

# Integrated Services for Frail Elders (SIPA): A Trial of a Model for Canada\*

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## RÉSUMÉ

Le complexe formé par les maladies chroniques, les épisodes de maladies aiguës, les déficiences physiologiques, les incapacités fonctionnelles et les problèmes cognitifs dominant les personnes âgées fragiles. Elles comptent sur l'aide des programmes sociaux et de santé qui, au Canada, sont encore fragmentés. Le SIPA (Services intégrés pour les personnes âgées fragiles) est un modèle de services intégrés basé sur des services de proximité, une équipe multidisciplinaire et un gestionnaire de cas qui détiennent la responsabilité clinique de l'ensemble des services sociaux et de santé requis, la capacité de mobiliser des ressources en fonction des besoins et l'application de protocole de soins. Le projet de démonstration SIPA a utilisé un devis expérimental avec assignation aléatoire de 1230 participants, de deux quartiers de Montréal, dans un groupe expérimental et un groupe témoin. Les coûts des services institutionnels ont été de 4270\$ inférieur dans le SIPA comparés au groupe témoin, les coûts des services de proximité ont été supérieurs de 3394\$. La proportion des personnes en attente d'hébergement en hôpitaux de courte durée a été deux fois plus élevée dans le groupe témoin que dans le groupe SIPA. Les coûts des hospitalisations de courte durée des personnes du SIPA avec incapacité dans les activités de la vie quotidienne ont été inférieurs d'au moins 4000\$ à ceux des personnes du groupe témoin. En conclusion, l'expérimentation SIPA démontre qu'il est possible de s'engager dans des projets de démonstration ambitieux et rigoureux au Canada. Ces résultats ont été obtenus sans augmentation des coûts globaux des services sociaux et de santé, sans diminution de la qualité des soins et sans augmentation du fardeau des personnes âgées et de leurs proches.

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The Canadian population is aging, and the eldest segment of this aging population is increasing rapidly.<sup>1,2</sup> The consequences of aging for society as a whole, and for health services in particular, are controversial.<sup>3-8</sup> On the one hand, medical and hospital costs appear to be related to proximity of

death rather than to age,<sup>9,10</sup> while, on the other, functional disabilities, cognitive deterioration, and frailty appear to increase the costs of long-term services only.<sup>11</sup> Similarly, the burden of disability on future health systems is uncertain although it is not as alarming as we so often fear.<sup>12-14</sup> Specifically,

the complex formed by chronic illness, episodes of acute illness, physiological limitations, functional disabilities, and cognitive problems is prevalent among persons aged 75 or over.<sup>15,16</sup> They rely on assistance from social and healthcare programs, but their families and close friends provide most of the support and assistance they require.<sup>17,18</sup> Older persons with disabilities comprise approximately 20 per cent of the population aged 65 or over,<sup>19,20</sup> use a significant portion of health and social services, and are frequently referred from one service to another.<sup>21</sup>

The health and social services provided by the Canadian provinces to frail older persons are fragmented,<sup>22,23</sup> and financial and organizational incentives are not conducive to the use of the most appropriate and least costly services, while institutional services are still used too often.<sup>24,25</sup> Integrated service models intended for this population have attracted increasing interest. The Bois-Francs<sup>26</sup> and PRISMA<sup>27</sup> demonstration projects in Quebec, the CHOICE<sup>28</sup> project in Alberta, and the On Lok,<sup>29</sup> PACE,<sup>30–32</sup> and S/HMO<sup>33–35</sup> projects in the United States have attempted to demonstrate their ability to improve the health of frail older persons, increase levels of satisfaction, and redirect patterns of institutional service utilization towards community-based services.<sup>36–38</sup> Paradoxically, few demonstration projects have used experimental or quasi-experimental designs for evaluation purposes.

Solidage, the Université de Montréal–McGill University research group on integrated services for older persons, in collaboration with a group of managers, practitioners, and academics, designed a model for an integrated service system for frail older persons (SIPA—Services intégrés pour les personnes âgées en perte d'autonomie).<sup>39</sup> This multidisciplinary group undertook discussions with all the stakeholders in the Quebec health and social services network at each stage of the model development. International experts also participated in the work. Solidage, in collaboration with the regional health and social services authority (La Régie régionale de la Santé et des Services sociaux de Montréal-Centre (RRSSM-C)) proposed a demonstration project with an experimental design,<sup>40</sup> participated in its implementation, and was responsible for its evaluation.

SIPA was informed by the analysis of experiments conducted in Quebec and elsewhere in the world and brings together the following characteristics:

1. a system based on community primary care services responsible for the delivery of all services, including health and social, acute and long-term, and community and institutional, including acute care hospitals and nursing homes
2. a local organization responsible for the health of and service utilization by a frail older population within a given territory
3. the integration of health and social services via
  - a. case management
  - b. multidisciplinary teams
  - c. the application of guidelines and services based on the latest knowledge and adapted to local populations
4. an organization that mobilizes needs-based, flexible, and rapid responses through
  - a. the availability of intensive community-based services
  - b. the ability to determine and intervene in several areas: medical, social, and rehabilitation
5. a system to assess the quality of services and management on an ongoing basis
6. services adapted to persons' circumstances via
  - a. communication and rapid response once needs have been expressed
  - b. on-call services
  - c. links and coordination among service providers
7. funding of local SIPA budgets via capitation and exercising the resulting financial responsibility
8. accountability to the universal, public health insurance system

The SIPA model is consistent with the reforms proposed by the Clair Commission<sup>41</sup> in Quebec and the Romanow Commission at the federal level<sup>42</sup> and is related to proposals by other groups.<sup>43–45</sup> The reform components retained by SIPA are the pivotal role of front-line services, the necessary integration of various health service components, and the concept of responsibility for the health care of, and delivery of services to, the population within a given territory. In accordance with these orientations, the SIPA model involves significant modifications in the ways in which health and social services are funded, organized, and delivered.

The promising changes in clinical, organizational, and management practices suggested by the SIPA model, the close relationship between this model and the most important reforms proposed in Canada, and federal and Quebec government commitments to fund and support innovations within the health system paved the way for the implementation of the SIPA demonstration project. In this context, the RRSSM-C—now the Agence de développement de réseaux locaux de services de santé et des services sociaux de Montréal—became involved in the SIPA demonstration project within its territory, with a view

to either having SIPA implemented throughout its territory or retaining its positive components. This involved assessing the differences, attributable to SIPA, in patterns of use and costs of services provided to frail older persons.

The target population of the demonstration project, the methods of project implementation, the financial and human resources invested, the choice of implementation sites, the evaluation design, and the work schedule were drawn up and selected by the Solidage group, working closely with the RRSSSM-C.

The target population comprised vulnerable older persons; that is, individuals with one or more problems in the following areas or involving the following health conditions: activities of daily living (ADL), instrumental activities of daily living (IADL), incontinence, physical mobility, communication, and mental function. The designation of two pilot sites in June 1998, by the RRSSSM-C board of directors, marked the start and implementation of the SIPA project. During the course of the trial the St-Laurent CLSC joined the institutions affiliated with the CLSCs in Côte-des-Neiges (CdN) and Bordeaux-Cartierville (BC). A regional monitoring committee was formed, consisting of representatives from the three CLSCs as well as hospitals, nursing homes, and rehabilitation centres used by older persons within the territories of the participating CLSCs. These institutions were Sacré-Cœur Hospital, the Jewish General Hospital, the Maimonides and Notre-Dame de la Merci Geriatric Centres, and the Jewish Rehabilitation Hospital. They participated in the design of the SIPA evaluation and in its implementation. The regional monitoring committee became an important venue for discussions between those with local and regional responsibility for SIPA and those responsible for its evaluation.

