Study Report

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DARWIN EU® - Characterising STOPP criteria medication use in people with recurrent falls

14/04/2026

Version 5.0

CONTENTS

Study title	DARWIN EU® - Characterising STOPP criteria medication use in people with recurrent falls
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Date of last version of report	14/04/2026
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Active substance	Drug classes listed in STOPP section K criteria: • Benzodiazepines • Antipsychotics • Vasodilating drugs (nitrates, ACE inhibitors, angiotensin receptor blockers (ARB) inhibitors, calcium channel blockers) • Hypnotic z-drugs • Anti-epileptics • First generation antihistamines • Opioids • Antidepressants • Alpha-blockers • Centrally acting antihypertensives • Antimuscarinic drugs (indicated for overactive bladder)
Medicinal product	n/a
Research question and objectives	Research question What are the characteristics of patients with recurrent falls and how are STOPP Section K criteria medicines prescribed in Europe? Study objectives 1. To characterise individuals aged 65 years and older with newly diagnosed recurrent falls in terms of age, sex, risk factors, comorbidities, and concomitant prescriptions. Results were stratified by database and where feasible by healthcare setting. 2. To estimate the overall survival of individuals aged 65 years and older with newly diagnosed recurrent falls. 3. To estimate prevalence of use of drug classes belonging to the STOPP section K criteria in individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. Results were stratified by database, calendar year, age, and sex. 4. To estimate incidence of use of drug classes belonging to the STOPP section K criteria in individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. Results were stratified by database, calendar year, age, and sex. 5. To characterise a cohort of individuals aged 65 years and older with recurrent falls at the time of their new prescription of any of the drug classes belonging to the STOPP section K criteria in terms of age, sex, comorbidities, and comedication. Additionally, the proportion of individual drug substances within each drug class belonging to the STOPP section K criteria is provided. Results were stratified by database. 6. To determine the median duration of use of the different drug classes

	belonging to the STOPP section K criteria at the time of treatment initiation of drugs of interest in the individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. To provide product names with details on strength, formulation, and volume at treatment initiation.
Countries of study	United Kingdom, Finland, Germany, Croatia, and Spain
Authors	Dina Vojinovic, d.vojinovic@darwin-eu.org Akram Mendez a.mendezrangel@darwin-eu.org

TITLE

DARWIN EU® - Characterising STOPP criteria medication use in people with recurrent falls

1. DESCRIPTION OF STUDY TEAM

Study team role(s)	Name(s)	Organisation(s)
Principal Investigator/Epidemiologist	Dina Vojinovic	IQVIA
Data Scientists	Akram Mendez Gargi Jadhav	IQVIA
Data partner name*	**Data Partner member name(s)**	**Organisation(s)**
CPRD GOLD	Antonella Delmestri	University of Oxford
IQVIA DA Germany	James Brash Isabella Kaczmarczyk	IQVIA
FinOMOP - HILMO	Tuomo Nieminen Tiina Wahlfors	Finnish Care Register for Health Care
NAJS	Pero Ivanko Marko Čavlina Antea Jezidžić Marija Svajda	Croatian Institute for Public Health
SIDIAP	Talita Duarte Agustina Giuliodori Irene Lopez	Institute for Primary Health Care Research Jordi Gol i Gurina (IDIAPJGol)

*Data partners' role is only to execute code at their data source, review and approve their results. These people do not have an investigator role. Data analysts/programmers do not have an investigator role and thus declaration of interests (DOI) for these people is not needed.

2. DATA SOURCES

Country	Name of Database	Health Care setting	Type of Data	Number of active subjects	Latest available data in each data source
United Kingdom	CPRD GOLD	Primary care	EHR	17.4 million	15/06/2024
Germany	IQVIA DA Germany	Primary care and outpatient specialist care	EHR	43 million	30/09/2023
Finland	FinOMOP-HILMO	Primary care, outpatient specialist care, and inpatient care	EHR and registries	7.1 million	09/10/2024
Croatia	NAJS	Primary care, outpatient specialist care, and inpatient care	EHR and registries	4.9 million	30/01/2025
Spain	SIDIAP	Primary care	EHR	8.6 million	30/06/2023

CPRD GOLD = Clinical Practice Research Datalink GOLD; IQVIA DA Germany = IQVIA Disease Analyzer Germany; EHR = Electronic Heath Record; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària.

3. ABSTRACT

Title

DARWIN EU® - Characterising STOPP criteria medication use in people with recurrent falls

Rationale and background

Falls in older adults are associated with significant health outcomes, including hospitalisation and increased mortality. Inappropriate prescribing, particularly in populations with multimorbidity and polypharmacy, is a recognised risk factor for falls. The prevalence of potentially inappropriate prescriptions, as outlined in Section K of the STOPP criteria, among individuals with recurrent falls remains uncertain across Europe.

Research question and objectives

Research question

What are the characteristics of patients with recurrent falls and how are STOPP Section K criteria medicines prescribed in Europe?

