A Patient Classification System

by Level of Nursing Care Requirements

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A classification scheme and an instrument to determine work load, in use since June 1975 in the daily adjustment of supply and demand in the 24 pediatric units of the Sainte-Justine Hospital, Montreal, Quebec, is described. Construction and implementation of the instrument are delineated. The instrument was successful in determining the number of nurses necessary to meet the work load on various units. On the basis of these data, the short- and long-term management of supply and demand of nursing care was examined and the classification system was generalized to all types of patients except psychiatric.

BECAUSE traditional care demand quantification methods do not provide information accurate enough for efficient management of nursing staff, patient classification systems have been developed in recent years. Most systems apply only to general hospitals or are too context-dependent to be transposed from hospital to hospital. As a result, a classification system for all types of health care institutions was developed at the Sainte-Justine Hospital in Montreal, using the framework of the Project for Research in Nursing (PRN) 74 project devised by Chagnon *et al.* (1975, 1976, in press) for pediatric patients.

Development of the Classification Instrument

In the classification instrument, nursing interventions are defined as patient-contact activities and are characterized by specificity, frequency, and scope. The scope of the interventions covers a 24-hour period. The instrument was developed in four stages. In the first stage, a list of all nursing interventions was drawn up on the basis of data collected by Laberge-Nadeau *et al.* (1974). Next, more than 100 experienced members of the nursing staff were asked to set up typical care programs. This list of interventions was tested for context independence (if the instrument is to be valid in any hospital setting, the definition of each activity should have the same meaning and, therefore, the same implications in terms of time required to carry it out in any context), exhaustiveness (all nursing interventions should be listed; various interventions should be grouped together under the same heading if, and only if, specificity and mutual exclusion are met), specificity (the definition of an intervention should not lend itself to interpretation), and mutual exclusion (two interventions appearing on the list and liable to be applicable to the same patient should not overlap, that is, cover the same procedures). The list developed in the PRN 74 classification for pediatric patients includes 129 such interventions (Figure 1).

In the second stage, each intervention was weighted normatively in number of minutes to direct and indirect care it requires during a 24-hour period. Most interventions (direct care) require periods of preparation and follow-up that involve no contact with the patient (indirect care imputable to nursing interventions). These items of indirect care were termed indirect care interventions.

The interventions were weighted by nurses and doctors who determined the average time required for each intervention and its preparation and follow-up procedures under normal conditions, that is, when staff has enough time to meet patients' needs adequately (Dalkey, 1969). While the assumption that it is possible to establish a normative weighting of nursing interventions that would be valid in any context may be challenged, the normativeness of the proposed weighting is reinforced by the fact that it includes both direct and indirect care. Depending on the organizational pattern of nursing units, certain preparation and follow-up procedures in one context may form the integral part of nursing interventions in another context. Direct care time may, therefore, decrease or increase from context to context in favor of or at the expense of indirect care time. For this reason, it was impossible to identify normative weighting

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of interventions in terms of only direct care. Nevertheless, it was reasonable to believe that the total time devoted to an intervention and its preparation and follow-up procedures does not vary much with the context, since what is lost at the level of the intervention is regained in preparation and follow-up procedures.

On the basis of the weighted list of interventions, the needs of a patient over a 24-hour period can be estimated easily by adding up the values of interventions needed by the patient (according to care plan). These individual estimates may be used to achieve the end in view, that is, evaluation of the work load. However, such a method is impractical.

In consequence, in a third stage, a relevant number of patient classes were determined and class boundaries defined. The scheme, as adopted, is illustrated in Table 1. In this scheme, patients are classified according to their need for direct and indirect care interventions over the next 24-hour period. Except for previous experience (Laberge-

Figure 1. List of Interventions and Their Weight in the PRN74 Classification[1]

