Appendix 12: direct patient care

This document presents EDPPs collective contribution to patient care. Table 1 is a summary of the number of patients cared for at each stage of the patient management process. Each stage is then taken in turn with specific detail as to the activities undertaken given.

Table 1: Number of patients at each stage of the patient management pathway who EDPPs cared for

Activity (number of potential patients)	Number of patients (% / potential patients)
1. History (682)	
• Obtained	583 (85.5)
• Reviewed	606 (88.9)
2. Vital signs (682)	
• Taken	100 (14.7)
• Reviewed	404 (59.2)
3. Clinical examinations (682)	
• Performed	264 (38.7)
• Reviewed	323 (47.4)
4. Investigations, tests and procedures (682)	
• Ordered / requested	147 (21.6)
• Results reviewed	270 (39.6)
5. Tests and procedures (682)	
• Performed	48 (7.0)
6. Diagnosis by EDPP (682)	238 (34.9)
7. Management planning (682)	162 (23.8)
8. Treatment in the ED (682)	
• Prescribing medicines	266 (39.0)
• De-prescribing (stopping) medicines	86 (12.6)
• Clinical check / screen / validation of prescription	257 (37.7)
• Dispensing medicines	54 (7.9)
• Accuracy check of dispensed medicines	36 (5.3)
• Administration of medicines	46 (6.7)
• Advice to professional (proactive)	201 (29.5)
• Advice to professional (reactive)	103 (15.1)
• Procedures	63 (9.2)
9. Monitoring treatment in the ED (682)	
• Response to medicine	110 (16.1)
• Response to procedures	72 (10.6)
10. Discharge (altogether from ED and hospital) (271)	
• Developed discharge plan	58 (21.4)
• Enacted discharge plan	40 (14.8)
• Prescribed discharge medicines	75 (27.7)
• Clinical check / screen / validation of discharge prescriptions	43 (15.9)
• Dispensed discharge medicines	26 (9.6)
• Accuracy checked discharge medicines	22 (8.1)
• Discharge counselling	188 (69.4)
• Referral	118 (43.5)
11. Admission to hospital (363)	
• Transfer of medicines	112 (30.9)
• Write first inpatient drug chart	107 (29.5)

To gain a general appreciation of EDPPs responsibility for patients and their involvement, pharmacists were first asked whether they were the designated care provider. Of all patients, this was true for 232 patients (34.0%) for whom EDPPs had primary and official responsibility.

1. History

Collectively, EDPPs obtained some type of history information for 583/682 patients (85.5%). To acquire this information, EDPPs most often asked patients 485/682 (71.1%) or used the Summary Care Record (or equivalent) 226/682 (33.1%). EDPPs reviewed the history information of 606/682 (88.9%) patients. Table 2 lists the different types of history information and how often these were obtained and reviewed by EDPPs.

Table 2: Frequency of history information obtained or reviewed for patients

Type of history information	Number of patients obtained for (%)	Number of patients for whom reviewed (%)
Alcohol history	230 (33.7)	199 (29.2)
Drug history	575 (84.3)	489 (71.7)
Family history	200 (29.3)	178 (26.1)
History of presenting complaint	314 (46.0)	402 (58.9)
Medical history	308 (45.2)	338 (49.6)
Mental health history	81 (11.9)	82 (12.0)
Other history information	21 (3.1)	19 (2.8)
Recreational drug use	150 (22.0)	127 (18.6)
Smoking history	241 (35.3)	212 (31.1)
Social / functional history	301 (44.1)	258 (37.8)
Surgical history	201 (29.5)	203 (29.8)

Drug history

The majority of drug histories obtained or reviewed by EDPPs were a Level 2 drug history (Medicines Reconciliation) 370/682 (54.3%). Of all patients, 73 were not taking any medicines and therefore no drug history was obtained or reviewed. From obtaining and reviewing drug histories, EDPPs identified issues with the medicines of 153 (22.4%) patients. Whilst the nature of the issue identified was not sought, these

issues concerned both medicines taken regularly by patients (129, 84.3%), and acute medicines (29, 19.0%). Issues were mostly related to medicines prescribed by a healthcare professional (150/158 issues, 94.9%), but 8/158 issues (5.1%) were related to medicines obtained through other means e.g. over the counter products.

2. Vital signs – taken and reviewed

EDPPs took and/or reviewed the vital signs of 412/682 patients (60.4%) to inform a patient's diagnosis (either diagnosed by themselves or another healthcare professional). Specifically, at least 1 vital sign was obtained for 100 patients and reviewed for 404 patients. Table 3 presents these vital signs and the frequency taken and reviewed.

Table 3: Vital signs taken and/or reviewed by EDPPs to inform a diagnosis

Vital sign	Number of patients from whom vital sign taken (%)	Number of patients for whom reviewed (%)
Blood pressure	91 (13.3)	401 (58.8)
Capillary blood glucose	4 (0.6)	88 (12.9)
ETCO2	1 (0.1)	1 (0.1)
O2 saturation	90 (13.2)	338 (49.6)
Pain Score	-	5 (0.7)
Peak expiratory flow rate	4 (0.6)	9 (1.3)
Pulse	92 (13.5)	392 (57.5)
Respiratory rate	87 (12.8)	368 (54.0)
Temperature	90 (13.2)	384 (56.3)
Other	-	1 (0.1)

3. Clinical examinations – performed and reviewed to inform diagnosis

EDPPs either performed clinical examination(s), and/or reviewed the findings of these, for 344/682 (50.4%) of patients. Specifically, EDPPs examined 264/682 (38.7%) patients, and reviewed the findings of examinations for 323/682 (47.4%) patients. Table 4 presents clinical examinations and the frequency performed or findings reviewed.

Table 4: Clinical examinations performed, or findings reviewed, to inform patient diagnosis

Clinical examination	Number of patients for whom examination performed (%)	Number of patients for whom findings of examination reviewed (%)
Abdominal	123 (18.0)	126 (18.5)
Body examination (e.g. external body)	134 (19.6)	126 (18.5)
Breast	1 (0.1)	1 (0.1)
Cardiovascular	131 (19.2)	152 (22.3)
Ear / nose / throat	45 (6.6)	46 (6.7)
Eye	9 (1.3)	9 (1.3)
General examination – calculated their CIWA score	1 (0.1)	4 (0.6)
General examination – calculated their Glasgow Coma Score	95 (13.90)	90 (13.2)
General examination – examined their general appearance	241 (35.3)	206 (30.2)
General examination – other	7 (1.0)	7 (1.0)
General examination – weighed the patient	8 (1.2)	17 (2.5)
Genital	-	1 (0.1)
Musculoskeletal	39 (5.7)	46 (6.7)
Neurological	32 (4.7)	51 (7.5)
Rectal / anal	6 (0.9)	5 (0.7)
Respiratory	145 (21.3)	173 (25.4)
Vaginal	2 (0.3)	2 (0.3)

4. Investigations, tests and procedures

Investigations, tests and procedures - ordered or requested to inform diagnosis

For the purposes of diagnosis, EDPPs ordered/requested investigations, tests or procedures for 147/682 patients (21.6%). The 37 types of investigations and 11 types of tests and procedures ordered are given in Table 5 and 6.

