

# Integrating a Clinical Pharmacist into a Multidisciplinary Pain Center: Feedback and Perspectives

Amélie BOURSIER (✉ [boursier-a@ch-valenciennes.fr](mailto:boursier-a@ch-valenciennes.fr))

CH Valenciennes: Centre Hospitalier de Valenciennes <https://orcid.org/0000-0003-4462-132X>

Laurie Ferret

CH Valenciennes: Centre Hospitalier de Valenciennes

Julie Fulcrand

CH Valenciennes: Centre Hospitalier de Valenciennes

Julie Delvoye - Heiremans

CH Valenciennes: Centre Hospitalier de Valenciennes

Pascal Charpentier

CH Valenciennes: Centre Hospitalier de Valenciennes

Laure Dujardin

CH Valenciennes: Centre Hospitalier de Valenciennes

Antoine Lemaire

CH Valenciennes: Centre Hospitalier de Valenciennes

---

## Research article

**Keywords:** Clinical pharmacy services, Multidisciplinary pain center, Pharmaceutical care, Medication therapy management, Pain management

**Posted Date:** February 15th, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-230281/v1>

**License:** © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

---

# Abstract

## Background:

In January 2017, two clinical pharmacists joined our institution's multidisciplinary pain center care team. They help optimize management of chronic pain patients.

The purpose of this study is to present and discuss an innovative model of clinical pharmacy development in France.

## Method:

A retrospective study for the period January 1, 2017 to June 30, 2019 was conducted.

The care team evaluated the clinical pharmacy service using a satisfaction questionnaire.

The outcome measures were the type of activities, number of interventions and healthcare team satisfaction.

## Results:

During this period, the clinical pharmacists intervened 1839 times.

Conventional clinical pharmacy activities do not represent the majority of solicitations, which shows the advantage of both adapting the activities deployed to the expectations of care teams and expanding care packages to those needs.

Pharmaceutical advice was the main activity, mostly given to physicians (55%) and patients (35%).

They consisted in contributing to the choice of drug strategy, explaining the treatment, adjusting a dosage, and improving relations between hospital and community caregivers.

The feedback forms showed that caregivers believe that clinical pharmacy has positive impacts on patient care and healthcare team quality of life.

## Conclusion:

The numerous requests for clinical pharmacist interventions show the care team's significant interest in this new activity. Clinical pharmacy has shown its added value in patient quality of care and helps optimize the patient's care pathway by decompartmentalizing hospital and community medicine.

This clinical pharmacy development model is innovative in France, as pharmacists are full members of the care team. Specific activities were set up progressively according to the care team's needs. Caregivers' expectations and requests made in clinical pharmacy progressed over time to more specialized activities.

Assessment of team satisfaction showed that this model was very well accepted by caregivers and highlights the relevance of adapting and specializing clinical pharmacy development to the care team's needs.

## Background

Pain is defined by the International Association for the Study of Pain (IASP) as "An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage. (1) The term chronic is applied when pain lasts for more than three months. (2)

Chronic pain is a real public health challenge. According to Breivik (3), 15 million French people suffer from pain, yet an estimated 70% of patients in pain do not receive appropriate pain treatment.

Chronic pain has many repercussions: medical (lower quality of life, anxiety, depression, sleep disorders, etc.), socio-professional (absenteeism, reduced activity, isolation) and economic (direct and indirect costs: work disruptions, hospitalizations, drug therapies). (4)

French guidelines for pain management (5–7) have led to the creation of specialized structures that manage chronic pain in France: Chronic Pain Structures (*Structures Douleur Chronique*, or SDC).

In the first instance, patients mostly consult their general practitioners for chronic pain. However, when the patient's situation becomes complex or refractory (diagnosis, drug resistance, iatrogenicity, etc.), access to an SDC becomes necessary. (4)

In 2018, French Regional Health Agencies listed 67 SDC in France. (7)

An SDC team is generally composed of doctors, nurses, psychologists, and physiotherapists, who work in an interdisciplinary manner, but no pharmacist belongs to the team. Management of patients - some of whom have been in pain for several years - is global. The four components of pain (sensory-discriminative, emotional, behavioral, and cognitive) are thus taken into consideration. (7)

The SDC in our general hospital center was created in 2012. It takes care of 1660 patients annually for a total of 860 hospitalizations and 3500 consultations.

Since January 2017, two clinical pharmacists (CP) have joined the multidisciplinary team to participate in optimizing the medication management of chronic pain patients. The CP are involved in consultations, hospital day care (HDC) and full hospitalizations (FH).

The French clinical pharmacy society (Société Française de Pharmacie Clinique: SFPC) defines clinical pharmacy as "a patient-centered health discipline, whose purpose is to optimize therapeutic management at each stage of the care process by contributing to the safety, relevance and efficiency of the use of health products". (8)

The positive impacts of integrating a CP into hospital clinical services have already been documented in several studies, including improved detection and prevention of errors, improved medication compliance, reduced adverse drug events and fewer inappropriate medication choices (side effects, best available alternative). (9–13)

Nevertheless, to our knowledge, this is the only initiative in a French SDC that integrated directly into the team a CP who do not depend on the hospital pharmacy, on the opposite to French current model.

The purpose of this article is to discuss an innovative model of CP development in a hospital chronic pain management structure, in accordance with the description of our original experience in a French community hospital.

## Methods

### Method for implementing clinical pharmacy activities

Since 2017, the SDC ward has benefited from CP activities. The affectation of 2 CP to the SDC ward (equivalent of 1 full-time CP) was part of a process to optimize medication management in chronic pain patients in our institution. All types of SDC stays are concerned by clinical pharmacy activities (consultations, HDC and FH). They were implemented gradually. Before the CPs joined the healthcare team, various clinical pharmacy activities were proposed to the SDC medical and nursing staff. Physicians, managers, and nurses selected the activities they believed to provide the greatest added value to the quality of care, either through the direct impact on the patient or by facilitating the caregivers' work.

The activities chosen were:

- Pharmaceutical advice on treatments and therapeutic strategies,
- Medication reconciliation on admission to hospital, (14)
- Medication reconciliation on discharge from hospital and providing a drug intake plan, to summarize the treatments to be taken, along with the indications, time, and conditions of use (Appendix 1), (14)
- Cancer pain and supportive care consultations carried out in duo with a doctor.
- Follow-up by telephone with the CP could be organized for patients seen during pain and cancer consultations, upon medical decision, allowing follow-up of the efficacy, and tolerance of the treatment, and patient compliance with it. Dose adjustments could be supervised by the CP when necessary, according to the doctor's instructions,
- Drafting of drug protocols in partnership with the staff.

These activities were carried out by a CP with one fifth time contract since January 2017. Cancer pain consultations and telephone follow-ups were distributed among several CPs in the hospital, with half a day of consultations per week.

After one year of implementation, additional requests were made by the healthcare team. With the recruitment of another CP in January 2018, the following activities started:

- Participation in Multidisciplinary Consultation Meetings (MCP),
- Telephone follow-up of patients to help them reduce opioids and adapt treatment in conjunction with the patient's referring hospital practitioner,
- Pharmaceutical interviews during hospitalization focused on understanding analgesic treatment. These were carried out in particular with all patients in HDC for installation of capsaicin patches: assessment of the patient's knowledge of the different types of pain and their analgesics, global evaluation of the management of home treatments (including compliance/adherence)( Appendix 2).

