Implementation of clinical pharmacy in the hospital setting in Europe

Models of care, successes and failures, thoughts for the future

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Plan

- Clinical pharmacy practice models
  - Evidence from European studies
- Scope of implementation
  - Influencing factors
- Strategic planning
- Thoughts for the future
MODELS AND EUROPEAN DATA ON IMPACT
Models of care

Pharmacists are expected to assess a prescription before it is dispensed.

Prescription intervention occurs after a prescription has been generated → reactive service.

Large variability possible within this level.

Examples:
- Ward pharmacists spending 1-2 h/day per ward (UK)
- Validation of prescriptions in France
Level 4

- The pharmacist becomes part of the decision to initiate or modify a prescription = proactive
  - Inclusion in the team making decisions
    - Attending ward rounds
  - or referral by the prescriber to the pharmacist for advice
    - For specific medicines (e.g. TPN) or medication review
- No change to the patient’s treatment is made without the agreement of the prescriber
Levels 3 and 4: European data on impact?

Publications describing interventions

Evaluation of pharmacist clinical interventions in a Dutch hospital setting

- 1 junior hospital pharmacist, 24 patients
- ~20h/week for 7 weeks, ‘level 4’
- 82% acceptance rate

Liesbeth Bosma et al., Pharm World Sci 2008;30:31-38

Evaluation of clinical pharmacist recommendations in the geriatric ward of a Belgian university hospital

- 1 senior hospital pharmacist, acute geriatric ward
- ~2h/week for 4 months, level 3
- 60% acceptance rate

Annemie Somers et al., Clin Interv Ageing 2013;8:703-9
Levels 3 and 4: European data on impact?

- Publications describing interventions

**Clinical pharmacists’ interventions in a German University Hospital**

- 2 senior clinical pharmacists; hemato-oncology and ICU
- 50 h/week for 2 yrs; ward rounds; ‘level 4’
- 93% acceptance rate

**Clinical pharmacy services in a London hospital, have they changed?**

- 50-60 clinical pharmacists; 1100 bed-hospital (Trust)
- 4 yrs
- 47 interventions / 100 bed-days; 85-92% acceptance rate

Claudia Langebrake et al., Pharm World Sci 2010;32:194-99

Gayle Campbell et al., Int J Clin Pharm 2013;35: 688-91
### Levels 3 and 4: European data on impact?

#### Randomized controlled trials

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Participants</th>
<th>Setting</th>
<th>Interventions</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinewine et al., 2007</td>
<td>RCT</td>
<td>203 patients</td>
<td>Belgium</td>
<td>Pharmaceutical care from admission to discharge</td>
<td>↑ appropriateness of prescribing (MAI, ACOVE), 90% acceptance rate, ↓ mortality and ED visits</td>
</tr>
<tr>
<td>Gillespie et al., 2009</td>
<td>RCT</td>
<td>400 patients ≥80y</td>
<td>Sweden</td>
<td>Pharmaceutical care from admission to discharge (+ after)</td>
<td>16% ↓ hospital visits, 46% ↓ ED visits, 80% ↓ drug-related readmissions</td>
</tr>
<tr>
<td>Lisby et al., 2010</td>
<td>RCT</td>
<td>100 patients ≥75y</td>
<td>Denmark</td>
<td>Medication history and treatment discussion with clinical pharmacologist</td>
<td>&lt;50% acceptance rate, No ≠ in LOS, readmission, QOL</td>
</tr>
</tbody>
</table>

**RCT**: Randomized controlled trial.
Levels 3 and 4: European data on impact?

- Comparison of effectiveness
  - « the optimal exploitation of levels 3 and 4 will be essential » (FIP) BUT...

- **What’s the most (cost)effective ‘model’?**
  - « There was a division of opinion amongst chief pharmacists as to how best clinical pharmacy service can be provided within the resource limitations:
    - provide a limited service to all wards
    - Provide a quality service to a limited number of wards (Fitzpatrick 2005)
Levels 3 and 4: European data on impact?

- **Comparison of effectiveness**
  - No or very limited data!

