Seamless care with regard to medications between hospital and home - Supplement

KCE reports 131S

Belgian Health Care Knowledge Centre
Federaal Kenniscentrum voor de Gezondheidszorg
Centre fédéral d'expertise des soins de santé
2010

The Belgian Health Care Knowledge Centre

Introduction: The Belgian Health Care Knowledge Centre (KCE) is an organization of public interest, created on the 24th of December 2002 under the supervision of the Minister of Public Health and Social Affairs.
KCE is in charge of conducting studies that support the political decision making on health care and health insurance.

Administrative Council

Actual Members: Pierre Gillet (President), Dirk Cuypers (Vice-president), Jo De Cock (Vice-president), Frank Van Massenhove (Vice-president), Yolande Avondtroodt, Jean-Pierre Baeyens, Ri de Ridder, Olivier De Stexhe, Johan Pauwels, Daniel Devos, Jean-Noël Godin, Floris Goyens, Jef Maes, Pascal Mertens, Marc Moens, Marco Schetgen, Patrick Verertbruggen, Michel Foulon, Myriam Hubinon, Michael Callens, Bernard Lange, Jean-Claude Praet.

Substitute Members: Rita Cuypers, Christiaan De Coster, Benoît Collin, Lambert Stamatakis, Karel Vermeyen, Katrien Kesteloot, Bart Ooghe, Frederic Lernoux, Anne Vanderstappen, Paul Palsterman, Geert Messiaen, Anne Remacle, Roland Lemeye, Annick Poncé, Pierre Smiets, Jan Bertels, Catherine Lucet, Ludo Meyers, Olivier Thonon, François Perl.

Government commissioner: Yves Roger

Management

Chief Executive Officer: Raf Mertens

Assistant Chief Executive Officer: Jean-Pierre Closon

Information

Federaal Kenniscentrum voor de gezondheidszorg - Centre fédéral d'expertise des soins de santé –
Belgian Health Care Knowlegde Centre.
Centre Administratif Botanique, Doorbuilding (10th floor)
Boulevard du Jardin Botanique 55
B-1000 Brussels
Belgium
Tel: +32 [0]2 287 33 88
Fax: +32 [0]2 287 33 85
Email : info@kce.fgov.be
Web : http://www.kce.fgov.be

Seamless care with regard to medications between hospital and home - Supplement

KCE reports 131S

ANNE SPINEWINE, VEERLE FOULON, CORALINE CLAEYS, JAN DE LEPELEIRE,
PIERRE CHEVALIER, FRANCISKA DESPLENTER, SABRINA DE WINTER,
CHRISTOPHE DUMONT, VALÉRIE LACOUR, STEVEN SIMOENS,
CÉCILE DUBOIS, DOMINIQUE PAULUS

Belgian Health Care Knowledge Centre
Federaal Kenniscentrum voor de Gezondheidszorg
Centre fédéral d'expertise des soins de santé
2010

KCE reports 131 S

Title: Seamless care with regard to medications between hospital and home - Supplement

Authors: Anne Spinewine (Université catholique de Louvain, Cliniques Universitaires de Mont-Godinne et Centre de Pharmacie Clinique), Veerle Foulon (Katholieke Universiteit Leuven, Research Centre for Pharmaceutical Care and Pharmaco-economics), Coraline Claeys (Université Libre de Bruxelles, Faculté de Pharmacie), Jan De Lepeleire (Katholieke Universiteit Leuven, Academisch Centrum Huisartsgeneeskunde), Pierre Chevalier (Université Catholique de Louvain, Centre Académique de Médecine Générale), Franciska Desplenter (Katholieke Universiteit Leuven, Research Centre for Pharmaceutical Care and Pharmaco-economics), Sabrina De Winter (Universitaire Ziekenhuizen Leuven, ziekenhuisapotheek), Christophe Dumont (Grand Hôpital de Charleroi, Service de Gériatrie), Valérie Lacour (pharmacien), Steven Simoens (Katholieke Universiteit Leuven, Research Centre for Pharmaceutical Care and Pharmaco-economics), Cécile Dubois (KCE), Dominique Paulus (KCE)

External experts: Corinne Bouüaert (Département de Médecine Générale, ULG), Marie-Thérèse Celis (Association belge des praticiens de l'art infirmier), Alain Chaspierre (Société Scientifique des Pharmaciens), Evelyne Delmée (pharmacien, Hôpitaux Iris Sud), Martine Generêt (pharmacien, CHU Charleroi), Francis Heller (Médecine interne, Centre Hospitalier de Jolimont), M. Lombard (Fédération Nationale des Infirmiers de Belgique), Frie Niesten (Alliance Nationale des Mutualités Chrétiennes, Bruxelles), Alice Peters (Laboratoire d'Anthropologie des Mondes Contemporains, ULB), Mirko Petrovic (Gériatrie, UZGent), Dominique Putseys (CHR La Citadelle, Liège), Jan Saevels (Centre de Développement Scientifique des Pharmaciens, Association Pharmaceutique Belge), Stephane Steurbaut (pharmacien, UZ Brussel), Frank Van Beeck (pharmacien, UZ Antwerpen), Irène Vanden Bremt (FOD Volksgezondheid)

Acknowledgements: Patrice Chalon (KCE), Stephan Devriese (KCE), the participants to the qualitative study, all respondents to the enquiry about the Belgian projects, the members of the « Seamless Care Taskforce » of the Belgian Pharmaceutical Association, the international experts who have provided or validated data for this project.

External validators: Christine Bond (Head of Centre of Academic Primary Care, University of Aberdeen), Thierry Pepersack (Gériatrie, Hôpital Erasme, Bruxelles), Hugo Robays (Vakgroep Farmaceutische analyse, UGent)

Conflict of interest: Related to « seamless care » : E. Delmée has oftained funding from a company for a conference and got a stipend from AFPHB for a clinical pharmacy fellowship; H. Robays declares having received a budget (SPF Santé Publique) for a project in clinical pharmacy.

Layout: Ine Verhulst

Brussels, 12th July 2010

Study nr 2009-04

Domain: Health Services Research (HSR)

MeSH: Seamless care; Medication errors ; Continuity of Patient Care ; Primary Health Care ; Hospitals

Classification: W 84.6

Language: English

Format: Adobe® PDF™ (A4)

Legal depot: D/2010/10.273/40

This document is available on the website of the Belgian Health Care Knowledge Centre

How to refer to this document?

Spinewine A, Foulon V, Claeys C, De Lepeleire J, Chevalier P, Desplenter F, De Winter S, Dumont C, Lacour V, Simoens S, Dubois C, Paulus D. Seamless care with regard to medications between hospital and home - Supplement. Health Services Research (HSR). Brussels: Belgian Health Care Knowledge Centre (KCE). 2010. KCE Reports 131S. D/2010/10.273/40

Seamless care – appendices

Table of contents

1 APPENDIX CHAPTER 3: SYSTEMATIC LITERATURE REVIEW

1.1 SEARCH STRATEGY

1.1.1 Indexed literature search

The indexed literature search was conducted within the following databases: Medline (OVID), EMBASE, the Cochrane Database of Systematic Reviews, Cumulative Index of Nursing and Allied Health Literature (CINAHL), International Pharmaceutical Abstracts (IPA). The different databases were searched in June and July 2009. The search strategy relative to economic studies is detailed in the next chapter.

1.1.1.1 Medline (by OVID)

Two search strategies were run in parallel by two members of the research team, and their results were combined thereafter.

The first search strategy provided below combined two groups of terms. The first group included MESHs (and free terms) that relate to the transition between settings. The second group of terms described the scope of interventions that relate to medications. All terms from group one were combined with terms from the second group. Limits were dates (from 1995 onwards) and languages (Dutch, Flemish, French and English).

The second search strategy provided below was conducted simultaneously to the first strategy by another member of the research team, and combined three groups of terms. The first group included MeSHs (and free terms) that relate to the transition between settings. The second group of terms described the scope of interventions that relate to medications. The MeSH and free terms used in these two groups partially differed from those used in the first search strategy. The third group of terms included terms that relate to outcome of interventions. All terms from group one were combined with terms from the second and third groups. Limits were dates (from 1995 onwards) and languages (Dutch, Flemish, French and English).

In addition, all terms from group one were combined with terms from the second group. Limits were dates (from 1995 onwards), languages (Dutch, Flemish, French and English), article type (reviews or meta analyses or clinical trials or controlled clinical trials or randomized controlled trials).

Details of the search strategy in Medline/OVID (by DP, 9th June 2009)

The search strategy combined two groups of terms.

The first group included MESHs (and free terms) that relate to the transition between settings: Patient admission, patient discharge, patient readmission, patient transfer, continuity of care, seamless, delivery of care/integrated, interprofessional relations, transmural care. Also a combination of settings (using the Boolean "AND") has been used to include papers that refer to different settings: MESHs terms "hospitalization", "emergency service" and terms that describe residential or home care settings.

The second group of terms described the scope of interventions that relate to medications: community pharmacy services, medication therapy/management, pharmacy service/hospital, prescriptions, medication interactions (focus), medication therapy/computer assisted, medication errors, medication systems, medication reconciliation.

All terms from group one were combined with terms from the second group. Limits were dates (from 1995 onwards) and languages (Dutch, Flemish, French and English).

Search History D. Paulus saved as "Seamless care - final", Medline OVID, 9June

	Searches	Results
1	pharmaceutical services/ or community pharmacy services/ or medication therapy management/ or pharmacy service, hospital/ or prescriptions/ or drug prescriptions/ or electronic prescribing/	31761
2	Drug Interactions/	66716
3	drug therapy, computer-assisted/ or medication errors/	8425
4	medication systems/ or medication systems, hospital/	3336
6	patient admission/ or patient discharge/ or patient readmission/ or patient transfer/	34984
7	"Continuity of Patient Care"/	10308
8	"Delivery of Health Care, Integrated"/	5765
9	Interprofessional Relations/	36085
10	seamless.mp.	951
14	transmural care.mp.	20
15	medication reconciliation.mp.	124
16	4 or 1 or 3 or 2 or 15	105743
17	8 or 6 or 7 or 10 or 9 or 14	85045
18	16 and 17	1366
19	limit 18 to (yr="1995 -Current" and (dutch or english or flemish or french) and humans)	808
25	Hospitalization/	54710
26	residential facilities/ or homes for the aged/ or nursing homes/	31103
27	home care services/ or home care services, hospital-based/	24800
28	primary health care/ or "continuity of patient care"/	48760
29	Emergency Service, Hospital/	29970
30	25 or 29	83118
31	27 or 28 or 26	102214
32	30 and 31	3778
33	32 and 16	61
34	33 or 19	851
35	limit 34 to (yr="1995 -Current" and (dutch or english or flemish or french) and humans)	834
36	limit 35 to (meta analysis or "review")	68
37	limit 35 to (clinical trial, all or controlled clinical trial or randomized controlled trial)	60

Details of the search in Medline/Ovid (by AS,19th June 2009)

The second search strategy combined three groups of terms.

The first group included MESHs (and free terms) that relate to the transition between settings: Patient admission, patient discharge, patient readmission, patient transfer, continuity of care, seamless, delivery of care/integrated, interprofessional relations, transmural care.

The second group of terms described the scope of interventions that relate to medications: pharmaceutical services, community pharmacy services, medication therapy/management, pharmacy service/hospital, prescriptions, medication prescriptions, medication therapy/computer assisted, medication errors, electronic prescribing, computer communication networks, computerized medical records systems, clinical pharmacy information systems, medication systems, medication reconciliation, pharmaceutical preparations, medication therapy, combination medication therapy.

The third group of terms included terms that relate to outcome of interventions: Intervention studies, outcome assessment (health care), process assessment (health care).

All terms from group one were combined with terms from the second and third groups. Limits were dates (from 1995 onwards) and languages (Dutch, Flemish, French and English) and humans.

All terms from group one were combined with terms from the second group. Limits were dates (from 1995 onwards), languages (Dutch, Flemish, French and English), article type (reviews or meta analyses or clinical trials or controlled clinical trials or randomized controlled trials) and humans.

Searches		Results
1	Pharmaceutical Services/	3177
2	Community Pharmacy Services/	1747
3	Medication Therapy Management/ or Pharmacy Service, Hospital/	8744
4	Prescriptions/ or Drug Prescriptions/	19492
5	Medication Errors/ or Drug Therapy, Computer-Assisted/ or Electronic Prescribing/ or Computer Communication Networks/ or Medical Records Systems, Computerized/ or Clinical Pharmacy Information Systems/	33709
6	Medication Systems/	586
7	medication reconciliation.mp.	124
8	6 or 4 or 1 or 3 or 7 or 2 or 5	63584
9	Pharmaceutical Preparations/	37188
10	Drug Therapy/	28151
11	Drug Therapy, Combination/	113209
12	11 or 10 or 9	176218
13	8 or 12	235097
14	Patient Readmission/	5067
15	Patient Admission/	14532
16	Patient Discharge/	13866
17	Patient Transfer/	4143
18	"Continuity of Patient Care"/	10328
19	"Delivery of Health Care, Integrated"/	5776
20	Interprofessional Relations/	36116
21	seamless.mp.	953
22	transmural care.mp.	20
23	21 or 7 or 17 or 20 or 15 or 14 or 22 or 18 or 16 or 19	85226
24	8 and 23	2658
25	23 and 13	3259
26	Intervention Studies/	4089
27	"Outcome Assessment (Health Care)"/	32905
28	"Process Assessment (Health Care)"/	2265
29	27 or 28 or 26	38927
30	24 and 29	88
31	25 and 29	105
32	limit 24 to (yr="1995 -Current" and (dutch or english or flemish or french) and humans and (meta analysis or "review"))	106
33	limit 25 to (yr="1995 -Current" and (dutch or english or flemish or french) and humans and (clinical trial or controlled clinical trial or randomized controlled trial))	81
34	limit 24 to (yr="1995 -Current" and (dutch or english or flemish or french) and humans and (clinical trial or controlled clinical trial or randomized controlled trial))	40
35	limit 25 to (yr="1995 -Current" and (dutch or english or flemish or french) and humans and (meta analysis or "review"))	144
36	33 or 31	176
37	limit 31 to (yr="1995 -Current" and (meta analysis or "review"))	9
38	limit 31 to (yr="1995 -Current" and (dutch or english or flemish or french) and humans)	87
39	38 or 33	158

1.1.1.2 Embase

The strategy used was identical to that used in Medline. MeSHs and free terms from Medline were translated in Emtree terms.

The first group included Emtree (and free terms) that relate to the transition between settings: hospital admission, hospital discharge, hospital readmission, patient transport, patient transfer, continuity of patient care, continuity of care, integrated health care system, public relations, interprofessional relations, seamless, transmural care. Also a combination of settings (using the Boolean "AND") has been used to include papers that refer to different settings: Emtree terms "Hospitalization", "Residential home", "Homes for the aged", "Nursing home", "Home care", "Primary health care", "Emergency health service".

The second group of terms described the scope of interventions that relate to medications: pharmacy, hospital pharmacy, medication therapy management, prescription, electronic prescribing, medication interactions, computer assisted medication therapy, medication error, medication systems, hospital medication systems, medication reconciliation.

All terms from group one were combined with terms from the second group. Limits were dates (from 1995 onwards), type of article (reviews or meta-analyses or clinical trials), and language (Dutch, Flemish, French and English).

The second search strategy combined three groups of terms.

The first group included MESHs (and free terms) that relate to the transition between settings: Hospital admission, Hospital discharge, Hospital readmission, Patient transport, Patient transfer, Continuity of patient care, Continuity of care, Integrated health care system, Public relations, Interprofessional relations, Seamless, Transmural care.

The second group of terms described the scope of interventions that relate to medications: pharmacy, medication therapy management, hospital pharmacy, prescription, medication error, computer assisted medication therapy, electronic prescribing, computer network, electronic medical records, clinical pharmacy AND medical information systems, medication systems, medication reconciliation, medication (explode, focus), medication therapy (explode, focus), medication combination (explode, focus).

The third group of terms included terms that relate to outcome of interventions: Intervention study, outcome assessment. No appropriate translation was found for the Mesh Term "process assessment (health care)".

All terms from group one were combined with terms from the second and third groups. Limits were dates (from 1995 onwards) and languages (Dutch, Flemish, French and English) and humans.

All terms from group one were combined with terms from the second group. Limits were dates (from 1995 onwards), type of article (reviews or meta-analyses or clinical trials or controlled clinical trials or randomized controlled trials) and languages (Dutch, Flemish, French and English) and humans.

1.1.1.3 International Pharmaceutical Abstracts (IPA)

The Medline search was translated into IPA (23/07/2009). No distinction could be made between original studies and systematic reviews or meta-analysis.

Les termes ont été prétestés dans l'index afin de trouver le « subject headings » permettant de référencer l'article dans la base de données IPA. Pour choisir les synonymes utilisés, tous les termes des recherches embase et medline ont été testés au singulier et au pluriel dans IPA. Ensuite, les termes au singulier et au pluriel donnant le plus de hits ont été utilisés.

Au vu des hits données lors de l'utilisation unique des mots de l'index, nous avons étendus la recherche aux mots clés (titre, abstract, mot clé, etc… .mp). Le tableau complet relative à la correspondance des termes peut être communiqué sur demande.

A noter que la fin de la stratégie de recherche dans la base de données IPA diffère de la stratégie dans la base de données Ovid et Embase. En effet, il n'est pas possible de limiter la recherche aux essais cliniques. En effet, le choix possible de limites possible est le suivant : Abstracts of meeting presentations, Communications, Editorials, Journal articles, Letters, Notes, Reprints, Reviews. Remarque : les « reviews » sont contenues dans les références limitées aux « journal articles ».

1 pharmaceutical services.mp. (1142)
2 Medication therapy management.mp. (139)
3 Hospital pharmacy service.mp. (123)
4 community pharmacy services.mp. [mp=title, subject heading word, registry word, abstract, trade name/generic name] (170)
5 electronic prescribing.mp. (117)
6 Medication error.mp. (832)
7 medication errors.mp. (2475)
8 electronic medical record.mp. (180)
9 drug therapy.mp. (7118)
10 medication reconciliation.mp. (155)
11 drug related problems.mp. (629)
12 medication related problems.mp. (162)
13 medication discrepancies.mp. (40)
14 Medication systems.mp. (67)
15 Clinical pharmacy information system.mp. (2)
16 prescription.mp. (11418)
17 prescriptions.mp. (10475)
18 computer communication network.mp. [mp=title, subject heading word, registry word, abstract, trade name/generic name] (0)
19 computer assisted drug therapy.mp. [mp=title, subject heading word, registry word, abstract, trade name/generic name] (2)
20 11 or 7 or 17 or 2 or 1 or 18 or 16 or 13 or 6 or 3 or 9 or 12 or 14 or 15 or 8 or 4 or 19 or 10 or 5 (26459)
21 hospital admissions.mp. (559)
22 hospitals admissions.mp. (1234)
23 patient discharge.mp. (117)
24 hospitals discharge.mp. (583)
25 continuity of patient care.mp. (29)
26 continuity of care.mp. (251)
27 seamless.mp. (94)
28 medication reconciliation.mp. (155)
29 hospital readmission.mp. (43)
30 integrated health care system.mp. (69)
31 interprofessional relations.mp. (12)
32 transmural care.mp. (1)
33 patient transfer.mp. (6)
34 27 or 25 or 33 or 32 or 28 or 21 or 26 or 22 or 30 or 24 or 23 or 31 or 29 (2745)
35 34 and 20 (789)
36 limit 35 to (human and (dutch or english or flemish or french) and journal articles and yr="1995 -Current") (311)

Searches in Medline and Embase

Database	Ref-Date	Hits	Total
1. "Clinical trials"			
Medline/Ovid	DP-09-06-2009	60	
	AS-19-06-2009	158	
Embase	DP-01-07-2009	145	
	AS-01-07-2009	339	
Total after removing duplicates			534
2. "Reviews"			
Medline/Ovid	DP-09-06-2009	68	
	AS-19-06-2009	144	
Embase	DP-01-07-2009	35	
	AS-01-07-2009	52	
Total after removing duplicates			217

1.1.1.4 CINAHL

The Medline search was translated into CINAHL using free terms.

Free terms were used for this search.

The first group of terms included the following: pharmaceutical services, community pharmacy services, medication therapy/management, pharmacy service/hospital, prescription, medication prescriptions, medication therapy/computer assisted, medication errors, electronic prescribing, computer communication networks, computerised medical records systems, clinical pharmacy information systems, medication systems, medication reconciliation, pharmaceutical preparations, medication therapy, combination medication therapy.

The second group of terms included the following: patient admission, patient discharge, patient readmission, patient transfer, continuity of care, seamless care, delivery of care, integrated or interprofessional relation, transmural care. The third group of terms included the following: intervention studies, outcome assessment, process assessment.

All terms from group one were combined with terms from the second group. Limits were dates (from 1995 onwards) and languages (Dutch, Flemish, French and English) and type of publication (clinical trials or experimental studies).

1.1.1.5 Cochrane

The Cochrane Database of Systematic Reviews was searched using the following key MeSH terms: continuity of patient care, patient discharge, patient admission, patient transfer, patient compliance, patient readmission.

1.1.2 Handsearch in the literature

Handsearching of journals was performed for the European Journal of Hospital Pharmacy Science (from 1995 onwards), because this was a peer-reviewed journal of relevance to the research topic and which is not included in the above databases.

1.1.3 Personal databases

Databases compounded by members of the research group before the beginning of the project were searched to check if there were relevant papers that had not been identified through the indexed literature search.

1.2 SELECTING STUDIES

Studies needed to comply with the following study selection criteria for inclusion in the literature review:

- Date of publication: from 1995 onwards;
- Language: English or French or Dutch;
- Sample: Patients admitted to hospital and/or patients discharged from hospital (no age or other limitations regarding the patients); health care professionals caring for these patients in the outpatient and inpatient settings;
- Intervention: Seamless care interventions focusing on medications;
- Study design: Experimental and quasi-experimental studies (parallel group studies), systematic reviews and meta-analyses.

The following exclusion criteria were applied:

- Intervention:
  - studies where the intervention was broader than "seamless care with a focus on medications" and that had no specific outcome measure to evaluate the effect of the intervention on the medications component;
  - studies where the intervention focused on medications but was broader than seamless care (e.g. clinical pharmacists doing admission histories and discharge counselling but also interventions to improve prescribing during the hospital stay) and that had no specific outcome measure to evaluate the effect of the intervention on the seamless care component, ie the effect could not be analysed separately.
- Study design:
  - studies without a comparison or control group, including before-after studies with no control group (i.e. in which the control group is the historical group).
- Sample size: less than 30 patients per group.

Systematic reviews and meta-analyses were included as such if they exclusively focused on seamless care with regard to medications. Systematic reviews and meta-analyses with a broader perspective (e.g. looking at seamless care but not specifically at the medication component, looking at the impact of health care professionals (HCPs) providing continuity of care but also other interventions) were not included as such, but the list of articles included in the review were checked. The individual studies that were eligible for the present review were then added to the database of individual studies (if this was not already the case).

In a preliminary sift, papers that did not meet the inclusion criteria were eliminated based on their title and/or abstract. All titles and abstracts identified as being potentially relevant were provisionally included. The final inclusion or exclusion was decided after retrieving all full texts. This selection process was done independently by two members of the research team (PC and AS). Disagreements were resolved by discussion and a consensus was reached.

1.3 CRITICAL APPRAISAL OF THE EVIDENCE SELECTED

1.3.1 Critical appraisal of controlled studies

Every selected study was appraised using a grid including 14 different items [1] used in another KCE project. The tool consists of ten generic items (namely research question, patient population and setting, intervention, comparison, outcome, design, sample size, statistics, generalisability, confounders) and four design specific items (randomisation, blinding, clustering effect, number of data point). For each study, a score was given for each of the 14 items, ranging from -1 (lower quality) to +1 (higher quality). This scoring system was piloted by two members of the research team (PC and AS) on six studies that had been included in the review.

It appeared that it was necessary to define better several items as well as the scoring given for each item. The final scoring grid used to score all studies is in Appendix 1, as well as the instructions for use. The quality appraisal was performed independently by those two researchers (PC and AS). Disagreements were resolved by consensus. A cut-off score of six and above was used for final inclusion in the synthesis of evidence. The choice of this rather low cut-off point was decided after the review of all scores that were generally low.

