Pharmacist's role in seamless care in the hospital

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Conflicts of interests

Markus L.Lampert, 02.02.2018

Identifying the Optimal Role for Pharmacists in Care Transitions: A Systematic Review

Hendrik T. Ensing, PharmD; Clementine C. M. Stuijt, PharmD; Bart J. F. van den Bemt, PharmD, PhD; Ad A. van Dooren, PharmD, PhD; Fatma Karapinar-Çarkit, PharmD, PhD; Ellen S. Koster, PhD; and Marcel L. Bouvy, PharmD, PhD

What this study adds

- Our model systematically categorized components of pharmacist intervention in care transition programs. Study heterogeneity enabled a best evidence synthesis to elucidate effective components.
- This review revealed that multifaceted programs should combine medication reconciliation with active patient counseling and a clinical medication review. Care continuity can be secured by integrating pharmacists across settings and providing them with patients' clinical background.
- Collaborating with other health care professionals is crucial to increase the effectiveness of pharmacist intervention.

HEALTH CARE REFORM

Hospital-Based Medication Reconciliation Practices

A Systematic Review

Stephanie K. Mueller, MD; Kelly Cunningham Sponsler, MD; Sunil Kripalani, MD, MSc; Jeffrey L. Schnipper, MD, MPH
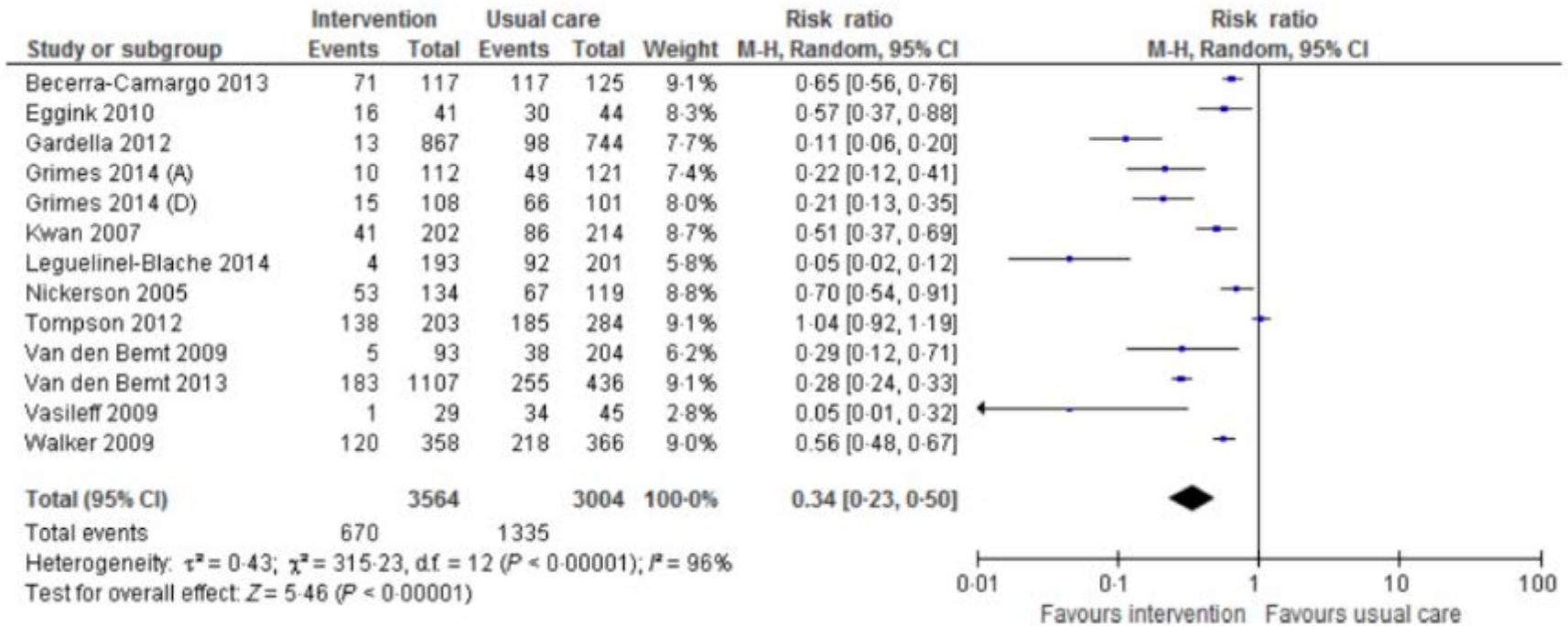
Conclusions: Rigorously designed studies comparing different inpatient medication reconciliation practices and their effects on clinical outcomes are scarce. Available evidence supports medication reconciliation interventions that heavily use pharmacy staff and focus on patients at high risk for adverse events. Higher-quality studies are needed to determine the most effective approaches to inpatient medication reconciliation.

Medication Reconciliation by pharmacists: what is the evidence?

Study or subgroup	Intervention Events	Total	Usual care Events	Total	Weight	Risk ratio M-H, Random, 95% CI
Becerra-Camargo 2013	71	117	117	125	9·1%	0·65 [0·56, 0·76]
Eggink 2010	16	41	30	44	8·3%	0·57 [0·37, 0·88]
Gardella 2012	13	867	98	744	7·7%	0·11 [0·06, 0·20]
Grimes 2014 (A)	10	112	49	121	7·4%	0·22 [0·12, 0·41]
Grimes 2014 (D)	15	108	66	101	8·0%	0·21 [0·13, 0·35]
Kwan 2007	41	202	86	214	8·7%	0·51 [0·37, 0·69]
Leguelinel-Blache 2014	4	193	92	201	5·8%	0·05 [0·02, 0·12]
Nickerson 2005	53	134	67	119	8·8%	0·70 [0·54, 0·91]
Tompson 2012	138	203	185	284	9·1%	1·04 [0·92, 1·19]
Van den Bemt 2009	5	93	38	204	6·2%	0·29 [0·12, 0·71]
Van den Bemt 2013	183	1107	255	436	9·1%	0·28 [0·24, 0·33]
Vasileff 2009	1	29	34	45	2·8%	0·05 [0·01, 0·32]
Walker 2009	120	358	218	366	9·0%	0·56 [0·48, 0·67]
Total (95% CI)		3564		3004	100·0%	0·34 [0·23, 0·50]
Total events	670		1335			

Heterogeneity: $\tau^2 = 0·43$; $\chi^2 = 315·23$, d.f. = 12 ($P < 0·00001$); $I^2 = 96\%$
Test for overall effect: $Z = 5·46$ ($P < 0·00001$)

Mekonnen A et al; Journal of Clinical Pharmacy and Therapeutics, 2016, 41, 128–144

