A Review of Pharmaceutical Care in Community Pharmacy in Europe

J. W. Foppe van Mil, PhD, Martin Schulz, PhD

Although a number of articles about pharmacy practices in European countries have been published, few reviews compare pharmacy and pharmaceutical care practices throughout Europe.[1,2] In 2000 the status of pharmaceutical care in Europe was discussed in a Spanish journal,[3] and in 2004 two other reviews were published.[4,5] A series of articles on the development of pharmaceutical care and pharmacy practice in a number of countries is now being published in the Annals of Pharmacotherapy.[6] But these articles describe one country at a time, and the series will only cover a limited number of European countries.[7,8,9,10]

There are several reasons why it is difficult to get a clear picture of pharmacy and pharmaceutical care practices in Europe. Although the European Union (EU) has now existed for many years, there has yet to be any harmonization in the field of primary health care even though a number of recommendations have been made.[11] As a result, there still are major differences in health care policies and practices among European countries. Furthermore, it is not very common to describe current practices or professional developments in pharmacy; most articles focus on commercial and professional threats to pharmacy or future challenges. It is somewhat easier to find articles describing research into small elements of pharmacy practice; but in most European countries even this research is not yet normal practice. There are many different pharmacy journals in Europe, but they are published in over forty different languages and many are not indexed in major international databases like Medline/Pubmed.

In this literature review, we aim to describe contemporary European developments regarding the implementation of and research into pharmaceutical care, focusing on the community pharmacy. We will identify the major

J.W. Foppe van Mil, PhD, is a community pharmacist in a rural area of the Netherlands. Since 2000, he has also served as a consultant on pharmacy practice research and pharmaceutical care. In January 2000, he concluded his PhD in Social Pharmacy and Pharmacoepidemiology at the University Center of Pharmacy in Groningen. He is author or co-author of over 100 publications on pharmacy practice and pharmaceutical care. Martin Schulz, PhD, is an Adjunct Professor at Johann Wolfgang Goethe University, Department of Pharmacology, Frankfurt at Main, Germany. He is head of the Center for Drug Information and Pharmacy Practice (ZAPP) of ABDA - the Federal Union of German Associations of Pharmacists, Berlin. In addition, Dr. Schulz is Director of Pharmacy of the German Institute for Drug Use Evaluation (DAPI). He has more than 360 publications to his name, has delivered 220 lectures and seminars, and has written books as well.

movements in the pharmacy profession and give some indication of future developments. This review is based upon information from articles that are written in major European languages (French, German, English, Dutch and Spanish) and articles written in other languages with English abstracts. Letters to the editors are not included in the review, but commentaries are.

Definition of Pharmaceutical Care

In 1990 Hepler and Strand published the first useful definition of pharmaceutical care. They wrote, "pharmaceutical care is the responsible provision of drug therapy for the purpose of achieving definite outcomes which improve a patient's quality of life." Most European countries rely on this definition in their approach to pharmaceutical care, and many have just translated Hepler and Strand's terminology. But even the act of translation has introduced notable discrepancies, for the meaning of the word "care" differs across languages.

Some Europeans have tried to clarify the definition of pharmaceutical care. During a symposium in the Netherlands in 2003, pharmaceutical care was regarded more or less as "pharmacists being nice to the patient." It was even suggested that grocers provided pharmaceutical care when being kind to drug-using patients. Although perhaps it is not necessary that pharmaceutical care is always provided by a pharmacist per se, just being nice is certainly not enough.[12] Some have tried to clarify that pharmaceutical care in Europe basically is "the care of the pharmacist around pharmaceuticals for the benefit of the patient." Even such a simple concept may lead to political confusion. By this definition, does pharmaceutical care include pharmacovigilance or health promotion activities?[13] It seems that there simply cannot be a uniform definition of pharmaceutical care across Europe because of the different countries, languages and health care systems involved.

The different terms used in Europe, such as "farmaceutische zorg" in Belgium, "farmaceutische patiëntenzorg" in the Netherlands, "Pharmazeutische Betreuung" in German-speaking regions, "farmaceutisk/Farmacøytisk omsorg" in most Scandinavian languages or "soin pharmaceutique" in francophone regions, basically refer to pharmaceutical care in terms of Hepler and Strand's definition. Additionally, there exist seemingly disparate concepts with similar implications, like "seguimento farmacoterapéutico" with the strange translation of "pharmacotherapy follow-up" in Spain and Portugal and "medicines management" in parts of the United Kingdom (UK).[14] The term "cognitive pharmacy services," which is often used in social pharmacy circles, also points in the direction of pharmaceutical care.[15] Apart from this confusion, there also can be a difference in the interpretation of the term pharmaceutical care within one country or between and within settings (like community or hospital pharmacy).[16]

Not dissimilar from Hepler and Strand's original American definition, pharmaceutical care is often regarded in Europe as the process of optimizing the outcome of a patient's drug therapy—nothing more and nothing less. The goal of that process is to improve the patient's quality of life (QOL).[17] An optimized set of drugs is not a goal in itself, but the improved clinical, economic and/or humanistic outcomes are. The question "who does it?" is relevant when it comes to defending the professionalism of pharmacists, but it is not necessarily important from the patient's perspective.

Nonetheless, in most European countries pharmacists are the only health care professionals who have the knowledge and skills required to provide pharmaceutical care. Additionally, they are usually the professionals who are most easily accessible.

Community Pharmacy Systems and Their History

Before we can describe pharmaceutical care in Europe, it is necessary to recognize that pharmacy practices in European countries are quite diverse because of the different languages and legal, political and healthcare systems in the nations involved and because practices have developed in different ways and at different paces in different countries.

Roughly four different pharmacy systems can be recognized. The Scandinavian type of pharmacy has relatively large pharmacies, serving 10,000–18,000 people and focused mainly on medicines. Southern Europe, France, and Belgium have very small pharmacies that serve approximately 2,000–2,500 clients and that also sell parapharmaceuticals and cosmetics. In the UK and Ireland are Anglo-Saxon type pharmacies (resembling those in the United States [US] and Australia), which sell many non-medical items in addition to medicines and which serve approximately 3,500 people. Lastly, there are the pharmacies in Central and Eastern Europe (Germany, Switzerland, Austria and farther east), which focus on all kinds of healthcare amenities and serve 3,000–5,000 people. In Europe, the drug-store concept is hardly known outside of Great Britain.