## **Request procedures and traceability**

Each CP intervention was motivated by a medical or paramedical request, and a pharmaceutical observation was registered in the electronic health record.

Clinical pharmacy activities were also registered on an Excel® table in order to establish an activity report. Data were extracted between January 1, 2017 and June 30, 2019.

## **Evaluating caregiver satisfaction**

The healthcare team evaluated the clinical pharmacy missions using a satisfaction questionnaire (see Appendix 3) based on that of Jennings et al.(15). It was sent to the entire medical and paramedical team (4 hospital practitioners, 1 manager, 6 nurses, 1 psychologist, 1 physiotherapist).

## **Statistics**

A univariate descriptive analysis of the clinical pharmacy activity monitoring data was performed. The quantitative variables are described using the mean and the standard deviation, plus the qualitative variables with their absolute values and percentages.

## **Results**

During the period studied, the CP intervened 1839 times, mainly for outpatients, i.e. during consultations or during the phone follow-up. Each intervention could include several activities.

Figure 1 shows the distribution of CP interventions by type of stay.

Figure 2 details the types of activity performed by the CP. The main activity was providing pharmaceutical advice, telephone follow-up of outpatients and interviews during hospitalization.

Advice was the main activity of the CP. It is important to note that advice could be provided as part of other activities (telephone follow-ups, interviews during hospitalization, drug conciliations, for example) or in isolation, on request or spontaneously.

## **Provision of pharmaceutical advice**

The advice was primarily intended for hospital physicians and patients, as shown in Fig. 3.

Figures 4 and 5 show the distribution of the different types of advice given by the CP to the healthcare team and to the patients, respectively. Medical and paramedical staff mainly benefited from advice on therapeutic strategy and dosage, whereas patients needed and asked for advice about their treatment indication and conditions of use, their community care after hospitalization/consultation and adaptation of dosages.

Central nervous system drugs were the main therapeutic class concerned by pharmaceutical advice, with 79% of the advice. Within this therapeutic class, analgesics were the subject of 80.2% of the advice given. (16)

## **Carrying out pharmaceutical interviews during HDC for capsaicin patch placement**

Since February 2, 2018, 254 pharmaceutical interviews have been conducted with 103 different patients. During their first pharmaceutical interview, patients' knowledge of their analgesic treatment was assessed.

In total, 66% of patients knew the difference between drugs for acute episodes of pain and background treatments, 42% knew the difference between neuropathic and nociceptive pain, and 34% knew other indications for anti-neuropathic treatments.

This first pharmaceutical interview allowed 64% of patients to improve their knowledge of their analgesic treatment.

## **Telephone follow-up of patients**

Two types of telephone follow-up were carried out: assistance with decreasing doses of opioids following discharge from the SDC (38 telephone follow-ups for a total of 5 patients monitored), and pharmaceutical support after consultations (630 telephone follow-ups for a total of 104 patients monitored).

## **Healthcare team's satisfaction**

Figure 6 presents the healthcare team's satisfaction with the clinical pharmacy activities.

## **Discussion**

This study describes an original experience of integrating clinical pharmacy into an SDC. This review at 2.5 years describes the activities for which caregivers requested assistance from the CP. It also provides better understanding of the ways in which a clinical pharmacy activity can be developed.

### Solicitation of the clinical pharmacist

The CP was requested by the health team for 3 main activities: providing pharmaceutical advice (59%), telephone pharmaceutical follow-up of patients (18%), and conducting interviews with patients during hospitalization (11%).

## Advice

It should be noted that the medical team got used to the clinical pharmacy approach very quickly: they were the source of most requests. Advice mainly concerned therapeutic strategy. This close cooperation between physicians and CP plays a part in patient safety. Several studies have shown that the presence of a CP in a hospital unit significantly reduces medication errors (10, 17) and promotes acceptance of pharmacist recommendations compared to written advice. (10, 18)

The studies published mainly concern the positive impact of pharmaceutical interventions formulated by pharmacists during prescription validation, i.e. retroactively, after drug prescription. (18–21) However, in our experience, proactive advice was the main activity when the CP was part of the care team. Nevertheless, there is little data available in the literature on the impact of advice provided proactively by pharmacists for medical teams. (22, 23)

Integrating a CP into the SDC staff made him or her a closer partner of the team. This approach promoted trust and mutual understanding. The essentially proactive nature of this approach is adapted to the organization of a hospital ward, and is complementary to the activities carried out at the hospital pharmacy.

This approach also reinforces the relations between the ward staff and the hospital pharmacy. Several studies have shown its role in saving time for various professionals, both in the services and at the hospital pharmacy.

## Current HDC interviews

Patients are the second beneficiaries of advice. Within our department, advice to patients was provided particularly during HDC for the application of capsaicin patches. These interviews were set up at the behest of the medical team. During these interviews, we frequently found a lack of knowledge among patients about the difference between background and acute analgesic treatments (34%), about the difference between nociceptive and neuropathic pain (58%) and about other indications for their neuropathic pain treatments and the onset and duration of action (66%). These elements have been reported in the literature as obstacles to drug compliance. Providing appropriate information on the drugs taken by the patient (indications, methods of administration, side effects and how to prevent them, drug

interactions, etc.) can improve compliance.(24) According to several studies, clinical pharmacy activities have led to improved drug compliance of 10.9 to 14.5%.(9, 25) Other studies have shown a positive impact of clinical pharmacy services on health in different pathologies. (26, 27)

## **Pharmaceutical follow-up by telephone**

Implementing close pharmaceutical follow-up (668 calls to 109 patients) made personalized accompaniment of the patient possible during a change in analgesic treatment, in particular when a new treatment was introduced. It also made it possible to prevent adverse effects by progressively adapting dosages, improving compliance, and ensuring the correct treatment mode. New medical consultations could be provided only if necessary, thus probably avoiding consultations in hospital emergency departments, and freeing capacity for more urgent painful patients, especially in the fields of cancer pain.

In 2006, Wu et al. published a randomized controlled study of poly-medicated patients who were not compliant at inclusion. In the intervention arm, telephone follow-up with a CP was set up. After 2 years (6 to 8 calls in the intervention group, none in the control group), and after adjustment for confounding factors, the relative risk of death decreased by 41% (RR = 0.59, IC95 = 0.35–0.97). Adherence, assessed by a structured self-report questionnaire describing patient compliance with the prescribed treatment regimen, was improved by 23% (p = 0.038). (28)

In 2015, a study also reported patient satisfaction with these telephone follow-ups, carried out when a drug was introduced (OR = 2.2; [1.3–3.6]), with patients feeling less concern about their treatment (OR = 0.5; [0.3–0.9]). (29)

## **Link between community medicine and hospital**

The interface between hospital and community medicine is a major concern, as it is still one of the weak points in the care pathway in France.(30–35) Most problems of collaboration and continuity of care are concentrated around hospital admission and discharge. The French Institute for Healthcare Improvement estimates that up to 50% of medication errors in hospitals are due to poor communication of medical information at different transition points, particularly admission.(36) Several studies have shown that when there is a lack of medication reconciliation on admission, the rate of medication errors that could have had serious clinical consequences for the patient is about 5% (37, 38). Similarly, on discharge, 36.4% of hospitalization reports contain errors according to Wilson.(39) Mention and justification of therapeutic changes made during hospitalization appear to be insufficient in between 2 and 40% of hospitalization reports.(40)

It is therefore essential that the link between community and hospital care be strengthened. CP participates in improving this link through its activities of medication reconciliation on admission and discharge, plus telephone follow-ups. The benefits of medication reconciliation have been fully demonstrated and published. According to the studies and services concerned, reconciliation makes it possible to detect medication errors in 38 to 68% of patients on admission(41–43) and around 40% of



patients on discharge.(41, 42) According to Vira et al., drug reconciliation showed that 60% of patients had at least one unintentional discrepancy, taking admission and discharge together.(42)

## Deployment method

Clinical pharmacy started to develop in the 1960s in North America, arriving in France more recently, where hospital pharmacies were given this mission. Our model is different: pharmacists are recruited by, and in, a medical department; they are therefore hierarchically attached to a non-pharmacist head of department.

