

Part I

Setting and context

- In Germany drugs are solely prescribed by physicians irrespective of the care sector.
- Pharmacists are not allowed to prescribe drugs despite recommending 'over the counter medication' (OTC medication) in primary care.
- German hospitals only hold on average 0.33 pharmacists/100 beds, currently only around one-fifth of these work on the wards.
- Nevertheless, hospital pharmacists are increasingly integrated in the care process from admission to discharge.
- Different strategies and individual approaches are required to fit the legal requirements as well as local hospital structures
- At the very most, the clinical/ward pharmacists' activity could be related to as 'indirect prescribing' (this is not an official term)

Implementation of clinical pharmacy services

Clinical pharmacy services in Germany

- Clinical/ward pharmacists perform medication reconciliation and medication review from patients' admission to patients' discharge
- Furthermore, they are infrequently involved in patient counseling
- These processes are individualized to local structures and differ from hospital to hospital

Implementation and development of clinical pharmacy services

- Often clinical pharmacy services are implemented secondary to a 'trigger event' which facilitates the change of existing processes and the implementation of new services

Tab. 1: Possible events which might trigger the integration of clinical/ward pharmacists into the medication processes

Possible trigger events	Level
<i>Incident/accident/'tragedy'</i>	National Regional Local
<i>Cost/budget analysis</i>	Local
<i>Law changes</i>	National Regional
<i>Research/evidence</i>	(National) Regional Local
<i>Staff changes</i>	Local
<i>Quality improvement strategies</i>	Local

Examples:

Incident/accident/tragedy: A German nurse was convicted for murder in over 85 cases because he purposefully administered antiarrhythmics without indication in order to induce a cardiac arrest leading to subsequent cardiopulmonary resuscitation. This triggered the new law for mandatory ward based hospital pharmacists in the state of Lower Saxony (one state of Germany).

Law changes: In October 2017, a new law regarding discharge management came into force. This law provides detailed specifications in terms of the discharge medication e.g. discharge prescriptions, medication schedule for patients, and a detailed discharge medication letter. In order to meet these new regulations, new medication processes had to be developed in which pharmacists were sometimes integrated (s. fig. 1).

Research/Evidence: Different projects have shown benefits in terms of drug safety which led to a permanent integration of hospital pharmacists in some hospitals (IntJClinPharm. 2019; 41(5): 1184–1192). However, in some cases, pharmacy services were not continued after the study period although benefit had been shown.

Staff changes: A newly employed senior physician has previously worked with hospital pharmacists and integrated clinical pharmacists in a newly developed medication process at a university hospital (s. fig. 1).

Medication process elements with hospital pharmacist participation in Germany

- Medication history taking
- Participating in ward rounds
- Medication screening
- Prescription validation for the automated unit-dose system
- Preparing discharge medication documents/list/instruction sheet
- Patient counseling

Possible processes of 'indirect prescribing' implemented in different German hospitals

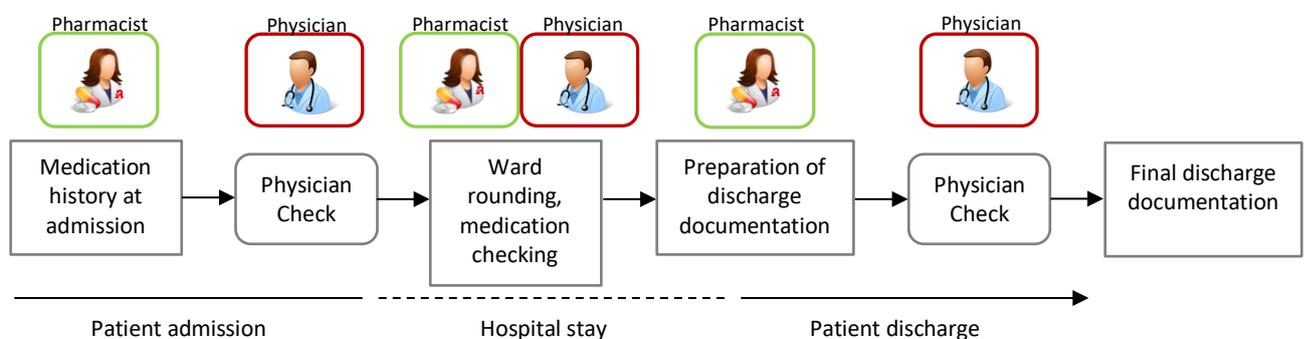


Fig. 1: Process A: Medication process from admission to discharge on different wards in a university hospital with a mainly paper based documentation.