Table 5: Investigations ordered to inform patient diagnosis

Investigation	Number of patients for whom ordered (%)
Full blood count	89 (13.0)
Urea and electrolytes	85 (12.5)
C-reactive protein (CRP)	77 (11.3)
Liver function tests (LFTs)	73 (10.7)
Arterial Blood Gases (ABG)	19 (2.8)
Venous Blood Gases (VBG)	18 (2.6)
Lactate	15 (2.2)
Troponin	11 (1.6)
Toxicology	10 (1.5)
D-dimer	9 (1.3)
Activated Partial Thromboplastin Time (APTT)	9 (1.3)
Prothrombin Time	8 (1.2)
Glucose	6 (0.9)
Amylase	5 (0.7)
Bone profile	4 (0.6)
Sputum culture	4 (0.6)
Urine culture	4 (0.6)
International Normalised Ratio (INR)	4 (0.6)
Thyroid Stimulating Hormone (TSH)	3 (0.4)
Free Thyroxine (T4)	3 (0.4)
Blood culture	3 (0.4)
Phosphate	2 (0.3)
Magnesium	2 (0.3)
Creatinine Kinase	1 (0.1)
Cholesterol	1 (0.1)
Calcium	1 (0.1)
Corrected calcium	1 (0.1)
Skin culture	1 (0.1)
Cerebral Spinal Fluid culture	1 (0.1)
Triptase	1 (0.1)
Ovarian cancer markers	1 (0.1)
Brain Natriuretic Peptide	1 (0.1)
Human Immunodeficiency Virus (HIV)	1 (0.1)
Hepatitis	1 (0.1)
Epstein Barr Virus	1 (0.1)
Group and save	1 (0.1)
Paul Bunnell	1 (0.1)

Table 6: Test and procedures ordered/requested to inform patient diagnosis

Tests and procedures	Number of patients for whom ordered/requested (%)
Chest X-ray	57 (8.4)
Electrocardiogram	54 (7.9)
Venepuncture (to obtain a venous blood sample)	37 (5.4)
Urinalysis	19 (2.8)
Other X-ray	15 (2.2)
Cannula insertion	11 (1.6)
CT scan	10 (1.5)
Artery puncture (to obtain an arterial blood sample)	7 (1.0)
Pregnancy test	7 (1.0)
Ultrasound scan	1 (0.1)
Blood ketone	1 (0.1)

Tests and procedures – performed to inform diagnosis

For the purposes of diagnosis, EDPPs performed tests and procedures on 48/682 patients (7.0%). The 11 types of tests and procedures performed are given in Table 7.

Table 7: Tests and procedures performed to inform patient diagnosis

Tests and procedures	Number of patients performed on (%)
Urinalysis (dipped the patient's urine)	21 (3.1)
Analysed an Arterial Blood Gas sample using a blood gas machine	10 (1.5)
Venepuncture (withdrew a venous blood sample)	9 (1.3)
Pregnancy test (read the test device)	7 (1.0)
Analysed a Venous Blood Gas sample using a blood gas machine	3 (0.4)
Artery puncture (withdrew an arterial blood sample)	2 (0.3)
Electrocardiogram	1 (0.1)
Blood ketone	1 (0.1)
Point of care International Normalised Ratio	1 (0.1)
Siatic nerve test	1 (0.1)
Nasal tampon	1 (0.1)

Investigations, tests and procedures – results reviewed to inform diagnosis

For the purposes of diagnosis, EDPPs reviewed the results of investigations, tests and procedures for 270/682 patients (39.6%). The 32 different types of investigations and 9 tests and procedures reviewed are given in Table 8Table 9.

Table 8: Investigations reviewed to inform patient diagnosis

Investigation	Number of patients for whom results reviewed (%)
Urea and electrolytes	220 (32.3)
Full blood count	215 (31.5)
Liver function tests (LFTs)	188 (27.6)
C-reactive protein (CRP)	170 (24.9)
Glucose	25 (3.7)
Troponin	25 (3.7)
Magnesium	23 (3.4)
Arterial Blood Gases (ABG)	22 (3.2)
Venous Blood Gases (VBG)	20 (2.9)
Phosphate	20 (2.9)
Lactate	19 (2.8)
International Normalised Ratio (INR)	19 (2.8)
D-dimer	17 (2.5)
Toxicology	17 (2.5)
Corrected calcium	15 (2.2)
Amylase	13 (1.9)
Prothrombin Time	11 (1.6)
Activated Partial Thromboplastin Time (APTT)	9 (1.3)
HbA1c	8 (1.2)
Creatinine Kinase	7 (1.0)
Urine culture	6 (0.9)
Bone profile	5 (0.7)
Free Thyroxine (T4)	3 (0.4)
Calcium	3 (0.4)
Cholesterol	2 (0.3)
Thyroid Stimulating Hormone (TSH)	2 (0.3)
Blood culture	2 (0.3)
Sputum culture	1 (0.1)
Brain Natriuretic Peptide	1 (0.1)
Triptase	1 (0.1)
Ovarian cancer markers	1 (0.1)
Skin Biopsy	1 (0.1)

Table 9: Tests and procedures reviewed to inform patient diagnosis

Tests and procedures	Number of patients for whom results reviewed (%)
Electrocardiogram (ECG)	76 (11.1)
Chest X-ray	75 (11.0)
Urinalysis	50 (7.3)
CT scan	22 (3.2)
Pregnancy test	16 (2.3)
Other X-ray	14 (2.1)
Ultrasound scan	3 (0.4)
Blood ketone	2 (0.3)
Cardiology tests	1 (0.1)

5. Diagnosis

Patients who EDPPs helped to care for were allocated to 1 of 15 diagnosis categories. These categories – which includes 'No abnormality detected' – are listed in Table 10 by frequency across all patients.

Table 10: Frequency of diagnosis categories, with most common diagnosis sub-category and diagnosis given

Diagnosis category	Frequency (%)	Most common diagnosis sub-category (n)	Most common diagnosis of sub-category (n)*
Medical	254 (37.2)	Cardiac (62)	Acute coronary syndrome (13)
Infectious disease	174 (25.5)	Respiratory (86)	Lower respiratory tract infection (59)
Surgical	65 (9.5)	General surgery (24)	Acute pancreatitis (5)
Soft tissue injury / wound	37 (5.4)	Muscle injury (11)	Lower back (5)
Psychiatric	30 (4.4)	Depression (10)	-
Toxicology	23 (3.4)	Paracetamol overdose (8)	-
Fracture / dislocation	20 (2.9)	Closed fracture (17)	Hip – neck of femur (3)
Musculoskeletal	15 (2.2)	Orthopaedics (6)	Sciatica (3)
No abnormality detected	15 (2.2)	-	-
Environmental / social / not applicable	15 (2.2)	Fall (=5)	-
Trauma	11 (1.6)	Head injury (4)	Contusion of brain (=1)
Drug / alcohol related	10 (1.5)	Alcohol withdrawal syndrome (=3)	-
Childhood condition	6 (0.9)	Medical (6)	Croup (=2)
Obstetrics / gynaecology	5 (0.7)	Gynaecology (3)	Abscess of labia or vulva (=1)
Foreign body	2 (0.3)	Alimentary tract (1)	-
Total	**582.1 (100.0)**		

*Some diagnosis sub-categories did not further divide into specific diagnoses

Due to being broad categories of high frequency, 'Medical' (n=252), 'Infectious Disease' (n=174) and 'Surgical' (n=65) have been further disaggregated into their sub-categories and specific diagnoses in Table 11, Table 12 and Table 13 overleaf, respectively.