Item		Score	Instruction
1	Research question	+1	Précisément mentionné
		-1	Non précisément mentionné
2	Patient population and setting	+1	Précisément mentionné
		-1	Non précisément mentionné
3	Intervention	+1	Précisément mentionné
		-1	Non précisément mentionné
4	Comparison	+1	Groupe comparaison en parallèle
		-1	Pas de groupe comparaison en parallèle
5	Outcome	+1	Précisément mentionné
		-1	Non précisément mentionné
6	Design	+1	Précisément mentionné
		-1	Non précisément mentionné
7	Sample size	+1	Calculée, au moins 30 par groupe, et chiffre atteint
		-1	Non calculée et/ou < 30 par groupe et/ou chiffre non atteint
8	Statistics	+1	Précisément mentionné et méthodes adéquates, entre
			Autres IC pour les résultats
		-1	Non précisément mentionné et/ou méthodes inadéquates
9	Generalisability	+1	Généralisable population moyenne belge
		0	Applicable dans un contexte belge particulier
		-1	Non généralisable population belge
10	Confounders addressed	+1	Discuté et corrigé
		0	Mentionné mais pas de correction
		-1	Pas discuté
11	Randomisation	+1	Présent et correct
		0	Non pertinent
		-1	Présent et incorrect
12	Blinding	+1	Présent (au moins évaluateur aveugle)
		0	Non pertinent
		-1	Pas en aveugle et évaluation non aveugle
13	Clustering effect	+1	RCT cluster avec corrections pour clustering
		0	Non pertinent
		-1	RCT cluster sans correction pour clustering
14	Nr datapoints	+1	Au moins 3 mesures avant et après intervention
			Au moins 30 observations par mesure si ANOVA ou t-test multiplle
		0	Non pertinent

1.3.2 Critical appraisal of systematic reviews and meta-analyses

Systematic reviews and meta-analysis were appraised using the Dutch Cochrane grid:

1. Research question PICOD: clear, unclear
2. Search strategy
   a. Databases: broad,…
   b. Entry terms: broad, unclear,…
   c. Period
3. relevance selection: clear, unclear
4. Quality appraisal (Jadad, other): clear, unclear
5. Data extraction: clear, unclear
6. Studies description: clear, unclear
7. Heterogeneity and pooling: clear, unclear
8. Validity rating: sufficient, insufficient

1.4 DATA EXTRACTION

A data extraction form was developed and pilot tested on a small number of studies before the final form was decided upon. This form was also used for the extraction of data from the projects conducted in Belgium (see chapter 6). This form summarized specific information i.e. the research setting, study population, focus of transition, study design, objectives of the study, type and characteristics of intervention, outcome measures, main findings, comments. Data extraction was performed by one member of the research team (PC) and checked by a second member (AS). Disagreements were resolved by consensus.

1.5 RESULTS

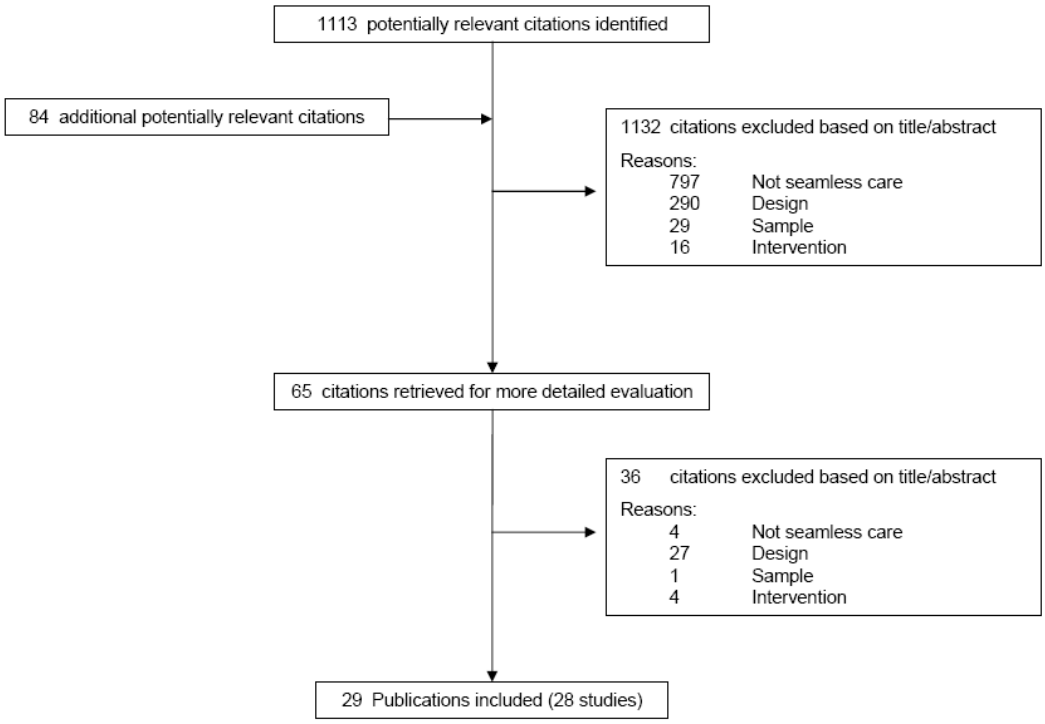
1.5.1 Search results

After removing duplicates, the search strategy run in Medline and Embase yielded 751 hits. The strategy run in IPA yielded 311 citations after removing duplicates. The search in the Cochrane and CINAHL databases generated 49 and 33 hits respectively (49 and 29 after removing duplicate citations found in Medline, Embase, IPA).

The researchers identified a total of 1113 potentially relevant citations (after removing duplicates), all databases confounded. Eighty-four additional references were added after checking the personal databases (n=79) as well as original studies found in systematic reviews or meta-analysis, as explained in the methods section. No paper was found upon handsearch in the European Journal of Hospital Pharmacy Science.

The figure below summarises the selection process for inclusion. At the end of this selection process, 29 publications were selected, representing 28 different studies.

Selection process for the inclusion of the studies



Comment by C Bond: add 1 box explaining the qualitative appraisal → 15 studies

No systematic review/meta-analysis exclusively focused on seamless care in relation with medications. However, several of them had included individual studies that possibly fitted the inclusion criteria and were consulted for this purpose [2,3,4,5,6,7,8].

1.5.2 quality scores for clinical trials

Reference	Research question	Patient population and setting	Intervention	Comparison	Outcome	Design	Sample size	Statistics	generalisability	Counfounders addressed	Randomization	Blinding	Clustering effect	Nr. datapoints	Total score
AL-RASHED 2002	+1	+1	+1	+1	+1	+1	-1	-1	0	-1	1	-1	-1	0	2
BOLAS 2004	+1	+1	+1	+1	+1	+1	-1	-1	+1	-1	+1	-1	0	0	4
CABEZAS 2006	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	-1	0	0	10
CROTTY 2004	+1	+1	+1	+1	+1	+1	-1	+1	+1	0	+1	+1	0	0	9
DUDAS 2001	+1	-1	+1	+1	+1	+1	-1	-1	0	0	0	-1	0	0	1
DUGGAN 1998	+1	+1	+1	+1	+1	-1	-1	-1	0	-1	0	-1	0	0	0
DUNN 1995	+1	+1	+1	+1	+1	+1	+1	-1	+1	-1	0	-1	0	0	5
GUTSCHI 1998	+1	+1	+1	+1	+1	+1	-1	-1	-1	-1	0	-1	0	0	1
HAYES 1998	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	0	0	12
HUGTENBURG 2009	+1	+1	+1	+1	+1	-1	-1	+1	+1	-1	-1	0	0	0	3
JACK 2009	+1	+1	+1	+1	+1	+1	-1	+1	0	0	+1	+1	0	0	8
KUNZ 2007	+1	-1	+1	+1	+1	+1	-1	-1	+1	+1	+1	-1	+1	0	5
KWAM 2007	+1	+1	+1	+1	+1	+1	+1	+1	0	+1	+1	-1	0	0	9
LALONDE 2008	+1	+1	+1	+1	+1	+1	+1	+1	+1	0	+1	-1	0	0	9
LOWE 1995	+1	+1	+1	+1	+1	+1	-1	+1	+1	-1	+1	-1	-1	0	5
MANNING 2007	+1	+1	+1	+1	+1	+1	-1	+1	0	-1	+1	+1	0	0	7
NAZARETH 2001	+1	+1	+1	+1	+1	+1	-1	+1	+1	-1	+1	+1	0	0	8
NESTER 2002	+1	+1	+1	+1	+1	+1	-1	+1	0	0	+1	-1	0	0	6
PERELES 1996	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	0	-1	0	0	9
SCHNIPPER 2006	+1	+1	+1	+1	+1	+1	-1	+1	+1	0	+1	+1	0	0	9
SCHNIPPER 2009	+1	+1	+1	+1	+1	+1	-1	+1	00	+1	+1	+1	+1	0	10
SHAW 2000	+1	+1	+1	+1	+1	+1	-1	+1	0	-1	+1	-1	0	0	5
SMITH 1997	+1	+1	+1	+1	+1	-1	-1	-1	-1	-1	0	+1	0	0	1
SMITH 1996	+1	+1	+1	+1	+1	+1	-1	+1	-1	-1	+1	-1	-1	0	3
STOWASSER 2002	+1	+1	+1	+1	+1	+1	-1	+1	+1	-1	+1	0	0	0	7
VANDERKAM 2001	+1	-1	+1	+1	+1	+1	-1	-1	-1	-1	0	-1	-1	0	0
VOIROL 2004	+1	+1	+1	+1	+1	+1	-1	+1	0	+1	+1	+1	0	0	9
VUONG 2008	+1	+1	+1	+1	+1	+1	-1	+1	0	0	+1	-1	0	0	6

2 APPENDIX CHAPTER 4: SYSTEMATIC REVIEW ON COST-EFFECTIVENESS

2.1 SEARCH STRATEGY

Studies were identified by searching Medline (PubMed), EMBASE, Centre for Reviews and Dissemination databases (Database of Abstracts of Reviews of Effects, NHS Economic Evaluation Database, and Health Technology Assessments Database), Cochrane Database of Systematic Reviews, and EconLit (OVID) up to August 2009. The bibliography of included studies was also checked for other relevant studies. Additionally, the results of the literature review of the Belgian situation (see chapter 6) and the literature review of the effectiveness of approaches to improve seamless care focusing on medication (see chapter 3) were searched for relevant economic evaluations.

Search terms included the following MeSH terms: 'economics, medical', 'economics, pharmaceutical', 'costs and cost analysis', 'cost-benefit analysis', 'health care costs', 'hospital costs', 'drug costs' in combination with terms describing seamless care focusing on medication (see chapter 3). A list of search terms for each database is provided below.

Articles could be published in English, Dutch or French. The review was limited to studies published between January 1995 and July 2009. Earlier articles were considered of limited relevance because changes in the organisation and financing of health care systems over time are likely to influence cost-effectiveness estimates.

Search strategy and results for Medline (OVID)

Date	16/07/2009		
Database	Medline (OVID)		
Date covered	January 1995 to July 2009		
Search Strategy	**#**	**Search History**	**Results**
	1	Pharmaceutical Services/	3177
	2	Community Pharmacy Services/	1747
	3	Medication Therapy Management/ or Pharmacy Service, Hospital/	8744
	4	Prescriptions/ or Drug Prescriptions/	19492
	5	Medication Errors/ or Drug Therapy, Computer-Assisted/ or Electronic Prescribing/ or Computer Communication Networks/ or Medical Records Systems, Computerized/ or Clinical Pharmacy Information Systems/	33709
	6	Medication Systems/	586
	7	medication reconciliation.mp.	124
	8	6 or 4 or 1 or 3 or 7 or 2 or 5	63584
	9	Pharmaceutical Preparations/	37188
	10	Drug Therapy/	28151
	11	Drug Therapy, Combination/	113209
	12	11 or 10 or 9	176218
	13	8 or 12	235097
	14	Patient Readmission/	5067
	15	Patient Admission/	14532
	16	Patient Discharge/	13866
	17	Patient Transfer/	4143
	18	"Continuity of Patient Care"/	10328
	19	"Delivery of Health Care, Integrated"/	5776
	20	Interprofessional Relations/	36116
	21	seamless.mp.	953
	22	transmural care.mp.	20
	23	21 or 7 or 17 or 20 or 15 or 14 or 22 or 18 or 16 or 19	85226

	24	8 and 23	2658
	25	23 and 13	3259
	40	Economics, Medical/ or Economics, Pharmaceutical/	9113
	41	"Costs and Cost Analysis"/	37490
	42	Cost-Benefit Analysis/	46149
	43	Health Care Costs/	18253
	44	Hospital Costs/	5890
	45	Drug Costs/	9245
	46	42 or 40 or 45 or 43 or 44 or 41	113336
	47	25 and 46	149
	48	*limit 47 to (humans and yr="1995 -Current" and (dutch or english or flemish or french))*	*82*
Citations	82 references found		

Search strategy and results for EMBASE

Date	29/07/2009		
Database	EMBASE		
Date covered	No restrictions		
Search Strategy	**#**	**Search History**	**Results**
	3	'health economics'/exp AND [embase]/lim	241,451
	4	'pharmacoeconomics'/exp AND [embase]/lim	57,904
	6	'cost'/exp AND [embase]/lim	132,672
	7	'cost benefit analysis'/exp AND [embase]/lim	31,590
	8	'health care cost'/exp AND [embase]/lim	109,880
	9	'hospital cost'/exp AND [embase]/lim	10,525
	10	'drug cost'/exp AND [embase]/lim	36,619
	11	#3 OR #4 OR #6 OR #7 OR #8 OR #9 OR #10	261,744
	74	'pharmacy'/exp/mj AND [embase]/lim	13,359
	75	'medication therapy management'/exp/mj AND [embase]/lim	30
	76	'hospital pharmacy'/exp/mj AND [embase]/lim	2,817
	77	'prescription'/exp/mj AND [embase]/lim	12,935
	79	'medication error'/exp/mj AND [embase]/lim	1,243
	80	'electronic prescribing'	249
	81	'computer assisted drug therapy'/exp/mj AND [embase]/lim	66
	82	'computer network'/exp/mj AND [embase]/lim	790
	83	'medical information system'/exp/mj AND [embase]/lim	2,869
	85	'clinical pharmacy'/exp/mj AND [embase]/lim	1,537
	86	#83 AND #85	1
	87	'electronic medical record'/exp/mj AND [embase]/lim	1,359
	88	'medication systems'	42
	89	'medication reconciliation'	178
	91	'drug therapy'/exp/mj AND [embase]/lim	444,022
	92	'drug'/exp/mj AND [embase]/lim	58,276
	93	'drug combination'/exp/mj AND [embase]/lim	21,030
	94	'hospital admission'/exp/mj AND [embase]/lim	4,085
	95	'hospital discharge'/exp/mj AND [embase]/lim	1,931
	96	'hospital readmission'/exp/mj AND [embase]/lim	162
	97	'patient transfer'	400
	98	'patient transport'/exp/mj AND [embase]/lim	1,901
	99	'integrated health care system'/exp/mj AND [embase]/lim	140
	100	'continuity of patient care'	154
	101	'continuity of care'	2,977
	102	'interprofessional relations'	53
	103	'public relations'/exp/mj AND [embase]/lim	435
	104	seamless	1,173

	105	'transmural care'	39
	106	#74 OR #75 OR #76 OR #77 OR #79 OR #80 OR #81 OR # 82 OR #86 OR #87 OR #88 OR #89 OR #91 OR #92 OR #93	523,511
	107	#89 OR #94 OR #95 OR #96 OR #97 OR #98 OR #99 OR #100 OR #101 OR #102 OR #103 OR #104 OR #105	13,247
	108	#106 AND #107	487
	119	*#11 AND #108 AND ([dutch]/lim OR [english]/lim OR [french]/lim) AND [humans]/lim AND [1995-2009]/py*	*37*
Citations	37 references found		

Search strategy and results for CRD: DARE

Date	29/07/2009
Database	CRD DARE
Date covered	January 1995 to July 2009
Search Strategy	transmural cost continuity patient care cost integrated health care cost
Citations	28 references found

Search strategy and results for CRD: NHS EED

Date	29/07/2009
Database	CRD NHS EED
Date covered	January 1995 to July 2009
Search Strategy	transmural cost continuity patient care cost integrated health care cost
Citations	163 references found

Search strategy and results for CRD: HTA

Date	29/07/2009
Database	CRD HTA
Date covered	January 1995 to July 2009
Search Strategy	transmural cost continuity patient care cost integrated health care cost
Citations	16 references found

Search strategy and results for CDSR

Date	29/07/2009		
Database	CDSR		
Date covered	No restrictions		
Search Strategy	**#**	**Search History**	**Results**
	1	Seamless care	7
	2	Integrated health care	7
	3	Continuity care	8
Citations	22 references found		

Search strategy and results for Econlit (OVID)

Date	29/07/2009		
Database	Econlit (OVID)		
Date covered	January 1995 to July 2009		
Search Strategy	**#**	**Search History**	**Results**
	1	Seamless care cost	4
	2	Integrated health care cost	54
	3	Continuity care cost	7
Citations	65 references found		

2.1.1 Selecting studies

Evidence about the cost-effectiveness of approaches to improve seamless care focusing on medication was derived from economic evaluations. An economic evaluation was defined as a study contrasting an intervention with a comparator in terms of both costs and consequences [9]. The intervention was an approach to improve seamless care focusing on medication. The comparator was usual care.

Articles were included if they focused on the transition between ambulatory care (including nursing homes) and hospital care and enrolled patients admitted to and/or discharged from hospital. The main inclusion criteria are presented in the table below.

Population	Patients in transition between ambulatory care (including nursing homes) and hospital care, and patients admitted to and/or discharged from hospital.
Intervention	Approaches to improve seamless care focusing on medication
Comparator	Usual care
Design	Full economic evaluations: studies contrasting an intervention with a comparator in terms of both costs and consequences Trial-based economic evaluation: economic evaluation based on a randomised controlled trial, cohort study, case-control study or before-and-after analysis. Model-based economic evaluation: economic evaluation applying a decision-analytic technique (e.g. decision tree, Markov model)

2.1.2 Critical appraisal of the evidence

The quality of economic evaluations was assessed by considering the perspective, study design (trial- or model-based economic evaluation); source of clinical and economic data; cost and consequence measures; allowance for uncertainty; and incremental analysis of costs and consequences [9].

2.1.3 Data analysis and interpretation

To compare costs between studies, costs were actualized to 2007 values using a rate of inflation based on the evolution of the Consumer Price Index. Costs were converted using purchasing power parities for Belgium, i.e. market exchange rates adjusted for differences in purchasing power between countries and Belgium.

Economic evaluations were summarized by focusing on the study country, type of economic evaluation (i.e. cost-effectiveness analysis, cost-minimisation analysis, cost-utility analysis, cost-benefit analysis), sample, intervention, comparator, cost and consequence results. Due to the heterogeneity of the primary studies, a descriptive synthesis of the extracted data was made. The characteristics and the results of the included studies were summarized via tabulation.

2.2 RESULTS

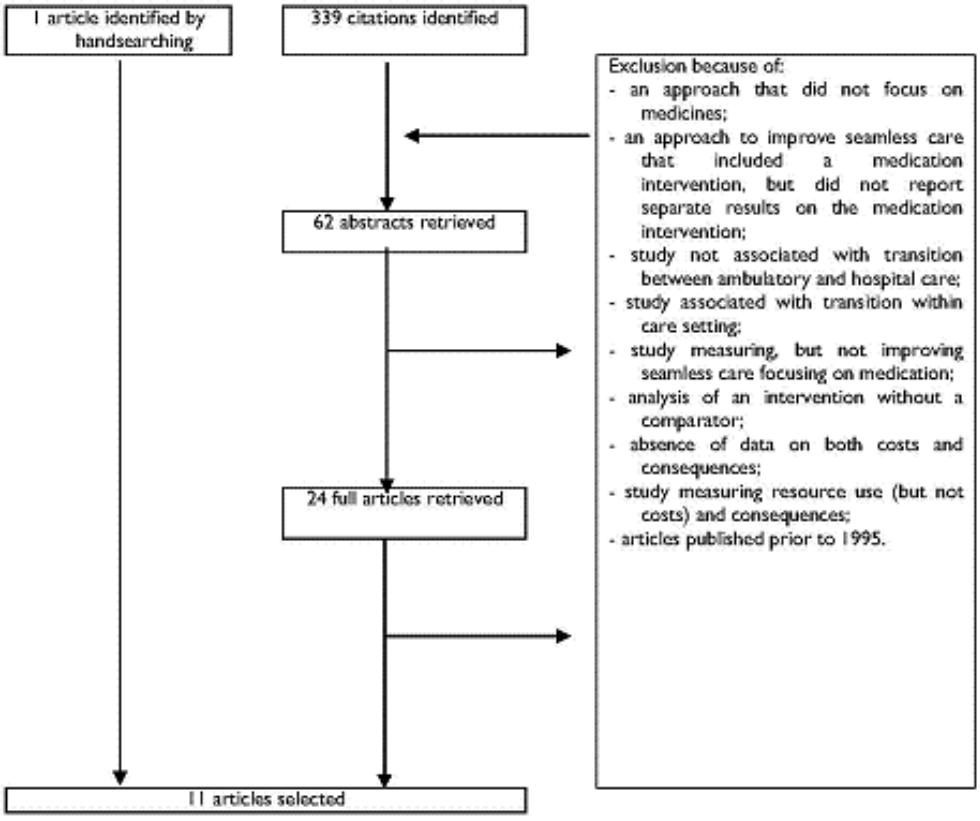
2.2.1 Search results

A total of 413 papers were identified: 82 with Medline, 37 with EMBASE, 207 with Centre for Reviews and Dissemination databases (28 with Database of Abstracts of Reviews of Effects, 163 with NHS Economic Evaluation Database, 16 with Health Technology Assessments Database, 22 with the Cochrane Database of Systematic Reviews, 65 with EconLit). The search strategy and results for each database are in Appendix 2. After removing 74 duplicates, 339 articles were left.

Search for cost-effectiveness studies: summary

Database	References identified
Medline	82
EMBASE	37
Centre for Reviews and Dissemination	
Database of Abstracts of Reviews of Effects	28
NHS Economic Evaluation Database	163
Health Technology Assessments	16
Cochrane Database of Systematic Reviews	22
EconLit	65
Total references identified	413
Duplicates	74
Total	**339**

Flow chart of literature search for economic studies



3 APPENDIX CHAPTER 5: GREY LITERATURE

3.1 WEBSITES AND EXPERTS CONSULTED

3.1.1 Australia

- Websites: Australian Commission on Safety and Quality in Healthcare (http://www.safetyandquality.gov.au), Commonwealth Department of Health and Ageing (http://www.health.gov.au), Australian Pharmacy Council (http://www.apec.asn.au/), Australian Pharmaceutical Advisory Council (http://agencysearch.australia.gov.au/search/), The Pharmacy Guild of Australia (http://www.guild.org.au/), Pharmaceutical Society of Australia (www.psa.org.au), eHealth (http://www.health.gov.au/internet/main/publishing.nsf/Content/eHealth), and http://www.nehta.gov.au/).
- Experts: Dr. Simon Bell, Research Director, Kuopio Research Centre of Geriatric Care and Clinical Pharmacology & Geriatric Pharmacotherapy Unit, School of Pharmacy, University of Eastern Finland, Kuopio, Finland; Dr. Timothy Chen, Senior Lecturer, Faculty of Pharmacy, University of Sydney, Australia; Ms. Glena Ellitt, Faculty of Pharmacy, University of Sydney, Australia; Dr. Rebekah Moles, pharmacy lecturer, Faculty of Pharmacy, University of Sydney, Australia

3.1.2 Canada

- Websites: Canadian Patient Safety Institute (http://www.patientsafetyinstitute.ca), Safer Health Care Now (http://www.saferhealthcarenow.ca/fr/Pages/default.aspx), Canadian Council on health services accredication (http://www.accreditation.ca), Quality Healthcare Network (http://www.qhn.ca), Canadian Pharmacist Association (http://www.pharmacists.ca/), Ordre des Pharmaciens du Québec (http://www.opq.org/), Canadian Institute for Health information (http://secure.cihi.ca), Canada Health Infoway (http://www.infoway-inforoute.ca).
- Experts: Dr Margaret Colquhoun, project leader ISMP Canada; Pr Louise Mallet, clinical pharmacist at the University of Montreal.

3.1.3 Denmark

- Websites: The European Observatory on health systems and Policies – Denmark 2007 (http://www.euro.who.int/observatory/Hits/TopPage), The Danish Medicine Agency (www.dkma.dk), The Danish Medicine Agency - Medicine Profile (www.laegemiddelstyrelsen.dk), The Danish Pharmaceutical Association (www.apotekerforeningen.dk), Ministry of Health and Prevention (http://www.sum.dk/English.aspx), Sundhedsstyrelsen - Danish National Board of Health (http://www.sst.dk/English.aspx), Medcom (http://www.medcom.dk/wm109991), Sundhed – The Danish eHealth Portal (https://www.sundhed.dk/profil.aspx?id=11062.105), Digital Sundhed – Connected Digital Health in Denmark (http://www.sdsd.dk/).
- Experts: Tina Eriksson PhD GP, President of European Association for Quality in General Practice (EQuiP) Consultant of DAK-E, Danish Quality Unit of GP; Henrik Schroll, Senior researcher, PhD, head of the National Quality Unit – IT department University of Southern Denmark

3.1.4 France

- **Websites** : Haute Autorité de Santé (http://www.has-sante.fr), Agence Française de Sécurité Sanitaire des Produits de Santé (http://www.afssaps.fr/), Ordre National des Pharmaciens (http://www.ordre.pharmacien.fr/), Société Française de Pharmacie Clinique (http://adiph.org/sfpc/).
- Experts : Benoît Allenet, Université Joseph Fourier et CHU de Grenoble

3.1.5 The Netherlands

- **Websites**: KNMP (http://www.knmp.nl); www.medicatieoverdracht.nl
- **Experts**: J.F. Schüsler, KNMP; Nicolette van Horssen, KNMP

3.1.6 UK

- Websites: National Health Service (NHS; http://www.nhs.uk), National Institute for Clinical Excellence (NICE; http://www.nice.org.uk), Scottish Intercollegiate Guideline Network (SIGN; http://www.sign.ac.uk), The Royal Pharmaceutical Society of Great Britain (http://www.rpsgb.org.uk/)
- **Experts:** Saskia Vercaeren, Specialist Pharmacist Cardiac Services, Barts and the London NHS Trust

3.1.7 US

- **Websites**: Joint Commission on the Accreditation of Healthcare Organizations (http://www.jointcommission.org), Institute for Healthcare Improvement (http://www.ihi.org/), Agency for healthcare research and quality in US (http://www.ahrq.gov/), United States Department of Veteran Affairs (www1.va.gov/health/), NHS connecting for health – newsroom – "world view" reports (www.connectingforhealth.nhs.uk/newsroom/worldview/protti4), Geisinger Health System (www.geisinger.org)
- **Experts**: Maureen Layden, MD, MPH, Veterans Health Administration, Director, VA Medication Reconciliation Initiative, VA Central Office: Pharmacy Benefits Management

3.2 DESCRIPTION OF THE HEALTH CARE SYSTEMS OF THE COUNTRIES SELECTED

3.2.1 Australia

Australia has a complex health system, with both public and private funders and providers. With 2.6 acute beds per 1000 population, Australia is below the European Union average, reflecting shorter stays and quicker throughput of patients, more same-day procedures, and more health care provided in the community. There is a blurring of boundaries between hospital and community, and there are now programmes such as « hospital in the home » and other early hospital discharge strategies (eg having a discharge nurse).