Within the SDC, we initiated the development of CP by first offering traditional activities, and then followed up on the team's requests. For example, one of the first activities set up was medication reconciliation on admission, which is one of the most widespread activities and the one most described in the literature.(14, 44) However, after 2.5 years of experience, we noted that this activity represents only 4.6% of the requests (2.3% on admission and 2.3% on discharge).

Finally, the clinical pharmacy activities for which the CP were most solicited are not described in the literature and were developed as the CP integrated into the service. They were increasingly specific, such as implementing pharmaceutical telephone follow-up. This activity was initially aimed at post-consultation cancer pain patients and then, with the current opioid crisis in the United States and the increased vigilance in France on this subject, hospital practitioners asked the CPs for closer monitoring of patients for whom a reduction in opioid use was necessary.

These telephone follow-ups can be similar to health coaching and thus go far beyond simple advises. In fact, in addition to ensuring that the methods used to treat and manage pain are correct and respected by the patient, these close follow-ups make it possible to maintain a dynamic and educational relationship between the healthcare teams and the patient, encouraging patients in their approach and giving them a sense of responsibility.(35, 45)

Our experience shows the variability in needs, depending on the specificities of each department, and the value of adapting the activities deployed to the expectations of the healthcare teams. As the CP becomes part of the unit, activities diversify, allowing the CP to specialize in a specific areas.

Observations made by pain physicians working with CP are rich and qualitative, especially in the cancer pain or pediatric fields. In particular, physicians report a change in their working mode, notably in consultations, both by learning specialized pharmaceutical fields in contact with pharmacists, but also inversely by delegating medical tasks to the pharmacist. As a result, these changes have a positive impact on the management of consultations: telephone follow-ups avoid systematic reconvening of patients who are doing well, and conversely, allow earlier management of unbalanced treatments or pain emergencies.

Healthcare professionals' satisfaction with the activities of the CP is very high. It reflects the good integration of the CP into the service and the team's interest in the activities implemented.

# Limitations

This work presents an assessment of CP activities in a medical department. While the clinical and relational impacts are recognized by all, we did not measure the clinical impact with objective criteria. Proactive advice represents the majority of the CP's work, yet the medico-economic impact of something that was not done cannot be evaluated. Nor did we assess the medico-economic impact of the interventions carried out. However, in the literature, several studies have reported that implementing clinical pharmacy activities is associated with a reduced risk of iatrogenicity, mortality and length of stay. (46–49) Most studies report that these activities are cost-effective or have a good cost/benefit ratio. (50–55)

Furthermore, we did not rate the potential seriousness of the interventions carried out. This is less amenable to a severity rating, as may be the case for retroactive pharmaceutical interventions for which many articles have been published. (56, 57)

# Conclusion

This article presents an innovative model for the development of clinical pharmacy in France.

Beyond the traditional activities of clinical pharmacy that we have already described, and on a systemic scale, the CP had a positive impact that we did not initially anticipate on quality of life at work for the care teams. CP might even improve prevention of psychosocial risks by being a proactive, reactive, and available interlocutor, particularly for nurses. This integrative, specialized, and comprehensive model has been deployed throughout the cancerology and medical specialties department of our hospital, and is now being developed in other units of the institution. In our opinion, this innovative approach is a real operational and qualitative response to the necessary development of medical and surgical hyperspecialization in healthcare institution.

# Abbreviations

IASP  
International Association for the Study of Pain  
SDC  
Structures Douleur Chronique  
HDC  
Hospital Day Care  
FH  
Full Hospitalizations  
SFPC  
Société Française de Pharmacie Clinique  
MCP

## Declarations

**-Ethics approval and consent to participate:** This study was made on data registered during our clinical practice, corresponding to the current pharmaceutical care in our medical wards. Therefore, according to the french and european law, we did not need formal ethics approval. (<https://www.cnil.fr/fr/RGDP-le-registre-des-activites-de-traitement> )

The study is registered in the internal registry of data processings.

All the patients hospitalized in our health care institution receive an individual and collective written information that the data registered during their hospitalisation can be used for research and are informed of their rights, including the modalities for opposition to the processing of their personal data for research.

**-Consent for publication:** Not applicable

**-Availability of data and materials:** This study was performed on the clinical pharmacy following data used in clinical practice independently to the study. These data are registered in a securised file in the hospital where the study was performed

**-Competing interests:** The authors declare that they have no competing interests

**-Funding:** Not applicable

**-Authors' contributions:** AB, LD, LF and AL conceived the idea and design of the study.

AB and LF analyzed and interpreted the data. AB drafted the article.

All authors revised and approved the final manuscript.

**-Acknowledgements:** Not applicable

## References

1. Merskey H, Bogduk N. **Descriptions of chronic pain syndromes and definitions of pain terms. Force on taxonomy of the international association for the study of pain.** [Internet]. IASP Press. Seattle; 1994 [cited 2019 Apr 10]. Available from: <https://www.iasp-pain.org/PublicationsNews/Content.aspx?ItemNumber=1673>
2. Haute Autorité de Santé. **Douleur chronique: reconnaître le syndrome douloureux chronique, l'évaluer et orienter le patient - consensus spécialisé - argumentaire 2008.** Available from: <https://www.has->

sante.fr/upload/docs/application/pdf/2009-01/douleur\_chronique\_argumentaire.pdf

