Table S1: Hospital speciality groups, according to national frequency emergency admissions (21)

Hospital Speciality Group	Main Speciality	Emergency hospital admissions; 2016-17 %
General Medicine	General Medicine; Acute Internal Medicine.	13.8
Surgery	General Surgery; Urology; Ear, Nose & Throat (ENT); Ophthalmology; Oral Surgery; Restorative Dentistry; Orthodontics; Oral & Maxillo Facial Surgery; Prosthodontics; Neurosurgery; Plastic Surgery; Cardiothoracic Surgery; Dental Medicine Specialties; Special Care Dentistry; General Dental Practice; Community Health Services Dental; Public Health Dental.	32.7
Geriatric	Geriatric Medicine	2.4
Obstetrics and gynaecology	Obstetrics; Gynaecology; Midwife episode.	11.4
Cardiology	Cardiology	2.6
Other medicine	Gastroenterology; Endocrinology; Clinical Haematology; Clinical Pharmacology; Audiological Medicine; Clinical Genetics; Clinical Immunology & Allergy; Rehabilitation; Palliative Medicine; Dermatology; Respiratory Medicine (Thoracic Medicine); Infectious Diseases; Tropical Medicine; Genitourinary Medicine; Nephrology; Medical Oncology; Neurology; Rheumatology; Medical Ophthalmology; Clinical Oncology (previously Radiotherapy); Blood Transfusion; Haematology; Medical Microbiology & Virology; Medical Microbiology (Microbiology & Bacteriology).	20.7
Other	Trauma & Orthopaedics; Accident & Emergency (A&E); Anaesthetics; Critical Care Medicine; Non-UK Provider; specialty function not known, treatment mainly medical; General Medical Practice; Learning Disability (previously MH); Adult Mental Illness; Forensic Psychiatry; Psychotherapy; Old Age Psychiatry; Community Medicine; Public Health Medicine; Nursing episode; Allied Health Professional Episode; Paediatric Dentistry; Paediatric Surgery; Paediatric Cardiology; Paediatrics; Paediatric Neurology; Child & Adolescent Psychiatry; Clinical Physiology; Nuclear Medicine; Clinical Neuro-physiology; Radiology; General Pathology; Chemical Pathology; Histopathology; Immunopathology.	16.5

Table S2: Investigation of regression to the mean analysis with observed and expected number of prescriptions (mean) at 4-weeks post-discharge, compared to before hospitalisation, and 6-months post-discharge, compared to 4-weeks post-discharge, stratified by number of prescriptions before hospitalisation.