Table 11: Medical diagnosis category disaggregated into sub-categories and specific diagnoses

Sub-category, ordered by frequency n (%N), and their diagnoses n (%N)			
1. Cardiac	**62 (9.1)**	**2. Neurology**	**43 (6.3)**
Acute coronary syndrome	13(1.9)	Migraine	8 (1.2)
Postural hypotension	9 (1.3)	Epilepsy - generalised	6 (0.9)
Myocardial infarction (NSTEMI)	7 (1.0)	Stroke	5 (0.7)
Congestive cardiac failure	6 (0.9)	Subarachnoid haemorrhage	4 (0.6)
Angina – stable	5 (0.7)	Transient ischaemic attack	4 (0.6)
Vasovagal syncope	5 (0.7)	Bell palsy	3 (0.4)
Angina – unstable	4 (0.6)	Status epilepticus	3 (0.4)
Left-sided heart failure	4 (0.6)	Dystonic reaction	2 (0.3)
Hypertension	3 (0.4)	Tension headache	2 (0.3)
Myocardial infarction (STEMI)	2 (0.3)	Epilepsy - focal	1 (0.1)
Pericarditis	2 (0.3)	Hydrocephalus	1 (0.1)
Hypotension	1 (0.1)	Parkinson's disease	1 (0.1)
Myocarditis	1 (0.1)	Spinal cord compression	1 (0.1)
		Subdural haemorrhage	1 (0.1)
		SUNA headache	1 (0.1)
3. Respiratory	**41 (6.0)**	**4. Gastroenterology**	**34 (5.0)**
Chronic obstructive pulmonary disease	17 (2.5)	Constipation	10 (1.5)
Asthma	13 (1.9)	Upper gastrointestinal haemorrhage	6 (0.9)
Pulmonary embolism	4 (0.6)	Gastro-oesophageal reflux	4 (0.6)
Pleural effusion	2 (0.3)	Gastritis	3 (0.4)
Spontaneous pneumothorax	2 (0.3)	Irritable bowel syndrome	3 (0.4)
Haemoptysis	1 (0.1)	Crohns disease	1 (0.1)
Pleuritic chest pain	1 (0.1)	Gastrointestinal haemorrhage	1 (0.1)
Stridor	1 (0.1)	Hepatitis	1 (0.1)
		Lower gastrointestinal haemorrhage	1 (0.1)
		Mallory-Weiss Syndrome	1 (0.1)
		Nausea	1 (0.1)
		Oesophageal varices with bleeding	1 (0.1)
		Ulcerative colitis	1 (0.1)

Sub-category, ordered by frequency n (%N), and their diagnoses n (%N)			
5. Cardiac electrical	**23 (3.4)**	**6. Endocrine / metabolic**	**18 (2.6)**
Atrial fibrillation/flutter	12 (1.8)	Diabetic ketoacidosis	3 (0.4)
Cardiac arrest	8 (1.2)	Hypoglycaemia without coma	3 (0.4)
Arrhythmia: other	1 (0.1)	Hyperglycaemia	2 (0.3)
Supraventricular tachycardia	1 (0.1)	Hypokalaemia	2 (0.3)
Trifasicular block	1 (0.1)	Dehydration	1 (0.1)
		Hyperkalaemia	1 (0.1)
		Hypocalcaemia	1 (0.1)
		Hypomagnesemia	1 (0.1)
		Hyponatraemia	1 (0.1)
		Type 1 diabetes mellitus	1 (0.1)
		Type 2 diabetes mellitus	1 (0.1)
7. Haematology / oncology	**10 (1.5)**	**8. Allergy**	**9 (1.3)**
Malignant tumour	3 (0.4)	Angioneurotic oedema	1 (0.1)
Anaemia	1 (0.1)	Calcium channel blocker related angioedema	1 (0.1)
Haemophilia	1 (0.1)	Drug reaction	2 (0.3)
Low haemoglobin	1 (0.1)	Flare of hereditary angioedema	1 (0.1)
Lymphoma	1 (0.1)	Food allergy	1 (0.1)
Neutropenic sepsis	1 (0.1)	Latex	1 (0.1)
Renal mass	1 (0.1)	Scombroid toxin	1 (0.1)
Thrombocytopenia	1 (0.1)	Spontaneous reaction	1 (0.1)
9. Skin and soft tissues	**7 (1.0)**	**10. Renal**	**6 (0.9)**
Atopic eczema / dermatitis	3 (0.4)	Acute renal failure	2 (0.3)
Rash – drug induced	2 (0.3)	Hydronephrosis	2 (0.3)
Contact dermatitis	1 (0.1)	Pyelonephritis	1 (0.1)
Sebaceous cyst	1 (0.1)	Uraemia	1 (0.1)

Table 12: Infectious disease diagnosis category disaggregated into sub-categories and specific diagnoses

Sub-category, ordered by frequency n (%N), and their diagnoses n (%N)			
1. Respiratory	**89 (13.0)**	**2. Genitourinary**	**43 (6.3)**
Lower respiratory tract infection	59 (8.7)	Urinary tract infection	41 (6.0)
Upper respiratory tract infection	13 (1.9)	Chlamydia	1 (0.1)
Lobar pneumonia	9 (1.3)	Gonorrhoea	1 (0.1)
Bronchopneumonia	5 (0.7)		
Influenza	3 (0.4)		
3. Skin	**20 (2.9)**	**4. Gastrointestinal**	**14 (2.1)**
Cellulitis	10 (1.5)	Abdominal sepsis	1 (0.1)
Boil / abscess	5 (0.7)	Gastroenteritis	1 (0.1)
Infected leg ulcer	3 (0.4)	Infectious gastroenteritis	12 (1.8)
Impetigo	1 (0.1)		
Infected bites	1 (0.1)		
5. Systemic / central nervous system	**3 (0.4)**		
Flu	1 (0.1)		
Scarlet fever	1 (0.1)		
Viral meningitis	1 (0.1)		

Table 13: Surgical diagnosis category disaggregated into sub-categories and specific diagnoses

Sub-category, ordered by frequency n (%N), and their diagnoses n (%N)			
1. General surgery	**24 (3.5)**	**2. Urology**	**13 (1.9)**
Acute pancreatitis	5 (0.7)	Renal colic	5 (0.7)
Appendicitis	3 (0.4)	Urinary retention	5 (0.7)
Bowel obstruction	3 (0.4)	Epididymitis / orchitis / epidymo-orchitis	1 (0.1)
Diverticulitis	3 (0.4)	Haematospermia	1 (0.1)
Abscess – perianal or anal	2 (0.3)	Haematuria	1 (0.1)
Biliary colic	2 (0.3)		
Cholecystitis	2 (0.3)		
Gallstones with cholecystitis	2 (0.3)		
Anal fissure	1 (0.1)		
Infected central line	1 (0.1)		
Stoma problem	1 (0.1)		
Umbilical hernia	1 (0.1)		
=3. Ear, nose and throat	**8 (1.2)**	**=3. Vascular**	**13 (1.9)**
Epistaxis	2 (0.3)	Deep vein thrombosis	5 (0.7)
Tonsillitis	2 (0.3)	Abdominal aneurysm with rupture	1 (0.1)
Ear wax (impacted)	1 (0.1)	Abdominal aneurysm without rupture	1 (0.1)
Otitis externa	1 (0.1)	Arterial embolism / thrombosis	1 (0.1)
Otitis media / ear infection	1 (0.1)	Thrombophlebitis of arm	1 (0.1)
Pharyngitis	1 (0.1)		
4. Post-operative	**5 (0.7)**	**5. Eye**	**3 (0.4)**
Surgical procedure complication	4 (0.6)	Conjunctivitis	3 (0.4)
Infected prosthetic knee	1 (0.1)		
6. Maxillo-facial	**1 (0.1)**		
Toothache	1 (0.1)		

6. Diagnosis by the EDPP

EDPPs diagnosed 238/682 patients (34.9%). Of these, EDPPs diagnosed 79 (33.2%) entirely independent of any support, 106 (44.5%) independently but their diagnosis was then reviewed by another healthcare professional, and 53 (22.3%) with the support of another healthcare professional. Figure 1 presents each diagnosis category divided into these three methods of diagnosis.

