

Development of pharmaceutical care services in nursing homes: practice and research in a Swiss canton

Jean-François Locca · Martine Ruggli ·
Michel Buchmann · Jacques Huguenin ·
Olivier Bugnon

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Abstract *Objective* The aim of this study was to assess the implementation process and economic impact of a new pharmaceutical care service provided since 2002 by pharmacists in Swiss nursing homes. *Setting* The setting was 42 nursing homes located in the canton of Fribourg, Switzerland under the responsibility of 22 pharmacists. *Method* We developed different facilitators, such as a monitoring system, a coaching program, and a research project, to help pharmacists change their practice and to improve implementation of this new service. We evaluated the implementation rate of the service delivered in nursing homes. We assessed the economic impact of the service since its start in 2002 using statistical evaluation (Chow test) with retrospective analysis of the annual drug costs per resident over an 8-year period (1998–2005). *Main outcome measures* The description of the facilitators and their implications in implementation of the service; the economic impact of the service since its start in 2002. *Results* In 2005, after a 4-year implementation period supported by the introduction of facilitators of practice

change, all 42 nursing homes (2,214 residents) had implemented the pharmaceutical care service. The annual drug costs per resident decreased by about 16.4% between 2002 and 2005; this change proved to be highly significant. The performance of the pharmacists continuously improved using a specific coaching program including an annual expert comparative report, working groups, interdisciplinary continuing education symposia, and individual feedback. This research project also determined priorities to develop practice guidelines to prevent drug-related problems in nursing homes, especially in relation to the use of psychotropic drugs. *Conclusion* The pharmaceutical care service was fully and successfully implemented in Fribourg's nursing homes within a period of 4 years. These findings highlight the importance of facilitators designed to assist pharmacists in the implementation of practice changes. The economic impact was confirmed on a large scale, and priorities for clinical and pharmaco-economic research were identified in order to continue to improve the quality of integrated care for the elderly.

J.-F. Locca · O. Bugnon (✉)
Community Pharmacy Practice Research Unit,
Universities of Lausanne and Geneva, Pharmacie de la PMU,
Rue du Bugnon 44, 1011 Lausanne, Switzerland
e-mail: olivier.bugnon@hospvd.ch

M. Ruggli
PharmaSuisse, Swiss Association of Pharmacists,
3097 Bern-Liebefeld, Switzerland

M. Buchmann
Community Pharmacy Tête Noire, 1680 Romont, Switzerland

J. Huguenin
Institute of Health Economics and Management,
University of Lausanne, 1015 Lausanne, Switzerland

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Impact of findings on practice

- Development of a new pharmaceutical care service needs a structured approach since the initial model for practice change to its successful implementation.
- Facilitators of practice change represent key elements to assist pharmacists in their implementation process.
- Local networking between pharmacists, physicians, and nurses within nursing homes can improve the economic

situation in terms of drug costs, and identify health priorities.

Introduction

Elderly people are at particular risk for encountering problems with their medication. Moreover, institutions for the elderly are becoming even more medically oriented, and, as a result, they are experiencing increasing problems with drug safety and financing. Almost 50% of individuals aged 65 or older will spend time in a nursing home at some point during their lives [1]. In Switzerland in 2000, about 7.1% of the population currently 65 years and older and 20% of the population 80 years and older were permanently residing in a nursing home [2]. The 42 nursing homes (2,214 residents) (Table 1) in Fribourg, one of the 26 Swiss cantons, experienced a considerable increase (25.7%) in nursing home drug costs between 1998 and 2001. While manufacturer supply and dispensing of drugs remain core services of a community pharmacy, pharmacists have been asked to accept even more responsibility for safer and more cost-effective use of drugs [3]. This growing economic pressure led some pharmacists to develop new care services for drug therapy management [4] in nursing homes [5, 6].