- Comparison level 3 (routine care) vs level 4 (new intervention)
  - 3 ward rounds, 53 patients, 109 recommendations
  - Nearly all medication histories modified
  - Lower increase in medication costs
Level 5

- Pharmacist given the authority to initiate or modify medicine therapy rather than to advise on the initiation or modification of therapy
  - Within bounds agreed within the team
- Responsibility and accountability
- Requires a system-wide change in national or state/provincial law
SCOPE OF IMPLEMENTATION OF CLINICAL PHARMACY IN EUROPEAN HOSPITALS
Scope of implementation

- EAHP survey 2010 on hospital pharmacy in Europe
  - Respondents: 1283 hospital pharmacies from 30 countries (27% response rate)
    - France and UK under-represented (<10% RR)
    - >50% response rate in several Eastern countries

EAHP survey 2010 on hospital pharmacy in Europe: parts 4 and 5. Clinical services and patient safety

**INTER-COUNTRY VARIABILITY (+ INTRA)**
Only 6% of pharmacies have pharmacists spending at least 50% of their time on the ward

- 34% of US hospitals have pharmacists working on the ward for 8h/day

40% of hospital pharmacies offer clinical services occasionally (range by country 3.6-79.2%)

Only small changes since the 2005 survey
EAHP survey 2010

Main clinical counselling activities
- Enteral nutrition (31.9%)
- Cytotoxic-induced nausea (19.6)
- Antibiotics (16.1%)
- Anticoagulation (13.6%)
EAHP survey 2010

- **Additional limitations**
  - « clinical activity »: perceptions might differ
  - « ward pharmacist »: likely to be heterogenous
    - Which « model » of practice?
Influencing factors

- **Type of hospital**
  - Teaching status
    - Facilitating factor in many countries; Barrier in others
  - For-profit or not: EAHP survey 3.3% vs 10%

- **Methods of financing health care / drugs**
  - (+) Fixed payments linked to patients’ diagnoses and severity of illness
  - (-) Revenues related to the number of prescriptions dispensed
Influencing factors

- **Cost of pharmacists**
  - (-) Similar to physicians in France, Suisse = barrier
  - (+) Lower in other countries

- **Champions**
  - (+) Leadership = critical factor in the rate of adoption of an innovation

- **Resources and role of trainees**
  - Trainees do the daily work on the ward in several countries
Additional influencing factors

- **Education**
- **Research**
- **Accreditation**

Session L3. Clinical pharmacy in Europe: education, research and management: future directions

Session L1.7 Ensuring patient safety in JCI accredited hospitals – requirements on clinical pharmacy services
Session L1.8 Clinical pharmacy and Qmentum
EAHP survey 2010

- Europe: 0.9 FTE/100 beds
- US: 17.5 FTE/100 beds

Figure 3  Pharmacists/100 beds (full time equivalents complete + partial hospitalisations) (n = 1024). BiH, Bosnia and Herzegovina; FYROM, Former Yugoslav Republic of Macedonia.
Only 14.7% of hospital pharmacies said they write down their interventions in the medical records; 21.9% in pharmacy records.
- Vision for the future?
- Standards of practice? Metrics?
Please raise you hand if...

- In your **country** you are aware of any recent document/white paper describing
  - A vision for clinical pharmacy
  - Clinical pharmacy standards/ metrics
Please raise your hand if...

- You work as a clinical pharmacist in a hospital
  - There is a vision on the development of clinical pharmacy for the next 5 years in your hospital
  - You have defined clinical pharmacy metrics / standards of practice
  - There has been internal/external audit of your practice
« Hospital pharmacy manufacturing is subject to strict (inter)national standards »

« However, there has been very little attention focused on standards in relation to clinical pharmacy practice.

Fitzpatrick 2005
Northern Ireland

- Clinical pharmacy standards, 2009
  - Basic standard requirements & advanced requirements

<table>
<thead>
<tr>
<th>Acute</th>
<th>General Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Medicine History Interview</td>
<td>12 Education and Training</td>
</tr>
<tr>
<td>2 Medicine Therapy Monitoring</td>
<td>13 Resources</td>
</tr>
<tr>
<td>3 Prescription Monitoring and Review</td>
<td>14 Staffing Levels and Structure</td>
</tr>
<tr>
<td>4 Prevention, Detection, Assessment and Management of Adverse Drug Reactions</td>
<td>15 Documentation</td>
</tr>
<tr>
<td>5 Prevention, Assessment and Management of Drug Interactions</td>
<td>16 Quality of Clinical Pharmacy Services</td>
</tr>
<tr>
<td>6 Therapeutic Drug Monitoring</td>
<td>17 Health Promotion</td>
</tr>
<tr>
<td>7 Prevention, identification, management and reporting of medication incidents</td>
<td>18 Pharmacoeconomic Evaluation of the use of Medicines</td>
</tr>
</tbody>
</table>
Northern Ireland

STANDARD 3
Prescription Monitoring and Review

Basic Standard Requirements

All patients’ prescription charts are monitored and reviewed in conjunction with the patient’s medical notes and relevant medical laboratory results by a pharmacist at regular intervals. The recommended intervals are:

- Acute wards: once daily
- Intermediate stay wards: once weekly
- Rehabilitation wards, community hospital wards: once weekly
- Long stay psychiatric/learning difficulties: once a month

3.1 A local SOP exists for prescription monitoring and review.

3.2 All patients’ prescription charts are monitored and reviewed by a pharmacist by the next working day after admission.