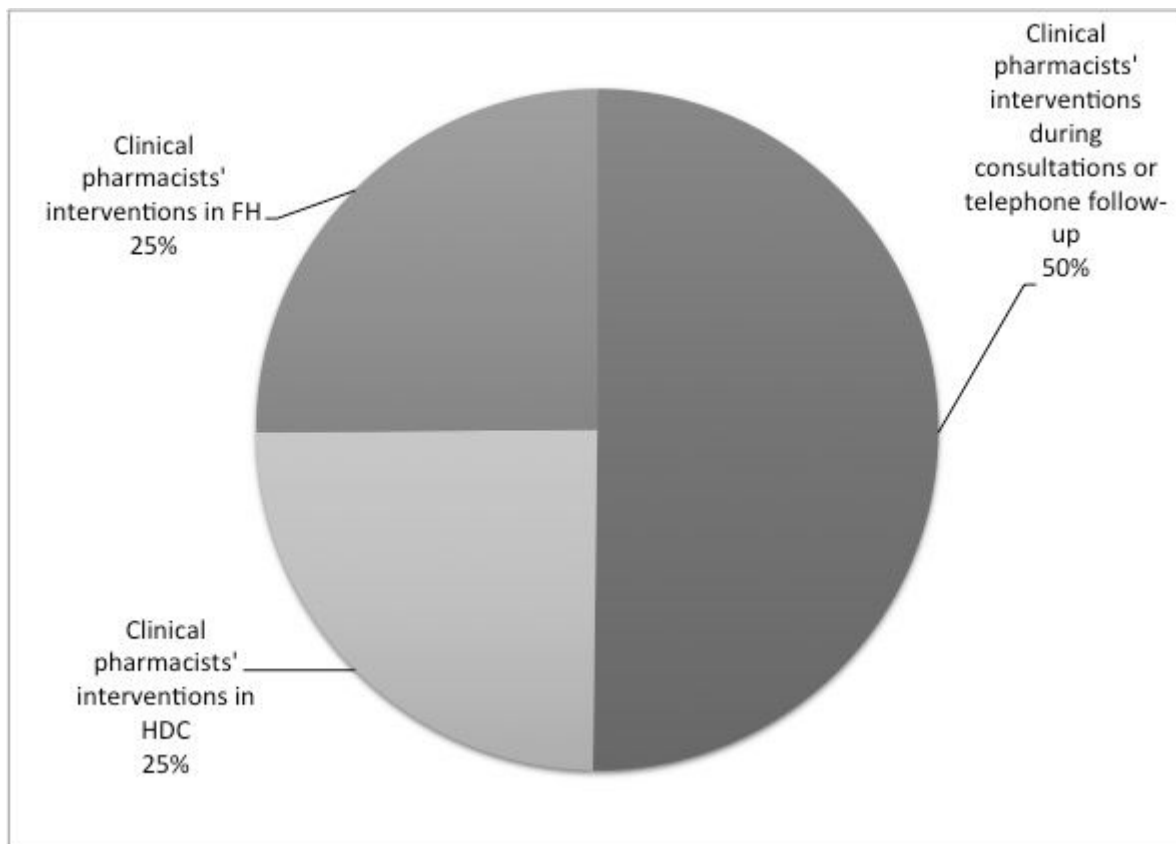
3. Breivik H, Collett B, Ventafridda V, Cohen R, Gallacher D. Survey of chronic pain in Europe: prevalence, impact on daily life, and treatment. *Eur J Pain Lond Engl*. 2006 **May**;10(4):287–333.
4. Société Française d'Etude et de Traitement de la Douleur. Livre blanc de la douleur 2017 - Etat des lieux et propositions pour un système de santé éthique, moderne et citoyen. Med-line. 2017.
5. Ministère des solidarités et de la Santé. **Programme national de lutte contre la douleur. Douleur : l'action des services publics**. 2015 [cited 2019 Apr 10]. Available from: <https://solidarites-sante.gouv.fr/soins-et-maladies/prises-en-charge-specialisees/douleur/article/l-action-des-pouvoirs-publics>
6. Queneau P, Serrie A, Trèves R, Bontoux D. Les douleurs chroniques en France. Recommandations de l'Académie nationale de médecine pour une meilleure prise en charge des malades. *Douleurs Éval - Diagn - Trait*. 2018 **Dec**;19(6):265–72.
7. Haute Autorité de Santé. **Douleur chronique: les aspects organisationnels. Le point de vue des structures spécialisées - Argumentaire**. 2009. [cited 2019 Apr 10]. Available from: [https://www.has-sante.fr/upload/docs/application/pdf/2009-01/douleur\\_chronique\\_argumentaire.pdf](https://www.has-sante.fr/upload/docs/application/pdf/2009-01/douleur_chronique_argumentaire.pdf)
8. Allenet B, Juste M, Mouchoux C, Collomp R, Pourrat X, Varin R, et al. De la dispensation au plan pharmaceutique personnalisé: vers un modèle intégratif de pharmacie clinique. *Pharm Hosp Clin*. 2019 **Mar**;54(1):56–63.
9. Chisholm-Burns MA, Spivey CA, Garrett C, McGinty H, Mulloy LL. Impact of clinical pharmacy services on renal transplant recipients' adherence and outcomes. *Patient Prefer Adherence*. 2008 Feb 2;2:287–92.
10. Leape LL, Cullen DJ, Clapp MD, Burdick E, Demonaco HJ, Erickson JI, et al. **Pharmacist participation on physician rounds and adverse drug events in the intensive care unit**. *JAMA*. 1999 Jul 21;282(3):267–70.
11. Owens NJ, Sherburne NJ, Silliman RA, Fretwell MD. The Senior Care Study. The optimal use of medications in acutely ill older patients. *J Am Geriatr Soc*. 1990 **Oct**;38(10):1082–7.
12. Folli HL, Poole RL, Benitz WE, Russo JC. Medication error prevention by clinical pharmacists in two children's hospitals. *Pediatrics*. 1987 **May**;79(5):718–22.
13. Dager WE, Gulseth MP. Implementing anticoagulation management by pharmacists in the inpatient setting. *Am J Health-Syst Pharm AJHP Off J Am Soc Health-Syst Pharm*. 2007;64(10):1071–9.
14. Haute Autorité de Santé. **Mettre en oeuvre la conciliation des traitements médicamenteux en établissement de santé. Sécuriser la prise en charge médicamenteuse du patient lors de son parcours de soins**. 2008. [cited 2019 Apr 10]. Available from: [https://www.has-sante.fr/upload/docs/application/pdf/2017-01/dir1/guide\\_conciliation\\_des\\_traitements\\_medicamenteux\\_en\\_etablissement\\_de\\_sante.pdf](https://www.has-sante.fr/upload/docs/application/pdf/2017-01/dir1/guide_conciliation_des_traitements_medicamenteux_en_etablissement_de_sante.pdf)
15. Jennings P, Lotito A, Baysson H, Pineau-Blondel E, Berlioz J. La pharmacie clinique en milieu hospitalier: une enquête de satisfaction auprès des prescripteurs. *Ann Pharm Fr*. 2017 **Mar** 1;75(2):144–51.

