

5

Caring for people with acute conditions: transitional care, relocation of care and new division of work

IVY BOURGEAULT, CHRISTINE BOND, ROMY MAHRER-IMHOF, HANNAH BUDDE, BERND RECHEL, CLAUDIA B. MAIER

5.1 Introduction

There is an overall trend towards decreasing length of stay in hospitals. Earlier discharges and transitions to home and community care are increasing, as well as the use of outpatient clinics for acute care across European countries. How this is implemented varies significantly not only between but also within countries (Corbella et al., 2018). Some of the key drivers of these trends are: improvements in medical and surgical techniques and pharmacotherapies; increased use of e-health, m-health and digital technologies; efforts to reduce the risk of hospital-acquired infections; and tightening health care budgets where care in the community and ambulatory care settings is seen to be more cost effective (Busby, Purdy & Hollingworth, 2015; Marschang & Bernardo, 2015).

Earlier discharge and shorter hospital stays result in more patients with more complex conditions being treated in the community by health professionals in primary care and in specialized ambulatory care settings. All patients are vulnerable during care transitions from acute care, but most particularly adults with complex medical conditions and older adults with comorbidities or on polypharmacy regimens. Ineffective care transitions resulting from poor cross-site communication and collaboration can lead to suboptimal patient outcomes. Key factors fostering more effective care transitions include interdisciplinary coordination and collaboration of patient care across care sectors, shared accountability by all clinicians involved, provision of appropriate support and follow up after discharge (Sheikh et al., 2018), mutual respect, shared

goals and good communication. New models of care easing the shift in the location of care use existing health professionals in new ways (for example, extended roles) or introduce new professionals (for example, physician assistants or retinal screeners). These changes reflect an ongoing and dynamic process.

We focus this chapter on the changing skill-mix of health professionals providing care for patients with acute illnesses. Acute illnesses are defined for the purpose of this chapter as all short-term, acute conditions, ranging from acute episodes of chronic conditions, such as stroke or myocardial infarction, which require highly specialized, coordinated health care across sectors (for example hospital–ambulatory care transitions), to minor acute illnesses that are often prevalent in primary care practices (such as influenza, pharyngitis, urinary tract infections). We begin with a review of the literature on the increasingly earlier shift of patients from hospital to outpatient, ambulatory and community care, with a focus on home care settings, and the use of the wider health care team in the management of acute presentations of conditions – both major and minor. We then provide an overview of recent trends across Europe and internationally of skill-mix changes and innovations. We present three case studies of skill-mix innovations and innovative models of care that optimize the scope of practice of health professionals.

Our analysis of literature reviews and recently published studies shows that there are some promising innovations involving various skill-mix interventions. Caution is necessary, however, in comparing seemingly similar models across different country contexts and assuming transferability across different clinical conditions and unique professional practices.

5.2 Evidence on outcomes based on an overview of reviews

Twenty-eight reviews were identified that focused on skill-mix changes for acute health conditions including acute episodes of chronic conditions (see Box 5.1). The majority ($n = 20$) assessed new skill-mix models across care settings or providers (transitional care). Four reviews assessed skill-mix changes due to relocation of services (hospital-at-home) and four assessed expanded roles for specific health professionals for (minor) acute illnesses.

Box 5.1 Overview of the evidence on skill-mix innovations in acute care patients

- Number of reviews: A total of 28 systematic reviews covering 637 individual studies, often RCTs, were identified.
- Country coverage: The studies were conducted in a large number of different EU countries and other, primarily high-income, countries, notably the USA.
- Methods: Of all reviews, six performed meta-analyses. One review was a Cochrane review.

Most reviews covered skill-mix changes to reduce disruptions at the interface between care sectors, with a focus on the transitioning of care from hospital to ambulatory care (Table 5.1). The population groups targeted by the interventions ranged from patients with stroke, acute myocardial infarction or other acute cardiovascular conditions, or acute pneumonia to pregnant women at risk, and transitional care between paediatric and adult care for patients with juvenile onset of rheumatic and musculoskeletal diseases.

5.3 Skill-mix strategies addressing acute conditions

Skill-mix interventions with a focus on transitional care

Improving the transition from one setting to another is critical for patients with acute conditions, as there is a risk of disruption in service delivery. Transitional care is defined as the various points where a patient moves to, or returns from, a particular physical location or makes contact with a health care professional for the purposes of receiving health care. This includes transitions between home, hospital, residential care settings and consultations with different health care providers in out-patient facilities (World Health Organization, 2016).

Skill-mix interventions to improve transitional care were analysed in 20 systematic reviews emanating from the overview of reviews. All reviews evaluated interventions before, at, or immediately after discharge from hospitals to ambulatory care services. The skill-mix interventions were clustered into transitional care roles performed by various professions. These reviews did not differentiate between the professions that performed the role of coordination or case management. Four and five

Table 5.1 *Summary of reviews: skill-mix on transitional care and early discharge planning*

Description of intervention	Content of interventions and skill-mix changes	Profession(s)	Population	Countries	Patient-related outcomes ^a	Health-system-related outcomes	Profession-specific outcomes
Transitional care roles, various professions [1–9]	Various roles including case manager role, care coordinator, transition coordinator. Interventions included structured pre- and/or post-discharge planning, pre-discharge education, home visits, medication reconciliation scheduling follow up and linkage with other services and sectors, mostly provided by multiprofessional teams in a community setting	Intervention: Nurses (incl. APN), clinical pharmacists, GPs, care coordinators, physiotherapists, social workers, stroke support workers, case managers, caregivers, transitional care teams (team composition including transition coordinator) Comparison: Pharmacists, family physician, cardiologist not consistently reported	Stroke patients [1,2], patients with community-acquired pneumonia [3] or older people [4], juvenile onset rheumatic and musculoskeletal disease patients [5], patients with heart failure [6,9], adults hospitalized for diverse conditions [7,8]	UK, USA, AU, CA, DE, BE, BR, NL, IT, IL, IE, IR, ES, CH, NZ, AT, CN, HK, TW, DK, IN, NO PT, SE, TH, SW, not consistently reported	<ul style="list-style-type: none"> • Improvement in mortality (OR 1.04, 95% CI 0.77–1.40, $P = 0.81$) in stroke patients [2] • Home-visits reduced mortality 3–6 months (RR 0.77, 95% CI 0.60–0.997), outpatient clinic-based interventions reduced mortality in patients with heart failure (RR 0.56, 95% CI 0.34–0.92) [9] • Reductions in post-discharge clinical adverse event rates [8] • Improved knowledge about the disease [1], adherence to appointments; quality of life; psychosocial and disease-specific health status [5] 	<ul style="list-style-type: none"> • Case management reduced emergency visits [1,6]; increased outpatient appointments [1]; significantly reduced hospital stay (MD 5.5 days, 95% CI 2.9–8.2, $P < 0.0001$) [2,4] • Significant reduction of hospital readmission (RR 0.92, 95% CI 0.87–0.98) in heart failure patients [6,9], mixed results for older people, pneumonia [3,4,7,8] • High (vs low) intensity interventions with significantly improved effect for readmissions in heart failure [6] • No significant improvements in ED visits, GP visits and specialist clinic/outpatient visits for older people [4] and no difference for health service utilization [1] 	

Pharmacist-led transitional care [10–13]	Interventions covered medication review, reconciliation and patient counselling and education	Intervention: Pharmacists, pre-graduate pharmacists, pharmacist technicians, nurses/physicians (collaborator), GPs, community health care professionals Comparison: Physicians, nurses, care coordinators, others n/r	Patients with various acute conditions (e.g. heart failure, COPD, diabetes, coronary syndrome [13],	AU, BE, CA, CN, DK, ES, IR, SE, UK, USA (not consistently reported)	<ul style="list-style-type: none"> • No significant effect in physical functioning, mood, quality of life for patients and caregivers [1] • Little or no difference for mood status and subjective health status and participants' ADL [2] • Medication error significantly improved (OR 0.44, 95% CI 0.31–0.63) [11] • Mixed results on adverse drug event [10] • Mixed results on mortality [10] • No significant difference for all-cause mortality [12] • Improved medication adherence [13] 	<p>Resource use:</p> <ul style="list-style-type: none"> • Community-initiated case management reported lower costs [4] • Estimated costs ranged from 23% lower to 15% higher costs for the intervention group [2] • ED visits reduced [10–12]; 2 meta-analyses: OR 0.42, 95% CI 0.22–0.78 [11] and RR 0.72, 95% CI 0.58–0.92 [12] • Mixed results on hospital readmissions [10–12] • Reduction in hospital visits due to adverse drug events (RR 0.33, 95% CI 0.20–0.53) [12] • No significant improvements for readmissions, hospitalizations, emergency visits and mortality [13] • Cost savings associated with difference in readmissions [13]
--	---	--	---	---	---	---

Table 5.1 (cont.)