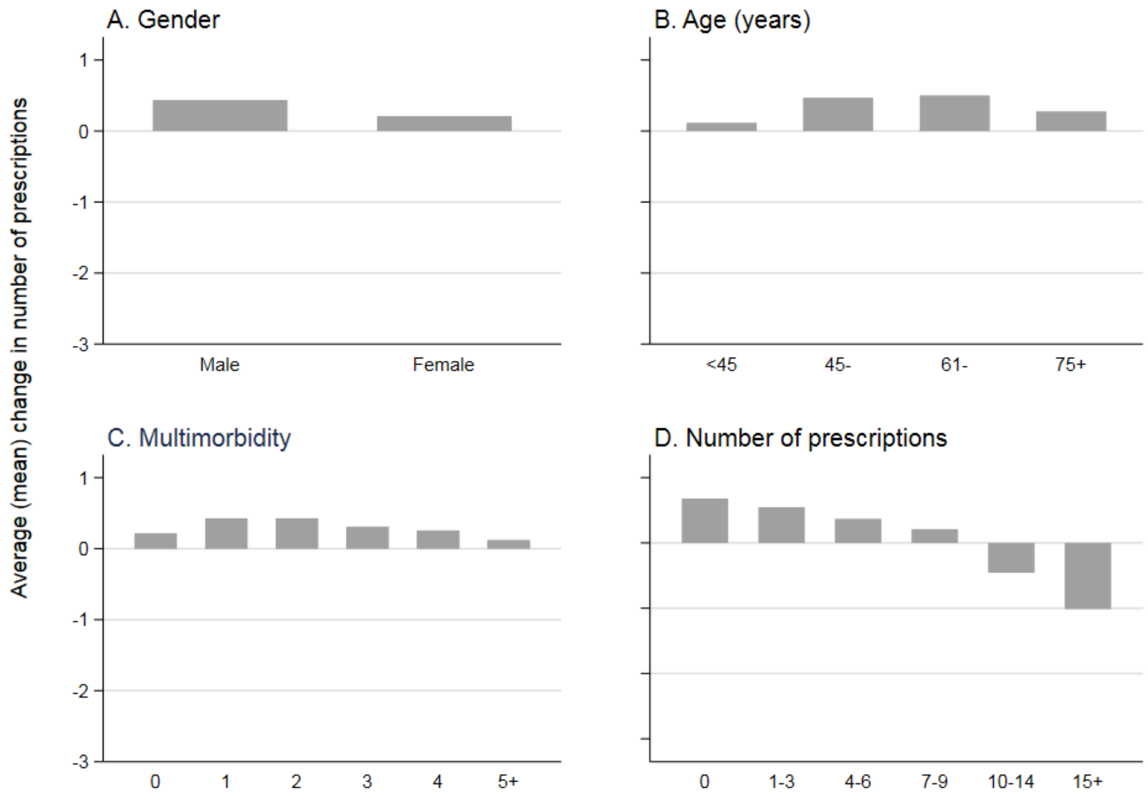
Number of prescriptions before hospitalisation	Before hospital (observed)	4-weeks after		6-months after	
		Expected	Observed	Expected	Observed
0	0.0	0.5	0.7	1.1	0.7
1-3	1.4	1.8	2.0	2.3	1.7
4-6	3.5	3.6	3.8	3.9	3.4
7-9	6.8	6.5	7.0	6.7	6.2
10-14	12.2	11.3	11.7	10.9	10.2
15+	17.4	15.9	16.4	15.1	14.0

The correlation between standardised (z-scores) measures of number of prescriptions one year and 6-months prior to hospitalisation (r=0.89) was used as a measure of changes in prescribing in the general population over time. Regression to the mean expected estimates was calculated, as described below:-

Regression to the mean estimates: expected z-score after = z-score before * r

Multiplying r by standardised measures (z-score) of the number of prescriptions before hospitalisation, and at 4-weeks post-discharge, calculates the expected number of prescriptions (given regression to the mean) at 4-weeks and 6-months post-discharge, respectively. Expected numbers were converted to the original scale and compared to observed results. Large differences between observed and expected figures indicate a greater change in prescribing than expected from regression to the mean alone.

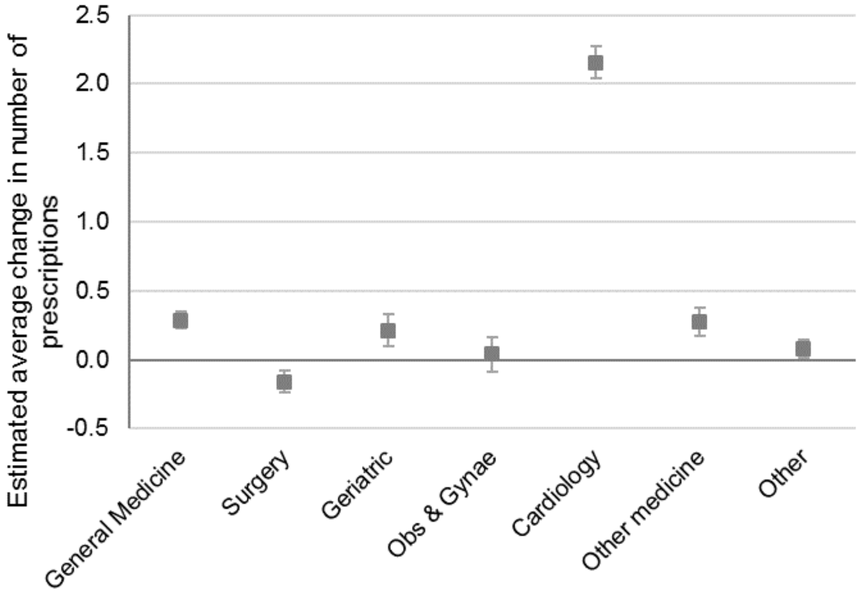
Figure S1: Estimated average change (mean) in number of prescriptions at 4-weeks, compared to at hospital admission, stratified by demographic and clinical characteristics.