16. Beaulieu P, Lussier D, Porreca F, Dickenson A. Pharmacology of Pain. International Association for the Study of Pain (IASP). 2010;pp. 622,.
17. Grain F, Brudieu E, Guimier C, Calop J. Analyse des erreurs de prescription et de l'activité de pharmacie clinique dans une unité de soins informatisée. J Pharm Clin. 1999 **May** 14;18(1):56–7.
18. Benoit P, Mangerel K, Garreau I, Vonna P, Juste M. Évaluation des moyens mis en œuvre et acceptation d'une présence pharmaceutique dans les services de soins. 2019;26:8.
19. Vernardet S, Bossaert S, Livrozet A, Pont E, Charpiat B. Validation pharmaceutique des prescriptions hospitalières: Intervention et analyse sur cinq ans - ScienceDirect. Presse Médicale. 2005;34(14):990–6.
20. Lee AJ, Boro MS, Knapp KK, Meier JL, Korman NE. **Clinical and economic outcomes of pharmacist recommendations in a Veterans Affairs medical center. Am J Health-Syst Pharm AJHP Off J Am Soc Health-Syst Pharm. 2002 Nov 1;59(21):2070–7.**
21. Ziane A, Ngami C, Youb R, Atri MH, Aikpa R, Kabirian F, **et al.** Évaluation de la qualité des interventions pharmaceutiques chez le sujet âgé de plus de 75 ans. 2019;32:7.
22. Moch C, Pivot C, Floccard B, Rimmelé T, Paillet C. Intégration d'un pharmacien hospitalier en service de réanimation. Ann Pharm Fr. 2014 **Mar** 1;72(2):90–4.
23. Dufay É, Doerper S, Michel B, Marson C, Grain A, Liebbe A, **et al.** High 5 s initiative: implementation of medication reconciliation in France a 5 years experimentation. Saf Health. 2017 **May** 1;3:6.
24. Marchand F, Mimassi N, Autret J, Baron D. Les difficultés d'observance dans la prise en charge des douleurs chroniques non cancéreuses. Douleurs Eval - Diagn - Trait. 2006 **Feb** 1;7(1):17–21.
25. Murray MD, Young J, Hoke S, Tu W, Weiner M, Morrow D, **et al.** Pharmacist intervention to improve medication adherence in heart failure: a randomized trial. Ann Intern Med. 2007 **May** 15;146(10):714–25.
26. Clark PM, Karagoz T, Apikoglu-Rabus S, Izzettin FV. **Effect of pharmacist-led patient education on adherence to tuberculosis treatment. Am J Health-Syst Pharm AJHP Off J Am Soc Health-Syst Pharm. 2007 Mar 1;64(5):497–505.**
27. Garcia-Cardenas V, Armour C, Benrimoj SI, Martinez-Martinez F, Rotta I, Fernandez-Llimos F. Pharmacists' interventions on clinical asthma outcomes: a systematic review. Eur Respir J. 2016 Apr 1;47(4):1134–43.
28. Wu JYF, Leung WYS, Chang S, Lee B, Zee B, Tong PCY, **et al.** Effectiveness of telephone counselling by a pharmacist in reducing mortality in patients receiving polypharmacy: randomised controlled trial. BMJ. 2006 **Sep** 9;333(7567):522.
29. Kooy MJ, Van Geffen ECG, Heerdink ER, Van Dijk L, Bouvy ML. Patients' general satisfaction with telephone counseling by pharmacists and effects on satisfaction with information and beliefs about medicines: Results from a cluster randomized trial. Patient Educ Couns. 2015 **Jun**;98(6):797–804.
30. Clanet R, Bansard M, Humbert X, Marie V, Raginel T. **Revue systématique sur les documents de sortie d'hospitalisation et les attentes des médecins généralistes. Santé Publique. 2015 Jan 1;27:701.**

31. Forster AJ, Murff HJ, Peterson JF, Gandhi TK, Bates DW. The incidence and severity of adverse events affecting patients after discharge from the hospital. *Ann Intern Med.* 2003 **Feb** 4;138(3):161–7.
32. Forster AJ, Clark HD, Menard A, Dupuis N, Chernish R, Chandok N, **et al.** **Adverse events among medical patients after discharge from hospital.** *CMAJ Can Med Assoc J J Assoc Medicale Can.* 2004 **Feb** 3;170(3):345–9.
33. Makeham MAB, Mira M, Kidd MR. Lessons from the TAPS study - communication failures between hospitals and general practices. *Aust Fam Physician.* 2008 **Sep**;37(9):735–6.
34. Bergkvist A, Midlöv P, Höglund P, Larsson L, Bondesson A, Eriksson T. Improved quality in the hospital discharge summary reduces medication errors–LIMM: Landskrona Integrated Medicines Management. *Eur J Clin Pharmacol.* 2009 **Oct**;65(10):1037–46.
35. François P, Boussat B, Fourny M, Seigneurin A. Qualité des services rendus par un Centre hospitalier universitaire: le point de vue de médecins généralistes. *Sante Publique (Bucur).* 2014 **May** 27;Vol. 26(2):189–97.
36. Manno M, Hayes D. BEST-PRACTICE INTERVENTIONS: **How medication reconciliation saves lives.** *Nursing (Lond).* 2006 **Mar** 1;36(3):63–4.
37. Quélenec B, Beretz L, Paya D, Blicklé JF, Gourieux B, Andrès E, **et al.** Potential clinical impact of medication discrepancies at hospital admission. *Eur J Intern Med.* 2013 **Sep**;24(6):530–5.
38. Dufay E, Morice S, Dony A, Baum T, Doerper S, Rauss A, **et al.** **The clinical impact of medication reconciliation on admission to a French hospital: a prospective observational study.** *Eur J Hosp Pharm.* 2016 **Jul** 1;23(4):207–12.
39. Wilson S, Ruscoe W, Chapman M, Miller R. General practitioner-hospital communications: a review of discharge summaries. *J Qual Clin Pract.* 2001 **Dec**;21(4):104–8.
40. Kripalani S, LeFevre F, Phillips CO, Williams MV, Basaviah P, Baker DW. Deficits in communication and information transfer between hospital-based and primary care physicians: implications for patient safety and continuity of care. *JAMA.* 2007 Feb 28;297(8):831–41.
41. Salanitro AH, Osborn CY, Schnipper JL, Roumie CL, Labonville S, Johnson DC, **et al.** Effect of patient- and medication-related factors on inpatient medication reconciliation errors. *J Gen Intern Med.* 2012 **Aug**;27(8):924–32.
42. Vira T, Colquhoun M, Etchells E. Reconcilable differences: correcting medication errors at hospital admission and discharge. *Qual Saf Health Care.* 2006 **Apr**;15(2):122–6.
43. Kwan JL, Lo L, Sampson M, Shojania KG. Medication reconciliation during transitions of care as a patient safety strategy: a systematic review. *Ann Intern Med.* 2013 **Mar** 5;158(5 Pt 2):397–403.
44. HAS. **Initiative des 5's - Medication reconciliation [Internet]. [cited 2019 Apr 10] Available from:** [http://www.has-sante.fr/portail/upload/docs/application/pdf/2015-11/rapport\\_dexperimentation\\_sur\\_la\\_mise\\_en\\_oeuvre\\_conciliation\\_des\\_traitements\\_medicamenteux\\_par\\_9\\_es.pdf](http://www.has-sante.fr/portail/upload/docs/application/pdf/2015-11/rapport_dexperimentation_sur_la_mise_en_oeuvre_conciliation_des_traitements_medicamenteux_par_9_es.pdf).
45. Lonie JM, Austin Z, Nguyen R, Gill I, Tsingos-Lucas C. Pharmacist-based health coaching: A new model of pharmacist-patient care. *Res Soc Adm Pharm RSAP.* 2017 **Jun**;13(3):644–52.