As elsewhere, the profession in Europe developed from compounding (in the 1910s and 1920s) to dispensing (around the 1950s) and finally towards the provision of clinical pharmacy and pharmaceutical care. This last development has had to compete with some commercial issues that emerged around 2000, when different European governments, recognizing that the costs of health care were starting to grow uncontrollably, tried to deregulate the health care system—including the pharmacy system. Pharmacies lost their monopoly over a limited number of medicines in some European countries, like Denmark, Portugal, Ireland, and the UK, in an effort to increase competition and reduce prices. In many countries like Iceland and Norway, these discussions caused a temporary stop in the development of pharmaceutical care and other patient-oriented services.[18,19,20]

Other major developments in Europe were system changes around 1991 and 1992 that occurred in (now former) Communist states and newly independent countries. Despite the efforts of the World Health Organization (WHO), among others, the pharmaceutical industry and wholesalers stormed this new terra incognita and thoroughly disturbed local production, markets, and formularies.[21] Some industries provided expensive medicines for free to push other cheaper drugs from the market. Given these problems, the first priority in those states was (and still is) to focus on proper drug use and prescribing and dispensing practices. There seems to be very little pharmaceutical care going on in this region of Europe, apart from the Czech Republic, Croatia, Poland, Slovenia and perhaps Hungary.

From Clinical Pharmacy to Pharmaceutical Care

As in the US, clinical pharmacy was the foundation for the development of pharmaceutical care in most European countries.[22] Al-

though there is little written evidence in international journals about this, clinical pharmacy started to play a role in community pharmacies in Scandinavia and the Netherlands in the early 1980s, when the European Society of Clinical Pharmacy (ESCP) was founded. In 1991, Doug Hepler, shortly after the publication of his cornerstone publication with Strand,[17] was invited to the Danish pharmaceutical association in Copenhagen. This began a momentous chain of events in Europe. Pharmacists' organizations in other countries slowly became aware of the new professional development known as pharmaceutical care, especially after the community pharmacy section of International Pharmaceutical Federation (FIP) started discussing its importance in 1993 and subsequently issued a Statement of Professional Standards about it in 1998. Thus in the 1990s most community pharmacists' organizations in Europe started looking at pharmaceutical care as the (strategic) future for the profession. The following paragraphs describe developments in different European countries.

In Sweden, the first publication about pharmaceutical care programs came out in 1993,[23] but the national pharmacy organization, Apoteket, focused initially on health promotion, counseling and over-the-counter (OTC) advice. In 2004 a national database for drug-related problems was founded,[24] and this hastened the implementation of drug review. A national register of patients' dispensed drugs became available in 2006, facilitating more integrated forms of pharmaceutical care in which the identification and resolution of drug-related problems play central roles.

In Norway, the first ESCP workshop about pharmaceutical care was held in 1993,[25] but there seem to have been few subsequent developments in practice.

In Denmark, pharmaceutical care has been included in professional standards of practice for community pharmacy since 1995.[26] As in Sweden, however, its implementation has long been hampered by privacy issues surrounding patients' drug data. Many research and implementation projects have been carried out (in particular in the fields of asthma and migraine),[27] but only half of the pharmacies today try to detect drug-related problems in a systematic way.[28]

In the Netherlands, where pharmacies are relatively big and 95% of patients always visit the same pharmacy, medication surveillance (automated drug use review or DUR) developed as early as the 1980s, and pharmacists and general practitioners (GPs) in the region discuss pharmacotherapy almost monthly.[29] Pharmaceutical care per se was first described in 1993.[30] Pharmaceutical care standards were first established in 1996, and the scientific institute of the professional pharmacist organization (WINAP) chose pharmaceutical care as its focus for further professional development around 1997.[31] In general, the comprehensive pharmaceutical care model is followed,[32] although a number of disease-oriented projects addressing asthma and diabetes have also been implemented. Today, the delivery of pharmaceutical care is often included in contracts between pharmacies and health insurance companies, but remuneration is only very limited.

In the UK, pharmaceutical care has been linked to professional development and the quality control of medication use since 1991.[33,34] Because the National Health Service (NHS) was interested in possible new roles for pharmacists, many studies have been carried out as to the opinions and needs of pharmacists and patients. Different practice options have been chosen, and, in addition to hospital and community pharmacy, consultant pharmacists (also called primary care pharmacists) are now

performing medication review in health practices.[35] Meanwhile, practitioners like pharmacists and nurses have been trained to do supplementary prescribing.[35,36] Full-blown pharmaceutical care in normal pharmacy practice has been studied but hardly implemented.

Cognitive pharmaceutical services have developed in Germany since the early 1990s, mainly by the national pharmacist organization, the Federal Union of German Associations of Pharmacists (ABDA). The first paper on the topic was published in 1993,[37] and the first pharmaceutical care conference was held in Germany in 1994.[38] Several studies and programs have shown that pharmaceutical care and other pharmaceutical services are feasible in German community pharmacy practice, and that patients benefit from these services.[7] A number of studies and implementation projects have taken place in Germany's separate federal states, coached by both the ABDA and Humbold University in Berlin. In 2003, a nationwide contract was established between representatives of community pharmacy owners and Germany's largest health insurance fund. In this so-called family pharmacy contract, remuneration of pharmacists for the provision of pharmaceutical care services was successfully negotiated for the first time. In 2004 a trilateral integrated care contract was signed that added GPs and thus combined the family pharmacy with the family physician. Within a few months, the vast majority of community pharmacies (over 80%) signed up to participate in this program, but the real impact on practice is not yet clear. Limiting the opportunities for pharmaceutical care is the relatively old-fashioned education available to pharmacists; clinical pharmacy has only recently been introduced into the curriculum. Nevertheless, several other pharmaceutical care programs are ongoing, such as a certified diabetes counseling program since 2002.[39]

In some countries like Spain, the obligation of community pharmacists to provide pharmaceutical care has been laid down in legislation. This resulted from the activities of a foundation with its own pharmaceutical care journal and from a consensus (known as the Granada Consensus) about the essence of pharmaceutical care that was reached by the different organizations and people that were active in the field of pharmaceutical care.[40] This consensus has also led to a system of medication review and classification of drug-related problems.[41] Although Spain has many community pharmacies, there is little pharmacy practice research. Some advanced cognitive services existed in 2005, but few were being remunerated.[9]

Portugal is an example of an integrated approach. Since 1999, the Portuguese pharmacist association (ANF) has developed a strategy, methods and tools (documentation forms, software applications, pharmacist's intervention protocols, etc.) for pharmacy-based disease management programs. While they are labeled "disease management," these programs are in fact counseling-oriented pharmaceutical care. Currently programs have been established for patients with asthma, diabetes and hypertension. Remuneration of the diabetes program was successfully negotiated with the government in 2004. All newer developments have been guided by extensive research efforts and many of the results were published in 2004 and 2005.[42]

In Belgium, the Flemish pharmacist association made a priority of pharmaceutical care in 1994, and Haems published on pharmaceutical care in the Flemish pharmacist journal in 1995.[43] Even so, full development started relatively late. In 2005, the provision of pharmaceutical care became a legal duty for the community pharmacist.[44] Implementation

remains difficult in this country, because usually there is only one pharmacist per relatively small pharmacy.