Process A: Pharmacists take patient drug histories on admission, subsequently screen all medicines and propose a possible switch to the hospital formulary. Thereafter, the medication is doublechecked and prescribed by a physician. As part of the multidisciplinary team clinical/ward pharmacists check prescriptions for errors, ensuring they're appropriate and safe during the patient's stay. They also recommend changes in terms of drug safety. At discharge, pharmacists finally check the medication, prepare a discharge medication list indicating reasons for drug changes and drug monitoring recommendations, as well as a medication schedule for the patient. The responsible physician doublechecks all documents and finally integrates them into the discharge letter.

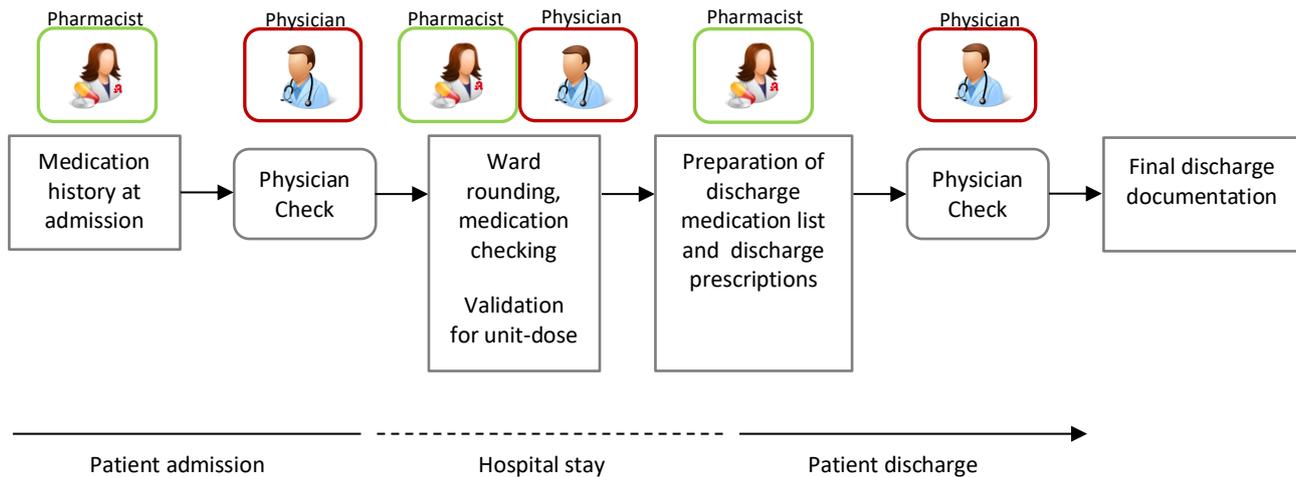


Fig. 2: Process B: Digital medication documentation process in a German university hospital with integration of clinical pharmacists.

Process B: Pharmacists take the drug history on admission, subsequently screen the medication and propose a possible switch to the hospital formulary. After that the medication is double checked and prescribed by a physician. As clinical pharmacists are part of the multidisciplinary team, they check patients' medication during their stay and recommend changes with regards to drug safety. The screened and validated medication is transferred to the automated unit-dose system which then dispenses the drugs. During this process, every prescription is validated by a clinical pharmacist. At discharge, pharmacists finally check all drugs, compile a discharge medication summary and prepare a medication schedule for the patient. The responsible physician approves these documents and finalizes the discharge letter and prescriptions.