46. Kopp BJ, Mrgan M, Erstad BL, Duby JJ. **Cost implications of and potential adverse events prevented by interventions of a critical care pharmacist.** *Am J Health-Syst Pharm AJHP Off J Am Soc Health-Syst Pharm.* 2007 Dec 1;64(23):2483–7.
47. Gallagher J, McCarthy S, Byrne S. Economic evaluations of clinical pharmacist interventions on hospital inpatients: a systematic review of recent literature. *Int J Clin Pharm.* 2014 Dec;36(6):1101–14.
48. Reeder TA, Mutnick A. **Pharmacist- versus physician-obtained medication histories.** *Am J Health-Syst Pharm AJHP Off J Am Soc Health-Syst Pharm.* 2008 May 1;65(9):857–60.
49. Karnon J, Campbell F, Czoski-Murray C. Model-based cost-effectiveness analysis of interventions aimed at preventing medication error at hospital admission (medicines reconciliation). *J Eval Clin Pract.* 2009 Apr;15(2):299–306.
50. Kaboli PJ, Hoth AB, McClimon BJ, Schnipper JL. Clinical pharmacists and inpatient medical care: a systematic review. *Arch Intern Med.* 2006 May 8;166(9):955–64.
51. V Anderson S, Schumock G. Evaluation and justification of clinical pharmacy services. *Expert Rev Pharmacoecon Outcomes Res.* 2009 Dec 1;9:539–45.
52. Lada P, Delgado G. Documentation of pharmacists' interventions in an emergency department and associated cost avoidance. *Am J Health-Syst Pharm AJHP Off J Am Soc Health-Syst Pharm.* 2007 Jan 1;64(1):63–8.
53. Papadopoulos J, Rebuck JA, Lober C, Pass SE, Seidl EC, Shah RA, **et al.** The critical care pharmacist: an essential intensive care practitioner. *Pharmacotherapy.* 2002 Nov;22(11):1484–8.
54. Gallagher J, Byrne S, Woods N, Lynch D, McCarthy S. Cost-outcome description of clinical pharmacist interventions in a university teaching hospital. *BMC Health Serv Res.* 2014 Apr 17;14:177.
55. Yasunaga D, Tasaka Y, Murakami S, Tanaka A, Tanaka M, Araki H. **Economic contributions of pharmaceutical interventions by pharmacists: a retrospective report in Japan.** *J Pharm Policy Pract [Internet].* 2016 Jul 19 [cited 2020 Jul 21];10. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4955163/>
56. Chedru V, Juste M. Evaluation médicale de l'impact clinique des interventions pharmaceutiques. *J Pharm Clin.* 1997 Dec 30;16(4):254–8.
57. Hatoum HT, Hutchinson RA, Witte KW, Newby GP. Evaluation of the contribution of clinical pharmacists: inpatient care and cost reduction. *Drug Intell Clin Pharm.* 1988 Mar;22(3):252–9.

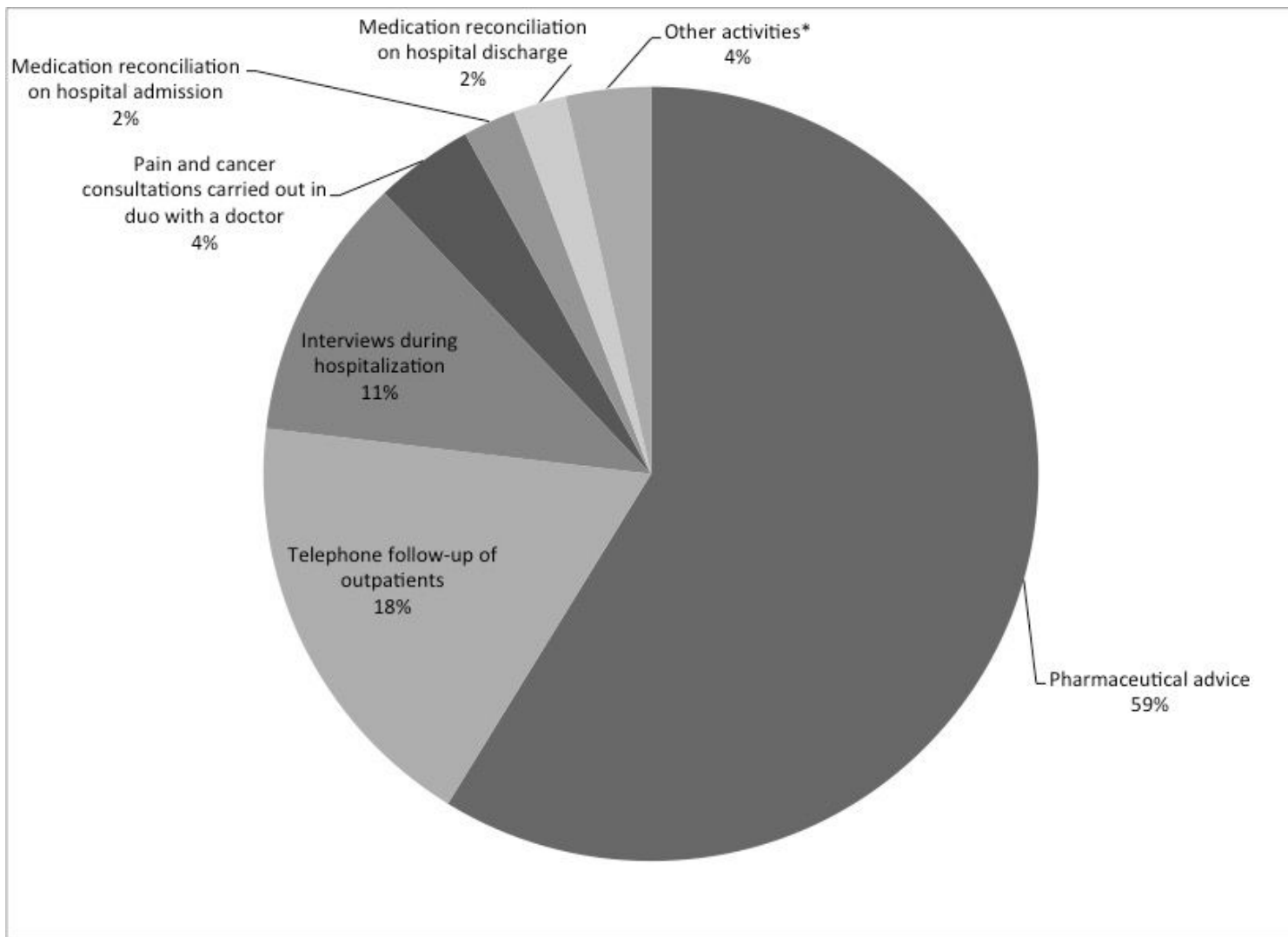
## Figures



**Figure 1**

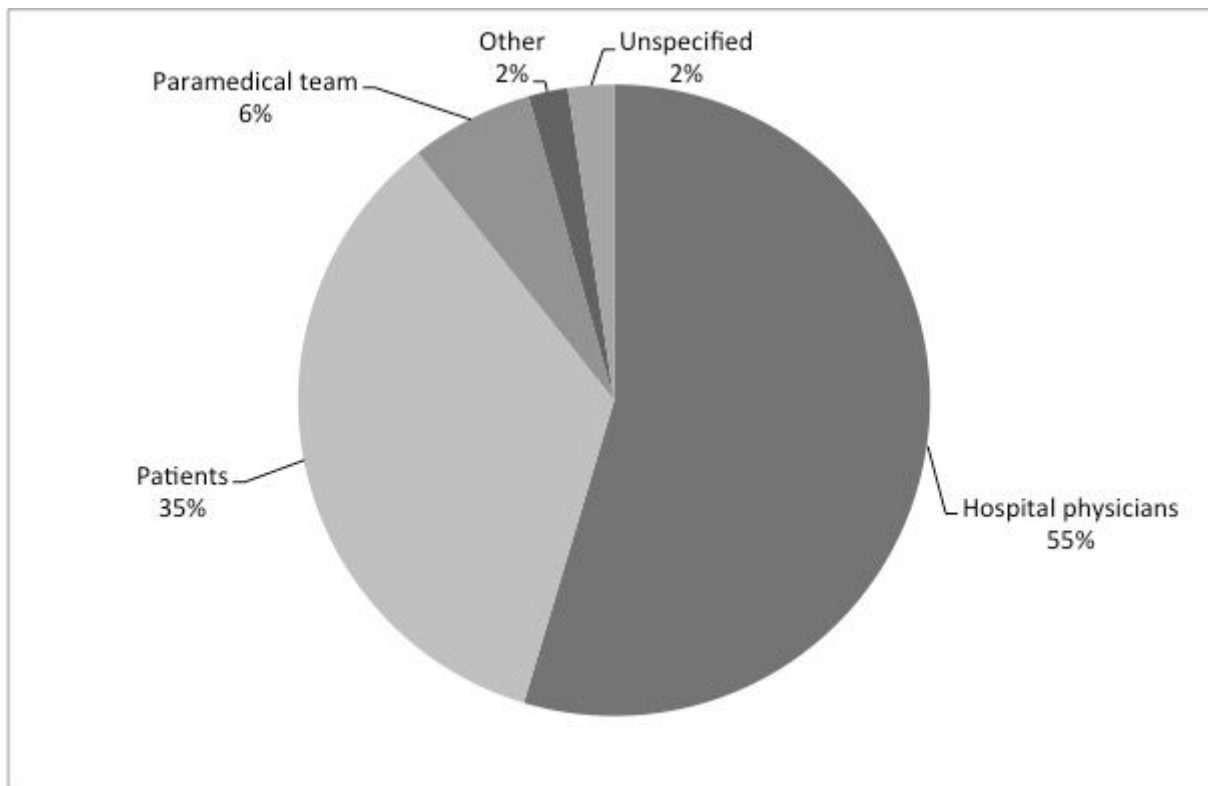
Distribution of clinical pharmacists' interventions by type of stay HDC: hospital day care FH: full hospitalization