## Objectives of the Evaluation

The principal objective of the SIPA demonstration project was to compare the differences in utilization and costs of health and social services as between the persons admitted to SIPA and those receiving the services usually available to frail older persons within the Quebec health and social service system. The hypotheses predicted that the implementation of an integrated service model and the increased availability of nursing, homemakers, rehabilitation, and social work services would reduce the use and costs of institution-based services. The integrated model encompassed a group of coordinated services offered to persons admitted to the SIPA program under the responsibility of a case manager and a multidisciplinary team providing home health

and social care, 24/7 on-call service, the application of care protocols, and so on.

The primary expected outcomes were reduced use and costs of institutional services. Institutional services included short-term hospitalization, emergency hospital services, waiting for a nursing home bed in acute-care hospitals, and nursing home placement. The effect of SIPA would also be reflected in the greater use of other community-based services, such as those provided by family physicians. Supplemental expected outcomes included equivalent evolution of health status, private costs, and caregiver burden for the two groups and greater satisfaction for the participants.

## An Experimental Study

### *Design and Recruitment*

The target population was elderly persons with functional disabilities. The Functional Autonomy Measurement System (SMAF) score<sup>46</sup> was used to identify elderly persons who were eligible for SIPA. SMAF scores vary from 0 (*independent*) to 80 (*dependent*). To ensure that the elderly persons recruited had a complex mixture of service needs requiring coordination, the threshold for admission was set at  $-10$  or less. To be admissible, persons also had to satisfy the following criteria: aged 65 or over, not admitted to a nursing home, has consented to the study and to random allocation to the experimental or control groups, caregiver has consented to study participation, and understands English or French or has someone close with knowledge of either of these two languages.

The records of persons aged 65 or over who received CLSC homecare services were reviewed. Persons meeting the selection criteria were invited to participate in the study and their consent was requested. Consent included consent to participation in interviews; agreement that the participant's social, medical, and hospital records could be consulted; and consent to the participant's Quebec health insurance number being identified. Recruiting took place between January and August 1999. A special consent procedure was developed for persons with a diagnosis of dementia and those with indicators of cognitive problems on the SMAF.

The sample size was calculated for  $\alpha=0.05$  and  $\beta=0.90$ , using figures for the utilization and costs of health and social services from a sample of elderly persons living in an area of Montreal in 1995.<sup>47</sup> It was hypothesized that, compared to the control group, SIPA participants would have 50 per cent fewer admissions to nursing homes, that 50 per cent fewer

people would wait in acute-care hospitals for nursing home placement, and that average elective and emergency hospital stays would be 25 per cent shorter. The maximum sample size obtained was 1,270 persons in total.

The SIPA demonstration project used an experimental design with random assignment of participants either to the SIPA program (experimental group) or to the usual program of care offered by local CLSCs (control group). The persons recruited (see Appendix 1) were allocated according to a random sequence that was computer generated and administered by the SIPA research coordinator. The person's status was then passed on to the CLSC. Eligible older persons had an equal likelihood of being assigned to either of the two groups. A total of 1,309 persons were approached during the recruiting phase. Of these, 1,230 participated in the SIPA experiment (see Appendix 1). The socio-economic characteristics of the participants are described in Table 1.

The measurement of service utilization and costs is based on administrative records from the Quebec Ministry of Health and Social Service (MSSS), the Régie d'assurance maladie du Québec (RAMQ), and the RRSSM-C. Other data were collected from patients' records. The costs of hospitalization and

institutionalization were obtained via estimation procedures specially created by the research team. Statistical analyses aimed to compare service utilization and costs between participants assigned to the SIPA group and those assigned to the control group. The estimated differences between these two groups took into account losses to follow-up and associations between use and costs of multiple services.

The intent to treat principle was used in the data analysis. Data on persons who voluntarily withdrew from the study were no longer collected as of the date of withdrawal. The ethics committees of the Jewish General Hospital and the CLSCs approved the evaluation protocol. The project ran for 22 months, from June 1, 1999, to March 31, 2001.

### The Measures

The measures of utilization and costs of services were the number of hospitalizations and nursing home stays, and the length of stay, the use of sheltered housing, and the extent of utilization of home care services offered by SIPA—that is, nursing, homemakers, social workers, and other professionals. Data concerning utilization of care and services was collected from institutions' patient records and from information systems (SICC, local MEDECHO) and

**Table 1: Socioeconomic characteristics and health status—SIPA and control groups on admission**

	Range of Variation	SIPA		Control Group		Totals	
		Average or %	SD	Average or %	SD	Average or %	SD
<b>Socioeconomic Characteristics</b>							
Age (years)	64–104 years	82.02	(7.36)	82.28	(7.18)	82.15	(7.25)
Sex	% of men	29.4%	(0.46)	28.0%	(0.45)	28.7%	(0.45)
Education	1 (none) to 6 (university)	3.91	(1.40)	3.96	(1.34)	3.93	(1.37)
Sufficient Income	1 (sufficient) to 5 (none)	2.43	(1.01)	2.38	(1.00)	2.41	(1.00)
Lives Alone	% living alone	56.2%	(0.50)	60.0%	(0.49)	58.1%	(0.49)
<b>State of Health</b>							
# of Chronic Conditions	from 0 to 16	4.90	(2.33)	4.99	(2.32)	4.94	(2.32)
Functional Limitations	from 0 to 16	9.84	(5.18)	9.61	(5.19)	9.72	(5.18)
IADL Disabilities	from 0 to 16	6.95	(4.53)	7.01	(4.58)	6.97	(4.56)
ADL Disabilities	from 0 to 26	4.34	(5.54)	4.35	(5.71)	4.35	(5.62)
Incontinence	% with incontinence	42.0%	(0.44)	46.3%	(0.50)	44.1%	(0.50)
Cognitive Problems	% with problems	30.6%	(0.46)	32.1%	(0.47)	31.4%	(0.46)
Depression	0 (none) to 15 (high)	5.03	(3.40)	4.90	(3.55)	4.97	(3.47)
Perceived Health	1 (excellent) to 5 (poor)	3.47	(1.07)	3.41	(1.03)	3.44	(1.05)

administrative files (RRSSM-C, RAMQ, MEDÉCHO-MSSS, Urgence-santé).

The costs were obtained by multiplying utilization by the unit costs of services. The volume of certain services was counted by item, such as the number and type of medical services, laboratory tests, radiological examinations, nutritional supplements, medical procedures, paramedical services, and the number and type of surgical interventions.

In a second stage, a unit cost was determined for all the services used. The unit costs for medical services, medicines, and technical aides used in the community were determined from RAMQ reimbursement fee schedules (physicians fees, drugs, prostheses, etc.). Urgence-santé fees were used for ambulance transport.

To improve the precision of the calculations of the unit costs, estimations of direct and overhead costs were obtained. A step-down procedure<sup>48</sup> was applied for attributing the indirect costs to the activity centres at each institution according to the hours worked. This method yields more precise estimates than using a general average for overhead costs.

The efficiency of the different establishments was not uniform. It was necessary to ensure that the probability of using different institutional settings by members of the two groups did not influence the costs. Thus, the unit costs used in the study represented the average of the costs from the different settings.

### *The Statistical Analyses*

Statistical analyses estimated the differences in access, intensity of utilization, and costs of health and social services between the experimental group (participants assigned to SIPA) and the control group (participants assigned to the usual services available to frail elderly persons in Montreal). The null hypothesis that there was no difference between the experimental and control groups was tested.

The objective of the analysis was to obtain an estimate of the experimental effect. Four modulators were considered in this analysis:

- Utilization and costs could only be measured for persons who used services, thereby introducing selection bias.<sup>49</sup> This was taken into consideration in the analyses.
- Hospitalization (for example) does not happen on its own, with those hospitalized having a high probability of high utilization of other health and social services. In general, frail elderly persons have intensive and varied use of services. The associations between access, utilization, and costs of these services had to be included in the statistical models.