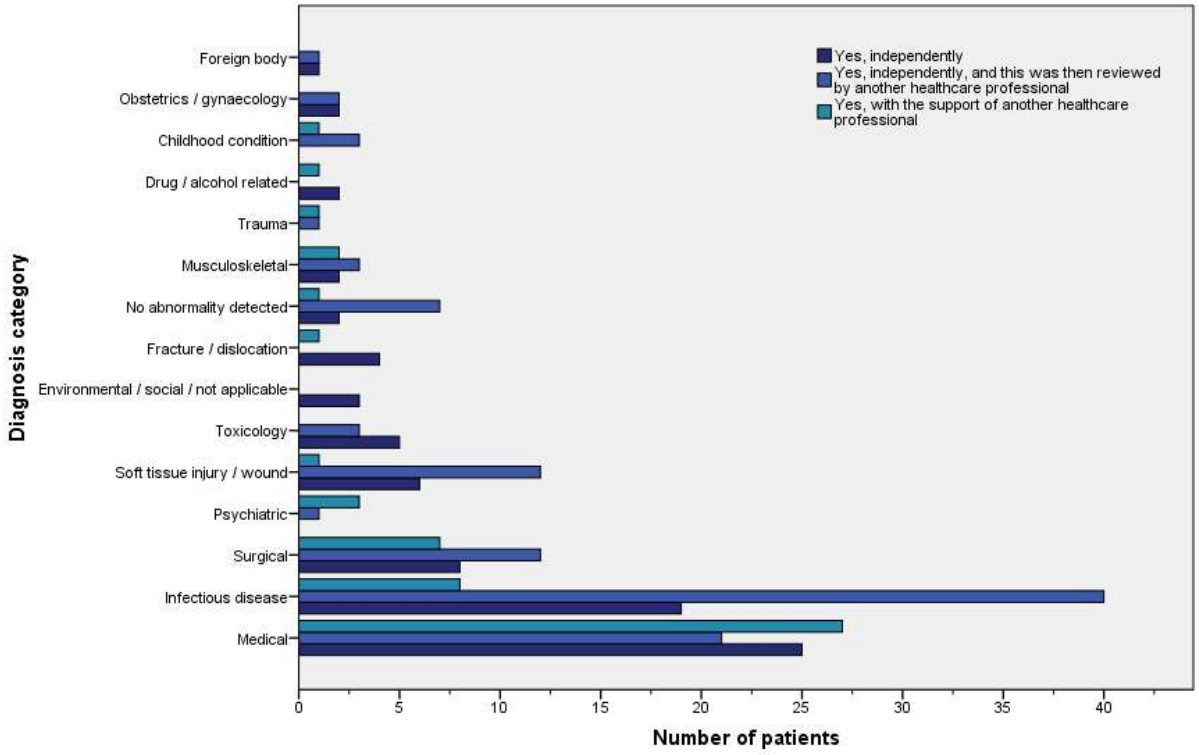


Figure 1: Number of patients of each diagnosis category divided by the diagnosis method

7. Management planning

Of all 682 patients, EDPPs either produced or enacted some or all of 162 patient's clinical management plans (23.8%). They also produced a pharmaceutical care plan for 237 (34.8%) of patients. Aside from care plans, EDPPs also identified safeguarding issues with 3 patients (0.4%) and both identified and escalated safeguarding issues for a further 16 patients (2.3%).

8. Treatment in the ED

EDPPs were involved with all stages of medicines use and non-medicines treatment (e.g. procedures). Table 14 summarises and enables comparison of EDPPs contribution to different aspects of treatment, ordered by number of patients to whom the pharmacists contributed.

Table 14: Summary of EDPP contribution to different aspects of treatment

Treatment contribution	Number of patients to whom EDPPs contributed (%)
Prescribe medicine	266 (39.0)
Clinical check of prescriptions	257 (37.7)
Proactive advice	201 (29.5)
Reactive advice	103 (15.1)
De-prescribe (stop) medicine	82 (12.0)
Procedures performed	62 (9.1)
Dispense medicine	54 (7.9)
Administer medicine	46 (6.7)
Accuracy check of dispensed medicine	36 (5.3)

Prescribing medicines

Medicine was prescribed for 266/682 patients (39.0%) as a treatment to be administered in the ED. Of these, the number of medicines prescribed were: 1 (75 patients, 28.2%); 2 (50, 18.8%); 3 (36, 13.5%); 4 (21, 7.9%); 5 (12, 4.5%) and >5 (72, 27.1%). In total, a sample of 603 prescribed medicines was reported, of which there were 191 unique drugs. Whilst this collected data representative of the full range of drugs prescribed, in the following analyses of these 603 prescriptions, the most common were likely under-represented and the least common over-represented. This is because EDPPs could only report detail of 3 medicines prescribed and were encouraged to prioritise those not previously reported for other patients.

The most common types of drug prescribed (those ≥1% of all prescribed) are presented in Figure 2. The drugs least prescribed (only once) were of 91 different types, and thus haven't been presented graphically. Examples of those least prescribed include etanercept (biologic), digoxin, phenoxymethylpenicillin and propranolol.

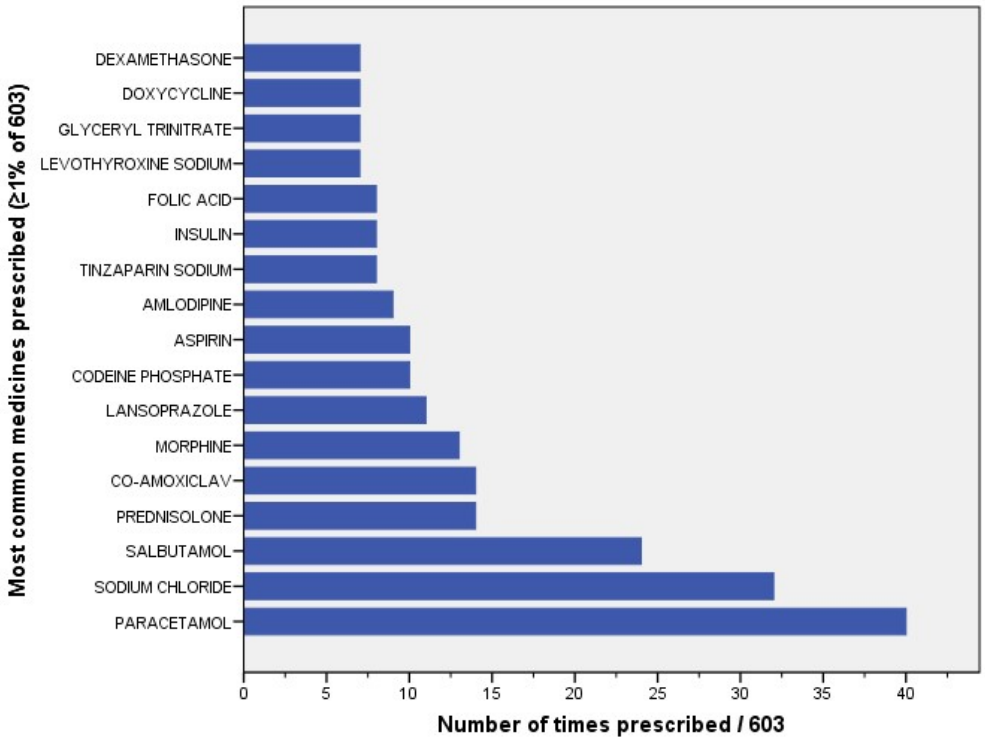


Figure 2: Most common medicines prescribed by EDPPs

For 599/603 medicines prescribed an administration route was given. The popularity of these 8 different routes, which includes the category ‘Other’, are given in Figure 3. Oral administration was most popular (345, 57.6%) followed by intra-venous injection (93, 15.5%). Intra-muscular injection was least common (6, 1.0%).