3.3 Prescription monitoring and review is repeated at regular intervals as defined above throughout the patient’s admission.

3.4 The patient’s administration record is reviewed to determine non-administration and to resolve any issues e.g. patient nil by mouth.

3.5 Pharmacist endorse prescriptions to add clarity to the original prescription, if applicable.

3.6 A local SOP exists for prescription endorsement by pharmacists.

3.7 If a medication incident or a near miss has occurred it is reported according to the local policy/procedure for reporting medication incidents or near misses.

Advanced requirements

3.8 A pharmacist reviews all prescriptions for ‘high risk’ drugs (except in emergency situations) before the first dose is dispensed or administered.

STANDARD 13
Resources

Table 1: Clinical Pharmacy Staffing Levels to Provide a Clinical Pharmacy Service

<table>
<thead>
<tr>
<th>Hospital Area</th>
<th>Pharmacist Ratio</th>
<th>Technician Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Medicine</td>
<td>1 pharmacist per 40 beds (± 10 beds)</td>
<td>1 technician per 40 beds (± 10 beds)</td>
</tr>
<tr>
<td>Cardiology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paediatrics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Psychiatry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Elderly Care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oncology Inpatients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haematology Inpatients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other comparable specialties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternity / Obs &amp; Gynae ENT</td>
<td>1 pharmacist per 60 beds (± 10 beds)</td>
<td>1 technician per 60 beds (± 10 beds)</td>
</tr>
<tr>
<td>Orthopaedics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long stay Psychiatric</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long stay learning difficulties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long stay Elderly Care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other comparable specialties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICU / ICU / HDU</td>
<td>0.1 pharmacist per bed/ cot station</td>
<td>0.1 technician per bed/ cot station</td>
</tr>
<tr>
<td>PICU / Neonatal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal Haemodialysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other comparable specialties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accident and Emergency</td>
<td>1 pharmacist per 100,000 attendances</td>
<td>1 technician per 100,000 attendances</td>
</tr>
<tr>
<td>Cystic Fibrosis Patients</td>
<td>0.3 pharmacist per 50 registered patients</td>
<td>0.3 technician per 50 registered patients</td>
</tr>
<tr>
<td>HIV Patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other comparable specialties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharmacy led Clinics</td>
<td>0.2 pharmacist per clinic</td>
<td></td>
</tr>
<tr>
<td>Specialist Teams</td>
<td>0.1 pharmacist per team</td>
<td></td>
</tr>
<tr>
<td>Clinics - STD</td>
<td>0.1 pharmacist per 1000 patient visits</td>
<td></td>
</tr>
</tbody>
</table>
United Kingdom

Professional Standards
For Hospital Pharmacy Services

Optimising patient outcomes from medicines

For pharmacy services in acute, mental health, private and community service providers

July 2012
Belgium

- Pilot projects 2006-2013
- Implementation and evaluation at the national level
- Vision
- No official standards
- Wide variability remains present
Denmark

- National definition of clinical pharmacy
- Three levels
  - Patient
  - Ward
  - Management
- National strategy 2012-2015

Australia

- Standards of practice for clinical pharmacy services
  - Medication reconciliation
  - Assessment of current medication management
  - Clinical review, TDM and ADR management
  - Medication management plan
  - Providing medicines information
  - Facilitating continuity on transition between settings
  - Interdisciplinary care planning
  - Prioritising clinical pharmacy services
  - Staffing levels and structure
  - Training and education
  - Participating in research
  - Pharmacy technicians supporting clinical pharmacy services
  - Documenting clinical activities
  - Improving the quality of service
  - Clinical competency assessment tool
Table 9.1. Pharmacist staffing levels for provision of clinical pharmacy services based on ‘overnight beds’

<table>
<thead>
<tr>
<th>Category</th>
<th>Service related bed type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Specialist units, high dependence on medicines</td>
<td>Haematology Infections, M Oncology, R Medicine, Transfused Blood</td>
</tr>
<tr>
<td>2 Medical bed type</td>
<td>General medical Cardiology, I Cardiology, E Endocrinology, Gastroenterology, P Neurology, R Respiratory, R Rheumatology, P Paediatric medicine</td>
</tr>
<tr>
<td>3 Surgical bed type</td>
<td>General surgery, Breast Cardiologist, Gastroenterology, Urology, V Vascular surgery, N Neurosurgery, O Orthopaedic Surgery, R Reconstructive Surgery, U Urology, V Vascular surgery</td>
</tr>
<tr>
<td>4 Palliative care</td>
<td>Palliative care</td>
</tr>
</tbody>
</table>

