DEPENDENCY MONITORING AND RESOURCES ALLOCATION IN NURSING HOMES AND EXTENDED CARE HOSPITALS*

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ABSTRACT

We present the system used in Quebec to monitor the dependency and the nursing (professional and non professional) services and resources required by clients (mostly elderly) in loss of autonomy living in extended care hospitals and nursing homes.

The orientation of the system is managerial rather than clinical. Its aim is to provide information to managers at all levels (nursing wards, institution, group of institutions, health area, health district, health and social services department) to help them in resources allocation decisions.

In a context of limited, often insufficient resources, their fair, equitable allocation is critical for insuring the quality of services.

BACKGROUND

On the first of July 1988, Quebec's population amounted to 6 600 000 peoples concentrated on 2% of its territory, a space about the size of Belgium. The 65 years of age or more represented exactly 10% of this population, a percentage expected to raise sharply in the coming years to peak at 16% in 2 011.

Quebec is well equiped in «institutional» facilities for elderly persons in loss of autonomy. These are:

- **extended care hospitals** - ECH - which admit the more demanding clients for very long periods (average lenght of stay: 3.7 years), in general until death. ECH are well staffed with professionals nurses.

- **nursing homes** - NH - whose original vocation was to admit socially, isolated, physically or psychologically frail persons who on the other hand were autonomous or almost autonomous in activities of daily living (ADL). Their vocation is changing and NH are now asked to admit and to keep more and more dependant clients as there is not enough ECH beds to care for them and because home care and home aid programs are underdeveloped. Average lenght of stay in NH is 4.9 years.

- **pavillon** - PAV - which are small (less than 20 but more than 9 beds) nursing homes. Average lenght of stay there is 4 years.

- **«famille d'accueil»** - FAM - which are small, «familial» settings offering 9 beds or less to not very dependant clients.

The approximative numbers of beds in these different facilities are the following (table I). Figures for ECH include the 5 000 extended care beds located in acute care hospitals. They do not include the acute care beds which are occupied by persons in loss of autonomy and waiting for their transfer to ECH, NH, PAV, etc.

Their annual public cost is around $1.5 billion not including medical fees.

Table I: Number of places in institutional facilities (except «familles d'accueil) for persons in loss of autonomy in Quebec in 1990.

	Publics	Private*	All	Places/ 1 000 population
- Extended care hospitals	14 800	2 200	17 000	2.58
- Nursing homes	23 800	4 400	28 200	4.27
- Pavillon	--	2 000	2 000	0.30
	38 600	8 600	47 200	7.15

Because of the increase in the absolute number of persons in loss of autonomy and of the increase of the service demand of these customers, because of the huge cost of the different institutional facilities, because of their inequitable distribution among Quebec's regions, because of the changing vocation of nursing homes and the increasing inequity in the budgeting of ECH versus NH, it was felt necessary, at all decision levels (Ministery, Districts,

*Private facilities considered here are the one funded **publicly** through a global budget (ECH and NH) or on a per diem basis (pavillon). Except for their ownership, these facilities are equivalent to the public ones in all respects.

Institutions) to gain a better knowledge of the 47 200 customers of Quebec's ECH, NH and PAV, and to update that information regularly, in such way as to always known what is the need for services and resources of any group of clients, what services and resources are provided to the same, and what is the gap between both.

This gap has a serious impact on the quality of services provided to clients. By measuring it, it would at least be easier to add resources where they were the most needed even if these resources had to be taken from other («wealthier») categories of institutions, or individual institutions.

GENERAL DESCRIPTION OF THE SYSTEM[1]

Data regarding client's needs are collected in a formulary by a nurse who has been specially trained to use it. Sources of information are the care team, the client record and care plan, the client himself and family. The average number of assessment performed per working day is ten.

Assessors training format and data quality assurance measures are as follows. Each nurse assessor receives two days of formal training in group of at most eight trainees. Then, the assessor complete twelve assessments. Next, these are reviewed by the trainer with the trainee in the trainee institution. This is the first stage of the individualized part of the training process. It last for about one day. Then, trainer and trainee assess independently six clients and the evaluations are compared and all discrepancies are resolved. This second stage last also for about one day. So globally the duration of training is four days, two in group, two in individual training.

The processing of data is centralized at the district or group of districts level. When formularies are received, they are coded and data are entered on computer. Next the computer reproduces for nurses whose main task is to validate the data, the contents of the formulary in **compact** form in such way that it can be read in a very **efficient** and **effective** way. The computer also signals any missing data and sends messages to point out incoherences in data to the validator attention. To collect missing data and correct errors that she has discovered, the nurse validator communicate by phone with the nurse assessor. This is done for all clients where it is needed.

Also, to uniformize as far as possible need assessment, standards of care have been established. Nurses assessors may depart from these norms but they have then to justify it on the basis of the client unique characteristics. A very detailed user's guide of the formulary further contributes to the reliability of data. Finally, also to insure reliability, only a very limited number of assessors are trained, in the average one per one hundred beds.

At the time of the implementation of the system in an institution, needs of all its clients are assessed for the first time. Afterwards, assessments are made at intervals of four to six months using the same tool and method.

Each time the data is updated, standards outputs are produced for the institution. They describe the patients (globally and per nursing wards) in terms of age, sex, lenght of stay, diseases, consequences of diseases, nursing care levels (see next section). They compare the actual profile of clients with their profiles in the preceeding five assessment updates. They provide also managers with workload measures usefull for staffing purposes.

At least once a year or when they requested it, standards outputs are also produced for health districts and the department of health and social services authorities who use them for planning, programming and budgeting purposes.