Description of intervention	Content of interventions and skill-mix changes	Profession(s)	Population	Countries	Patient-related outcomes ^a	Health-system-related outcomes	Profession-specific outcomes
Nurse-led transitional care [14–18]	Initiated in hospital, community or post-discharge. Interventions included discharge planning, care coordination and plans, patient education, assessment, home visits, improve medication adherence, technology-based integrated counselling, care coordination, advocacy for options and services, involvement with family members	Intervention: Case manager/ specialist nurses, clinical nurse specialists, registered nurses, registered nurses and other professions Comparison: GPs, nurses, physiotherapists, caregivers, discharge planning nurses (not consistently reported)	Patients with various acute conditions (e.g. after cancer surgery, heart failure, elderly, high-risk pregnant women) or chronic illness [17,18]	CA, CN, DE, DK, ES, HK, IL, IT, LB, NL, Taiwan, UK, USA	<ul style="list-style-type: none"> Improved treatment adherence [15], and medication adherence [16] Risk of death significantly reduced by 50% in cancer patients [15] Increased satisfaction for postpartum mothers and for heart failure patients after discharge [15] Depression symptoms for caregivers in elderly care reduced [15] Improved patient satisfaction and quality of life [17] Mixed results for psychological outcomes [18] 	<ul style="list-style-type: none"> Readmission rates reduced (RR 0.51, 95% CI 0.29–0.91, $P = 0.02$) [15], (OR 0.74, 95% CI 0.60–0.92) [14] Hospital stay reduced [14,15,18], (MD 1.28 days [14]) No difference for ED / outpatient visits [14] Primary care visits reduced [15] Hospital readmissions [17,18], ED visits [18], duration of readmission and mortality reduced [17] No reduction in index admission stay [17] <p>Resource use:</p> <ul style="list-style-type: none"> Cost saving (case management) [14] and lower maternal and infants care costs [15] Discharge planning reduced total and readmission costs [17] Mixed results for costs [18] 	

Patient navigator roles [19,20]	Transitional care intervention from hospital to home through patient navigation. Intervention components included coordination, discharge planning and follow up, education and multiprofessional collaboration	Intervention: Nurse, advanced practice nurse, social worker, pharmacist Comparison: Family physician, not consistently reported	Older patients with chronic conditions	<ul style="list-style-type: none">• Significantly improved depression symptoms ($P < 0.001$) [19]• Significant improvement for disease self-management ($P < 0.05$) [19]• Mixed results on quality of life: improved ($P < 0.001$) [19], no significant effect [20]• Improved activities of daily living, communication with patients, caregivers, education for caregivers, self-management, knowledge of patient medication [19]• Mortality was significantly reduced (RD -0.02, 95% CI -0.05 to 0.00) [20]	<ul style="list-style-type: none">• Significantly fewer ED visits at 3 months post-discharge (RD -0.08, 95% CI -0.15 to -0.01); no effect at 1, 6, 12 months [20]• Significantly lower at 6 months (RD -0.05, 95% CI -0.09 to -0.00), 12 months (RD -0.11, 95% CI -0.17 to -0.05), and at 24 months (MD -1.03, 95% CI -1.81 to -0.24) (for patients with chronic conditions) [20]; lower readmissions for patients with chronic conditions [19]• Shorter time to readmission and fewer hospital days [19]• Improved community referrals [19] <p>Resource use:</p> <ul style="list-style-type: none">• Inconclusive effect on emergency costs [19]
---------------------------------	---	--	--	--	--

Abbreviations: ADL: activities of daily living; CI: confidence interval; CNS: clinical nurse specialist; COPD: chronic obstructive pulmonary disease; ED: Emergency Department; GP: general practitioner; MD: mean difference; n/r: not reported; OR: odds ratio; RD: risk difference; RR: relative risk.

Country abbreviations: AU: Australia; AT: Austria; BE: Belgium; BR: Brazil; CH: Switzerland; CN: China; DE: Germany; DK: Denmark; ES: Spain; FI: Finland; GE: Georgia; IT: Italy; IR: Iran; JP: Japan; NL: the Netherlands; NZ: New Zealand; SE: Sweden; UK: the United Kingdom; USA: the United States of America.

Notes: ^a Including caregiver-related outcomes.

Sources: [1] Allison et al. (2011); [2] Langhorne & Baylan (2017); [3] Domingo et al. (2012); [4] Huntley et al. (2013); [5] Clemente et al. (2016); [6] Vedel & Khanassov (2015); [7] Hansen et al. (2011); [8] Rennke et al. (2013); [9] Feltner et al. (2014); [10] Ensing et al. (2015); [11] De Oliveira et al. (2017); [12] Mekonnen, McLachlan & Briem (2016); [13] El Hajj et al. (2017); [14] Huntley et al. (2016); [15] Bryant-Lukosius et al. (2015); [16] Verloo et al. (2017); [17] Zhu et al. (2015); [18] Joo & Liu (2017); [19] Manderson et al. (2011); [20] Le Berre et al. (2017).

reviews, respectively analysed the effects of transitional care roles led by pharmacists and nurses, whereas two reviews specifically analysed patient navigator roles for older people (Table 5.1). Although the skill-mix interventions varied across the reviews, they all had in common that the main tasks were to improve the coordination and transitioning of care between the inpatient and outpatient sectors.

The reviews evaluated the effects of several, often bundled, interventions. These included discharge planning, care coordination, home visits, shared care plans, multisectoral care collaboration across social and health sectors, as well as care coordination between hospital and ambulatory care providers.

- Nine systematic reviews focused on transitional care roles and pre- and post-structured discharge interventions. Case management was central to all reviews, but interventions in one review combined health and social care to collaboratively provide primary care-based follow up for stroke patients post-discharge from hospital. The interventions comprised medication reviews, assessment of disability and caregiver needs. It also included the provision of information and linkage with other services provided by social workers, stroke support workers, care coordinators, case managers, GPs and caregivers (Allison et al., 2011). Seven reviews covered a range of different interventions such as home visits or rehabilitation in addition to case management delivered by nurses, pharmacists, family physicians or case managers (Domingo et al., 2012; Feltner et al., 2014; Hansen et al., 2011; Huntley et al., 2013; Langhorne & Baylan, 2017; Rennke et al., 2013; Vedel & Khanassov, 2015). Multiprofessional teams were introduced in the transition from paediatric to adult care settings for patients with juvenile onset rheumatic and musculoskeletal diseases. Transitional care teams that focused on the care transitioning across the two different phases of life (paediatric to adulthood) encompassed at least a transition coordinator, paediatric and adult rheumatologist trained in adolescent rheumatology and a clinical nurse specialist as well as several other professionals (Clemente et al., 2016).
- Pharmacist-led transitional care focused primarily on medication reviews and reconciliation and patient counselling at the hospital-home interface (De Oliveira et al., 2017; El Hajj et al., 2014; Ensing et al., 2015; Mekonnen, McLachlan & Brien, 2016). Nurse-led

transitional care interventions often covered more interventions compared with pharmacists, including discharge planning and coordination, home visits and patient assessments, among others (Bryant-Lukosius et al., 2015; Huntley et al., 2016; Joo & Liu, 2017; Verloo et al., 2017; Zhu et al., 2015). However, pharmacists were unique in providing expert medication reviews and reconciliation services.

- Two reviews covered patient navigator roles performed by different professions. The reviews included a wide range of interventions, but most of them focused on the role of patient navigation providing discharge planning and follow up, education and multiprofessional collaboration (Le Berre et al., 2017; Manderson et al., 2011).

Skill-mix interventions focusing on the relocation of care

Four reviews summarized the evidence on skill-mix interventions resulting from re-location of care settings (Table 5.2). All analysed hospital-at-home services.

Three reviews, including two Cochrane reviews, analysed the effects of shifting care location from hospitals to home in which various professions were involved, a concept referred to as hospital-at-home, in which a specialized team provides active treatment in the patient's home for a disease that usually would require hospital inpatient stays. Randomized controlled trials covered different patient groups: stroke, mixed conditions, elective surgery (Gonçalves-Bradley et al., 2017), heart failure (Qaddoura et al., 2015) and acute episodes of chronic obstructive pulmonary disease (COPD) (Shepperd et al., 2017). The interventions comprised several new team and skill-mix models, including teams working in hospital outreach services, community-based teams, as well as teams enhancing coordination of care across the settings. The professions covered a range of both specialists and lay workers, including specialist physicians and social care workers, various therapists (speech, etc.), care assistants, home helps and volunteers (Gonçalves-Bradley et al., 2017; Qaddoura et al., 2015; Shepperd et al., 2017).