Medication Errors: effect of parmacists' interventions

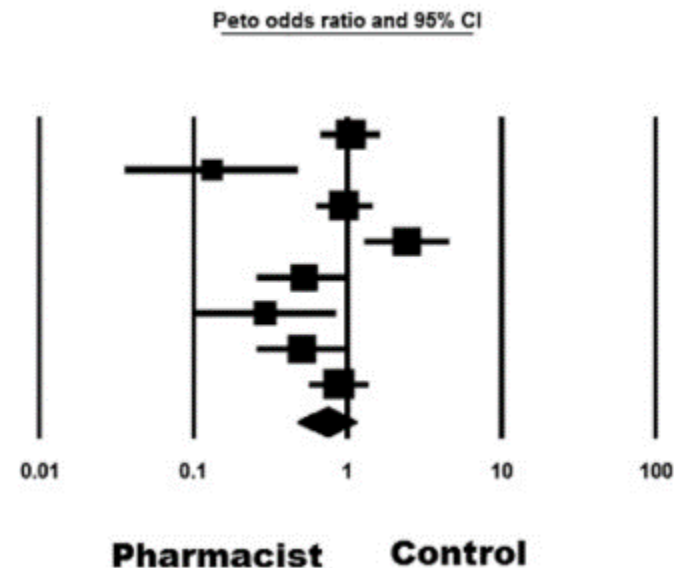| Study name	Comparison	Outcome	Statistics for each study					Events / Total		Peto odds ratio and 95% CI
			Peto odds ratio	Lower limit	Upper limit	Z-Value	p-Value	Phramacist	Control	
Farris et al.	PharmD	Med Errors	0.752	0.496	1.140	-1.343	0.179	47 / 311	60 / 313	
Hawes et al	PharmD	Med Errors	0.342	0.122	0.965	-2.028	0.043	6 / 24	19 / 37	
Shah et al.	PharmD	Med Errors	0.552	0.276	1.105	-1.677	0.094	26 / 64	35 / 63	
Kripalani et al.	PharmD	Med Errors	0.635	0.486	0.829	-3.338	0.001	187 / 430	237 / 432	
Eggink et al.	PharmD	Med Errors	0.313	0.134	0.732	-2.680	0.007	16 / 41	30 / 44	
Gillespie et al	PharmD	Med Errors	0.216	0.121	0.384	-5.210	0.000	9 / 182	45 / 186	
Schnipper et al	PharmD	Med Errors	0.178	0.046	0.681	-2.521	0.012	1 / 79	8 / 73	
Cabezas et al.	PharmD	Med Errors	0.469	0.202	1.088	-1.763	0.078	10 / 70	17 / 64	
Al-Rashed et al	PharmD	Med Errors	0.202	0.082	0.500	-3.461	0.001	21 / 43	34 / 40	
Nazareth et al	PharmD	Med Errors	0.917	0.566	1.484	-0.354	0.723	73 / 133	77 / 135	
			0.449	0.318	0.634	-4.546	0.000	396 / 1377	562 / 1387	

Pharmacist   Control

De Oliveira G et al; J Patient Saf 2018; e-pub 30-01-2018

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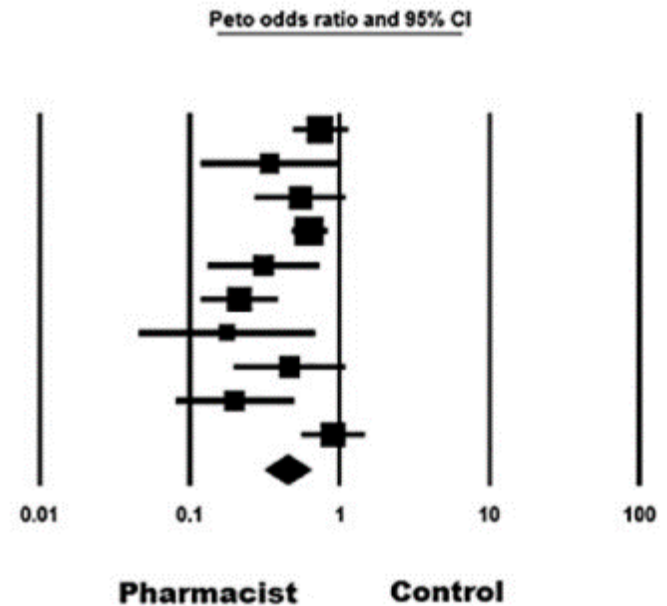
Readmission and emergency room visits: effect of parmacists' interventions

Study name	Comparison	Outcome	Statistics for each study					Events / Total		Peto odds ratio and 95% CI
			Peto odds ratio	Lower limit	Upper limit	Z-Value	p-Value	Phramacist	Control	
Farris et al.	PharmD	Readmission	1.058	0.685	1.634	0.256	0.798	49 / 311	47 / 313	
Hawes et al	PharmD	Readmission	0.133	0.037	0.478	-3.087	0.002	0 / 24	12 / 37	
Gillespie et al	PharmD	Readmission	0.964	0.637	1.459	-0.175	0.861	106 / 182	110 / 186	
Holland et al.	PharmD	Readmission	2.458	1.318	4.584	2.829	0.005	134 / 149	112 / 144	
Cabezas et al.	PharmD	Readmission	0.526	0.264	1.047	-1.830	0.067	23 / 70	31 / 64	
Al-Rashed et al	PharmD	Readmission	0.297	0.105	0.839	-2.292	0.022	5 / 43	13 / 40	
Dudas et al.	PharmD	Readmission	0.513	0.266	0.992	-1.983	0.047	16 / 110	28 / 111	
Nazareth et al	PharmD	Readmission	0.888	0.580	1.361	-0.544	0.586	64 / 181	69 / 181	
			0.734	0.476	1.131	-1.403	0.161	397 / 1070	422 / 1076	

0.01   0.1   1   10   100

Pharmacist   **Control**

			Peto odds ratio	Lower limit	Upper limit	Z-Value	p-Value	Phramacist	Control
Farris et al.	PharmD	ER Visit	0.882	0.561	1.386	-0.545	0.586	41 / 311	46 / 313
Hawes et al	PharmD	ER Visit	0.138	0.037	0.520	-2.926	0.003	0 / 24	11 / 37
Gillespie et al	PharmD	ER Visit	0.379	0.249	0.576	-4.541	0.000	49 / 182	93 / 186
Dudas et al.	PharmD	ER Visit	0.367	0.183	0.738	-2.815	0.005	11 / 110	27 / 111
			0.424	0.228	0.787	-2.719	0.007	101 / 627	177 / 647

0.01   0.1   1   10   100

Pharmacist   **Control**

De Oliveira G et al; J Patient Saf 2018; e-pub 30-01-2018

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The role of the hospital pharmacist – vision and reality

- "The pharmacists in our hospital enter all medicines used onto the patient's medical record on admission."
  (24% of responses were positive.)

- "The pharmacists in our hospital reconcile medicines on admission."
  (39% of responses were positive.)

- "When reconciling medicines, the pharmacists in our hospital assess the appropriateness of all patients' medicines, including herbal and dietary supplements."
 (40% of responses were positive.)

- "The pharmacists in our hospital contribute to the transfer of information about medicines when patients move between and within healthcare settings."
  (39% of responses were positive.)

Horák P, et al. Eur J Hosp Pharm 2017; doi:10.1136/ejhpharm-2017-001334

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The role of the hospital pharmacist - today

EAHP Statement 4.5: Hospital pharmacists should promote **seamless care** by contributing to transfer of information about medicines whenever patients move between and within healthcare settings.
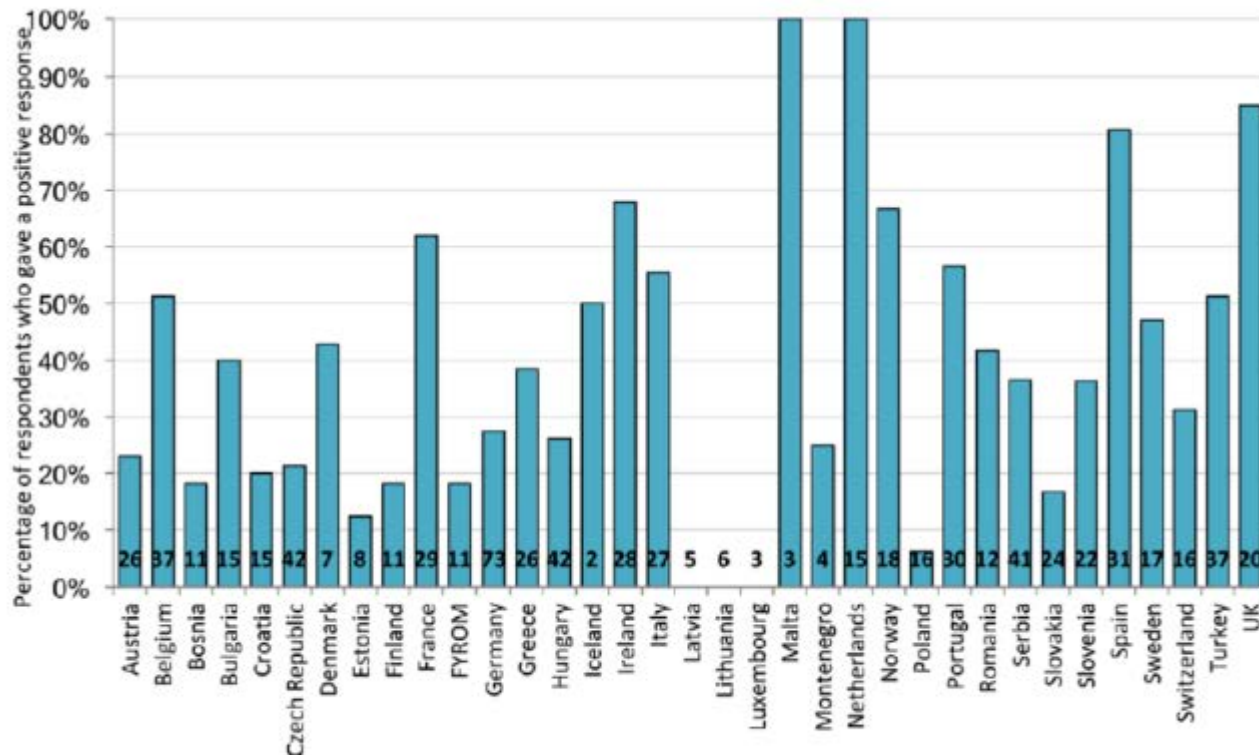
Figure 2 Percentage of respondents who gave a positive response to the statement 'The pharmacists in our hospital contribute to the transfer of information about medicines when patients move between and within healthcare settings'. FYROM, former Yugoslav Republic of Macedonia.