DESCRIPTION OF THE SYSTEM FORMULARY AND MAIN INDICATORS

The system basic tool is a twelve pages formulary which allows to collect the following data:

1. **Age** and **sex, date of admission.**

2. Three main **diagnoses** by order of importance (coded following the ICDA - 4 digits).

3. Levels of **handicap** according to five out of the six key dimensions of the ICIDH[2]: orientation, mobility, occupation, independance in activities of daily living and social integration. The economic self-sufficiency dimension has been eliminated because it is not pertinent for an institutionalized population in Quebec's public system.

   The ICIDH handicap scales have been used as they are except that the definitions of categories in each scale have been reviewed and eventually slightly adapted to describe more precisely the potential handicaps of institutionalized elderly.

4. Levels of **psychological and sensory impairments**: in order to complement the information acquired through the handicap scales, scales of psychological and sensory impairments have been developped. All of them have three categories: no impairment, partially impaired, totally impaired. These scales are the following: intelligence, memory, thinking, perception and attention, consciousness and wakefulness, drives, emotion, affect and mood, volition, psychomotor functions, behavior pattern, language, hearing and vision. These concepts have been defined after the ICIDH code of impairments. It should be noted that in the impairments classification of the ICIDH, individuals are likely to be identified in the categories which apply to them while here they have to be classified on each of the above impairment scales in order to obtain a profile of their cognitive, affective, behavioral and sensory impairments.

   Subsequentally, synthetic cognitive and affective impairments indicators have been developed. The cognitive impairments scale combines the above memory, thinking, and perception/attention scales. The affective impairments scale combines the drives, emotion/affect/mood, and volition scales.

5. The last and most extensive part of the formulary is devoted to the explicit identification of the **nursing actions** required to fill the aid need of the individual in loss of autonomy. A complete list of all possible nursing actions has been developed from the P.R.N. system[3] [4]. This list is structured by need areas which are the following: respiration, feeding and hydration, elimination, hygiene, mobilization, communication, treatments (including medication) and diagnostic procedures. The first five categories corresponds to what is generally called basic care, the last two, to technical care. Communication is a category in itself. Actions in this category are aimed to fill the relational and educational needs of the patient.

   Spaces are provided in the formulary to specify, for each nursing action: its aide mode, staff category, and schedule (how many times the action is required by day of the week, at which hours of the day). The aid mode refers to the intensity of aid required: to guide/remind; partial help (supervise/motivate); partial help (compensatory); complete help.

   The account of nursing actions is realized **retrospectively** for the last seven days. It is important to note that the assessor must describe **required** care as planned for the client in fonction of his need, and not **given** care. This is important from a quality insurance point of view since the knowledge of required care allows to measure required resources which may then be compared with actual resources. In this way, gap may be detected which could be conductive to poor quality of care by lack of resources.

From this information on nursing services, it is possible to produce many indicators. The most used are these measuring levels of nursing care required. In order to produce them, each nursing action had to be weighted in terms of the time it takes in the average, to perform it once. (These norms do not appear on the formulary, they are in computer memory; they have been taken from the PRN system).

The main nursing care acuity indicator measures the global level or quantity (in hours) of nursing care required by 24 hours. This level may be splitted between basic, technical and relational/educational care level indicators. Basic care level indicator may in turn be splitted between respiration, feeding, elimination, hygiene and mobilization care level indicators. Same for technical care level indicator. The global level of nursing care indicator may also be splitted in function of the category of staff required to deliver care (R.N., L.P.N., Aid).

The following table summarizes the principal variables and indicators of the system (table II).

Table II: Main variables and indicators

DEMOGRAPHIC	CONSEQUENCES OF DISEASES		NURSING CARE LEVELS
Age	Handicaps (ICIDH)	Impairments	
Sex	Orientation	Intelligence	Global
Date of admission	Independance for	Memory	
	activities of daily	Thinking	Basic care
	living	Perception/	Technical care
	Mobility	attention	
DISEASES	Occupation	Conciousness/	Relational/Educ. care
	Social integration	wakefulness	Respiration care
Diagnosis 1		Drives	Feeding/hydration care
Diagnosis 2		Emotion/affect/mood	Elimination care
Diagnosis 3		Volition	Hygiene care
		Psychomotors	Mobilization care
		functions	Treatments
		Behaviour pattern	Diagnostic procedures
		Language	
		Hearing	R.N. care
		Vision	L.P.N. care
			Aid care
		Cognitive functions	
		Affective functions	

SOME EXAMPLES OF THE SYSTEM OUTPUTS AND RESULTS[5] [6] [7]

In the following, we will present a series of tables and figures to illustrate the outputs of the system. These tables and figures are extracted from the 1985-86 data base which counted 33 324 clients coming from 425 differents programs. Let us first consider some socio-demographic data on the ECH, NH and PAV population.

Figures 1 and 2 show the distribution of the clients by age. This population is very old with an average age of 78 years, and 32.5% of its members are 85 years old or more. Women are in the average, 5.1 years older than the men: 79.6 years (σ=11.4) versus 74.5 years (σ=14.3). The proportion of women in this population increases considerably with age (figure 3). In the 0-64 years age group, men are even slightly more numerous than women 50.4% versus 49.6%. After, their proportion decreases sharply: 40.2% in the 65-75 years group, 28.1% in the 75-84 group and 23.8% in the 85+ group. In the average, across all age groups, the percentage of women is 68.6%.