Another Cochrane review focused on hospital-at-home skill-mix interventions. This time delivered by a specialist respiratory nurse under guidance of a medical hospital team targeting patients with acute exacerbations of COPD (Jeppesen et al., 2012).

Table 5.2 *Summary of reviews: skill-mix interventions and relocation of care from hospital settings to patients' homes*

Description of intervention	Content of interventions and skill-mix changes	Profession(s)	Population	Countries	Patient-related outcomes	Health-system related outcomes	Profession-specific outcomes
Hospital-at-home, various professions [1–3]	Hospital treatment at home provided by specialized team	<p>Intervention: Physicians and various specialties, nurses, GPs, cardiologists, care assistants, home helps, dieticians, physiotherapists, social workers, volunteers, occupational or speech therapists, social workers</p> <p>Comparison: Health care staff in inpatient settings, inconsistently reported</p>	Patients with heart failure [2], stroke [1, 4], mixed condition [1, 3], elective surgery patients [1] or acute episodes of COPD [3]	AU, CA, NO, SE, UK, ES, IT, NZ, RO, USA	<p>Lower risk of living in an institutional setting for patients with stroke (RR 0.63, 95% CI 0.40–0.98) and mixed medical conditions (RR 0.69, 95% CI 0.48–0.99) [1]</p> <ul style="list-style-type: none"> • Little to no difference in mortality at 6 months follow up (RR 0.77, 95% CI 0.60–0.99; $P = 0.04$) [3] • No effect on functional status, patient-reported outcomes and caregiver outcomes for stroke patients [1] • No or little difference in mortality at 3–6 months for stroke patients (RR 0.92, 95% CI 0.57–1.48) and little or no difference in hospital readmission (RR 1.09, 95% CI 0.71–1.66) [1] 	<ul style="list-style-type: none"> • Reduced days of hospital stay for all three patient groups [1] or mixed results [3] • No effect on hospital readmission [1] and little or no difference in the likelihood of being transferred (or readmitted) to hospital (RR 0.98, 95% CI 0.77–1.23; $P = 0.84$) [3] • Increased time to first readmission (MD 14.13 days 95% CI 10.36–17.91) and decreased readmissions [2] • Reduced likelihood of living in residential care at 6-month follow-up (RR 0.35, 95% CI 0.22–0.57, $P < 0.0001$) [3] 	

Nurse specialist-delivered hospital-at-home [4]	Nurse specialist-delivered hospital-at-home, under guidance of medical hospital team	Intervention: specialist respiratory nurse, medical hospital team Comparison: medical hospital team	Patients with acute exacerbations of COPD	AU, DK, IT, ES, UK	<ul style="list-style-type: none"> • Slight improvement in patient satisfaction [1] • No effect on all-cause mortality (RR 0.94, 95% CI 0.67–1.32) [2] • Improved health-related quality of life [2] • Lower mortality, but not significant (RR 0.65, 95% CI, 0.40–1.04, $P = 0.07$) • Mixed results in patient satisfaction 	<p>Costs:</p> <ul style="list-style-type: none"> • Reduced total costs in the intervention group [2] • Slightly decreased treatment costs, but this benefit is offset when the costs of informal care are considered [3] • A small and significant reduction in readmission rates for acute exacerbations of COPD (RR 0.76, 95% CI, 0.59–0.99, $P = 0.04$) [3] <p>Costs:</p> <ul style="list-style-type: none"> • Significant reduction in direct costs [3]
---	--	--	---	--------------------	--	--

Abbreviations: CI: confidence interval; COPD: chronic obstructive pulmonary disease; ESP: extended scope-of-practice physiotherapists; GP: general practitioner; RR: relative risk.

Country abbreviations: AU: Australia; CA: Canada, DK: Denmark; ES: Spain; IT: Italy; NO: Norway; NZ: New Zealand; RO: Romania; SE: Sweden; UK: the United Kingdom; USA: the United States of America.

Sources: [1] Gonçalves-Bradley et al. (2017); [2] Qaddoura et al. (2015); [3] Shepperd et al. (2017); [4] Jeppesen et al. (2012)

Skill-mix interventions focusing on new division of work for (minor) acute illnesses

New division of work for acute, often minor, illnesses was the focus of four reviews (Table 5.3). The triage of patients with acute musculoskeletal conditions was shown to be as effectively performed by physiotherapists with extended scopes-of-practice as by physicians. The role of physiotherapists with extended scopes-of-practice in the triage involved assessments of patients, undertaking diagnostic procedures and onward referrals to other departments, surgery or community services such as rheumatology and orthopaedic services (Oakley & Shacklady, 2015).

A systematic review that covered studies in the United Kingdom found that pharmacy-based and pharmacy-led minor ailment schemes were effective in the management of minor acute illnesses. It resulted in generally high patient satisfaction and improved GP satisfaction, as well as reducing costs of prescribing by 25% (Paudyal et al., 2013).

Two reviews analysed the effects of extending the role of mid-level dental care workers by taking over tasks that have traditionally been performed by dentists. One review focused on caries treatment for patients with acute dental health care needs as a means to expand the dental care workforce in primary care and reduce dentists' workloads (Wright et al., 2013). The other review assessed interventions such as irreversible procedures or local anaesthesia performed by dental hygienists and assistants (Dasanayake et al., 2012).

5.4 Outcomes of skill-mix interventions

Transitional care

All 20 reviews (Table 5.1) on transitional care skill-mix interventions found them to be associated with improvements in at least one patient-related or health-system-related outcome measure. There was no evidence on profession-specific outcomes.

Positive effects were found with transitional care roles performed by various professions for patients with stroke and heart failure. Skill-mix changes focused on improving transitional care reduced mortality in stroke patients (Langhorne & Baylan, 2017). Moreover, home visits and clinic-based interventions focusing on easing transitions were associated

Table 5.3 *Summary of reviews: skill-mix interventions and new division of work for (minor) acute illnesses*

Skill-mix interventions		Outcomes					
Description of intervention	Content of interventions and skill-mix changes	Profession(s)	Population	Countries	Patient-related outcomes	Health-system related outcomes	Profession-specific outcomes
Triage of acute care [1]	Triage performed by Extended Scope-of-Practice Physiotherapists (ESP)	Intervention: Physiotherapists with expanded scope-of-practice Comparison: Physicians, orthopaedic surgeons, rheumatology consultants, GPs	Patients with musculo-skeletal conditions	AU, CA, IE, NL, UK, USA	<ul style="list-style-type: none"> No significant differences between the percentage of correct diagnoses between ESP and physicians All studies showed generally high patient satisfaction with ESP. Patient satisfaction with ESP ranged from 77% to 89% 		<ul style="list-style-type: none"> High general GP satisfaction with ESP's work
Pharmacy-based minor ailment schemes (PMAS) [2]	Community PMAS offering the management of two or more minor ailments (consultation by pharmacists)	Intervention: Pharmacists Comparison: GPs	Patients with various minor ailments	UK	<ul style="list-style-type: none"> The resolution of minor ailments following pharmacy-based consultation ranged from 68% to 94.4% >90% expressed general satisfaction with the PMAS consultation, pharmacy staff attitude and expertise of pharmacy staff 	<ul style="list-style-type: none"> Significantly fewer GP consultations for minor ailments Decline in prescribing volume in general practices through PMAS Reduction of prescribing cost by 25% 	<ul style="list-style-type: none"> GP satisfaction with PMAS was reported Community pharmacists expressed positive attitudes towards the scheme

Table 5.3 (cont.)