DELIVERY OF CARE: nursing care / according to medical prescription

NEEDS	FACTORS		WEIGHT
HYGIENE AND PHYSICAL COMFORT	Sponge bath or tub (age 5 & over)		1
	Full bath: bed or basin (age 0 to 5)		1
	Full bath: bed or basin (age 5 & over, bedridden)		2
	Assistance in getting up and/or walking		1
	Setting up orthesis or prosthesis		1
	Position and/or bed change	qid	1
	Position and/or bed change (24h)	q3-4h	2
	Position and/or bed change (24h)	q1-2h	4
	Position and/or bed change (24h)	q½h	7
	Isolation technique		1
	Dental care (Water Pik) *tid* or dental care	q2h	1
	Sitz-bath or medicinal bath (preparation)	die,bid	1
	Sitz-bath or medicinal bath (preparation)	tid,qid	2
	Sitz-bath or medicinal bath (const.pres.)	die,bid	2
	Sitz-bath or medicinal bath (const.pres.)	tid,qid	4
FEEDING AND HYDRATION	Feeding without assistance or oral hydration	qlh	1
	Feeding with supervision or encouragement		2
	Feeding with total assistance		3
	Feeding with constant encouragement (const.pres.)		6
	Bottle feeding & baby food	tid	3
	Bottle feeding & baby food	qid	4
	Bottle feeding & baby food	q4h	5
	Bottle feeding & baby food with special care	q4h	9
	Bottle feeding	q3h	7
	Bottle feeding	q1-2h	9
	Gavage	tid,qid	4
	Gavage	q3-4h	8
	I.V. perfusion (24h)		3
	Simple parenteral feeding		5
	Parenteral feeding with central catheter		7
ELIMINATION	Diapers, bedpan		1
	Diapers, bedpan (incont., diarr.)	q1-2h	3
	Toilet training or Crede's method		2
	Vesical catheterization or retention cath.	die	1
	Vesical catheterization or retention cath.	q4-6h	4
	Vesical irrigation	bid	1
	Vesical irrigation	tid,qid	2
	Vesical irrigation	continuous or q4h	3
	Levine irrigation	q4-6h	2
	Levine irrigation	q2-3h	3
	Levine irrigation	qlh	4
	Colostomy irrigation or enema	die	1
	Colostomy irrigation or enema	bid,tid	2
	Colostomy or ileostomy dressing	tid,qid	3
	Colostomy or ileostomy dressing	q2-3h	6
BREATHING	Breath. ex. or Spiro (setting up & stim.)	tid,qid	1
	Breath. ex. or Spiro (constant presence)	tid,qid	2
	Breath. ex. or Spiro (constant presence)	q2-4h	3
	Suction of secretions	q4-6h	1
	Suction of secretions	q2-3h	2
	Suction of secretions	qlh	6
	Suction of secretions (intubated or Byrd)		8
	Tracheotomy care (long-term)		2
	Tracheotomy care (2nd week)		4
	Tracheotomy care (3rd-6th day)		8
	Tracheotomy care (1st 48h)		15
	Aerosol (setting up & stimulation)	bid,tid	1
	Aerosol (setting up & stimulation)	q4-6h	2
	Aerosol (constant presence)	bid,tid	3
	Aerosol (constant presence)—(24h)	q4-6h	6
	O_2 and/or humidity		2
	O_2 (highly concentrated)		5
SUPERVISION	Supervision (minimal)		1
	Supervision (24h)	q1h	2
	Supervision (24h)	q½h	4
	Supervision (constant)-(4 patients in room)		15
	Supervision (constant)-(2 patients in room)		10
	V.S. and/or N.S.	q4-6h	1
	V.S. and/or N.S.	q2-3h	2
	V.S. and/or N.S. or monitor	q½-1h	5
	Veinous pressure	q½-1h	6
PATIENT ACTIVITY	Group activities (school age)		1
	Group activities (pre-school age)		2
	Individual activities (bedridden)		2
	Individual activities (isolated)		3
	Individual activities (constant presence)		4
	Structured program of activities		6
TEACHING	Teaching to walk		1
	Teaching: daily activities		1
	Teaching: crutches (1st day)		1
	Teaching: Cotrel traction (2nd day)		2
	Teaching: Cotrel traction (1st day)		3
	Teaching diabetic patients (5-day program)		3
	Prep.surg.pat. (psychol.prep.,breath.ex.,shaving)		2
	Prep.surg.pat. (same, trial of O_2 tent)		3
	Prep.surg.pat. (same, trial of Stryker bed or shaving)		4
THERAPY	Medication: oral *or* rectal *or* drops	tid,qid	1
	Medication: oral *or* rectal *or* drops (24h)	q3-4h	2
	Eye drops (24h)	q2h & over	4
	Continuous eye irrigation		8
	Liniment application	bid,tid	1
	Liniment application	q4-6h	2
	S.C. *or* I.M.	bid,tid	1
	S.C. *or* I.M.	q4-6h	2
	I.V.	die,bid	1
	I.V.	tid,qid	2
	I.V.	q3-4h	4
	I.V.	q2h & over	8
	Short-term I.V.	die	2
	Lavage: sinus	die	1
	Lavage: ears	die	2
	Wound cleaning (no dressing)	q3-4h	1
	Dressing: dry or wet	bid,tid	1
	Dressing: dry or wet	q4-8h	2
	Dressing: dry or wet	q2-3h	4
	Dressing: dry with drain	die,bid	1
	Dressing: dry with drain	tid,qid	2
	Dressing: dry with drain	q2-4h	5
	Dressing: wet, open-mesh (grafting)	q4-6h	6
	Hydrotherapy (preparation)	die	1
	Hydrotherapy (preparation)	bid	2
	Hydrotherapy (on unit)	die	2
	Hydrotherapy (on unit)	bid	4
	Debridement (−20%)	bid	2
	Debridement (20-40%)	bid	4
	Debridement (+ 45%)	bid	3
	Dressing of burns (−20%)	qid	9
	Dressing of burns (20-40%)	qid	13
	Dressing of burns (+ 45%)	qid	20