At the time of the assessment, client's average lenght of stay in the program where they lived at that time, was 4.5 years (4.2 for men, 4.6 for women). Figure 4 gives the distribution of lenghts of stay.
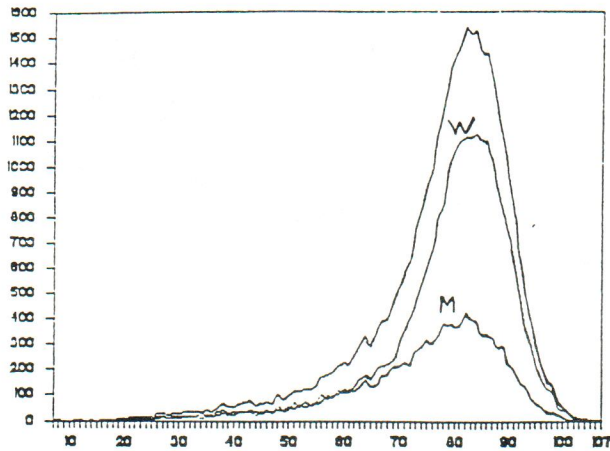

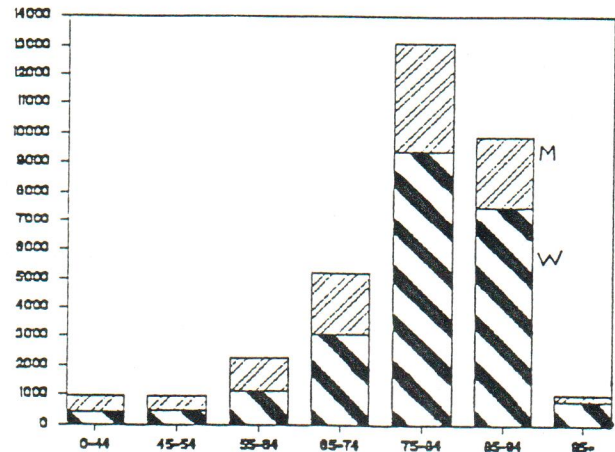Figure 1: Frequency distributions (total and by sex) of ECH, NH and PAV clients by year of age

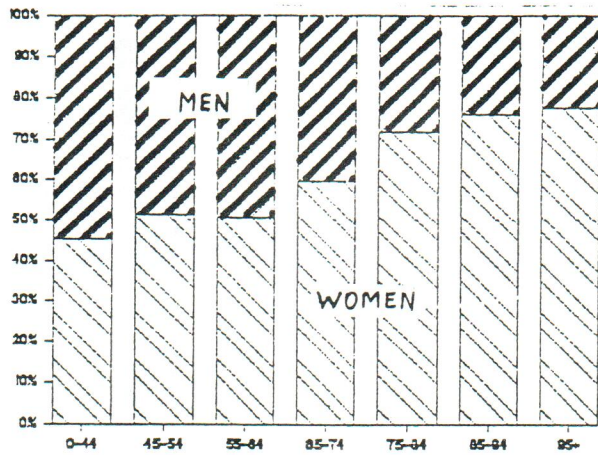Figure 2: Frequency distribution (total and by sex) of ECH, NH and PAV clients by age category

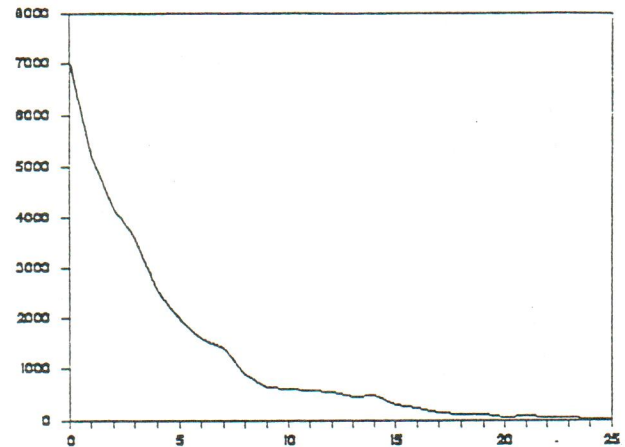Figure 3: Probability distribution of ECH, NH and PAV clients by sex in each age category

Figure 4: Frequency distribution of ECH, NH and PAV clients by lenght of stay at the time of the assessment

Table III shows the probability distribution of clients according to their level of handicap for each of the five ICIDH'S handicap categories. Handicaps in these clients are rather important.

Thus, at the level of ADL, 89% of the clients requires help at least once per 24 hours, and 72% requires to be looked after in a permanent way. In the sphere of mobility, these individuals are also very limited: 80% of them are confined to the institution where they live, 59% do not leave their floor, 37% are confined to their room. Also, 34% of these clients have no occupation at all and 63% of them have at least some difficulties in sustaining relations with secondary contacts such as friends, other clients, etc. Finally, 46% of them have at least severe impediment to orientation.

Table III: Probability distribution of clients according to their level of handicap for each of the five ICIDH handicap categories