Index hospital admission defined as first hospitalisation of 2014 (with no hospitalisation 6 months prior) and includes any hospital admissions within 6 weeks of discharge

Number of prescriptions includes all ongoing prescriptions on the date of interest. Patients restricted to those who were still alive 6-months post-discharge.

Figure S2: Marginal effects of the change (95% CI) in number of prescriptions at 4-weeks post-discharge, compared to at hospital admission, stratified by hospital speciality.



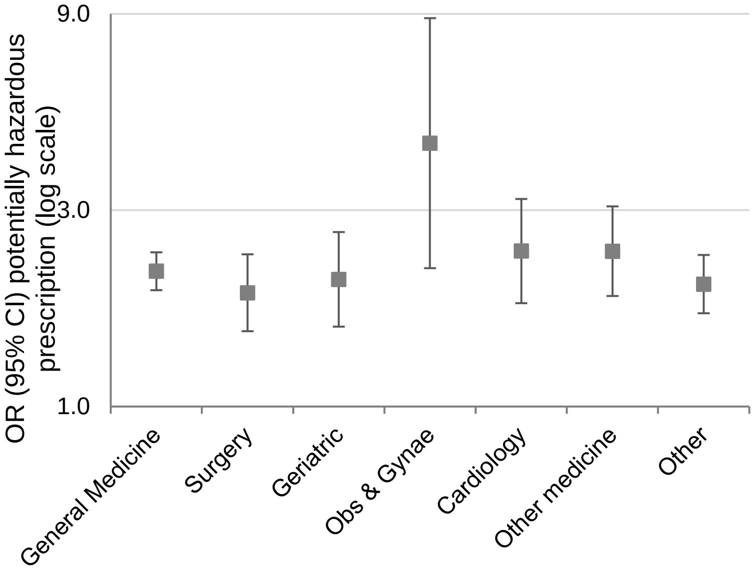
Multi-level linear regression models were used to estimate (95% CI) the change in number of prescriptions at 4-weeks post-discharge, compared to number of prescriptions at hospitalisation. Marginal effects are presented, keeping all other covariates constant. General practice was included as a random effect to account for clustering. Models were adjusted for gender, age and number of prescriptions and multimorbidity at hospital admission, and duration of hospitalisation.

Index hospital admission defined as first hospitalisation of 2014 (with no hospitalisation 6 months prior) and includes any hospital admissions within 6 weeks of discharge

Number of prescriptions includes all ongoing prescriptions on the date of interest.

Patients restricted to those who were still alive 6-months post-discharge.

Figure S3: Association between having a potentially inappropriate prescription 4-weeks post-discharge, compared to before hospitalisation (baseline), stratified by hospital speciality