PARTICIPATION IN DIAGNOSTIC PROCEDURES

	Simple and quick tests (on each miction)		1
	Urine *or* stool collection (24h)		2
	Samples: urine		1
	Samples: blood *or* gastric tubage		2
	Assist M.D. in veinous dissection or omb. vein.		3
	Exam. under local anaesthetics (on unit)		3
	Multiple sample test (on unit)		3
	Weighing on metabolic scale	die,bid	1
	Dosage of intake and/or output		1
	Dosage of intake & output (maintain fluid balance)		2

[1] From Chagnon *et al.* (1975)

Table 1. Project for Research in Nursing Classification Scheme

Minutes of Direct and Indirect Care Interventions	Classes	Points
From 0 to 90	1	From 0 to 6
From 91 to 180	2	From 7 to 12
From 181 to 270	3	From 13 to 18
From 271 to 450	4	From 19 to 30
More than 450: from 451 to 600	5.1	More than 30: from 31 to 40
More than 450: from 601 to 750	5.2	More than 30: from 41 to 50
More than 450: from 751 to 900	5.3	More than 30: from 51 to 60
More than 450: more than 900	5.4	More than 30: more than 60

Table 2. Weighting of Patient Classes for the 24-Hour Period (in Minutes) according to Care Required

Patient Classes	Direct and Indirect Care Interventions (in Minutes)	Indirect Care (Communications, Medical Records, Care Plans) (in Minutes)	Weighting of Classes for 24-Hours (Minutes)
1	72	40	112
2	137	55	193
3	241	85	327
4	342	110	452

Table 3. Weighting of Patient Classes by Shift (in Minutes)

Patient Classes	Shift			24 Hours
	Day	Evening	Night	
1	66	29	17	112
2	106	55.5	31.5	193
3	161	99	67	327
4	210	133	109	452

Nadeau *et al.*, 1974) and certain special characteristics of pediatric patients, no rigorous criterion forced such a choice concerning the number and boundaries of patient classes.

In the fourth stage, classes were weighted in terms of direct and indirect care interventions during a 24-hour period. To obtain the value of a class, the average care time of each patient in the sample who belonged to that class was calculated. An indirect care component—which may be related to each patient in particular but which is not imputable to one or several particular interventions—consists in communications about the patient (among nursing staff, with the patient's relatives, and with physicians) and in the time devoted to the patient's care plan and record. On the basis of the data collected by work sampling (Laberge-Nadeau *et al.*, 1974), the average time devoted to these indirect care activities for each patient in each class for the 24-hour period was estimated. These estimates were added to the preceding values to obtain the total weighting of patient classes over 24 hours. Results appear in Table 2.