	Density	Cumulative	
INDEPENDANCE IN ADL			
1. Fully independent	0.02	1.00	
2. Aided independence	0.00	0.98	
3. Adapted independence	0.00	0.98	
4. Situational dependence	0.03	0.98	
5. Long-interval dependence	0.06	0.94	
6. Short-interval dependence	0.17	0.89	
7. Critical-interval dependence	0.28	0.72	
8. Special-care dependence	0.22	0.44	
9. Intensive-care dependence	0.22	0.22	
MOBILITY			
1. Fully mobile	0.02	1.00	
2. Variable restriction of mobility	0.02	0.98	
3. Impaired mobility	0.01	0.96	
4. Reduced mobility	0.04	0.95	
5. Neighbourhood restriction	0.11	0.92	
6. Institution restriction	0.21	0.80	
7. Floor restriction	0.22	0.59	
8. Room restriction	0.07	0.37	
9. Total restriction of mobility	0.30	0.30	
OCCUPATION			
1. Customarily occupied	0.06	1.00	
2. Intermittently occupied	0.02	0.94	
3. Curtailed occupation	0.05	0.92	
4. Adjusted occupation	0.07	0.88	
5. Reduced occupation	0.03	0.81	
6. Restricted occupation	0.15	0.78	
7. Confined occupation	0.29	0.63	
8. No occupation	0.21	0.34	
9. Unoccupiable	0.13	0.13	
SOCIAL INTEGRATION			
1. Socially integrated	0.06	1.00	
2. Inhibited participation	0.02	0.94	
3. Restricted participation	0.12	0.91	
4. Diminished participation	0.14	0.79	
5. Impoverished relationships	0.14	0.65	
6. Reduced relationships	0.13	0.51	
7. Disturbed relationships	0.22	0.38	
8. Alienated	0.14	0.16	
9. Socially isolated	0.02	0.02	
ORIENTATION			
1. Fully oriented	0.01	1.00	
2. Fully compensated impediment to orientation	0.07	0.99	
3. Intermittent disturbance of orientation	0.06	0.92	
4. Partially compensated impediment to orientation	0.19	0.86	
5. Moderate impediment to orientation	0.21	0.67	
6. Severe impediment to orientation	0.17	0.46	
7. Orientation deprivation	0.11	0.29	
8. Disorientation	0.17	0.18	
9. Unconscious	0.01	0.01	

The system formulary allows to collect three diagnoses per client. In the average, 2.18 diagnoses were recorded per client. Table V gives the thirty most prevalent diseases in these clients (ICDA three digits code).

Arterial hypertension, the most prevalent disease, is present in 12% of clients. Then comes arteriosclerotic cardiac diseases which affect the same percentage of clients, and in third place: arteriosclerosis with a prevalence of 10%. The ten most prevalent diseases account for 42% percents of all identified diagnoses, and the thirty most prevalent diseases for 74% percents of them. Thus a fairly small number of diagnoses is required to establish the morbidity picture of these clients.

Table IV gives an other version of this picture in termes of ICDA two digits categories. Here, prevalences are given by sex. The most important differences between men and women appear in the following diagnostic categories:

08	Respiratory system diseases	W:6.1 ; M:16.7
10	Genito-urinary system diseases	W:2.9 ; M:5.1
13	Osteo-articular system, muscles and conjunctive tissue diseases	W:27.1 ; M:14.9
14	Lesions, traumatism and poisoning	W:7.4 ; M:4.7

But, the three most prevalent categories are the same for men and women, in other words:

07	Circulatory system diseases	W:55.6 ; M:48.0
06	Nervous system and sensory organs diseases	W:32.6 ; M:37.6
05	Mental diseases	W:29.9 ; M:30.8

Table IV: Prevalence of diseases (ICDA, two digits code) per sex

Women	Rank	Men	Rank	Total	Rank	Code	Name
1.0	14	1.2	14	1.0	14	1	Infectious and Parasitic Diseases
3.7	10	4.8	10	4.0	10	2	Neoplasms
15.9	5	11.3	7	14.4	5	3	Endocrine, Nutritional, and Metabolic Diseases and Immunity Disorders
3.6	11	2.3	12	3.2	12	4	Diseases of the Blood and Blood-Forming Organs
29.9	3	30.8	3	30.2	3	5	Mental Disorders
32.6	2	37.3	2	34.1	2	6	Diseases of the Nervous System and Sense Organs
55.6	1	48.0	1	53.2	1	7	Diseases of the Circulatory System
6.1	9	16.7	4	9.4	7	8	Diseases of the Respiratory System
6.7	8	6.4	8	6.6	8	9	Diseases of the Digestive System
2.9	12	5.1	9	3.6	11	10	Diseases of the Genitourinary System
0.0	17	0.0	17	0.0	17	11	Complications of Pregnancy, Childbirth, and the Puerperium
1.3	13	2.2	13	1.6	13	12	Diseases of the Skin and Subcutaneous Tissue
27.1	4	14.9	5	23.3	4	13	Diseases of the Musculoskeletal System and Connective Tissue
0.7	15	0.9	15	0.8	15	14	Congenital Anomalies
0.0	16	0.0	16	0.0	16	15	Certain Conditions Originating in the Perinatal Period
13.1	6	11.6	6	12.6	6	16	Symptoms, Signs, and Ill-Defined Conditions
7.4	7	4.7	11	6.5	9	17	Injury and Poisoning

Table V: Prevalence of diseases (ICDA, three digits code)

	CODE	N	%	NAME
1	401	4 097	12.29	Arterial hypertension
2	414	4 022	12.07	Arteriosclerotic cardiac disease
3	440	3 587	10.76	Arteriosclerosis
4	715	3 546	10.64	Arthrosis/gonarthrosis
5	250	3 266	9.80	Diabetes
6	437	2 523	7.57	Cerebro-vascular disease
7	428	2 503	7.51	Congestive heart failure
8	342	2 429	7.29	Hemiplegia
9	797	2 327	6.98	Senility
10	290	2 153	6.46	Senile dementia, psychosis

S-total 1: 30 453 diagnoses or 42% of all identified diagnoses

	CODE	N	%	NAME
11	905	1 695	5.09	Fracture, traumatic amputation sequelae
12	298	1 686	5.06	Depression, psychosis
13	438	1 658	4.98	Cerebro-vascular accident with sequelae
14	716	1 629	4.89	Arthritis, polyarthritis
15	496	1 586	4.76	Chronic obstructive pulmonary disease
16	300	1 269	3.81	Anxiety
17	332	1 267	3.80	Parkinson's disease
18	331	1 177	3.53	Alzheimer's disease or sclerosis, Pick's disease
19	366	1 132	3.40	Secondary cataract
20	310	1 118	3.35	Frontal, post-traumatic, cerebro-organic syndrome