- Whatever the experimental design used, the experimental and control groups cannot be completely identical on a range of socio-economic and health characteristics. The comparative analyses, therefore, included indicators of these variables.
- The effect of SIPA may be particularly marked in subgroups of frail elderly persons with particular characteristics. The frailest individuals could be more responsive to case management interventions and the availability of intensive home care. Supplementary analyses were undertaken to examine the possible specific effects of SIPA by persons' socio-economic characteristics and their health status.

Multi-level analysis<sup>50</sup> allows estimation of the experimental effect, taking into account each of these modulators, whether by modelling the variance-covariance matrix of prediction errors or by including indicators of modulators in the equations or by introducing their interactions with the experimental effect.

### **The Model as Implemented**

The SIPA sites involved in the demonstration project offered integrated service programs, which were independently managed both clinically and financially although located within two of the three host CLSCs—CdN and BC. Each SIPA site helped to determine its own budget, implementation plan, and deployment of human resources. At each of the two sites, SIPA was overseen by a program director, with assistance from administrative support personnel. The program directors were administratively responsible for clinical staff—case managers, nurses, social workers, rehabilitation specialists, homemakers, and so on.<sup>51</sup>

The SIPA sites oversaw the intervention plans drawn up for persons admitted, monitored changes in these individuals' health status and need for services, adapted services to their needs, delivered a range of community-based health and social services, and shared clinical responsibility with other agencies and professionals when the latter's services were used by persons admitted to SIPA. The records of study participants were administered from the SIPA sites.

### *Program Implementation*

Preparatory activities for the implementation of the demonstration project began in the spring of 1998, intensified in the fall of 1998, and continued through to June 1999.<sup>51</sup> The main activities were

- determining the human-resource, financial, material, and information-resource needs and the resources to substitute for institutional care
- setting up the sites (premises, equipment, etc.)

- recruiting of managers, clinical, and administrative staff (almost 80 from different disciplines) as well as doctors
- recruiting of 1,230 frail elderly persons and their caregivers
- developing interdisciplinary intervention protocols and the service delivery processes
- training personnel in the SIPA model
- preliminary identification of systems to guide activities at the sites, such as performance indicators for clinical and administrative monitoring
- setting up the regional committee and the site monitoring committees, the inter-site coordination committee, as well as the working committees for specific issues such as residences for the elderly, critical incidents, and so on
- negotiation of agreements between institutions associated with the project and other partners, such as family doctors of persons admitted to SIPA, hospitals, day centres, the police, community organizations, care homes, and so on
- putting in place the mechanisms for a rapid-response teams to be available 24 hours a day, 7 days a week, with a dedicated SIPA telephone number and on-call nursing and medical services as well as other care services
- the gradual takeover of the care of elderly persons assigned to SIPA and the putting in place of services according to the SIPA model
- the gradual identification of treating physicians and the process of establishing formal collaboration agreements

#### *Recruiting and Care for Persons Admitted to SIPA*

Nearly 10,000 hours were required to recruit 1,230 frail older persons and their caregivers. This burdensome recruiting process was attributable to the constraints inherent in an experimental project. Recruiting required the cooperation of CLSC home care support staff already overloaded by their usual tasks.

Most of the individuals assigned to the experimental group were known to the CLSC home care program. The period during which participants admitted to SIPA were transferred from the CLSC home care services was prolonged beyond the scheduled date on which the experiment was to begin, extending nearly 3 months into the operational period. Responsibility for the cases of those admitted to the program was assumed in batches, rather than as a continuous flow. The incorporation of SIPA model components into the clinical practice of the various health professionals involved proved difficult.

#### *Recruiting of Personnel*

Each site included two to three managers, an equal number of administrative assistants, and the equiva-

lent of approximately 15 full-time professionals (case managers, nurses, social workers, occupational therapists, physiotherapists, dieticians) as well as 14 to 35 homemakers.

This staff was recruited from the CLSC personnel or from those on their recall lists. The lack of available personnel in certain professional categories affected staffing and team stability. Nursing, physiotherapy, and homemaker positions remained vacant for variable periods, the hiring process was continuous, and the project used a significant amount of subcontracted labour. The nurses' strike during the summer of 1999 disrupted SIPA activity, especially at one site.

#### *Intensity of Home Support Services*

The increase in intensity in use of home care services was less than predicted. At the time the demonstration-project implementation plan was developed, the average annual expenditure for home care services provided to older persons was set at approximately \$1,800. The SIPA budget allowed for an amount 5 times higher. Over time, recurrent home-care-service funding increased substantially; additional funds were contributed in the winter of 2000 to deal with the seasonal crisis in hospital emergency services. The RRSSM-C implemented certain components of the SIPA model throughout the Montreal network, such as the continuous presence of a CLSC representative in hospital emergency departments to accelerate transfer from hospitals to CLSCs for older persons and to increase the use of home care services.

In the end, the SIPA home-care-service budget was no more than 1.5 times higher than the usual CLSC home-care-service budget.

#### *Clinical Responsibility*

SIPA was responsible for services, regardless of the location of the person under its jurisdiction—at home, in a residence for the elderly, or in a hospital or nursing home—and of whether or not s/he used the services of a day centre or day hospital. Follow-up of visits to general practitioners and specialists, as well as drug prescriptions, were also SIPA's responsibility. Such responsibility and follow-up were assumed by the case manager and multidisciplinary team, via the service plan and through the intervention of the case managers in health and social service organizations.

#### *Inter-organizational Coordination*

The actions of the case manager required the negotiation of inter-organizational service and intervention protocols. Relationships between Montreal hospitals,

nursing homes, and rehabilitations centres; CLSCs; and the SIPA program were ensured by several means:

1. Local SIPA projects were set up from the start by institutional consortia that included at least a CLSC, an acute-care hospital, and a public nursing home.
2. A monitoring committee of all organizational partners, including the RRSSM-C, was formed at the beginning of the experiment and met regularly to make certain that the project ran smoothly.
3. Specific inter-organizational agreements were negotiated to specify the ways in which organizations would work with local SIPAs and how case managers would intervene at various phases of service delivery to SIPA participants.
4. Case managers' job descriptions and training explicitly included intervention in organizations other than CLSCs.

Inter-organizational agreements defined and specified the case manager's right to intervene in decision making that, up to that point, had fallen under the jurisdiction of the partner organization. Undoubted progress in inter-organizational coordination was made, due, in particular, to agreements regarding the management of critical incidents and 24/7 on-call availability.

Coordination with emergency services improved over time. However, case managers experienced difficulties in hospital care units. These were attributable to the turnover of hospital personnel, the lack of a local hospital SIPA case coordinator, the difficult information transmission process within the institutions, and coordination problems with hospital physicians.

Coordination with family physicians was also difficult, especially due to the lack of physicians at one of the SIPA sites during part of the experimental period and to the difficulty of establishing stable clinical relationships with the numerous family physicians.