Given the division of powers within the federal form of government and the many stakeholders, the ability of any one actor to plan or regulate is limited. The main changes over the last decade, relative to seamless care, are: national government funding for coordinated care programs, more e-health initiatives and greater attention to the quality and safety of patient care.

3.2.2 Canada

Canada has a predominantly publicly financed health system with services provided through private (for-profit and not-for-profit) and public (arm's-length or state-run) bodies. Canada's publicly funded health care system is an interlocking set of ten provincial and three territorial health insurance plans. Provincial and territorial governments are responsible for the management, the organisation and the delivery of health services for their residents.

Accreditation Canada requires all Canadian hospitals to do medication reconciliation (*Required Organisational Practices*).

3.2.3 Denmark

The Danish healthcare sector has a taxed-based system and has 3 political and administrative levels: the state, the regions and the municipalities.

The Danish health system can be described as a tripartite health care delivery system consisting of hospitals, primarily managed and financed by the regions (except private hospitals), private (self-employed) practitioners (GPs, specialists, pharmacists, …) who are financed by the regions trough capitation and fee-for-service payment, and municipal health services (nursing homes, …), that are mainly managed and financed by municipalities. Primary health care is provided by private practitioners and municipal health services.

At the end of the nineties, a National Strategy Group has been established for the development of an IT strategy in health that probably marked an important step relative to seamless care. The major priority is to provide a common framework for the full computerization of the Danish health care sector to share data among systems that are already in use through integrated information systems and electronic health records and using common standards.

3.2.4 The Netherlands

Medical care in the Netherlands is largely funded by a system of public and private insurance schemes. In the Netherlands, three parallel compartments of insurance coexist, which is different from other European health care systems: the first compartment is a national health insurance scheme for exceptional medical expenses; the second compartment consists of different regulatory regimes – one for compulsory health insurance through sickness funds for those under a certain income, and another for private health insurance, mostly voluntary; and the third compartment is voluntary supplementary health insurance. These different compartments and the systems that constitute them are steered and supervised by different ministries and have (at least) partly different relationships to the insured on the one side and the providers on the other side.

Public health services, primary care and secondary care are separate modalities. Secondary and tertiary care in hospitals is largely provided in private not-for-profit institutions.

Transmural care – care given "across the walls" of the existing system – was introduced in the early 1990s and has been growing rapidly since then. Despite certain successes in improving quality and efficiency in care delivery, incorporation of the concept of transmural care as a new modality in the Dutch health care structure has faced some difficulties. The problems concern cooperation, capacity management, and financing. Here, the inflexibility of the financial structure of the Dutch health care system is considered to be a major implementation barrier.

3.2.5 United Kingdom

The UK has a tax-based health care system managed by the National Health Service (NHS) (http://www.euro.who.int/document/e68283.pdf, 1999). With the exception of charges for some prescriptions and optical and dental services, the NHS remains free at the point of use for anyone who is resident in the UK. The UK is made up of four constituent countries: England, Wales, Scotland and Northern Ireland and each of them have their NHS managed separately. We will focus on England in this report.

The National Health Service (NHS) is divided in two sections: the primary and the secondary care. Primary care is the first point of contact for most people and is delivered by a wide range of independent contractors, including GPs, dentists, pharmacists and optometrists. All of these services are managed for patients by a local primary care trust (PCT). PCTs work with local authorities and other agencies that provide health and social care to make sure that the local community's needs are being met. PCTs control 80% of the NHS budget. Secondary care is known as acute healthcare and can be either elective care or emergency care. Hospitals are managed by acute trusts. Acute trusts make sure that hospitals provide high-quality healthcare and that they spend their money efficiently. They also decide how a hospital will develop, so that services improve (http://www.nhs.uk/NHSEngland/thenhs/about/Pages/nhsstructure.aspx , 27/12/09)

In the NHS, guidance on ways of promoting good health (public health guidance) and treating ill health (technology appraisal, interventional procedures, clinical guidelines) are published by the National Institute of Clinical Excellence (NICE). The current Care Quality Commission (CQC) (previously called Commission for Health Improvement) ensures that good quality services are provided based on independent inspection (HIT, 1999).

3.2.6 United States: Veteran Healthcare System

The Veteran Healthcare System (VHS) is one of the publicly-funded (tax-based) healthcare systems in the United States. VHS provides healthcare services to veterans and their families. In 1995, VH administration (VHA) established 22 regional networks (now 21) and charged each one with conducting daily operations and decisions affecting hospitals, clinics, nursing homes and Vet centres located within their regions. These regional networks (called Veterans Integrated Service Networks, or VISNs) remain the VA fundamental units for managing funding and ensuring accountability. Since 1995, VHS has moved from an inpatient model of care, characterized by a limited number of specialized facilities that often were far from a veteran's home, to an outpatient model in which more than 1,400 sites provide care in communities throughout the United States. The main strategy developed by VHA to improve seamless care is the implementation of the Veterans Health Information Systems and Technology Architecture (VistA). It is a single, integrated system for health care providers serving all VA hospitals, nursing homes, outpatient clinics and Vet centers. Another focus is to support patients' ability to successfully age and manage disease in their own homes.

The Geisinger health system is an integrated provider network located in 31 counties in Pennsylvania with 52 clinic sites, 2 hospitals and 600 employed physicians. This not-for-profit system was founded in 1915 (Hassol 2004 JAMIA).

3.3 DETAILED DESCRIPTION OF SEAMLESS CARE INITIATIVES OF INTEREST

3.3.1 Australia

Title of initiative	**The National Inpatient Medication Chart (NIMC)**
Country	**Australia**
Period	Development between 2003 and 2006; implementation from then
Aims	To use the same medication chart wherever a doctor or nurse works, and wherever a patient is in hospital. Expected benefits: • standardisation of best practice throughout the medication management pathway • improved mutual understanding of respective roles in prescribing, administration and supply • standardised, integrated education at post graduate and undergraduate level • no need for major retraining as staff move between healthcare services • improved documentation and therefore improved patient safety
Initiator(s)	Australian Health Ministers; Australian Council for Safety and Quality in Healthcare
Environment	Hospitals
Professionals involved	NIMC was worked out by a NIMC Oversight Committee, jurisdictional representatives and state based as well as local working parties
Description of the development process	The development of the NIMC took different steps, of which the first ones were taken in Queensland, the lead state: 1) audits of >15,000 prescriptions; 2) observations of > 2000 administrations; 3) review of > 2500 medication incidents; 4) review of literature; 5) focus groups with all levels of staff; 6) three revisions of the chart; 7)statewide baseline audit >12,000 orders The National Multidisciplinary working group learnt from existing work, developed an implementation plan, piloted the NIMC and amended it following feedback
Evidence of intake in practice (data from October 2007)	• Victoria : implemented in over 100 hospitals ; • New South Wales: implemented in 192 out of 216 facilities ; • Northern Territory: implemented across all 5 hospitals ; • Queensland: implemented in 98% of all acute health facilities ; • South Australia : ?; • Tasmania : rolled out in 3 major hospitals ; • Western Australia : implemented in all public hospitals
Impact	The pilot program showed that: • documentation of adverse drug reaction details improved from 21 to 50%; • re-prescribing of drugs to which a patient was allergic decreased from 9 to 6%; • drug dose unclear or wrong decreased from 7.4 to 3.9%; • drug frequency unclear or wrong decreased from 7.2 to 4.8%; • 'prn' prescription with the indication stated improved from 13 to 26%; • 'prn' prescription with a maximum dose stated increased from 24 to 36%; • prescriber identifiable improved from 41 to 79%. Implementation in different states showed: • increased awareness of medication safety issues • a higher level of consistency around education and training of staff re prescribing and administration; some undergrad courses now include this in their curriculum • that NIMC provides a standardised baseline for electronic medication management • that NIMC created an opportunity to drive home med safety within one's hospital • that pharmacists are organised and can get things done
Advantages and critical	Critical success factors: • structured standardised change management

success factors	• standardised (further) education • comprehensive communication strategies • planned evaluation • transparent version control process • unified approach to ancillary chart development required
Disadvantages, difficulties and factors contributing to failure	• Clinician resistance and scepticism
Follow-up	Development of ancillary forms Implementation of a paperless system
Funding and cost	?
References	The national inpatient medication chart (NIMC) : has it worked ? What are the issues ? Found at : http://www.safetyandquality.gov.au/internet/safety/publishing.nsf/content/NIMC_001 Helen Leach, senior advisor, QUM Program,Victoria The National Inpatient Medication Chart Implementation. H. Leach. Journal of Pharmacy Practice and Research Volume 36, No. 1, 2006

3.3.2 Canada

Title of initiative	**Safer Health Care Now! Campaign. Section: medication reconciliation (MedRec)**
Country	**Canada**
Period	Initiated since April 2005
Aims	The SHN! Campaign focuses on sharing Canadian experiences to facilitate implementation and learning to increase the use of MedRec across Canada with the goal of reducing potential adverse outcomes of patient care related to medication therapy. The aim is to eliminate undocumented intentional discrepancies and unintentional discrepancies by reconciling all medications, at all interfaces of care.
Initiator(s)	Institute for Safe Medication Practices (ISMP) Canada (independent national not-for-profit agency committed to the advancement of medication safety in all healthcare settings), and Canadian Patient Safety Institute (CPSI)
Environment	Facilities targeted: registered Canadian healthcare facilities (acute, long term and home care settings), on a voluntary basis Target population of patients: any, but the Getting Started Kit specifies that there should be criteria for those patients who should benefit first from MedRec (several examples are provided) – those criteria are agreed upon at local levels
Professionals involved	Multidisciplinary teams. The composition is decided upon at local levels. Commonly involve doctors (including interns and residents), nurses, pharmacists and pharmacy technicians.
Description of the intervention	• MedRec on admission to hospital: different models exist: proactive reconciliation, retroactive reconciliation, or hybrid model • MedRec upon discharge A Getting Started Kit (GSK) provides support to start the process on small numbers of patients, makes changes, and gradually develop, implement and evaluate MedRec more broadly using quality improvement processes. The updated kit (May 2007) includes medication reconciliation at admission, internal transfer and discharge from a healthcare facility. For each of them, the GSK provides a conceptual framework for doing it, the process to do it, as well as sample tools (examples from hospitals or centers). The GSK also highlights the importance to identify criteria for those patients who should benefit first from MedRec.
Evidence of intake in practice	The number of teams enrolled in the SHN! MedRec in Acute Care intervention includes 339 acute care teams (march 2009). National MedRec teams reporting

	data to the Central Measurement Team has increased from 39% in May 2006 to 77% in May 2008 and 86% (291/339) in May 2009. In march 2009, 71 long term care teams, and 15 home care pilot teams were also reporting data. Teams implementing MedRec at discharge is currently low due to teams wanting to have the MedRec process working well at admission and spread to all areas of their facility before starting on the next phase
Impact	The SHN framework measures improvement by focusing on a consistent set of core measures. All participants are encouraged to report the three core medication reconciliation measures (undocumented intentional discrepancies, unintentional discrepancies, and percent of patients reconciled at discharge) to the Central Measurement Team of SHN monthly. 10-20 charts should be reviewed and data collected each month. Undocumented intentional discrepancies have decreased from 1.1 per patient to 0.34 per patient by the end of the phase I of the campaign. Unintentional discrepancies have decreased from 1.2 per patient to 0.42 per patient by the end of phase I of the campaign.
Advantages and critical success factors	• Accreditation Canada requires all Canadian hospitals to do medication reconciliation. • Creating and maintaining partnerships with Canadian organisations (CPSI, Accreditation Canada, WHO,…) • National intervention leadership for medication reconciliation supporting nodes and connecting and sharing the work of teams builds national capacity for the intervention. • Implementation of teleconference national calls, workshops and conferences to educate teams; face-to-face meetings between the MedRec National Faculty and members help to re-engage and reconnect members; SHN mentorship program (links successful teams to teams that require assistance with their programs). • Existence and success of "Communities of Practice" (CoP): web-based communities for healthcare professionals involved in implementing the SHN interventions -- accessible anytime, from any computer with an Internet connection. The sites include online discussion, file sharing, events calendars and more
Disadvantages, difficulties and factors contributing to failure	• Medication reconciliation is complex, requires time, leadership and commitment. • Lack of resources (how to train enough people).
Follow-up	09/2009: many teams have moved toward sustaining admission MedRec and are now earnestly focused on transfer and discharge The Campaign initially focused in acute care, and is now being extended to MedRec in ambulatory care, homecare, long-term care.
Funding and cost	At national level: full costs not available. ISMP Canada, summary of costs for CPSI Grant for the six month period ending March 21, 2009: 96,000 (covers personnel, translation, travel, supplies/communication) Local levels: costs of hiring leaders, … taken over by each individual institution
References	• Safer Healthcare Now! Getting Started Kit: Medication Reconciliation prevention of adverse drug events: how to guide. May 2007 (72 pages) • Safer Healthcare Now! ISMP Canada Annual Report. Medication reconciliation intervention. April 2007 to March 2008 • Safer Healthcare Now! ISMP Canada Semi-Annual Report. Medication reconciliation intervention. October 2008 to March 2009 • Bayoumi I, Howard M, Holbrook AM, Schabort I. Interventions to improve medication reconciliation in primary care. Ann Pharmacother. 2009;43:1667-75. • Ong SW, Fernandes OA, Cesta A, Bajcar JM. Drug_related problems on hospital admission: relationship to medication information transfer. Ann Pharmacother. 2006 Mar;40:408-13

Title of initiative	**Linking MedsCheck to MedRec**
Country	**Canada (Province: Ontario)**
Period	Pilot phase: February 2008 – March 2009
Aims	To link the community-based MedsCheck program with medication reconciliation programs in hospitals, in order to obtain the best possible medication history (BPMH) for patients preparing to be admitted to hospital for surgery.
Initiator(s)	ISMP Canada (with the support of the Ontario Ministry of Health and Long-Term Care (MOHLTC) and the Ontario Pharmacy Council
Environment	Ten Ontario Hospitals
Professionals involved	• Ambulatory setting: community pharmacists • Acute care setting: surgeons, receptionists, support staff, nurses and pharmacists in the pre-admission clinics
Description of the intervention	• Eligible elective surgical patients were asked to bring a *MedsCheck* to their pre-admission clinical appointments. This MedsCheck was used to obtain the BPMH. • The MedsCheck is a one-to-one pharmacist consultation with patients taking three or more prescription medications for approximately 30 minutes once a year, to help them comply with their prescription medications and better understand how the medications interact with each other and other over-the-counter medication they may be taking.
Evidence of intake in practice	6/10 hospitals reported data that were requested for the pilot project.
Impact	Baseline data (n=140 surgical patients): average time to complete a BPMH: 12 minutes per patient. No patients brought a MedsCheck to the BPMH interview 12-month data (n=113 MedsCheck from 6 hospital sites): 12 minutes per patient to complete the BPMH. 180 discrepancies between the MedsCheck and the BPMH taken by the pre-admission clinical staff (approximately 1.6 discrepancies per MedsCheck).
Advantages and critical success factors	• ISMP Canada coordinated monthly teleconference calls to discuss progress and share ideas, developed communication tools, assisted hospitals with implementation of internal change processes, communicated with community pharmacies,…
Disadvantages and factors contributing to failure	• The MedsCheck quality was not consistent and at a professional standard → teaching community pharmacists a systematic process for completing MedsCheck at the highest possible level is an important next step to moving this initiative forward • Difficulties: coordination of resources and time to implement
Follow-up	Perspective: expanding the initiative province-wide
Funding and cost	• Ontario Ministry of Health care Long-Term Care – cost unknown
References	• Institute for Safe Medication Practices Canada. Linking MedsCheck to MedRec. ISMP Canada Progress Report to the Ontario Ministry of Health and Long-Term Care and the Ontario Pharmacy Council. June 2009. • The MedsCheck Program Guidebook. http://www.medscheck.ca (accessed 2010, January 17) • Kwan Y, Fernandes OA, Nagge JJ, et al. Pharmacist Medication Assessments in a Surgical Preadmission Clinic. Arch Intern Med 2007; 167: 1034-40. SPPACE study

Title of initiative	**Canada Health Infoway (Infoway)**
Country	**Canada (all Provinces)**
Period	2001 to present
Aims	To accelerate the use of electronic health records[a] (EHRs) in Canada. Ten investment programs are defined. Specific aim relative to Infoway's Drug Information Systems (DIS) investment program: to support jurisdictional projects that will result in interoperable systems that enable authorized health care providers to access, manage, share and safeguard patients' medication histories
Initiator(s)	Canada Health Infoway (independent, not-for-profit organization funded by the federal government) Collaborates with the provinces and territories, health care providers and technology solution providers
Environment	Health care environment – all settings of care involved
Professionals involved	All
Description of the intervention	Infoway has approved funding for 291 projects across Canada as of September 30, 2009. This number includes all projects, including those in the comprehensive planning stage of development. DIS projects: Authorized health care providers have access to a patient's secure and complete medication profile, as well as decision support tools to assist in achieving significant improvements in patient safety
Evidence of intake in practice	• Progress for DIS programs (March 31, 2009): 95-100% complete in 5 provinces; partially complete in 3 provinces; planning underway in 4 provinces; forecast in one province. • DIS projects: planning is complete for 18 projects All Provinces have electronic medication databases; 7/10 provinces have communication between the community pharmacy and institutional sector
Impact	Expected: Patients will suffer fewer adverse drug events, and reduced mortality. Health system costs will be lowered thanks to fewer physician visits, hospitalizations and long-term care placements related to drug complications
Advantages and critical success factors	• Not reported
Disadvantages and factors contributing to failure	• Not reported
Follow-up	Selected priorities for 2009-2010: • measure results and benefits for selected early completed projects
Funding and cost	• $1.6 billion had been allocated by the federal government to the end of 2008, including 241 million for DIS programs • The Federal Budget 2009 provides Infoway with $500 million to support the goal of ensuring 50 per cent of Canadians have an EHR by the end of 2010
References	• Canada Health Infoway. Annual report 2008/2009. Building a healthy legacy together. • IBM Drug Information System (DIS) Overview. IBM Canada Health Care Team.

[a] An electronic health record is defined as the availability of client demographic, provider demographic, public facility diagnostic images, laboratory test results, dispensed pharmaceuticals, as well as clinical reports or immunization data.

3.3.3 Denmark

Title of initiative	**Electronic Medicine Profile (EMP)**
Country	**Denmark**
Period	From 2004 until now
Aims	To permit to patient, doctors and pharmacist to gain an up-to-date overview of the individual Dane's medication history since the previous two years , an overview that did not exist before. Only prescribed medications are registered.
Initiator(s)	Ministry of Health and Prevention (through the National Strategy for Digitalisation of the Health sector 2008-2012). Medicines Agency is responsible for the development and the storage on a server of the Medicine Profile.
Environment	Every citizen, physicians (general practitioner, specialist doctor, hospital doctor from every wards – emergency and others) and community pharmacies
Professionals involved	Physicians (general practitioner, specialist doctor, hospital doctor from every wards – emergency and others) and community pharmacy
Description of the intervention	The EMP is an electronic overview of the purchase of prescription medications. All purchases are automatically registered and gathered in an individual, personal medical profile for every citizen. Medicine agency is responsible of the secure system which permits to handle electronic prescription from doctor. EMP contains: • A full list of all the citizen's purchased medications prescribed during the last two years. • Information about the patient's general practitioner. • Information about the doctor who prescribed medicines. • Information on which pharmacies medications prescribed are delivered. • Information about the citizen medicine. • Checking whether the prescribed medications interact. • Information on products or classes of drugs that the citizen cannot tolerate. • A log access with which the citizen can see who has viewed information in citizen's medication profile, when and what information has been looked at. Citizen can access the EMP via the National eHealth Portal www.sundhed.dk or via www.medicin-it.dk. A digital signature permits each citizen to sign in his medicine profile. Physicians have access to the EMP without his consent. However, physician must declare electronically that he is treating patient, the information of the medicine profile is necessary for patient's treatment and that the information are used to ensure quality, safety and efficacy of patient's treatment. His access is gained only for physicians using a special certificate. Pharmacist cannot access a EMP without his consent. Once patient has given his consent to a pharmacist, pharmacy staff must declare electronically that the pharmacy have the patient consent, the information in the medicine profile is needed to guide the patient and that the information are used to ensure quality, safety and efficacy of patient's treatment.
Evidence of intake in practice	100% of community pharmacies (prescriptions from all doctors)
Impact	Measured: two studies assessed if the EMP could contribute to the completeness of patient medication information at hospital admission: • Larsen M.D. et al. : an additional check in the EMP after a patient medication history realized by a clinical pharmacist based on a semi-structured interview with patient revealed 12 errors (n=67 patients). Authors concluded that PEM can contribute to improved hospital stay. • Glintborg B. et al.: 500 patients prospectively included at acute medical department admission. In individual patients, the EMP was compared with (i)

	the medication list written in the patient chart and (ii) drug information provided by the patient during a structured drug interview upon admission and during a home visit 4 weeks after discharge. Results: Upon admission, 1958 prescription-only medications (POM) reported by patients and/or hospital file, of which 114 (6%) not registered in EPM. In EPM, 1153 POM registered during the month preceding admission. 309 (27%) of these not reported upon admission by patients. Home visits performed in a subgroup of 115 patients. During home visits, 18% of POM registered in EPM during the preceding month were not reported. Underreporting might be due to recall bias, non-adherence or discontinuation of drugs. Conclusion: Omission errors are frequent despite structured medication interviews. Pharmacy records or medication lists from all treating doctors must be included in medication reviews in order to reduce recall bias.
Advantages and critical success factors	Not reported
Disadvantages and factors contributing to failure	Not reported
Follow-up	100% pharmacies
Funding and cost	Not reported
References	• Danish Medicine Agency. Medicine Profile. 2010 Available from: www.laegemiddelstyrelsen.dk (last update date 11.01.2010) (accessed 2010, 12th January) • The Danish Pharmaceutical Association, Annual report 2003/2004. 2004: København. • Ministry of Health and Prevention, Healthcare in Denmark, Chapter 7: IT in health care, version 1.0, September 2008, available from: http://www.sum.dk/publikationer/healthcare_in_dk_2008/kap07.htm (accessed 2009, 6th December) • Sundhedsstyrelsen (Danish National Board of Health), Bilag til rapporten: kvaliteten i den danske lægevagtsordning. 2009, København. Available from : http://www.sst.dk/publ/Publ2009/SUPL/Laegevagt/Bilagsdel_laegevagtordn_dk.pdf (accessed 2010, 6th December) • Larsen, M.D., et al., [Medication errors on hospital admission]. Ugeskr Laeger, 2006. 168(35): p. 2887-90. • Glintborg, B., H.E. Poulsen, and K.P. Dalhoff, The use of nationwide on-line prescription records improves the drug history in hospitalized patients. Br J Clin Pharmacol, 2008. 65(2): p. 265-9.