Between 1999 and 2000, two decisive laws were introduced into the Fribourg cantonal legislation [7, 8]. The first of these stated that any nursing home that would like to have its own pharmacy supply must have a pharmacist to organize and supervise the delivery. The second, requiring that any pharmacist working in a nursing home must apply a specific pharmaceutical care service (PCS), gave the government the authority to organize this new professional service. For the first time in Switzerland, an agreement between the health insurers and the Fribourg Association of the Institutions for the Elderly (AFIPA) was negotiated to

be in concordance with the cantonal law. This agreement has two appendices. Appendix I (not described in this article) relates to nursing care, and Appendix II refers to PCS. This second appendix, written according to previous pharmacy practice research and new legal context, defined two distinct fees: a single payment for drugs and medical materials and a fee to remunerate the cognitive services delivered by the pharmacist [9]. Furthermore, each pharmacist responsible for the PCS in a Fribourg nursing home must follow the official postgraduate education program organized by pharmaSuisse (the Swiss Association of Pharmacists) [10]. The compulsory specifications outlined for the PCS have been defined in a specific document proposed by the cantonal association of pharmacists and were approved by the health department of the canton of Fribourg [11]. (Fig. 1, part A)

This new PCS is the result of previous pharmacy practice research projects [5, 6]; its aim is to promote rational drug use in geriatric patients through local networking between doctors, pharmacists, nurses and administrative directors. It was developed and disseminated in two essential steps (Fig. 2, part A). The first step (*concept and development*) described the three sets of conditions according to the Holland-Nimmo practice change model [12] that must be simultaneously satisfied before a change is likely to occur in the health care system: *learning resources, practice environment, and motivational strategies*. The second step (*dissemination*) consisted of defining a business model and successfully negotiating service remuneration with health insurers; this step was necessary to enhance adoption of the new service into practice by pharmacists. All of these prerequisites contributed to the preparation for implementing the PCS within all Fribourg nursing homes.

Aim of the study

This study aimed to assess the implementation process of the new compulsory PCS within all Fribourg nursing homes (42) since its start in 2002. Specifically, this article describes the implications of the different facilitators developed to aid in the implementation of the PCS, an analysis of the economic impact of the service regarding drug costs and perspectives toward further improvement of service quality.

Method

As discussed in the literature, changes in pharmacy practice can be hindered by many different types of barriers: those on the organizational level (e.g., structure, money or other

Table 1 Residents and facility characteristics of the 42 nursing homes in the Canton of Fribourg, Switzerland

Characteristic	Value
Total population, <i>n</i>	2214
Age, years (mean \pm SD)	83.2 \pm 7.4
65–74 years, %	14.3
75–84 years, %	36.8
85 years and over, %	48.9
Women, %	71.3
Facility size	
Fewer than 50 beds, %	57.2
50–99 beds, %	35.7
100–199 beds, %	7.1