#### *Clinical and Administrative Follow-Up Instruments*

Certain clinical forms, such as the basic evaluation form and the intervention plan form, were already in use within the Montreal system of home-care-service programs. A logging system was created to monitor the administrative procedures and services received by SIPA participants. This highlighted SIPA's responsibility to its clientele, regardless of the clientele's location, and allowed the clinical model to be closely monitored. Clinical instruments were created specifically for SIPA—for example,

interdisciplinary intervention protocols, the guide to contacting physicians in private practice, the interdisciplinary-intervention-plan (IIP) and integrated-service-plan (ISP) evaluation grid, and a case- and critical-service management process discussion follow-up instrument (e.g., emergency room visits, hospitalizations, nursing home placement). Other forms being designed were used as instruments for on-call service triage and a list of approximate costs of certain services.<sup>52</sup> At approximately the mid-point of the experiment, an experimental computer application to coordinate gerontological-geriatric services was tested.<sup>53</sup>

#### *Case Management*

Nurses, social workers, and on one site, an occupational therapist assumed the role of case manager. They were responsible for 35 to 45 cases. Case managers' work was organized in different ways, depending on the site. At one site, social workers acting as case managers were matched with a nurse co-manager and vice versa. At one site, case managers who were nurses wished to assume near total responsibility for clinical nursing care. At another, the clinical tasks of nurses working as case managers were reduced.

Case managers played an essential role in the SIPA experiment. They were each responsible for the clinical and administrative management of one of the multidisciplinary teams. This involved overseeing compliance with SIPA model parameters by members of the team, supervising personnel, and chairing clinical and administrative team meetings. From a clinical perspective, their tasks included assessing the needs of older persons and their close relatives, drawing up a service plan, making sure it was applied, keeping track of developments in a given situation, quickly mobilizing resources according to requirements and seeing that the service plan was adapted accordingly, and lastly, making certain that clinical and administrative information on changes in the patient's situation was entered into records and computer systems. Case managers' duties also involved making certain that all professionals worked together, and in particular, maintaining close contact with treating family physicians and monitoring persons during their stays in various institutions and their use of various services, such as hospitals, emergency services, and day centres.

#### *Multidisciplinary Team*

Local SIPA multidisciplinary teams included case managers, nurses, social workers, occupational- and physiotherapists, dieticians, homemakers, and community organizers. Physicians were members of

**Table 2: Position titles, number of persons per position, and number of older persons per position within the SIPA team**

Positions	Number of Equivalent Full-Time Positions	Number of Older Persons
Regional Coordinator	1	640
SIPA Director	1 per SIPA site	320
Program Directors	2	160
Case Manager	8	40
Nurses	5	64
Occupational Therapist	1	160
Physiotherapist	1	160
Dietician	0.5	320
Social Worker	1	160
Community Organizer	0.5	320
Pharmacist	1	160
Home Health Aides	15	21
SIPA Team Physician	0.5	320
Family Physicians	160	2

the SIPA team although most SIPA participants retained their family physicians. Formal ties were established between the multidisciplinary teams and these physicians, although the involvement of the latter did not always meet expectations. The Bordeaux–Cartierville CLSC site had a pharmacist available (see Table 2). Finally, case managers were responsible for the multidisciplinary team and were supported in their work by all team members, from nurses to homemakers.

#### *Medical Services Provided by SIPA Physicians and Those in Private Practice*

The approximately 606 older persons admitted to SIPA at both sites were served by 245 family physicians. Each physician cared for an average of fewer than three SIPA patients. Consequently, SIPA participants made up a very small fraction of their practices. Over 85 per cent of them worked in private practice and over 95 per cent were general practitioners. The SIPA sites had family physicians and geriatricians available at various times. One site succeeded in recruiting a coordinating physician and a geriatrician, each of whom worked 2 days a week. During certain periods, SIPA teams did not have a physician available, and during others, teams had a full-time equivalent physician available 4 days per week.

#### *Role of Subjects and Caregivers*

The older persons admitted to SIPA participated in decisions regarding the services provided to them. For example, referrals to private home care services and private seniors' residences were made bearing the wishes and means of the older person in mind. This applied particularly to out-of-pocket expenses for such private services. Caregivers were consulted with respect to the implementation of services for the older persons admitted to SIPA.

#### **Services for the Control Group**

Those assigned to the control group received the services usually available in Quebec to frail older persons, as organized and delivered by participating CLSCs. The CLSCs were the main bodies responsible for delivering home care services to these persons according to the Quebec Ministry of Health and Social Services home-care-service policy in force at that moment.<sup>54,55</sup> The SIPA model and this policy are similar in certain respects but differ fundamentally in several ways. Home care services in Quebec offered nursing care and assistance only with the activities of daily living. The number of hours available per person was restricted and services were not available on weekends. In the current instance, case management was not put into practice, although health and social service professionals did assume some responsibility for coordination. This responsibility did not exceed CLSC departmental boundaries.

Home care services provided to frail older persons in the control group were funded by the CLSC general budget, which did not offer flexibility to home-care-service personnel, in the sense that they could only allot sums for specific items within the scope accepted by the ministry home-care-service program and local practice standards.

#### **Results**

The SIPA evaluation examined SIPA's ability, as compared to that of the Quebec health and social service system,

- to substitute community-based health and social services for institutional services, a substitution that assumes equivalent total costs for all health and social services for both systems
- to increase the use of and expenditures for home care services for those in the SIPA group (increased use and costs for other community-based services, such as visits to physicians, were also expected)
- to reduce the use and costs of patients' waiting in acute-care hospitals for placement in a nursing home



### *Substitute Community-Based Services for Institutional Services*

Health and social services under local SIPA jurisdiction comprised a comprehensive range of services offered by several types of Quebec public health and social service organizations. Institution-based services included hospital emergency room visits, short- and long-term hospital stays, rehabilitation hospital stays, institutionalization, and palliative care. Community-based services included prescription medication purchased at pharmacies, visits to general practitioners and specialists, home care services, housing in sheltered housing, technical aids provided in the home, day hospitalizations, and day centres.

All participants in the SIPA group and the control group used at least one community-based service during the 22-month experimental period, while 80 per cent used an institutional service. Figure 1 compares the average cost per participant of institutional services to the cost of community-based services. The average cost of SIPA community-based services (\$12,695) was \$3,394 higher than the average costs generated by participants in the control group (\$9,301). This sum was offset by the \$4,270 in higher average costs of institutional services (\$27,314) generated by participants in the control group, as compared to those in the SIPA group (\$23,544). Lastly, the total cost of services was comparable in both groups; that is, approximately \$36,000 over 22 months.

How can SIPA's success in substituting community-based services for institutional services be explained? Is the increased cost of community-based services in the SIPA group attributable to specific services? To all types of services? Is the difference due to less frequent accessing of services? Or to a lower intensity of service utilization? Unit costs related to service production would not come into play here, since they are equivalent in both groups by definition. The same questions were asked conversely regarding institution-based services.

### *Increased Use and Costs of Community-Based Services*

Our study compared only the community-based services that the SIPA-experiment participants used most frequently; that is, home care services, family physician and specialist services, and pharmaceutical services insured by the Quebec public health insurance plan.

