research. When used in conjunction with well-planned interviews, possibly supplemented by spot observations, the time study can produce quantitative information fundamental to progress in public health administration.

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