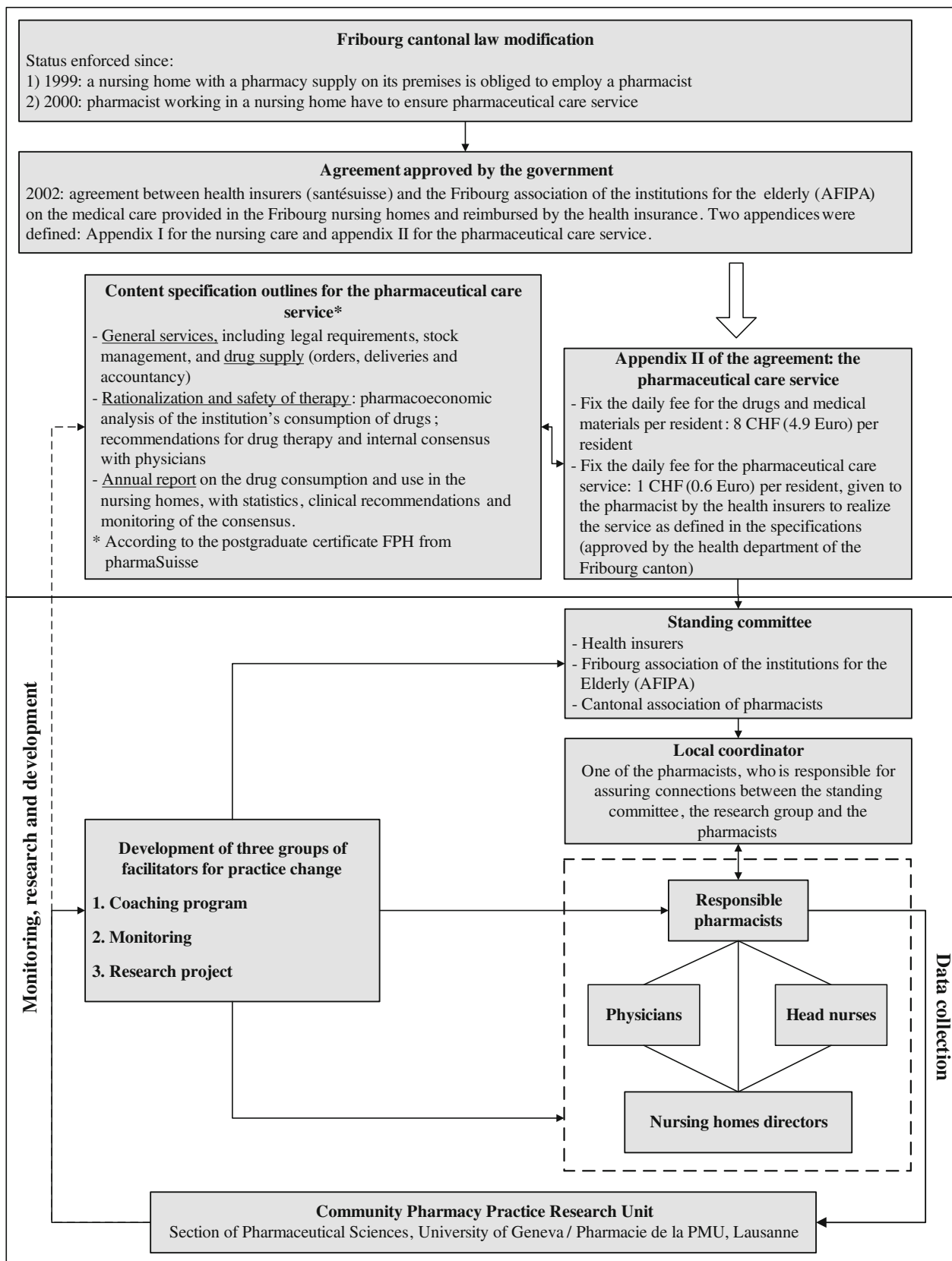


Fig. 1 Organization (2008) of the pharmaceutical care service (PCS) in the Fribourg nursing homes and a description of the information and processes involved.