Skill-mix interventions			Outcomes				
Description of intervention	Content of interventions and skill-mix changes	Profession(s)	Population	Countries	Patient-related outcomes	Health-system related outcomes	Profession-specific outcomes
New roles for mid-level professions [3, 4]	Mid-level providers in dental teams in primary care	Intervention: Mid-level providers (e.g. dental hygienists, dental nurse, dental assistants) and dentists in supervision Comparison: No care, dentist or other professions	Population requiring dental care [3, 4]	AU, CN, HK, NZ, USA, UK, CA, SE	<ul style="list-style-type: none"> • Reductions in caries/severity over time [3] • Most studies comparing dental hygienists with other professions (e.g. dentists) or no usual care, found lower levels of untreated caries in the intervention group [3] • Mixed results for the differences in caries severity in the interventions vs comparison groups [3] • Effect on patient satisfaction [4] • Better restorations and fewer failures [4] 	<ul style="list-style-type: none"> • Increased productivity and reduced waiting times with dental hygienists [4] • 3% required re-visits after irreversible procedures were performed by mid-level providers [4] • More than 90% success after first attempt to perform local anaesthesia by dental hygienists [4] • Equal quality provided by dental hygienists compared with dentists [4] 	<ul style="list-style-type: none"> • 90% of students favoured the expansion of dental assistants' role [4]

Abbreviations: ESP: extended scope-of-practice physiotherapists; PMAS: pharmacy-based minor ailment schemes.

Country abbreviations: AU: Australia; CA: Canada; CN: China; IE: Ireland; HK: Hong Kong; NL: the Netherlands; NZ: New Zealand; SE: Sweden; UK: the United Kingdom; US: the United States of America.

Sources: [1] Oakley & Shacklady (2015); [2] Paudyal et al. (2013); [3] Wright et al. (2013); [4] Dasanayake et al. (2012)

with a decrease in mortality in patients with heart failure (Feltner et al., 2014). Other positive effects ranged from improved knowledge about the condition (Allison et al., 2011), improved self-management (Manderson et al., 2011), adherence to appointments (Clemente et al., 2016) and medication (El Hajj et al., 2017; Verloo et al., 2017) and increased patient satisfaction (Zhu et al., 2015). Several positive benefits were also identified for caregivers (Bryant-Lukosius et al., 2015; Manderson et al., 2012).

Pharmacist-led transitional care was found to significantly reduce medication errors in one review (De Oliveira et al., 2017), whereas a second review showed mixed results on adverse drug events (Ensing et al., 2015). Nurse-led transitional care was associated with improved treatment and medication adherence (Bryant-Lukosius et al., 2015).

Overall, there were mixed effects on mortality. In two studies, mortality was significantly reduced for patients receiving transitional care, based on meta-analyses (Bryant-Lukosius et al., 2015; Le Berre et al., 2017) and one showed improved mortality rates (Feltner et al., 2014). One review showed a non-significant reduction (Langhorne & Baylan, 2017), one review showed mixed results (Ensing et al., 2015) and one showed no significant difference for all-cause mortality (Mekonnen, McLachlan & Brien, 2016).

Regarding health-system-related outcomes, transitional care was shown to reduce emergency department visits in the pharmacist-led models (De Oliveira et al., 2017; Ensing et al., 2015; Mekonnen, McLachlan & Brien, 2016), and with mixed results emanating from the reviews analysing nurse-led and mixed-profession-led transitional care (Huntley et al., 2016; Le Berre et al., 2017) and case management and structured discharge (Allison et al., 2011). In the case of nurse-led transitional care, hospital readmissions and hospital length of stay were reduced (Bryant-Lukosius et al., 2015; Huntley et al., 2016; Joo & Liu, 2017; Zhu et al., 2015). Transitional care interventions delivered by various professions showed a significant reduction in readmission rates (Vedel & Khanassov, 2015) or mixed results (Rennke et al., 2013). Several reviews analysed the costs and efficiency of transitional care interventions, of which one found lower costs in nurse-led case management across care settings for patients (Huntley et al., 2016), one demonstrated reduced costs for nurse-led transitional care for at-risk pregnant women and low-birthweight newborns (Bryant-Lukosius

et al., 2015), one reported cost savings associated with the difference in readmissions in the pharmacist-led intervention (El Hajj et al., 2017). Inconclusive (Manderson et al., 2011) or mixed (Joo & Liu, 2017) evidence on costs was also shown.

Skill-mix and relocation of care

Meta-analyses showed that hospital-at-home skill-mix models were associated with a reduced risk of living in an institutional setting for stroke patients at follow up (for example at 6 months) and for patients with multiple medical conditions, as well as slight improvements in patient satisfaction (Gonçalves-Bradley et al., 2017). Reduced likelihood of living in residential care was also found in Shepperd et al. (2017). Hence, there is some evidence to suggest that hospital-at-home may delay admission to residential care and nursing homes. In all three patient groups reported in Gonçalves-Bradley et al. (2017), the length of inpatient hospital stay was significantly reduced, but mixed results were found in Shepperd et al. (2017). The two Cochrane reviews on hospitals-at-home showed no or little difference on mortality (Shepperd et al., 2017) at 3–6 months for stroke patients (Gonçalves-Bradley et al., 2017). Little or no difference on hospital readmission was reported in two reviews (Gonçalves-Bradley et al., 2017; Shepperd et al., 2017). Mixed results on costs were reported in one review (Shepperd et al., 2017). The third systematic review on hospital-at-home for patients with heart failure reported improved quality of life, decreased readmissions and a reduction in the total costs (Qaddoura et al., 2015).

The Cochrane review that focused on hospital at home interventions for patients with COPD delivered by a specialist respiratory nurse showed a small significant reduction in readmission rates and a non-significant effect for mortality rates. Mixed results on patient satisfaction and a significant reduction in direct costs were found in the review (Jeppesen et al., 2017).

New division of work for minor acute illnesses

Only one review highlighted profession-specific outcomes in terms of satisfaction of GPs with the skill-mix intervention (Oakley &

Shacklady, 2015). The review on triage performed by extended scope-of practice physiotherapists showed high patient and physician satisfaction with their overall performance in terms of diagnostic accuracy. The evidence was based on a total of 14 studies in six countries assessing the correctness of the diagnoses, after physiotherapists were trained in performing triage functions. This review states, however, that there may be a lack of robustness to the evidence making it difficult to generalize findings to all extended scopes-of practice in musculoskeletal triage, especially in terms of the different aspects of satisfaction. There is also insufficient evidence concerning the content and length of training for triage purposes. Extended scopes-of practice have a variety of clinical roles; these need to be clearly described and updated with current extended scope-of practice clinical practice/competencies to allow findings to be of relevant clinical value (Oakley & Shacklady, 2015).

In the review by Wright et al. (2013), all studies with mid-level dental hygienists performing expanded procedures for acute dental conditions (such as caries) were associated with reductions in caries over time, less untreated caries and mixed results in the treatment of caries severity, suggesting that mid-level providers can take care of minor, routine caries cases and expand access to services. Dasanayake et al. (2012) demonstrate that tasks performed by dental hygienists show equal quality compared with dentists, and they also find high success rates in giving local anaesthesia and in carrying out reversible and irreversible procedures. Increased productivity, reduced waiting times and patient satisfaction were also reported.

Results of pharmacy-based minor ailment consultations by pharmacists suggest that these are being managed well and are less costly than by a general practitioner. Moreover, the review's findings show significantly fewer GP consultations and an overall satisfaction or positive attitudes among patients, GPs and pharmacists (Paudyal et al., 2013).

Education and training of professions involved in the skill-mix changes

While the majority of reviews provided information on the professions involved in the skill-mix changes, few reported details on the education,

competencies and skills they acquired. Also, when comparator groups were mentioned, their education was not reported.

5.5 Strengths and limitations of the reviewed evidence

The systematic reviews covered a large number of studies (>600) conducted in many countries in Europe and other high-income countries. Several meta-analyses of RCTs were performed, as well as reviews that narratively reported the findings from other research. Several RCTs had a small sample size, faced high attrition or other limitations and the comparison groups were not reported or not consistently reported. The education and training of the professions and individuals were insufficiently reported, as were the details of the skill-mix interventions. Often, bundled interventions of new skill-mixes and new organizations of care were evaluated, which limits the attribution of causality.

5.6 Conclusions on skill-mix intervention effectiveness in acute and transitional care

Several reviews evaluated new skill-mix models in the provision of acute care, where the boundaries between the care settings have shifted considerably from inpatient to outpatient care. Transitional care roles were shown to have several positive patient outcomes for stroke and heart failure patients and other conditions, although the evidence on multiple conditions was more limited. Pharmacist-led transitional care roles were associated with reduced medication errors and improved adherence whereas nurse-led transitional care roles showed improved therapy and treatment adherence. The re-allocation of tasks and roles from physicians and dentists to other professions, namely nurses, pharmacists and physiotherapists, was shown to be generally effective for a wide range of conditions and roles (including transitional roles, hospital-at-home and minor acute care) within the professions' enlarged scopes-of-practice. The reviews suggest that skill-mix models with the primary aim to improve transitions across sectors can improve patient-related outcome parameters, such as enhanced knowledge about the condition and self-management as well as improved medication

adherence. The evidence on hospital readmissions and Emergency Department use is inconclusive, although there are some promising country experiences.