Little information can be found about developments in France, as most French journals are not accessible in Internet databases and sometimes cannot be traced in libraries. In 2004, Dupin-Spriet and Wierre considered the possibilities for medication management review in France but concluded that there were very few initiatives at the time. The French Ordre des Pharmaciens, however, is doing its best to stimulate pharmacists to enhance continuity of care and implement more medication surveillance in their practices.[45]

In Italy, where clinical pharmacy has been important since the 1990s, pharmaceutical care seems to be the domain of hospital pharmacy and does not have the same meaning as it does elsewhere in Europe. Little is known about the development of community pharmacy practice.

Polish pharmacists displayed their interest in the topic during their first pharmaceutical care conference in 2001, but members of Polish pharmacist organizations had been present at international conferences devoted to pharmaceutical care since 1997. The authors of this paper presented at another pharmaceutical care conference in 2005. The audience consisted mainly of academics, and it seems that the concept of pharmaceutical care has not yet penetrated practice.

It is difficult to get an overview of pharmacy practices in Switzerland due to the federal structure of the country and the four different languages spoken in it. Early activities developed in 1996, but they were aimed at reforming professional practice and creating opportunities for activities like pharmaceutical care. Although some form of remuneration has existed since 2001 ("Leistungsorietierte Abgeltung" or LOA), it seems that only lately has implementation been enacted in both the German and French speaking parts. But the limited and regional implementation still seems to be largely associated with research efforts (as in diabetes, improving adherence, and quality circles).[10]

Pharmacist Education

In European practice, people who have received training in clinical pharmacy (usually pharmacists and sometimes clinical pharmacologists) have most of the knowledge and skills necessary to carry out pharmaceutical care—to analyze a given patient's drug use; to prevent, detect or correct drug-related problems; and to improve therapeutic outcomes and hopefully QOL. In several European countries, however, having a pharmacy degree is not enough and a special qualification is required for the provision of pharmaceutical care. For instance, in Spain and Portugal, much emphasis is placed on post-graduate education.[46] In the UK, it has recently been recognized that participation in post-graduate education has a positive impact on the practice activities of community pharmacists[47] and so continuing education is bound to become obligatory.

In 2000, Bonal argued that changes in the pharmacist education were still necessary.[48] The European Association of Faculties of Pharmacy published several reports on how the curricula for basic education in Europe should be restructured to enable the provision of pharmaceutical care by pharmacists. In most European countries, clinical pharmacy is now part of the curriculum (Germany, for one, introduced the topic only in 2001).[49] In general pharmacists now receive a four-year education leading to the equivalent of the American MS, but the end terms are not the same. In other coun-

tries there is a requirement to do an additional two years, which then leads to a PharmD or equivalent title. In countries like Portugal and the Netherlands, mandatory registration (with or without an exam) leads to professional accreditation, and continuing education is compulsory.[50]

Although journal publications about pharmacy education suggest that there is increased attention to patient communication and other pharmaceutical care skills, only a few international publications can be found about adaptation of the curricula. Van de Werf et al. have published on the reforms in the Netherlands.[51] Sramkova et al. analyzed the necessary changes in the Czech pharmacy education.[52] In Basle, Switzerland, pharmaceutical care became part of the official pharmacy curriculum in 2003.

The main problem in Europe from a pharmaceutical care perspective seems to be the lack of cooperation between pharmacists, medical doctors and nurses during their education, which leads to different professional cultures that inhibit cooperation during later professional practice. This gap is being addressed in a limited number of faculties now in the UK, Belgium and the Netherlands, which allow medical and pharmacy students to work together on pharmacotherapeutic issues in their final year.[53,54]

Pharmacy Practice Research

Pharmacy practice research has been increasingly performed in European countries. However, there is still some conflict between sociologically-driven and laboratory-based approaches to the research field of pharmacy practice. This often results in a "living apart together" (LAT) relationship, to the detriment of funding options.[55] Pharmacy practice research is especially prevalent in the UK, due to the availability of funding from the NHS.

Pharmaceutical care research in Europe focuses on different issues. There have been studies assessing patients' knowledge, needs and opinions about medicines and their attitudes towards pharmacists.[56,57,58,59,60,61,62] All such studies indicate the limited knowledge of patients and their need for information and understanding. But it is still often found that patients prefer to receive that information from their doctor, and they hardly consider pharmacists care providers because they are unaware of their educational backgrounds. Patients also express privacy concerns.

The actual behavior of pharmacists with regard to pharmaceutical care has been assessed in different countries, using the Behavioral Pharmaceutical Care Scale (BPCS) among other instruments.[63,64] In Denmark and the Netherlands, pharmacists' opinions about the provision of pharmaceutical care were also assessed.[65,66] From such studies, it is clear that pharmacists are prepared to provide care and recognize its political necessity, but they still see many barriers in practice. In 2006 and 2007, a similar study will again take place in more European countries, coordinated through the Pharmaceutical Care Network Europe (PCNE).

In many pharmaceutical care intervention studies, pharmacists' opinions have also been assessed. For instance, in the PEER study it was found that most pharmacists liked providing pharmaceutical care but had difficulties finding time for it. In some countries the opinion of GPs proved somewhat reserved but never really negative.[67]

Many studies concerning the outcomes of pharmaceutical care have been conducted, with different kinds of interventions and in different settings. Interventions range from

patient counseling and self-management training to periodic screening of pharmacotherapy for drug-related problems or pharmacotherapeutic discussions with GPs. Such practice studies do not always show positive outcomes because they are extremely difficult to conduct well and because evaluation of the impact on outcomes varies.[68,69,70] In general, it is wise to be critical about the results of studies that are published in the field of pharmaceutical care. Often such studies are not conducted rigorously enough and the outcomes are poorly defined and assessed.[71] The large range of studied outcomes in diabetes care, for instance, has been described in Storimans' dissertation, and the author concludes that it still is necessary for proper indicators to measure the impact of pharmaceutical care to be defined.[72] In 2004, Wong et al. tried to design a rigorous and large study in the UK using the MCR framework and a health technology approach, but no results have been published to date.[73,74]

Implementation Barriers and Facilitators. Of course, there are studies into implementation, its barriers, and its facilitators.[75,76] Since time is said to be a major barrier, a limited number of work sampling studies were conducted.[77] Implementation, its barriers, and its (potential) facilitators have also been studied in a major coordinated European study in which several PCNE members took part (Denmark, Spain, and Portugal) along with Australia's University of Sydney. Not all results are published yet.[78,79] Unlike in the United States, relatively few studies have been conducted concerning the financial aspects of pharmaceutical care implementation.