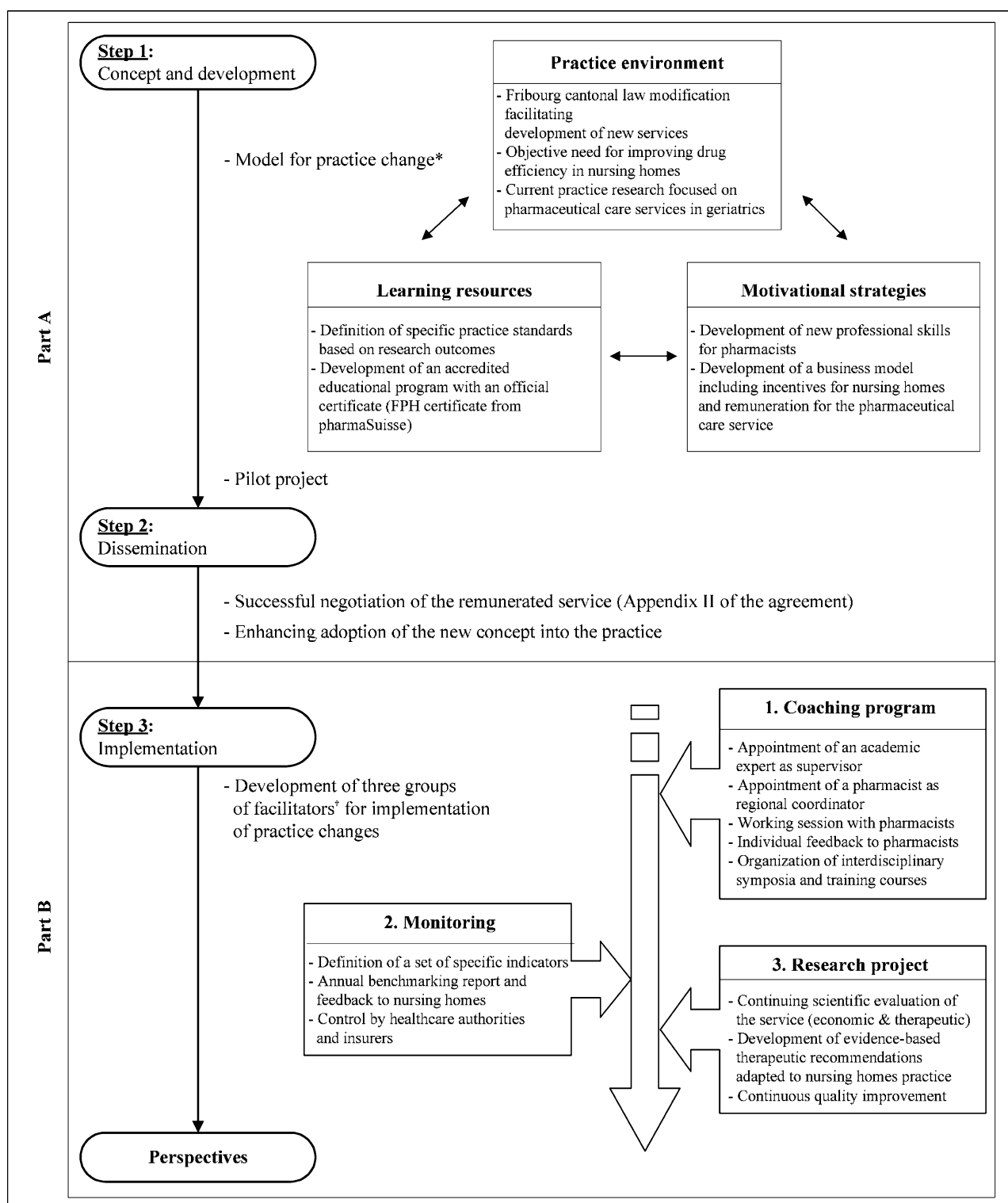


Fig. 2 Comprehensive framework developed for implementing a new specific pharmaceutical care service (PCS) in Fribourg nursing homes. *Adapted and modified from Holland et al. (8); [†] Adapted

from Benrimoj et al. (14): Part A : Prerequisites for implementation : concept development and dissemination steps. Part B: Implementation step

resources), those due to lack of availability of knowledge (e.g., drug profiles or indications), or those resulting from human attitudes and emotions [13]. In the Fribourg nursing

homes, the new PCS was officially introduced in 2002, and three categories of facilitators were developed to facilitate the implementation, adoption and maintenance of the new

practice (Fig. 2, part B) [14]. These facilitators were defined during the concept development and the dissemination steps of the service, and they were continuously adjusted throughout the implementation process. The three facilitators are as follows:

The coaching program A regional coordinator pharmacist for the PCS was chosen. The major responsibility of this individual was the coordination of the information between the 22 participating pharmacists (representing 15% of the pharmacists in the canton), the AFIPA, the health insurers, and the cantonal association of pharmacists. Working sessions were organized to allow pharmacists to improve their skills with the help of experienced pharmacists. An academic expert was assigned to review the pharmacists' reports on the basis of criteria defined in the practice standards of the Swiss Association of Pharmacists [10]. This expert supervised the pharmacists in their work and provided individual coaching as needed. The drug data (e.g., price, number of boxes delivered, therapeutic index) furnished by all pharmacists enabled the expert to establish an annual monitoring report encompassing all the nursing homes, including a benchmarking analysis to compare the performances of all nursing homes.

By analyzing data on drug prescriptions, the pharmacist could identify some priorities for rationalization. For all significant increases in drug costs, each pharmacist determined if the increase was caused by the choice of prescribed therapies (impact of the price) or their use (impact of the volume). The pharmacist then organized 1–2 times per year a discussion meeting (quality circle) with physicians and nurses to ultimately reach a definition and application of an improved therapeutic consensus. Finally, interdisciplinary courses and symposia were organized to enhance training in certain specific topics, which represent clinical priorities for the patients (e.g. dementia, pain).

The monitoring of the system The academic expert provided an annual benchmark report that compared the quality of the implementation of the service in the 42 nursing homes. This report included an analysis of the data furnished annually by the 22 pharmacists responsible for the PCS. To facilitate the collection of necessary information, a set of indicators was defined (e.g., age of each resident, number of residents, annual drug costs per resident, death rate, hospitalization rate, therapeutic classes prescribed). Gathering these indicators in a specific form aided the nursing home, the pharmacists and the insurers in understanding the reasons for differences between comparable facilities or year-to-year differences within the same nursing home.

The research project The Community Pharmacy Practice Unit of the School of Pharmacy Geneva-Lausanne was fully involved in performing scientific evaluations of the PCS and identifying ways to further solve economic and clinical issues.