Horák P, et al. Eur J Hosp Pharm 2017; doi:10.1136/ejhpharm-2017-001334

The role of the hospital pharmacist - today

EAHP Statement 4.4: All the medicines used by patients should be entered on the patient's medical record and reconciled by the hospital pharmacist on admission. Hospital pharmacists should assess the appropriateness of all patients' medicines, including herbal and dietary supplements.
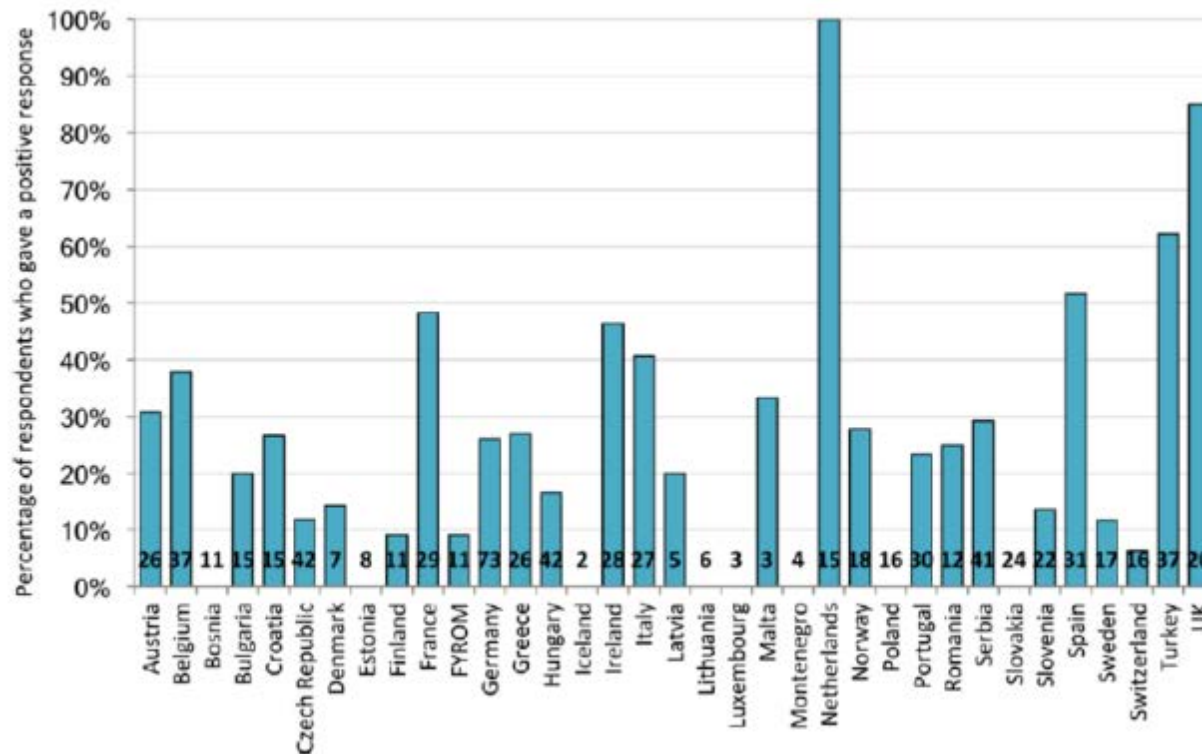
Figure 1 Percentage of respondents who gave a positive response to the statement 'The pharmacists in our hospital enter all medicines used onto the patient's medical record on admission'. FYROM, former Yugoslav Republic of Macedonia.

Horák P, et al. Eur J Hosp Pharm 2017; doi:10.1136/ejhpharm-2017-001334

Clinical Pharmacy in Hospitals: the European situation
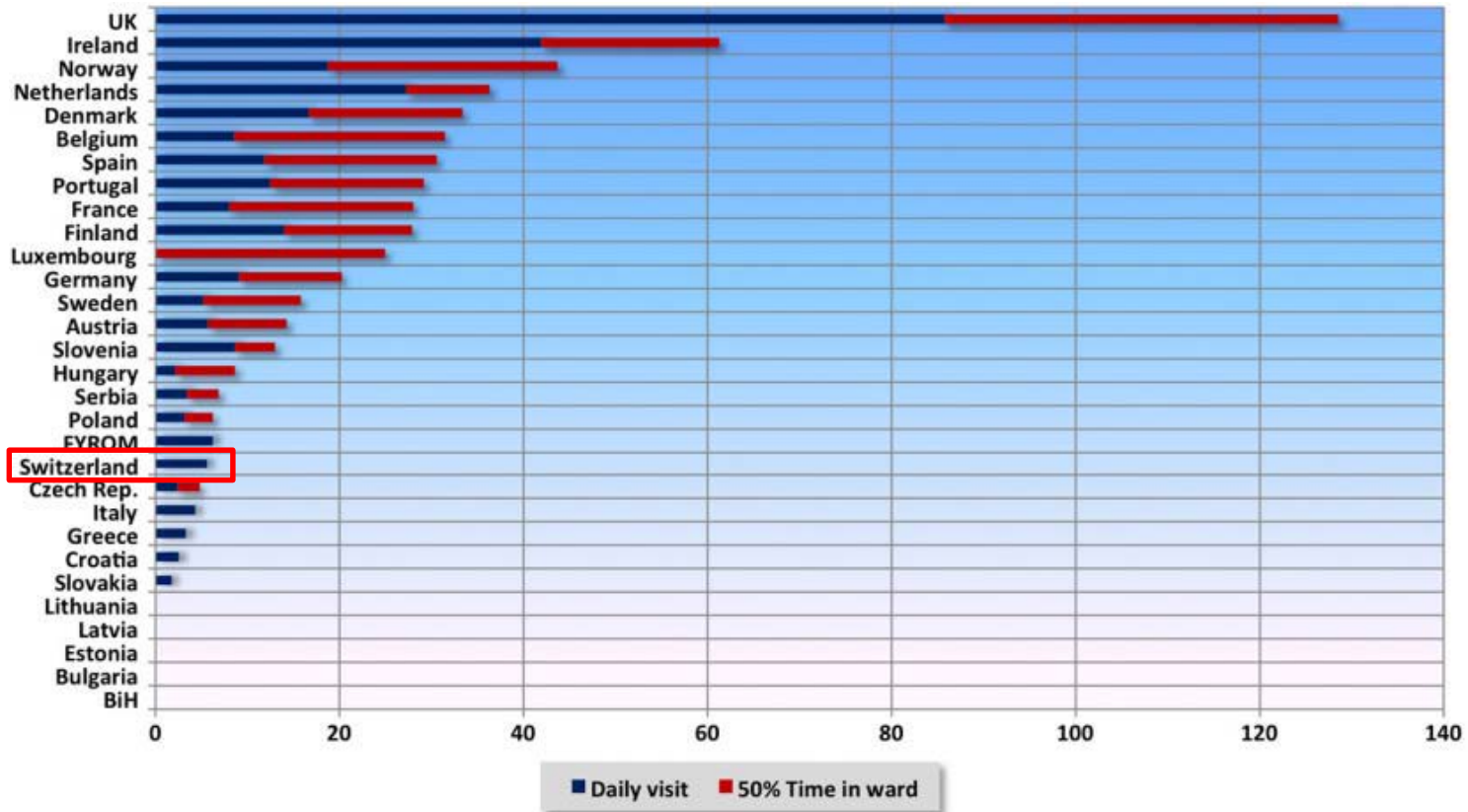
Percentage of pharmacies with either daily visits on the wards by pharmacists or having pharmacists working at least 50% of their time on the ward (n=981). Total may be >100% as some pharmacies have both services. BiH, Bosnia and Herzegovina; FYROM, Former Yugoslav Republic of Macedonia.