Research Support. Apart from the national bodies of community pharmacists, two organizations in Europe are especially active in stimulating the implementation of and research into pharmaceutical care. The PCNE (see www.pcne.org) is a network of researchers in the field of pharmaceutical care that was established in 1995. Its members are researchers from many European countries, and researchers from other continents can participate as observers. Members discuss research methodology during a bi-annual working conference. Some international coordinated studies are carried out, sometimes with EU funding. EuroPharm Forum (see www.europharm.org) is a cooperative structure between European community pharmacy associations and the regional office of the WHO in Europe. EuroPharm focuses especially on the implementation of pharmaceutical care in normal community pharmacy practice. Its members discuss and study the process of and indicators for successful implementation.

Comprehensive Pharmaceutical Care

The effects of comprehensive pharmaceutical care have been studied especially in the elderly and nursing home populations of Europe. A major international study was conducted at the end of the 1990s, and the results were published in two papers.[67,80] Commentary on economic evaluations was also a result of this study.[81] The positive effects on outcomes were not as significant as expected and differed per country, but patients' satisfaction was high everywhere.

In France, a reference can be found to the implementation of an "opinion pharmaceutique" in community pharmacy practice, but results have not been described.[82] There also has been a Czech study in community pharmacy.[83]

In the Netherlands, Sweden, and the UK, some more fundamental research is ongoing

in the fields of drug use evaluation, indicators for inappropriate prescribing, and drug-related problems and their severity.[84,85,86] Such studies can provide a more general view on the possible impact of comprehensive pharmaceutical care. A major problem in the Netherlands is the incompleteness of patient data in the electronic patient records of community pharmacies, even though most patients there visit the same pharmacy. Not all relevant diseases were always documented.[87] The Spanish way of detecting and classifying drug-related problems (the Dadér program) has been used for many years now in several countries, including Portugal. However, only preliminary results from Spain in 2002 and results from a small pilot study in a hospital can be found.[88,89]

Disease-Oriented Pharmaceutical Care

It is considered easier for pharmacists and their staff to provide disease-oriented pharmaceutical care than comprehensive pharmaceutical care, but in Europe there is an ongoing discussion about whether it is ethically permissible to limit the provision of pharmaceutical care to groups of patients with certain characteristics and to not provide pharmaceutical care to others.[90,91]

HIV/AIDS. Since (almost) full adherence is so important in the use of highly active antiretroviral therapy (HAART),[92] it would be reasonable to expect that several pharmaceutical care studies would be conducted in this field. However, few can be found. One Italian study was published in 2004, but focused more on HAART provision than on pharmaceutical care.[93] There has been some research in Sweden on this topic, but the studies have yet to be published. Other care activities took place in special dedicated clinics or hospitals, mainly in the US, but not with the involvement of pharmacists.

Hypertension. In general hypertension proves to be a field in which pharmaceutical care is useful. In 2001, Enlund et al. found in Finland that there is room for improvement in hypertension management and that many problems were caused by patients' behavior with medicines.[94] In Switzerland, adherence has been studied using the electronic medication event monitoring system (MEMS).[95] From that study, it is clear that "resistant hypertension" is usually caused simply by poor adherence. One study in France showed that patients needed counseling but that frequently community pharmacists themselves needed to update their knowledge.[96]

Under the name "disease management," the Portuguese ANF has implemented a pharmaceutical care program for hypertensive patients. Earlier, Garcao had proved that such a program would benefit Portuguese rural communities. This research program resulted in significantly better blood pressure control.[97] A pilot study is now under way for sending SMS reminders to hypertensive patients in order to improve their adherence.[42]

A pilot study in the UK showed that the implementation of a pharmacist-led hypertension clinic in a GP practice improved blood pressure control and appropriate prescribing of anti-platelet agents and statins for primary prevention of coronary heart disease and secondary prevention of arthrosclerosis.[98] The results were not compared to a doctor-led clinic, but the applied interventions certainly resembled pharmaceutical care.

Coronary Heart Disease. Very few studies have been conducted in this important field. An early study of congestive heart failure in Northern Ireland showed that as a result of

pharmaceutical care patients significantly improved in their knowledge of their drug therapy and showed improved outcomes. Furthermore, the intervention group had fewer hospital admissions than the controls.[99] More research is needed into the exact role for pharmacists and pharmaceutical care in this field.

Diabetes. Studies of the effect of pharmaceutical care on diabetes were carried out in several countries. In Portugal and Germany, a diabetes service has been implemented.[42,100] Wermeille et al. developed a pharmaceutical care model for Type 2 diabetes in Switzerland.[101] Storimans focused on the support for self-management in the Netherlands and found that there was significant variation in the services offered by different pharmacies.[72] Many pharmacies in the Netherlands now provide support for self-monitoring and check blood-sugar meters regularly.[102,103] In some countries like Belgium or Switzerland, screening studies have been carried out to detect latent diabetes patients.[104] Diabetes clearly is a field in which pharmaceutical care is valuable.

Lipid Management. Most studies into lipid management in Europe are parts of other pharmaceutical care research into conditions like diabetes or hypertension. But the LipoPharm study in Germany found a positive impact on the lipid level and profile in 60% of patients – 50% more than without the intervention.[105] General implementation of the protocol in Germany is now being advised. In Groningen, reminder letters were used to try to improve adherence to cholesterol or hypertension medication.[106] The intervention was only partially effective, and larger studies are now needed.

Asthma. Many studies into the effect of pharmaceutical care for asthma patients in community pharmacies have been conducted in a number of countries, including Denmark, Finland, Germany, Malta, Northern Ireland, the Netherlands and Spain. Often the therapeutic outcome monitoring (TOM) approach of Hepler was used. Most studies were successful and showed significant impact on economic, clinical and humanistic outcomes, although all those studies had their weaknesses.[107,108,109,110,111,112,113,114] Other counseling-based approaches were also successful.[115] Like diabetes, asthma thus appears to be a disease to which applying pharmaceutical care can be very successful.

Pharmaceutical Care in the Hospital Setting

Patient-centered clinical pharmacy services are still poorly developed in most of Europe (with the exception of the UK), despite their demonstrated advantages in North America.[116] With a few exceptions, most hospital pharmacies and pharmacists focus on managerial issues to prevent medication errors and not on care provision to detect and deal with drug-related problems. Apart from general disease and medicine oriented counseling, the main focus of pharmaceutical care in the hospital setting should be on seamless care issues: patient transfer to and from hospital, clinic or nursing home. Studies on this topic have been published in the UK, Northern Ireland and Sweden.[117,118,119]

There still proves to be an important communication barrier when patients are being transferred from one setting to the other, resulting in many drug-related problems. Patient education before discharge, as part of comprehensive pharmaceutical care, has been studied in a clinic in the UK.[120] Counseling was shown to decrease unplanned visits to the doctor and re-admissions. Pharmaceutical care, like clinical pharmacy services, was piloted in a geriatric

team in a Belgian clinic, and many drug-related problems were detected and solved.[121]

Future Developments

Throughout Western Europe, many studies have been performed in different fields related to pharmaceutical care. However, implementation on a large scale still appears to be lacking, despite the positive outcomes of most studies. Because many pharmacists' associations seem to have committed themselves to implementing pharmaceutical care and pharmacy faculties also have recognized the importance of the topic, it may be expected that there will be more and more pharmaceutical care in pharmacies in the future. However, in addition to reforming the attitude, knowledge, and skills of pharmacists, there also must be some form of remuneration for their provision of pharmaceutical care.