Statistics

A Chow test [15] was performed on the drug cost per resident in the different nursing homes of the canton. This test represents the standard F test for the equality of two sets of coefficients in linear regression models. Linear regressions were generated before and after the introduction of the new service in 2002. The three separate subsamples (1998–2001, 2002–2005 and 1998–2005) were compared. Statistical analyses were performed with Stata[®] software (*Stata Statistical Software: Release 9*).

The currency is the Swiss franc (CHF), based on an exchange rate (UBS, <http://www.ubs.com/1/f/index/bcqv/calculator.html>) of 1.000 CHF = 0.6012 Euro = 0.8679 US\$, calculated on 10 March 2008.

Results

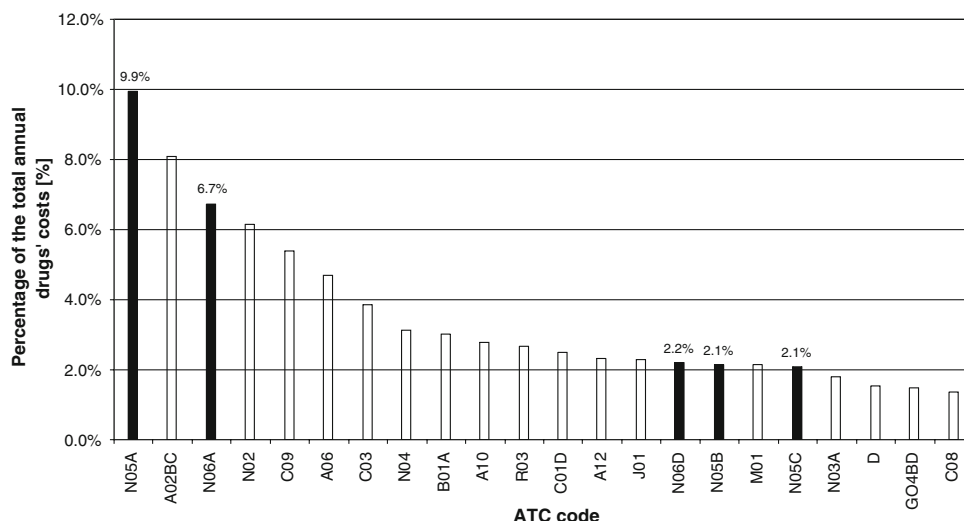
Four years after the introduction of the new PCS in 2002, 22 pharmacists implemented the service in each of the 42 nursing homes (100%) within the Fribourg canton. More than 120 physicians, nurses and administrative directors collaborated actively with the pharmacists. None of them have terminated their roles in the PCS so far. The implementation process was assisted by the strategy using the three facilitators (Fig. 1, part B).

First, in the coaching program, the academic expert analyzed the annual pharmaceutical reports. Each pharmacist's report was evaluated with regards to the criteria defined in the official program from pharmaSuisse. The expert gave group and individual feedback to the pharmacists. Clinical and pharmacoeconomic issues were also discussed with the pharmacists to identify areas for further improvement. A continuing education program was conducted through interdisciplinary half-day symposia on management of behavioral and psychological symptoms of dementia in nursing homes (December 2006) and pain management in elderly patients in nursing homes (October 2007). These programs were accredited by the physicians' and the pharmacists' national associations and gave the nursing home teams the opportunity to improve their skills, based on specific evidence-based geriatric recommendations.

Second, in the monitoring of the service, the academic expert sent his annual report, based on drug data provided by all pharmacists involved, to the different partners defined in Appendix II of the agreement (e.g., health insurers, AFIPA, Fribourg cantonal pharmacists' association). This annual report represented a key element for the stakeholders in charge of the agreement and PCS follow-up.

Finally, the research group was in charge of evaluating in detail the impact of the cantonal program. The analysis of the principal therapeutic classes prescribed in the

Fig. 3 ATC* classification of drugs representing 80% of the total annual drug costs† in Fribourg nursing homes‡ in 2006. * Anatomical Therapeutic Chemical. † 6.23 million CHF. ‡ 42 nursing homes (2,214 residents)



N05A: Antipsychotics; **A02BC:** Proton pump inhibitors; **N06A:** Antidepressants; **N02:** Analgesics; **C09:** Agents acting on the renin-angiotensin system; **A06:** Laxatives; **C03:** Diuretics; **N04:** Anti-Parkinson's drugs; **B01A:** Antithrombotic agents; **A10:** Drugs used in diabetes; **R03:** Drugs for obstructive airway diseases; **C01D:** Vasodilators used in cardiac diseases; **A12:** Mineral supplements; **J01:** Anti-infectives for systemic use; **N06D:** Anti-dementia drugs; **N05B:** Anxiolytics; **M01:** Anti-inflammatory and antirheumatic products; **N05C:** Hypnotics and sedatives; **N03A:** Antiepileptics; **D:** Dermatologicals; **GO4BD:** Genito urinary system and sex hormones; **C08:** Calcium channel blockers.