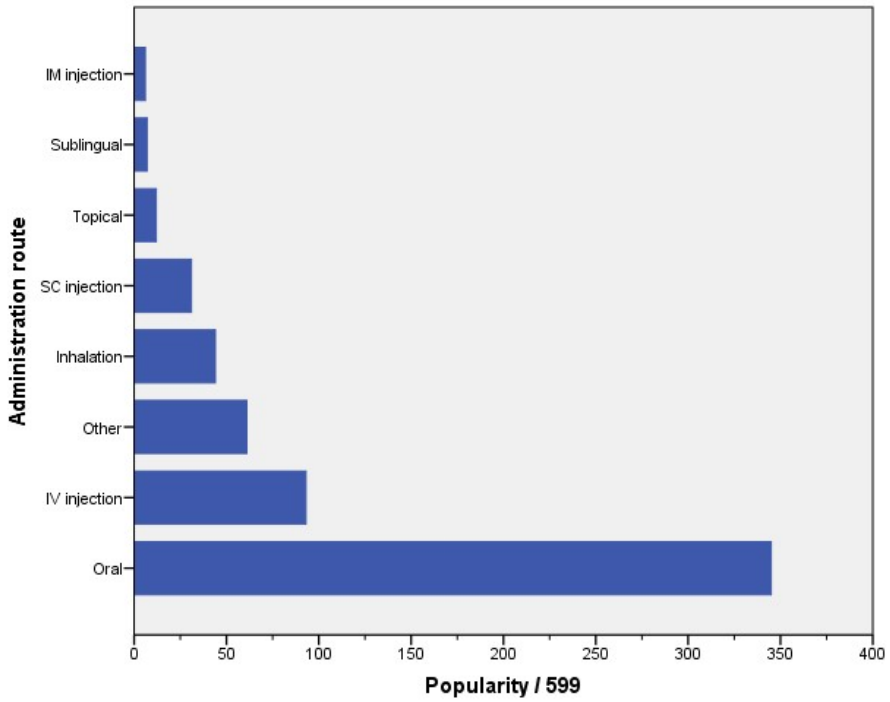


Figure 3: Popularity of administration routes of medicines prescribed

Medicines were prescribed for various reasons. Of 603 medicines prescribed by EDPPs, 1 of 5 reasons for prescribing were chosen for 596 prescriptions. The frequency of each reason is given in Table 15. Together, in near equal parts, the re-prescribing of a patient's regular medicine and the prescribing of a new medicine were reasons given for over 90% of prescriptions.

Table 15: Reasons for prescribing medicines

Reason for prescribing	Description	Frequency (%)
Existing medicine	I re-prescribed a medicine the patient is regularly prescribed	291 (48.8)
New medicine	I prescribed a medicine the patient is not regularly prescribed	273 (45.8)
Correction of error	I re-prescribed a medicine which had been prescribed incorrectly	19 (3.2)
Dose change	I re-prescribed this medicine at a different dose	10 (1.7)
Re-written for clarity	I re-prescribed this medicine as the prescription could be misunderstood / misinterpreted	3 (0.5)

De-prescribing (stopping) medicines

Of medicines either prescribed prior to or during the ED visit, at least 1 medicine was de-prescribed (stopped) for 86/682 patients (12.6%). Overall, 113 medicines were de-prescribed which were of 71 unique drugs. As per medicines prescribed, if a patient had medicines de-prescribed this was most likely to be 1 medicine (67 patients, 77.9%) followed by 2 medicines (14, 16.3%). Only 1 patient (1.2%) had either 3, 4 or 5 medicines were de-prescribed, with 2 patients (2.3%) having >5 medicines stopped. The most common types of drug de-prescribed (those ≥2% of all de-prescribed) are presented in Figure 4.

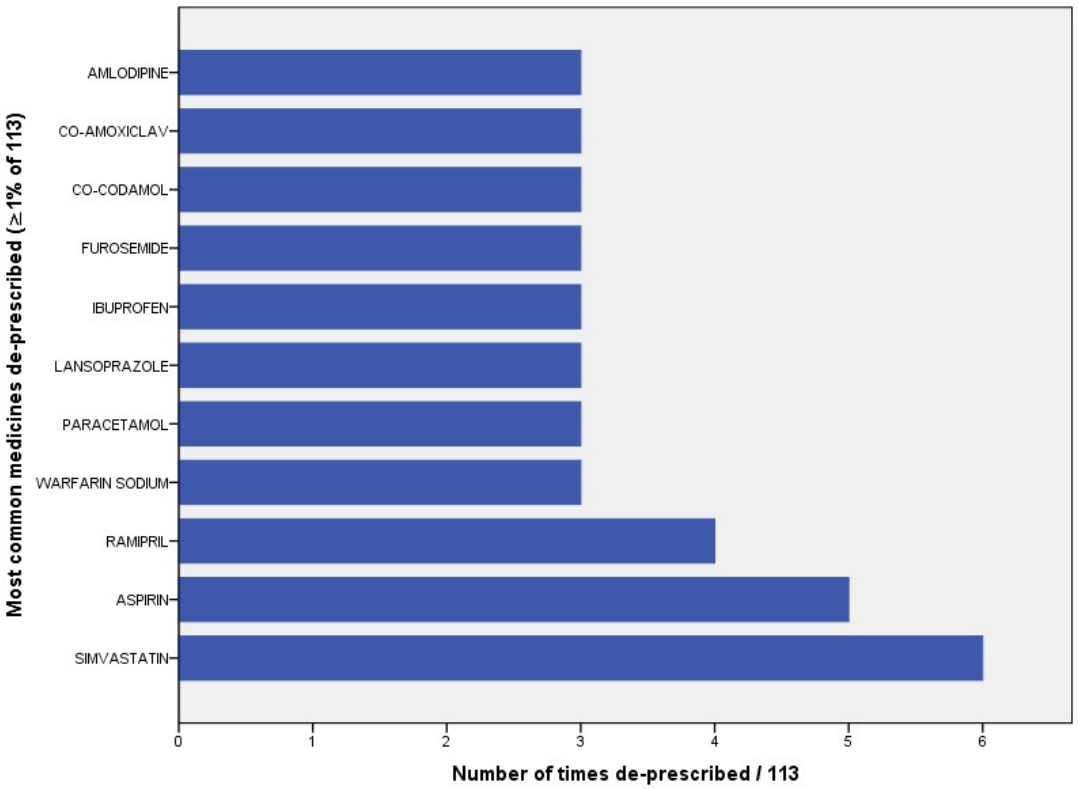


Figure 4: Most common medicines prescribed by EDPPs collectively

As presented in Figure 5, of all 113 medicines de-prescribed the majority were those administered orally (95, 84.1%). Medicines which are administered via other methods were de-prescribed 5 times or less.

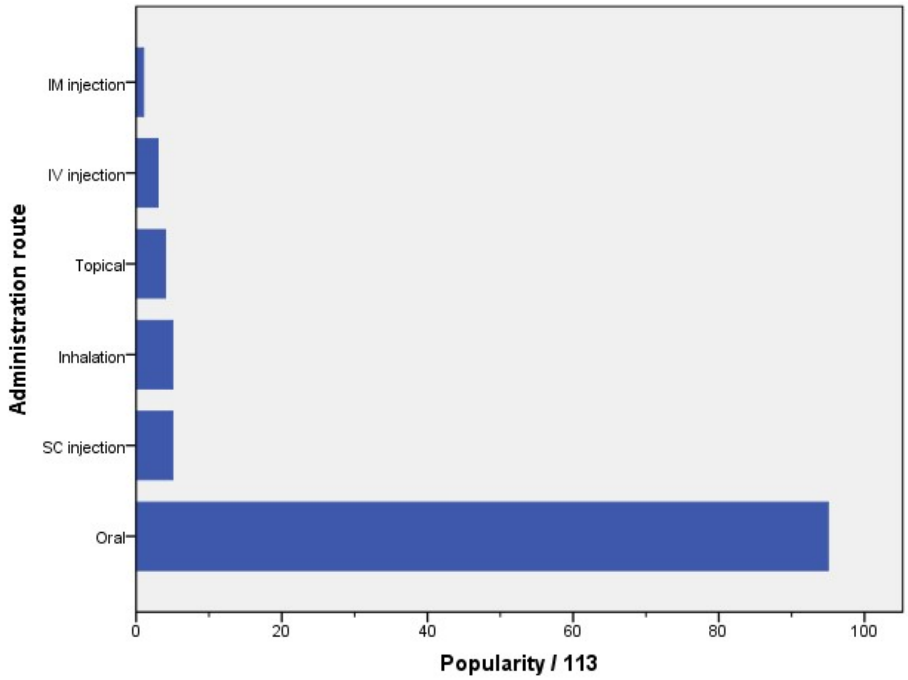


Figure 5: Popularity of administration routes of medicines de-prescribed

Clinical check / screen / validation of prescriptions

Medicines were clinically checked by EDPPs for 257/682 patients (37.7%). Overall, 667 prescriptions were checked for their clinical appropriateness which were of 192 unique drugs. The number of medicines checked for patients were: 1 (35 patients, 13.6%); 2 (39, 15.2%); 3 (29, 11.3%); 4 (18, 7.0%); 5 (17, 6.6%) and >5 (119, 46.3%). The most common drug to be clinically checked (those ≥1% of all checked) are presented in Figure 6.

