HOW MANY PUBLIC HEALTH NURSES ARE NEEDED?[1]

A METHOD OF ESTIMATING THE NURSES NEEDED IN HOME VISITING FOR HEALTH SUPERVISION OF CHILDREN

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ANY estimate of the number of nurses needed for the various activities of a city health department obviously must be based on recognized standards of practice. The Appraisal Form[2] has been the usually accepted standard. Thus, methods have already been suggested for estimating the nursing requirements in communicable disease control, clinic service, school health service, and the like.[3] In home visiting for the health supervision of children, estimates ordinarily have been made for each age group separately. In the method suggested here an attempt has been made to take into account (1) that children of one age group are combined in families with children of other ages, (2) that a visit in the home offers an opportunity to combine services to children of various age groups to the extent to which there are two or more children in the families of a given community, and (3) that a health supervision program can be most effectively carried out if the family is considered as a unit.

The discussion summarized in this paper grew out of the making of plans for district health administration in New York City. One part of this plan was illustrated by a pro-

[1]From the Division of Public Health Activities, Milbank Memorial Fund.

[2]The Appraisal Form for City Health Work, by Committee on Administrative Practice, third edition. New York, American Public Health Association, 1929.

[3]Community Health Organization, edited by Ira V. Hiscock for the Committee on Administrative Practice of the American Public Health Association, New York, 1932.

Winslow, Emma A., Ph.D.: The Measurement of Nurse Power. *The Public Health Nurse*, October, 1927, xix, No. 10, pp. 492–498.

posed program for the Mott Haven district, including estimates of the personnel needed to carry out all phases of the health work. It was convenient to use the data collected for this health plan and for other special studies, and the method suggested here is illustrated by an estimate of the nurses needed for the Mott Haven district in New York City.

CONTENT OF A SAMPLE OF FAMILIES

The census of a random sample of a thousand families was part of the information collected by a special investigator who visited unselected homes on many different streets in the Mott Haven district. Using only the families with children, we have a sample of 723 families. In these families were 1,582 children; 99 infants, 518 preschool children, and 965 school children.[4] The way in which children of different age groups were combined in the families is shown in Table 1.

It will be noted in this table that 18 per cent of the infants did not have older brothers or sisters. When the nurse visited these infants it would not be possible to include visits to other children. It will be noted next that 40 per cent of the infants had siblings of preschool age. In these homes there would be an opportunity to combine infant visits with preschool visits. It is also shown that 13 per cent of the infants had brothers or sisters of school age, and 28 per cent had both preschool and school siblings, indicating the opportunity of combining visits for two other age groups. In a like manner, Table 1 indicates the per cent of the preschool children that have brothers and sisters; and also the same information for the school group. Since this is a random sample of families, these percentages may be applied to the numbers of children in the total population and for our purposes indicate approximately the way in which the children are combined in the families of the entire district.

[4]Infants under 1; preschool 1-5; school 6-14 years of age.

AGE GROUPS OF CHILDREN[1]	NO. OF FAMILIES	CHILDREN IN THE FAMILIES					
		Infants		Preschool		School	
		Number	Per Cent	Number	Per Cent	Number	Per Cent
TOTAL	723	99	100.0	518	100.0	965	100.0
Infants only	18	18	18.2				
Infants with pre-school	40	40	40.4	56	10.8		
One preschool					4.6		
Two + preschool					6.2		
Infants with school	13	13	13.1			17	1.8
One school							.9
Two + school							.8
Infants with pre-school and school	28	28	28.3	42	8.1	58	6.0
Preschool only	115			159	30.7		
One preschool					13.7		
Two + preschool					17.0		
Preschool with school	219			261	50.4	394	40.8
One preschool					29.3		
Two + preschool					21.1		
One school							4.5
Two + school							36.3
School only	290					496	51.4
One school							7.6
Two + school							43.8

[1]Infants under one; preschool 1-5 years; school 6-14 years.

Table 1. Composition of a random sample of families with children, in the Mott Haven District, New York City.

It has not been customary to tabulate information about children in families in this manner. The Federal Census material has not been tabulated this way, although for the first

time the 1930 census material is published on a family unit basis. From the many different studies now being undertaken it would be quite possible to gather enough material to find an average experience of the way in which children of different ages are combined in families. It would be possible also to use the information from a sample of families known to a health organization. Such material might also be used as an index of the extent to which the full opportunities of home visiting were utilized.