Title of initiative	**The common medication card**
Country	**Denmark**
Period	From 01/01/2010 (implementation would ideally be finish at the end of 2011)
Aims	To obtain an accurate and update current patient medication list at hospital admission and after hospital discharge. The objective is then to transfer the medication information between the hospitals 'medication systems, GP systems and personal medication profile (PEM - see form)
Initiator(s)	Included in the National Strategy for Digitalisation of the Health sector 2008-2012 set up by the Ministry of Health and Prevention. The project was called the FAME project. This project has a lot of contributors and participants: • The Digital Health is responsible for ensuring the program implementation

	in collaboration with stakeholders and donors (www.sdsd.dk). • The Danish regions are responsible for the implementation in both primary as the secondary sector. • The Medicines Agency is responsible for operation and maintenance of the central part of the Common Medication Card (www.dkma.dk). • MedCom is responsible for contacts with - and the development of Health care systems in Denmark, which will integrate with the Joint Medical Cards (www.medcom.dk). • A Program Steering Group: The program's steering committee consists of participants from the various parties responsible for funding and the future use of Community Medicine Cards. This committee has to manage the project and take decisions regarding its application.
Environment	• **Hospital :** all public Danish hospitals • **Ward :** all wards • **Target population of patients :** the whole Danish population **Participant population**: patient who subscribe for a login to the eHealth Portal.
Professionals involved	general practitioner, specialist, public hospitals, pharmacy
Description of the intervention	The Common Medication Card (FMK abbreviated in Danish) contains a patient's current medication, thus giving an electronic oversight to the physician, the patient or his carer (via his profile in the National e-Health portal Sundhed.dk). Data are centrally gathered on the server of the Danish Medicines Agency. In practice, when a patient is admitted to the hospital, hospital doctor can download medication information on the patient hospital electronic record and suspends FMK (other healthcare professionals can see that the patient is hospitalized). During hospitalization, medications are only recorded in the hospital medication module. When patient is discharged, the hospital doctor updates the FMK through the hospital electronic system. Information on medications that the patient needs to take after discharge are transferred from the hospital medicine module to the FMK. The medications that the patient doesn't need after discharge are discontinued and doses are updated. The FMK is no longer suspended. The electronic medicine profile server provides an electronic copy of all prescriptions issued within the past 2 years. The FMK server downloads copies of prescriptions from the previous server. These copies can help doctors to create medication prescriptions in FMK though their own system. From a purely technical perspective, the task involves creating an IT infrastructure where different systems communicate with each other. The different systems comprised: GPs, home care service, hospitals and pharmacies. So, they don't need to buy a new program. The up-to-date medication list will be available from the Danish Medicines Agency. The local medication cards will be updated then from a medication profile installed on a central server system. It will also mean that data from the local medication cards will be transferred to the central solution. Medications administered during hospitalisations are not included in FMK.
Evidence of intake in practice	The national implementation will start in 2010
Impact	The common medication card will eliminate a major source of errors and prevent time waste when establishing the current patient medication list from several health systems. Indeed, the patient received his treatment without any delays or errors and the entire health care sector will be able to improve the quality in terms of prescribing medication, while also saving resources No information on the actual measured impact were found.
Advantages and critical success factors	Comparison of how the healthcare system is working today and how FMK will make a difference: Before FMK: • Hospital staff has to spend a lot of time to obtain the patient's medical information because information has to be gathered from multiple locations. • Hospital staff has to spend time for entering medical information into their

	own medications module of the hospital electronic system. • Nobody is never quite sure whether he has gathered every information about a patient's medication. • Healthcare professionals may have difficulty obtaining medication information in discharge summaries. • If the patient is unconscious, healthcare professionals have many difficulties to obtain a patient's medication. After FMK : • Hospital staff can get an overview of the patient's medication at one point : FMK. • The hospital staff can simply transfer the relevant information from FMK to their own medications module. • Healthcare professional has a much better basis to build up a picture of the patient's medication • Healthcare professionals can simply refer to FMK to obtain the whole patient medication information. • Hospital staff can get an overview of patient medication FMK if the patient is unconscious.
Disadvantages and factors contributing to failure	• Difficulties to establish a common security solution and expending the IT infrastructure • Speed of access will succeed or fail according to the capacity of the individual doctor's internet connection. • Doctors have to change their procedure when they will change a medication: now, if they change a medication of one of their patient, this will no longer just be a matter between their patient and them. With the FMK system, they have to make sure that their colleagues in the other sectors can depend on the information which they input individually.
Follow-up	The first final objective is that the national medication record would be implemented by the end of 2011.
Funding and cost	Not reported
References	• Medcom, On the treshold of a healthcare IT system for a new era, I.J. Lars Hulbæk, Iben Søgaard and Rikke Viggers, Editor. 2007, MedCom-the Danish Health Data Network. • Medico-Industrien, Medication errors cost lives but solutions are delayed in Medico-Insight News & Opinion - Newsletter 2009. • Digital Sundhed, FMK - Fælles Medicinkort, poster for the Danish Society for Patient Safety Conference in 2009. • Ministry of Health and Prevention, Healthcare in Denmark, Chapter 7: IT in health care, version 1.0, September 2008, available from: http://www.sum.dk/publikationer/healthcare_in_dk_2008/kap07.htm (accessed 2009, 6th December) • Sundhed, D. Fælles Medicinkort - Vision og organisation. 2010; Available from: http://sdsd.dk/Det_goer_vi/Faelles_Medicinkort/Om_faelles_medicinkort.aspx (accessed 2010, 10th January). • Ahrensberg, K.B. *Status of the important developments and future challenges in eHealth in Denmark*. 2009 not indicated; Important developments and future challenges in eHealth in Denmark, available from http://www.sdsd.dk/Det_goer_vi/Status.aspx (accessed 2010, 6th December) • Common medication card, 2008 (video viewing on the 31th January 2010): available from: http://greatdanefilm.dk/web/sdsd/medicinkort_11112008/engelsk/index.html

3.3.4 The Netherlands

Title of initiative	**« Overdracht van medicatiegegevens in de keten » *or* « Transfer of information about medication of patients between different health care professionals ».**
Country	**The Netherlands**
Period	From 2005 to 2011
Aims	**Aims** Development and implementation of guidelines for a safe transfer of information on medication of patients. 1. To create awareness, and stimulate the cooperation of different healthcare professionals. 2. To share knowledge and experiences by collecting good practice examples on transfer of medication information of patients and by communicating on these examples on a national level 3. To guarantee that transfer of information on medications is part of medication safety plans. 4. To create transparency by development of performance-indicators for transfer of information on medication of patients in different healthcare settings 5. Todevelop a feasible stepwise plan by introducing guidelines per moment of transfer
Initiator(s)	Inspection of health care
Environment	**Country-wide**: hospitals, warfarin clinics, nursing homes, consultations, homes for disabled persons **Ward :** elective and unelective admissions, internal and surgery wards, day hospitalization **Target population of patients:** all patients on transition moments **Transition moments:** Admission, discharge, intramural transfers, consultation
Professionals involved	Hospital pharmacists, pharmacy technicians, hospital physicians, nurses (home and hospital), community pharmacists, general practitioners, dentists.
Description of the intervention	1)Taking medication histories using a standardized method on admission. To complete the medication by using available sources such as patient, referral letter, fax of community pharmacist or electronic information on medication from the community pharmacist. Informing general practitioner, community pharmacist, nursing home and patient about discharge medication. 2) Evaluation of patient satisfaction of information about medication at admission. 3) Structural implementation of nationwide electronic patient file and electronic medication file www.infoepd.nl
Evidence of intake in practice	See impact and advantages.
Impact	The impact of drug history taking was measured in different local projects (pre- and post measurements). Overall, drug history taking at admission reduced the risk for errors in the medication profile by 17-96%. One project measured a saving of 605.000 euros a year, meaning 32 euro per patient. One study examined the effect of medication reconciliation with and without patient counselling among patients at the time of hospital discharge on the number and type of interventions necessary to prevent drug-related problems. Significantly more interventions were identified when reconciliation included patient counselling (mean of 5.3 interventions/patient for reconciliation including patient counselling versus 2.7 interventions/patient for reconciliation without patient counselling) (Ann Pharmacother. 2009;43(6):1001-1010)
Advantages and critical success factors	Enthusiasm of all the involved health care professionals was noted. All projects showed a profit on quality and efficiency and more patient satisfaction is mentioned.
Disadvantages and	Health care professionals had to get used to a new procedure. Automatically

factors contributing to failure	converting the list of medication of the community pharmacist to the electronic hospital system is not possible, which is a barrier. Sufficient manpower is necessary. Need for training for health care professionals. IT support (as a computerized physician order entry system, electronic medical and electronic patient file) is necessary. Practical organization and logic support of intake and discharge conversations is sometimes difficult.
Follow-up	In process
Funding and cost	Hospitals themselves, health insurances, government
References	www.medicatieoverdracht.nl Ann Pharmacother. 2009;43(6):1001-1010

3.3.5 United Kingdom

Title of initiative	**The management of medicines in acute and specialist trusts (review)**
Country	**United Kingdom**
Period	From 2002 to 2006 (first audit performed in 2002, second audit performed in 2005-2006)
Aims	To identify initiatives to modernise medication management and audit acute hospitals to assess indicators of performance in their implementation and eventually to list priorities for improvement in the future in acute hospitals. The data below focus on key areas to improve seamless care.
Initiator(s)	The Audit Commission, now replaced by the Care Quality Commission (CQC)
Environment	All acute hospitals in NHS (in 2002: 197 out of 199 NHS acute trusts in England)
Professionals involved	All (assessment managed by hospital pharmacy)
Description of recommendations	The common key areas identified in the review made in 2002 and 2005-2006 as to be improved to build effective relationship between primary and secondary care were: (1) Joint-working arrangement such as the development of joint formularies between primary and secondary care. (2) The patients' own medicine (POM) use: to ask patients to take their all medicines into hospital and to check them on admission to assess their suitability for use during the hospital stay (pharmacist or pharmacy technician) (3) Self-administration of medicines by patient or caregiver during the hospital stay under hospital staff supervision. Bedside lockers should be provided to each patient that are self-administering. (4) Medication review on admission by a pharmacist or another hospital healthcare professional that obtain the current drug summary and identify recent changed to medication and allergies to medicines. (5) Original pack dispensing by hospital pharmacy during hospital stay and/or at hospital discharge. The original pack does include patient information leaflet, product's batch number and expiry date and generally for 28 days of treatment. Additional indicators related to seamless care in medication management assessed in 2005-2006: (6) Informing patients on their medicines prior to discharge (7) Quality of information received by hospital at admission for elective patients (8) Quality of hospital medication record and their sharing with primary care: GPs' information on any changes of medicines and their reasons for the change by hospital. Community pharmacist should be informed of any changes in patients' prescriptions. (9) Accessibility of the hospital in the event of a medication problem: a pharmacy helpline should give support to patient experiencing a medication event. (10) Share of patients where patients or carer self-management agreed: to put in place a self-management plan for patients or carers. (11) Influence of local stakeholders on Drug Therapeutic Committee: Stakeholders (patients, primary care professionals and service commissioners) views should be taken into account in deciding which medicines will be the primary and secondary choices within a trust (trust formulary). (12) Share care utilization: there must be good understanding between primary and secondary care on responsibilities to ensure that medication and monitoring regimes are maintained (triggers for when a patient may need to be referred back to secondary

	care and ongoing patient monitoring requirements). The data for the reviews in regard to these key indicators were obtained trough a core questionnaire completed by pharmacy department, pharmacy clinical services audit, national data sources (department of Health, …), a web-based service users satisfaction survey (non-pharmacy staff), a web-based primary care trust satisfaction survey, a outpatient audit, the national patient survey
Evidence of intake in practice	(1) Not reported (2) 2002: procedure to reuse wherever possible all or selected medicines in the majority of trusts; 2005-2006: 40-50% of patients on a ward used their own medicines, (3) 2002: scheme in place for self-administration for some groups of patients in the majority of trusts; 2005-2006: self-administration offered on only 19,5% of wards (highest level in transplant wards). Availability of bedside lockers in wards varying from 0 to 100%. (4) 2005-2006: medication review within 24 hours of admission by a pharmacist or another hospital healthcare professional for 60% to 100% of patients. (5) 2002: dispensing for discharge schemes implemented only in a minority of trusts – issuing original packs on admission or during the patient's stay in hospital; 2005-2006: the proportion of patients dispensed medicines at discharge (in a pack labelled with patients' details) ranged from 25% in a pediatric ward to 70% and over for general surgical and transplant wards. (6) 2005-2006: 7/10 patients received written information with their medicines on discharge (patient survey). (7) 2005-2006: comprehensive drug history for less than 50% of patients in the majority of trusts (98%). Better situation for planned admissions, but still 88% of trusts with less than 50% of patients with comprehensive drug histories from their GPs. (8) 2005-2006: 16% of primary care trusts (PCT) had GPs usually receiving full discharge information before they see patients, 47% this sometimes occurred, while 36% reported that GPs often had not received discharge information before visiting patients. Quality of information considered less than adequate (medication prescribed and ongoing care, diagnosis and reason for medication and shared care). (9) 2005-2006: Helpline for patients in 64% of trusts, of which 28% available as a source of advice for the community, 9% available for recently discharged patients and local pharmacists, 21% available for patients who they had dispensed medicines to, and 5% available only for recently discharged inpatients. The number of helpline contacts handled in a week ranged from none through to 80 (average =9). (10) 2005-2006: Present in nearly 70% of trusts. (11) 2005-2006: Not reported. (12) 2005-2006: If shared care in place, on average 47.5% (from trust point of view) to 57% (from PCT point of view) of protocols covered monitoring and triggers.
Impact	(1) Measured: Saving of £500.000 (from a total medicines expenditure of £63 million) by agreeing protocols on the use for eight conditions (avoid unnecessary therapeutic switching of medicines at transition). (2) Expected: to have an accurate medication record, limit patient confusion by receiving the same medicine presented and packed in 3 or 4 different ways, and to save money in diminishing ward medication supply by hospital pharmacy during the stay and at discharge. Measured: Results on costs saving of 2 studies (1,2) and 1 case study (3) reported in the report a spoonful of sugar (2002): (1) 77% of POM suitable for re-use on admission and 56% pursued at discharge - annual saving of £46 000. (2) 58% of patients brought some of their medicines into hospital with them, of which 60% suitable for re-use - potential savings of £37 000 a year in one trust. (3) £60 000 saved by POM - 10% of items used in the trust (Mid-Sussex NHS trust). £45,209.29 of savings after the initiation of such a scheme with pharmacy technicians - net saving of £24,212.57 per annum after allowing for staffing for 11 wards in an another hospital (Southampton General Hospital). Moreover, poor quality medicines removed from use (inappropriately stored, expired or discontinued medication) and duplication of therapy avoided. (3) Expected: To improve patients' compliance by empowering patient to take an active role in managing their own care and by alerting healthcare professionals to any problems the patient may experience with medication. Improved patient compliance

	with medication regimes and so treatment failure prevented. The failure of patients and clinicians to reach concordance about medication regimes is a major cause of increased morbidity and cost (due to patient readmission). (4) Expected: To identify incorrect or incomplete medicines or allergies recorded by pharmacists and to identify medication related hospital admission. (5) Expected: To reduce process cost as medicines are dispensed only once, greater convenience for patients, to reduce GP workload after discharge, to reduce overall costs of medicines to the local health economy (hospital prices are usually lower than those available to GPs), to allow time for GP to be fully informed on any problems or changes in treatment before the patient presents for a repeat prescription (if a 28 days original pack is dispensed at admission the patient will left hospital with at least two weeks of supply), to reduce medicine administration error rates, to reduce the discharge delay as medicines are readily available at patient bedside, to favor the patients' own medicines use. Measured: Overall saving of £200 000 a year to the local economy through better procurement after introduction of this initiative at a 1500-bed hospital. (6) Expected: To promote patient compliance. (7) Expected: To have a complete medication history at patient admission. (8) Expected: Explaining the rational of medication change will be important background for those taking over the care and could influence future choice (ie. It is important to share that a patient failed to respond to a first choice). (9) Expected: To quickly resolve patient medication problems. (10) Expected: To support patients' compliance with their medications. (11) Expected: To minimize disruption to medication as patients move between services. (12) Expected: To minimize risk of poor follow up for patients (ie. routine tests normally associated with a medication do not occur).
Advantages and critical success factors	(3) A national contract to offer an attractive price for individual medicine locker that need to be available at each bedside should be established by the NHS Purchasing and Supply Agency, self administration scheme (standard procedure to assess patients' ability to self medicate) should be in place, staff use of self administration to reinforce message about medicines, patients' competency at self administering is assessed prior to discharge, mechanisms are in place to identify those who will require additional support in the community. Successful introduction of self-administration relies on the commitment of nurses and their available time, as they are the staff who usually assess and educate patients. (2, 4) National coordination of publicity posters to support an awareness campaign to promote the importance of taking all medication (including complementary therapies) into hospital (5) Trusts need to discuss local implementation with their health authorities and primary care trusts (PCTs) particularly for the transfer of money from primary care to hospitals and the consequent impact on general practitioners budget. This initiative depends also on the stability of the patients' medication regimen (12) Nationally agreed list of medicines suitable for shared care should be produced. Health communities should implement shared care agreements for this nationally agreed list of medicines. To encourage GPs to engage in shared care, consideration should be given by commissioners to using the qualities and outcomes framework (QOF –assessment of general practice performance based on different type of indicators aims to deliver substantial financial rewards for high-quality care in NHS – clinical, organizational, patient experience and additional services). A suitable mechanism should be introduced for sharing existing shared care agreements to assist development.
Disadvantages and factors contributing to failure	(3) The initial investment in time and money that is required. (5) Failure to establish an agreement on reallocation of money between health authorities, PCTs and hospitals. (6) A proportion of the medicines without leaflets are unlicensed medicines, packs are being split as the patient does not need a full pack and there is only one leaflet to be shared between two or more patients. (12) GPs' workloads and costs of medicines.
Follow-up	Not reported

Funding and cost	No except when being assess by CQC and not meeting the relevant points will prevent the trusts become foundation trusts as an example so more about penalization if that don't meet the relevant standards.
References	[10] The_Audit_Commission, A spoonful of sugar - medicines management in NHS hospitals, The_Audit_Commission, Editor. 2001, The_Audit_Commission: London., [11]The_Audit_Commission, Acute hospital portfolio: review of national findings : medicines management, The_Audit_Commission, Editor. 2002, The_Audit_Commission: London., [12] The_Healthcare_Commission, Acute hospital portfolio reviews 2005/2006 : Guide to Medicines Management (v2), The_Healthcare_Commission, Editor. 2006, The_Healthcare_Commission: London., [13] Commission_for_Healthcare_Audit_and_Inspection, The best medicine - The management of medicines in acute and specialist trusts, C.f.H.A.a. _Inspection, Editor. 2007, Commission_for_Healthcare_Audit_and _Inspection: London., [14] The_Royal_Pharmaceutical_Society_of-Great_Britain, T.G.o.H.P., The_Pharmaceutical_Services_Negociating_Commitee, The_Pharmaceutical_Services_Negociating_Committee, The_Primary_Care_Pharmacists'Association, Moving Patients, moving medicines, moving safely : Guidance on discharge and transfer planning. 2006. p. 124. , Available from: http://www.nhsemployers.org/PayAndContracts/GeneralMedicalServicesContract/QOF/Pages/QualityOutcomesFramework.aspx.

Title of initiative	**Managing patients' medicine after discharge from hospital (review)**
Country	**United Kingdom (England)**
Period	2008-2009
Aims	To look at what organizations were doing to ensure the safety of patients who had been discharged from hospital with a change of medication, along the key steps of the pathway in this process.
Initiator(s)	The Care Quality Commission
Environment	12 Primary Care Trusts (PCTs) in NHS
Professionals involved	Mainly health care providers (HCPs) in PCTs
Description of the intervention	No intervention was implemented and/or evaluated, as this was more an observational study. The different key indicators evaluated were: (1) Information provided by general practitioners (GPs) to acute trusts for referred patients (list of medicines currently prescribed for the patient, co-morbidities, allergies, drug reactions and medicines that should be stopped); (2) Information provided by acute trusts to GPs, patients and community pharmacist at discharge (timeliness and information of changes of medications); (3) GP systems and processes for medicines reconciliation after discharge. (4) GP systems and processes for medicines review after discharge. (5) PCTs mechanisms other than (4) to improve patient medication adherence The study was based on: (1) The assessment based on a formal framework (literature review and consultation with subsequent key stakeholders), (2) a documentary evidence request to PCT for their answer, (3) a GP practice survey, (4) study visits including interviews with senior PCT staff and practice-based staff, (5) the assessment of PCT for each part of the study was based on the study expectation developed by the Care Quality Commission.
Evidence of intake in practice	(1) 11 of the 12 PCTs visited had little or no reliable, systematic knowledge of whether GPs were sending the correct information at the right time to hospitals. When referring patients in non-emergency cases provided (view of GPs), 98% provided a list of all medicines currently prescribed for the patient, but only a minority (11 to 24%)

	systematically provided information on co-morbidities, allergies, drug reactions and medicines that should be stopped. The transmission of information by GPs for people admitted through the emergency department was too slow and informal. (2) 53% of GP practices reported that discharge summaries received on time were useful either "all" or "most" of the time; 27% of GP practices found that discharge summaries were "hardly ever" or "never" inaccurate or incomplete; and 81% of practices reported that "all" or "most" of the time details of prescribed medicines were incomplete or inaccurate on discharge summaries. A copy of the discharge letter was given to patients in only 7 PCTs. Six PCTs shared information with community pharmacy only if patients was using a compliance aid or was prescribed a high-risk drug. (3) Agreed protocol for reconciliation not operated by a large number of practices. Only half of the PCTs provided GPs with any specific guidance on reconciliation, and in these PCTs the majority of GP practices were not aware of the guidance. In the six PCTs, where no guidance on reconciliation was issued, only 25% of GP practices set out their own guidance. Furthermore, no system to monitor reconciliation available in 8 of the 12 PCTs and evidence to confirm whether reconciliation was timely or accurate provided by any PCTs. Responsibility for reconciliation in the majority of practices given to GPs and other clinical staff (nurse prescriber or practice pharmacist), but a small number of practices (17%) delegated the responsibility for medicines reconciliation to managerial or clerical staff. (4) 57% to 63% of GP practices conduct a medication review within the first month of discharge from hospital for patients aged 65 or older with one or more high risk drugs (NSAIDS, anti-platelets, diuretics). Over 70% of the GP practices surveyed said that they discuss patients' experience, side effects, drug monitoring, test results and length of treatment during medication reviews "most of the time". 10 out of 12 of the PCTs provided GP practices with some form of written guidance for medication review and in 9 out of these 10 PCTs, GPs were prioritising patients for review, on the basis of population group, medical condition, or type of medicine. However, only one PCT monitored both the timeliness and quality of medication reviews. (5) Patients were provided with copies of discharge letters in only 7 of the 12 PCTs. Medication reviews provide a forum for patients to discuss any concerns they might have with their GP and identify changes needed, but only 55% of practices said that patients are present during medication review "most of the time"; and 5% said patients were "hardly ever" present. All the PCTs had some other mechanisms in place to pick up on whether particular groups of patients were following their medication regimen, and all either employed or commissioned pharmacists, nurses and matrons to support patients. However, there was a great variation in the way pharmacists were used, which reflected the fact that the pharmacist resource available to practices varied by a factor of 10 across PCTs. In the best PCT, pharmacists reviewed patients with complex medication needs, undertook home visits and identified potential changes in treatment. Community (high street) pharmacies can also talk through medications with patients in 'medicine use reviews', but the take-up of these has been slow, as not all community pharmacies are accredited to provide this service, and the number of accredited pharmacies varies greatly by PCT
Impact	Expected: To promote high-quality care when patients are transferred from one setting to another– especially on medication management after hospital discharge. No objective measurement reported.
Advantages and critical success factors	(1) Existence of clear guidelines or standardised referral forms on the flow of information between GPs/out-of-hours services and acute trusts, to ensure consistency and promote patients' safety, for both elective and emergency admissions (guidelines or standardized referral forms). (2) Development of extra ways of communicating drug regimens to encourage patients to bring their medication (over-the-counter and prescribed drugs) into hospital (patients' own drugs or green bag schemes) or folder kept at patients' home containing their emergency care plan (yellow folder scheme) to guide HCPs in case of emergency for patients with long-term conditions (ie: anticoagulant). (2) Use of standard, electronic discharge forms. The new standard contract for NHS-funded hospital care sets out specific mandatory obligations to share discharge summaries

	with a patient's GP within 72 hours of discharge, and to include a summary of diagnosis and details of any medication prescribed at the time of the patient's discharge. Encouragement of acute trusts by PCTs for providing timely and accurate discharge information by including financial penalties or incentives within their local discharge protocol. (3) PCTs should carry out reconciliation according to agreed local processes and guidelines and monitor process to assess their quality. (4) as (3) above for medication review. (5) Various professionals involved in the patient pathway can provide information and support patients to take their medicines and PCTs should evaluate the pharmacist and nursing resources available across their practices and the community, and target them on the practices and the patients most in need
Disadvantages and factors contributing to failure	Not reported
Follow-up	Not reported
Funding and cost	Not reported
References	The Care Quality Commission, Managing patients' medicines after discharge from hospital, Special Review, 2009, London. National Prescribing Center. Managing patients' medicines after discharge from hospital – a National Study from the Care Quality Commission, 2009, Available from: http://www.npci.org.uk/blog/?p=870 (accessed 2010, 17th January) The Care Quality Commission, Managing patients' medicines after discharge - study report 2008/2009 - Coventry Teaching Primary Care Trust, study report, 2009, London. The care Quality Commission, Managing patients' medicines after discharge from hospital - a self assessment tool, 2009, London. The Care Quality Commission. NHS must do more to prevent harm to patients from prescribed medicines after leaving hospital, says CQC, 2009; Available from: http://www.cqc.org.uk/newsandevents/pressreleases.cfm?cit_id=35474&FAArea1=customWidgets.content_view_1&usecache=false (accessed 2010, 17th January)