S-total 2: 14 217 diagnoses or 19.6% of all identified diagnoses

	CODE	N	%	NAME
21	389	1 086	3.26	Deafness
22	311	1 000	3.00	Depression
23	295	942	2.83	Schizophrenia
24	278	927	2.78	Obesity
25	369	917	2.75	Blindness
26	345	887	2.66	Epilepsia
27	281	830	2.49	Pernicious anemia
28	317	798	2.39	Mild mental retardation
29	733	720	2.16	Other and unspecified impairments of bones and cartilages
30	341	665	2.00	Central nervous system other degenerative diseases

S-total 3: 8 772 diagnoses or 12.1% of all identified diagnoses

The (global) level of nursing care (LNC) required per patient-day is probably the indicator in which Quebec's decision makers are more interested in. This level includes the time of all nursing actions, professional and non professional, required by the client **individually**. These actions are usually performed at bedside but some may be executed outside the patient's room: preparation of medication or material, for example.

The average level of care (LNC) in Quebec's NH, ECH and PAV's is 1.95 hours/day. This level divides in 1.51 hours for basic care (77.4%), 0.16 hours for technical care (8.2%) and 0.28 hours for relational and educational care (14.3%). The distribution of LNC's is particular (figures 5 and 6). Data suggest a bimodal curve with first mode located at 26 minutes, and second at 218 minutes of care/day. These figures show also that LNC's are distributed over a very large interval: the more demanding client has a LNC of 713 minutes or 11.9 hours/day; nevertheless, there is very few clients requesting more than 6 hours/day. The average LNC of men and women are very similar: 1.97 for women against 1.91 for men. Figure 7 shows that between 48 and 88 years of age, the level of care does not vary very much. Outside this interval, that is between $\pm$ 20 to 48 years, and 88 to $\pm$ 100 years, LNC increases sharply.

Average LNC varies considerably from region to region: from 1.19 hours/day in Côte Nord to 2.2. hours/day in Monteregie. It is lower in northern regions (#09, 02, 01, 08) than in southern ones (table VI).
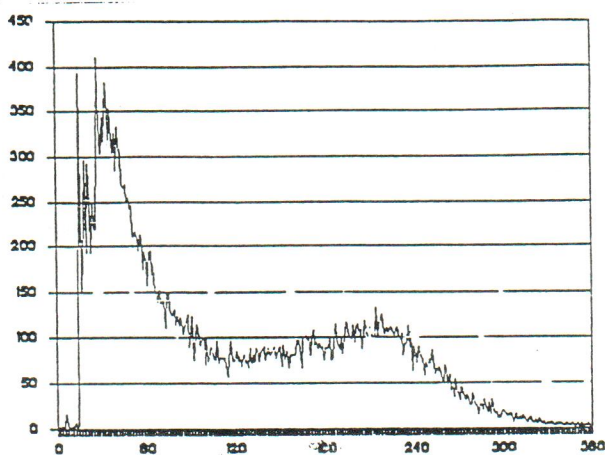
Figure 5: Frequency distribution of ECH, NH and PAV clients according to the number of minutes of care required per client per day
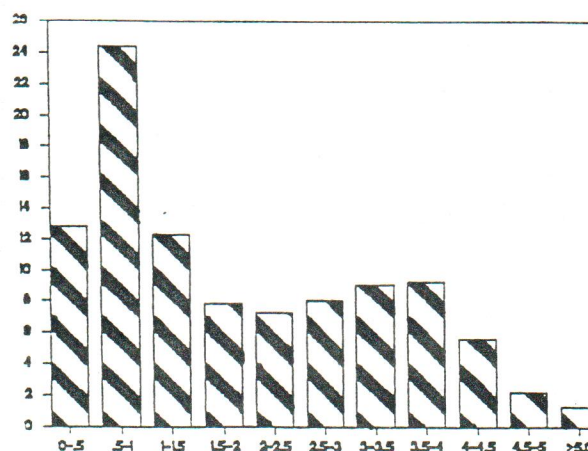

Figure 6: Frequency distribution of ECH, NH and PAV clients according to the category (half an hour intervals) of level of care (in hours of care per day)
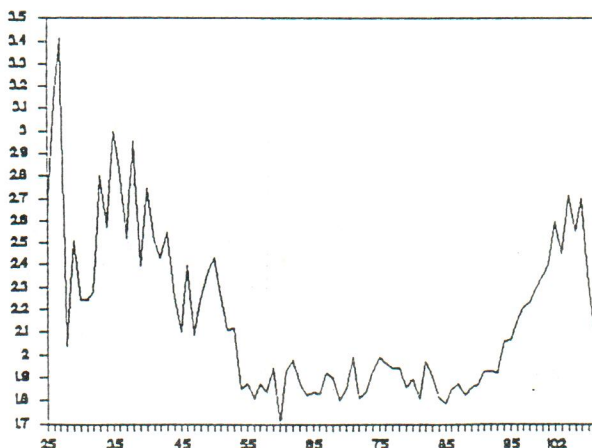

Figure 7: Average number of hours of care required per ECH, NH, PAV client-day at each year of age

Rang	Région		Moyenne	Écart-type
1	09	Côte-Nord	1.19	1.19
2	02	Saguenay/Lac-St-Jean	1.29	1.15
3	01	Bas-St-Laurent/Gaspésie	1.62	1.31
4	08	Abitibi/Témiscamingue	1.89	1.25
5	04	Centre du Québec	1.92	1.37
6	06A	Montréal	1.96	1.40
7	07	Outaouais	2.01	1.30
8	05	Estrie	2.03	1.41
9	06B	Laurentides/Lanaudière	2.11	1.33
10	06C	Montérégie	2.20	1.40
	QUÉBEC		1.95	1.38