Black bars represent the economical weight (% of total annual drug costs) of psychotropic drugs used in nursing homes.

Fribourg facilities was based on the drug data (volume and price) according to the ATC (Anatomical Therapeutic Chemical) code classification (Fig. 3). These data were collected by the pharmacists and furnished to the research group for analysis and service monitoring. In 2006, the analysis of ATC codes gave us important information: psychotropic drugs (antipsychotics, antidepressants, anti-dementia drugs, anxiolytics, hypnotics and sedatives) represented about 25% of the annual total drug costs (based

on public official prices), with an important contribution from antipsychotics (about 10% of the total drug costs).

The economic impact of the service since its introduction was also measured: from 2002 to 2005, the annual drug cost per resident decreased by 16.4% (Fig. 4). For comparison, a drug cost projection without PCS has been calculated based on the official data for the growth of drug costs in the primary care market (data from Santé Suisse, the Swiss association of health insurers). These official data

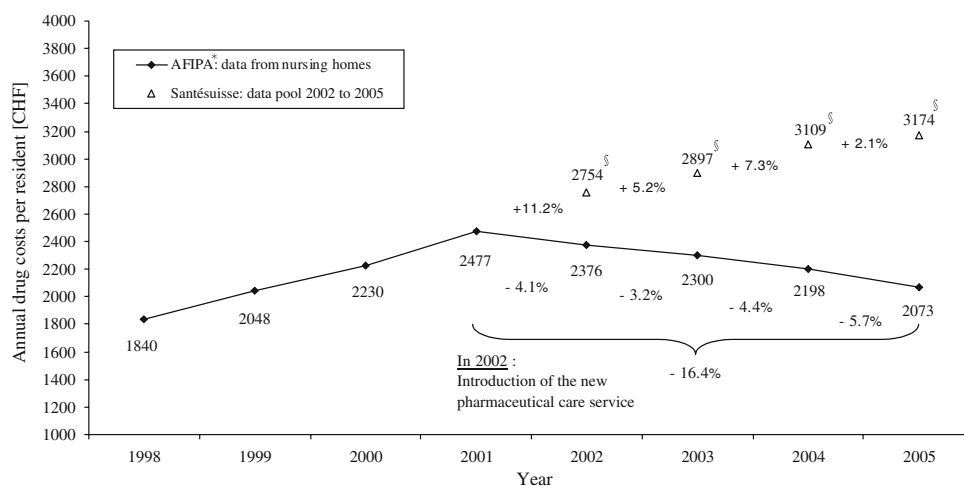


Fig. 4 Change in drug expenditure in Fribourg nursing homes before and after 2002, the year the new pharmaceutical care service (PCS) was introduced. *Fribourg association of institutions for the elderly. †Cost projection calculated with the official increase in the drug costs between 2002 and 2005 in the Swiss drug market. Annual drug fee per

resident in 2001: 2,299 CHF (=1,382 Euro). Annual drug fee per resident from 2002 to 2004: 2,555 CHF (=1,536 Euro). Annual drug fee per resident from 2005 to 2006: 2,372 CHF (=1,426 Euro). Annual drug fee per resident since 2007: 2,190 CHF (=1,316 Euro)