Frontini R, Miharija-Gala T, Sykora J. Eur J Hosp Pharm 2013;20:69–73.

Clinical pharmacy in Swiss Hospitals.
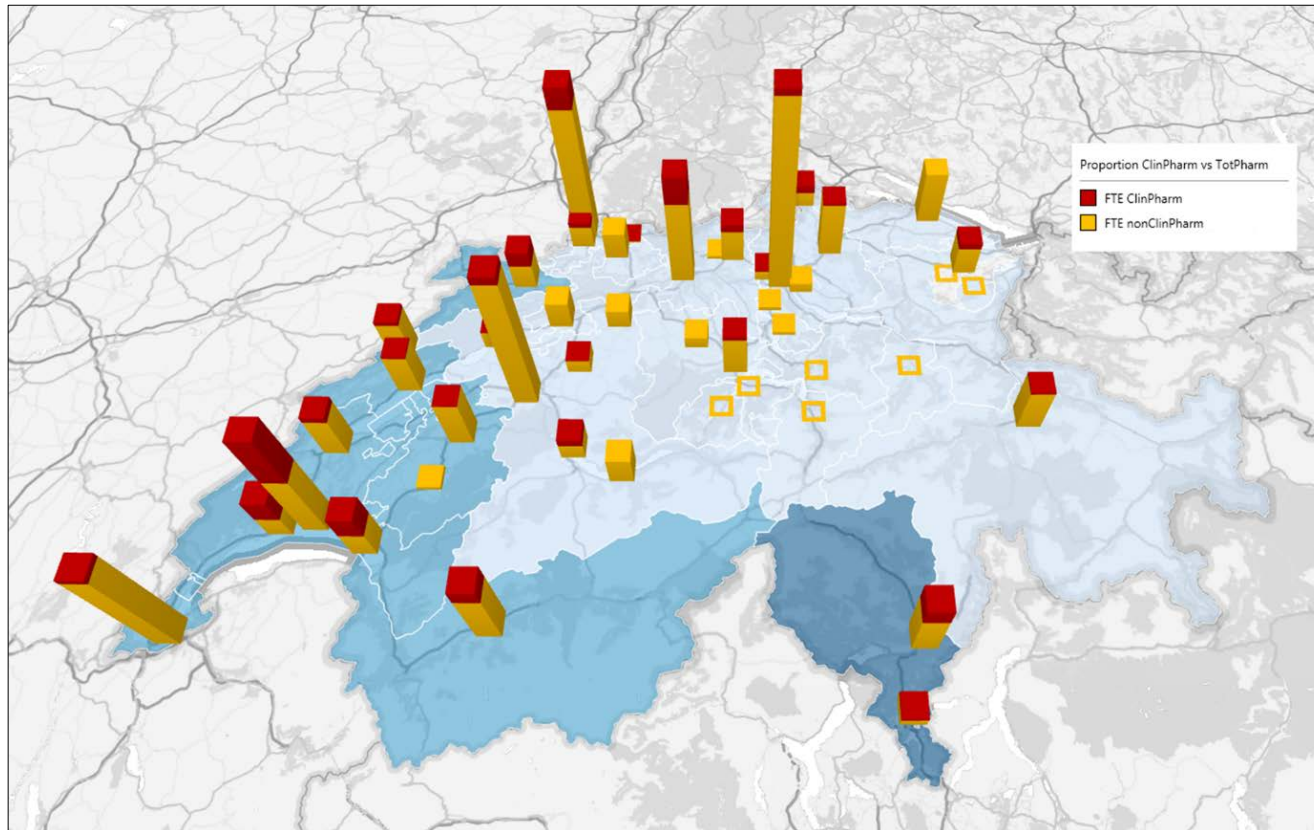
Figure 1 / Ratio of clinical pharmacy practice (red) vs other pharmacy activities (yellow) in the different language areas: French (blue), German (light blue) and Italian (dark blue). Hospital networks are represented as one location.

Messerli M et al: Mapping Clinical Pharmacy Practice in Swiss Hospitals - a Cross Sectional Study; Eur J Hosp Pharm 2016

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Clinical pharmacy in Swiss Hospitals.

Diagram 1 / Clinical pharmacy services were structured into a) patient-, b) treatment-, and c) process-related activities. Only responses from the institutions that provide clinical pharmacy activities were taken into account (n=33).

Messerli M et al: Mapping Clinical Pharmacy Practice in Swiss Hospitals - a Cross Sectional Study; Eur J Hosp Pharm 2016

Clinical pharmacy in Swiss Hospitals. Pharmacist's Interventions
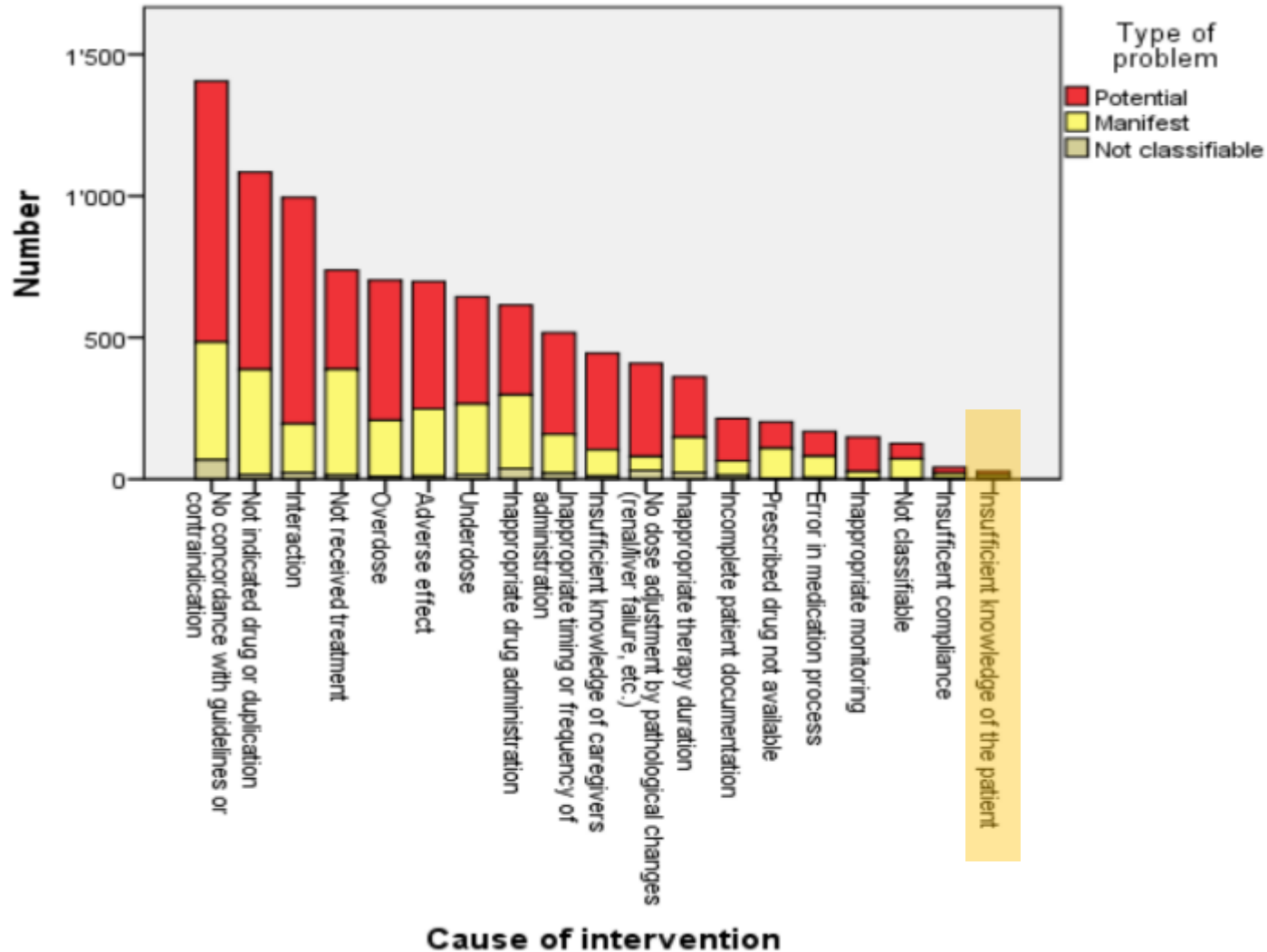
Gaufroid A: Master thesis, University of Basel 2013