OR: odds ratio; CI: confidence intervals

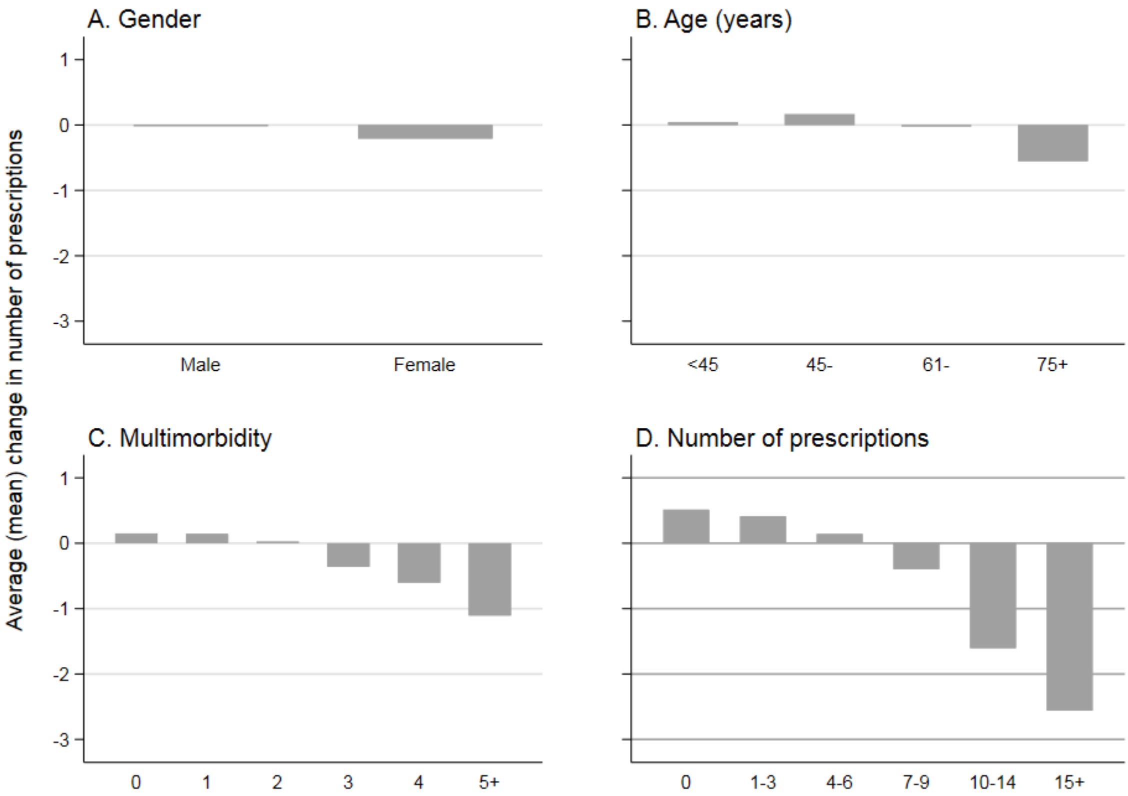
Prescribing safety indicator (Stocks, 2015; composite measure of indicators P1-P19) used to identify potentially inappropriate prescribing

Multi-level logistic regression models were used to estimate the OR (95% CI) of having a potentially inappropriate prescription at 4-weeks post-discharge, compared to pre-hospitalisation. General practice was included as a random effect to account for clustering. Models were adjusted for gender, age, multimorbidity at hospital admission and number of prescriptions at hospital admission and 4-weeks post-hospitalisation, duration of hospitalisation and number of hospital admissions between discharge and 6-months post-discharge from index hospital admission.

Number of prescriptions includes all ongoing prescriptions on the date of interest.

Patients restricted to those who were still alive 6-months post-discharge.

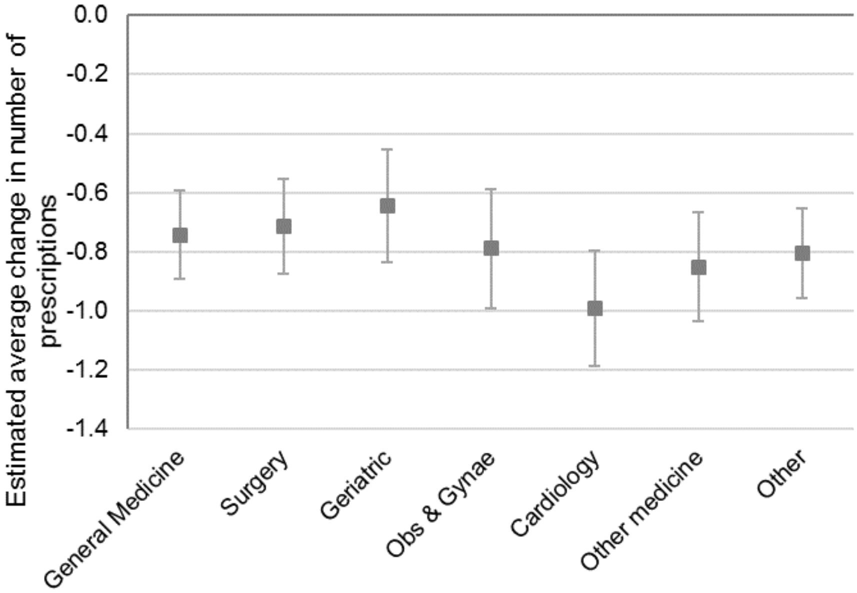
Figure S4: Estimated average change (mean) in number of prescriptions at 6-months post-discharge, compared to 4-weeks post-discharge, stratified by demographic and clinical characteristics.