3.3.6 United States - Veterans Health Information Services and Technology Architecture (VistA)

Title of initiative	**Veterans Health Information Services and Technology Architecture (VistA)**
Country	**United States**
Period	From 1997 to actually for the Computerized Patient Record System (CPRS). Data has been stored on a national databank since 2005. By the end of 2006, all veterans can access their personal health record through My HealtheVet program.
Aims	The aim of the Vista project is to fully support safe, effective, and efficient care by providing integrated, longitudinal health information and a management system throughout VA medical facilities and clinic sites with CPRS. and to improve patient accountability and awareness of their health care thanks to an engagement of patients as key partner in health care team by providing them the ability to see and connect to their health record at any time or place through My HealtheVet.
Initiator(s)	The Department of Veterans Affairs (VA) - Veterans Health Administration (VHA)
Environment	VistA covers more than 1,200 sites of care, including acute care hospitals, ambulatory facilities, skilled nursing facilities, and pharmacies.
Professionals involved	All members of the health care team, including desk registration clerks, nurses, and physicians, can access portions of the electronic health record through the Computerized Patient Record System (CPRS) as needed to fulfill their duties. VA provides greater coordination of care when all members of the team can quickly access the record.
Description	The clinical computer system, VistA, includes the following components:

of the intervention	• Computerized Patient Records System (CPRS) • VistA Imaging • Bar Code Medication Administration (BCMA) • My HealtheVet (or personal health records) The CPRS and My healtheVet are the 2 components of VistA that improve continuity of care in medication management and that we will describe. **Computerized Patient Record System Graphical User Interface (VistA CPRS GUI)** enables clinicians to enter, review and continuously update all order-related information connected with any patient throughout VA's 1,400 site system. Clinicians can order lab tests, medications, diets, radiology tests, and procedures; record a patient's allergies or adverse reactions to medications; request and track consultations; and enter progress notes, diagnoses, treatments for each encounter, and discharge summaries. Electronic health records allow hospital personnel to keep comprehensive patient records and enables clinicians, managers, and Quality Assurance staff to review and analyze data on any patient to directly support clinical decision-making. In 2005, a national databank for standardized, patient-specific clinical data was introduced: the central Health Data Repository (HDR). Then, each patient's records will be stored as a true longitudinal healthcare record what means that authorized clinicians have access to any veteran's record, regardless of which region they reside in. During hospital stay, admission orders may be written weeks ahead of an admission. Discharge orders may be written throughout a hospital stay and modified as needed. These orders are easily available for review. Similarly, when writing admission orders, a patient's current outpatient prescriptions are easily viewed and may be transferred to become inpatient orders, if appropriate *from CPRS*. Veterans increasingly have access to their records and more opportunity to successfully manage their own health because of personalized electronic health records, through a derivative of the EHR called **My HealtheVet.** A section called "pharmacy" in the program gives the opportunity to the patient to : • refill their prescriptions • view their prescriptions history • record their non VA medications, OTC, Herbals, Supplements (name, dosage, frequency, date of introduction and stop) • see their complete medication list Patient can also search information on medications. Actually, patients are incited to keep an updated medication list handy – at home and wherever they go. So patients can print out their medication profile from their health journal that they managed in their "My HeatlheVet" session. In the future, information managed by patients could be shared after patients' permission with their healthcare provider (. and see informations extracted from their CPRS.
Evidence of intake in practice	100% coverage of VA healthcare system for EPHR In 2005, the system contains a single health record of 8.5 million veterans in 22 regions across the entire United States. In July 2009, more than 810 000 veterans (16.5% of veterans currently receiving VA healthcare services) had subscribe for an access to My HealtheVet

Impact	The cost of care per patient in the VA has remained the same for the past 10 years, while costs in other health care systems have risen dramatically during the same period. Key factors for cost effectiveness of VA health care from CPRS, with regard to medications: The cost of each medication prescribed is listed in the electronic health records order entry system, encouraging providers, whenever possible, to select the most effective and least costly medication VA's electronic health record has largely eliminated all errors stemming from lost or incomplete medical records. One in every seven hospital admissions is due to the lack of a medical record and 20 percent of all lab tests are repeated because the physician cannot access the results. VA is a leader in quality of care and patient satisfaction and is considered one of the safest health care systems in the country. More information of the impact of VistA (electronic patient records - CPRS) on quality of healthcare could be finding in the paper: Jha, A.K., et al., Effect of the transformation of the Veterans Affairs Health Care System on the quality of care. N Engl J Med, 2003. 348(22): p. 2218-27. My HealtheVet portal has been assessed since 2007 by users via the American Customer Satisfaction Index (ASCI) survey to better understand their needs and preferences in view of future development of the program. Results from 100 617 surveys showed a high satisfaction (8.3/10) and users are highly likely to return to the site (8.6/10.0) and recommend the site to other veterans (9.1/10.0). The majority of system adopters are male (91%), between the ages of 51 and 70 (68%), and served in the Vietnam War (60%). Most veterans currently visit the site to utilize pharmacy-related features. See : Nazi, K.M., Veterans' voices: use of the American Customer Satisfaction Index (ACSI) Survey to identify My HealtheVet personal health record users' characteristics, needs, and preferences. J Am Med Inform Assoc, 2010. 17(2): p. 203-11.
Advantages and critical success factors	Not reported
Disadvantages and factors contributing to failure	Not reported
Follow-up	Yes
Funding and cost	The current cost of CPRS to VA is approximately $87 per patient per year, whereas the average cost of a repeated test is $80.
References	• Department of Veterans Affairs. Veterans Health Information Systems and Technology Architecture (VistA) – Description, 2009; Available from: <http://www.virec.research.va.gov/DataSourcesName/VISTA/VISTA.htm> (accessed 2010, 14th February) • Department of Veterans Affairs, VistA Frequently Asked Questions. 2006: Washington. • Department of Veterans Affairs, VistA, in Winner of Innovations in American Government Award. 2006, The Ash Institute for Democratic Governance and Innovation at Harvard University's John F. Kennedy School of Government. • Protti, D.J. The Benefits of a Single 'National' Health Record Have Been Demonstrated, 2005, Available from: http://www.connectingforhealth.nhs.uk/newsroom/worldview/protti4 (accessed 2010, 31th January) • VA Information Resource Center (VIReC), Veterans Health Information Systems and Technology Architecture (VistA) – Description, 2009 Available from: http://www.virec.research.va.gov/DataSourcesName/VISTA/VISTA.htm (accessed 2010, 31th January) • Dayhoff Ruth E., Kuzmak Peter M., Meldrum Kevin, Experience providing complete online multimedia patient records, presented in 2001 at the Annual

Healthcare Information and Management Systems Society conference and exhibition, New Orleans.
- Nazi, K., My healtheVet, VIReC clinical informatics cyber seminar, Department of Veterans Affairs, 2008, Washington.
- Department of Veterans Affairs. Medications: playing it safe at home, 2009; Available from: <https://www.myhealth.va.gov/mhv-portal-web/anonymous.portal?_nfpb=true&_nfto=false&_pageLabel=spotlightArchive&contentPage=spotlight/August%202009/spotlight_medications.html> (accessed 2010, 14th February)
- Department of Veterans Affairs, My HealtheVet - one year anniversary, video transcript, 2004, avalaible from https://www.myhealth.va.gov/mhv-portal-web/ShowDoc/BEA%20Repository/multimedia/ColRetWilliamLSharp_MHV.pdf (accessed 2010, 14th February)
- Department of Veterans Affairs, A Whole New My HealtheVet. In the Spotlight 2006, Available from: https://www.myhealth.va.gov/mhv-portal-web/anonymous.portal?_nfpb=true&_nfto=false&_pageLabel=spotlightArchive&contentPage=spotlight/spotlight_ucd.htm (accessed 2010, 14th February)
- Jha, A.K., et al., Effect of the transformation of the Veterans Affairs Health Care System on the quality of care. N Engl J Med, 2003. 348(22): p. 2218-27.
- Nazi, K.M., My HealtheVet - Personal health record, presented at the 20th National Conference on Chronic Care Disease Prevention & Control, 2009, National Harbor.
- Nazi, K.M., et al., Embracing a health services research perspective on personal health records: lessons learned from the VA My HealtheVet system. J Gen Intern Med, 2010. 25 Suppl 1: p. 62-7.
- Nazi, K.M., Veterans' voices: use of the American Customer Satisfaction Index (ACSI) Survey to identify My HealtheVet personal health record users' characteristics, needs, and preferences. J Am Med Inform Assoc, 2010. 17(2): p. 203-11.

4 APPENDIX CHAPTER 6. BELGIAN PROJECTS

4.1 SEARCH STRATEGY

A combination of three approaches was used:

1. Indexed literature search,
2. Handsearch of specific Belgian medical and pharmaceutical journals AND abstract books of national conferences
3. Grey literature search through a questionnaire survey sent to "experts" in the field

4.1.1 Indexed literature search

The authors checked if there was any relevant Belgian citation from the set of eligible citations retrieved in the systematic literature review (chapter 3 of the scientific report).

4.1.2 Handsearch of Belgian journals

The journals listed below were searched from January 2000 until July 2009. These journals were chosen in consensus between the researchers because of their relevance in the field and because of the possibility that projects or initiatives related to seamless care could have been described herein.

- Acta Clinica Belgica
- Archives of Public Health
- Apothekersblad / Annales Pharmaceutiques Belges
- Journal de Pharmacie de Belgique / Farmaceutisch Tijdschrift voor België
- Huisarts nu

Louvain Medical

- Tijdschrijft voor Geneeskunde
- Pharmakon
- Revue Médicale de Liège
- Revue Médicale de Bruxelles

In addition, the following abstract books were reviewed:

- abstract books of the Forum of Pharmaceutical Sciences (Belgian Society of Pharmaceutical Sciences) for 2000-2009.
- abstract books of the Eerste Lijns Symposium (organised by Domus Medica) for 2000-2008

4.1.3 Grey literature – questionnaire survey

Based on our own experience and through contacts with people in the field, a questionnaire was developed to inventory the characteristics of the different seamless care studies / projects that have been performed in Belgium. The questionnaire was pilot tested in French and Flemish on a small number of studies before the final version was decided upon (Appendix 4).

A substantial amount of projects was identified through the Seamless Care Taskforce. This taskforce was founded in October 2006 by the APB (Algemene Pharmaceutische Bond- Association Pharmaceutique Belge). It brings together people who are actively involved in projects or initiatives to optimize seamless care with relation to medication. The taskforce gives members the opportunity to share their experiences and to keep on track of current developments in seamless care.

The following persons or groups were contacted (195 in total):

- Contact person(s) of each seamless care project listed by the APB Seamless Care Task Force;

Clinical pharmacists involved in the 28 Pilot Projects Clinical Pharmacy, sponsored by the Ministry of Public Health. The aim of these pilot projects, started in July 2007, is to develop and evaluate the added value of clinical pharmacy services.

- Professional organizations e.g. SSMG (Société Scientifique de Médecine Générale), SSPF (Société Scientifique des Pharmaciens Francophones), Domus Medica, IPSA (Instituut voor Permanente Studie voor Apothekers), Wit Gele Kruis, Soins A Domicile, SEL's (Samenwerking Eerste Lijn) ;
- Hospital networks: Vlaams Ziekenhuisnetwerk K.U.Leuven;
- All 105 Flemish discharge managers (list provided by the Ministry of Public Health). A discharge manager is a social nurse or social assistant working at the hospital and in charge of activities in relation to continuity of care.
- Faculties/Departments of Pharmacy, General Practice, and Nursing of all Belgian universities, in order to identify theses related to the theme.

All experts were contacted by phone and were asked to describe briefly the project(s) they have been involved in. When appropriate, the contact person was sent an e-mail containing the structured questionnaire asking for the characteristics and results of the project in question. Experts were asked to return this questionnaire by July 15, 2009. If no answer was received, an additional phone call was made, or a reminder was sent by e-mail. Sampling of data was finished by October 09, 2009.

Finally, the Antigifcentrum-Centre Antipoisons was contacted to ask for data on drug related problems that might have been caused by transition of care.

4.2 SELECTING STUDIES

4.2.1 Study selection criteria

Studies needed to comply with the following study selection criteria for inclusion in the literature review:

Topic	Inclusion criteria
Date of project	1995 till present
Language	English OR Dutch OR French OR German
Setting	Transition between ambulatory care (including nursing homes) and hospital care. Only studies performed in Belgium
Sample	Patients admitted to hospital AND/OR patients discharged from hospital (no age or other limitations regarding the patients) Health care professionals caring for these patients in the outpatient and inpatient settings
Intervention	No intervention in case of descriptive studies OR Seamless care interventions to avoid drug related problems, e.g. admission or discharge management
Outcome measures	Drug related problems due to the transfer of patients between ambulatory care and hospital care OR Causes of these drug related problems OR Costs of drug related problems OR Characteristics of seamless care interventions aiming to avoid drug related problems and impact of these interventions

The following exclusion criteria were applied:

Topic	Exclusion criteria
Sample	Transition between settings of care, not in the context of admission /discharge from the hospital (e.g. transition between ambulatory care and nursing home, between an intensive care ward and a cardiology ward,...)
Intervention	Seamless care interventions not focusing on medicines
Outcome measures	Drug related problems not associated with transition between settings of care (ie hospital care and ambulatory care)

Exclusion criteria related to study design were not specified due to the expected limited amount of information gathered.

4.2.2 Inclusion process

For the indexed literature search as well as for the handsearch in a preliminary sift, papers that were clearly not relevant to the review question were eliminated based on their title. Abstracts of remaining papers were then examined and any that failed to meet specific inclusion/exclusion criteria were also eliminated. All titles and abstracts identified as being potentially relevant were provisionally included. The final inclusion or exclusion was decided after retrieving all full texts. To support reliability all papers were first assessed by one member of the research team. Pre-selected papers were then reviewed by two other members of the team (AS and/or VF). Discrepancies were resolved by consensus.

For the grey literature search, inclusion or exclusion was first based on information given during the conversation on the phone, and secondly on the answer received on the questionnaire. If necessary, contact persons were joined by telephone or e-mail to collect additional information before deciding for inclusion. Pre-selected projects and initiatives were then reviewed by two other members of the team (AS and/or VF). Discrepancies were resolved by consensus.

4.3 DATA EXTRACTION

Two data extraction forms were developed : one for research projects reporting on drug related problems secondary to discontinuity of care, and/or the impact of interventions aiming at avoiding drug related problems, and another for initiatives aiming at improving continuity of care.

A project was called a 'research project' when clear measures of evaluation were described and results were presented. A project was called 'initiative' when it was not a research and no results (other than data on the level of implementation of the initiative like number of interventions done) were presented. Data extraction was first performed by one member of the research team, and was done in the language that was used by the expert to fill in the questionnaire (either Dutch or French). Data extraction forms were then reviewed by two other members of the team (AS and/or VF). Disagreements were resolved by consensus. An example of data extraction form is provided below.

4.3.1 Data extraction form for research projects

The data extraction form for research projects enabled the gathering of general as well as specific information, such as:

- clinical question
- research setting
- focus of transition (admission and/or discharge)
- study population (type of patients and/or health care professionals, n participants,...)
- study design (descriptive, (quasi) experimental, qualitative,...)
- type and characteristics of intervention, if applicable (what, by who, to whom, how long,…)

- outcome measures (process and ECHO measures)
- adverse events
- dropout
- driving forces
- barriers / difficulties
- follow-up
- authors' conclusion
- financial support
- conflicts of interest

4.3.2 Data extraction form for initiatives

- setting
- target group
- description of the initiative (what, by who, to whom, how long,…)
- driving forces
- barriers / difficulties
- financial support

4.4 DATA ANALYSIS AND INTERPRETATION

Due to the heterogeneity of the primary studies, a descriptive or non-quantitative synthesis of the extracted data was made. The characteristics and the results of the included studies and initiatives are summarized via tabulation. The textual narrative synthesis of the results is organized around the following themes:

- Research projects describing drug related problems associated with transition between settings of care
- Research projects evaluating interventions to improve seamless care
- Research projects evaluating opinions or experiences of stakeholders on themes related to seamless care
- Ongoing research projects
- Initiatives taken to improve continuity of care with regard to medications

4.5 RESULTS

4.5.1 Search results: number of projects identified by source

4.5.1.1 Indexed literature search

No Belgian citation was identified from the systematic literature review.

4.5.1.2 Handsearch of Belgian journals

Three articles were identified through handsearch of Pharmakon ([15],[16],[17]). Searching Journal de Pharmacie de Belgique yielded two papers ([18],[19]).

No other papers have been found by checking the following journals: Tijdschrift voor Geneeskunde, Huisarts NU, Archives of Public Health, Apothekersblad / Annales Pharmaceutiques Belges, Revue Médicale de Liège, Revue Médicale de Bruxelles

Scattered initiatives have been identified in abstracts from Belgian conferences (2000-2008). An overview of these initiatives can be found in Appendix 4.

4.5.1.3 Evidence obtained from experts in the field

Identification of projects and initiatives: seamless care task force, initiatives sponsored by the Ministry of public health, hospital discharge managers

A substantial amount of projects was identified through the Seamless Care Taskforce.

Of the hospitals involved in pilot projects on clinical pharmacy, 24 seem to have developed initiatives on seamless care.

The contacts with the Flemish discharge managers resulted in 5 completed questionnaires.

Unfortunately, the Antigifcentrum-Centre Antipoisons was not able to deliver data on drug related problems due to transition of care, as reported errors are not coded according to their cause.

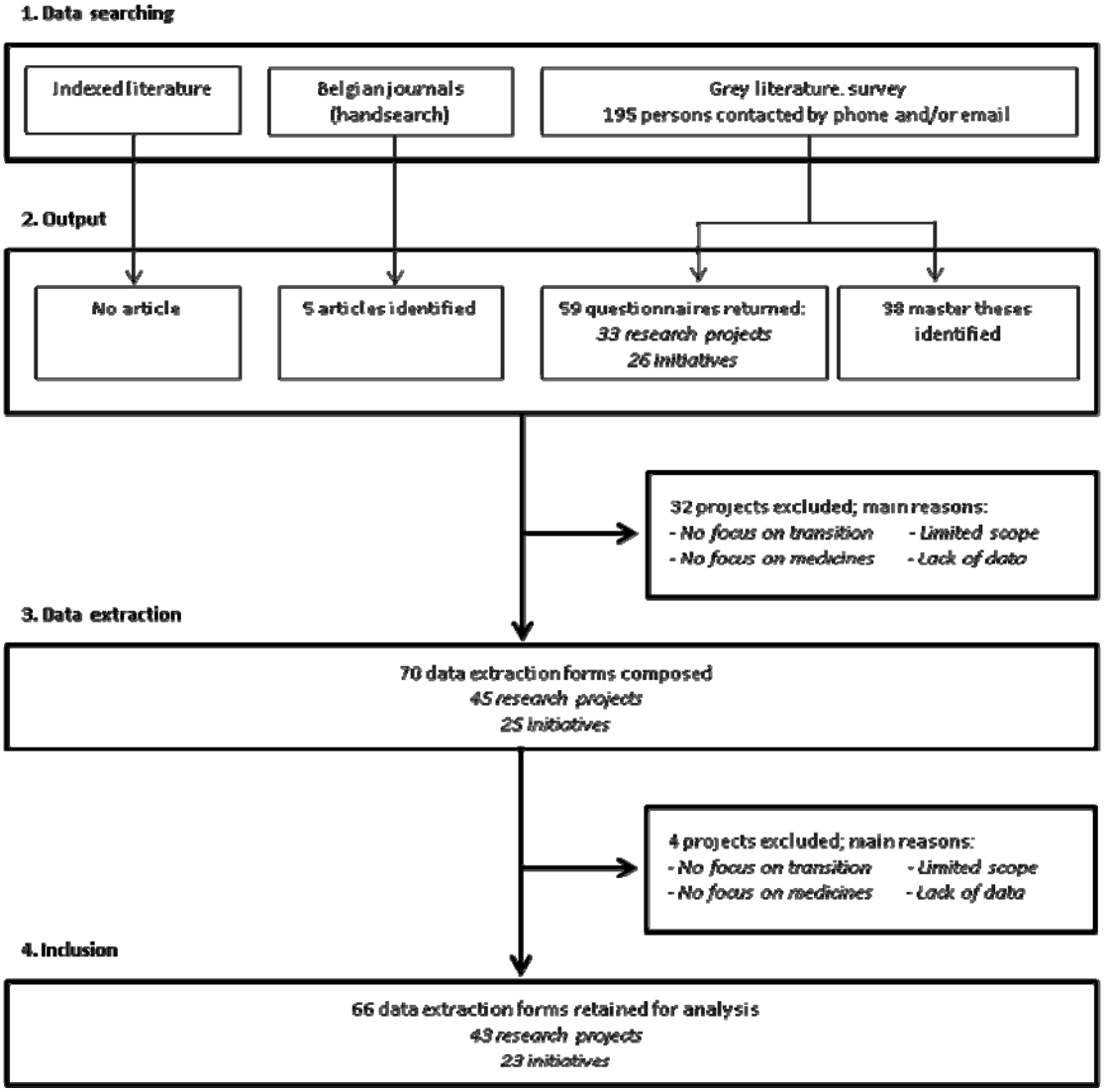
Number of projects reported by experts

In total, 196 persons were contacted by phone and/or e-mail. 59 completed questionnaires were returned. Upon analysis, 33 questionnaires delivered details on projects, either reporting on the number and type of drug related problems due to transition of care or on the impact of initiatives aiming to improve the continuity of care with regard to medications. 26 questionnaires delivered details on initiatives, without measurement of the impact on any outcome parameter. In addition, 38 master theses related to the theme were identified.

4.5.2 Data extraction and evidence sifting

32 projects were excluded from further analysis, mainly because there was no clear focus on transition or medicines, or because of limited scope or output. 70 data extraction forms were drawn up, of which 66 were retained for analysis.

Overview of search strategy



4.5.3 Initiatives presented at national conferences

The following initiatives have been presented at the "Eerstelijnssymposium / Wetenschapsdag", a congress for the first line of care coordinated by Domus Medica:

- Naar een optimale informatieoverdracht tussen thuiszorg en ziekenhuis; project opname-en ontslagmanagement regio Oostende (2001)
- Feedback aan huisartsen over verwijzingen naar de internist (2002)
- Goed verwezen is half genezen: kritische analyse van verwijsbrieven naar de spoedopname (2002)
- Een gestandardiseerde verwijsbrief voor een betere kwaliteit van zorg (2005)
- De onmiddelijke ontslagbrief: een praktijkbevorderend project (2006)
- De verwijzing van huisarts naar de tweede lijn (2006)
- Communicatie met de behandelende huisarts en de spoeddienst met behulp van de HDB-Mailer of de Domus Medica-Mailer (2006)
- Een studie naar de objectieve en subjectieve kwaliteit van het hospitalisatieverslag (2006)
- Verwijs- en ontslagbeleid van zwaar zorgbehoevende patiënten met een zorgplan opgenomen in het ziekenhuis (2006)
- Het transmuraal klinisch pad "totale radicale prostatectomie": een pioniersverhaal (2007)
- Zorgpaden in de oncologie: naar een gestructureerde patiëntgestuurde samenwerking tussen eerste en tweed lijn in de oncologische zorg. Pilootproject Limburg: transmuraal zorgpad voor patienten met borstcarcinoom (2007)
- De medische thuiszorgmap: de praktische aanpak van de palliatieve thuiszorg in de huisartsenpraktijk (2008)
- Zorgpaden in de oncologie: naar een gestructureerde patiëntgestuurde samenwerking tussen eerste en tweed lijn in de oncologische zorg. Pilootproject Limburg: transmuraal zorgpad voor patienten met borstcarcinoom (2008)

5 APPENDIX CHAPTER 7. ANALYSIS OF IMA DATA

5.1 DATA CLEANING AND DEFINITIONS

IMA-AIM datasets were available for 2006 & 2007, restricted to the EPS (permanent sample).

5.1.1 Data cleaning

In order to construct the dataset needed for analyses, some data cleaning and convention rules were taken as follows:

Issue	Action
1 patient with different gender in the dataset 2006 & 2007	deletion of the patient
2 patients with different year of birth in the dataset 2006 & 2007	deletion of the patients
Last year information is the most updated information	take the last information by patient after concatenation of the dataset 2006 & 2007 for the demographic data analyses
CNK code not found in the reference dataset: **12 records over 1.651.872 records of FARMANET dataset.**	Deletion
After regularization of the data (sum of reimbursement + sum of personal intervention + sum of suppl): **39.488 records** lead to negative or zero sum of cost	Deletion
number of package for one delivery date for 1 product was above or equals to 25 packs: **4 records**	Deletion

5.1.2 Conventions

Determination of start and end dates for the hospitalization:

- 2 hospitalizations with a gap of max 3 days between each other will be considered as **ONE** hospitalization (called it "merged hospitalizations")
- Begin date = Date of the first records of the "merged hospitalizations"
- End date = Date of end of the last records of the "merged hospitalizations" – 1

Consideration only of hospitalizations apart from each other of at least 3 months and begin date after 31 MAR 2006 and end date < 01 OCT 2007 – those are the hospitalizations taken into account for the analyses in order to have the FARMANET information before and after the hospitalization.

Take the information in FARMANET (ambulatory delivery data) within the 3-months before and after the hospitalization.