Weighting of patient classes for the 24-hour period is useful, in that it provides multipliers which reduce all patient-days to a common denominator (such as the class 1 patient-day). However, weighting of patient classes must be available by shift, since staffing requirements are determined by shift. The time devoted to direct and indirect nursing care interventions for each patient during each shift is totaled to obtain the weighting of classes per shift. Finally, time estimates of communications and preparation of care plan and record for each patient of each class for the 24-hour period are distributed among shifts and the total weighting of classes per shift is obtained (Table 3).

Tables 2 and 3 do not give weighting for class 5. At the time of implementation of the instrument, because of the small number of class 5 patients in the sample and the great variability of the demand from such patients (from 450 to more than 1,000 minutes of direct and indirect care over a 24-hour period), it was deemed advisable to evaluate the demand of class 5 patients individually by adding up the values of the interventions they required. A simulation study of this system revealed no great loss of accuracy if class 5 patients were divided into four subclasses (Table 1). These subclasses exist only for staffing purposes at each shift. From the long-term statistical viewpoint, there are only class 5 patients. At that level, no accuracy is lost when estimating the demand of a class 5 patient by calculating the average of the demands of all class 5 patients for a year, for instance. When the demand of a lone class 5 patient on a unit during a given shift is to be estimated, however, it is a difficult matter, as his demand can be far from average.

Evaluation of Nursing Work Load

When the classification instrument reveals the number of patients in each class in a particular unit, the number of staff members needed to serve the patients can be calculated. Tilquin (1975) devised a formula to determine needed staff. For example, if a_i and b_i respectively represent the average direct and indirect care required by a class patient during a given shift and N_i represents the number of class 1 patients in the unit during that shift, total amount of direct and indirect care required by class 1 patients in the unit is $N_i(a_i + b_i)$, i.e., the product of the average care required by the patients of that class multiplied by their number. To obtain the total care for a shift, these products are totaled for all classes (I). If S represents this total, the result is $S = \Sigma_i N_i(a_i + b_i)$.

Nursing staff, however, devote part of their time to tasks not directly related to patients. Previous work sampling (Laberge-Nadeau *et al.*, 1974) revealed, on average, that on each shift, 25 percent of staff time is nonproductive (time devoted to duties such as meals and rest and to meetings such as team conferences and teaching). Moreover, a constant part (varying neither with the patient population nor with the number of staff present) is spent on tasks unrelated to individual patients (TUPs) such as administration of the unit, replacement of material, and upkeep. TUPs can be divided among several persons. Based on work sampling studies at Sainte-Justine Hospital, their amount equals 660, 360, 216 minutes for the day, night, and evening shifts, respectively, at that hospital.

The total number of minutes of staff time required in the unit is, therefore, obtained by adding the time devoted to TUPs to the patient care time (S). However, as mentioned previously, once the nonproductive time and the time devoted to meetings and teaching has been subtracted, each member of the staff works 360 minutes. The number of staff required is, therefore, obtained by dividing the sum of the minutes required from the whole staff (S + TUP) by the number of productive minutes that each member of the staff can supply, i.e., 360 minutes. Staff required is, therefore, obtained by the formula:

$$P = \frac{(S + TUP)}{360}$$

When the classification instrument is used, the quantity P must be evaluated for each shift for each unit. To facilitate this evaluation, IRODOM Project investigators (Laberge-Nadeau *et al.*, 1974) suggested using tables which give the

value of P directly when the number N_i of patients in each class is known. This is done by breaking the formula down into three terms:

$$P = \underbrace{\frac{TUP + (a_2 + b_2)\,N_2 + (a_3 + b_3)\,N_3 +}{360}}_{P_1}$$

$$\underbrace{\frac{(a_1 + b_1)\,N_1 + (a_4 + b_4)\,N_4 + \Sigma g}{360}}_{P_2} = \underbrace{\frac{1{,}4(a_5 + b_5)\,N_5}{360}}_{P_3}$$

Tables corresponding to these three terms are constructed which permit evaluation of the staff required: 1) patients in classes 2 and 3, 2) patients in classes 1 and 4, and 3) patients in class 5. The table for class 2 and 3 patients contains a constant representing tasks unrelated to patients.