5.7 Acute and transitional care skill-mix innovations and reforms

Overview of recent trends across Europe and internationally

Recent trends in skill-mix innovations in acute and transitional care across Europe and internationally have focused on discharge and transition from hospital to ambulatory community care and home settings; relocating care to the lowest level (hospital-at-home) and new forms of division of work for minor acute illnesses in primary outpatient care. New models of care have emerged, involving the utilization of new skills of existing providers. The expanded roles of two key professions, nurses and pharmacists, are emphasized in the literature, but there are also expanded roles of physiotherapists (particularly in the triage function), radiographers and physician assistants, and of team-based interventions more generally. We highlight some of the key trends below.

Transitional care

Expanded roles of nurses and pharmacists are two of the more recent innovations to ensure smooth discharge and transition from acute care.

Expanded roles of nurses

In several countries, the role of nurses in care coordination from acute to community settings has been expanded. Having nurses and other clinical staff involved in transitioning care can help in both identifying patients at high risk and focusing interventions to reduce readmissions and improve quality of care.

In the Netherlands, recent transitional care interventions include the Transitional Care Bridge programme for acutely hospitalized older patients, combining a Comprehensive Geriatric Assessment, an integrated care plan and a transitional care programme, including visits during hospitalization and soon after discharge by a community nurse (Buurman et al., 2016). Another intervention in the Netherlands,

coordinated by nurses and directed at outpatients with a recent coronary syndrome included guidance on lifestyle factors, biometric risk factors and therapy adherence (Jorstad et al., 2013). The nurse-coordinated Cardiac Care Bridge transitional care programme aimed to reduce unplanned hospital readmission and mortality in older hospitalized cardiac patients at high risk of readmission and mortality. In this programme, a cardiac research nurse develops an integrated care plan with the patient, is involved with a community nurse in handover and discharge, and a community nurse visits the patient four times after discharge. Participating nurses followed a 5-day training course on case and disease management (Verweij et al. 2018).

In Germany, secondary prevention after acute hospital episodes is provided by a number of actors, including GPs and nurses. However, no home-based early post-discharge programmes are available. Several intervention trials explored whether a post-discharge nurse-based case management could improve health outcomes and reduce readmissions. The KORINNA (“Coronary infarction follow-up in the elderly”) study, for example, evaluated the effects of nurse-based case management for older patients discharged after an acute myocardial infarction from a tertiary care hospital. The intervention consisted of a nurse-based follow up for 1 year including home visits and telephone calls (Meisinger et al. 2013).

In the United States of America (USA), the Centers for Medicare & Medicaid Services are implementing a range of policies to reduce readmissions. This includes penalties for hospitals with 30-day readmissions above their expected rates and support for demonstration projects aimed to improve the transition from hospital to the community (Linden & Butterworth, 2014). Hospitals have responded with a range of transitional care interventions, including in some cases an expanded role for nurses (Jones et al., 2017). A nurse-driven intervention in an acute care hospital in California, for example, aimed to reduce readmissions through a multifaceted approach during hospitalization with pre-discharge planning and post-discharge follow up (Dizon & Reinking, 2017). The intervention involved the hiring of a nurse outpatient care manager for those patients discharged home who performed home visits and follow-up phone calls, follow-up phone calls by a nurse practitioner for high-risk patients discharged to a skilled nursing facility, a review of discharge instructions for high-risk patients by a pharmacist, and medication reconciliation by pharmacist technicians.

Expanded roles of pharmacists

Roles of pharmacists in transitional care are expanding in several countries, partly driven by the attempt to reduce costly readmissions to hospital. Several studies have shown that pharmacist involvement in the discharge process can reduce the incidence of adverse drug events and have a positive impact on patient satisfaction (Phatak et al., 2016). A pharmacist-led discharge medication reconciliation service, conducted in collaboration with the hospital-based physician, can improve the completeness and accuracy of discharge prescriptions (Holland, 2015).

Pharmacist roles differ widely between and within countries. In a survey among experts from 30 European countries, only respondents from the United Kingdom stated that medication reconciliation is standard practice in the country. In most countries, medication reconciliation is implemented only in some hospitals, for some patients, or in some projects (Gillespie & Eriksson, 2016), although in Ireland, medication reconciliation services are mandated for all patients in all transitions of care (Holland, 2015). In the United Kingdom, a National Health Service (NHS) scheme encourages providers to plan and maintain provision of care support for the first 14 days after discharge (Yang 2017). These post-discharge interventions include an expanded role of pharmacists, with one example being telephone follow up to provide support for medicine management (Yang 2017).

In the USA, various interventions expanding the roles of pharmacists have been undertaken. In one study using a comprehensive approach in a tertiary care academic medical centre, pharmacists were involved in (i) face-to-face medication reconciliation on admission, (ii) development of a personalized medication plan discussed with the patient's physician, (iii) addressing any medication discrepancies with the discharge instructions being given to the patient, (iv) medication counselling performed at discharge, and (v) three post-discharge phone calls at 3, 14 and 30 days (Phatak et al., 2016). Earlier pharmacist-facilitated hospital discharge programmes had been undertaken elsewhere (Arnold, Buys & Fullas, 2015; Ni et al., 2018; Walker et al., 2009).

Multiprofessional team-based interventions

Team-based interventions seem to have become more common in a number of countries. In the above-mentioned, nurse-coordinated Cardiac Care Bridge transitional care programme in the Netherlands, which

aimed to reduce unplanned hospital readmission and mortality in older hospitalized cardiac patients at high risk of readmission and mortality, multiprofessional collaboration across sectors was an important part of the intervention. This included the in-hospital cardiac team (including the cardiac research nurse and the cardiologist, the clinical nurse specialist in geriatrics and the pharmacist) as well as the community nurse and the physiotherapist in primary care. There were face-to-face handovers before discharge and a joint home visit of the community nurse and the physiotherapist, as well as support from a pharmacist (Verweij et al., 2018).

Skill-mix and relocation of care

Several countries have implemented or are evaluating new skill-mix models that are also linked to the re-organization of care. One frequently mentioned example is hospital-at-home. However, other models are specialized clinics (for example, heart failure clinic) or new roles and locations, such as intermediate care, all aiming at reducing hospital admissions and stays and providing care as close to patients' homes as possible.

While hospital-at-home service delivery has been adopted in the USA and Australia, the idea has also been taken up in some European countries such as the United Kingdom, Germany and Switzerland as an alternative to standard hospital care. Highly specialized and experienced health professionals are required to provide quality care. A hospital-at-home programme to avoid hospital readmissions involving advanced practice nurses is described in Box 5.2.

A United States-based study examined the effect of a multiprofessional team-based specialized Heart Failure clinic on 90-day readmission rates or all-cause mortality (Jackevicius et al., 2015). The team consisted of a physician assistant, clinical pharmacist specialist and case manager, with care overseen by a cardiologist. Prompt outpatient follow up was identified as specifically important in the case of heart failure because of a high risk of hospital readmission and mortality.

A Canadian study involved an advanced practice nurse (specifically a nurse practitioner) in an intermediate care role for patients discharged from an acute care hospital to home who were at high risk for acute care readmission (Neiterman, Wodchis & Bourgeault, 2015).

Box 5.2 Hospital-at-home to avoid readmission

Hospital-at-home schemes, although in existence since the early 1960s, are becoming an increasingly popular way of delivering health care (Corrado, 2001). Schemes differ in the type of patients they cater for and in the intensity and complexity of treatment they provide, depending on the health care team composition and their skills. Advanced practice nurses often play an important role within such teams.

For example in South London a project has started, bringing patient-centred care to the place of residence of older people (NHS England, 2018). The goal is to improve hospital discharge so that patients stay in hospital only as long as they clinically need to be there. A multiprofessional team, led by nurse practitioners and community nurses, improves care received at home. In London, the team is situated in the hospital and reaches out to patients in the community so as to avoid hospitalization or to help shorten length of stay through a single-point access with a 2-hour response to the request for urgent medical assessment. The teams operate 365 days a year, 24 hours a day. The home visits are provided by an advanced practice nurse or a GP when required. The visits can be provided daily up to four times a day for 3–7 days. There are intensive nursing, physical therapy and occupational therapy inputs during the intervention.