5.1.3 Structure of the datasets for analyses

The output SAS dataset called **FINAL** was made available in SAS format. The table below shows the list of variables included in the FINAL dataset

Variable label	Variable name	Format	Length	Detail
Patient identifier	ANON_BASER	CHAR	8	
Gender	GENDER	NUM		1 = Men 2 = Women
Gender (nl)	GENDER_NL	CHAR	1	M = Man V = Vrouw
Gender (fr)	GENDER_FR	CHAR	1	H = Homme F = Femme
Gender (en)	GENDER_EN	CHAR	1	M = Male F = Female
Year of Birth	BIRTH_YEAR	NUM	5	
Month and Year of Death	DEATH	CHAR	26	
CNK number	CNK	NUM	8	
Commercial label of the package form - Fr	CNK_label_fr	CHAR	55	
Commercial label of the package form - Nl	CNK_label_nl	CHAR	55	
ATC level 5 code	ATC	CHAR	11	
ATC level 3 code	ATC_code3	CHAR	4	
ATC level 3 – Label - Fr	Libel_atc3_fr	CHAR	55	
ATC level 3 – Label - nl	Libel_atc3_nl	CHAR	55	
ATC level 3 – Label - en	Libel_atc3_en	CHAR	55	
Date of Delivery	DATE_DELIVERY	NUM	8	Format date: DATE9.
Defined Daily Dose	DDD	NUM	8	
Unit of the DDD	DDU	CHAR	7	
DDD per package	DPP	NUM	8	
Number of packages	NUM_P	NUM	8	
Total DDD	TOT_DDD	NUM	8	= DPP*NUM_P
Reimbursement	TERUG	NUM	8	
Patient's contribution	MOD	NUM	8	
Supplement	SUPP	NUM	8	
Total	TOTAL	NUM	8	Sum TERUG, MOD, SUPP
Flag for generic (nl)	OGC_lbl_nl	CHAR	32	• Generiek • Kopie • Originele specialteit • Parallel ingevoerde specialteit • Referentiespecialteit • Weesgeneesmiddel
Flag for generic (fr)	OGC_lbl_fr	CHAR	32	• Générique • Copie • Spécialité originale • Spécialité de référence • Spécialité importée de façon parallèle • Médicament orphelin
Flag for low cost	LOW	NUM	8	0 = NO (Not considered

Variable label	Variable name	Format	Length	Detail
drug				as low cost) 1 = YES (Considered as Low cost)
Flag of the Period	FLAG	CHAR	4	PRE = within a 3-month period prior the hospitalization POST = within a 3-month period after the hospitalization
Begin Date of Hospitalization	BEGD	NUM	8	Format date: DATE9.
End Date of Hospitalization	ENDD	NUM	8	Format date: DATE9.

Two additional datasets were created from the FINAL dataset:

- **FINAL DEMO**: containing one records by patient with the gender, number of hospitalization considered in the FINAL dataset and the age of the patient.
- **FINAL BEFORE AFTER**: containing one record by patient, hospitalization and ATC code. The information contained in the dataset are the information before and after the hospitalization.

The dataset Final DEMO was based on the **FINAL** dataset. The Derived variables and the rules applied are as followed:

- The **age** of the patient was calculated based on the Year of Birth and the Year of the last delivery date for this patient.
- **Age** = year(delivery_date) – birth_year
- The number of hospitalization was a count of hospitalizations included in the FINAL dataset for the patient.

Variable label	Variable name	Format	Length	Detail
Patient identifier	ANON_BASER	CHAR	8	
Gender	GENDER	NUM		1 = Men 2 = Women
Gender (nl)	GENDER_NL	CHAR	1	M = Man V = Vrouw
Gender (fr)	GENDER_FR	CHAR	1	H = Homme F = Femme
Gender (en)	GENDER_EN	CHAR	1	M = Male F = Female
Age (in year)	AGE	NUM	5	year(delivery_date) – birth_year
Number of Hospitalization(s)	number_hosp	NUM	8	

The dataset FINAL_BEFORE_AFTER was based on the **FINAL** dataset. The information contained in this dataset was presented by Patient, hospitalization, and, ATC code.

- Type of the drug used before/after the hospitalization: Generic & Copy OR Originator
  - Rule applied on the variable from the FINAL dataset:
    - IF OGC_lbl_fr = "Généric" or OGC_lbl_fr = "Copie" then the type of drug used was defined as "Generic or Copy"
    - Otherwise, the type of drug used was defined as "Originator"
- Reimbursment by unit was calculated as the division between the Reimbursement and the number of pack.

- RULE: BY patient, hospitalization and ATC, take the information the closest to the date of hospitalization and with the largest amount in **reimbursement by unit (= reimbursement / number of packages)**.
- The Reimbursement by unit was computed as = reimbursement / number of packages.

Variable label	Variable name	Format	Length	Detail
Patient identifier	ANON_BASER	CHAR	8	
ATC level 5 code	ATC	CHAR	11	
ATC level 3 code	ATC_code3	CHAR	4	
ATC level 3 – Label - Fr	Libel_atc3_fr	CHAR	55	
ATC level 3 – Label - nl	Libel_atc3_nl	CHAR	55	
ATC level 3 – Label - en	Libel_atc3_en	CHAR	55	
Begin Date of Hospitalization	BEGD	NUM	8	Format date: DATE9.
End Date of Hospitalization	ENDD	NUM	8	Format date: DATE9.
Type of drug (Generic & Copy vs Originator)/Before Hospitalization	Flag_before	CHAR	15	**IF** OGC_lbl_fr = "Généric" or OGC_lbl_fr = "Copie" then the type of drug used was defined as "Generic or Copy" **Otherwise**, the type of drug used was defined as "Originator"
Number of packages / Before Hospitalization	NUM_P _before	NUM	8	Information before the hospitalization
Total DDD)/Before Hospitalization	TOT_DDD_before	NUM	8	Information before the hospitalization
Reimbursement)/Before Hospitalization	Terug_ before	NUM	8	Information before the hospitalization
Reimbursement by unit /Before Hospitalization	Terug_unit_before	NUM	8	TERUG_BEFORE/NUM_P_BEFORE
Type of drug (Generic & Copy vs Originator)/After Hospitalization	Flag_after	CHAR	15	**IF** OGC_lbl_fr = "Généric" or OGC_lbl_fr = "Copie" then the type of drug used was defined as "Generic or Copy" **Otherwise**, the type of drug used was defined as "Originator"
Number of packages /After Hospitalization	NUM_P _ after	NUM	8	Information after the hospitalization
Total DDD /After Hospitalization	TOT_DDD_ after	NUM	8	Information after the hospitalization
Reimbursement /After Hospitalization	Terug_ after	NUM	8	Information after the hospitalization
Reimbursement by unit /After Hospitalization	Terug_unit_ after	NUM	8	TERUG_ after /NUM_P_ after

5.2 DEMOGRAPHIC DATA

5.2.1 Age Distribution of the patients

N	17764	Sum Weights	447900
Mean	65.9418174	Sum Observations	29535340
Std Deviation	16.1285597	Variance	260.130439
Skewness	.	Kurtosis	.
Uncorrected SS	2064126420	Corrected SS	116512424
Coeff Variation	24.4587735	Std Error Mean	.

Location		Variability	
Mean	65.94182	Std Deviation	16.12856
Median	69.00000	Variance	260.13044
Mode	76.00000	Range	104.00000
		Interquartile Range	22.00000

Quantile	Estimate
100% Max	104
99%	93
95%	87
90%	84
75% Q3	78
50% Median	69
25% Q1	56
10%	44
5%	36
1%	21
0% Min	0

5.2.2 Gender of the patients

Data Summary	
Number of Observations	17764
Sum of Weights	447900

Gender							
	Frequency	**Weighted Frequency**	**Std Dev of Wgt Freq**	**Percent**	**Std Err of Percent**	**95% Confidence Limits for Percent**	
M	7098	182580	1844	40.7636	0.3918	39.9957	41.5315
W	10666	265320	1850	59.2364	0.3918	58.4685	60.0043
Total	17764	447900	1170	100.000			

5.3 SUBSTITUTION BETWEEN GENERIC AND ORIGINATOR DRUGS

5.3.1 Substitution of drugs at the ATC level 5 presented at ATC class level 3

ATC level 3 code=A02B: Drugs for peptic ulcer and gastro-oesophageal reflux disease

Number of Observations	4990
Sum of Weights	124460

FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	2829	69260	965.02564
Generic & Copie – Originator	91	2160	236.38149
Originator - Generic & Copie	47	1140	174.77323
Originator - Originator	2023	51900	977.74740
Total	4990	124460	609.43218

FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	55.6484	0.7463	54.1854	57.1114
Generic & Copie – Originator	1.7355	0.1899	1.3631	2.1079
Originator - Generic & Copie	0.9160	0.1404	0.6407	1.1912
Originator - Originator	41.7001	0.7420	40.2455	43.1548
Total	100.000			

ATC level 3 code=A10B = Blood glucose lowering drugs, excl. insulins

Data Summary	
Number of Observations	3327
Sum of Weights	79660

Table of FLAG			
FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	338	7880	428.70906
Generic & Copie – Originator	67	1580	201.15123
Originator - Generic & Copie	27	680.00000	138.08239
Originator - Originator	2895	69520	634.54853
Total	3327	79660	459.04762

Table of FLAG				
FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	9.8920	0.5372	8.8387	10.9453
Generic & Copie – Originator	1.9834	0.2524	1.4886	2.4782
Originator - Generic & Copie	0.8536	0.1732	0.5141	1.1932
Originator - Originator	87.2709	0.6024	86.0898	88.4520
Total	100.000			

ATC level 3 code=C03B = Low-ceiling diuretics, excl. thiazides

Data Summary	
Number of Observations	544

Data Summary	
Sum of Weights	12300

Table of FLAG			
FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	263	5960	286.45030
Generic & Copie - Originator	18	360.00000	83.51398
Originator - Generic & Copie	11	220.00000	65.71886
Originator - Originator	252	5760	288.38280
Total	544	12300	157.28591

Table of FLAG				
FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	48.4553	2.2381	44.0589	52.8517
Generic & Copie - Originator	2.9268	0.6827	1.5858	4.2678
Originator - Generic & Copie	1.7886	0.5361	0.7356	2.8416
Originator - Originator	46.8293	2.2365	42.4360	51.2225
Total	100.000			

ATC level 3 code=C03C: High-ceiling diuretics

Data Summary	
Number of Observations	2068
Sum of Weights	44940

Table of FLAG			
FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	470	10300	436.79685
Generic & Copie - Originator	59	1200	155.29113
Originator - Generic & Copie	47	1020	152.01342
Originator - Originator	1492	32420	493.42675
Total	2068	44940	255.80101

Table of FLAG				
FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	22.9194	0.9594	21.0379	24.8009
Generic & Copie - Originator	2.6702	0.3464	1.9909	3.3495
Originator - Generic & Copie	2.2697	0.3380	1.6068	2.9326
Originator - Originator	72.1406	1.0187	70.1429	74.1383
Total	100.000			

ATC level 3 code=C03D = Potassium-sparing agents

Data Summary	
Number of Observations	1001
Sum of Weights	22640

Table of FLAG			
FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	275	6380	349.65469
Generic & Copie - Originator	32	740.00000	135.17100
Originator - Generic & Copie	23	520.00000	111.99286
Originator - Originator	671	15000	372.24078
Total	1001	22640	213.51347

Table of FLAG				
FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	28.1802	1.5007	25.2353	31.1252
Generic & Copie - Originator	3.2686	0.5956	2.0997	4.4374
Originator - Generic & Copie	2.2968	0.4942	1.3270	3.2666
Originator - Originator	66.2544	1.5730	63.1677	69.3411
Total	100.000			

ATC level 3 code=C07A = Beta blocking agents

Data Summary	
Number of Observations	6258
Sum of Weights	151180

Table of FLAG			
FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	1743	42960	942.56543
Generic & Copie - Originator	205	4700	338.36136
Originator - Generic & Copie	77	1820	216.97515
Originator - Originator	4233	101700	1031
Total	6258	151180	642.08870

Table of FLAG				
FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	28.4165	0.6059	27.2287	29.6043
Generic & Copie - Originator	3.1089	0.2239	2.6699	3.5479
Originator - Generic & Copie	1.2039	0.1435	0.9226	1.4851
Originator - Originator	67.2708	0.6280	66.0397	68.5019
Total	100.000			

ATC level 3 code=C08C = Selective calcium channel blockers with mainly vascular effects

Data Summary	
Number of Observations	2638
Sum of Weights	59680

Table of FLAG			
FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	443	10020	456.96813
Generic & Copie - Originator	74	1680	201.35905
Originator - Generic & Copie	47	1100	167.18826
Originator - Originator	2074	46880	566.22897
Total	2638	59680	346.83290

Table of FLAG				
FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	16.7895	0.7595	15.3003	18.2788
Generic & Copie - Originator	2.8150	0.3370	2.1543	3.4757
Originator - Generic & Copie	1.8432	0.2797	1.2947	2.3916
Originator - Originator	78.5523	0.8355	76.9139	80.1906
Total	100.000			

ATC level 3 code=C09A = ACE inhibitors

Data Summary	
Number of Observations	3667
Sum of Weights	84460

Table of FLAG			
FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	670	15680	581.24422
Generic & Copie - Originator	58	1320	179.81563
Originator - Generic & Copie	35	840.00000	149.04241
Originator - Originator	2904	66620	681.03721
Total	3667	84460	434.43136

Table of FLAG				
FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	18.5650	0.6782	17.2353	19.8947
Generic & Copie - Originator	1.5629	0.2128	1.1456	1.9801
Originator - Generic & Copie	0.9946	0.1763	0.6489	1.3402
Originator - Originator	78.8776	0.7114	77.4829	80.2723
Total	100.000			

ATC level 3 code=C10A = Lipid modifying agents

Data Summary	
Number of Observations	4843
Sum of Weights	115640

Table of FLAG			
FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	1360	32960	815.73376
Generic & Copie - Originator	93	1960	205.95031
Originator - Generic & Copie	40	920.00000	151.75634
Originator - Originator	3350	79800	890.65598
Total	4843	115640	550.30734

Table of FLAG				
FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	28.5022	0.6872	27.1550	29.8495
Generic & Copie - Originator	1.6949	0.1785	1.3449	2.0449
Originator - Generic & Copie	0.7956	0.1312	0.5383	1.0528
Originator - Originator	69.0073	0.7014	67.6322	70.3823
Total	100.000			

ATC level 3 code=M01A : Anti-inflammatory and anti-rheumatic products, non-steroids

Data Summary	
Number of Observations	1947
Sum of Weights	52860

Table of FLAG			
FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	448	12460	556.43521
Generic & Copie - Originator	102	3200	324.33726
Originator - Generic & Copie	84	2540	286.23149
Originator - Originator	1313	34660	642.18633
Total	1947	52860	423.05015

Table of FLAG				
FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	23.5717	1.0285	21.5547	25.5887
Generic & Copie - Originator	6.0537	0.6071	4.8630	7.2445
Originator - Generic & Copie	4.8051	0.5377	3.7507	5.8596
Originator - Originator	65.5694	1.1564	63.3016	67.8373
Total	100.000			

ATC level 3 code=M05B : Drugs affecting bone structure and mineralization

Data Summary	
Number of Observations	837
Sum of Weights	17920

Table of FLAG			
FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	2	40.00000	28.26735
Originator - Generic & Copie	3	60.00000	34.59955
Originator - Originator	832	17820	155.67725
Total	837	17920	148.19811

Table of FLAG				
FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	0.2232	0.1578	0.0000	0.5329
Originator - Generic & Copie	0.3348	0.1931	0.0000	0.7139
Originator - Originator	99.4420	0.2491	98.9530	99.9309
Total	100.000			

ATC level 3 code=N02A = Opioids

Data Summary	
Number of Observations	2262
Sum of Weights	56640

Table of FLAG			
FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	265	6800	419.08896
Generic & Copie - Originator	57	1420	196.78846
Originator - Generic & Copie	51	1500	219.60561
Originator - Originator	1889	46920	575.23781
Total	2262	56640	413.06398

Table of FLAG				
FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	12.0056	0.7320	10.5701	13.4412
Generic & Copie - Originator	2.5071	0.3470	1.8266	3.1875
Originator - Generic & Copie	2.6483	0.3857	1.8919	3.4047
Originator - Originator	82.8390	0.8540	81.1644	84.5136
Total	100.000			

ATC level 3 code=N05A = Antipsychotics

Data Summary	
Number of Observations	1602
Sum of Weights	43800

FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	127	3280	297.55615
Generic & Copie - Originator	6	120.00000	48.91324
Originator - Generic & Copie	5	100.00000	44.66546
Originator - Originator	1464	40300	482.86285
Total	1602	43800	385.95971

FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	7.4886	0.6794	6.1560	8.8212
Generic & Copie - Originator	0.2740	0.1118	0.0547	0.4933
Originator - Generic & Copie	0.2283	0.1021	0.0281	0.4285
Originator - Originator	92.0091	0.6938	90.6483	93.3699
Total	100.000			

ATC level 3 code=N06A : Antidepressants

Data Summary	
Number of Observations	5649
Sum of Weights	152700

FLAG	**Frequency**	**Weighted Frequency**	**Std Dev of Wgt Freq**
Generic & Copie - Generic & Copie	1284	34260	905.96114
Generic & Copie - Originator	144	4020	350.94308
Originator - Generic & Copie	80	2440	285.23759
Originator - Originator	4141	111980	1089
Total	5649	152700	717.77898

FLAG	**Percent**	**Std Err of Percent**	**95% Confidence Limits for Percent**	
Generic & Copie - Generic & Copie	22.4361	0.5860	21.2873	23.5850
Generic & Copie - Originator	2.6326	0.2293	2.1831	3.0821
Originator - Generic & Copie	1.5979	0.1863	1.2326	1.9632
Originator - Originator	73.3333	0.6239	72.1103	74.5563
Total	100.000			

ATC level 3 code = ALL ATC Level 3 code (TOTAL of all ATC presented above)

Data Summary	
Number of Observations	41633
Sum of Weights	1018880

FLAG	Frequency	Weighted Frequency	Std Dev of Wgt Freq
Generic & Copie - Generic & Copie	10517	258240	2341
Generic & Copie - Originator	1006	24460	805.26081
Originator - Generic & Copie	577	14900	653.51183
Originator - Originator	29533	721280	2675
Total	41633	1018880	1700

FLAG	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie - Generic & Copie	25.3455	0.2255	24.9035	25.7875
Generic & Copie - Originator	2.4007	0.0789	2.2459	2.5554
Originator - Generic & Copie	1.4624	0.0640	1.3369	1.5879
Originator - Originator	70.7915	0.2358	70.3292	71.2537
Total	100.000			

5.4 SUBSTITUTION WITHIN THE SAME CHEMICAL SUBGROUP

Analyses at the ATC 4 level By Drug Type prior the hospitalization - Weighted Analyses

ATC4=A02BC : Proton pump inhibitor drugs

Data Summary	
Number of Observations	4206
Sum of Weights	105600

Before Hospitalisation	Type of Change (prior and following hospitalization)	Frequency	Weighted Frequency	Std Dev of Wgt Freq	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie	Both change (name & dosage)	143	3640	317.60639	3.4470	0.3000	2.8587	4.0352
	Change in ATC level 5	264	6720	425.80094	6.3636	0.4014	5.5768	7.1505
	Change only in dosage	96	2280	242.44180	2.1591	0.2296	1.7089	2.6093
	Change only in name	367	9100	482.45912	8.6174	0.4552	7.7251	9.5098
	No change	1657	40640	848.70009	38.4848	0.7903	36.9354	40.0343
	Total	2527	62380	892.31130	59.0720	0.8061	57.4915	60.6524
Originator	Both change (name & dosage)	13	280.00000	79.89291	0.2652	0.0757	0.1168	0.4135
	Change in ATC level 5	198	5120	377.62585	4.8485	0.3561	4.1504	5.5466
	Change only in dosage	112	3100	306.81843	2.9356	0.2893	2.3684	3.5028
	Change only in name	20	480.00000	112.90816	0.4545	0.1069	0.2449	0.6642
	No change	1336	34240	840.85003	32.4242	0.7687	30.9171	33.9314
	Total	1679	43220	897.81497	40.9280	0.8061	39.3476	42.5085
Total	Both change (name & dosage)	156	3920	326.75976	3.7121	0.3088	3.1067	4.3175
	Change in ATC level 5	462	11840	554.56579	11.2121	0.5202	10.1922	12.2320
	Change only in dosage	208	5380	386.72195	5.0947	0.3646	4.3800	5.8094
	Change only in name	387	9580	493.39389	9.0720	0.4655	8.1594	9.9845
	No change	2993	74880	874.91885	70.9091	0.7436	69.4513	72.3669
	Total	4206	105600	565.66592	100.000			

ATC4=A02BC = proton pump inhibitor drugs (Continued)

Before Hospitalisation	Type of Change (prior and following hospitalization)	Row Percent	Std Err of Row Percent	95% Confidence Limits for Row Percent	
Generic & Copie	Both change (name & dosage)	5.8352	0.5012	4.8526	6.8178
	Change in ATC level 5	10.7727	0.6622	9.4744	12.0710
	Change only in dosage	3.6550	0.3858	2.8986	4.4114
	Change only in name	14.5880	0.7441	13.1292	16.0468
	No change	65.1491	1.0056	63.1776	67.1206
	Total	100.000			
Originator	Both change (name & dosage)	0.6478	0.1847	0.2858	1.0099
	Change in ATC level 5	11.8464	0.8378	10.2038	13.4889
	Change only in dosage	7.1726	0.6903	5.8192	8.5260
	Change only in name	1.1106	0.2605	0.5999	1.6213
	No change	79.2226	1.0566	77.1511	81.2941

Before Hospitalisation	Type of Change (prior and following hospitalization)	Column Percent	Std Err of Col Percent	95% Confidence Limits for Col Percent	
Generic & Copie	Both change (name & dosage)	92.8571	1.9843	88.9669	96.7474
	Change in ATC level 5	56.7568	2.4458	51.9617	61.5518
	Change only in dosage	42.3792	3.5871	35.3466	49.4118
	Change only in name	94.9896	1.1523	92.7304	97.2487
	No change	54.2735	0.9659	52.3798	56.1672
	Total				
Originator	Both change (name & dosage)	7.1429	1.9843	3.2526	11.0331
	Change in ATC level 5	43.2432	2.4458	38.4482	48.0383
	Change only in dosage	57.6208	3.5871	50.5882	64.6534
	Change only in name	5.0104	1.1523	2.7513	7.2696
	No change	45.7265	0.9659	43.8328	47.6202

ATC4=C10AA = HMG CoA Reductase Inhibitors (statins)

Data Summary	
Number of Observations	4325

Data Summary	
Sum of Weights	103720

Before Hospitalisation	Type of Change (prior and following hospitalization)	Frequency	Weighted Frequency	Std Dev of Wgt Freq	Percent	Std Err of Percent	95% Confidence Limits for Percent	
Generic & Copie	Both change (name & dosage)	82	1860	212.62772	1.7933	0.2051	1.3912	2.1954
	Change in ATC level 5	60	1600	217.75917	1.5426	0.2094	1.1320	1.9532
	Change only in dosage	45	1080	168.92871	1.0413	0.1628	0.7221	1.3604
	Change only in name	250	5740	369.88335	5.5341	0.3567	4.8347	6.2335
	No change	993	24200	722.71203	23.3320	0.6826	21.9938	24.6703
	Total	1430	34480	806.26731	33.2433	0.7564	31.7605	34.7262
Originator	Both change (name & dosage)	9	180.00000	59.94447	0.1735	0.0578	0.0602	0.2869
	Change in ATC level 5	92	2440	267.28255	2.3525	0.2568	1.8491	2.8559
	Change only in dosage	161	3760	305.86406	3.6251	0.2947	3.0474	4.2029
	Change only in name	36	840.00000	146.43023	0.8099	0.1412	0.5331	1.0866
	No change	2597	62020	868.57055	59.7956	0.7869	58.2529	61.3383
	Total	2895	69240	854.45213	66.7567	0.7564	65.2738	68.2395
Total	Both change (name & dosage)	91	2040	220.56525	1.9668	0.2128	1.5496	2.3841
	Change in ATC level 5	152	4040	342.13051	3.8951	0.3278	3.2524	4.5378
	Change only in dosage	206	4840	346.71526	4.6664	0.3339	4.0118	5.3210
	Change only in name	286	6580	395.00044	6.3440	0.3809	5.5972	7.0908
	No change	3590	86220	763.22772	83.1277	0.5981	81.9550	84.3003
	Total	4325	103720	525.26404	100.000			

ATC4=C10AA = HMG CoA Reductase Inhibitors (statins) (Continued)

Before Hospitalisation	Type of Change (prior and following hospitalization)	Row Percent	Std Err of Row Percent	95% Confidence Limits for Row Percent	
Generic & Copie	Both change (name & dosage)	5.3944	0.6065	4.2053	4.2053
	Change in ATC level 5	4.6404	0.6190	3.4269	3.4269
	Change only in dosage	3.1323	0.4845	2.1823	2.1823
	Change only in name	16.6473	1.0129	14.6615	14.6615
	No change	70.1856	1.2646	67.7064	67.7064
	Total	100.000			
Originator	Both change (name & dosage)	0.2600	0.0866	0.0902	0.0902
	Change in ATC level 5	3.5240	0.3820	2.7750	2.7750
	Change only in dosage	5.4304	0.4374	4.5728	4.5728
	Change only in name	1.2132	0.2110	0.7994	0.7994
	No change	89.5725	0.6028	88.3907	88.3907

Before Hospitalisation	Type of Change (prior and following hospitalization)	Column Percent	Std Err of Col Percent	95% Confidence Limits for Col Percent	
Generic & Copie	Both change (name & dosage)	91.1765	2.8379	85.6127	96.7402
	Change in ATC level 5	39.6040	4.2104	31.3494	47.8585
	Change only in dosage	22.3140	3.0789	16.2779	28.3502
	Change only in name	87.2340	2.0835	83.1493	91.3188
	No change	28.0677	0.7950	26.5091	29.6264
	Total				
Originator	Both change (name & dosage)	8.8235	2.8379	3.2598	14.3873
	Change in ATC level 5	60.3960	4.2104	52.1415	68.6506
	Change only in dosage	77.6860	3.0789	71.6498	83.7221
	Change only in name	12.7660	2.0835	8.6812	16.8507
	No change	71.9323	0.7950	70.3736	73.4909

6 APPENDIX CHAPTER 8. QUALITATIVE STUDY

6.1 METHODOLOGY

Given the research questions and the benefit of interactions between participants, a combination of nominal and focus groups were selected as qualitative research method. This method stimulates interaction among participants, which has the potential for greater insights to be developed

6.1.1 Organisation of the groups

Eleven groups were organised, nine with a multidisciplinary group of health care professionals (HCPs) and patient representatives (referred to as 'focus groups with health care professionals'), and two with stakeholders. The focus groups with health care professionals were organised at different locations, geographically spread all over the country. Attention was paid having focus groups in urban as well as in more rural regions. The two groups with stakeholders were organised in Brussels.