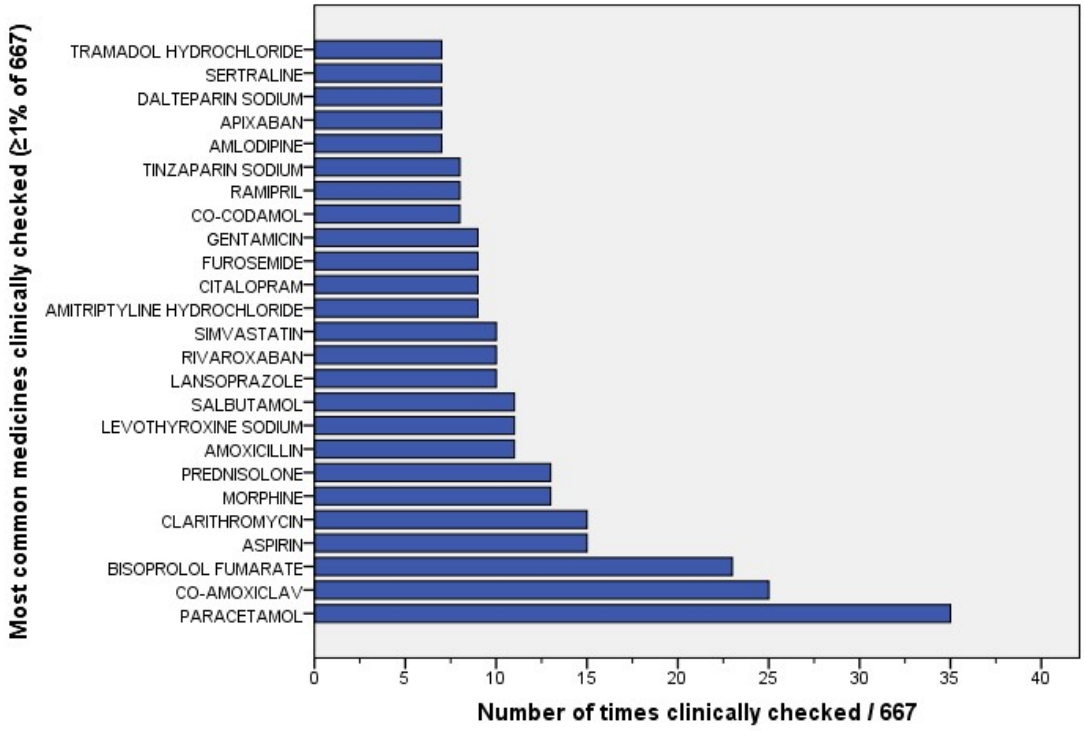


Figure 6: Most common prescriptions clinically checked by EDPPs

For 665/667 prescriptions clinically checked, an administration route was given. As per other medicines focused activities, prescriptions clinically checked were mostly those administered orally Figure 7.

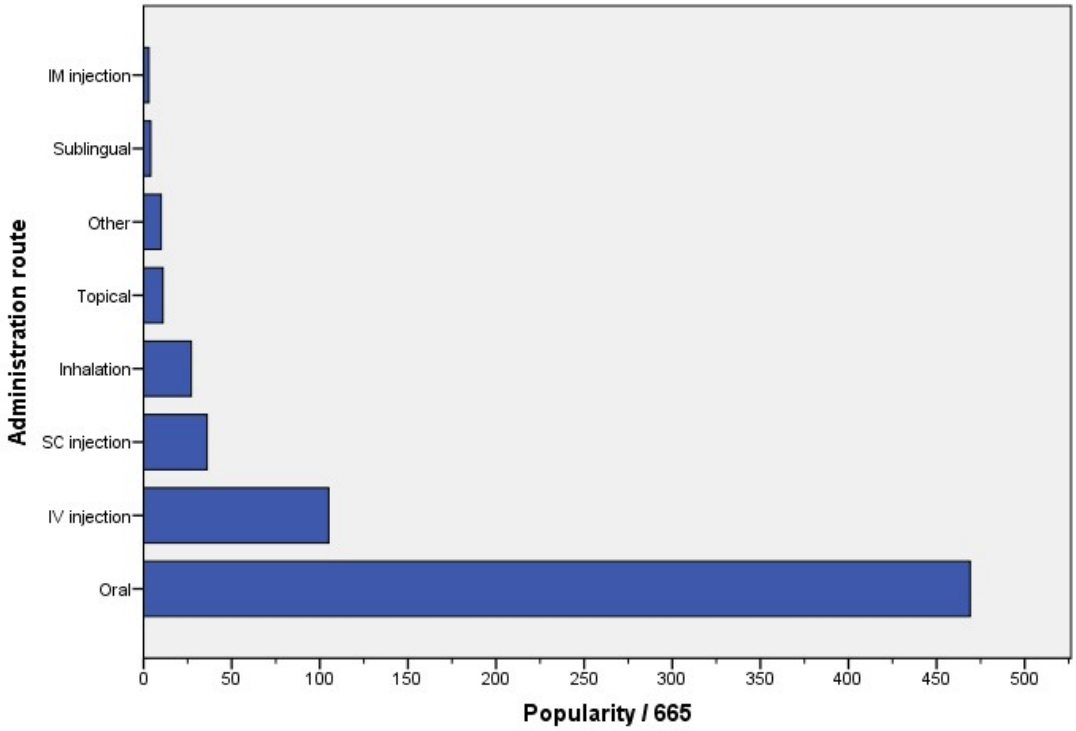


Figure 7: Popularity of administration routes of prescriptions clinically checked

Dispensing medicines

EDPPs dispensed medicine for 54/682 patients (7.9%). The number of medicines dispensed for patients were: 1 (36 patients, 66.7%); 2 (9, 16.7%); 3 (3, 5.6%); 4 (2, 7.4%); 5 (2, 3.7%) and >5 (2, 3.7%). Medicines dispensed were obtained from various locations. For 40/54 patients (74.1%), medicines were obtained from the main hospital dispensary. Other locations used to source medicines were a non-ED satellite hospital dispensary (7 patients, 13.0%), ED stock room (6, 11.1%), and medicines for 1 patient (1.9%) were obtained from another unknown location. No medicines dispensed were retrieved from an automated storage system e.g. Omnicell or Mediwell. Perhaps reducing the need for medicines to be dispensed, 142/682 patients brought at least some of their medicines with them from home (known as 'Patients Own Drugs' – PODs).

Accuracy check of dispensed medicines

EDPPs accuracy checked medicines for 36/682 patients (5.3%). Of these, the number of medicines accuracy checked were either 1 (16 patients, 44.4%); 2 (4, 5.6%); 3 (4, 11.1%); 4 (3, 8.3%); 5 (2, 5.6%); >5 (7, 19.4%).

Through accuracy check, a dispensing error was identified for only 1/36 patients (2.8%). This was a content error, where the wrong dosage form was dispensed.