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The role of the hospital pharmacist at discharge: a survey in Switzerland

Tasks of the pharmacists
Substitution (back to brand patient had before hospitalisation)
In-depth counselling patients on medication
Intervention and documentation on discharge prescription
Counselling patients on medication
Generating a medication plan
Validation of discharge prescription
Patient instructions (e.g. asthma devices)
Counselling patients on what to do with drugs from before hospitalization
Noting additional information on discharge prescription
Counselling patients on red flags
First provision of drugs
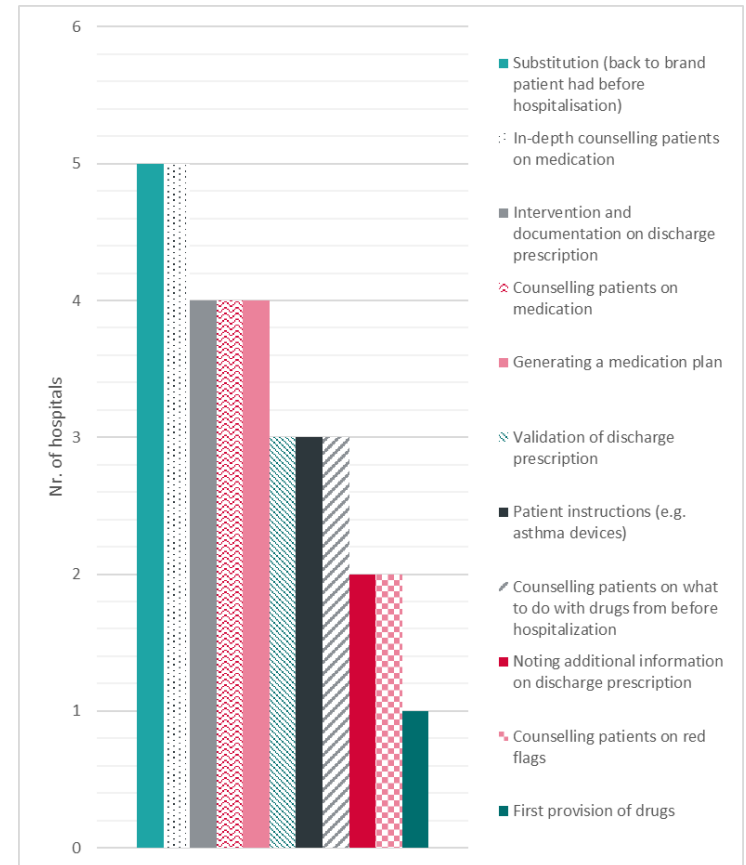
Studer H et al: PCNE Workshop 2018 Fuengirola (poster)

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Come and visit our poster…

The hospital pharmacist's role in the discharge procedures

University of Basel

Studer H[1], Boeni F[1,2], Hersberger KE[1], Lampert ML[1,2]

[1] Pharmaceutical Care Research Group, University of Basel, Switzerland
[2] Clinical Pharmacy, Institute of Hospital Pharmacy, Spitaeler Solothurn AG, Switzerland

Seamless care… a definition

"The degree to which the service system links episodes of treatment into a seamless, uninterrupted whole, in conformity with the needs of the patient."
"Continuity of care is a multidimensional concept including integration and coordination of services, communication among the various service providers and the stability of patient caregiver relationship over time." *Saarento, Soc Psychiatry Psychiatr*
Epidemiol 1998

Continuity of care is the desired *end product of the discharge process*, which enables clients to maximize their potential for wellness … while minimizing discomfort and stress." *Cameron, Can J Hosp Pharm, 1994*

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Seamless care: to build a bridge

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DEFINE ROLES

- *"There was an important job to be done and Everybody was asked to do it. Anybody could have done it, but Nobody did it. Somebody got angry about that because it was Everybody's job. Everybody thought Anybody could do it, but Nobody realized that Everybody wouldn't do it. It ended up that Everybody blamed Somebody when actually Nobody did what Anybody could have done."* (Anonymous)

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Pharmaceutical care models at discharge

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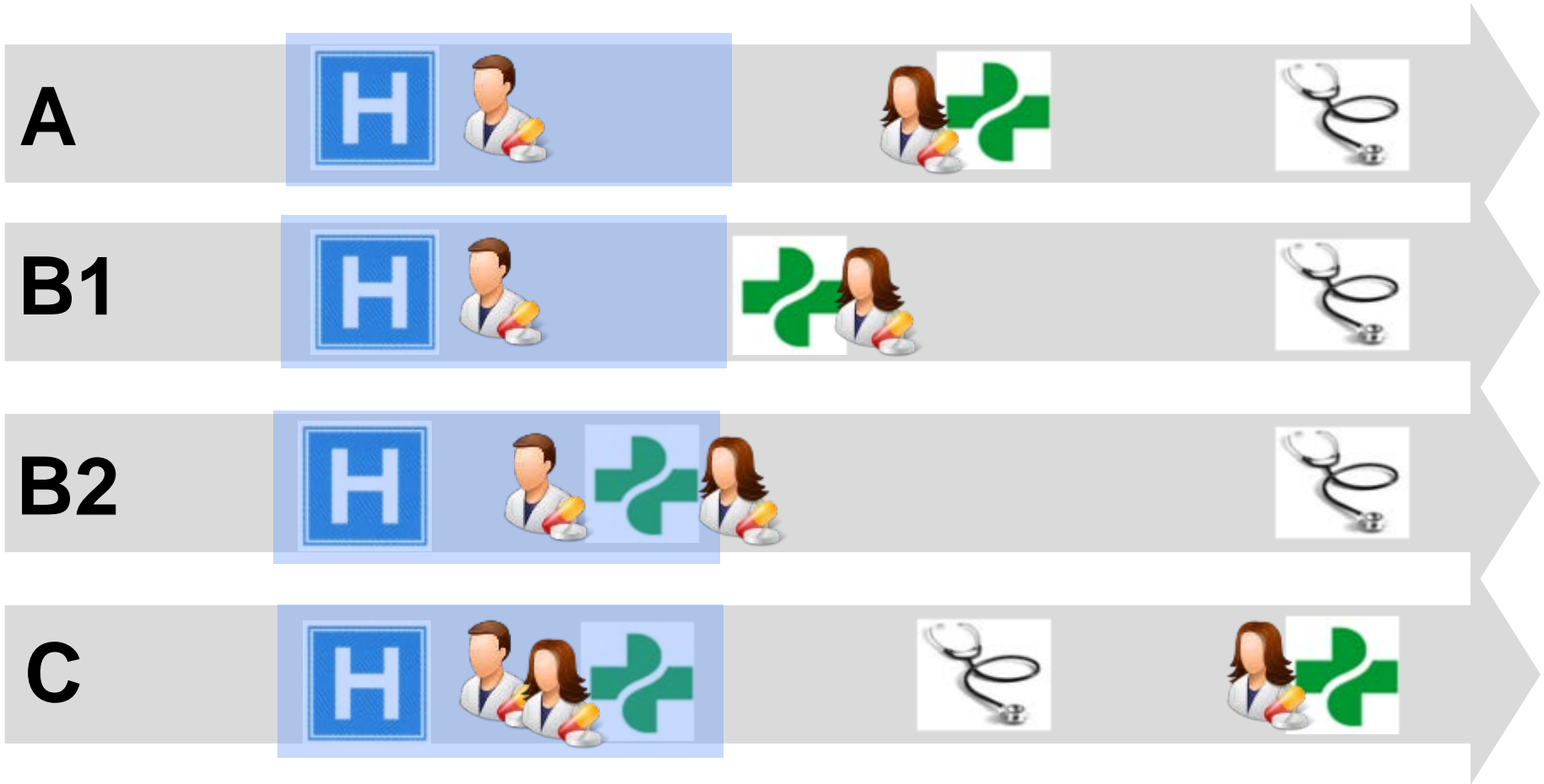
Pharmaceutical care models at discharge: the «sequential model»