Study objectives

1. To characterise individuals aged 65 years and older with newly diagnosed recurrent falls in terms of age, sex, risk factors, comorbidities, and concomitant prescriptions. Results were stratified by database and where feasible by healthcare setting.
2. To estimate the overall survival of individuals aged 65 years and older with newly diagnosed recurrent falls.
3. To estimate prevalence of use of drug classes belonging to the STOPP section K criteria in individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. Results were stratified by database, calendar year, age, and sex.
4. To estimate incidence of use of drug classes belonging to the STOPP section K criteria in individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. Results were stratified by database, calendar year, age, and sex.
5. To characterise a cohort of individuals aged 65 years and older with recurrent falls at the time of their new prescription of any of the drug classes belonging to the STOPP section K criteria in terms of age, sex, comorbidities, and comedication. Additionally, the proportion of individual drug substances within each drug class belonging to the STOPP section K criteria is provided. Results were stratified by database.
6. To determine the median duration of use of the different drug classes belonging to the STOPP section K criteria at the time of treatment initiation of drugs of interest in the individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. To provide product names with details on strength, formulation, and volume at treatment initiation.

Methods

Study design

- Cohort analysis (Objective 1 and 2, Patient-level characterisation of individuals aged 65 years and older with newly diagnosed recurrent falls in terms of age, sex, risk factors, comorbidities, and concomitant medication and survival).

- Population-level cohort study (Objective 3 and 4, Population-level drug utilisation of drug classes belonging to the STOPP section K criteria in individuals aged 65 years and older, categorised into those with recurrent falls and those without recurrent falls).
- New drug user cohort study (Objective 5 and 6, Patient-level drug utilisation of drug classes belonging to the STOPP section K criteria with regard to summary characterisation (age, sex, comorbidities, and comedication), proportion of the individual drugs in individuals aged 65 years and older with recurrent falls and duration of treatment in patients aged 65 years and older categorised into those with recurrent falls and those without recurrent falls).

Population

Patient-level characterisation: Patient-level characterisation included individuals aged 65 years and older with newly diagnosed recurrent falls in the respective databases between 1st of January 2013 and 31st of December 2023. Eligible individuals had at least 1 year of data visibility prior to the date of recurrent fall diagnosis (index date) and no prior diagnosis of recurrent falls. Additional eligibility criterion of a minimum of 1 year of potential follow-up after the index date was applied for survival analysis.

Population-level utilisation of drug classes belonging to the STOPP section K criteria: Population-level drug utilisation analyses included individuals aged 65 years and older registered in the respective databases between 1st of January 2013 and 31st of December 2023, with at least 1 year of data visibility prior to becoming eligible for study inclusion. Categorisation was done on those with recurrent falls and those without recurrent falls.

Patient-level utilisation of drug classes belonging to the STOPP section K criteria: Patient-level utilisation included new users of drug classes belonging to STOPP section K criteria in a cohort of individuals aged 65 years and older with recurrent falls registered in the respective databases between 1st of January 2013 and 31st of December 2023, with at least 1 year of data visibility prior to becoming eligible for study inclusion and no use of the respective drug classes belonging to the STOPP section K criteria in the previous 1 year prior to the index date. Product names with details on strength, formulation and volume were also reported at treatment initiation.

Variables

Drug classes listed in STOPP section K criteria

- Benzodiazepines
- Antipsychotics
- Vasodilating drugs (nitrates, ACE inhibitors, ARB inhibitors, calcium channel blockers)
- Hypnotic z-drugs
- Anti-epileptics
- First generation antihistamines
- Opioids
- Antidepressants
- Alpha-blockers
- Centrally acting antihypertensives
- Antimuscarinic drugs (indicated for overactive bladder)

Conditions of interest

- Recurrent falls

Data source

1. Clinical Practice Research Datalink GOLD (CPRD GOLD), United Kingdom
2. IQVIA Disease Analyzer Germany (IQVIA DA Germany), Germany
3. Finnish Care Register for Health Care (FinOMOP-HILMO), Finland
4. Croatian National Public Health Information System (NAJS), Croatia
5. The Information System for Research in Primary Care (SIDIAP), Spain

Statistical analysis

Patient-level characterisation: Patient-level characterisation including age, sex, pre-specified risk factors, comorbidities and comedication was conducted at the date of the new diagnosis of recurrent falls. Additionally, these characteristics were also assessed within the one year period prior to this date (Objective 1).

Overall survival (Objective 2) was calculated using data on time at risk of death from any cause and the Kaplan-Meier method. Results were reported as plots of the estimated survival curves as well as the estimated probability of survival at 1, 3, and 5 years after the new diagnosis of recurrent falls. This analysis was conducted only for databases that systematically collect data on mortality.

Statistical analyses were conducted using the "*CohortCharacteristics*", "*PatientProfiles*", and "*CohortSurvival*" R packages.