In the mean time, the pharmacy and pharmacist associations should make sure that pharmaceutical care (or medication management or whatever it is called) does not develop into an empty phrase, merely meaning "being nice to the patient." Someone in the health care chain should detect, prevent, or correct drug-related problems. Pharmacists in Europe seem to be in the best position to do this. Pharmaceutical care should therefore become an integral part of the pharmacy profession and of good pharmacy practice.

References

1. Cancrinus-Matthijsse AM, Lindenberg SM, Bakker A, Groenewegen PP. The quality of the professional practice of community pharmacists: what can still be improved in Europe? PharmWorld Sci 1996;18 (6):217-228.
2. van Mil JWF, Schulz M, Tromp TF. Pharmaceutical care, European developments in concepts, implementation, teaching, and research: a review. Pharm World Sci 2004;26(6):303-311.
3. van Mil JWF. Atención Farmacéutica en Farmacia Comunitaria en Europa, retos y barreras [Pharmaceutical Care in Community Pharmacy in Europe, challenges and barriers]. Pharm Care Esp 2000;2:42-56.
4. Berenguer B, La Casa C, de la Matta MJ, Martin-Calero MJ. Pharmaceutical care: past, present and future. Curr Pharm Des 2004;10(31):3931-3946.
5. Martin-Calero MJ, Machuca M, Murillo MD, Cansino J, M. A. Gastelurrutia MA, Faus MJ. Structural process and implementation programs of pharmaceutical care in different countries. Curr Pharm Des 2004;10(31):3969-3985.
6. Farris KB, Fernando Fernandez-Llimos F, S. I. Benrimoj SI. Pharmaceutical Care in Community Pharmacies: Practice and Research from Around the World. Ann Pharmacother 2005;39 (9):1539-1541.
7. Eickhoff C, Schulz M. Pharmaceutical care in community pharmacies: Practice and research in Germany. Ann Pharmacother 2006;40:729-735. DOI 10.1345/aph.1G458.
8. van Mil JWF. Pharmaceutical Care in Community Pharmacy: Practice and Research in the Netherlands. Ann Pharmacother 2005;39(10):1720-1725.
9. Gastelurrutia MA, Faus MJ, Fernandez-Llimós F. Providing Patient Care in Community Pharmacies in Spain. Ann Pharmacother 2005;39(12):2105-2109.
10. Guignard E, Bugnon O. Pharmaceutical Care in Community Pharmacies: Practice and Research in Switzerland. Ann Pharmacother 2006;40:512-517. DOI 10.1345/aph.1G199.
11. Thomas S. Europese gezondheidszorg, een visionair rapport van de Nederlandse gezondheidsraad inzake eerstelijns gezondheidszorg in de Europese Unie ["European primary care": a visionary report of the Dutch Health Council on primary health care in the European Union]. Ned Tijdschr Geneeskd 2005;149(20):1086-1088.
12. van Mil F. Can the grocer provide pharmaceutical care? (Editorial). Pharm World Sci 2003;25(5):183.
13. Granados Tejero C, Cobo Garcia M, Martinez Lopez M, Arrazola Saniger M. Adverse reactions in patients monitored at a community pharmacy. Farm Clin 1998;15(6):359-367.
14. Barber N. Pharmaceutical care and medicines management--is there a difference? Pharm World Sci 2001;23(6):210-211.
15. Roberts AS, Hopp T, Sorensen EW, Benrimoj SI, Chen TF, Herborg H, Williams K, Aslani P. Understanding practice change in community pharmacy: a qualitative research instrument based on organisational theory. Pharm World Sci 2003;25(5):227-234.
16. Daemen B, Heijboer-Vinks I. FPZ in de ziekenhuisfarmacie: WINAp constateert variatie in visie [Pharmaceutical patient care in the hospital pharmacy: The Dutch Pharmacists Scientific Institute finds variation in views] Pharm Weekbl 2003;138(29):1017-1019.
17. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. Am J Hosp Pharm 1990;47(3):533-543.
18. Grund J, Vartdal TE. Distribution of pharmaceuticals - a Norwegian logistic perspective. Pharm World Sci 2000;22(3):109-1150.
19. Morgall JM, Almarsdottir AB. No struggle, no strength: how pharmacists lost their monopoly. Soc Sci Med. 1999;48(9):1247-58.
20. van Mil F, Berg CL. Fri etablering-trussel eller mulighet? Norg Apotekerforen Tidsskr 2000;108(1):8-9.
21. Reed T. The regulation of medicines in central and eastern Europe [Thesis]. Series Sussex theses ; S 5464, ISBN/ISSN/CN M0421625US.
22. D. M. Angaran DM, Bonal J, Eide G, Koda-Kimble MA, Lake KD, Leufkens HG. Clinical pharmacy: looking 20