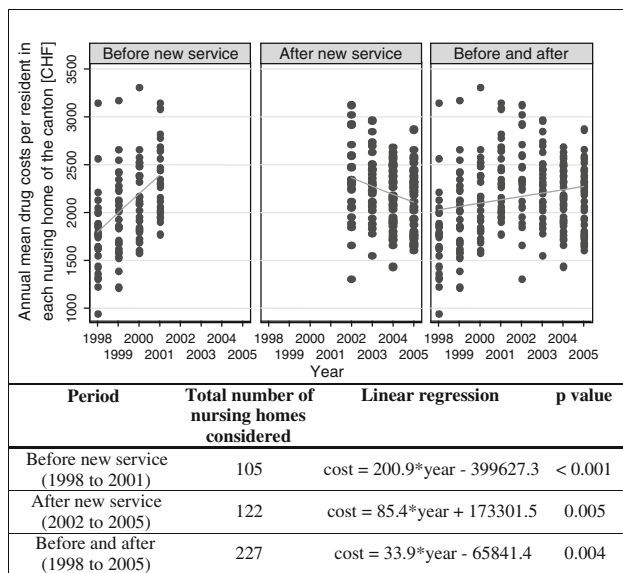


Fig. 5 Economic analysis (Chow test) of the drug cost per resident before and after implementation of the new pharmaceutical care service (PCS) in Fribourg nursing homes

from 2002 to 2005 indicated a constant increase in drug costs in nursing homes without the pharmaceutical care service. A Chow test, performed on drug cost data from 1998 to 2005, demonstrated a significant decrease in drug cost per resident since the introduction of the PCS. Three linear regressions were performed and showed highly significant *p* values (Fig. 5); there was a significant difference in drug cost per resident among the following: before the introduction of the PCS (1998–2001), after the introduction of the PCS (2002–2005), and during the whole period (1998–2005). The slopes of the three linear regressions were significantly different (P value = $1.83e-08$), thus demonstrating the economic impact of the PCS.

Discussion

This article details the implementation process of an innovative pharmaceutical care service developed for elderly patients. This service is provided by pharmacists in collaboration with physicians, nurses, and administrative directors; it represents an important opportunity for Swiss pharmacists to work in an interdisciplinary manner and to share responsibility for bringing about better patient outcomes.

Each step of the described process (Fig. 2) was essential for the successful development, dissemination, and implementation of the service. Many steps were needed from the initial model of practice change to its successful implementation. A clear legislative environment, an education program to apply the new standards of practice and a viable

business model represented key factors contributing to acceptance of the new service by the pharmacists. Reimbursement is often mentioned in the literature as one of the main barriers in the development of new cognitive services in pharmacy practice [16–18]. Once successful negotiation of the remunerated service was realized, the implementation process was conducted and followed-up by using the facilitators.

This service is also unique in that remuneration for PCS is totally independent of the price and volume of the drugs used in the nursing homes. The pharmacists are paid a fixed fee for their cognitive services (e.g., collaborative care, rationalization, annual statistic report, recommendations) and for drug deliveries. This unusual capitation system allows them to negotiate directly with the industry to achieve better prices for the various drugs used in the nursing homes. In other cantons of Switzerland, the pharmacist responsible for the delivery of drugs is generally paid with a margin based on the medicine dispensed. Considering the trends in the drug market (decreasing prices, shrinking margins, increasing liberalization and competition), a remuneration independent of the usual commercial incentives allows the pharmacist to choose the right drug at the best price without any economic pressure for himself.

The analysis of the drug prescription profile (per therapeutic drug class) represents a useful tool for monitoring global drug consumption in nursing homes. This analysis also shows the importance of defining recommendations for good usage of the most commonly prescribed drugs, psychotropic medicines (antipsychotics, antidepressants, anti-dementia drugs, anxiolytics, hypnotics and sedatives), in geriatrics. Antipsychotics are routinely prescribed for agitation and behavioral disorders in elderly patients with dementia despite several warnings regarding the increased risk of adverse cardiovascular events and mortality [19–25]. A 2005 study conducted over 4 years within four Fribourg nursing homes illustrated that about 20% of residents with dementia ($n = 196$) were treated with an atypical antipsychotic treatment despite international safety warnings about adverse cardiovascular events [26]. To assist physicians in the management of dementia, practice recommendations have been developed with pharmacists in a multidisciplinary approach for the care management of delirium and dementia in Swiss nursing home patients [27, 28].

Other priorities for health care quality improvement have been identified by the annual PCS reports. Variations in the consumption of drugs may be continuously monitored, and specific evidence-based practice recommendations may be continuously developed, thus improving the safety and efficiency of geriatric care. To achieve the dissemination of specific recommendations and health priorities identified by the research project, interdisciplinary symposia and training

courses were organized. These courses, combined with the official continuing education program for quality circles management [3], represent the specific accredited courses required to maintain the validity of postgraduate certifications. They were important for the pharmacists to maintain current knowledge of clinical and pharmaceutical research.