At the expert meeting on this part (KCE, 29/04/2010), one expert mentioned that the representativity of the views of specialized physicians was probably limited, as mostly geriatricians had been met and only a limited number of other specialists in internal medicine. Therefore, the researchers added two additional semi-structured one-to-one interviews with specialized physicians in internal medicine. The interviews were based on a similar protocol as the one used for the focus groups; additional information has been added in the results.

6.1.2 Participants

6.1.2.1 Sampling method

Purposive sampling was used to ensure representation of a range of characteristics likely to influence experience and opinions (i.e. presence of different health care professionals and stakeholders in the field). The health care professionals selected were those directly involved in medication management at transition moments. In order to avoid duplication of data from the survey (see chapter 6 of the scientific), we decided to invite HCPs that had no specific previous experience in pilot projects around seamless care with regard to medications. Purposive sampling is a frequently used sampling method in qualitative research, whereby the knowledge of the research problem allows the selection of persons with a specific profile for inclusion in the sample.

6.1.2.2 Composition of the focus groups

Health care Professionals

For each of the HCP focus groups, the following types (n=10) of participants were invited: a general practitioner, a general practitioner-coordinator in nursing home, a hospital physician (preferentially from geriatric, surgery or emergency ward), a community pharmacist, a hospital pharmacist, a ward nurse, a home care nurse, a care coordinator, a discharge manager, a patient (recently discharged from hospital and familiar with health care transition), a patient carer or representative, or a caregiver. This multidisciplinary composition enabled the interaction between the participants and warranted the collection of experienced based information.
The list of types of participants to be invited was based on earlier information on seamless care projects and on lists of people mostly involved in continuity of medication management.

For the hospital physicians, the selection of disciplines was based on international data that showed that most problems and / or initiatives related to seamless care were encountered at geriatric, surgical and emergency departments. Overall, an attempt was made to maximize the number of participants to 10, which is a well accepted number for focus group discussions.

Stakeholders

For the focus groups with stakeholders, people having responsibility in professional organizations of the different disciplines were invited: Domus Medica / SSMG (Société Scientifique de Médecine Générale): general practitioners; BVGG/SBGG (Belgische Vereniging voor Gerontologie en Geriatrie/Société Belge de gériatrie et de gerontology): geriatricians; APB (Algemene Pharmaceutische Bond/Association Pharmaceutique Belge) and OPHACO: community pharmacists; BVZA/ABPH (Belgische Vereniging voor Ziekenhuis Apothekers/Association Belge des Pharmaciens Hospitaliers): hospital pharmacists; Wit Gele Kruis/Croix Jaune et Blanche: home care nurses; Listel Limburg: care coordinators; FOD Volksgezondheid: discharge management and clinical pharmacy; Vlaams patiëntenplatform / LUSS (Ligue des Usagers des Services de Santé): patients; RIZIV/INAMI (Rijksinstituut voor ziekte- en invaliditeitsverzekering / Institut national d'assurance maladie-invalidité). Two additional interviews were conducted with members of unions of medical specialists (VBS/GBS).

This composition allowed to investigate the feasibility of the proposed initiatives from a policy perspective.

6.1.2.3 Sampling procedure

In each selected region (see table below), a hospital was the starting point for participant sampling for the focus groups with HCPs. Hospitals were chosen as a starting point because there is an operational structure (e.g. steering group, discharge management team) having contact with all sectors of health care (the hospital, GPs, nursing homes, pharmacists etc.). The selection of the hospitals was based on the condition that the hospital and surrounding ambulatory care practices had no or limited experience with seamless care initiatives focusing on medication, as the ideas of experts in the field were inventoried in chapter 6.

A good mix of rather rural versus urban, and teaching versus non-teaching hospitals was set up in order to make sure that all types of problems and solutions would be inventoried.

In an initial phase, discharge managers of the selected hospitals were contacted to present the research objectives and methodology, and to ask for possible participation. Further contacts were further made with the hospital management. In close collaboration with the contact persons at the different sites, possible names of representatives of the different disciplines were listed. Attendees were invited through the contact persons of the participating hospitals and/or by a member of the research team. According to the local structure and organisation either the contact person of the hospital or a member of the research team monitored the confirmation of attendance of the different disciplines. The invitation process started at the end of October 2009.

For the focus groups with stakeholders, contact persons of the before mentioned organisations were summoned by the coordinator of this part of the project (JDL; invitation letters: see Appendix 5.2). Stakeholders could indicate their preference for one of two dates and times; confirmation of attendance for both focus groups was monitored by JDL.

All attendees received a gift voucher of € 30 as a reward for their participation.

6.1.3 Running the focus groups

The groups with HCPs were run by a moderator (JDL) and a co-moderator (AS for French focus groups; VF for Dutch focus groups), who also collected illustrative fragments. For the French speaking focus groups, AS and VL made observations and took notes; FD and VF performed these tasks in the Dutch speaking focus groups. Observations and notes were taken on a laptop using the grid of the topic guide.

The focus groups with stakeholders were run by a moderator (JDL) and a co-moderator (VF), who also summarized the ideas in a slide presentation that was used to structure the discussion. FD, VL and AS took notes and made observations.

In the introduction, participants were welcomed by the moderator. Moderator, co-moderator and observer presented themselves to the participants and clarified their role during the focus group. The moderator explained the objectives and the procedure of the focus group.

Participants were asked to sign an informed consent.

A slide presentation (Dutch and/or French for the focus groups with HCPs; English for the focus groups with stakeholders) was used to guide the participants through the different questions of the topic guide (see 1.2.5). For each consecutive question, every participant was first asked to write down his / her own ideas on a form. Subsequently, the moderator started by asking all participants to present their ideas. This was followed by clarification and discussion on the topic by all participants.

For the second focus group with stakeholders, participants were sent some documents by e-mail two days before the meeting, in order to be able to prepare the focus group and make the meeting more efficient. In an accompanying message, they were explained the aim of the focus group, and what preparation from them would fruit the discussion. The same process was applied for the two additional one-to-one interviews.

At the end of all the focus groups, participants were asked to hand in their notes.

All focus groups were tape digitally recorded. All data were handled anonymously.

6.1.4 Topic guide

6.1.4.1 Development of the topic guide

Two topic guides were developed by the research team: one for the focus groups with health care professionals, and one for the focus groups with stakeholders.

Focus groups with healthcare professionals

Themes for the focus groups with HCP were delineated from previous parts in the research project. Open ended questions were chosen, as this type of questions demands for more description and explanation of the participants (Krueger RA, Casey MA. Focus groups. A practical guide for applied research. 3rd edition. California: Sage Publications Inc.; 2000; 215p)

Questions related to 1) problems experienced by participants; 2) solutions highlighted 3) opinion on six key elements of medication management at transition moments, as defined in the Australian guidelines (http://www.health.gov.au/internet/main/publishing.nsf/Content/4182D79CFCB23CA2CA25738E001B94C2/$File/guiding.pdf) proposed initiatives; 4) ideas on which health care professional should coordinate medication management; 5) selection of priorities; 6) barriers, facilitators and prerequisites for the implementation of a top-3 of solutions and 7) prerequisites and preferred target groups for implementation. The complete topic guide is displayed below.

1	Please present yourself (name, professional activities, affiliation with the hospital,…). If you previously or currently participate in seamless care initiatives, please mention briefly.	10 min (10')
2 Introductory question	From your professional point of view, which problems related to drug therapy do you encounter when patients are transferred from one care setting to another? *Please write down on the form you received.* Can each of you report the most important problem you identified?	10 min (25')
3 Transition question	In order to optimize this process, a) what kind of information would you like to receive from other health care professionals, and b) what kind of information can you deliver to others? *Please write down on the form you received.*	10 min (33')
4 Key question	Which solutions do you propose to answer the identified needs (question 2 and 3)? *Please write down on the form you received.*	20 min (53')
5	From previous parts in this research project, different strategies were identified to prevent or minimize drug related problems at transition moments. We would like to discuss several of them with you and ask your opinion on their feasibility (barriers and facilitators).	
5.1 Transition question	From the literature, we identified the following critical steps in medication management: accurate medication history; assessment of current medication management; medication action plan; supply of medicines information to patients; ongoing access to medicines; communicating medicines information. Are these steps familiar to you? Which other steps would you identify? *Please write down on the form you received.*	5 min (58')
5.2 Key question	There seems to be a need for coordination of this process of medication management. According to your opinion, what kind of HCP could, and should, perform this task? *Please write down on the form you received.* To what extent could a clinical pharmacist perform this task?	13 min (71')
5.3 Key question	What kind of technical support systems are needed to support your role and/or the role of the coordinator in medication management at transition moments? What are the characteristics of these systems? *Please write down on the form you received.*	16 min (84')
6 Transition question	From the elements discussed before, what actions need priority? *Please list your top three.*	8 min (92')
7 Key question	In order to implement the priorities, what are Barriers? Facilitators? Prerequisites? *Please write down on the form you received.*	15 min (107')
8 Key question	According to your opinion, which profiles of patients need priority and would benefit most from these interventions? *Please write down on the form you received.*	8 min (115')
9 Concluding question	What would you like to add to this discussion that was not covered by previous questions?	5 min (120')

Focus groups with stakeholders

Themes for the focus groups with stakeholders were identified from the focus groups with the health care professionals. Questions related to 1) problems highlighted by the HCPs; 2) initiatives taken by professional organisations; 3) solutions mentioned in focus groups with HCPs; 4) barriers, facilitators and prerequisites for the implementation of a selection of these solutions (see procedure) and 5) ideas on further steps to be taken in order to enhance seamless care.

The complete topic guide is displayed below.

1Opening question	Please present yourself (name, professional activities, professional organisation,…).	5 min (5')
2 Introductory question	From the first round of nine focus groups with people from the field, we identified the following problems. Which of these problems are known **within your professional organization**? *Please tick on the form you received.* Can each of you give an overview of the problems you ticked?	12 min (17')
3 Transition question	Which of these problems are you currently working on in your professional organization? *Please tick on the form you received.* Can each of you give an overview of the problems you are working on?	5 min (22')
4 Key question	Please clarify briefly how you tackle these problems. What kind of solution are you working on? Which phase (concept phase / pilot / implemented)? Any partners?	15 min (37')
5	From the literature, we identified the following critical steps in medication management: accurate medication history; assessment of current medication management; medication action plan; supply of medicines information to patients; ongoing access to medicines; communicating medicines information. (see information under 1.3; will be summarized and presented in a Figure on slide) These steps seem to fit well with the problems encountered and expectations of the people in the field regarding good medication management. Consequently, solutions should support the implementation of these steps.	3' (40')
5.1 Key question	This is a list of solutions that were identified by people in the field during the previous focus groups. To your opinion (professional organization!), which solutions would have the largest impact on medication management at transition moments? Why? Which solutions are feasible? Which barriers, facilitators and prerequisites do you identify? *Please indicate on the form you received.*	35 min (75')
5.2 Key question	For the problems identified, do you see other solutions than those listed? *Please write down on the form you received.*	10 min (85')
6 Key question	From the elements discussed before, which solutions would you support from your professional organisation? Why or why not?	10 min (95')
7 Key question	How to proceed? Who should take leadership in the development of seamless care: At national level? At local / practice level?	10 min (105')
8 Concluding question	What would you like to add to this discussion that was not covered by previous questions?	5 min (110')

6.1.5 Data analysis

Data analysis started from the notes taken during the focus groups. . Given the short time span, verbatim transcription of the focus groups and in-depth text-based analysis was not feasible.

A framework analysis approach was applied. This analysis is suited for policy research: the objectives of the investigation are set in advance and shaped by the information requirements of the project. Besides, it allows analyzing issues raised from the respondents themselves and views or experiences that recur in the data (Pope C, Mays N. Qualitative research in health care. Third ed. Oxford: Blackwell Publishing; 2006; 156p.)

After each focus group, the research team (moderator, co-moderator and observer) resumed and discussed the main themes emerging from the focus group, to list the problems and solutions mentioned and to discuss the most striking impressions and results. The observers of each group merged their observations and notes to one unique text file.

In a first round, one researcher (JDL) coded the items as they appeared in the unique observation files. When a code was present, it was marked with a cross in a summarizing file, generating a semi-quantitative overview of the codes. This summarizing file was composed in English, in order to facilitate joint coding from the Dutch and French observation files.

When something was unclear, the personal notes of the participants were manually reviewed and audiotapes were consulted.

Two overview files of respectively all problems and all solutions were composed after the last focus group with HCPs, and were structured according to either the specific part of the transition process or the characteristics of the problem / solution. The codes were reviewed, regrouped and clustered (JDL, VF, FD).These files served as the main documents to be discussed during the focus groups with stakeholders.

In a second round of analyzing the data, the observation files of each of the focus groups with HCPs were re-read and coded using the numbering in the problems' and solutions' file respectively. For each of the problems / solutions identified, it was indicated who of the HCPs mentioned the respective item, and, if appropriate, quotes were added to the coding document. These quotes (which were in Dutch or French), were later on translated in English. For the solutions, also the barriers, facilitators and prerequisites were listed. The latter analysis was limited to the solutions that were at least in one of the focus group mentioned as a 'top 3' solution, i.e. a solution for which most of the participants agreed that it needed priority. Coding was done by FD for the focus groups in Dutch and the focus group in Brussels. VF checked the codes; final allocations were decided in consensus. VL and AS coded the observation files of the French focus groups.

6.2 RESULTS

6.2.1 Description of the focus groups

Between mid-December 2009 and the beginning of February 2010, eleven focus groups were performed: nine focus groups with health care professionals, two with stakeholders. On average the groups lasted the planned two hours.

Overview of the groups

N°	Date	Location	Language	Participants
FG1	16/12/2009	Charleroi	French	HCPs
FG2	16/12/2009	Ieper	Dutch	HCPs
FG3	05/01/2010	Duffel	Dutch	HCPs
FG4	07/01/2010	Eeklo	Dutch	HCPs
FG5	08/01/2010	Ottignies	French	HCPs
FG6	14/01/2010	Liège	French	HCPs
FG7	15/01/2010	Genk	Dutch	HCPs
FG8	21/01/2010	Libramont	French	HCPs
FG9	28/01/2010	Brussels	Dutch/French	HCPs
FG10	02/02/2010	Brussels	Dutch/French	Stakeholders
FG11	04/02/2010	Brussels	Dutch/French	Stakeholders

In total 100 persons were involved in 11 groups, 47 women (47.0%) and 53 men (53.0%). Forty (40.0%) participants were French speaking, 60 (60.0%) were Dutch speaking. All the aforementioned disciplines were present in most focus groups.

6.2.1.1 Composition of the groups with HCPs and patient representatives

The composition of the HCPs groups is provided below.

Participants	**FG1**	**FG2**	**FG3**	**FG4**	**FG5**	**FG6**	**FG7**	**FG8**	**FG9**	**Total**
Care coordinator (CC)		1		2			3		2	**8**
Community pharmacist (CP)	1	3	1	1	1		1		1	**9**
Discharge manager (DM)	1		1		1	1				**4**
General practitioner (GP)	2	2	1	1	1	1	2	1	1	**12**
Home nurse (HN)	1	1	1	1	1		2	1	1	**9**
Hospital pharmacist (HP)	1	1	1	1	1	1	1	1	1	**9**
Patient/Carer (P)	1	1	1	1	1	1	1	1	1	**9**
Specialized physician (SP) *-Geriatrics* *-Nephrology* *- Cardiology* *-Hygienist* *-Psychiatry*	*1*	*1*	*1*	*1*	*1* *1* *1* *1*	*1*	*1*	*1*		**11**
Ward Nurse (WN)	1	2		1	1	1		1	1	**8**
Home assistance (HA) *Nursing home manager (NM)* *Social service (SS)*		*1* *1* *1*				*1*		*1*		***1*** ***1*** ***3***
Number of participants	**9**	**15**	**7**	**9**	**11**	**7**	**11**	**7**	**8**	**84**

Three of the 12 GPs were also GP coordinators in a nursing home. In some focus groups, the care coordinator worked part time in social service or as ward nurse. Their opinion on the topics discussed was therefore based on both experiences. In one Flemish group the patient perspective was presented by a GP who discussed the experiences of five written patient cases from his practice. In one French-speaking group the patient perspective was presented by a member of a patient association.

The community pharmacist was lacking in FG 6 due to a car accident on the way to the meeting. He commented later on the observation file of the respective group. In FG 8 the community pharmacist was not present due to unexpected circumstances. An indirect input from a community pharmacist was provided by the hospital pharmacist, whose wife was a community pharmacist. He therefore commented from both perspectives. In one Flemish focus group the ward nurse was not present due to unexpected admission of patients.

6.2.1.2 Composition of the focus groups with stakeholders

The composition of the stakeholders' focus groups is shown in the table below.

Representatives of	**FG10**	**FG11**	**Total**
Care coordinators		1	**1**
Community pharmacists	1		**1**
General practitioners	2	2	**4**
Geriatricians	1	1	**2**
FOD	1		**1**
Home nurses	1		**1**
Hospital pharmacists	1	2	**3**
Patients	1	1	**2**
RIZIV / INAMI		1	**1**
Number of participants	**8**	**8**	**16**

As explained above, the two additional one-to-one interviews were conducted with specialists in internal medicine.

6.2.2 List of all participants

Locatie focus group	**Naam**	**Voornaam**	**Functie/Titel**
Ieper	Catteeuw	Chantal	Ward nurse
Ieper	Leroy	Viviane	community pharmacist
Ieper	Lauwers	Eveline	hospital pharmacist
Ieper	Wyseur	Patrick	GP
Ieper	Caenepeel	Emmely	social service
Ieper	Coeman	Carine	home nurse
Ieper	Demeyer	Danny	specialist geriatrician
Ieper	Lecluyse	Lieve	patient/patient/carer/ patient representative
Ieper	Vandewal	Jacques	community pharmacist
Ieper	Vervisch	Pieter	community pharmacist
Ieper	Vandeale	Hendrik	Ward nurse
Ieper	Vulsteke	Jef	GP
Ieper	Maerten	Johan	care coordinator
Ieper	Hemelsoen	Hilde	hospital direction
Ieper	Vandeputte	Hilde	home assistance
Duffel	Reyntjens	Wim	GP
Duffel	Verheyen	Lore	home nurse
Duffel	Peeters	Martine	care coordinator

Duffel	Mergaerts	Patricia	patient/patient/carer/ patient representative
Duffel	Van Dijck	Herwig	hospital direction
Duffel	De Schepper	Marc	hospital pharmacist
Duffel	Smeets	Tom	community pharmacist
Eeklo	Lievens	Christine	community pharmacist
Eeklo	De Schrijver	Marianne	patient/patient/carer/ patient representative
Eeklo	Baeyens	Hilde	specialist geriatrician
Eeklo	Van Rossom	Agnes	care coordinator
Eeklo	Bulcaen	Sandrine	Ward nurse
Eeklo	Snoeck	Leen	hospital pharmacist
Eeklo	Mouton	Petra	home nurse
Eeklo	Van Wonterghem	Jo	GP
Eeklo	Apers	Odri	care coordinator
Charleroi	Rochet	Jean Francois	coordinator GP nursing home
Charleroi	Blanche	Jean Louis	community pharmacist
Charleroi	Fevrier	Dominique	home nurse
Charleroi	Godart	Frederique	discharge manager
Charleroi	Tenheede	Franz	patient/patient/carer/ patient representative
Charleroi	Eloy	Maryvonne	care coordinator
Charleroi	Kenguitameze	Joseph	specialist geriatrician
Charleroi	Geniesse	Christian	coordinator GP nursing home
Charleroi	Douchamps	Jacques	Hospital pharmacist
Ottignies	Gillain	Benoit	specialist psychiatrist
Ottignies	Lemaire	Monique	hospital pharmacist
Ottignies	Dehopre	Stéphanie	Ward nurse
Ottignies	Bernard	Xavier	specialist cardiology
Ottignies	Peneff	Brigitte	home nurse
Ottignies	Vandendorpe	Jean Marie	patient/patient/carer/ patient representative
Ottignies	Crutzen	Luc	community pharmacist
Ottignies	De Waele	Jean Francois	discharge manager
Ottignies	Wauthier	Michel	specialist nefrologist
Ottignies	Luyx	Catherine	specialist geriatrician
Ottignies	Bleeckx	Alain-François	GP
Genk	Dillen	Geert	care coordinator
Genk	Christa	Gilissen	hospital pharmacist
Genk	Kindt	Inge	home nurse
Genk	Martens	Marc	patient/patient/carer/ patient representative
Genk	Vandeweerd	Dirk	coordinator GP nursing home
Genk	Vansloen	Marc	home nurse
Genk	Voets	An	care coordinator
Genk	Maesen	Viviane	care coordinator
Genk	Quintiens	Eddy	community pharmacist
Genk	Van Loon	Ronny	specialist geriatrician
Genk	Vanhoof	Jos	GP
Liège	lambert	pascale	social service
Liège	Boüüart	Corinne	GP
Liège	Peterman	Jean	specialist geriatrician

Liège	Samalea	Audrey	hospital pharmacist
Liège	Bouvanger	jean marie	Ward nurse
Liège	Fierens	Micky	patient/patient/carer/ patient representative
Liège	Mathurin		social service
Libramont	Juckler	Jean Paul	hospital pharmacist
Libramont	Thiry	Myriam	GP
Libramont	Deneffe	Marylene	Ward nurse
Libramont	Gilles	Christian	specialist psychiatrist
Libramont	Henin	Frederic	home nurse
Libramont	Zigrand	M	patient/patient/carer/ patient representative
Libramont	Slachmuylders	anne	social service
Brussel	Arnout	Liesbet	hospital pharmacist
Brussel	De Smet	Willy	home nurse
Brussel	Louwagie	Erika	care coordinator
Brussel	Aeyels	Daan	care coordinator
Brussel	Geens	Florimond	patient/patient/carer/ patient representative
Brussel	Croon	Jos	Ward nurse
Brussel	Clément	Nathalie	community pharmacist
Brussel	Vanhalewyn	Michel	GP
Bru stakeholder 1	Jehaes	Michel	stakeholder coordinator gp nursing home
Bru stakeholder 1	Deneyer	Hilde	stakeholder pharmacy community
Bru stakeholder 1	Even-Adin	Danniele	stakeholder pharmacy hospital
Bru stakeholder 1	Petrovic	Mirko	stakeholder specialist geriatrician
Bru stakeholder 1	Paquay	Louis	stakeholder home nurse
Bru stakeholder 1	Dewez	Evelyne	stakeholder patient
Bru stakeholder 1	Vanden Bremt	Irene	stakeholder fod
Bru stakeholder 1	Vandevoorde	Jan	stakeholder GP
Bru stakeholder 2	Baeyens	Stéphane	stakeholder GP
Bru stakeholder 2	van Meer	Nele	Stakeholder home care coordinator
Bru stakeholder 2	Boland	Benoit	stakeholder specialist
Bru stakeholder 2	De Swaef	André	stakeholder pharmacy
Bru stakeholder 2	Faelens	Rudy	stakeholder coordinator gp nursing home
Bru stakeholder 2	Van Beek	Frank	stakeholder pharmacy
Bru stakeholder 2	Bruyninckx	Klaartje	stakeholder patient
Bru stakeholder 2	Willems	ludo	stakeholder pharmacy

6.3 LISTS OF IDENTIFIED PROBLEMS AND SOLUTIONS, USED DURING FOCUS GROUPS WITH STAKEHOLDERS

- indication of the groups in which the respective problems or solutions were mentioned, and some illustrative quotes