Population-level utilisation of drug classes belonging to the STOPP section K criteria: Annual incidence rates (expressed as the number of new users per 1,000 person-years) and annual period prevalence (expressed as number of users in the population at risk) of the use of drug classes belonging to the STOPP section K criteria were estimated in individuals aged 65 years and older, categorised into those with recurrent falls and those without recurrent falls (objectives 3 and 4). The statistical analysis was performed based on OMOP-CDM mapped data using the "*IncidencePrevalence*" R package. The results were also stratified by database, calendar year, age, and sex.

Patient-level utilisation of drug classes belonging to the STOPP section K criteria: Characterisation including age, sex, comorbidities and comedication was conducted at the date of new (incident) prescription of drug classes belonging to the STOPP section K criteria for individuals aged 65 years and older with a diagnosis of recurrent falls (index date). The frequency of comorbidities and comedications was assessed at the index date and in the 1 year prior to the index date. Additionally, the proportion of individual drug substances within each drug class belonging to the STOPP section K criteria was also provided. Duration of treatment with drug classes belonging to the STOPP section K criteria was calculated and summarised, providing minimum, quartiles and maximum for those with recurrent falls and those without recurrent falls. Statistical analyses were conducted using the "*CohortCharacteristics*", "*PatientProfiles*", and "*DrugUtilisation*" R packages based on OMOP-CDM mapped data.

For all analyses, a minimum cell count of 5 was used when reporting results, with any smaller counts obscured.

Results

Characterisation of individuals with recurrent falls – Patient-level characterisation

The study identified 271,244 individuals aged 65 years and older newly diagnosed with recurrent falls between January 1, 2013, and December 31, 2023 (CPRD GOLD: 32,240, IQVIA DA Germany: 24,440, FinOMOP-HILMO: 33,956, NAJS: 168,377, SIDIAP: 12,231). The median age at diagnosis varied across data sources, ranging from 76 years in registries such as FinOMOP-HILMO and NAJS to 82 years in the primary care database IQVIA DA Germany and 84 years in the primary care databases CPRD GOLD and SIDIAP. The majority of cases were female, with proportions ranging from 64.00% in CPRD GOLD to 70.63% in SIDIAP.

The frequency of pre-specified risk factors at the date of first diagnosis of recurrent falls varied significantly across data sources. The most common conditions were hypertension, abnormal gait, arthritis, diabetes mellitus, and dizziness, while the most frequently prescribed STOPP section K criteria medications included vasodilating drugs, opioids, antidepressants, benzodiazepines, and antipsychotics, with notable variations between data sources. When examining the period of one year prior to the index date, the frequency of pre-specified conditions and medications was substantially higher.

Hypertension, dizziness, and urinary incontinence were the most frequently recorded conditions at the index date. Additionally, injuries and fractures were commonly observed among the top recorded conditions, which were rather the result of a fall. Acetaminophen products, dipyrone products, nonsteroidal anti-inflammatory drugs (NSAIDs), and proton pump inhibitors were frequently prescribed medications at the index date. The frequency of these conditions and medications was higher in the period before the index date.

Survival

Of the 214,750 individuals aged 65 years and older newly diagnosed with recurrent falls who were included in the survival analysis, 74,141 had a subsequent death record during the study period. The proportion of deaths varied across data sources, with the highest observed in SIDIAP (52.51%) and the lowest in NAJS (31.69%).

Overall, the median survival ranged from 1,507 days (95% confidence interval (CI): 1,474 – 1,541 days) in CPRD GOLD to 2,770 days (95% CI: 2,714 – 2,836 days) in FinOMOP-HILMO.

Prevalence and incidence rates of STOPP section K criteria drug classes – Population-level utilisation

The prevalence and incidence rates of STOPP section K criteria drug class use among individuals aged 65 years and older, stratified by those newly diagnosed with recurrent falls and those without recurrent falls, reveal distinct patterns over time. The use of STOPP section K criteria drug classes was assessed following the diagnosis of recurrent falls, which may have occurred a considerable time afterwards. Vasodilating drugs, opioids, antidepressants, and benzodiazepines were the most frequently prescribed drug classes in both cohorts.

The prevalence of STOPP section K criteria drug classes was similar or greater among individuals aged 65 years and older following their new diagnosis of recurrent falls compared to individuals aged 65 years and older without recurrent falls, across all data sources. The prevalence of these drug classes showed a distinct pattern over time: benzodiazepine use remained relatively stable with a slight decline over the study period across most data sources, vasodilating drug use exhibited varied trends, opioid use was either stable or slightly decreased or increased and antidepressant use remained stable or increased. Antipsychotic use generally declined, increased, or remained stable depending on the data source, while the use of hypnotic z-drugs, antiepileptics, first-generation antihistamines, alpha-blockers, centrally acting antihypertensives, and antimuscarinic drugs generally remained low and relatively stable across the data sources.