Estimating Time Requirements

Time Spent in Visiting. Before going into the details of the number of children of each age in the population of Mott Haven, let us consider how the combination of visits in a home affects the time spent in home or so-called field visiting. It is customary in most organizations for the nurse to report her work as two visits if she visits two people in the same family. A visit to an infant and a preschool child in the same family is reported as an infant visit and also as a preschool visit. It has also been customary to report the time per visit by dividing the total time by the number of visits. This results in a crude average time for length of visits of all types, which does not make it possible to estimate accurately the time needs for a specific service under a generalized plan of visiting. For in applying this average we assume that when two persons are visited in a family it takes twice as much time as for one; that four patients take twice as much time as two.

If, however, the work of the organization is of such nature that by far the greatest number of nursing visits are to families where there is only one patient, the method yields reasonably accurate cost and time data because the errors introduced into the reckoning by two or more persons being

visited in the same family may be so small that they have no practical bearing on the result. But in a generalized program of health supervision, if all opportunities are utilized and services are extended to as many members of the family as possible, the method appears to be inaccurate. So much of the content of the health supervision visit is similar for the infant and two preschool children in a family, for example, that it will probably not take three times as long to make this visit as it does to make the visit in a home with only one child.

A few time studies have been made which take account of this fact. In an unpublished study in East Harlem Nursing and Health Center in 1925, by May Ayres Burgess, it was found that in their generalized program it took an average of twenty-two minutes when one member of a family was visited, but an average of fifteen minutes per visit when two persons were visited and an average of eleven minutes per visit for three visits in the same family. It was pointed out in this study that making a home visit requires a certain minimum amount of time regardless of how many persons there are to be visited. If there is more than one member of the family to be visited more time must be added, but the number of added minutes decreases each time an additional member of the family is seen.

Another time study which took account of combination of visiting in a family was made in Cattaraugus County.[5] The results were very similar to those found in East Harlem, but the Cattaraugus figures were given separately by types of services. For infant, preschool, and school visits it took an average of twenty-one minutes if only one person was visited; fifteen minutes per visit for two visits in a family;

[5]Gamble, L. A.; and King, F.: Length of Visits in a Generalized County Nursing Service. *The Public Health Nurse*, November, 1929, xxi, No. 11, pp. 567–570.

and an average of ten minutes per visit for three visits in a family. Since our discussion is confined to the health supervision of children and is dealing with an official service, it was decided to use the Cattaraugus figures in illustrating the method of estimating the nurses needed.

Travel Time. It takes just so long to travel between households regardless of how many visits are made when the home is reached. Thus, travel time per home visited is really more accurate than per individual visit. Here again few time studies have considered this detail. The result of one study that seemed suitable to use was a study of travel time of the Syracuse City Health Department nurses which showed that the travel time per household was 8.5 minutes.[6]

Record Time. In reporting the distribution of the nurse's total time spent in various services it is usual to report separately the time spent in record keeping. It has been estimated that this averages from 15 to 20 per cent.[7] Perhaps the largest part of this time is devoted to the records of home visiting. Clinic records are usually included in clinic time and school records are written in the schools and usually included in the time spent in schools. There may be some variations in practice in just what records are made out in the time recorded as "record time," but it may be suggested that if the per cent of nurses' total time that is devoted to records is added *after* an estimate is made of the time required for field visits it will probably be more accurate than to assign the time for records on a per visit basis.

ESTIMATING NUMBER OF NURSES NEEDED

In Table 2, an estimate of the nurses needed is related to

[6]Travel Time between Calls for Two Months in 1928. Report of the Nursing Service in the Annual Report of the Health Department in City of Syracuse, 1928.

[7]Winslow, Emma A.: The Measurement of Nurse Power. *Op. cit.*

METHOD OF ESTIMATING THE NUMBER OF NURSES REQUIRED FOR GENERALIZED HOME VISITING FOR HEALTH SUPERVISION OF CHILDREN

(Illustrated for Mott Haven District, New York City)

Table 2.