Figure 2 presents a set of tables for the day shift (TUP = 660 minutes). The tables can be used as follows: If on a particular day shift $(N_1, N_2, N_3, N_4, N_{5.1}, N_{5.2}, N_{5.3}, N_{5.4}) = (6, 6, 7, 2, 0.1, 0, 2)$, then $P_1 = 6.7$ is to be found at the intersection of the seventh column and the eighth line of the first table, and $P_2 = 2.2$ at the intersection of the seventh column and the third line of the second table. $P_3 = .8 + 2.3 = 3.1$ since $N_{5.2} = 1$ and $N_{5.4} = 2$. The staff required is therefore $P = 6.7 + 2.2 + 3.1 = 12$.

Implementation of the Instrument. Two aspects of the implementation process are particularly important: training of staff (or institutionalization) and systemization of procedures (Wolek, 1975). For a third important aspect—acceptance of change—definition of formal procedure is extremely difficult. In this hospital, acceptance of the new instrument created few problems because the instrument was needed and users, from nursing office to nursing staff, were aware of it, having been involved in all stages of its development. As a result, the system was accepted at the time of implementation.

Training of Staff. Many persons are concerned with the implementation of a classification instrument: nursing management, in-service education, supervisors, and nurses. Shift from the traditional method of staff allocation to a systematic procedure based on this classification can be done only in stages, as management learns to make use of the data provided by the classification. The most immediate task is to train nurses to classify patients. Supervisors and in-service education staff as well as the nurses themselves should be trained how to classify patients. The program was prepared according to the principles of adult education and presented in four stages:

- General discussions in groups of 15 persons, explaining objectives, structure, content of the classification, and operation of the system.
- Practical experience of classification in small groups of four or five persons, based on care plans, with the help of resource persons.
- Pooling of results in the large group and discussion concerning difficulties encountered and disagreements.
- Individual control of "learners": a project nurse visited each unit to check the classification made by nurses and to discuss problems encountered. This last stage permitted individualized training by allowing more time for persons who experienced special difficulties. It also revealed certain interventions whose formulation might prove confusing.

A user's handbook containing detailed description of the system, abbreviations, and definitions of certain interventions was also distributed to the units.

Systemization of Procedures. Staff training was not enough. Tools to carry out the expected tasks effectively need to be made available. A system to produce and collect data and to forward information to decision-making centers is schematized in Figure 3.

Data production devolves upon nurses in classifying patients. It is natural to assign this role to them, as the classification is based on patients' care plans and requires a good knowledge of patients' needs. Since, in this classification, the patient's class is determined by the sum of values of each intervention, a nurse with several patients to classify would have difficulty carrying out this calculation rapidly.

To compensate for this difficulty while keeping to the accuracy of classification, the value in minutes of each intervention was weighted, i.e., transformed into "points" (Figure 1). A point corresponds to a specific number of

Figure 2. Excerpts from Staffing Tables Developed in the PRN 74 Project

Number of Class 2 Patients

Number of Class 3 Patients	0	1	2	3	4	5	6	7	8	9	10
0	1.8	2.1	2.4	2.7	3	3.3	3.6	3.9	4.2	4.5	4.7
1	2.3	2.6	2.9	3.2	3.4	3.7	4	4.3	4.6	4.9	5.2
2	2.7	3	3.3	3.6	3.9	4.2	4.5	4.6	5.1	5.3	5.6
3	3.2	3.5	3.7	4	4.3	4.6	4.9	5.2	5.5	5.8	6.1
4	3.6	3.9	4.2	4.5	4.8	5.1	5.4	5.7	5.9	6.2	6.5
5	4	4.3	4.6	4.9	5.2	5.5	5.8	6.1	6.4	6.7	7
6	4.5	4.8	5.1	5.4	5.7	6	6.2	6.5	6.8	7.1	7.4
7	4.9	5.2	5.5	5.8	6.1	6.4	6.7	7	7.3	7.6	7.9
8	5.4	5.7	6	6.3	6.6	6.8	7.1	7.4	7.7	8	8.3
9	5.8	6.1	6.4	6.7	7	7.3	7.6	7.9	8.2	8.5	8.7
10	6.3	6.6	6.9	7.2	7.4	7.7	8	8.3	8.6	8.9	9.2