The incidence rates of STOPP section K criteria drug class use followed similar trends as prevalence with rates being similar or greater in older adults following their new diagnosis of recurrent falls compared to those without recurrent falls. In the cohort with recurrent falls, benzodiazepine use generally declined over the study period, antipsychotic use initially declined before stabilising and vasodilating drug use showed varied trends. Hypnotic z-drug use initially declined then stabilised, antiepileptic use declined over time, first-generation antihistamine use showed slight declines, stable trends or increases while opioid use exhibited a steep initial decline followed by a gradual decrease. Antidepressant use showed slight declines or stable trends, alpha-blocker use remained stable or increased, centrally acting antihypertensive use remained low and stable, and antimuscarinic drug use showed slight fluctuations but remained generally stable.

Both prevalence and incidence rates of STOPP section K criteria drug class use varied between age groups or sex among cohorts and drug classes.

Characterisation of new users of STOPP section K criteria – Patient-level utilisation

The number of individuals aged 65 years and older with recurrent falls at the time of new prescription of STOPP section K criteria drug classes ranged from 7,532 individuals at the time of new antiepileptic prescriptions to 78,714 individuals at the time of new opioid prescriptions. The median age at the time of new prescription ranged between 76 and 86 years across different drug classes and data sources. Generally, the proportion of females was higher than males across all drug classes, except for alpha-blockers, where males predominated.

Hypertension was one of the most frequently reported comorbidities at the time of their new prescription the STOPP section K criteria drug classes across the data sources. Other comorbidities varied across drug classes of interest and data sources. Benzodiazepine users frequently had essential hypertension and anxiety disorders, while antipsychotic users often had dementia, restlessness, agitation, and organic personality disorder. Cardiovascular comorbidities were common among vasodilator and centrally acting antihypertensives users, sleep disorders and anxiety among hypnotic z-drug users, epilepsy and seizures among antiepileptic users, pain-related conditions among opioid users and hyperplasia of the prostate and urinary conditions among alpha-blocker users.

Co-prescription patterns revealed frequent use of analgesics, gastrointestinal medications such as pantoprazole and omeprazole, and other sedative-hypnotic agents across various drug classes of interest and data sources.

In terms of individual drug substances within each drug class belonging to the STOPP section K criteria, notable findings included high frequencies of lorazepam, diazepam, oxazepam, and midazolam among benzodiazepines, quetiapine, haloperidol and risperidone among antipsychotics, and amlodipine and ramipril among vasodilating drugs. Additionally, codeine, tramadol, and oxycodone were prevalent opioids, while tamsulosin was the most commonly prescribed alpha-blocker.

Treatment duration

Among individuals with recurrent falls, the median treatment duration for benzodiazepine use ranged from 7 days in CPRD GOLD to 83 days in SIDIAP and for antipsychotics from 10 days in CPRD GOLD to 146 days in SIDIAP. Opioid treatment duration varied from 25 days in CPRD GOLD to 39 days in SIDIAP while vasodilating drug use ranged from 129 days in CPRD GOLD to 487 days in SIDIAP. Generally, treatment durations were shorter for individuals without recurrent falls, except for vasodilating drugs, where the duration was longer. The treatment duration for hypnotic z-drugs, first-generation antihistamines, and antidepressants was generally comparable between those with and without recurrent falls. However, alpha-blockers had longer treatment durations for those without recurrent falls in CPRD GOLD and SIDIAP.

Discussion

Our study analysed the data from 271,244 individuals aged 65 years and older newly diagnosed with recurrent falls between 2013 and 2023 across multiple European data sources. Older adults with recurrent falls frequently presented with comorbid conditions, and many exhibited fall-related consequences of the fall, including injuries and fractures, highlighting the substantial public health burden associated with recurrent falls in this population.

Our findings indicate that STOPP section K criteria drug classes were prescribed at similar or even greater prevalence and incidence rates in individuals aged 65 years and older following a new diagnosis of recurrent falls compared to those without recurrent falls. The most commonly prescribed drug classes included vasodilating drugs, opioids, antidepressants, and benzodiazepines, with variations observed across cohorts and drug classes.

These findings highlight the importance of identifying older adults with recurrent falls as a population at increased risk that may benefit from medication review. Given the persistent use of high-risk medications, a multidisciplinary approach to medication management may be essential to optimise prescribing practices, enhancing patient safety, and mitigating the adverse consequences of recurrent falls.

4. LIST OF ABBREVIATIONS

Acronyms/term	Description
ARB	Angiotensin receptor blockers
CDM	Common Data Model
CPRD	Clinical Practice Research Datalink
DA	Disease Analyzer
DARWIN EU®	Data Analysis and Real World Interrogation Network
DRE	Digital Research Environment
DOI	Declaration of interests
DQD	Data Quality Dashboard
DRE	Digital Research Environment
DUS	Drug Utilisation Study
EHR	Electronic Health Records
EMA	European Medicines Agency
EU	European Union
FinOMOP-HILMO	Finnish Care Register for Health Care
GDPR	General Data Protection Regulation
GP	General practitioner
ICD	International Classification of Diseases
ID	Index date
IP	Inpatient
MA	Marketing Authorisation
NAJS	National Public Health Information System
OHDSI	Observational Health Data Sciences and Informatics
OMOP	Observational Medical Outcomes Partnership
OP	Outpatient
OT	Other
SIDIAP	The Information System for Research in Primary Care
SNOMED	Systematized Nomenclature of Medicine
UK	United Kingdom
WHO	World Health Organisation