Type of Health Supervision Service	Average Case Load[1]	Age Groups of Children[2]	Per Cent of Specified Load	Number of Children of Specified Age	Number of Visits	Minutes Per Visit[3]			Total Minutes in Homes	Total Household Visits	Total Minutes Travel Time[4]	Total Hours for Visits and Travel	Total Nurses Needed[5]
						One Person	Two Persons	Three Persons					
Infant	4,313 births	Infant only	18.2	785	3,140	21			65,940	3,140			
		Infant with preschool (1)	24.2	1,044	4,176		15		62,640	4,176			
		Infant with preschool (2)	16.2	699	2,796			10	27,960	2,796			
Appraisal Form[6]		Infant with school (1)	9.1	392	1,568		15		23,520	1,568			
Standard: 4		Infant with school (2)	4.0	172	688			10	6,880	688			
visits per case		Infant with preschool and school	28.3	1,221	4,884			10	48,840	4,884			
for 100 per cent of cases[7]		Total	100.0	4,313	17,252				235,780	17,252	146,642	6,373.6	3.2
Preschool	19,000	Preschool (1) with infant	19.2	1,044	4,176		15		62,640	—			
		Preschool (2) with infant		1,398	5,592			10	55,920	—			
		Preschool with infant and school		1,221	4,884			10	48,840	—			
Appraisal Form		Preschool only (1) (13.7)	4.1	779	3,116	21			65,436	3,116			
Standard: 4		Preschool only (2) (17.0)	5.1	969	3,876		15		58,140	1,938			
visits per case		Preschool with school (1) (17.7)	7.0[8]	1,330	5,320		15		79,800	5,320			
for 30 per cent of cases		Preschool with school (2) (32.7)	13.0[8]	2,470	9,880			10	98,800	9,880			
		Total	48.4	9,211	36,844				469,576	20,254	172,159	10,695.6	5.4
School	41,000	School (1) with infant	4.8	392	1,568		15		23,520	—			
		School (2) with infant		344	1,376			10	13,760	—			
		School with infant and preschool		1,221	4,884			10	48,840	—			
Appraisal Form		School (1) with preschool	15.2	1,330	5,320		15		79,800	—			
Standard: one		School (2) with preschool		4,940	19,760			10	197,600	—			
visit per case		School only (1) (7.6)	3.0	1,230	1,230	21			25,830	1,230			
for 40 per cent of cases		School only (2) (43.8)	17.5	7,175	7,175		15		107,625	3,587			
		Total	40.5	16,632	41,313				496,975	4,817	40,044.5	8,065.3	4.4

[1]Population of Mott Haven district, 232,032. Number of children estimated from 1930 Federal Census.

[2]Infant under 1; preschool 1–5; school 6–14 years of age.

[3]Gamble, L. A., and King, F.: Length of Visits in a Generalized County Nursing Service. *The Public Health Nurse*, November 1929. "Time Study for Field Visits in East Harlem Nursing Service," May Ayres Burgess, unpublished.

[4]Travel time per household 8.5 minutes. Study of Syracuse Health Department Nurse's Travel Time between calls.

[5]Assuming 2,000 hours of service per year for each nurse.

[6]Appraisal Form for City Health Work by Committee on Administrative Practice, third edition (New York, American Public Health Association, 1929.)

[7]Appraisal Form p. 55–57 calls for 4,000 visits per 1,000 live births where infant mortality rate for past 3 years has averaged 51–75.

[8]Since 40 per cent of school children should be visited, estimates are made for 40 per cent of the children in school families.

service for each age group of children based on the population of the Mott Haven district and the Appraisal Form standards of practice.

Home Visiting for Infants. There were 4,313 births in this district in 1931. The infant mortality rate was 55 in 1930 and 53 in 1931. The Appraisal Form standard is four visits per case for 100 per cent of the cases, or 4,000 visits per 1,000 live births where the infant mortality rate for past three years has averaged 51-75. Applying our information about the way in which children are combined in families, we estimate that 18 per cent, or 785 of the 4,313 infants, will be in homes without other children. Four visits per case for these 785 infants is 3,140 visits. Since there are no other children in the family, they will probably be one-person visits, and will require an average of 21 minutes per visit, or a total of 65,940 minutes. The travel time for these visits is 8.5 minutes for each of the 3,140 household visits.

Next are the 40 per cent of the infants who have siblings in the preschool age. Twenty-four per cent of infants are in families having only one preschool child. These 1,044 infants will require 4,176 visits, which, if full opportunity is used, will be two-person visits requiring 15 minutes per visit or a total of 62,640 minutes. The travel time is estimated for 4,176 visits, but will not have to be counted again when providing for the preschool visits in these families. The remainder of the infants who were combined with the preschool group, 16 per cent, were in families where there were two or more preschool children. The home visits to these infants could be combined with two preschool visits, or three-person visits requiring 10 minutes per visit.