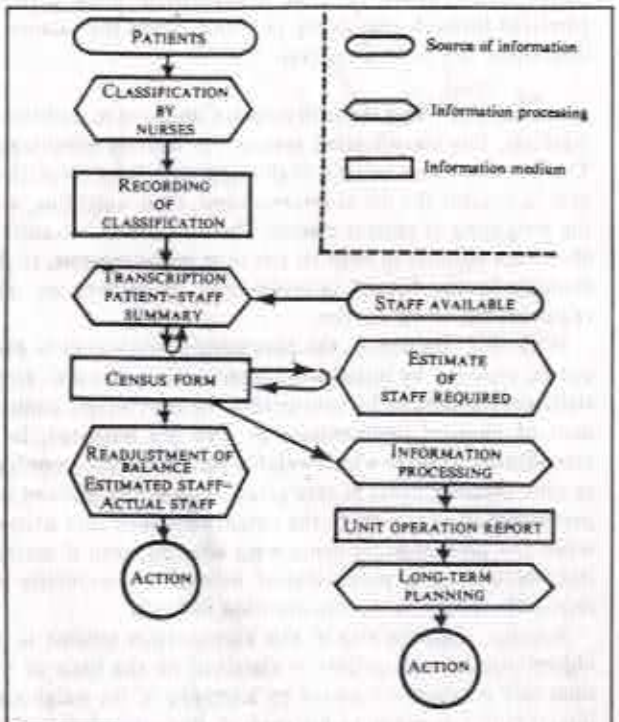
Number of Class 1 Patients

Number of Class 4 Patients	0	1	2	3	4	5	6	7	8	9	10
0	0	.2	.3	.5	.7	.8	1	1.2	1.3	1.5	1.7
1	.6	.8	.9	1.1	1.3	1.4	1.6	1.8	1.9	2.1	2.3
2	1.2	1.4	1.6	1.7	1.9	2.1	2.2	2.4	2.6	2.7	2.9
3	1.8	2	2.2	2.3	2.5	2.7	2.8	3	3.2	3.3	3.5
4	2.4	2.6	2.8	2.9	3.1	3.3	3.4	3.6	3.8	3.9	4.1
5	3.1	3.2	3.4	3.6	3.7	3.9	4.1	4.2	4.4	4.6	4.7
6	3.7	3.8	4	4.2	4.3	4.5	4.7	4.8	5	5.2	5.3
7	4.3	4.4	4.6	4.8	4.9	5.1	5.3	5.4	5.6	5.8	5.9
8	4.9	5.1	5.2	5.4	5.6	5.7	5.9	6.1	6.2	6.4	6.6
9	5.5	5.7	5.8	6	6.2	6.3	6.5	6.7	6.8	7	7.2
10	6.1	6.3	6.4	6.6	6.8	6.9	7.1	7.3	7.4	7.6	7.8

Number of Class 5.1 to 5.4 Patients

Class	1	2	3	4	5	6	7	8	9	10
5.1	.7	1.3	2	2.7	3.4	4	4.7	5.4	6.1	6.7
5.2	.8	1.6	2.4	3.3	4.1	4.9	5.7	6.5	7.3	8.1
5.3	1.0	1.9	2.9	3.8	4.8	5.7	6.6	7.6	8.6	9.5
5.4	1.2	2.3	3.5	4.6	5.8	6.9	8.1	9.2	10.4	11.5

Figure 3. Information Flow Chart for Patient Classification Scheme[1]



[1]Adapted from Laberge-Nadeau *et al.* (1974, p. 220)

minutes. Each intervention is worth from one to 30 points, and the total number of these points given to each patient determines his class. The transformation of minutes into points as far as the interventions are concerned operates in the same way for the classes (Table 1).