5. AMENDMENTS AND UPDATES

Amendment number	Previous approved version of the report	Date	Section of the study report	Amendment or update	Reason
1.0	V3.0	31 March 2025	Results	Amendment	Mislabelled exposure data in NAJS

The study report V4.0 (and subsequent versions) has been updated to incorporate the revised results from the Croatian National Public Health Information System (NAJS). In the data release used for the previous version of the study report (V3.0; CDM release date: 17/11/2023), some single drugs had been incorrectly mapped as combination therapies. This exposure misclassification was corrected in a subsequent data release (CDM release date: 08/02/2025), after which the study code was re-executed to ensure accurate results. The changes observed in the updated results based on the new data release include:

- The starting population in the new data release decreased to 4,853,340 compared with 5,448,809 in the previous data release. This change is attributed to updates implemented in the new data release. Specifically, individuals with no available clinical information other than the date and cause of death were excluded, resulting in a reduction in the number of individuals included.
- Several medication classes that were frequently observed in the previous data release were reduced or absent in the updated CDM version, consistent with corrected drug mappings. Overall, the results based on the updated CDM generally showed more stable estimates over time, reflecting improvements in data quality.

6. MILESTONES

STUDY SPECIFIC DELIVERABLE	TIMELINE (planned)	TIMELINES (actual)
Draft Study Protocol	6th September 2024	6th September 2024
Final Study Protocol	October 2024	28th October 2024
Creation of Analytical code	October 2024	October/November 2024
Execution of Analytical Code on the data	October/November 2024	December 2024
Interim Study Report (if applicable)	Not applicable	Not applicable
Draft Study Report	November 2024	31st December 2024
Final Study Report	December 2024	6th February 2025

7. RATIONALE AND BACKGROUND

Falls in older people are associated with a number of health outcomes, hospitalisation, and increased mortality. Risk factors for falls include inappropriate prescribing in older people, which is an important public health issue in a population where multimorbidity and polypharmacy are common.[1, 2]

STOPP/START (version 3) is a physiological systems-based set of criteria that attempts to define clinically important and potentially inappropriate medication use.[3] Detection and avoidance of potentially inappropriate medications is therefore a potentially important aspect of medication review in older people with multimorbidity and polypharmacy.

Section K of the STOPP criteria contains drug classes that are considered to increase falls risk in susceptible older people. However, the prevalence of potentially inappropriate medicine prescriptions listed in section K of the STOPP criteria among people with recurrent falls is uncertain across Europe.

8. RESEARCH QUESTION AND OBJECTIVES

Research question

What are the characteristics of patients with recurrent falls and how are STOPP Section K criteria medicines prescribed in Europe?

Study objectives

1. To characterise individuals aged 65 years and older with newly diagnosed recurrent falls in terms of age, sex, risk factors, comorbidities, and concomitant prescriptions. Results were stratified by database and where feasible by healthcare setting.
2. To estimate the overall survival of individuals aged 65 years and older with newly diagnosed recurrent falls.
3. To estimate prevalence of use of drug classes belonging to the STOPP section K criteria in individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. Results were stratified by database, calendar year, age, and sex.
4. To estimate incidence of use of drug classes belonging to the STOPP section K criteria in individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. Results were stratified by database, calendar year, age, and sex.
5. To characterise a cohort of individuals aged 65 years and older with recurrent falls at the time of their new prescription of any of the drug classes belonging to the STOPP section K criteria in terms of age, sex, comorbidities, and comedication. Additionally, the proportion of individual drug substances within each drug class belonging to the STOPP section K criteria was provided. Results were stratified by database.
6. To determine the median duration of use the different drug classes belonging to the STOPP section K criteria at the time of treatment initiation of drugs of interest in the individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. To provide product names with details on strength, formulation, and volume at treatment initiation.

Description of the proposed objectives to be achieved in the study (**Table 1**).

Table 1. Primary and secondary research questions and objectives.

A. Study objectives 1 and 2

Objectives:	**Objective 1:** To characterise individuals aged 65 years and older with newly diagnosed recurrent falls in terms of age, sex, risk factors, comorbidities, and concomitant prescriptions. Results were stratified by database and where feasible by healthcare setting. **Objective 2:** To estimate the overall survival of individuals aged 65 years and older with newly diagnosed recurrent falls.
Hypothesis:	Not applicable