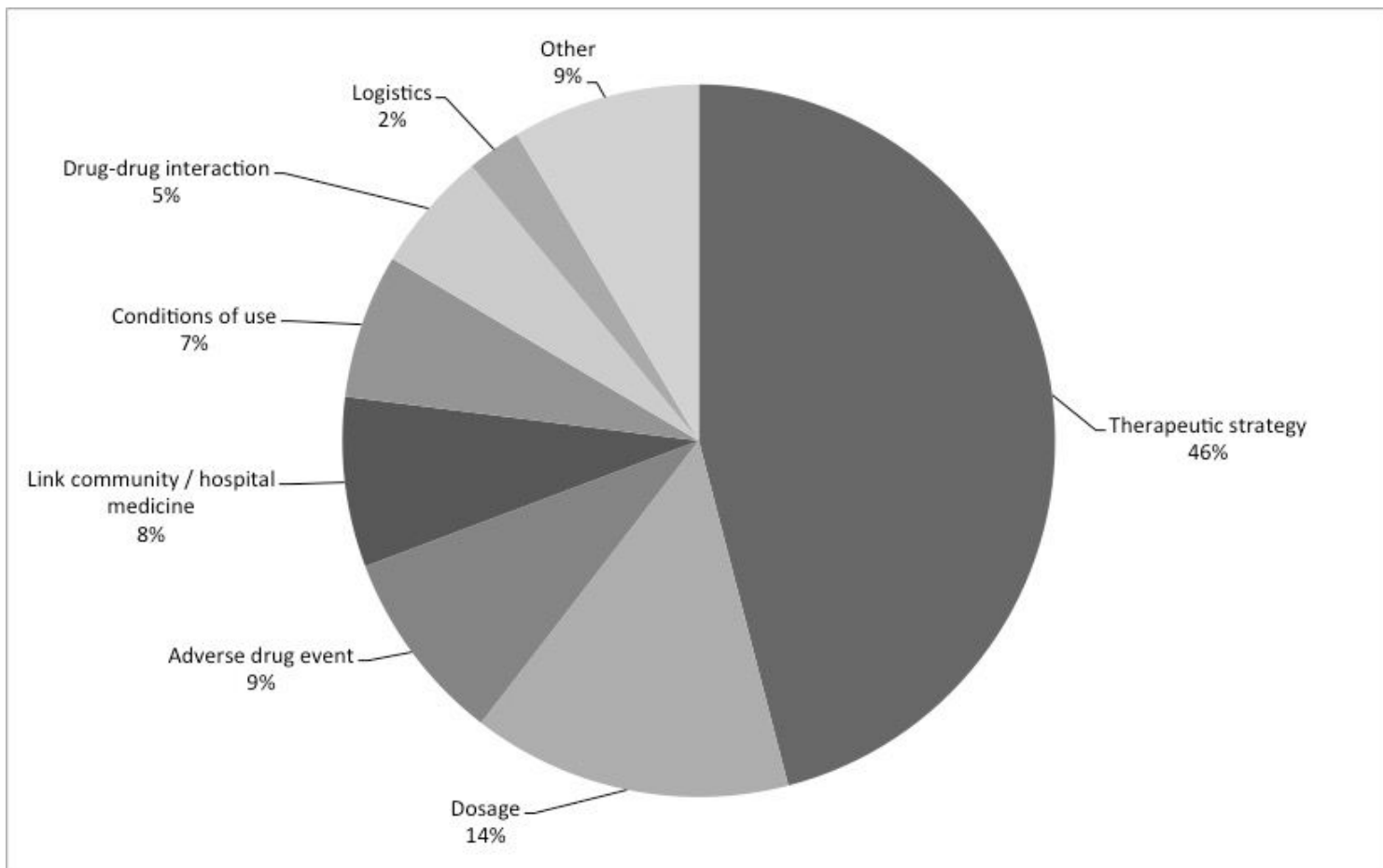
**Figure 2**

Distribution of activities performed by the clinical pharmacists \* Other activities: - Medication history - Pharmaceutical assessment - Participation in multidisciplinary consultation meetings - Pharmacovigilance reports - Updating of medication plans - Drafting of drug protocols