years back... looking 20 years forward. Pharmacotherapy 2000;20(10 Pt 2):235S-242S.
23. Nilsson LG, Nilsson A, Lingebrant K. Pharmaceutical Care Programme in Swedish Pharmacies. Int Pharm J 1993;7(5):194-196.
24. Westerlund LOT, Bjoerk HT. Pharmaceutical care in community pharmacy: practice and research in Sweden. Ann Pharmacother. Accepted for publication 2006.
25. Anonymous. Pharmaceutical care-time to stop walking around the issue. Pharm J 1993;251:28.
26. Rossing C, Holme Hansen E, Krass I. The provision of pharmaceutical care in Denmark: A cross-sectional survey. J Clin Pharm Ther 2003;28(4):311-318.
27. Sondergaard J, Foged A, Kragstrup J, Gaist D, Gram LF, Sindrup SH, Muckadell HU, Larsen BO, Herborg H, Andersen M. Intensive community pharmacy intervention had little impact on triptan consumption: a randomized controlled trial. Scand J Prim Health Care 2006;24(1):16-21.
28. Rossing C, Holme Hansen E, Morgall Traulsen J, Krass I. Actual and perceived provision of pharmaceutical care in danish community pharmacies: the pharmacists' opinions. Pharm World Sci 2005;27 (3):175-181.
29. de Smet PAGM. Pharmacotherapy consultation in the Netherlands. Pharm Weekbl 1992;127(36):973-975.
30. Van Mil JWF, Tromp TFJ, de Jong-van den Berg LTW. Pharmaceutical Care, de Zorg van de Apotheker [Pharmaceutical care, the care of the pharmacist]. Pharm.Weekbl. 1993;128(43):1243-1247
31. Boysen M. Delivering pharmaceutical care in the Netherlands: Practice and challenges. Pharm J 2004; 273 (7326):757-759.
32. Blom LTG, van Burg A, Schüsler-van Hees M. Expertmeeting toekomst Farmaceutische Patiëntenzorg [Expert meeting future of pharmaceutical care]. Pharm.Weekbl. 1999;134 (16):584-585.
33. Rawlins MD. Extending the role of the community pharmacist. Br.Med.J. 1991;302:427-428.
34. Pharmaceutical Care: the future for community pharmacy. London: Royal Pharmaceutical Society of Great Britain. 1992.
35. Silcock J, Raynor DK, Petty D. The organisation and development of primary care pharmacy in the United Kingdom. Health Policy 2004;67 (2):207-214.
36. Hobson RJ, Sewell GJ. Supplementary prescribing by pharmacists in England. Am.J.Health Syst.Pharm. 2006;63 (3):244-253.
37. Schulz, M., Morck, H. und R. Braun: Neues Apothekenprofil: Good Pharmacy Practice und Pharmaceutical Care. Pharm. Ztg. 1993;138 (41):3191-3197.
38. Berg C, Ganzer BM, Stieve G. Pharmaceutical Care-Professionelles Angebot an die Gesellschaft. Pharm.Ztg. 139 (41):3454-3462, 1994.
39. Gerdemann A, Mueller U, Schulz M. Akzeptanz und Evaluation der zertifizierten Diabetes-Fortbildung [Acceptance and evaluation of the certified diabetes training]. Pharm Ztg 2004;149(46):4052-4054.
40. Consensus panel ad hoc. Consenso de Granada sobre Problemas Relacionados con Medicamentos [Consensus of Granada on Drug-Releted Problems]. Pharm Care Esp 1999;1:107-112.
41. Fernandez-Llimos F, Faus MJ, Gastellurutia MA, Baena MI, Martinez-Martínez F. Evolution of the concept of drug-related problems: outcomes as the focus of the new paradigm. Sequim Farmacoter 2005;3(4):167-188.
42. Costa F, Paulino E, Silva I. Pharmacy in Portugal, an overview on its functioning with focus on efforts to increase patient safety. Int Pharm J 2005;19(2):40-45.
43. Haems M. Farmaceutische zorgverstrekking, pharmaceutical care [Pharmaceutical care provision]. Apothekersblad 1995;12:4-13.
44. Farmaceutische patiëntenzorg of farmaceutische zorg [Pharmaceutical patient care or pharmaceutical care]. In: van Mil JWF, Haems M, Rendering JA,, Tromp ThFJ. Framaceutische Patientenzorg. 2005, SDU Uitgevers BV, Den Haag. ISBN90-121-0755-5.
45. Dupin-Spriet T, Wierre P. La prise en charge médico-pharmaceutique: l"expérience australienne peut-elle être transposée en France ? [The domiciliary medication management review: is the Australian experience possible in France?]. Therapie 2004;59(4):445-450.
46. Van Mil JWF, Froekjaer B, Tromp TFJ. Changing a profession, influencing community pharmacy. Pharm World Sci 2004;26(3):129-132.
47. Aston J, Black P. Does participation in formal postgraduate studies have a positive impact on pharmacists' professional activities? Pharm J 2006;276:175-179.
48. Bonal JF. Clinical pharmacy in inpatient care. Pharmacotherapy 2000;20(10 Pt 2):264S-272S.
49. Helmstädter A. Klinische Pharmazie auf dem Weg zur pharmazeutischen Disziplin [Clinical pharmacy on the road to a pharmaceutical academic discipline]. Pharm Ztg 1999;144(12):925-932.
50. Aranda da Silva JA, Ramos F, Silva I. Implementing a new model for admission and qualification of Portuguese pharmacists. Pharm Educ 2004;4(3-4):123-128.
51. Van der Werf J, Dekens-Konter J, Brouwers JRBJ. A new model for teaching pharmaceutical care services management. Pharm Educ 2004;4(3-4):165-169.
52. Sramkova P, De Jong-Van Den Berg LTW, Oerlemans APWM. Comparison of Dutch and Czech systems of pharmacy studies. Pharm Educ 2004;4(3-4):153-163.
53. Kilminster S, Hale C, Lascelles M, Morris P, Roberts T, Stark P, et al.. Learning for real life: patient-focused interprofessional workshops offer added value. Med Educ 2004;38(7):717-726.
54. Leemans L, Willems L, Verbeke N, Verbruggen A, Knockaert D, Kinget R, et al. Arts en apotheker, twee handen op een buik: Balans na een jaar klinische stage [Medicine and pharmacy: Balance after one year of clinical training]. Pharm Weekbl 2000;135(4):127-129.
55. Laekeman G, Leemans L, de Vriese V. [Introduction to pharmaceutical sciences from the faculty of pharmaceutical science of Leuven: an experience of cohabitation]. J Pharm Belg. 2002;57(5):103-106.
56. Cordina M, McElnay JC, Hughes CM. Societal perceptions of community pharmaceutical services in Malta. J Clin Pharm Ther 1998;23(2):115-126.
57. Bell HM, McElnay JC, Hughes CM. Societal Perspectives on the Role of the Community Pharmacist and Community-based Pharmacy Services. J Soc Adm Pharm 2000;17(2):119-128.
58. Costa FP, Duggan C, Van Mil JW. Assessing the pharmaceutical care needs of asthmatic patients. Pharm World Sci 2004;26(6):313-318.
59. Liekweg A, Eckhardt M, Taylor SC, Erdfelder E, Jaehde U. Psychometric assessment and application of a questionnaire measuring patient satisfaction with information on cancer treatment. Pharm World Sci 2005;27(2):96-103.
60. Ragot S, Sosner P, Bouche G, Guillemain J, Herpin D. Appraisal of the knowledge of hypertensive patients and assessment of the role of the pharmacists in the management of hypertension: results of a regional survey. J Hum Hypertens 2005;19(7):577-584.
61. Zwaenepoel L, Bilo R, De Boever W, De Vos WM, Reyntens J, Hoorens V, el al. Desire for information about drugs: a survey