Population *(mention key inclusion-exclusion criteria):*	Patient-level characterisation included individuals aged 65 years and older with newly diagnosed recurrent falls recorded in the respective databases between 1st of January 2013 and 31st December 2023. Eligible individuals had at least 1 year of data visibility prior to the date of recurrent falls diagnosis and no prior diagnosis of recurrent falls. Additional eligibility criterion of a minimum of 1 year of potential follow-up after the index date was applied for survival analysis. Therefore, the individuals aged 65 years and older who received a new diagnosis of recurrent falls between 1st of January 2013 and one year before the end of the available data in the respective database were included. This means that the individuals could enter the cohort until 1 year before the end of the study period or the end of data availability in the database.
Exposure:	Not applicable
Comparator:	Not applicable
Outcome:	The main outcome of interest was death (Objective 2). Overall, 1-, 3-, and 5-year survival in patients with recurrent falls was calculated based on the registered date of death. This analysis was conducted only for databases that systematically collect data on mortality.
Time *(when follow up begins and ends):*	Follow-up started on the date of the new diagnosis of recurrent falls until the earliest of the following: 1) loss to follow-up, 2) end of data availability, 3) date of death or 4) end of study period (31st December 2023).
Setting:	Outpatient setting using data from the following 5 data sources: CPRD GOLD (UK), IQVIA DA Germany (Germany), FinOMOP-HILMO (Finland), NAJS (Croatia) and SIDIAP (Spain).
Main measure of effect:	Age, sex, risk factors, comorbidities, and concomitant prescriptions for individuals aged 65 years and older with newly diagnosed recurrent falls, stratified by database and where feasible by healthcare setting. Probability of survival in individuals aged 65 years and older with newly diagnosed recurrent falls, stratified by database.

B. Study objectives 3 and 4

Objective:	**Objective 3:** To estimate prevalence of use of drug classes belonging to the STOPP section K criteria in individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. Results were stratified by database, calendar year, age, and sex. **Objective 4:** To estimate incidence of use of drug classes belonging to the STOPP section K criteria in individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. Results were also stratified by database, calendar year, age, and sex.
Hypothesis:	Not applicable
Population *(mention key inclusion-exclusion criteria):*	Population-level utilisation of drug classes belonging to STOPP section K criteria included individuals aged 65 years and older registered in the respective databases between 1st of January 2013 and 31st December

	2023, with at least 1 year of data visibility prior to becoming eligible for study inclusion. These individuals were categorised into those with recurrent falls and those without recurrent falls. The cohort with recurrent falls included individuals aged 65 years and older who had their first diagnosis of recurrent falls between 1st of January 2013 and 31st of December 2023, with at least 1 year of data visibility prior to becoming eligible for study inclusion. Study participants with previous history of recurrent falls were excluded from this cohort. The cohort without recurrent falls included individuals aged 65 years and older without recurrent falls registered in the respective databases between 1st of January 2013 and 31st December 2023, with at least 1 year of data visibility prior to becoming eligible for study inclusion. Study participants with prior history of recurrent falls prior to the index date were excluded from this cohort.
Exposure:	Drug classes in STOPP section K criteria: benzodiazepines, antipsychotics, vasodilating drugs (nitrates, ACE inhibitors, ARB inhibitors, calcium channel blockers), hypnotic z-drugs, anti-epileptics, first generation antihistamines, opioids, antidepressants, alpha-blockers, centrally acting antihypertensives, and antimuscarinic drugs (indicated for overactive bladder).
Comparator:	Not applicable
Outcome:	Not applicable
Time *(when follow up begins and ends):*	Cohort with recurrent falls: Follow-up started at the date study participants fulfilled inclusion criteria (e.g. individuals aged 65 years and older with first recorded diagnoses of the recurrent falls during the study period between 1st of January 2013 and 31st of December 2023 and at least 1 year of prior data visibility). End of follow-up was defined as earliest of the following: 1) loss to follow-up, 2) end of data availability, 3) date of death or 4) end of study period (31st December 2023). Cohort without recurrent falls: Follow-up started on the respective date of the latest of the following: 1) study start date (1st January 2013), 2) date at which they reached age of 65 or 3) date at which they have 1 year of prior history. End of follow-up was defined as earliest of the following: 1) diagnosis of recurrent falls, 2) loss to follow-up, 3) end of data availability, 4) date of death or 5) end of study period (31st December 2023).
Setting:	Outpatient setting using data from the following 5 data sources: CPRD GOLD (UK), IQVIA DA Germany (Germany), FinOMOP-HILMO (Finland), NAJS (Croatia), and SIDIAP (Spain).
Main measure of effect:	Annual incidence rates, expressed as the number of new users of drug classes belonging to the STOPP section K criteria per 1,000 person-years. Annual incidence rates were provided for two cohorts: with recurrent falls and without recurrent falls. Results were stratified by age, sex, and database.

	Annual period prevalence of new users of drug classes belonging to the STOPP section K criteria, categorised into those with recurrent falls and those without recurrent falls. Results were stratified by age, sex, and database.