Administration of medicines

Medicines were administered to 46/682 patients (6.7%). Of these, the number of medicines administered were 1 (11 patients, 23.9%); 2 (11, 23.9%); 3 (12, 26.1%); 4 (4, 8.7%); 5 (1, 2.2%); or >5 (7, 15.2%). No medicines administered were the patient's own medicines brought into hospital.

Medicines were administered to patients by the different routes given in Table 16, with IV administration being most common.

Table 16: Administration routes and number of patients administered

Administration route	Number of patients to whom administered (%)
Intra-venous	34 (73.9)
Other	13 (28.3)
Oral	5 (10.9)
Intra-muscular	2 (4.3)
Subcutaneous	2 (4.3)

In addition to themselves administering medicines, EDPPs identified 12 errors in the administration of medicines by other healthcare professionals. The type and frequency of errors identified are given in Table 17.

Table 17: Types of administration error and number of patients for whom identified

Type of administration error	Description	Number of patients for whom identified (%N)
Omission	Failure to administer a prescribed dose	6 (0.9)
Wrong time	Administered more than 1 hour before or after specified time	0 (0.0)
Unauthorised	Not prescribed / given to the wrong patient	0 (0.0)
Wrong dose	-	1 (0.1)
Wrong drug preparation	Incorrect dilution or reconstitution / mixing drugs that are physically incompatible / inadequate drug packaging	1 (0.1)
Wrong administration technique	Dose administered via a different route than prescribed / correct route but wrong site / wrong rate	1 (0.1)
Deteriorated drug	Expired or improperly stored drug administered	0 (0.0)
Other	-	3 (0.4)

Advice provision

Both proactive and reactive advice concerning patient treatment was provided by EDPPs to other healthcare professionals. Advice was proactively provided to those caring for 201 patients (29.5%) and reactively to those caring for 103 patients (15.1%). Specific advice offered related to various stages of the medicines use process, with advice related to some stages more commonly provided. A breakdown of both proactive and reactive advice is given in Table 18.

Stage of medicines use	Number of patients for whom *proactive* advice given to their healthcare professional (%N)	Number of patients for whom *reactive* advice given to their healthcare professional (%N)
Prescribing	156 (22.9%)	57 (8.4%)
De-prescribing	39 (5.7%)	16 (2.3%)
Dispensing	5 (0.7%)	6 (0.9%)
Administration	73 (10.7%)	38 (5.6%)
Monitoring	28 (4.1%)	16 (2.3%)

Table 18: Stages of the medicines use process and number of patients for whom advice given to healthcare professionals

Stage of medicines use	Number of patients for whom *proactive* advice given to their healthcare professional (%N)	Number of patients for whom *reactive* advice given to their healthcare professional (%N)
Prescribing	156 (22.9%)	57 (8.4%)
De-prescribing	39 (5.7%)	16 (2.3%)
Dispensing	5 (0.7%)	6 (0.9%)
Administration	73 (10.7%)	38 (5.6%)
Monitoring	28 (4.1%)	16 (2.3%)

Procedures

EDPPs performed at least 1 procedure for 63/682 patients (9.2%). All 108 procedures reported are listed in Table 19.

Procedure category	Procedure	Number of times performed (%)
Airway / breathing		52 (48.1)
	Supplemental oxygen	31 (28.7)
	Continuous positive airways pressure / nasal intermittent positive pressure ventilation / bag valve mask	9 (8.3)
	Nebuliser / spacer	4 (3.7)
	Intubation & Endotracheal tubes / laryngeal mask airways / raid sequence induction	3 (2.8)
	General anaesthetic	2 (1.9)
	Nasal airway	2 (1.9)
	Airway management in arrest	1 (0.9)
Circulation		39 (36.1)
	Infusion fluids	37 (34.3)
	Electrical cardioversion	1 (0.9)
	Modified Valsalva manouver	1 (0.9)
Resuscitation		11 (10.2)
	Resuscitation / cardiopulmonary resuscitation	7 (6.5)
	Defibrillation	3 (2.8)
	Active rewarming of hypothermic patient	1 (0.9)
Analgesia		3 (2.8)
	Anaesthetic sedation	3 (2.8)
ENT		1 (0.9)
	Epistaxis control	1 (0.9)
Orthopaedic		1 (0.9)
	Application of Plaster of Paris	1 (0.9)
Wound management		1 (0.9)
	Closure of wound with steristrips	1 (0.9)
Other		1 (0.9)
	Removal of foreign body (ear)	1 (0.9)

Table 19: Procedures performed and their frequency

9. Monitoring treatment in the ED

Both medicine and procedure treatments were monitored by EDPPs. Of 682 patients, EDPPs monitored the response of 110 patients to medicine (16.1%) and 72 to procedures (10.6%). The types of activity undertaken to monitor patients are given in

Table 20.

Activity to monitor	Number of patients for whom undertaken (%N)
Vital signs	119 (17.4)
Review findings	119 (17.4)
Taken	14 (2.1)
Investigation / test / procedure	57 (8.4)
Review findings	56 (8.2)
Order	20 (2.9)
Perform	11 (1.6)
Clinical examination	51 (7.5)
Review findings	46 (6.7)
Perform	21 (3.1)

Table 20: Activities to monitor patient's response to treatment

Activity to monitor	Number of patients for whom undertaken (%N)
Vital signs	119 (17.4)
Review findings	119 (17.4)
Taken	14 (2.1)
Investigation / test / procedure	57 (8.4)
Review findings	56 (8.2)
Order	20 (2.9)
Perform	11 (1.6)
Clinical examination	51 (7.5)
Review findings	46 (6.7)
Perform	21 (3.1)

10. Discharge or admission to hospital

EDPPs supported patient discharge or admission to hospital. Of all 682 patients EDPPs cared for, 363 (53.2%) were admitted to an inpatient ward; 271 (39.7%) were altogether discharge from the ED and hospital; 6 (0.9%) died; and EDPPs were unsure of the fate of the remaining 42 patients (6.2%).

Of the 271 patients discharged, EDPPs contributed to the discharge of 220 of these (81.2%). Of 363 patients admitted, EDPPs contributed towards admitting 186 of these (51.2%).

Discharge planning

Of 271 patients discharged, 145 had a discharge plan in place (53.5%) and 90 did not (33.2%). EDPPs did not know whether 36 patients (13.3%) did or did not have a discharge plan. Of those 145 patients with discharge plans, EDPPs developed at least part of 58 (40.0%) and enacted (i.e. put into action) at least part of 40 (27.6%). The parts of these EDPPs helped to develop and enact are given in Table 21.

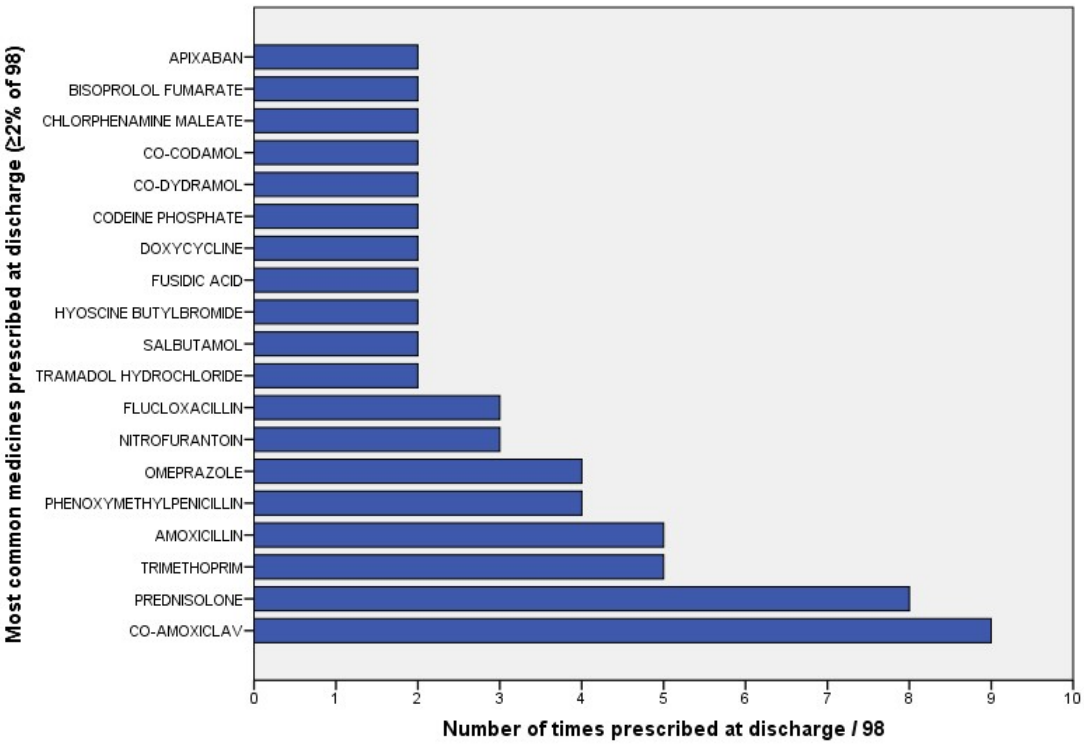
Table 21: Parts of discharge plan developed and enacted