A1

A2
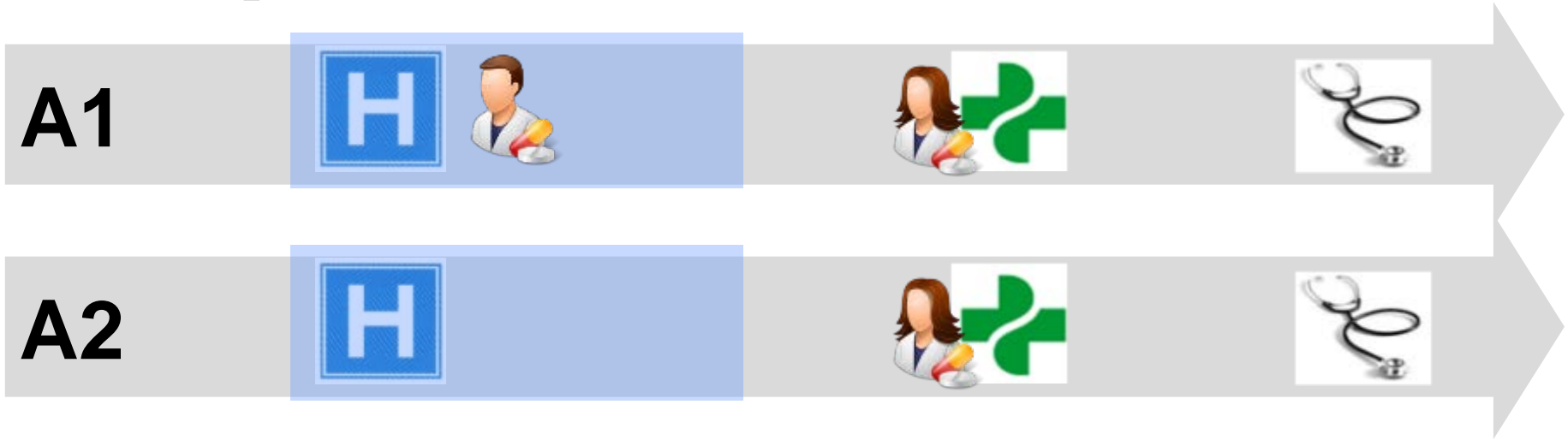
Hospital with/without clinical pharmacy service:
- MedRec at admission and/or discharge
- dsicharge medication plan
- hand-over documents for CP and GP

Community pharmacy:
- Constant partner for the patient's drug management

Pharmaceutical care models at discharge: the «focused model»

B1

B2
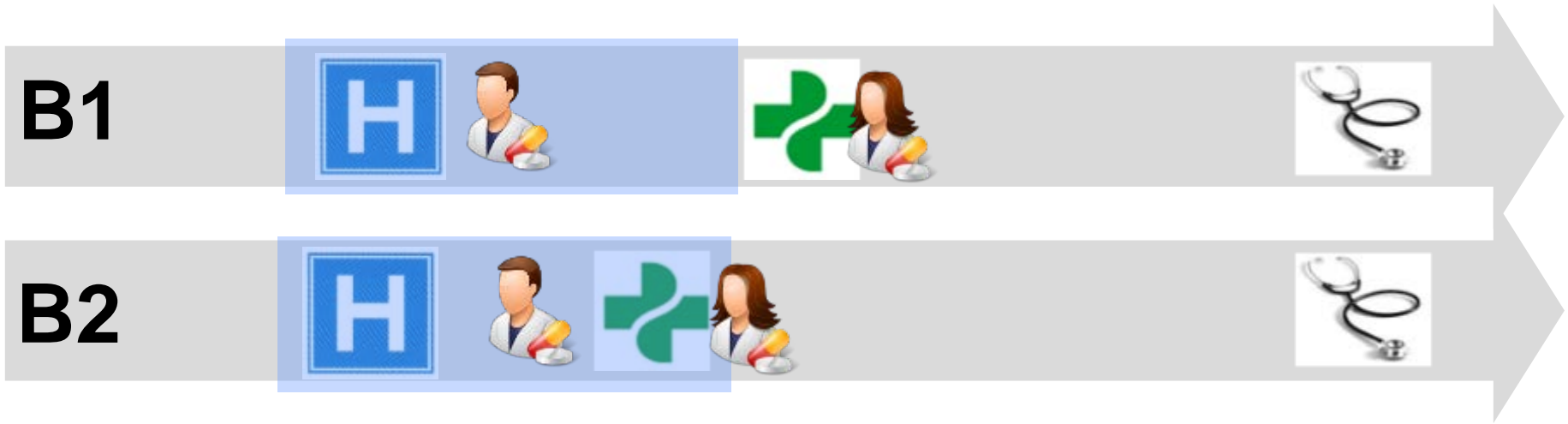
Hopital owned or hospital near «discharge pharmacies» provide specific services

Seamless does not necessarily mean continuous!

Access to patient data is crucial

Incentives for the hospital to do this?

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Pharmaceutical care models at discharge: the «collaborative model»
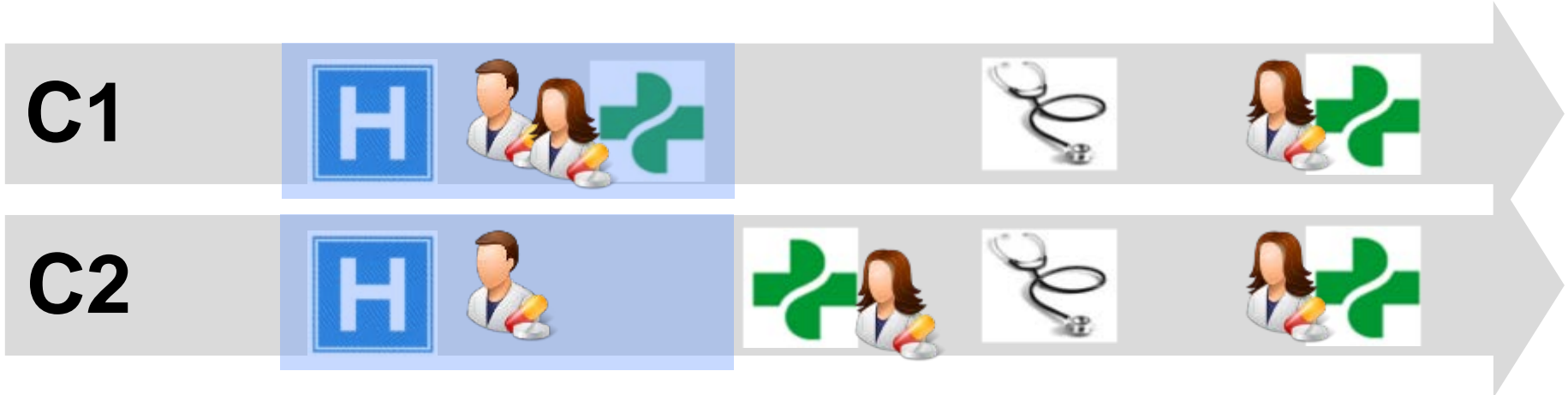
Specific services by specialised pharmacists at discharge:
- initiate changes in the medicines management
- follow-up by CP

Hand-over to the primary care setting (CP and GP)

Innovative collaborative models can create incentives!

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MOSAIC.