Home care services include health and social services. Health services were offered by nurses, dietitians, and occupational- and physiotherapists. Social services

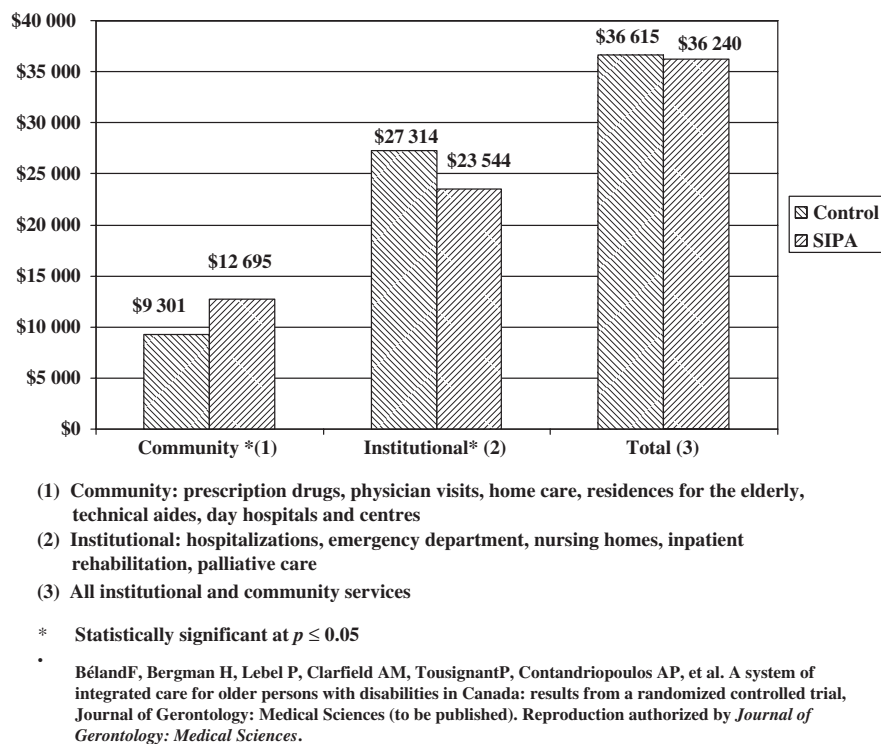
were provided by social workers and homemakers. Figure 2 compares access to community-based services by the SIPA and control groups. The rate of access was generally high, surpassing 80 per cent in all cases, except for access to home social services in the control group, where it reached only 68 per cent. The SIPA group accessed home care services and general practitioners' services more frequently. Access to specialists and medication was equivalent in both groups.

Intensity of utilization was measured differently according to the type of service. For home care services, the number of hours was calculated and the number of visits to specialists and general practitioners was compared between the SIPA and control groups. The number of pharmaceutical services was not considered here, since that depends on prescription patterns and, in particular, on the rate of renewal and other factors attributable to Quebec health insurance co-payment procedures. Figures 3.1 to 3.3 compare the results generated by participants in the SIPA and in control groups who used services only.

From a statistical perspective, the number of hours for home health care and the number of visits to general practitioners were significantly higher for the SIPA group than for the control group (see Figures 3.2 and 3.3). The number of home social care hours was somewhat higher for the SIPA group. It should be noted that the average number of hours of health and social care provided to all participants was low, since it never reached 1 hour per week for health services and 2 hours per week for social services.

The costs of community-based services within the SIPA and control groups were generated from figures for access to services, intensity of utilization, and unit costs. Generally speaking, costs generated by the SIPA group were higher than costs generated by the control group, although statistical significance was only reached in the case of home health services and visits to general practitioners. In Figure 4, the average cost figure used was obtained for all participants, not for service users only. The cost of home health care was lower than the cost of social care. This may have been attributable to the needs of participants with severe functional limitations and disabilities.

The higher total cost of SIPA community-based services resulted from the addition of differences in costs between the two groups for all the different services. Some of these differences were non-significant from a statistical point of view but, in terms of dollars, were greater than the significant difference for the visits to general practitioners.



**Figure 1: Total costs and costs for community and institution-based services**

#### Utilization and Costs of Institutional Services

Access, intensity of utilization, and costs of acute-care hospitalizations, of waiting in hospital for nursing home placement, of emergency room visits, and of nursing home stays for the SIPA and control groups are compared in Figures 3.1, 5, and 6. Half the participants were hospitalized at some time in the preceding 22 months of the SIPA experiment, over 60 per cent visited the emergency room at least once, and 14 per cent were institutionalized (Figure 5). SIPA succeeded in reducing the number of hospital waits for nursing home placement by half (5% as opposed to 10%).

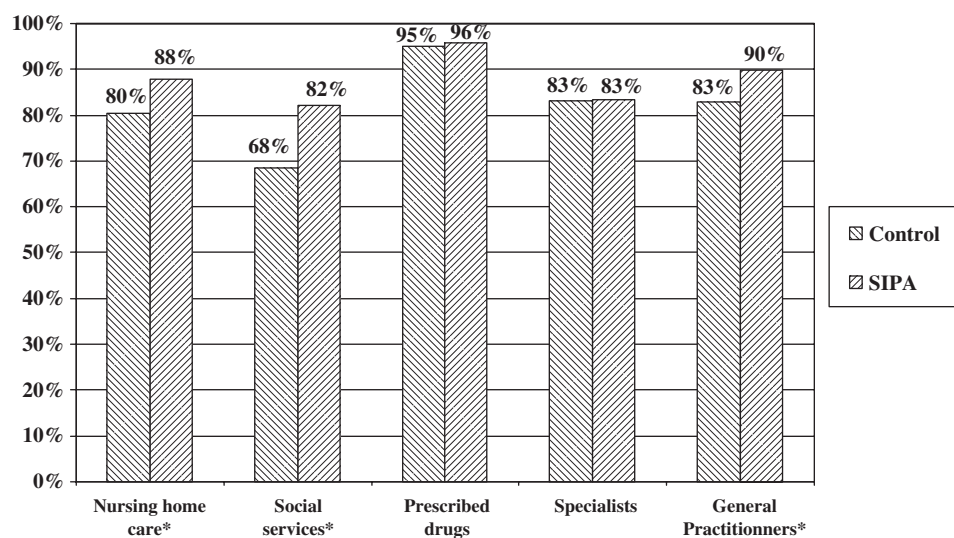
Length of stay for short-term hospitalizations and nursing home stays and waiting in acute-care hospitals for a nursing home placement are given in number of days in Figure 3.1. The number of hours was calculated for emergency room visits. No significant difference was observed among the experimental and control groups. Hospital stays were, however, usually longer for those in the control group than for those in the SIPA group.

The comparative average costs of institution-based services are shown in Figure 6. Averages were obtained for all participants. Emergency service costs, from \$7,700 to \$8,800 were very similar to the costs of hospitalization (\$7,200 to \$8,400). These costs

were also nearly the same as the total costs of home care services (\$5,600 for the control group and \$7,700 for the SIPA group). To summarize, the pattern of costs for health care and social services provided to frail older persons was very different from the pattern of costs generated either by older persons who were not frail or by middle-aged persons in the health and social care system in Quebec.

The costs for waiting in acute-care hospitals for nursing home placement were twice as high in the control group as in the SIPA group. This difference is attributable to the fact that those in the SIPA group had less than half the number of admissions than those in the control group. The differences in costs related to other institutional services were not statistically significant. However, the average costs generated by SIPA participants for emergency services and short-term hospitalizations were 10 per cent less than those generated by the control group.

The ability of SIPA to reduce the costs of institutional services by \$4,000—that is, by nearly 20 per cent—resulted from a significant reduction in costs related to time spent waiting for placement in an acute care hospital and to the reduction in the combined costs of emergency services, hospitalization, and permanent nursing home placement.