Another 13 per cent of the infants were in families in which there were school children, and the same method has been used, as shown in Table 2, in estimating the visits to

these infants and in estimating for the time required according to the number of children that could be visited in the home.

The group of infants who were born into homes in which there were also children of both preschool and school age represent 28 per cent of the total, or 1,221 infants. Visits to these infants could be combined with visits to at least two other children, and the time per visit reckoned accordingly.

For the total infant group, according to the standards quoted, it is estimated that 6,374 hours of service, including travel time, should be provided. Assuming 2,000 hours of service per year for each nurse,[8] this means 3.2 nurses for home-visiting for health supervision of these infants.

Home-Visiting for Preschool Children. There are approximately 19,000 preschool children in this district. The Appraisal Form standard gives four visits per case for 30 per cent of the cases.

The preschool children in the same families with infants represent 19 per cent of the total preschool children. The travel time required for visits to these households has already been provided for in the estimate for infant services. It is necessary to provide for the additional time needed in the home for the visits to the preschool children. This is 15 or 10 minutes per visit according to the number of children visited in the same family.

Referring again to Table 1 we find that 30 per cent of the preschool children do not have brothers and sisters in other age groups. Thirteen per cent in this group are only children and the other 17 per cent have siblings in the same age group. Estimating, according to the standard, for 30 per cent of these cases, we have 779 children requiring 3,116 visits which

[8]Winslow, Emma A.: The Measurement of Nurse Power. *Op. cit.*

will be one-person visits requiring 21 minutes each; and 969 children requiring 3,876 visits which could be two-person visits requiring 15 minutes each.

The remainder of the preschool children are in families in which there are school children. Since the Appraisal Form calls for services to 40 per cent of the school children, estimates are made for 40 per cent of the preschool children in these families, and the same method is used in estimating the time required to make the required number of visits. While the total per cent of preschool children provided for is 48 per cent (shown in Table 2) instead of the standard 30 per cent, this estimate based on combination of services still calls for fewer nurses than when services are considered separately. The preschool children have frequently been called the neglected group in health work and it is undoubtedly true that service to this group could be greatly increased by utilizing the full opportunities presented when giving service to other age groups. It is estimated that for this population 5.4 nurses could give more than the standard home-visiting service if the full opportunities were utilized.

Home-Visiting for School Children.[9] There are approximately 41,000 school children in this district. The Appraisal Form standard calls for one visit to 40 per cent of these children. As shown in Table 2, 5 per cent of the total school children could have been visited in infant families and another 15 per cent in preschool families. With the exception of adding the extra minutes required in the home for these two- or three-person visits, these services have been provided for.

Fifty-one per cent of the total school children will not have

[9]Experiments in the Bellevue-Yorkville district in New York City in providing consultation services in the schools have eliminated a large part of home-visiting for school children. While it has reduced travel time, it has increased the number of contacts with parents. Probably the same amount of time should be allowed for this phase of the nursing service for school children.

siblings of younger age groups. Nursing service must be pro-
vided for 40 per cent of this group. As shown in Table 2,
1,230 of these visits will be one-person visits and 7,175 will
be two-person visits. Travel time for these visits must be
allowed.

The total hours for home-visiting for school children is
estimated as 8,965 hours which would require the time of
4.4 nurses.

It is recognized that in using this method, as illustrated,
there are several assumptions: first, that the standards of
practice set up by the Appraisal Form are applicable to the
situation; second, that the estimates of time from a limited
number of studies are applicable; and third, that every visit
in a home will be a generalized visit. All of these assumptions
may be only partially true. The first was made because the
Appraisal Form standards are those generally accepted and
the second because the time studies are the only ones avail-
able. Before any precise estimate of nursing needs can be
made it will be necessary to make many more studies of time
distribution in public health nursing activities, and more
studies of standards of practice particularly as regards the
distribution of services.

Although the suggested method is limited to one phase of
activities and is considered only as a first step in the making
of more accurate estimates of nursing needs, it is based on
two known facts; (1) that there are two or more children in
many families, and (2) a visit in the home offers an oppor-
tunity to extend nursing services to the family group.