Beds to 1 FTE pharmacist for

Table 13.1 Risk classification of pharmacy interventions using a consequence/probability matrix

<table>
<thead>
<tr>
<th>Level</th>
<th>Consequence or impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Insignificant</td>
</tr>
<tr>
<td>2</td>
<td>Minor</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
</tr>
<tr>
<td>4</td>
<td>Major</td>
</tr>
<tr>
<td>5</td>
<td>Catastrophic</td>
</tr>
</tbody>
</table>

Likelihood of occurrence

<table>
<thead>
<tr>
<th>Level</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Almost certain</td>
</tr>
<tr>
<td>B</td>
<td>Likely</td>
</tr>
<tr>
<td>C</td>
<td>Possible</td>
</tr>
<tr>
<td>D</td>
<td>Unlikely</td>
</tr>
<tr>
<td>E</td>
<td>Rare</td>
</tr>
</tbody>
</table>

Risk (consequence x likelihood)

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Insignificant</th>
<th>Minor</th>
<th>Moderate</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (almost certain)</td>
<td>H</td>
<td>H</td>
<td>E</td>
</tr>
<tr>
<td>B (likely)</td>
<td>M</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>C (possible)</td>
<td>L</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>D (unlikely)</td>
<td>L</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>E (rare)</td>
<td>L</td>
<td>L</td>
<td>M</td>
</tr>
</tbody>
</table>

E = extreme risk; H = high risk; M = moderate risk; L = low risk.

Table 14.1 Some suggested performance indicators for clinical pharmacy services

<table>
<thead>
<tr>
<th>Clinical activity</th>
<th>Performance indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurate medication history</td>
<td>Percentage of patients with completed medication history by a pharmacist within 24 hours of admission or presentation</td>
</tr>
<tr>
<td>Medication reconciliation</td>
<td>Percentage of patients with completed medication reconciliation by a pharmacist within 24 hours of admission or presentation</td>
</tr>
<tr>
<td>Assessment of current medication management</td>
<td>Percentage of patients with current medications reconciled (on presentation, transfer or discharge)</td>
</tr>
<tr>
<td>Therapeutic drug monitoring</td>
<td>Percentage of patients that receive an assessment of current medication management by a pharmacist</td>
</tr>
<tr>
<td>Medication management</td>
<td>Quality of clinical pharmacy interventions: percentage of interventions rated &gt; moderate (collected periodically over 24 days)</td>
</tr>
<tr>
<td>Therapeutic drug monitoring</td>
<td>Percentage of patients with an INR &gt; 4 that have had their dosage adjusted or reviewed prior to the next warfarin dose</td>
</tr>
<tr>
<td>Medication management</td>
<td>Percentage of patients with toxic or subtherapeutic aminoglycoside concentrations that have had their dosage adjusted or reviewed prior to the next aminoglycoside dose</td>
</tr>
</tbody>
</table>

Journal of Pharmacy Practice and Research vol 43, 2 (suppl), 2013
In contrast with pharmacy education’s thorough embrace of clinical pharmacy, grassroots pharmacy practice seems to have suffered from a lack of vision and will (Zellmer AJHP 2010)

Goal: To significantly advance the health and well being of patients by developing and disseminating a futuristic practice model that supports the most effective use of pharmacists as direct patient care providers.
THOUGHTS FOR THE FUTURE?
- Move forward… using a stepwise approach
- Define precise clinical pharmacy practice standards
- Document, benchmark and evaluate level of practice
- Increase and optimise resources
- Research to inform strategic planning
A vision for Europe?
Objectives

- to set out the future direction of the profession, how it can further serve the patient and collaboration with other health professionals

Outcomes

- Defining competencies
- Highlighting best practices
- Proposing service metrics and implementation framework
« The transformation of pharmacy practice will not march in a straight line toward some ultimate perfection. Rather, it is likely to follow a haphazard course, leading to a variety of practice models that have core traits in common with the early concept of clinical pharmacy. »

The pace of change may fluctuate between exhilarating advances and disappointing setbacks, depending on the forces of the environment and the quality of the profession’s leadership.

Even if pharmacy continues to be blessed with wise and assiduous leaders, its full promise will be realized only if a perceptual transformation occurs within individual pharmacists.
Thank you for your attention

The future has already arrived.
It’s just not evenly distributed yet
- William Gibson (science-fiction writer)
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1- No funds were received in support of this presentation.

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