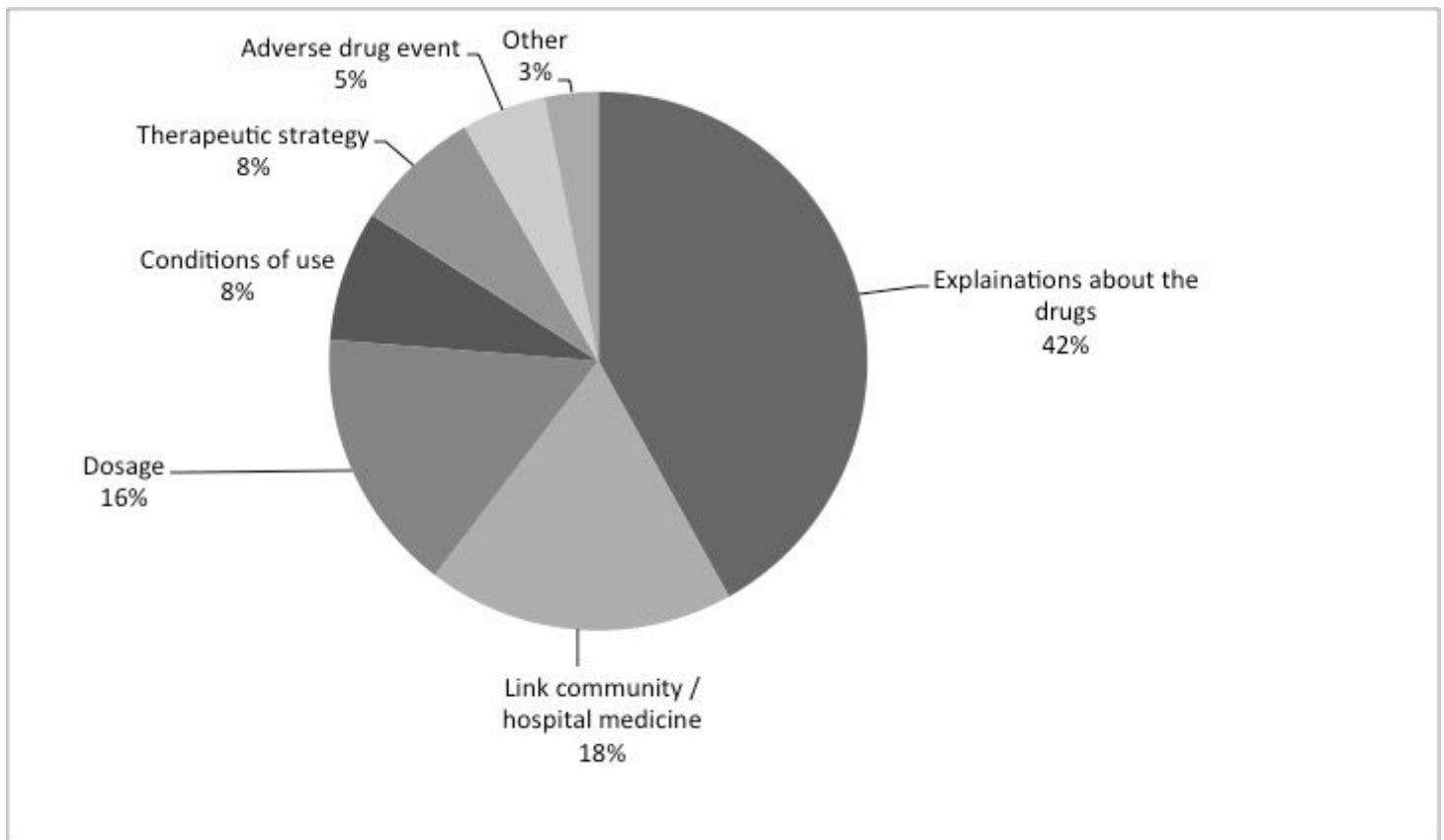
**Figure 3**

Distribution of the clinical pharmacists' advice according to the discussion partner Other: Hospital pharmacists, Community health professional



**Figure 4**

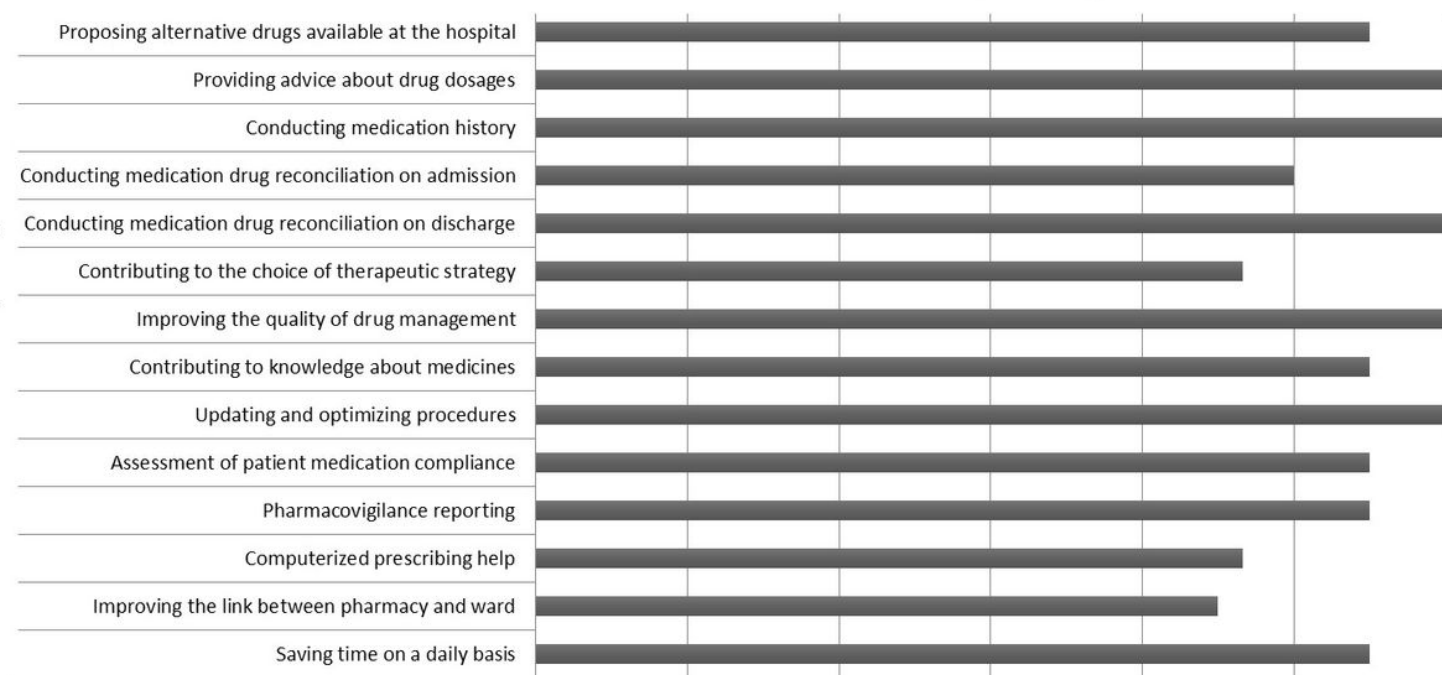
Distribution of the different types of advice given by the clinical pharmacist to the healthcare team



**Figure 5**

Distribution of the different types of advice given by the clinical pharmacist to the patients

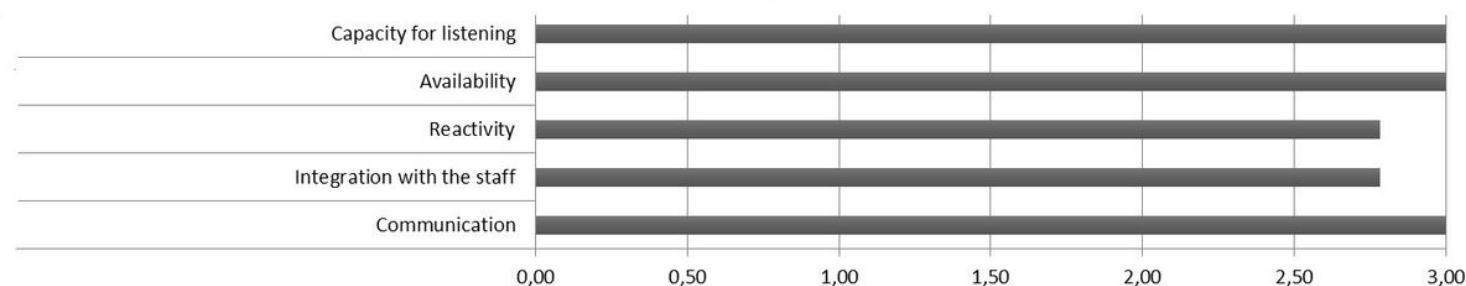
### Skills that can help health professionals



### Skills that can help patients



### Clinical pharmacist's behavior and communication



**Figure 6**

Healthcare team's satisfaction with clinical pharmacy activities. Rating scale from 0 to 3: 0: Not at all satisfied 1: Not satisfied 2: Satisfied 3: Very satisfied

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Appendix1.jpg](#)
- [Appendix2.doc](#)

- [Appendix3.tiff](#)