Patients can expect high-intensity clinical monitoring, with short-term interventions in an acute episode of ill-health in a safe and timely manner. For acutely unwell patients, urgent clinical assessment is provided, including where necessary electrocardiograms and urgent blood tests. Treatment and ongoing monitoring include the provision of intravenous therapy, subcutaneous hydration, ongoing blood therapy and nebulizers. Nurses further provide environmental checks and self-management support (Panagioti et al., 2014).

Several conditions have been identified that can effectively be treated at home, including cellulitis, falls, chronic obstructive pulmonary disease, unstable diabetes, gastroenteritis, deep vein thrombosis, urinary tract infections and viral illnesses.

This intervention, which involved the nurse practitioner completing a personal health record with patients outlining and reconciling their medication, laboratory tests and primary care visits, helped to effectively triage patients by attending to their medical as well as social needs during post-discharge recovery.

An expanded role for pharmacists to help avoid hospital admissions or readmissions has also emerged as a trend internationally. Countries in which the role of community pharmacists has been expanded in recent years include Australia, Canada, England, the Netherlands, Scotland, and the USA (Mossialos et al., 2015). There are notable divergences in scope of practice across the United Kingdom. England has defined different tiers of community pharmacist roles in terms of the effective, safe and efficient use of medicines and the prevention and management of chronic conditions. Not all pharmacies provide all services, and many are commissioned locally. In Scotland, provision of the majority of extended services is a core contractual requirement; that is, every pharmacist will provide them. In Canada, the scope of practice of pharmacists has also expanded in recent years, shifting from more traditional functions such as medication dispensing towards services such as minor ailment prescribing, medication reviews, immunizations and strategies to promote medication adherence (Kelly et al., 2014).

The roles of physiotherapists in triage at emergency departments to avoid acute care admissions have been expanded in recent years in several countries, including the United Kingdom, the Netherlands and Australia. In the above-mentioned, nurse-coordinated Cardiac Care Bridge transitional care programme in the Netherlands, for example, physiotherapists provided two home-based cardiac rehabilitation sessions per week during the first 6 weeks post-discharge in older hospitalized cardiac patients at high risk of readmission and mortality (Verweij et al., 2018).

In Australia, an expanded role of physiotherapists in emergency departments has been extensively funded since 2012. A study on the implementation of an expanded scope-of-practice physiotherapist role in a regional (that is, rural) hospital emergency department found that this role included increased autonomy in management and discharge of patients treated in the emergency department and independent ordering and interpreting of plain film X-rays (Goodman et al., 2018). For sustainability in rural areas, a larger advanced-level physiotherapy workforce with easier access to expanded scope training was recommended (Bird, Thompson & Williams, 2016).

Finally, physician assistants, a profession established in the USA in the 1960s, are now also being introduced in Europe, especially in the United Kingdom (since 2003), but also in Germany (since 2005).

Early studies of their implementation in the United Kingdom suggest that they are being deployed in primary care and out-of-hours centres as well as in hospital settings. A current limitation to their role is that they are not a regulated United Kingdom profession and therefore are not allowed to prescribe, but expectations are that this will ultimately be addressed. Observational studies suggest that patient satisfaction is high and outcomes are good (Farmer et al., 2011). One study in 12 English general practices for same-day consultations included 2086 patients and showed that processes and outcomes of physician assistants and GP consultations were similar, but physician assistants cost less per consultation (Drennan et al., 2015).

Treatment of minor, acute illnesses in primary and ambulatory care settings

Skill-mix innovations in the treatment of minor acute illnesses in primary, community and ambulatory care also involve the use of new and expanded roles. This is perhaps most extensive in the case of nursing and community pharmacy.

A number of countries have implemented programmes in which the unscheduled acute care of patients with minor illnesses is delivered by nurse practitioners. These programmes are based on extensive evidence that indicates that nurse practitioners can provide patients who have minor illnesses with a high standard of care similar to that provided by GPs. Some countries, such as the United Kingdom, Canada and the USA, have also allowed nurse prescribing in primary care (Bhanbro et al., 2011).

There have also been initiatives in a number of countries to expand the role of community pharmacists, for instance in Switzerland (see Box 5.3). Swiss pharmacists in community pharmacies are providing care and triage for patients with minor acute conditions. In the United Kingdom, far-reaching reforms have taken place. There, contractual frameworks recognize new roles of community pharmacies, including the provision of advice on and administration of vaccines, the provision of a minor ailment service, a chronic medicine management service including repeat dispensing, and many public health services, the most important of which is the provision of smoking cessation advice. Especially in Scotland, community pharmacy staff are responsible for the vast majority of successful quit attempts. These extended roles are

Box 5.3 *The netCare Project: Swiss community pharmacists providing triage to patients with minor acute conditions*

In Switzerland, a new form of skill-mix change initiated by the Swiss Pharmacists Association involved expanded roles of pharmacists in collaboration with physicians (Erni et al., 2016). Pharmacists working in community pharmacies were trained to perform structured triage for individuals with a range of common acute illnesses. The pharmacists used 24 evidence-based decision trees for the patients presenting at their pharmacy. The services ranged by severity and urgency of the patient's condition from

- (i) management by the pharmacist and (as required) dispensing of over-the-counter medicines for minor, routine cases;
- (ii) services by the pharmacists, in collaboration with telemedicine services provided by a physician; to
- (iii) direct referral to a GP or Emergency Room.

A total of 162 pharmacies participated in the programme, which was evaluated from 2012 to 2014. Overall, 4118 triages were performed. The most common medical conditions treated were urinary tract infection (>40%), followed by conjunctivitis (23%) and pharyngitis (6%). The majority (84%) of patients treated by pharmacists reported complete relief or symptom reduction, as assessed in follow-up calls. A collaborative approach with physicians was undertaken for 17% of cases. Triage was undertaken more often on Saturdays (20% of all cases) than on weekdays.

Overall, this new form of service delivery with extended roles for pharmacists was positively evaluated. It showed that pharmacists can take care of a range of common minor illnesses in the pharmacy setting, directly with patients or in collaboration via telemedicine with GPs as a back-up. This skill-mix change whereby community pharmacies act as first entry point to the primary care system shows promise as a low-threshold service for patients and may attract individuals who may – for various reasons – delay care or not go to a physician in the first place (Erni et al., 2016). From a cost perspective, an economic analysis found the programme to be cost-saving, compared with standard care provided in GP offices or other alternative treatment options (Trottmann et al., 2016).

further enhanced by the granting of prescribing rights to pharmacists (and nurses) who undertake a short (25 days of study, plus 12 days supervised practice) post-qualification, university-based course. This has enhanced the ability of pharmacists to manage a wider range of minor ailments, such as a urinary tract infection, whereby antibiotics can now be prescribed by an independent prescribing pharmacist according to an agreed local protocol or through an alternative arrangement called a “patient group directive”.

Research evidence underpinned these developments. Early work (Sinclair et al., 2006) showed that pharmacist-led care for rhinitis resulted in good outcomes, which were similar to those of a group of patients who had seen their GP. Most recently, the Minor Ailment Study (MINA) programme of work has looked at the real-world evidence for this service after national roll-out (see Box 5.4).

Box 5.4 The MINA Programme

The MINA programme of work in the United Kingdom studied the real-world experience of pharmacist provision of a minor ailment service compared with the provision of a similar service by emergency departments or GPs. Study sites were in both England and Scotland. In the first phase, a systematic review was conducted to explore the evidence for pharmacy provision of minor ailment services. This review included 26 studies (reported in 31 evaluations) and showed that for the majority (76–98%) of patients, symptoms were resolved completely, and the cost was between £1.44 and £15.90 per consultation.

In the second phase, data were collected from general practices and emergency departments to identify which ones had the highest impact on these services and might reasonably have been managed by a pharmacist. This showed that this ranged from 5.3% (95% CI 3.4%–7.1%) for emergency departments to 13.2% (95% CI 10.2%–16.1%) for general practices.

In the third phase, a prospective cohort study was undertaken in community pharmacies, general practices and emergency departments. For similar conditions, symptom resolution did not differ across the three settings, and as in the studies included in the review, health care costs were lowest in the pharmacy [£29.30 (standard deviation (SD) 37.81)] setting, compared with the general practice [£82.34 (SD 104.16)] and

Box 5.4 (cont.)

emergency departments [£147.09 (SD 74.96)]. The main reason for people choosing the provider they did was convenience.