Part II

Discussion 1

- Can you think of an area that you could develop as a prescriber (if the legal framework was in place) and why? Consider:
 - Why you think a pharmacist role could add value
 - Gap in existing service or shortage of other specialists
 - Complex conditions requiring specialist knowledge of disease and medication
 - Local / national quality indicators or audits
- What barriers would need to be overcome? Consider:
 - Additional skills/training
 - Attitudes from colleagues/patients
 - Funding
 - Mentoring / supervision
 - Clinical governance

Briefly discuss in small groups

Case

- Mr RH, 75-year-old male was referred to the HF team during his admission for elective right hip replacement, admitted 1 week ago 7/11/19 - now 6 days post-op 14/11/19. Recovering well from operation.
- Referral states patient is getting ready for discharge but has had worsening renal function (AKI on CKD) and complaining of increased shortness of breath (SOB) and ankle oedema

Patient Medical History (PMH)

Known severe LVSD
Rheumatoid arthritis
Chronic kidney disease
Hypertension
Ischaemic heart disease
Depression

ECHO Nov 2017

Severe LVSD, EF 25%
Mild LV hypertrophy
Mod MR
RV dilated with reduced
systolic function

SOCIAL HISTORY

Lives with wife in bungalow
Retired postman
Ex-smoker
Usually independent
and mobile

Drug History on admission

Bisoprolol 5mg morning
Ramipril 5mg night
Furosemide 80mg +40mg
Amitriptyline 25mg night
Citalopram 40mg morning
ISMO MR 120mg morning
Ibuprofen 400mg TDS PRN
Atorvastatin 80mg night

Medication at review in hospital

Amitriptyline 25mg night
Bisoprolol 1.25mg morning
Paracetamol 1g QDS
Ibuprofen 200mg TDS PRN
Morphine Sulphate 10mg/5mls 5mls PRN
Furosemide 40mg morning
ISMO MR 120mg morning
Citalopram 40mg morning
Atorvastatin 80mg night

2nd Review 19/11/19

Results

Bloods	7/11/19	14/11/19	19/11/19	Ref range
Na	138	139	136	133 – 144 mmol/L
K	4.4	4.0	3.6	3.5 – 5.0 mmol/L
Urea	12.5	13.0	12.7	4.5 – 11.1 mmol/L
Creatinine	195	250	205	69 – 162 µmol/L
LFTs	GGT 50 Alk phos 95 ALT 35 Bili 18	GGT 195 Alk phos 234 ALT 135 Bili 15	GGT 75 Alk Phos 145 ALT 55 Bili 14	4-53 U/L 46 – 148 u/L 8 – 45 u/L 3 – 25 µmol/L
TFTs	FT4 12.23 TSH 4.1	FT4 12.19 TSH 4.5	-	7.81 – 14.41 pmol/L 0.5 – 5.5 mU/L
Hb	122	115	120	130 – 170 g/L
WCC	6.2	5.9	5.8	4 -11 10 ⁹ /L
Chol	3.5	-	-	< 5.0 mmol/L
Calc CrCl	31mls/min	24mls/min	29mls/min	mls/min

Medication at review

Bisoprolol 1.25mg morning
 Oramorph 10mg/5mls 5mls PRN
 Furosemide IV infusion 2mls/hr
 ISMO MR 60mg morning
 Co-codamol 30/500 2 QDS
 Macrogol sachets 1 BD
 Sertraline 25mg morning
 Zopiclone 3.75mg night PRN
 Ramipril 1.25mg night

Observations

BP 122/75 Daily weights 105kg, 103.8kg, 102kg, 101.3kg, 99.8kg, 98kg
 HR 92bpm Fluid balance - 1100mls, - 1350mls, - 995mls, -1250mls, -1400mls
 SATs 99% on room air RR 15 / min

Review 19/11/19

- Patient feels much better. Occasional SOB when mobilising to the toilet
- Denies any orthopnoea or PND in past 2 days
- Denies any dizziness, chest pain, palpitations, presyncope or syncope
- Pain well controlled on co-codamol
- Very keen to go home

Examination

- Looks comfortable sat out in chair, warm and well perfused
- Pitting oedema to above knees
- Chest sounds clear, no wheeze on auscultation
- JVP raised 3-4cm
- Heart sounds: S1 + S2 + systolic murmur in mitral area.
- ECG sinus rhythm, QTc 435ms