The evolution of drug expenditures in Fribourg's nursing homes (Fig. 4) indicates that local networking between pharmacists, physicians, and nurses within nursing homes can improve the economic situation in terms of drug costs [3]. As limitations, the economic results presented here were not adjusted for inflation. As the PCS implementation was compulsory, there was no opportunity to determine a controlled group of nursing homes without PCS. However, the cost-containment effect of PCS was compared to the natural evolution of the drug costs index in the Swiss primary care setting.

Furthermore, current analysis of the death rate and hospitalization rate during the same period demonstrated a statistically significant ($P < 0.005$) mortality decrease and no significant change for the hospitalization rate (Locca J-F, personal data to be published). These results suggest that the cost-saving mediated by the PCS is associated neither with a decrease in life expectancy nor with a cost transfer toward hospitals. The cost containment effect was also confirmed in 2006, as stabilization was achieved (a decrease of 0.1% was observed in comparison with 2005). These economic successes allowed the insurers decrease the fee for drugs and medical materials in 2007 (Table 2), in accordance with the agreement (Fig. 6). In 2002, the fee for drugs and medical materials was 9 CHF (5.41 Euro) per resident per day. This fee was decreased to 8.50 CHF (5.11 Euro) for 2006 and to 8.00 CHF (4.80 Euro) since 2007. As a motivation for all involved partners and to preserve the overall stability of the collaborative system currently in place, the insurers should avoid a systematic fee decrease, which would create economic pressure and decrease financial incentives for the nursing homes. Before lowering the fee, it is important to perform further studies to understand the variability between drug costs at the different facilities and to create statistical models describing

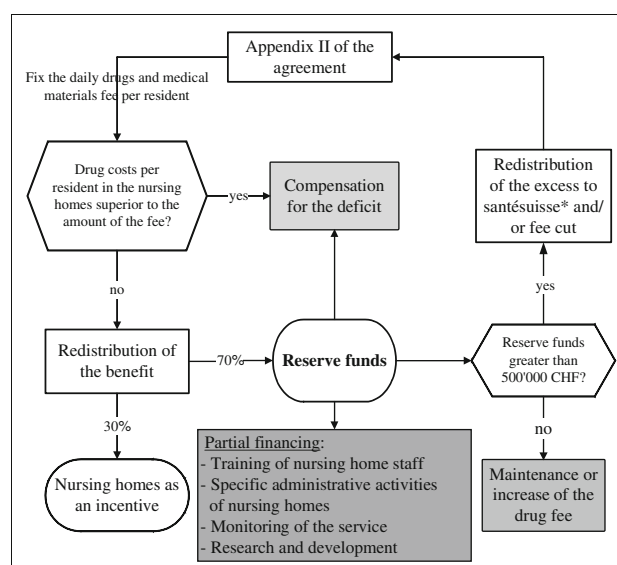


Fig. 6 Mechanism developed for the management of the drugs and medical materials fee in Fribourg nursing homes. *santésuisse: Swiss association of health insurers

the possible relationships between cost, associated factors and other outcomes, such as mortality and hospitalization rates. It is important to assess these last two parameters because the priority of the PCS pharmacists is not to lower the cost of drugs by rationing the therapies but to improve the overall efficiency of drug utilization and collaborative practices to benefit the elderly. In this role, the pharmacists act not as physician substitutes or extenders, but as physician enhancers, applying their specific drug therapy knowledge and drug data management skills and abilities in collaboration with other healthcare professionals.

The successful results communicated to the local and national stakeholders and media should encourage other Swiss cantons to explore, or even to begin, similar approaches. Further perspectives for research could be focused on a global economic analysis, considering the total costs in the nursing homes.

Conclusion

The successful implementation of a new PCS in nursing homes, in collaboration with physicians, nurses, and administrative directors, was a positive response to global drug efficiency problems for elderly patients. The program was introduced in 2002 in Fribourg nursing homes and has had a sustained effect supported by a comprehensive implementation strategy. The economic impact of the service has been demonstrated, and developments for further research on pharmaco-economic and clinical outcomes have been identified.

Table 2 Evolution of the daily drugs and medical materials' fee per resident from 2002 to 2007 in the Fribourg nursing homes

Year	Fee for drugs and medical materials [CHF] ^a	Fee for cognitive services [CHF] ^a
2002–2004	9	1
2005	8.50	1
2006	8.50	1
2007	8	1

^a 1 CHF = 0.6 Euro

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Conflicts of interest None to declare.

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