In the final phase, a simulated patient study was conducted to assess the quality of pharmacy provision of minor ailment services. Quality was assessed based on patient satisfaction but also using an agreed checklist of essential consultation components specific to each condition. Although patients were satisfied and reported that the pharmacists were very professional, few pharmacists delivered a consultation that met all the criteria and the authors recommend further continued support for pharmacists and their staff in order to improve consultation performance. Nonetheless, overall the conclusion is that pharmacists are a valuable addition to the NHS workforce to manage minor ailments and reduce the pressure on other providers.

In the United Kingdom, pharmacists are also increasingly employed in settings other than the hospital or community, and there have been government initiatives to increase pharmacy capacity within both GP surgeries and care homes. Pharmacists regularly run patient clinics for patients with diabetes, coronary heart disease, diabetes, asthma, COPD and sexual health services, and provide advice to GPs on their medicine management. As in the management of minor ailments, research suggests that pharmacists with prescribing rights can manage patients effectively, with outcomes as good as or better than those from GPs, at least in certain defined conditions such as chronic pain (Bruhn et al., 2013). Studies in Canada have also confirmed the success of pharmacist prescribing interventions (Famiyeh & McCarthy, 2017).

5.8 Conclusions

In summary, some elements of acute care have shifted from inpatient to outpatient care, supported by a re-allocation of tasks and roles. Three key developments are observed: first, transitional care (for example, transitional care coordinator), second, re-location of care (for example, specialized teams providing services in hospitals-at-home) and third, new division of work in ambulatory care for minor acute illnesses. Cutting across the reviews and recent studies and

trends across Europe and internationally, there are similar drivers and challenges of new roles in better navigating the transition of care from acute to community settings, the avoidance of acute care settings altogether and the delivery of acute care in more community-based settings including the home. The main factors motivating the implementation are a response to growing costs associated with hospital-based care, a changing demand for new more accessible locations of care, complemented by the desire for expanded roles for nurses, pharmacists and physiotherapists.

There are many differences in the nature and number of extended roles. Some extended roles are still provided on a delegated and supervised basis, whereas in other cases the practitioners are working independently and autonomously (de Bont et al., 2016). The most important facilitators to introducing a new extended role within a team are the willingness of medical practitioners to relinquish tasks, technological developments and service redesign.

In most reviews, these skill-mix interventions were shown to be effective, yielding at least one positive outcome for acute care patients or for health systems. There is however very limited evidence on profession-specific outcomes. There are also a number of challenges in the development and implementation of expanded roles, often only implicitly referenced, including opposition from the medical profession, organization and funding of care in the health systems, and legislative and regulatory changes. Moreover, there is a limited body of knowledge especially in the European context, as well as more broadly, regarding the scale of the expanded roles, level of implementation, and barriers and enablers experienced in different contexts. There is much variation across countries and care contexts within countries making it difficult to generalize conclusions of case studies.

In addition to the strengths and limitations of the systematic reviews, there are a number of other inherent challenges to note in research on this topic, including lack of clarity on definitions, labels of professions, qualifications, health service systems, research culture, clinician buy-in, clinician priorities and understanding of research and research ethics, among a number of others. These limitations are compounded by the inherent limitation of the significant differences in usual scope of practice and skill-mix across different country contexts where local education, funding and regulation affect practice at point of care.

References

- Allison R, Shelling L, Dennett R et al. (2011). The effectiveness of various models of primary care-based follow-up after stroke: a systematic review. *Primary Health Care Res Dev*, 12(3):214–222.
- Arnold ME, Buys L, Fullas F (2015). Impact of pharmacist intervention in conjunction with outpatient physician follow-up visits after hospital discharge on readmission rate. *Am J Health-Syst Pharm*, 72(11 Suppl 1):S36–42. (<https://doi.org/10.2146/sp150011>).
- Bhanbhro S, Drennan VM, Grant R et al. (2011). Assessing the contribution of prescribing in primary care by nurses and professionals allied to medicine: a systematic review of literature. *BMC Health Serv Res*, 11:330.
- Bird S, Thompson C, Williams KE (2016). Primary contact physiotherapy services reduce waiting and treatment times for patients presenting with musculoskeletal conditions in Australian emergency departments: an observational study. *J Physiother*, 62(4):209–214. (<https://doi.org/10.1016/j.jphys.2016.08.005>).
- Bruhn H, Bond CM, Elliott AM et al. (2013). Pharmacist-led management of chronic pain in primary care: results from a randomised controlled exploratory trial. *BMJ Open*, 3:e002361. doi:10.1136/bmjopen-2012.
- Bryant-Lukosius D, Carter N, Reid K et al. (2015). The clinical effectiveness and cost-effectiveness of clinical nurse specialist-led hospital to home transitional care: a systematic review. *J Eval Clin Pract*, 21(5):763–781.
- Busby J, Purdy S, Hollingworth W (2015). A systematic review of the magnitude and cause of geographic variation in unplanned hospital admission rates and length of stay for ambulatory care sensitive conditions. *BMC Health Serv Res* 15(1):324.
- Buurman BM, Parlevliet JL, Allore HG et al. (2016). Comprehensive geriatric assessment and transitional care in acutely hospitalized patients: the transitional care bridge randomized clinical trial. *JAMA Intern Med*, 176(3):302–309.
- Clemente D, Leon L, Foster H et al. (2016). Systematic review and critical appraisal of transitional care programmes in rheumatology. *Semin Arthr Rheum*, 46(3):372–379.
- Corbella X, Barreto V, Bassetti S et al. (2018). Hospital ambulatory medicine: A leading strategy for Internal Medicine in Europe. *Eur J Intern Med*, 54:17–20.
- Corrado OJ (2001). Hospital-at-home. *Age Ageing* 30-S3:11–14.
- Dasanayake AP, Brar BS, Matta S et al. (2012). Are procedures performed by dental auxiliaries safe and of comparable quality? A systematic review. *J Calif Dent Assoc*, 40:65–78.

- de Barra M, Scott CL, Scott NW et al. (2018). Pharmacist services for non-hospitalised patients. *Cochrane Database Syst Rev*, 9:CD013102.
- de Bont A, van Exel J, Coretti S et al.; MUNROS Team (2016). Reconfiguring health workforce: A case-based comparative study explaining the increasingly diverse professional roles in Europe *BMC Health Serv Res*, 16(1):637.
- De Oliveira G, Castro-Alves L, Kendall M et al. (2017). Effectiveness of pharmacist intervention to reduce medication errors and health-care resources utilization after transitions of care: a meta-analysis of randomized controlled trials. *J Patient Safety*, Epub 20 June.
- Dizon ML, Reinking C (2017). Reducing readmissions: nurse-driven interventions in the transition of care from the hospital. *Worldviews on evidence-based nursing*. 14(6):432–439. (<https://doi.org/10.1111/wvn.12260>).
- Domingo G, Reyes F, Thompson F et al. (2012). Effectiveness of structured discharge process in reducing hospital readmission of adult patients with community acquired pneumonia: a systematic review. *JBIC Database Syst Rev Implement Rep*, 10(18):1086–1121.
- Drennan VM, Halter M, Joly L et al. (2015). Physician associates and GPs in primary care: a comparison. *Br J Gen Pract* 65:e344–e350.
- El Hajj MS, Jaam MJ, Awaisu A (2018). Effect of pharmacist care on medication adherence and cardiovascular outcomes among patients post-acute coronary syndrome: a systematic review. *Res Social Adm Pharm*, 14:507–520.
- Ensing H, Stuijt C, van den Bemt B et al. (2015). Identifying the optimal role for pharmacists in care transitions: a systematic review. *J Manag Care Specialty Pharm*, 21(8):614–636.
- Erni P, von Overbeck J, Reich O et al. (2016). netCare, a new collaborative primary health care service based in Swiss community pharmacies. *Res Social Admin Pharm*, 12(4):622–626.
- Famiyeh IM, McCarthy L (2017). Pharmacist prescribing: a scoping review about the views and experiences of patients and the public. *Res Social Admin Pharm*, 13(1):1–16.
- Farmer J, Currie M, Hyman J et al. (2011). Evaluation of physician assistants in National Health Service Scotland. *Scott Med J*, 56(3):130–134.
- Feltner C, Jones CD, Cené CW et al. (2014). Transitional care interventions to prevent readmissions for persons with heart failure: a systematic review and meta-analysis. *Ann Intern Med*, 160:774–784.
- Gillespie U, Eriksson T (2016). Medication reconciliation activities among pharmacists in Europe. *Eur J Hosp Pharm*, 25(2).
- Gonçalves-Bradley D, Illife S, Doll H et al. (2017). Early discharge hospital at home. *Cochrane Database Syst Rev*, 6(6):CD000356