Table VI: Average number (+ standard deviation) of hours of care required per ECH, NH, PAV client-day in each Quebec's health district

NH, ECH and PAV are quite different in terms of their respective distribution of LNC (figures 8, 9 and 10). In the average, PAV clients average level of care is only 23% of ECH clients level of care, NH's one is 54% of ECH's one. The average LNC figures are the following: PAV: 0.68, NH: 1.59 and ECH: 2.94 hours/day. But the nature of care in these different settings does not vary greatly: the technical component of care is not more important in ECH than in NH; the difference in (global) level of care between these institutions is totally explained by the difference in levels of **basic** care. This brings about the **paradox** that the ratio of professional to non professional nursing personnel should be lower in ECH than in NH. Figures 11 also shows that even if average LNC are quite different in NH and ECH, these two categories of institutions share in fact the same clients. ECH have almost no clients in the LNC category: 0 to 0.5 hours/day but in all other categories they «compete» with NH. It is particularly noteworthy that NH and ECH share almost fifty-fifty the more demanding clients, these requesting more that 4.5 hours/day. The difference between the two categories of establishments remains with the fact that NH while accomodating these very demanding clients in about the same number than ECH, admit in their remaining beds (they have 11 000 beds more than ECH) much less demanding clients.
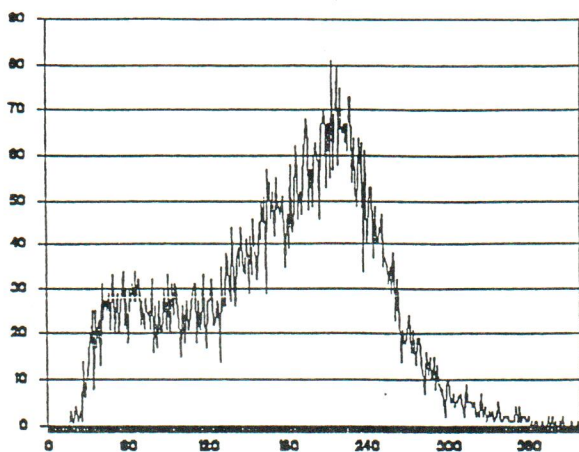

Figure 8: Frequency distribution of ECH clients according to the number of minutes of care required per client per day
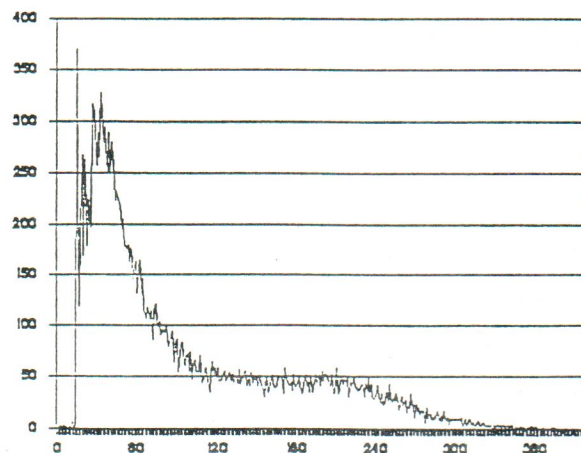

Figure 9: Frequency distribution of NH clients according to the number of minutes of care required per client per day
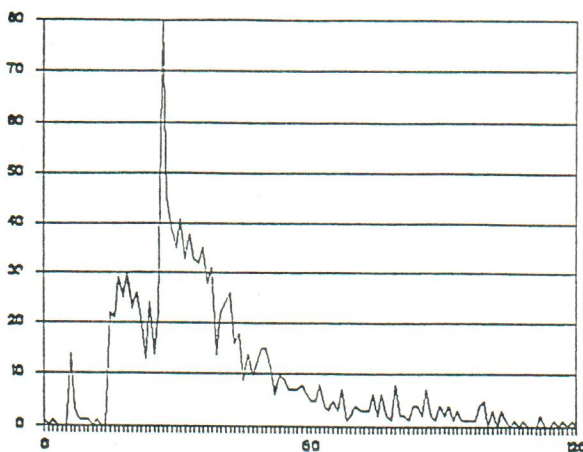

Figure 10: Frequency distribution of PAV clients according to the number of minutes of care required per client per day
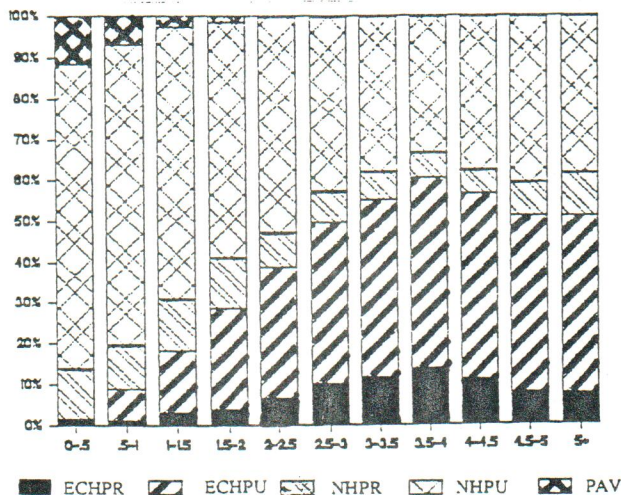

Figure 11: Probability distribution of ECH, NH and PAV clients by type of program in each category of level of care

To further illustrate the diversity and complementarity of ECH and NH, we will now compare the demand of nursing care of each individual program average client (LNC of the average client + 24 minutes*) with the amount of nursing care available (according to the Department of health and Social services budgetary data) to each program average client.