Part of discharge plan	Number of patients developed for (%)	Number of patients enacted for (%)
Psychosocial Assessment	1	0

Occupational therapy: functional assessment	1	0
Occupational therapy: equipment provision / training	1	0
Physiotherapy: falls prevention	0	0
Physiotherapy: general	0	0
Medication review	27	22
Social Work intervention	3	0
Provision of Home Oxygen Therapy	0	0
Patient's transport out of the ED	4	0
Outpatient treatment	1	0
Outpatient review	8	2
Other	25	21

Prescribing discharge medicines

EDPPs prescribed discharge medicines for 75/271 (39.0%) of patients discharged. Of these, the number of medicines prescribed were: 1 (57 patients, 76.0%); 2 (13, 17.3%); 3 (1, 1.3%); 4 (3, 4.0%); >5 (1, 1.3%). In total, a sample of 98 prescribed medicines was reported, of which there were 54 unique drugs. The most common drugs prescribed at discharge (those ≥2% of all de-prescribed) are presented in Figure 8.



Clinical check of discharge prescriptions

Of 271 patients discharged, 43 had discharge prescriptions checked for their clinical appropriateness by EDPPs (15.9%). Overall, 71 prescriptions were checked which were of 54 unique drugs. The number of medicines checked for patients were: 1 (22 patients, 51.2%); 2 (14, 32.6%); 3 (1, 2.3%); 4 (2, 4.7%); 5 (1, 2.3%) and >5 (3, 7.0%). The most common drug to be clinically checked (those ≥2% of all checked)

Figure 8: Most common medicines prescribed at discharge by EDPPs

are presented in Figure 9.

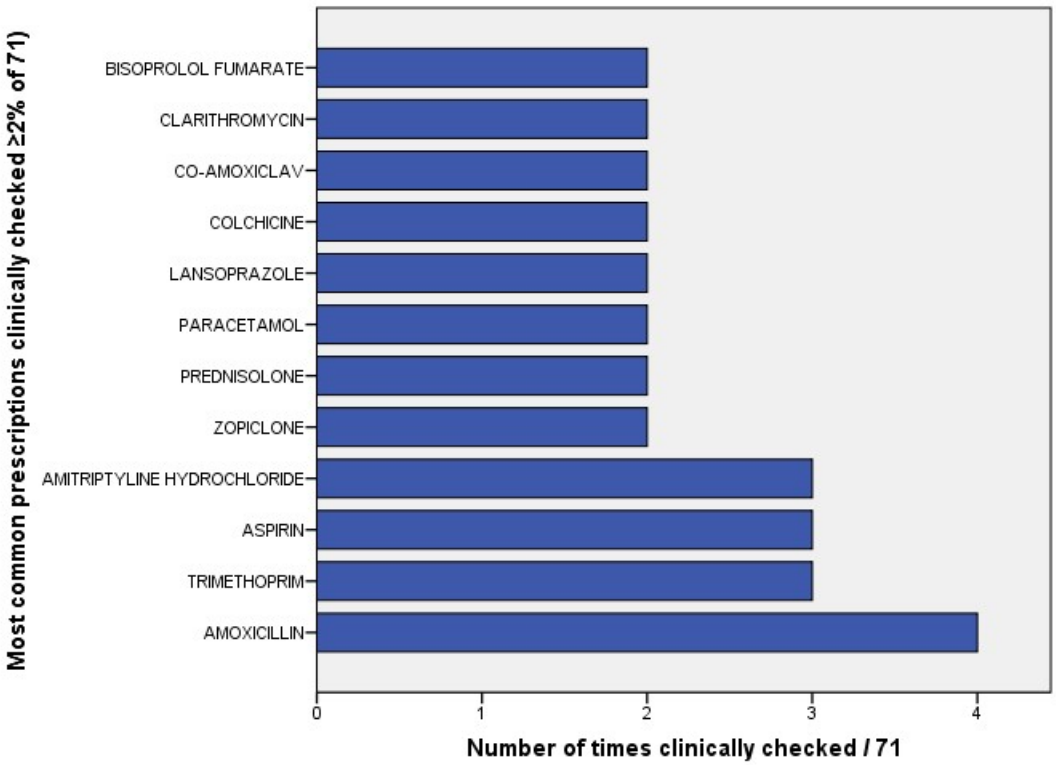


Figure 9: Most common discharge prescriptions clinically checked by EDPPs

An administration route was given for all 71 discharge prescriptions clinically checked, with oral administration being bar far most common (63, 88.7%).

Dispensing discharge medicines

EDPPs dispensed medicine for 26/271 patients discharged (9.6%). The number of medicines dispensed for patients were: 1 (11 patients, 42.3%); 2 (11, 42.3%); 3 (1, 3.8%); 4 (1, 3.8%); 5 (2, 7.7%) and >5 (2, 7.7%).

Accuracy check of dispensed discharge prescriptions

EDPPs accuracy checked discharge medicines for 22/271 patients (8.1%). Of these, the number of discharge medicines accuracy checked were either 1 (13 patients, 59.1%); 2 (6, 27.3%); 3 (2, 9.1%) or 4 (1, 4.5%).

Through accuracy check, a dispensing error was identified for only 1/22 patients (4.5%). This was a labelling error with no further detail provided.

Discharge counselling

In total, EDPPs counselled 188 patients at discharge. The majority of patients (114, 42.1%) were counselled on both their discharge medicines and management of their condition going forward. Of the remaining patients, EDPPs provided counselling limited to discharge medicines to 18 (6.6%) and management of their condition to 56 (20.7%).

Referral

Of 271 patients discharged, 118 (43.5%) were referred to another care provider. A total of 144 referrals were made, with some patients referred to more than 1 provider.

Table 22 lists providers by the number of referrals made. Outpatient clinics, which each had 1 or 2 patients referred to them, were of 16 different types. Examples include the fracture clinic, pharmacist led hepatology or anticoagulant clinics, urology, cardiology, and surgeon led clinics.

Table 22: Providers patients were referred to

Admission to hospital

Of 363 patients admitted to hospital, 191 (52.6%) had medicines that needed to be transferred to their inpatient ward. Of these EDPPs transferred, or ensured the transfer of, 112 patient's medicines (58.6%). With respect to the first inpatient drug chart of those admitted to hospital, EDPPs wrote this for 107 patients (29.5%).

Provider	Number of discharge referrals (%)
General Practitioner	84
Outpatient clinic (same / different hospital)	21
Community pharmacist	20
Other	7
Secondary care – other (same / different hospital)	5
Nurse/carer at nursing home	4
General practice nurse	2
Safeguarding team	1
District nurse	0
Optometrist	0
Podiatrist	0