Despite its modest format, the classification form (Figure 1) contains all the information necessary to classify a patient. For maximum accuracy, it would probably have been desirable to provide—opposite each intervention—a space for the nurse to mark the boxes corresponding to the interventions that are applicable. The inclusion of 129 interventions and the fact that certain patients need reclassification on different shifts, however, makes use of such a form prohibitive. The form requires the user to mentally add up the values of all the interventions relevant to a patient. That procedure has the drawback of reducing precision or, at least, of eliminating one way of ensuring it. (To compensate for this defect, a control form was prepared.) A daily user, however, is so familiar with the values of the interventions that time taken to classify is shortened to approximately 30 seconds.

Patients are classified according to their needs for the next 24 hours, a process which largely reduces the classification time at each shift since only newly admitted patients and a small number whose needs have changed are classified. The nurses classify all patients daily before 2:30 P.M. Nurses of the evening and night shifts classify new patients and those whose needs have changed since the preceding shift, before 9:00 P.M. and 6:00 A.M.

The nurses record the result of the calculation, that is, the class corresponding to the total points obtained by the patient, on a recording form which they put in the Kardex®; it contains the class of all patients in the unit at all times.

Estimation of staff required, thus, is based on the staffing tables (Figure 2) which indicate number of patients and classification of their needs.

Census Form. Prior to each shift, for each nursing unit, a census form is filled out which contains information concerning the unit, that is, the number of patients in each class as well as the staff available, according to the schedule. This form is sent to the nursing office. On the basis of this information, the nursing office can balance supply and demand. Actual staff may be deducted from the information that appears on the census form: actual staff = scheduled staff − absence + support staff.

The census form for each shift for each unit is forwarded to the hospital's data processing center. The data are stored and processed for each 28-day period as well as for the year, and reports are sent to the units and to the nursing office. Examination of these reports helps achieve long-term planning on the basis of objective data. It is, thus, possible to make changes in the basic teams as to size, e.g., addition of staff in the units that are constantly overloaded and transfer to the rotating team from underloaded units, and to components, e.g., larger proportion of nurses versus nursing assistants in units where more patients are rated in the higher classes and vice versa.

Testing the Instrument

Reliability and Validity Testing. Once the necessary training was given to users and the system was set up, tests for reliability and validity of the instruments were carried out. Reliability in this case meant that the same patient was placed in the same class when classified by various persons. Validity testing of the work load evaluation system amounted to checking whether the work load calculated on the basis of patient classes was equivalent to the actual work load of the unit (Chagnon *et al.*, 1976, in press; Tilquin, 1975). The PRN 74 report (Chagnon *et al.*, 1975 a) contains further details on these two concluding tests.

Control and Updating Procedures. For the system to produce expected results, certain conditions must be fulfilled. For short-term efficiency patients must be correctly classified, that is, utilization rules must be observed; staff allocation must rest on the estimations effected (if it is impossible to meet all demands, priority must be given to those units where the variation between estimated staff–actual staff is the most significant); and information recorded on the daily census form must be accurate and complete.

For long-term efficiency the classification must provide a realistic indication of patient needs as regards both the list of interventions and the value they are attributed; the staff estimation method must be updated, considering possible changes in the distribution of activities among shifts; and components of the basic team must be changed if need be, in accordance with the data provided by the statistical reports.

Accuracy of Classification. Because the classification form used in the units does not permit control of accuracy, a control form was prepared. Similar to the regular form, it provides an additional space for identifying the patient as well as a space opposite each intervention, to be marked if applicable to the patient. This control form is used in all nursing units at regular intervals but on a random basis.

Staff Allocation. Control of staff allocation is achieved through regular statistical reports provided by the data processing center. For each shift, the ratio (R) of staff

required to actual staff provides useful information on the balance maintained between supply and demand.

Checking of Census Form. On the census form, checking of data concerning all units for the three shifts by a responsible member of the staff is a prerequisite for obtaining reliable results in addition to the validation procedure included in the program.