\* Statistically significant at  $p \leq 0.05$

**Figure 2: Community services accessed**

### *Effects of SIPA on Specific Groups of Participants*

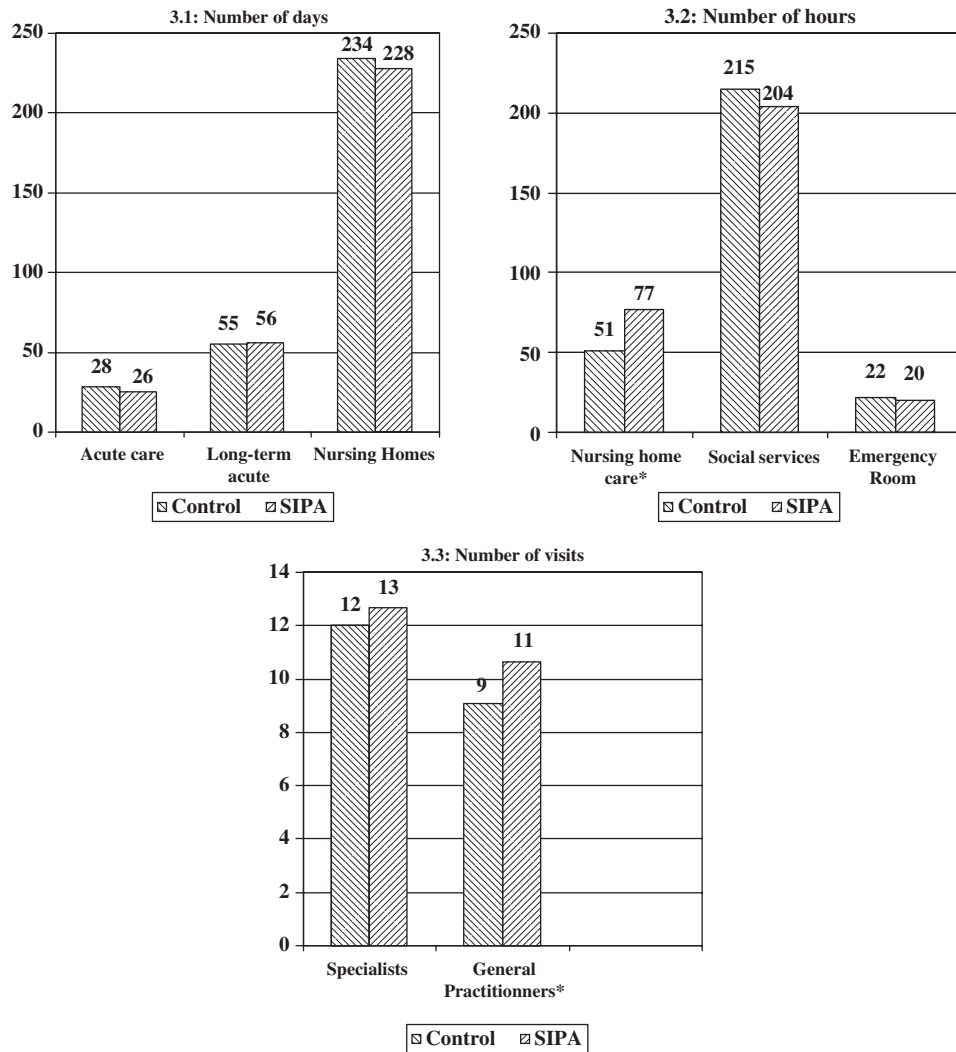
Participants in the SIPA experiment were frail elderly persons with several functional limitations, disabilities with respect to the activities of daily living and instrumental activities of daily living, and a variety of health problems. They suffered many chronic illnesses and a number of them had cognitive problems and were depressed. Nonetheless, a wide variation in state of health could be observed among these participants. Some had both chronic conditions and many functional disabilities, while others had functional disabilities but suffered from few chronic conditions; still others experienced cognitive problems as well, while others remain unaffected by such problems. The socio-economic conditions of SIPA participants also varied widely. Some enjoyed incomes they would describe as adequate, while others were low income earners. Some had not completed elementary school, while others had attended university. Lastly, some men and women lived alone and some cohabited with others.

The wide range of socio-economic conditions and states of health may have an impact on the costs of health and social care and in the ability of SIPA to transfer the costs of institution-based to community-based services.

Large differences in the costs of different services were found between the SIPA and control groups according to the number of chronic conditions and the number of ADL disabilities and to whether or not a given participant lived alone (Figure 7).

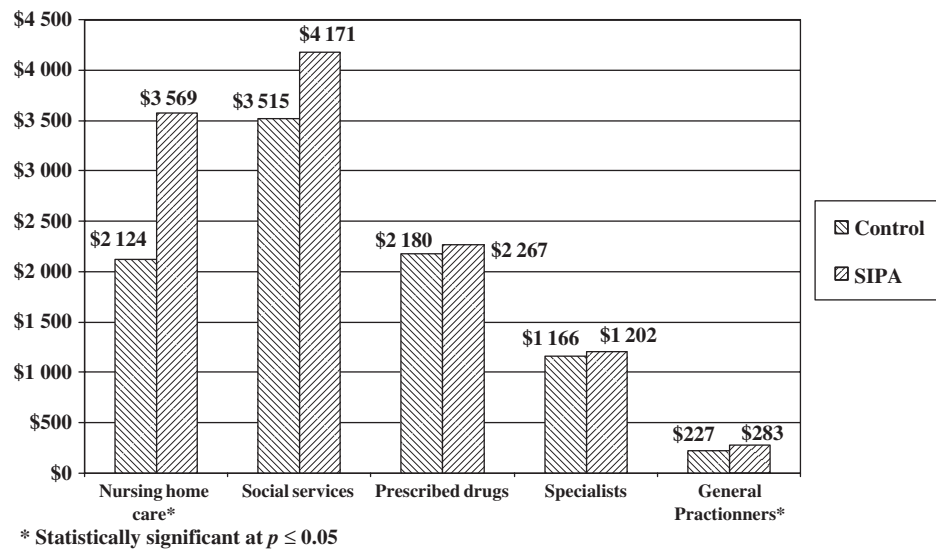
Firstly, home health services were more available to the SIPA group than to the control group among persons with a higher number of chronic illnesses, as the nearly \$2,500 higher cost within the SIPA group generated by those with five or more chronic illnesses will attest. The difference in costs was only \$550 for those with four chronic illnesses or less. Furthermore, nursing home costs were \$9,600 lower in the SIPA group for those with four chronic illnesses or fewer, as compared to \$500 for those with five chronic illnesses or more. In addition, SIPA succeeded in reducing institutionalization costs by \$14,500 for those living alone. These results appear to indicate that SIPA succeeded in reducing institutionalization for those who were least affected by chronic illness and who therefore required institutionalization not so much for health reasons as for more social reasons, such as isolation. Lastly, among persons with ADL disabilities, short-term hospitalization costs were reduced by \$4,000 to \$5,800 among those in the SIPA group, as compared to those in the control group.

SIPA affected institutionalization and short-term hospitalization costs selectively. Health reasons (such as the number of chronic conditions), social reasons (such as living alone), ADL disability, and other reasons that related sometimes to health status and at other times to informal and formal support received, all must have played an intermediary role in the ability of SIPA to influence the costs of health and social services.



\* Statistically significant at  $p \leq 0.05$

Figure 3: Intensity of utilization of health and social services for study participants who accessed them