To facilitate the analysis, programs have been grouped (according to the amount of nursing care required by or given to their average client) by interval of 10 minutes (figure 12 and 13). For example, all ECH which have a budget allowing them to provide between 3 hours and 3 hours 10 minutes of care/day to their average client, belong to the same category.
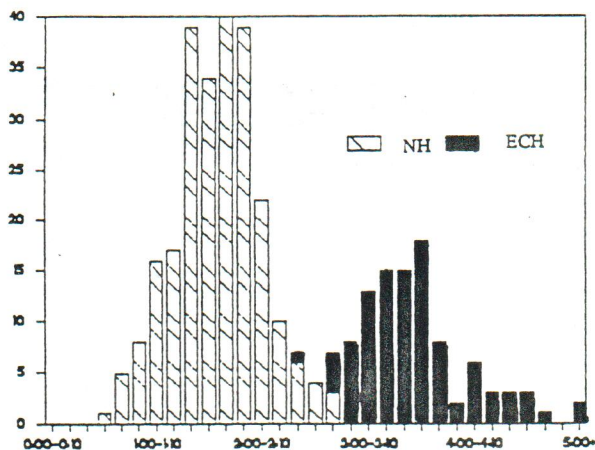

Figure 12: Frequency distribution of NH and ECH following the category of level of care (ten minutes intervals) supplied in the average per client-day
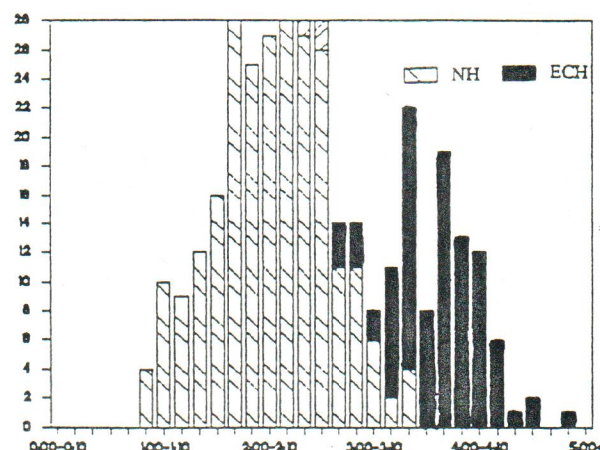
Figure 13: Frequency distribution of NH and ECH following the category of level of care (ten minutes intervals) required in the average per client-day

With respect to supply, NH and ECH constitute clearly distinct but still heterogeneous categories (figure 12). The distribution of NH extends from the class (0h30-0h40) hours/day to the class (3h00-3h10) hours/day while ECH are distributed on the interval (2h20-2h30) to (5h00-5h10) hours/day. Despite these large variations, the overlapping of the two distributions is very small. It happens in the interval (2h20-2h30) to (3h00-3h10) hours/day.

With respect to demand (figure 13), one observes about the same heterogeneity than in the supply side, but the overlapping of the distributions of the two types of programs is more important.

From the point of view of both supply and demand, it is obvious that one does not deal with **two** kinds of programs, but rather with a **continuum** of programs, from very «light» to very «heavy» programs. The separation between NH and ECH is still clear from the supply side (figure 12) and this is because the budget of these two types of programs have different historical bases (at the origin, they even were under the umbrella of two distinct Ministerial departments). This is less true from the demand side where many NH have more demanding clients than some ECH. (See also figure 11). So there seems no longer realistic

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*To take into account the other tasks performed by nursing personnel (maintenance, clerical, administrative activities performed for the functioning of the ward, as well as communications with other members of the care team, with the family, with other services regarding the patient), on adds 24 minutes/per 24 hours to the client level of care (LNC).

and desirable to continue with this distinction which has several perverse effects among which that of checking the allocation of resources to programs in function of the demand of their clients is not the least. That is indeed what one observes from the examination of care supply/demand ratios (S/D) in NH and ECH. Figure 14 presents the distribution of programs by category (NH or ECH) in each 10% interval of the S/D ratio. This figure illustrates in a spectacular way the inequities which affect globally the process of resources allocation between ECH and NH.

But these inequities may also be observed at less global levels: for example between public ECH and private ECH (see figure 15) or between health districts (in Quebec, northern districts exhibit far better S/D ratios than southern ones). And, indeed, inequities exist within each category of programs, at the level of individual programs (figure 16).
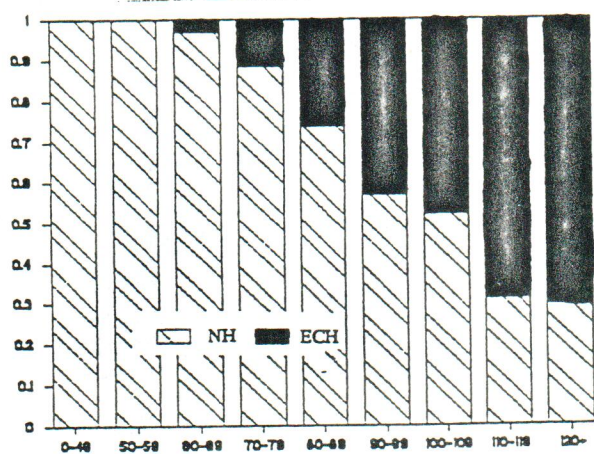