C. Study objectives 5 and 6

Objective:	**Objective 5:** To characterise a cohort of individuals aged 65 years and older with recurrent falls at the time of their new prescription of any of the drug classes belonging to the STOPP section K criteria in terms of age, sex, comorbidities, and comedication. Additionally, the proportion of individual drug substances within each drug class belonging to the STOPP section K criteria was provided. Results were stratified by database. **Objective 6:** To determine the median duration of use of the different drug classes belonging to the STOPP section K criteria at the time of treatment initiation of drugs of interest in the individuals aged 65 years and older, categorised into two cohorts: those with recurrent falls and those without recurrent falls. To provide product names with details on strength, formulation, and volume at treatment initiation.
Hypothesis:	Not applicable
Population ***(mention key inclusion-exclusion criteria):***	Patient-level utilisation included new users of drug classes belonging to STOPP section K criteria in a cohort of individuals aged 65 years and older with recurrent falls registered in the respective databases between 1st of January 2013 and one year prior to the end of available data in the respective databases. To be eligible, individuals had at least 1 year of data visibility prior to study inclusion and no use of the respective drug classes belonging to the STOPP section K criteria in the 1 year prior to the index date.
Exposure:	Drug classes in STOPP section K criteria: benzodiazepines, antipsychotics, vasodilating drugs (nitrates, ACE inhibitors, ARB inhibitors, calcium channel blockers), hypnotic z-drugs, anti-epileptics, first generation antihistamines, opioids, antidepressants, alpha-blockers, centrally acting antihypertensives, and antimuscarinic drugs (indicated for overactive bladder).
Comparator:	Not applicable
Outcome:	Not applicable
Time ***(when follow up begins and ends):***	Follow-up started on the date of the new (incident) prescription of drug classes belonging to the STOPP section K criteria. End of follow-up was until the earliest of the following: 1) loss to follow-up, 2) end of data availability, 3) date of death or 4) end of study period (31st December 2023).
Setting:	Outpatient setting using data from the following 5 data sources: CPRD GOLD (UK), IQVIA DA Germany (Germany), FinOMOP-HILMO (Finland), NAJS (Croatia), and SIDIAP (Spain).
Main measure of effect:	Age, sex, comorbidities, and comedication for new users of drug classes belonging to the STOPP section K criteria for individuals aged 65 years and older with a diagnosis of recurrent falls.

	Proportion of individual drug substances within each drug class belonging to the STOPP section K criteria. Product names with details on strength, formulation, and volume at treatment initiation. Duration of treatment with drug classes belonging to the STOPP section K criteria expressed as minimum, quartiles, and maximum, categorised for those with recurrent falls, and those without recurrent falls.

9. RESEARCH METHODS

9.1. Study type and study design

Study types with related study designs are described in **Table 2** below and are selected from the Draft Catalogue of Data analytics.

A cohort study was conducted using routinely collected health data from 5 databases. The study comprised three consecutive parts:

- Cohort analysis (Objective 1 and 2, Patient-level characterisation of individuals aged 65 years and older with newly diagnosed recurrent falls in terms of age, sex, risk factors, comorbidities, and concomitant medication and survival)
- Population-level cohort study (Objective 3 and 4, Population-level drug utilisation of drug classes belonging to the STOPP section K criteria in individuals aged 65 years and older, categorised into those with recurrent falls and those without recurrent falls). Results were stratified by database, calendar year, age, and sex.
- New drug user cohort study (Objective 5 and 6, Patient-level drug utilisation of drug classes belonging to the STOPP section K criteria with regard to summary characterisation (age, sex, comorbidities, and comedication), proportion of the individual drugs in individuals aged 65 years and older with recurrent falls and duration of treatment in individuals aged 65 years and older, categorised into those with recurrent falls and those without recurrent falls).

Table 2. Description of potential study types and related study designs.

Study type	Study design	Study classification
Patient-level characterisation	Cohort analysis	Off the shelf
Population Level DUS	Population Level Cohort	Off the shelf
Patient Level DUS	New drug/s user cohort	Off the shelf

9.2. Study setting and data sources

This study was conducted using routinely collected data from 5 databases in 5 European countries (4 EU countries and United Kingdom). All databases were previously mapped to the OMOP Common Data Model (CDM).

1. Clinical Practice Research Datalink GOLD (CPRD GOLD), United Kingdom
2. IQVIA Disease Analyzer Germany (IQVIA DA Germany), Germany
3. Finnish Care Register for Health Care (FinOMOP-HILMO), Finland
4. Croatian National Public Health Information System (NAJS), Croatia
5. The Information System for Research in Primary Care (SIDIAP), SIDIAP

For this study we have selected 5 databases that were considered fit for purpose from databases available in the DARWIN EU® Database Catalogue. The selection process was based on the size of the databases, the number of individuals diagnosed with recurrent falls, the number of individuals prescribed drug classes belonging to the STOPP section K criteria, geographical spread and the experience gained from databases that participated in other similar DARWIN EU® studies. Based on the feasibility assessment performed, the

suggested databases have sufficient counts of recurrent falls and drug classes listed under the STOPP section K criteria.

However, it is important to recognise that specific study objectives were answered using particular databases due to differences in data availability. For instance, in the case of survival analysis (Objective 2), all databases were included, with the exception of IQVIA DA Germany, which did not provide information on date of death.