\* Statistically significant at  $p \leq 0.05$

Figure 4: Costs of community services

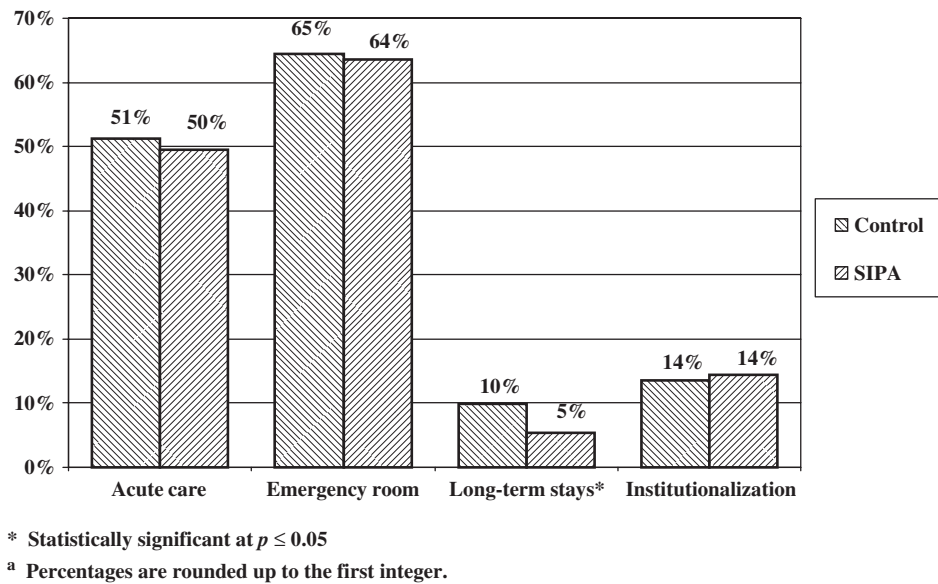


Figure 5: Institutional services accessed<sup>a</sup>

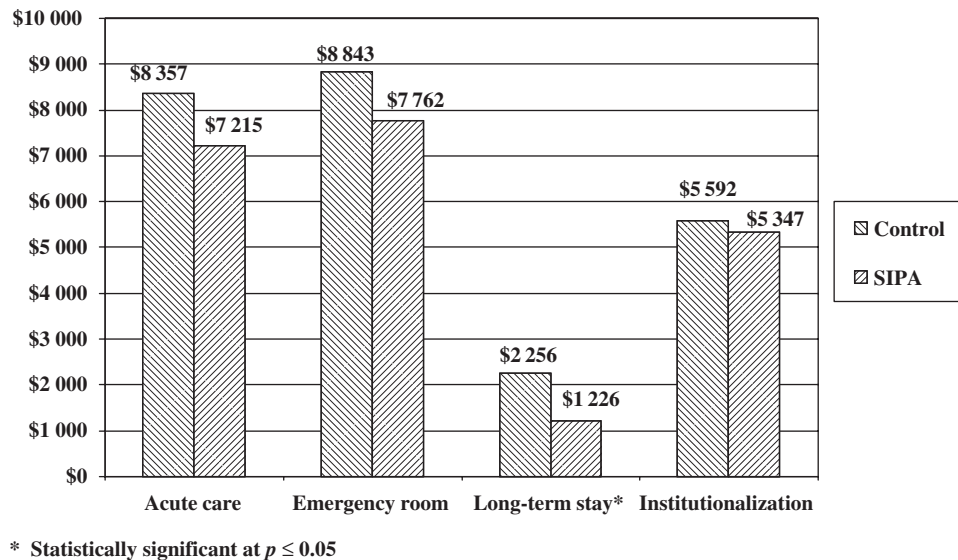


Figure 6: Costs of institutional services

### Conclusion

The SIPA demonstration project was the first experimental evaluation of a system of integrated services for frail older persons in North America. It ran for a 22-month period and involved a group of 1,230 frail older persons. The design complied with the requirements of the experimental study protocol developed by the CONSORT group.<sup>56</sup>

SIPA attained its primary objective. An average of \$4,000 of institution-based services per person was transferred to community-based services. This result was attained without its having to assume responsibility for a population of frail elderly persons and

without funding via capitation. It was not possible to implement these two components within the context of the experiment. They are powerful means and incentives for integrated networks for frail older persons, allowing them to rationalize their practices, orient their actions, and mobilize their resources. Demonstration projects involving integrated services for frail older persons should give them careful consideration.

SIPA had additional resources available to implement its model. This funding was incorporated into the evaluation costs of SIPA. However, the extra resources available to SIPA were less significant

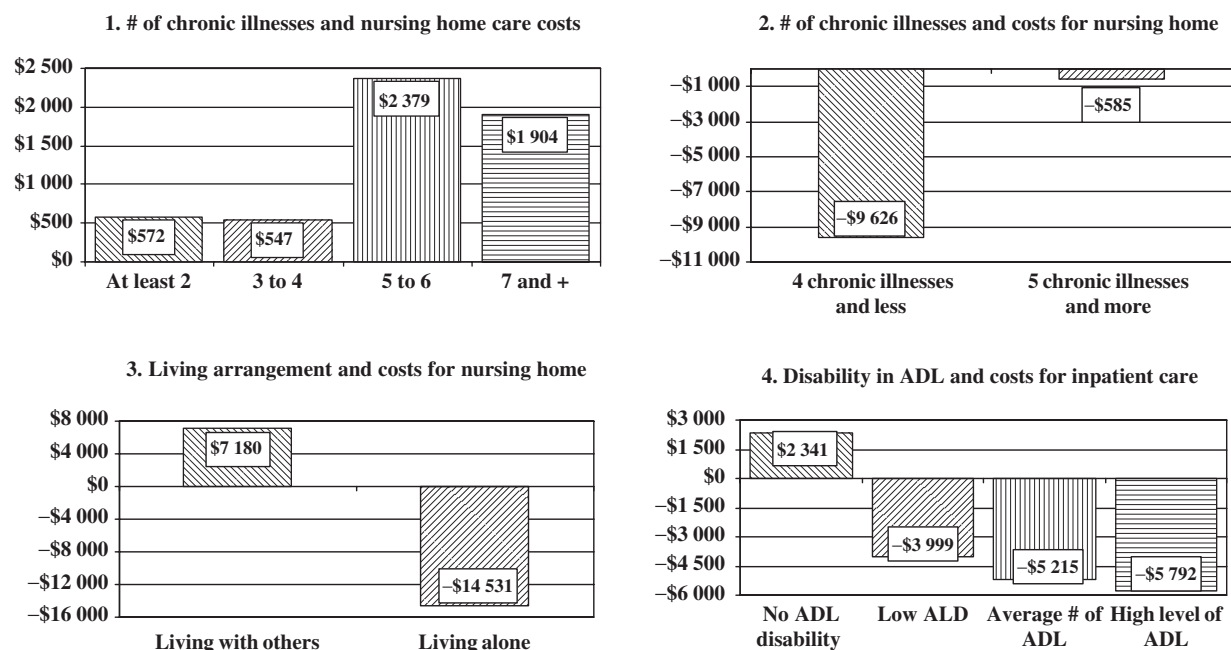


Figure 7: Cost differences between SIPA and control by participants' characteristics

than anticipated. Current home-care-service programs in Quebec received unexpected additional funding during the experiment. It focused its resources on home health services and persons with multiple chronic illnesses.

SIPA succeeded in reducing the recourse to, use, and costs of several institution-based services. Such reductions only reached statistical significance with respect to waiting time in acute-care hospitals for nursing home placement, although emergency room visits and permanent nursing home placement occurred 10 per cent less frequently within the SIPA group than within the control group. The transfer of costs of institution-based to community-based services was the result of an accumulation of moderate, but not statistically significant, reductions over a range of services.

The effects of SIPA on the costs of services for persons with several chronic illnesses or several ADL disabilities, or for those living alone, were particularly significant. Such results indicate that SIPA did not affect all groups of persons in the same manner. SIPA specifically focused on the most appropriate groups of people. For example, institutionalization costs were reduced for people with fewer chronic illnesses, while the total duration of hospital stays was reduced for those with the highest number of functional disabilities. Integrated services for older persons are, therefore, not intended only for those who are the most frail. Those "at risk" of making more frequent

use of services do not have a unique risk profile. Such profiles probably vary according to the society and health system within which the person lives. The Weissert formula,<sup>57</sup> which recommends accurately targeting the population to whom home care services are provided in order to maximize their effects, must be applied with caution.

The results suggest interesting ways to understand how SIPA functioned. First, reduced waiting time in acute-care hospitals for nursing home placement and the lower hospitalization costs generated by persons with ADL disabilities indicate that the principal effect of SIPA was on the use of the hospital as a pathway to the nursing home. Secondly, hospital discharge planning was an important responsibility of the case manager. Case managers were required to intervene on a patient's admission to hospital. They discussed cases with physicians, nurses, and social workers throughout patients' hospital stays and discharge planning and were able to enter notes in the patients' hospital records. Case managers were able to mobilize the community resources that hospitalized persons required after being discharged and to recommend admission to a transitional residence. SIPA services demonstrated to hospital personnel that SIPA was able to offer appropriate, high-quality services.