6.3.1 Overview of problems

	Problems identified	FG1	FG2	FG3	FG4	FG5	FG6	FG7	FG8	FG9	Quotes
A	**AT ADMISSION**										
A1	No medication list		X	X		X		X	X	X	*FG2/GP: 'Patients often don't know what they take'* *FG9/P: 'I went to the hospital for a one day procedure. Due to adverse events, I had to stay overnight. Nobody knew my medication list'*
A2	Incomplete medication list: no auto-medication, no OTC, no supplements, no details on patient-specific preparations	X	X	X	X		X	X	X	X	*FG2/CP: 'Sleeping tablets are not mentioned as well as eye drops. The latter ones are not seen as medication'* *FG4/WN: 'When I ask people their list, I get a wrinkled sheet of paper.'*
A3	Incomplete data on medication in medication list: no dose, no specifications on galenic form, no indication, no exact time of intake		X		X	X		X	X		*FG4/SP: 'For anti-coagulants, it is mentioned "dosage: see scheme". But there is no scheme!'*
A4	Lack of information on indication of (prescribed) medicines			X	X			X	X		*FG4/SP: 'There is often no clear information about the indication for a drug, which hinders our decisions.'*
A5	Confusion and little information about generic products	X		X		X				X	*FG3/HP: 'At admission patients talk about "docX" or "a red box". Often a lot of information is missing.'*
A6	Energy and time needed to get insight in patients medications list (phone call to GP, family, community pharmacist, nursing home,...)	X		X	X		X	X	X	X	*FG3/DM: 'At admission we ask the patient and the family and often there is a discrepancy. What do patients know and what do they want to tell?'* *FG7/S 'The files of home nurses are never in accordance with reality.'*
A7	At emergency admission: no information at all					X					*FG5/SP: 'For patients being admitted to the cardiology unit and the emergency departments, we often have no information at all.'*
B	**AT DISCHARGE**										
B1	No contact between hospital and GP to prepare or communicate on discharge					X	X		X		*FG6/GP: 'Another problem is that we are not informed in time so we can't arrange ourselves in an adequate way'*
B2	Timing: discharge at Friday afternoon causes problems	X	X	X		X	X	X	X	X	*FG3/HN: 'There are still many discharges on Fridays. A lot of patients are dependent on other people to go to the pharmacist. If*

											nobody comes on Monday, they are often lacking medication.'
B3	Discharge medication for three days: often not given to patients (as to obtain cost savings on the hospital level); for some patients / situations too little	X	X	X	X	X	X			X	*FG3/HP: 'Due to the medication forfait in hospitals, the budget is limited. Every euro has to be questioned, causing problems of availability.'*
B4	Discordance between different pieces of information, errors and inconsistencies between drugs on the medication list and drugs given to the patient at discharge	X	X	X	X	X	X	X			*FG2/HN: 'It is difficult for home nurses to prepare the medicines if other names than in the file are on the packages.'* *FG7/GP: 'The doses are often not in concordance, e.g. insulin dosage'*
B5	Lack of information for primary care HCPs and patients (e.g. reasons for change; new medicines;...)	X		X	X	X	X	X	X	X	*FG2/NM: 'Discharge information is often missing or not complete.'* *FG6/GP: 'The community pharmacist is not enough involved in the discharge process.'* *FG7/P: 'Especially at discharge from emergency department: documents not readable, hand written.'* *FG8/HN: 'It is important to have explanations about the monitoring of adverse effects.'* *FG8/SP 'We need to explain to our colleagues the reason for starting or stopping some medications, the reasons for modifications.'*
B6	Quite some work for HCPs to compose correct medication list for patient	X		X	X	X				X	*FG3/CP: 'At discharge is a lot of work for us, community pharmacists. We succeed to support the patient, but it remains difficult. It can't be done by the assistant. The pharmacist himself has to do it. And it is even a bigger problem for pharmacists on duty who do not know the patient.'*
B7	Chapter 4 drugs: unclear information about attestation (Eligibility patient? Administrative process started?)	X	X	X	X	X	X	X	X	X	*FG2.SP: 'Bf/chapter 4 drugs are not prescribed in hospitals but they are prescribed in primary care. Nobody knows where the information is.'* *FG7/CP 'For example people with acid inhibitors for Alzheimer's disease: they don't' know if the procedure has already been started'*
B8	Difficulties for primary care HCPs to reach HCPs in the hospital	X									
B9	Availability of drugs: hospital-limited delivery; no availability in Belgium	X					X	X	X	X	*FG8/HP: 'Some drugs are difficult to have access to for the community pharmacist.'*
B10	No transmission of information on medicines given on day care wards (e.g. oncology)			X							*FG3/HP: When the day care centres don't give information, the data are not complete'.*
B 11	Modification of drugs due to hospital formulary that are not changed back at discharge	X				X	X		X		*FG1/ GP and FG5/SP: 'Even when the same product is used, the name changes and they don't switch it again at discharge'* *FG6/GP: 'It happens often that a patient has the same medication*

											twice.'
C	**AS TO PROFESSIONS**										
C1	GP has other ideas about indication than specialist (e.g. anti dementia drugs)								X		*FG2/GP: I don' twant to contradict the specialist, so I continu even if I don't agree with it'*
C2	Hospital pharmacist doesn't meet the patient			X	X						
C3	Assistance of patients in their medication management (including administration), is not reimbursed.				X				X	X	*FG4/HN: 'It is not the nurses' task to go to the pharmacy.'*
C4	HCPs do not succeed in keeping an up to date medication list of their patients			X	X			X		X	*FG3/GP: 'We try to keep the files up to date; but it is difficult.'* *FG4/GP: 'For acute medication it is more difficult to keep everything up to date'* *FG5/SP: 'Even in a dialysis centre where we see the patient three times a week and do a review every month, we miss information, due to changes by the patient himself'*
D	**AS TO PATIENTS AND FAMILY**										
D1	Lack of knowledge on medicines		X	X	X		X	X		X	*FG1/CC: 'The patients often don't know what they take and often they take drugs that are over date'.*
D2	Lack of education by HCPs on medicines		X	X			X	X	X	X	*FG3/P: 'There is lack of time to explain it to the patient. "Ask your GP" they say. You get your drugs in a plastic bag.'* *FG6/P: 'Very soon they think the patient wouldn't understand. First of all take the patient as a responsible person.'*
D3	Uncertainty about patient compliance		X	X	X		X				*FG2/GP: 'Do patients take their drugs as they are supposed to do?'* *FG4/WN: 'We see that Parkinson medication very often is taken the wrong way.'*
D4	Inability to handle drugs (cognitive dysfunction; blister handling; vision impairment) and manage therapy		X	X	X		X	X	X	X	*FG3/P: 'One should be attentive to small disturbances: hearing and vision problems'* *FD2/SS: 'I question whether the patient is sufficiently independent to take the drugs.'* *FG4/HN: 'For some patients we prepare the medication once a week, for others three times a day. This has important financial consequences.'*
D5	Shopping by patients, both at physicians' and pharmacists' level				X				X		*FG8/WN: 'When people have two general practicioners, it is difficult to have accurate information.'*
D6	Changing of drugs by patients, without intervention of a physician	X	X			X					*FG2/ HN 'Patients decide themselves what they take or not. They throw away or add themselves'.*
E	**PROCESSES**										
E1	Loyalty to laws and regulations (GPs are forced			X	X	X	X	X	X		*FG3/SP: 'The hospitals receive a forfait based on the national*

	to prescribe drugs at the lowest cost for society; specialists' choice is driven by formulary of the hospital)										*average consumption. And every year the average goes down. This is causing problems.'* *FG4/GP: 'It is strange that GPs can prescribe everything and that specialists are restricted.'*
E2	Broad offer of generic products on the Belgian market, causing frequent switches between products (including generic – originator switches)			X				X			*FG3/SP: 'We use a formulary at the hospital and are obliged, by pressure of outside the hospital, to use X and Y. Therefore we don't understand each other anymore. We need to apply the formulary outside the hospital as well.* *FG7/CP: 'Why do the names of generics change every two months?'*
E3	Drug substitution (by all HCPs)	X	X	X	X			X		X	*FG2/GP: 'Drug substitution causes problems: patients do not know that drugs are the same. This can lead to mistakes'*
E4	Documents (prescriptions, medication lists,...) not readable and/or not understandable		X	X	X			X	X	X	*FG2/HN 'Tables for professionals are not understandable for patients.'* *FG7/HN 'Different ways of coding schemes between hospital and home care'*
E5	No electronic prescription at the hospital					X					
F	**MISCELLANEOUS**										
F1	Patients can take their drugs themselves, causing fear and double use (automedication)									X	

6.3.2 Overview of solutions

	Solutions identified	FG1	FG2	FG3	FG4	FG5	FG6	FG7	FG8	FG9	Quotes
A	**Sensitisation AND/OR REGULATION**										
A1	National campaign: inform the public on the problems (cfr. overuse of antibiotics and sleep medication), and encourage people to take their role in order to minimize these problems				X			X			
A2	Encourage patients to bring their medicines on admission, in order to improve and to ease medication history taking		X		X			X		X	*FG9/HP: 'We have a small project using a 'small bag It works.'*
A3	Oblige hospitals to deliver drugs at discharge and to apply existing regulations				X	X	X		X	X	*FG9/CC: 'The hospital direction has financial incentives not to do so*
B	**Small technology and standardisation**										
B1	Up to date (paper-based or electronic) medication list / plan, including a logbook of changes and reasons for modifications, contact details of HCPs,... If possible, (national) standardised form.		X	X	X	X	X	X	X	X	*FG3/HN: 'At home you don't have anything. I should already be pleased when it is on paper.'* *FG4/HP: 'When substitution is performed, give a clear message about conversions/'.* *FG7/CC: "It would be easier if all schemes would be the same (any hospital, any department)"*
B2	Accurate list of medicines, to be carried and managed by the patient (paper-based or electronic, e.g. on SIS card or ID card)	X	X	X	X	X	X	X	X	X	*FG4/GP: 'Make the patient also responsible to bring an up-to-date medication list* *FG4/P: 'For me it is logic to give my SIS card, it is like your bank card.'* *FG5/CP: 'It supposes that every professional completes the card.'* *FG9/CC: 'The patient's role in the management is underestimated. Patient information carier is a pragmatic alternative waiting for an electronic platform'"*
B3	Standardized referral letter to be used from primary care to secondary care				X		X	X	X	X	*FG6/GP: 'GP's should use a standardised referral letter"* *FG4/HN: "We need an up-to-date info from home to hospital including who is involved as HCP's"* *FG7/CP: "Give medication history of the past 6 months"*
B4	Discharge file with all relevant documents for patients and HCPs (from specialist to	X	X	X		X			X	X	*FG1/NM: 'We need dosage, when it has to be taken and when they got it the last time in the hospital.'*

	GP, from hospital pharmacist to community pharmacist, from ward nurse to home care nurse,….)										
B5	Uniform regional drug formulary			X							*FG3/SP: 'We need a standardisation of drug formulary between hospital and nursing home.'*
C	**Technical support (IT)**										
C1	Centralised national electronic database with all information on all **drugs** (+related products) delivered to patients, whatever the setting of care – if patient consents	X	X		X			X			*FG7/P: "So that there is only one list. Then patient do not have to take care of this"*
C2	Centralised electronic **medical** file (standardised, protected), accessible by different HCPs, whatever the setting of care – if patient consents		X					X	X		*FG7/CP:"Medication history should be seen by every caregiver, for example, the GP could check which generic has been prescribed"*
C3	Centralized national electronic patient file, including **medical**, **pharmaceutical, care and social information,** whatever the setting of care – if patient consents	X	X	X	X		X	X		X	*FG3/DM: 'We need an extramural electronic file so we don't need to be detectives.'* *FG4/GP: 'We need good electronic systems with the use of KHMEHR (computerised medical health record)'* *FG6/GP: 'The hierarchy and access must be well developed.'* *FG3/HP: "Data should be collected somewhere. There are so many details, which can be simply joined together"* *FG1/GP: "We don't accept that data are exchanged via internet or mails because they are not protected"*
C4	Electronic prescribing in hospitals, facilitating appropriate prescribing and administration procedures for reimbursement of drugs		X	X		X	X	X	X	X	*FG2/HN: 'At discharge: an electronic module that allows us to go back to the original drug a patient is taking can avoid double intake.'* *FG5/SP: "Pending clinical pharmacists, we should have the electronic prescription with logiciels of interactions"*
C5	Database with contact details for HCPs in primary and secondary care					X	X			X	
C6	On-line and real-time available procedures for chapter 4 drugs				X	X		X			*FG4/SP: About procedures for chapter 4 drugs, "if we now simply electronically could do it..."*
D	**New nomenclature**										
D1	Assistance of patients in their medication management (e.g. for home care nurses)	X	X	X	X			X	X	X	*FG8/SS: "For patients whose cognitive functions are impaired, someone has to prepare medicines at home but this is not included in the nomenclature INAMI of nurses"* *FG9/HN: "There is no nomenclature for nurses to manage*

											medication: we have to do something else, for example wash the patient"
D2	Fully reimbursed visit by the GP for patients post-discharge (2-3 days) in the third payer system	X	X	X	X				X		*FG3/GP: 'The hospital must advice the patient to call his GP.'*
D3	Therapeutic education for patients	X		X	X	X	X	X		X	*FG2/SP: 'ICT installs correctness of the information but not necessary correct transmission of information to the patient.'* *FG4/P: 'Why is this drug prescribed? What are the adverse effects?'* *FG5/P: 'Information of the patient is the most important you can automate everything you want, if you do not convince me of the relevance I do not take the medicine.'"*
E	**TRANSITION process**										
E1	Clinical pharmacy (e.g. standardized drug history taking).	X	X	X			X			X	*FG8/SP: "We need the expertise of a clinical pharmacist"*
E2	Contact between the hospital and primary care HCPs shortly before discharge to discuss relevant information			X		X		X	X	X	*FG2/GP: 'I want to discuss on beforehand with the specialist why some drugs are prescribed.'* *FG4/SP: "It should be necessary to consult with the specialist who has prescribed a generic medicine* *FG3/HN: "It would be nice if all dependant patients are systematically followed by the social service, which then can make contact with home and hospital" "*
E3	Discourage discharges later than 3pm on Fridays as well as over the week-end, unless this was planned in advance and/or follow-up care is organized		X	X	X		X		X		*FG8/HN: "When patient returns home on Friday and Saturday, for certain types of drugs not necessarily available in pharmacies, difficulty for these people to continue their treatment without stopping."*
E4	Medication discharge plan sent to community pharmacist, GP and home care nurse, upon discharge	X				X	X			X	*FG1/GP: 'We want that the specialist specifies what must be followed-up, especially in oncology"*
F	**GENERAL PROCESSES**										
F1	Reduction of administrative workload (e.g. attestation,...)			X	X						
F2	Reduction of range of generic products on Belgian market			X	X			X			*FG7/P: "Why not only 1 generic for each medicine with the same dose, name, color and box.We need the same size and color for tablets of the same product."*
F3	Use substance names for drug prescribing (DCI / Voorschrift op stofnaam)						X	X			*FG2/SP: "Allow community pharmacists to chose the appropriate brand for a patient to support continuity"'*

F4	Local consultation to enhance cooperation between settings of care and between HCPs (micro- and meso-level).			X	X	X	X	X	X	X	*FG7/P: 'As a patient I want to give a central role to the GP because he knows the antecedents. GP should be central and also an intermediary person. Much more communication is needed'* *FG8/WN: 'ICT can regulate many things but not all: each HCP has to explain his approach'* *FG4/SP: "It would be good to involve the specialist, GP, pharmacists to discuss what to do while incompatibilities"*
G	**Extra**										
	Hospital practitioners					X					
	Perform discharge management			X							
	Fixed 'chaperon' for patient during hospitalisation			X							
	Coordination of care at home and in the hospital			X							
	Transmural care									X	
	Enhance the communication process							X			
	Cahier de liason								X		
	Obligatory registration with GP and ambulatory pharmacy							X		X	
	Taking social factors in mind			X							
	Medical specialist should also prescribe generic products							X			
	Generic products, whatever the name, the same size and colour									X	
	Medication review every year				X						
	Readable information leaflets				X						

7 APPENDIX CHAPTER 9. PERSONS INTERVIEWED DURING THE PREPARATION OF THE CONCLUSIONS

- F. Robben, eHealth
- Prof. Dr. Ir. M. Nyssen, VUB, Recip-e
- Dr. J. De Vlies, Prorec and E-prescribe
- A. De Swaef, RIZIV-INAMI

8 BIBLIOGRAPHY OF APPENDICIES

1. Annemans L, Boeckxstaens P, Borgermans L, De Smedt D, Duchesnes C, Heyrman J, et al. Avantages, d,savantages et faisabilit, de l'introduction de programmes "P4Q" en Belgique. Health Services Research (HSR). Bruxelles: Centre f,d,ral d'expertise des soins de sant, (KCE). 2009. KCE Reports 118 B. D/2009/10.273/51. 2009.
2. Bayoumi I, Howard M, Holbrook AM, Schabort I. Interventions to improve medication reconciliation in primary care. Ann.Pharmacother. 2009;43(10):1667-75.
3. Ellitt GR, Brien JA, Aslani P, Chen TF. Quality patient care and pharmacists' role in its continuity--a systematic review. Ann.Pharmacother. 2009;43(4):677-91.
4. Kaboli PJ, Hoth AB, McClimon BJ, Schnipper JL. Clinical pharmacists and inpatient medical care: a systematic review. Arch.Intern.Med. 2006;166(9):955-64.
5. McLeod SE, Lum E, Mitchell C. Value of medication reconciliation in reducing medication errors on admission to hospital. J Pharm Pract Research. 2008;38(3):196-9.
6. Mistiaen P, Poot E. Telephone follow-up, initiated by a hospital-based health professional, for postdischarge problems in patients discharged from hospital to home. Cochrane.Database.Syst.Rev. 2006(4):CD004510.
7. Shepperd S, Doll H, Broad J, Gladman J, Iliffe S, Langhorne P, et al. Early discharge hospital at home. Cochrane.Database.Syst.Rev. 2009(1):CD000356.
8. Wright J, Emerson A, Stephens M, Lennan E. Hospital inpatient self-administration of medicine programmes: a critical literature review. Pharm World Sci. 2006;28(3):140-51.
9. Drummond M, Sculpher MJ, Torrance GW, O'Brien BJ, Stoddart GL. Methods for the economic evaluation of health care programmes. Oxford: Oxford University Press; 2005.
10. The Audit Commission. A spoonful of sugar - medicines management in nhs hospitals. London: The Audit Commission; 2001. Available from: internal-pdf://nrspoonfulsugar-2001-0821428992/nrspoonfulsugar-2001.pdf internal-pdf://brspoonfulsugar-2001-2113280256/brspoonfulsugar-2001.pdf
11. The Audit Commission. Acute hospital portfolio: review of national findings : medicines management. London: The Audit Commission; 2002. Available from: internal-pdf://Acutemedmgt-2002-0653767680/Acutemedmgt-2002.pdf
12. The Healthcare Commission. Acute hospital portfolio reviews 2005/2006 : guide to medicines management (v2). London: The Healthcare Commission; 2006. Available from: internal-pdf://Medicines_Management_Guide-2005-2006-2835794177/Medicines_Management_Guide-2005-2006.pdf
13. Commission for Healthcare Audit and Inspection. The best medicine - the management of medicines in acute and specialist trusts. London: Commission for Healthcare Audit and Inspection; 2007. Available from: http://www.carequalitycommission.org.uk/_db/_documents/The_Best_Medicine_acute_trust_tagged.pdf internal-pdf://The_Best_Medicine_acute_trust_tagged07-0789428737/The_Best_Medicine_acute_trust_tagged07.pdf
14. The Royal Pharmaceutical Society of Great Britain, The Guild of Hospital Pharmacists, The Pharmaceutical Services Negociating Commitee, The Primary Care Pharmacists'Association. Moving patients, moving medicines, moving safely : guidance on discharge and transfer planning. 2006. Available from: www.rpsgb.org internal-pdf://dischtransfplanguid-2592808197/dischtransfplanguid.pdf
15. Bink S. De Farmaceutische ontslagmanager. Pharmakon 2008:11-7.
16. Deryckere S. Pati‰ntvriendelijke geneesmiddeleninformatie folders bij ontslag op heelkundige dienst: effectmeting op kennis en appreciatie. Pharmakon 2008:8-12.
17. Vermeulen N. Het medisch voorschrijven van de thuismedicatie tijdens het ziekenhuisverblijf. Pharmakon 2006:6-11.
18. Leemans L, Peeters M, Vanderheyden C, Dupont AG, Leys M, Saevels J, et al. Probl,matique des m,dicaments … prendre par les patients sortant de l'h"pital. Journal de Pharmacie de Belgique. 2008;63(4):94-102.

19. Cavrenne P, Spinewine A. ProblŠmes dans la continuit, des soins … la sortie de l'h“pital: int,rˆt d'un transfert d'informations du pharmacien clinicien au pharmacien d'officine. Journal de Pharmacie de Belgique. 2008;63(3):69-72.

This page is left intentionally blank.

Legal depot : D/2010/10.273/40

KCE reports

33 Effects and costs of pneumococcal conjugate vaccination of Belgian children. D/2006/10.273/54.
34 Trastuzumab in Early Stage Breast Cancer. D/2006/10.273/25.
36 Pharmacological and surgical treatment of obesity. Residential care for severely obese children in Belgium. D/2006/10.273/30.
37 Magnetic Resonance Imaging. D/2006/10.273/34.
38 Cervical Cancer Screening and Human Papillomavirus (HPV) Testing D/2006/10.273/37.
40 Functional status of the patient: a potential tool for the reimbursement of physiotherapy in Belgium? D/2006/10.273/53.
47 Medication use in rest and nursing homes in Belgium. D/2006/10.273/70.
48 Chronic low back pain. D/2006/10.273.71.
49 Antiviral agents in seasonal and pandemic influenza. Literature study and development of practice guidelines. D/2006/10.273/67.
54 Cost-effectiveness analysis of rotavirus vaccination of Belgian infants D/2007/10.273/11.
59 Laboratory tests in general practice D/2007/10.273/26.
60 Pulmonary Function Tests in Adults D/2007/10.273/29.
64 HPV Vaccination for the Prevention of Cervical Cancer in Belgium: Health Technology Assessment. D/2007/10.273/43.
65 Organisation and financing of genetic testing in Belgium. D/2007/10.273/46.
66. Health Technology Assessment: Drug-Eluting Stents in Belgium. D/2007/10.273/49.
70. Comparative study of hospital accreditation programs in Europe. D/2008/10.273/03
71. Guidance for the use of ophthalmic tests in clinical practice. D/200810.273/06.
72. Physician workforce supply in Belgium. Current situation and challenges. D/2008/10.273/09.
74 Hyperbaric Oxygen Therapy: a Rapid Assessment. D/2008/10.273/15.
76. Quality improvement in general practice in Belgium: status quo or quo vadis? D/2008/10.273/20
82. 64-Slice computed tomography imaging of coronary arteries in patients suspected for coronary artery disease. D/2008/10.273/42
83. International comparison of reimbursement principles and legal aspects of plastic surgery. D/200810.273/45
87. Consumption of physiotherapy and physical and rehabilitation medicine in Belgium. D/2008/10.273/56
90. Making general practice attractive: encouraging GP attraction and retention D/2008/10.273/66.
91 Hearing aids in Belgium: health technology assessment. D/2008/10.273/69.
92. Nosocomial Infections in Belgium, part I: national prevalence study. D/2008/10.273/72.
93. Detection of adverse events in administrative databases. D/2008/10.273/75.
95. Percutaneous heart valve implantation in congenital and degenerative valve disease. A rapid Health Technology Assessment. D/2008/10.273/81
100. Threshold values for cost-effectiveness in health care. D/2008/10.273/96
102. Nosocomial Infections in Belgium: Part II, Impact on Mortality and Costs. D/2009/10.273/03
103 Mental health care reforms: evaluation research of 'therapeutic projects' - first intermediate report. D/2009/10.273/06.
104. Robot-assisted surgery: health technology assessment. D/2009/10.273/09
108. Tiotropium in the Treatment of Chronic Obstructive Pulmonary Disease: Health Technology Assessment. D/2009/10.273/20
109. The value of EEG and evoked potentials in clinical practice. D/2009/10.273/23
111. Pharmaceutical and non-pharmaceutical interventions for Alzheimer's Disease, a rapid assessment. D/2009/10.273/29
112. Policies for Orphan Diseases and Orphan Drugs. D/2009/10.273/32.
113. The volume of surgical interventions and its impact on the outcome: feasibility study based on Belgian data
114. Endobronchial valves in the treatment of severe pulmonary emphysema. A rapid Health Technology Assessment. D/2009/10.273/39
115. Organisation of palliative care in Belgium. D/2009/10.273/42
116. Interspinous implants and pedicle screws for dynamic stabilization of lumbar spine: Rapid assessment. D/2009/10.273/46

117. Use of point-of care devices in patients with oral anticoagulation: a Health Technology Assessment. D/2009/10.273/49.
118. Advantages, disadvantages and feasibility of the introduction of 'Pay for Quality' programmes in Belgium. D/2009/10.273/52.
119. Non-specific neck pain: diagnosis and treatment. D/2009/10.273/56.
121. Feasibility study of the introduction of an all-inclusive case-based hospital financing system in Belgium. D/2010/10.273/03
122. Financing of home nursing in Belgium. D/2010/10.273/07
123. Mental health care reforms: evaluation research of 'therapeutic projects' - second intermediate report. D/2010/10.273/10
124. Organisation and financing of chronic dialysis in Belgium. D/2010/10.273/13
125. Impact of academic detailing on primary care physicians. D/2010/10.273/16
126. The reference price system and socioeconomic differences in the use of low cost drugs. D/2010/10.273/20.
127. Cost-effectiveness of antiviral treatment of chronic hepatitis B in Belgium. Part 1: Literature review and results of a national study. D/2010/10.273/24.
128. A first step towards measuring the performance of the Belgian healthcare system. D/2010/10.273/27.
129. Breast cancer screening with mammography for women in the agegroup of 40-49 years. D/2010/10.273/30.
130. Quality criteria for training settings in postgraduate medical education. D/2010/10.273/35.
131. Seamless care with regard to medications between hospital and home. D/2010/10.273/39.

This list only includes those KCE reports for which a full English version is available. However, all KCE reports are available with a French or Dutch executive summary and often contain a scientific summary in English.