of the need for information in psychiatric in-patients. Pharm World Sci 2005;27(1):47-53.
62. Raynor DK, Savage I, Knapp P, Henley J. We are the experts: people with asthma talk about their medicine information needs. Patient Educ Couns 2004;53(2):167-174.
63. Cordina M, McElnay JC, Hughes CM. The importance that community pharmacists in Malta place on the introduction of pharmaceutical care. Pharm World Sci 1999;21(2):69-73.
64. Bell HM, McElnay JC, Hughes CM, Woods A. Provision of pharmaceutical care by community pharmacists in Northern Ireland. Am J Health Syst Pharm 1998;55(19):2009-2013.
65. C. Rossing C, Holme Hansen E, Traulsen JM, Krass I. Actual and perceived provision of pharmaceutical care in Danish community pharmacies: the pharmacists' opinions. Pharm World Sci 2005;27(3):175-181.
66. Van Mil JWF. Pharmaceutical Care and the Professionals. In: van Mil, JWF. Pharmaceutical Care, the future of pharmacy; Theory Research and Practice [Dissertation]. Zuidlaren, the Netherlands.1999. Page 121-135. ISBN 90-9013367-4.
67. Bernsten C, Bjorkman I, Caramona M, Crealey G, Frokjaer B, Grundberger E, et al. Improving the well-being of elderly patients via community pharmacy- based provision of pharmaceutical care: a multicentre study in seven European countries. Drugs Aging 2001;18(1):63-77.
68. van Mil JWF. Editorial: Proving the benefits of pharmaceutical care [Editorial]. Pharm World Sci 2004;26:123.
69. Christensen DB, Ferguson MS, Garrett DG, Bunting BA, Malone DC, Cranor CW. Studying pharmaceutical care: difficult but necessary. J Am Pharm Assoc 2003;43(5 Suppl 1): S36-S37.
70. Schulz M. Comment: When does pharmaceutical care impact health outcomes? A comparison of community pharmacy-based studies of pharmaceutical care for patients with asthma. Ann Pharmacother 2005;39 (7-8):1371.
71. Tully MP, Seston EM. Impact of pharmacists providing a prescription review and monitoring service in ambulatory care or community practice. Ann Pharmacother 2000;34(11):1320-1331.
72. Storimans MJ. Pharmaceutical care in diabetes [Dissertation]. Utrecht, 2005. Page 15. ISBN90-39341192.
73. Wong I, Campion S, Coulton PS, Cross B, Edmondson H, Farrin A, et al. Pharmaceutical care for elderly patients shared between community pharmacists and general practitioners: A randomised evaluation. RESPECT (Randomised Evaluation of Shared Prescribing for Elderly people in the Community over Time) [ISRCTN16932128]. BMC Health Services Research 2004;4 :1-11.
74. Wong IC. Randomised controlled trials (RCTs) to evaluate complex healthcare interventions--a case study. Pharm World Sci 2004;26(5):247-252.
75. Van Mil JWF, de Boer WO, Tromp TFJ. European barriers to the implementation of pharmaceutical care. Int J Pharm Pract 2001;9:163-167.
76. Hidalgo Cabrera J, Cámara Núñez D, Baena MI, Fajardo PC, Martinez Martínez F. Barreras para la implantaciόm del sequimiento farmacoterapéutico en las farmacias comunitarias de Granada (España) [Barrier for implementing pharmacotherapy follow-up in community pharmacies from Granada (Spain)]. Seq Farmacother 2005;3:144-149.
77. Bell HM, McElnay JC, Hughes CM. A Self-reported work sampling study in community pharmacy. Pharm World Sci 1999;21(5):210-216.
78. Hopp T, Westh Sørensen E, Herborg H, Roberts A. Cognitive pharmaceutical services: A study of the relationships that influence the implementation process in community pharmacy. J Soc Adm Pharm 2002;19(6):231-232.
79. Roberts AS, Hopp T, West Sorensen E, Benrimoj SI, Chen T, Herborg H, Williams K, Aslani P. Understanding practice change in community pharmacy: a qualitative research instrument based on organisational theory. Pharm World Sci 2003;25(5):227-234.
80. Björkman IK, Fastbom J, Schmidt IK, Bernsten CB, PEER group. Drug-Drug Interactions in the Elderly. Ann Pharmacother 2002;36:1675-1681.
81. Crealey GE, Sturgess IK, McElnay JM, Hughes CM. Pharmaceutical care programmes for the elderly: economic issues. Pharmacoeconomics 2003;21(7):455-465.
82. Lepage H, Mergelin F, Dutertre H. Projet d"insertion de l"opinion pharmaceutique et du dossier de suivi pharmaceutique dans les logiciels de l"officine. Bulletin de l"ordre des pharmaciens 2003; 380: 247-61
83. B. Maceskova B, Plevacova H. [Dispensing care at the dispensing counter in the conditions of a Czech pharmacy]. Ceska Slov Farm. 2005;54(2):70-74.
84. Buurma H, de Smet PA, van den Hoff OP, Egberts AC. Nature, frequency and determinants of prescription modifications in Dutch community pharmacies. Br J Clin Pharmacol 2001;52(1):85-91.
85. Buurma H, de Smet PA, Leufkens HG, Egberts AC. Evaluation of the clinical value of pharmacists' modifications of prescription errors. Br J Clin Pharmacol 2004;58(5):503-511.
86. Tully MP, Cantrill JA. Inter-rater Reliability of Explicit Indicators of Prescribing Appropriateness. Pharm World Sci 2005;27 (4):311-315.
87. Buurma H, De Smet PAGM, Kruijtbosch M, Egberts ACG. Disease and Intolerability Documentation in Electronic Patient Records. Ann Pharmacother 2005;39(10):1640-1646.
88. Fernández-Llimós F, Faus-Dáder MJ. Curso 18. Resuldados del programa Dáder de Sequimiento Farmacoterapéutico del patiente en España [Results of the Dader program in pharmaceutical care in Spain]. El Farmacéutico 2002;1:83-88.
89. Bicas Rocha K, Campos Vieira N, Callega MA, Faus MJ. Detección de problemas relacionados con los medicamentos en pacientes ambulatorios y desarrollo de instrumentos para el seguimiento farmacoterapéutico [Pharmacotherapy failures detection in ambulatory patients and development of tools for pharmacotherapy follow-up]. Seguim Farmacother 2003; (2):49-57.
90. Sporrong SK, Hoglund AT, Hansson MG, Westerholm P, Arnetz B. "We are White Coats Whirling Round" - Moral Distress in Swedish Pharmacies. Pharm World Sci 2005;27(3):223-229.
91. Dessing RP. Ethics applied to pharmacy practice. Pharm World Sci 2000;22(1):10-16.
92. Paterson DL, Swindells S, Mohr J, Brester M, Vergis EN, Squier C, Wagener MM, Singh N. Adherence to protease inhibitor therapy and outcomes in patients with HIV infection. Ann Intern Med 2000;133;21-30
93. Tramarin A, Postma J, Gerzeli S, Campostrini S, Starace F. The clinical and economic efficacy of HAART: a shift from inpatient medical to outpatient pharmaceutical care for HIV/AIDS patients in Northeastern Italy. AIDS Care 2004;16(2):213-218.
94. Enlund H, Jokisalo E, Wallenius S, Korhonen M. Patient-perceived problems, compliance, and the outcome of hypertension treatment. Pharm World Sci 2001;23(2):60-64.
95. Burnier M, Schneidert MP, Chiolero A, Fallab Stubi CL, Brunner HR. Electronic compliance monitoring in resistant hypertension: the basis for rational therapeutic decisions. J Hypertens 2001;19(2):335-341.
96. Ragot S, Sosner P, Bouche G, Guillemain J, Herpin D. Appraisal of the knowledge of hypertensive patients and assessment of the role of the pharmacists in the management of hypertension: results of a regional survey. J Hum Hyperten.