- Goodman D, Harvey D, Cavanagh T et al. (2018). Implementation of an expanded-scope-of-practice physiotherapist role in a regional hospital emergency department. *Rural Remote Health*, 18(2):4212–4212. (<https://doi.org/10.22605/RRH4212>).
- Hansen LO, Young RS, Hinami K, et al. (2011). Interventions to reduce 30-day rehospitalization: a systematic review. *Ann Intern Med*, 155:520–528.
- Holland DM (2015). Interdisciplinary collaboration in the provision of a pharmacist-led discharge medication reconciliation service at an Irish teaching hospital. *Int J Clin Pharm*, 37(2):310–319. (<https://doi.org/10.1007/s11096-014-0059-y>).
- Huntley A, Johnson R, King A et al. (2016). Does case management for patients with heart failure based in the community reduce unplanned hospital admissions? A systematic review and meta-analysis. *BMJ Open*, 6(5):e010933.
- Jackevicius CA, de Leon NK, Lu L et al. (2015). Impact of a multiprofessional heart failure post-hospitalization program on heart failure readmission rates. *Ann Pharmacother*, 49(11):1189–1196. (<https://doi.org/10.1177/1060028015599637>).
- Jeppesen E, Brurberg KG, Vist GE et al. (2012) Hospital at home for acute exacerbations of chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2012 May 16;(5):CD003573. doi: 10.1002/14651858.CD003573.pub2.
- Jones J, Lawrence E, Ladebue A et al. (2017). Nurses' Role in Managing "The Fit" of Older Adults in Skilled Nursing Facilities. *J Gerontol Nurs*, 43(12):11–20. (<https://doi.org/10.3928/00989134-20171110-06>).
- Joo JY, Liu MF (2017). Case management effectiveness in reducing hospital use: a systematic review. *Int Nurs Rev*, 64:296–308.
- Jorstad HT, von Birgelen C, Alings AM et al. (2013). Effect of a nurse-coordinated prevention programme on cardiovascular risk after an acute coronary syndrome: main results of the RESPONSE randomised trial. *Heart*, 99(19):1421–1430.
- Kelly DV, Young S, Philips L et al. (2014). Patient attitudes regarding the role of the pharmacist and interest in expanded pharmacist services. *Can Pharm J (Ott)*, 147(4):239–247.
- Langhorne P, Baylan S (2017). Early Supported Discharge Trialists. Early supported discharge services for people with acute stroke. *Cochrane Database Syst Rev*, 7(7):CD000443.
- Le Berre M, Maimon G, Sourial N et al. (2017). Impact of transitional care services for chronically ill older patients: a systematic evidence review. *J Am Geriatrics Soc*, 65(7):1597–1608.

- Linden A, Butterworth SW (2014) A comprehensive hospital-based intervention to reduce readmissions for chronically ill patients: a randomized controlled trial. *Am J Managed Care*, 20(10):783–792.
- Manderson B, McMurray J, Piraino E et al. (2011). Navigation roles support chronically ill older adults through healthcare transitions: a systematic review of the literature. *Health Soc Care Commun*, 20(2):113–127.
- Marschang S, Bernardo G (2015). Prevention and control of healthcare-associated infection in Europe: a review of patients' perspectives and existing differences. *J Hosp Infect*, 89(4):357–362.
- Meisinger C, Stollenwerk B, Kirchberger I et al. (2013). Effects of a nurse-based case management compared to usual care among aged patients with myocardial infarction: results from the randomized controlled KORINNA study. *BMC Geriatrics*, 13:115.
- Mekonnen A, McLachlan A, Brien J (2016). Effectiveness of pharmacist-led medication reconciliation programmes on clinical outcomes at hospital transitions: a systematic review and meta-analysis. *BMJ Open*, 6(2):p. e010003.
- Mossialos E, Courtin E, Naci H et al. (2015). From “retailers” to health care providers: Transforming the role of community pharmacists in chronic disease management. *Health Policy*, 119(5):628–639.
- Neiterman E, Wodchis W, Bourgeault I (2015). Experiences of older adults in transition from hospital to community. *Can J Aging / Rev can vieillissement*, 34:90–99. doi:10.1017/S0714980814000518.
- NHS England (2018). Hospital at home. (<https://www.england.nhs.uk/urgent-emergency-care/improving-hospital-discharge/>, accessed 20 May 2020).
- Ni W, Colayco D, Hashimoto J et al. (2018). Reduction of healthcare costs through a transitions-of-care program. *Am J Health-Syst Pharm*, 75(10):613–621. (<https://doi.org/10.2146/ajhp170255>).
- Oakley C, Shacklady C (2015). The clinical effectiveness of the extended-scope physiotherapist role in musculoskeletal triage: a systematic review. *Musculoskeletal Care*, 13(4):204–221. (<https://doi.org/10.1002/msc.1100>).
- Panagioti M, Richardson G, Murray E et al. (2014). Reducing Care Utilisation through Self-management Interventions (RECURSIVE): a systematic review and meta-analysis. *Health Serv Deliv Res*, 2(54):1–200. (<https://doi.org/10.3310/hsdr02540>).
- Paudyal V, Watson MC, Sach T et al. (2013). Are pharmacy-based Minor Ailment Schemes a substitute for other service providers? A systematic review *BJGP* 63(612):e472–481. doi: 10.3399/bjgp13X669194.
- Phatak A, Prusi R, Ward B et al. (2016). Impact of pharmacist involvement in the transitional care of high-risk patients through medication reconciliation,

- medication education, and postdischarge call-backs (IPITCH Study). *J Hosp Med*, 11:39–44.
- Qaddoura A, Yazdan-Ashoori P, Kabali C et al. (2015). Efficacy of hospital at home in patients with heart failure: a systematic review and meta-analysis. *PLoS One*, 10(6):e0129282.
- Rennke S, Nguyen OK, Shoeb MH, et al. (2013). Hospital-initiated transitional care interventions as a patient safety strategy: a systematic review. *Ann Intern Med*, 158:433–440.
- Sheikh F, Gathecha E, Bellantoni M et al. (2018). A call to bridge across silos during care transitions. *Joint Commission J Qual Patient Safety*, 44(5):270–278. (<https://doi.org/10.1016/j.jcjq.2017.10.006>).
- Shepherd S, Craddock-Bamford A, Butler C et al. (2017). A multi-centre randomised trial to compare the effectiveness of geriatrician-led admission avoidance hospital at home versus inpatient admission. *Trials*, 18(1):491. (<https://doi.org/10.1186/s13063-017-2214-y>).
- Sinclair H, Bond C, Largue G et al. (2006). Community pharmacy provision of allergic rhinitis treatments a longitudinal study of patient reported outcomes *IJPP*, 13:249–256.
- Trottmann M, Frueh M, Telser H et al. (2016). Physician drug dispensing in Switzerland: association on health care expenditures and utilization. *BMC Health Serv Res*, 16(1):238.
- Vedel I, Khanassov V (2015). Transitional care for patients with congestive heart failure: a systematic review and meta-analysis. *Ann Fam Med*, 13:562–571.
- Verloo H, Chiolero A, Kiszio B et al. (2017). Nurse interventions to improve medication adherence among discharged older adults: a systematic review. *Age Ageing*, 46(5):747–754.
- Verweij L, Jepma P, Buurman BM et al. (2018) The cardiac care bridge program: design of a randomized trial of nurse-coordinated transitional care in older hospitalized cardiac patients at high risk of readmission and mortality. *BMC Health Serv Res*, 18(1):508. doi: 10.1186/s12913-018-3301-9.
- Walker PC, Bernstein SJ, Jones JN et al. (2009). Impact of a pharmacist-facilitated hospital discharge program: a quasi-experimental study. *Arch Intern Med*, 169(21):2003–2010. (<https://doi.org/10.1001/archinternmed.2009.398>).
- World Health Organization (2016) *Transitions of care: technical series on safer primary care*. Geneva, World Health Organization; Licence: CC BY-NC-SA 3.0 IGO.
- Wright J, Graham F, Hayes C et al. (2013). A systematic review of oral health outcomes produced by dental teams incorporating midlevel providers. *J Am Dental Assoc*, 144(1):75–91.

- Yang S (2017). Impact of pharmacist-led medication management in care transitions. *BMC Health Serv Res*, 17:722.
- Zhu QM, Liu J, Hu HY et al. (2015). Effectiveness of nurse-led early discharge planning programmes for hospital inpatients with chronic disease or rehabilitation needs: a systematic review and meta-analysis. *J Clin Nurs*, 24:2993–3005.