Medicines management **O**ptimisation by **S**tructured **A**ssessment in **I**ntegrated **C**are

[Individualised Clinical Risk Management Using Integrated Pharmaceutical Care]

a new framework optimising the cost/effectiveness-ratio of clinical pharmacist's interventions and leads to a continuum of care in the Swiss health care system.
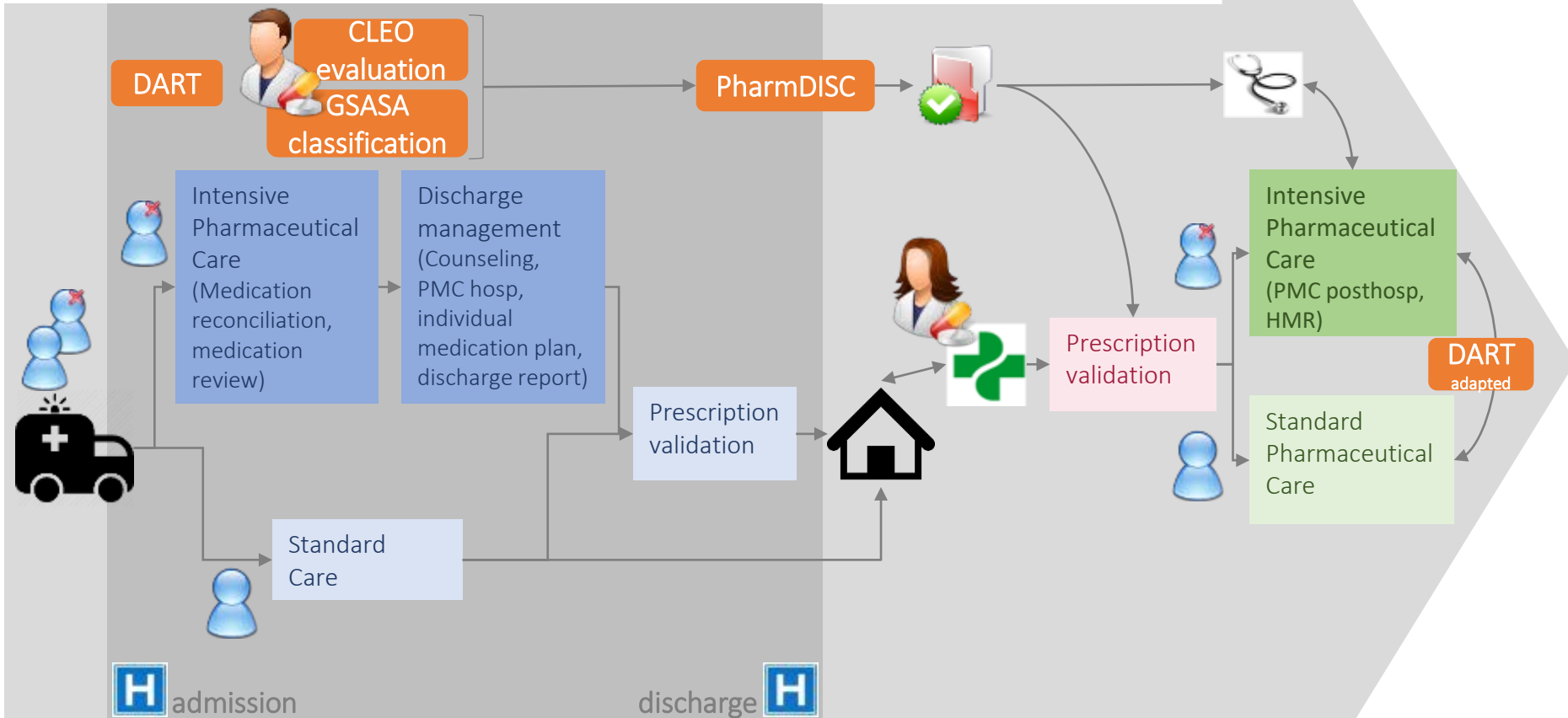
Legende
Orange, round edges: tools
Blue/green, sharp edges: processes/interventions

DART – Drug-associated risk tool
Defining risk factors (RF) for ADEs by a mixed methods approach

Kaufmann CP, Stämpfli D, Hersberger KE, et al.. BMJ Open 2015; doi:10.1136/bmjopen-2014-006376

DART – Drug-associated risk tool
Defining risk factors (RF) for ADEs by a mixed methods approach

DART

Patient code: ___ ___ ___ ˙ ___ ___ ˙ ___ ___ ___

Questionnaire for patients

General information

What is your preferred language of communication? _____

What is your current age? _____

My state of health

Yes	No	
☐	☐	I have a restricted kidney function/kidney dysfunction/kidney disease
☐	☐	I have a liver disease/liver dysfunction
☐	☐	I have a heart weakness/heart performance weakness
☐	☐	I have a chronic respiratory disease
☐	☐	I have diabetes
☐	☐	I have trouble remembering things or tend to be forgetful

If you do not take any medication, the questionnaire is finished for you.

My medicine

Yes	No	
☐	☐	I regularly take medicine, which I bought myself without a prescription from my physician. (including vitamin supplements)
☐	☐	I take more than 5 drugs every day, which are prescribed by my physician.

I use the following drugs at home (before my hospital stay):

Yes	No	
☐	☐	Sleeping pills
☐	☐	Cortison
☐	☐	Medicine against epilepsy
☐	☐	Marcoumar, Xarelto, Sintrom or Pradaxa
☐	☐	Surmontil (Trimipramin), Saroten (Tryptizol, Limbitrol), Tofranil or Nortrilen
☐	☐	Medicine against rheumatism / inflammation
☐	☐	Medicine for drainage (Diuretics)
☐	☐	Digoxin
☐	☐	Detrusitol
☐	☐	Insulin / Medicine against diabetes

Yes	No	
☐	☐	Do you sometimes forget to take your medicine?

DART

Patient code: ___ ___ ___ ˙ ___ ___ ˙ ___ ___ ___

Yes	Partially	No	
☐	☐	☐	I'm worried about taking my medicine.
☐	☐	☐	Sometimes I worry about the long term effects of my medicine.
☐	☐	☐	I do not understand what my medicine is for.
☐	☐	☐	My medicine interferes with my life.
☐	☐	☐	Sometimes I worry about becoming dependent on my medicine.

I feel well informed about my medicine.

Strongly disagree	Disagree	Agree	Strongly agree
☐	☐	☐	☐

Application of medicine

I am having trouble with the application of my medicine

Yes	No	
☐	☐	when splitting
☐	☐	when identifying
☐	☐	when swallowing

The preparation of my medicine

Yes	No	
☐	☐	is done by myself
☐	☐	is done by a relative / a friend
☐	☐	is done by a home care institution

I use one of the following application forms

Yes	No	
☐	☐	Inhalation device
☐	☐	Syringe for self injection
☐	☐	Skin patch

Would you like to tell us more about your health and medicine?