2005;19(7):577-584.
97. Garcao JA, Cabrita J. Evaluation of a pharmaceutical care program for hypertensive patients in rural Portugal. J Am Pharm Assoc (Wash.) 2002;42(6):858-864.
98. Reid F, Murray P, Storrie M. Implementation of a pharmacist-led clinic for hypertensive patients in primary care - a pilot study. Pharm World Sci 2005;27(3):202-207.
99. Varma S, McElnay JC, Hughes CM, Passmore AP, Varma M. Pharmaceutical care of patients with congestive heart failure: interventions and outcomes. Pharmacotherapy 1999;19(7):860-869.
100. Kahmen, U, Schaefer M. Diabetes-Studie (III). Patienten haben profitiert [Diabetes study, patients benefitted]. Pharm Ztg 2001;146:3942-3946.
101. Wermeille J, Bennie M, Brown I, McKnight J. Pharmaceutical care model for patients with type 2 diabetes: integration of the community pharmacist into the diabetes team--a pilot study. Pharm World Sci 2004;26(1):18-25.
102. Anonymous. Diabeteszorg in de dorpsapotheek [Diabetes Care in the "Dorpsapotheek"]. Pharm Weekbl 2003;138(21):740.
103. Wasmann-Van Wisse ML, Nortier YLM, Wasmann JEA. Een grondig voorbereid project: Patiëntenzorg bij Diabetes Mellitus [A well prepared project. Pharmaceutical care for diabetes mellitus]. Pharm Weekbl 2002;137(42):1490-1495.
104. Simoens S, Foulon E, Dethier M, Mathieu C, Laekeman G. Promoting targeted screening for Type 2 diabetes mellitus: the contribution of community pharmacists (Letter). Diabetic Med 2005;22(6):812-813.
105. Birnbaum U, Schaefer M, Verheyen F, Schulz M, Mast O, Evers T. Pharmazeutische Betreuung vond Patienten mit Fettstoffwechselstörungen [Pharmaceutical care in patients with dyslipaedemia]. Pharm Ztg 2003;148(43):3848-3853.
106. Atthobari J, Monster TB, de Jong PE, de Jong-van den Berg LT. The effect of hypertension and hypercholesterolemia screening with subsequent intervention letter on the use of blood pressure and lipid lowering drugs. Br J Clin Pharmacol 2004;57 (3):328-336.
107. Narhi U, Airaksinen M, Tanskanen P, Erlund H. Therapeutic outcomes monitoring by community pharmacists for improving clinical outcomes in asthma. J.Clin.Pharm.Ther. 2000;25 (3):177-183.
108. Schulz M, Verheyen F, Muehlig S, Mueller JM, Muehlbauer K, Knop-Schneickert E, Petermann F, Bergmann KC. Pharmaceutical care services for asthma patients. A controlled intervention study. J Clin Pharmacol 2001;41(6):668-676.
109. Mangiapane S, Schulz M, Muehlig S, Ihle P, Schubert I, Waldmann HC. Community pharmacy-based pharmaceutical care for asthma patients. Ann Pharmacother 2005;39(11):1817-1822.
110. Herborg H, Soendergaard B, Frøkjaer B, Fonnesbaek L, Jorgensen T, Hepler CD, et al. Improving drug therapy for patients with asthma--part 1: Patient outcomes. J Am Pharm Assoc(Wash.) 2001;41(4):539-550.
111. Van Mil JWF. Results of Pharmaceutical Care in Asthma, the TOM study. In: van Mil, JWF. Pharmaceutical Care, the future of pharmacy; Theory Research and Practice [Dissertation]. Zuidlaren, the Netherlands.1999. Page 99-120. ISBN 90-9013367-4.
112. Grainger-Rousseau TJ, McElnay JC. A Model for Community Pharmacist Involvement with General Practitioners in the Management of Astma Patients. J Appl Therap 1996;1:145-161.
113. Cordina M, McElnay JC, Hughes CM. Assessment of a community pharmacy-based program for patients with asthma. Pharmacotherapy 2001;21(10):1196-1203.
114. Andres JJ, Garcia AI. [Prospective study about the impact of a community pharmaceutical care service in patients with asthma]. Rev Esp Salud Publica 2003;77(3):393-403.
115. Kalb U, Kommert HJ, Ott S, Schneider J, Spangenberg G, Schaefer M. The Augsburg model: Results. Pharm Ztg 1997;142(29):41-47.
116. Knapp KK, Okamoto MP, Black BL. ASHP survey of ambulatory care pharmacy practice in health systems--2004. Am.J Health Syst.Pharm. 2005;62 (3):274-284.
117. Duggan C, Feldman R, Hough J, Bates I. Reducing adverse prescribing discrepancies following hospital discharge. Int J Pharm Pract 1998;6:77-82.
118. Bolas, H, Brookes K, Scott M, McElnay J. Evaluation of a hospital-based community liaison pharmacy service in Northern Ireland. Pharm World Sci 2004;26(2):114-120.
119. Midlov P, Bergkvist A, Bondesson A, Eriksson T, Hoglund P. Medication errors when transferring elderly patients between primary health care and hospital care. Pharm World Sci 2005;27(2):116-120.
120. Rashed SA, Wright DJ, Roebuck N, Sunter W, Chrystyn H. The value of inpatient pharmaceutical counselling to elderly patients prior to discharge. Br J Clin Pharmacol 2002;54(6):657-664.
121. Spinewine A, Dhillon S, Mallet L, Tulkens PM, Wilmotte L, Swine S. Implementation of Ward-Based Clinical Pharmacy Services in Belgium--Description of the Impact on a Geriatric Unit. Ann Pharmacother 2006;40(4):720-728. Unit. Ann Pharmacother 2006;40(4):720-728.