If regular application of control procedures is a prerequisite for the system's viability, it is also essential that an updating procedure be used to make that system as dynamic as possible in the face of a changing reality.

Classification Form. The classification form is revised annually to make sure that the list of interventions realistically reflects patient needs. The control method applied to the classification may be used to accumulate material for updating the form. Removal of interventions that have become meaningless raises no problem. New interventions are added by assigning points to each intervention on the basis of the corresponding estimate of direct and indirect care time.

Method of Staff Estimation. Alteration of the list of interventions and their weighting does not affect staffing tables inasmuch as the weighting of patient classes (direct and indirect care) is not changed. A change in shift distribution, however, calls for a readjustment of staffing tables. Three staffing tables, one for each eight-hour shift, are now being used. Staff estimation for each shift is based on distribution of direct and indirect care requirements among the three periods, as well as on the distribution of tasks unrelated to individual patients. Time devoted to meetings and nonproductive activities is essentially the same for the three periods. If working hours should be changed, such as a reduced work week, these proportions have to be reduced so that staffing tables can be recalculated according to the length of the new shifts, taking into account staff overlaps from shift to shift.

Increase in Support Staff. To simplify daily adjustments and to help achieve the desired balance, support staff on nursing units has been gradually increased at the expense of permanent staff members who cannot be moved from unit to unit as needed because of union regulations and provisions. After the system was in operation for a few months and reports provided by the data processing center were studied in detail, units where job transfers could be made were identified.

Admission Control as an Additional Means of Balancing the Work Load. Although utilization of support staff has been emphasized as a means of improving the patient–staff balance, there is another alternative: control of patient admissions that takes into account forecasts of the work load generated by patients already admitted and the work load which would result from the admission of any given patient. This control was one of the objectives of the nursing module of the IRODOM project (Laberge-Nadeau *et al.*, 1974), but was not achieved. Use of an admission control tool to control the work load implies knowledge, previous to admission, of a profile of the patient's progress through the different classes on the basis of such given facts as age and diagnosis. Even though data were collected for that purpose, their unreliability as a forecast instrument prevented their being retained. Still, admission control plays a part in the system as devised. Knowledge of the situation in each unit permits—in cases where it is possible to make a choice—to place patients admitted through emergency in a unit where the balance is least disturbed by their arrival.

Advantages of Using the Instrument. Compared to traditional methods, this classification system has definite advantages. The primary characteristic of this approach is its normativeness as regards the list of interventions, their weighting, and the weighting of patient classes. The instrument is transferable from hospital to hospital (no time measurements, slight changes in the list of interventions). It centers on care required, not on care given.

With this instrument, the psychologic component of care can be included by introducing interventions that are essentially psychologic or by considering the psychologic component of physical interventions as they are weighted. In a classification scheme which weights patient classes according to time measurements of care given, time will be allowed for psychological care only to the extent that such care existed when the time measurements were effected, even if certain interventions of a psychological nature may explicitly or implicitly appear in the classification formula.

Another characteristic of this classification scheme is its objectivity, as each patient is classified on the basis of his total care demand, calculated by a totaling of the weights of interventions relevant to his case. A link, therefore, exists between the implicit criterion (list of relevant interventions) which helps classify a patient and his care demand expressed in minutes. In other classification systems, the list of criteria is developed a priori, in a purely subjective way, without explicit reference to care times; a subjectively constructed scheme leads to classification errors by overlapping of classes. In this scheme, classes do not overlap, and, if the list of interventions is exhaustive and their weighting valid, no classification error can be made.

Other advantages of this instrument are the quantity of relevant information it generates at low cost and its contribution to the measurement of quality of care. Although the classification developed does not explain the "how" of care, it does indicate "what." In this respect, use of this classification can directly contribute to the maintenance of quality care since it implies the formulation of a comprehensive and precise care plan for each patient.

Progress of the Classification System. Under PRN 76, the classification system was generalized to be applicable to all patients in all hospitals except psychiatric. Further information and a copy of the new classification system may be obtained from Charles Tilquin, Ph.D., Health Administration Department, University of Montreal, Montreal, Quebec. **NR**

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