_____

_____

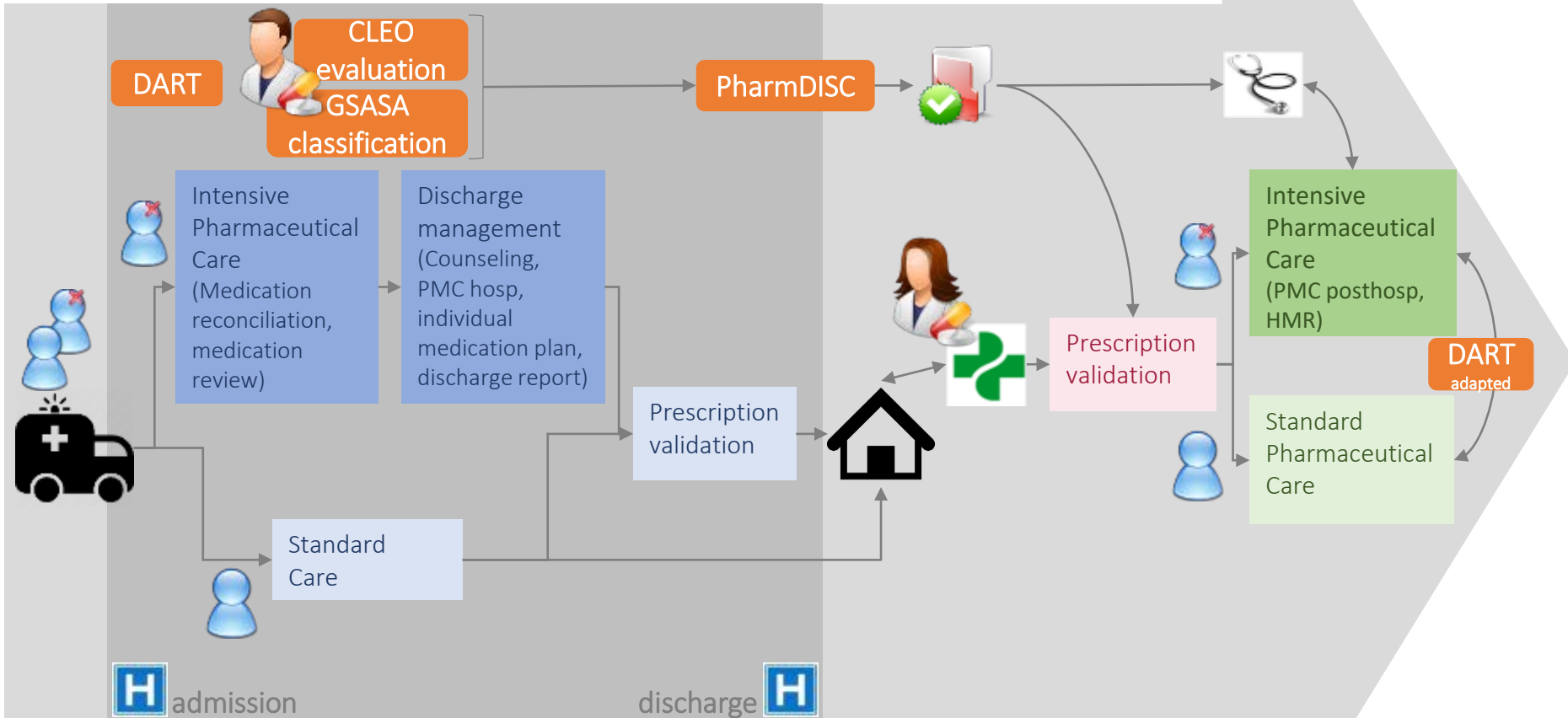Thank you very much for taking the time to fill out this questionnaire.

Kaufmann CP, Stämpfli D, Mory N, *et al. BMJ Open 2018 (in press)*

MOSAIC.

Medicines management **O**ptimisation by **S**tructured **A**ssessment in **I**ntegrated **C**are
[Individualised Clinical Risk Management Using Integrated Pharmaceutical Care]
a new framework optimising the cost/effectiveness-ratio of clinical pharmacist's interventions and leads to a continuum of care in the Swiss health care system.

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PharmDISC: an intervention-based classification

PharmDISC : Documentation of pharmaceutical interventions	
A Problem (1 choice)	**B Type of problem (1 choice)**
☐ 1. Treatment effectiveness	☐ 1. Manifest, reactive
☐ 2. Untreated indication	☐ 2. Potential, preventive
☐ 3. Safety of treatment	
☐ 4. Treatment costs	
☐ 5. Patient dissatisfaction / problems	
☐ 6. Technical / formal problem	
C Cause of intervention (1 choice)	**4. Drug use**
1. Therapy choice	☐ 1. Inappropriate timing or frequency of admin.
☐ 1. No concordance with guidelines, only suboptimal therapy possible	☐ 2. Inappropriate application
	☐ 3. Inappropriate therapy duration
☐ 2. Contraindication	**5. Patient**
☐ 3. Interaction	☐ 1. Insufficient adherence
☐ 4. Drug not indicated	☐ 2. Insufficient knowledge
☐ 5. Duplication	☐ 3. Concerns about the treatment
☐ 6. Adverse effect	☐ 4. Financial burden (patient/ public health)
☐ 7. Missing patient documentation	**6. Logistics**
2. Drug choice	☐ 1. Prescribed drug not available
☐ 1. Inappropriate dosage form / administration route	☐ 2. Error in medication process
3. Dose choice	**7. Prescription quality**
☐ 1. Underdose	☐ 1. Incomplete / unclear prescription
☐ 2. Overdose	☐ 2. Illegible prescription
☐ 3. Inappropriate monitoring	☐ 3. Missing prescription of necessary application aid(s)
☐ 4. Dose not adjusted to organ function (e.g., renal/ liver failure, age)	☐ 4. Formal / regulatory reason
D Intervention (1 choice)	
☐ 1. Substitution	☐ 7. In-depth counselling of patient
☐ 2. Dose adjustment	☐ 8. Application instruction (training)
☐ 3. Adjustment of package size / quantity	☐ 9. Delivery of adherence aid incl. counselling
☐ 4. Optimisation of administration / route	☐ 10. Clarification / addition of information
☐ 5. Therapy stopped / no delivery	☐ 11. Transmission of information
☐ 6. Therapy started / continued	☐ 12. Proposition of therapy monitoring
E Communication: involved person(s) except of pharmacist (multiple choice possible)	
☐ 1. nobody	☐ 3. Caregiver / home care
☐ 2. physician	☐ 4. Patient / relative
F Outcome of the intervention (1 choice)	
☐ 1. Accepted and implemented	☐ 3. Not accepted
☐ 2. Partially accepted or accepted without implementation	☐ 4. Not known
	☐ 5. Not applicable

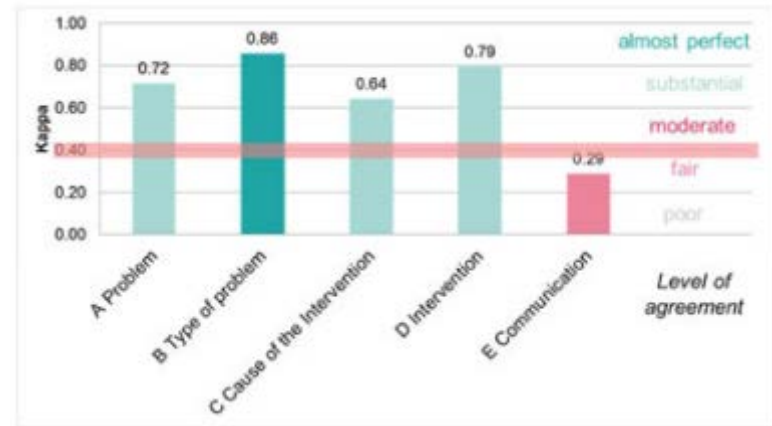(Column C items 2–7 span the "Technical" grouping.)

FIGURE 1 User-agreement based on 3 model pharmaceutical interventions rated by 19 users for each classification category of the PhamDISC system expressed as κ coefficients. A κ value greater than 0.40 is considered necessary for a valid classification system

TABLE 1 PharmDISC development process[7]: From research to practice

Documentation of pharmaceutical interventions				
	Part 1: Development of PharmDISC[8]		**Part 2: Validation of PharmDISC**	
Stage	Development	Piloting	Evaluation	Implementation
Methods	1. Exploratory trial: analysis of medication review protocols (modification of GSASA system[6] to PharmDISC) 2. Expert panel discussion	1. Interrater reliability study 2. Appropriateness, interpretability and validity study 3. Face and content validity study	1. Interrater reliability study 2. Appropriateness, interpretability and validity study 3. Acceptability and feasibility study	1. Questionnaire (barriers, facilitators) Outlook: quick classification of frequent interventions
Output	Version 1.0	Version 1.1	Version 2.0	Version 2.1 (e-version)

Conclusion.

The hospital pharmacist should play a major role in the seamless care process
- by analysing the current setting and initiating discussions about shared responsibilities
- by establishing patient-centered services
  - targeted to high risk patients
  - linked to primary care
- by documenting the performance and impact of such services
- by rising the awareness in the hospital management
- by being involved in research projects to develop and evaluate progress in the seamless care process

Thanks to the team.

Fabienne Böni, PhD
Carole Kaufmann, PhD
Dominik Stämpfli
Karen Maes
Tamara Imfeld
Helene Studer
Kurt Hersberger, Prof.
… and many more

Thank you!