Figure 14: Probability distribution of programs by type (NH or ECH) in each category of supply/demand ratio
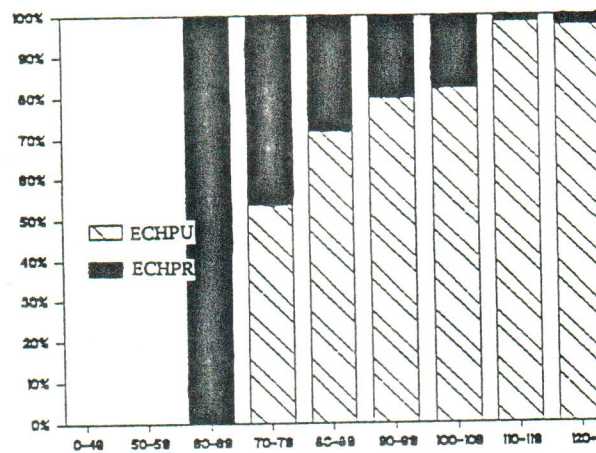

Figure 15: Probability distribution of ECH by status (private or public) in each category of supply/demand ratio
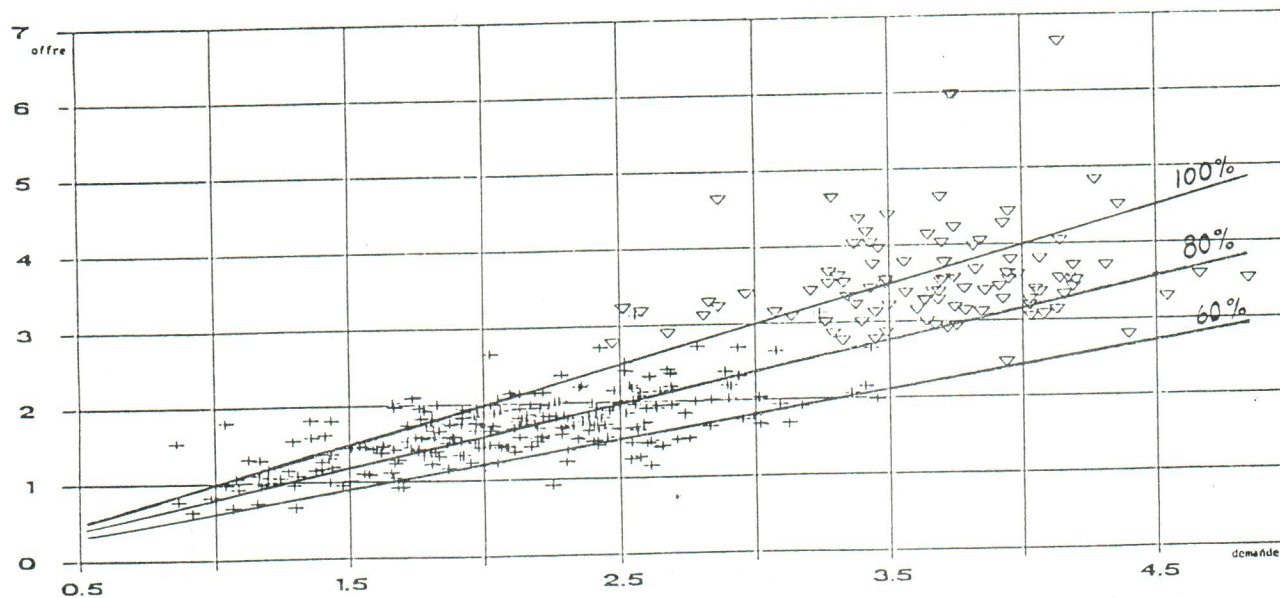

Figure 16: Supply and demand diagram: representation of supply (in hours of nursing care per patient-day) in relation with demand in each individual NH (+) and ECH (▽) program

CONCLUSION

In presenting some outputs of the system, we have concentrated on results which are produced for planners and decision-makers at the area, district and country levels, because we thought that these results could be the more interesting for an international audience. Nevertheless, it should not be forgotten that the system would not exist without the contribution of programs staff and management. To motivate these peoples to monitor their clients, the system tries also to answer as much as possible of their information needs in providing them with many outputs describing the present status and the evolution of their clients in terms of age, sex, lenght of stay, diseases, handicaps, impairments, levels of care; measuring staff required per ward, shift, day of the week, hour of the day; describing in details the services required by clients both in terms of time and frequency, etc. This first level of reporting has been the backbone of the system since its beginning.

REFERENCES

1. Tilquin, C. et al: **PLAISIR - Planification informatisée des soins infirmiers requis**, EROS, Health Administration Department, University of Montreal, 1984.

2. Wood, P.H.N.: **International Classification of Impairments, Disabilities and Handicaps**, W.H.O. Geneva 1980.

3. Tilquin, C.; Carle, J.; Saulnier, D.: **PRN 80: Measuring the Level of Nursing Care Required**, Health Administration Department, University of Montreal, 1980, 230 p.

4. Tilquin, C.; Saulnier, D.; Lejeune, H.; Clément, H.: **PRN 87: Measuring the Level of Nursing Care Required**, Health Administration Department, University of Montreal (to appear).

5. Tilquin, C. et al.: **L'alourdissement des clientèles placées dans les programmes offrant des services de longue durée - Rapport no. 1: cadre méthodologique de l'évaluation continue des clientèles avec le système PLAISIR**, EROS, Health Administration Department, University of Montreal, 1989.

6. Tilquin, C. et al.: **L'alourdissement des clientèles placées dans les programmes offrant des services de longue durée - Rapport no. 2: la lourdeur des clientèles placées en centre d'accueil d'hébergement et en centre hospitalier de soins de longue durée**, EROS, Health Administration Department, University of Montreal, 1989.

7. Tilquin, C. et al.: **L'alourdissement des clientèles placées dans les programmes offrant des services de longue durée - Rapport no. 3: l'offre et la demande de soins et d'assistance dans les centres d'accueil d'hébergement et les centres hospitaliers de soins de longue durée**, EROS, Health Administration Department, University of Montreal, 1989.