Index hospital admission defined as first hospitalisation of 2014 (with no hospitalisation 6 months prior) and includes any hospital admissions within 6 weeks of discharge. Thus, discharge date based on last hospital admission.

Number of prescriptions includes all ongoing prescriptions on the date of interest. Patients restricted to those who were still alive 6-months post-discharge.

Figure S5: Marginal effects of the change (95% CI) in number of prescriptions at 6-months post-discharge, compared to 4-weeks post-discharge, stratified by hospital speciality.



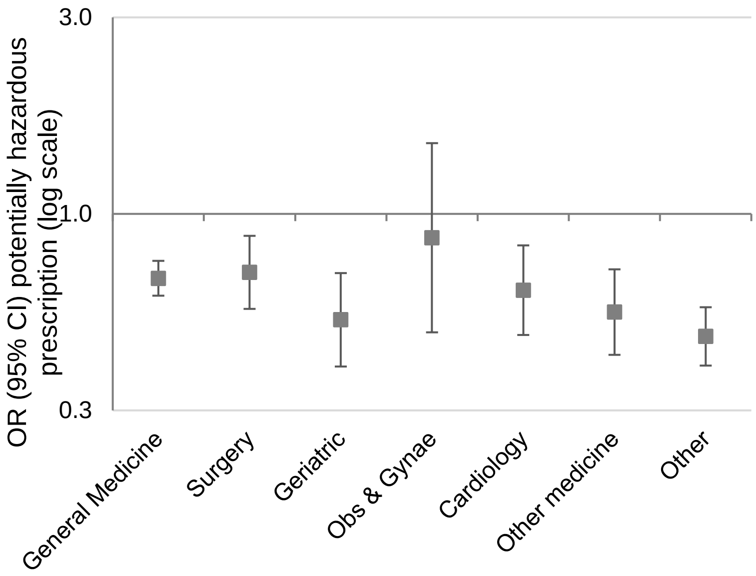
Multi-level linear regression models were used to estimate (95% CI) the change in number of prescriptions 6-months post-discharge, compared to 4-weeks post-discharge. Marginal effects are presented, keeping all other covariates constant. General practice was included as a random effect to account for clustering. Models were adjusted for gender, age and number of prescriptions and multimorbidity at hospital admission, duration of hospitalisation and number of hospital admissions between discharge and 6-months post-discharge from index hospital admission.

Index hospital admission defined as first hospitalisation of 2014 (with no hospitalisation 6 months prior) and includes any hospital admissions within 6 weeks of discharge

Number of prescriptions includes all ongoing prescriptions on the date of interest.

Patients restricted to those who were still alive 6-months post-discharge.

Figure S6: Association between having a potentially inappropriate prescription 6-months post-discharge, compared to 4-weeks post-discharge (baseline), stratified by hospital speciality



OR: odds ratio; CI: confidence intervals

Prescribing safety indicator (Stocks, 2015; composite measure of indicators P1-P19) used to identify potentially inappropriate prescribing

Multi-level logistic regression models were used to estimate the OR (95% CI) of having a potentially inappropriate prescription at 6-months post-discharge, compared to 4-weeks post hospital discharge. General practice was included as a random effect to account for clustering. Models were adjusted for gender, age, multimorbidity at hospital admission and number of prescriptions at hospital admission and 4-weeks/6-months post-hospitalisation, duration of hospitalisation and number of hospital admissions between discharge and 6-months post-discharge from index hospital admission.

Number of prescriptions includes all ongoing prescriptions on the date of interest.

Patients restricted to those who were still alive 6-months post-discharge.