Several factors may account for the lack of significant reduction in the use and costs of hospitalization, emergency services, and nursing homes for the SIPA group as a whole. First, family physicians did not

respond to case managers' requests, case managers did not always develop the necessary communication skills, and incentives offered to physicians to encourage their participation were inadequate, as is the case within the Canadian medical system in general.<sup>58</sup> Secondly, SIPA represented a change in the care delivery paradigm. Despite prior training in the implementation of the demonstration project, personnel did not have an adjustment period allowing them time to adapt to the model. Uncertainty regarding funding for the continuation of the experiment 10 months after its inception led to the resignation of some project management personnel. Thirdly, SIPA sites were located in the same institutions that were responsible for services provided to those in the control group. Contamination was therefore possible to some extent, as regular CLSC home-care-service coordinators and SIPA coordinators may have emulated each other. Lastly, the power of the trial only allowed us to determine differences of 25 per cent to 50 per cent between the experimental and control groups. A difference of 10 per cent may have been significant from a health policy standpoint, especially regarding hospitalizations and nursing home placement. A sample double the size of that available to SIPA would have been required to examine a difference of that magnitude between the two groups.

The significance of the SIPA experiment results reaches beyond the borders of the two host sites. Several Canadian provinces face the same dilemmas as those faced at the two experimental sites, as well as in the entire Montreal region, where hospital beds are "blocked" by individuals waiting to be placed in nursing homes.<sup>59</sup> Hospital services are more expensive in this case<sup>60</sup> than services in nursing homes. Generally speaking, SIPA affected three main hospital functions—emergency services, short-term hospitalization, and waiting time for nursing home placement. An adapted application of the SIPA model to other contexts may generate significant effects on the rational use of hospital services.

The results of the SIPA trial are consistent with the evaluation results of other integrated service models for older persons. Although Social/Health Maintenance Organizations (S/HMOs) did not perform as well as expected,<sup>61</sup> Programs of All-Inclusive Care for the Elderly (PACE) are now incorporated into Medicare in the United States. PACE does not appear to have reduced hospitalization and institutionalization, but Medicare costs appear to have lessened in comparison to the costs generated by the older population.<sup>62–65</sup> Similarly, two small-scale Italian studies have succeeded in reducing the costs of hospitalization.<sup>66,67</sup>

The SIPA experiment shows that it is possible to implement ambitious and rigorous demonstration projects in Canada. The conditions for state-of-the-art evaluations of systemic and significant innovations are not all currently in place in Canada. The SIPA demonstration project was made possible through the implementation of the federal *ad hoc* Health Transition Funds (HRT), support from the Quebec Ministry of Health and Social Services, the involvement of the RRSSM-C and many Montreal institutions, as well as the diligent work of universities, practitioners and decision makers. We must be able to transform this special context of forces of change into conditions that will systematically incorporate and evaluate ongoing change within provincial health and social service systems.

In conclusion, despite the limitations of our study, the results indicate that it is possible to expect integrated service systems for frail older persons to reduce the use and costs of hospital services and nursing homes without increasing overall healthcare costs, reducing quality of care, or increasing the burden on older persons and their relatives.

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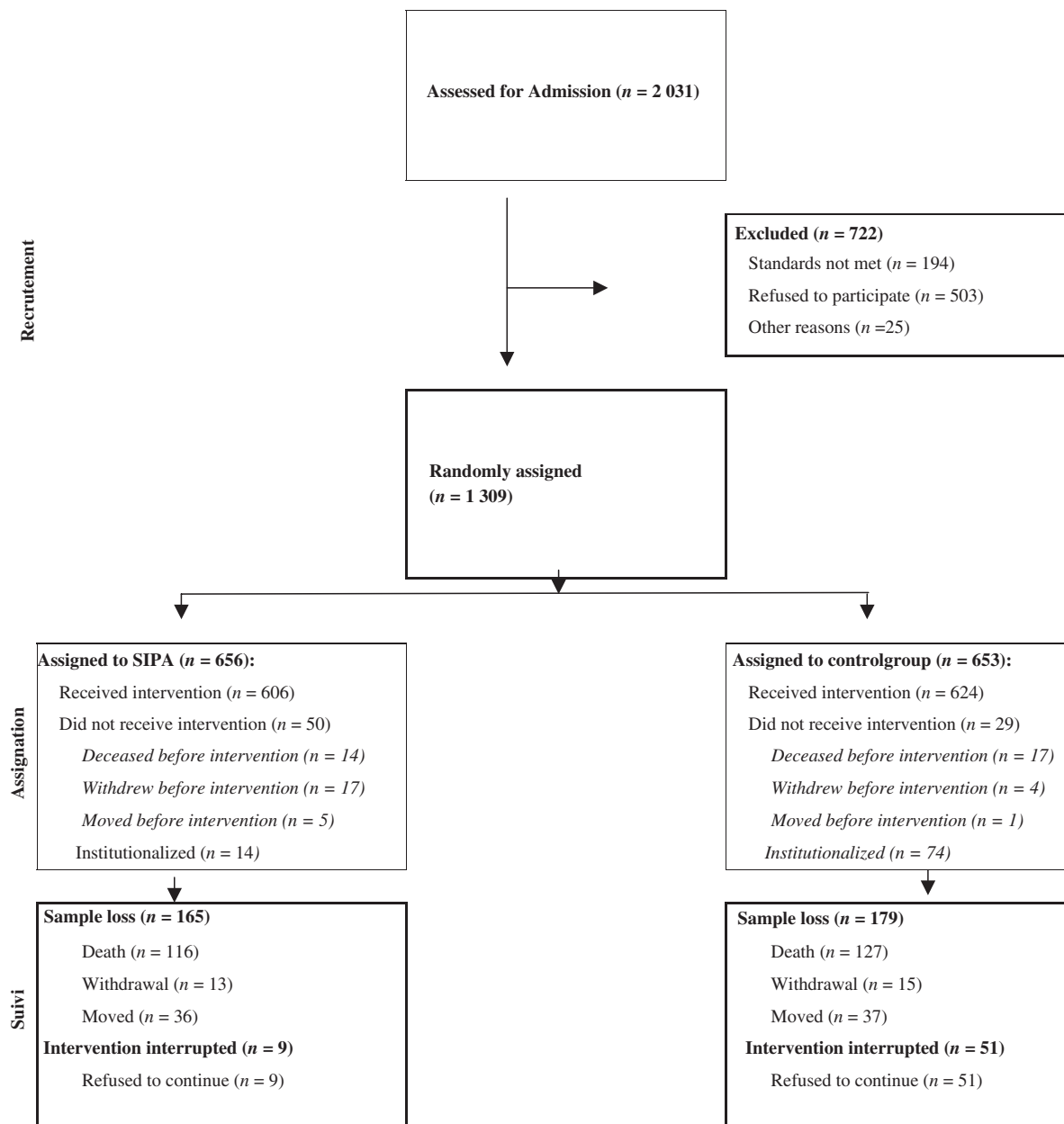
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## Appendix 1: Recruitment and Random Assignment History<sup>a</sup>



<sup>a</sup> Béland F, Bergman H, Lebel P, Clarfield AM, Tousignant P, Contandriopoulos AP, et al. A system of integrated care for older persons with disabilities in Canada: results from a randomized controlled trial, *Journal of Gerontology: Medical Sciences* (to be published). Reproduction authorized by *Journal of Gerontology: Medical Sciences*.