Information on data sources planned to be used with a justification for their choice in terms of their ability to capture the relevant data is described in **Table 3**.

When it comes to assessing the reliability of data sources, the data partners were asked to describe their internal data quality process on the source data as part of the DARWIN EU® onboarding procedure. To further ensure data quality, we utilised the Achilles tool, which systematically characterises the data and presents it in a dashboard format that was inspected. The generated data characteristics such as age distribution, condition prevalence per year, data density and measurement value distribution could be compared against expectations for the data. Additionally, the data quality dashboard (DQD) provided more objective checks on plausibility consistently across the data sources. In terms of relevance, more general-purpose diagnostic tools, "*CohortDiagnostics"* (https://github.com/darwin-eu-dev/CohortDiagnostics) and "*DrugExposureDiagnostics"* (https://darwin-eu.github.io/DrugExposureDiagnostics/), were developed. The "*CohortDiagnostics"* R package evaluated phenotype algorithms for OMOP CDM datasets, offering a standard set of analytics for understanding patient capture including data generation. It provided additional insights into cohort characteristics, record counts, and index event misclassification. The "*DrugExposureDiagnostics"* R package assessed ingredient-specific diagnostics for drug exposure records. Furthermore, timeliness was guarded by extracting the release dates for each dataset in the network and monitoring when data were out of date with the expected refresh cycle (typically quarterly or half-yearly). In addition, it was important to have a clear understanding of the time period covered by each released database, as this could vary across different domains. To facilitate this, the CdmOnboarding (and Achilles) packages contained a 'data density' plot. This plot displayed the number of records per OMOP domain on a monthly basis. This allowed to get insights into when data collection started, when new sources of data were added and until when data was included.

Table 3. Description of the selected data sources.

Country	Name of Database	Justification for Inclusion	Health Care setting (e.g. primary care, specialist care, hospital care)	Type of Data (EHR, claims, registries)	Number of subjects	Database last update
United Kingdom	CPRD GOLD	The database includes primary care settings where diagnoses of recurrent falls and prescriptions for selected pre-specified medicinal products of interest may be recorded	Primary care	EHR	17.5 million	17/08/2024
Germany	IQVIA DA Germany	The database includes primary care settings and outpatient specialist care where diagnoses of recurrent falls and prescriptions for selected pre-specified medicinal products of interest may be recorded	Primary care and outpatient specialist care	EHR	43 million	23/01/2024
Finland	FinOMOP-HILMO	The database includes healthcare settings where diagnoses of recurrent falls and prescriptions for selected pre-specified medicinal products of interest may be recorded	Primary care, outpatient specialist care, and inpatient care	EHR and registries	6.6 million	01/10/2024
Croatia	NAJS	The database includes healthcare settings where diagnoses of recurrent falls and prescriptions for selected pre-specified medicinal products of interest may be recorded	Primary care, outpatient specialist care, and inpatient care.	EHR and registries	4.9 million	08/02/2025
Spain	SIDIAP	The database includes primary care settings where diagnoses of recurrent falls and prescriptions/dispensations for selected pre-specified medicinal products of interest may be recorded	Primary care	EHR	8.6 million	30/08/2023

CPRD GOLD = Clinical Practice Research Datalink GOLD; IQVIA DA Germany = IQVIA Disease Analyzer Germany; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària; EHR = Electronic Heath record;

Clinical Practice Research Datalink (CPRD) GOLD, United Kingdom

The Clinical Practice Research Datalink (CPRD) GOLD is a database of anonymised electronic health records (EHR) from General Practitioner (GP) clinics in the UK that use the Vision® software system for their management.[4] The source population encompasses 98% of the UK, registered with GPs responsible for non-emergency care and referrals. Participating GPs provide CPRD EHR for all registered patients who did not specifically request to opt out of data sharing. Covering 4.6% of the current UK population, GOLD includes 4.9% of contributing GP practices, providing comprehensive information within its defined source population. GOLD contains data from all four UK constituent countries, and the current regional distribution of its GP practices is 5.7% in England, 55.6% in Scotland, 28.4% in Wales, and 10.2% in Northern Ireland (May 2022).

GOLD data include patient's demographics, biological measurements, clinical symptoms and diagnoses, referrals to specialist/hospital and their outcome, laboratory tests/results, and prescribed medications. GOLD has been assessed and found broadly representative of the UK general population in terms of age, gender, and ethnicity.[4] GOLD has been widely used internationally for observational research to produce nearly 3,000 peer-reviewed publications, making GOLD the most influential UK clinical database so far.[5-7]

In terms of quality checks, the integrity, structure, and format of the data are reviewed. Collection-level validation ensures integrity by checking that data received from practices contain only expected data files and ensures that all data elements are of the correct type, length, and format. Duplicate records are identified and removed. Transformation-level validation checks for referential integrity between records to ensure that there are no orphan records included in the database (for example, that all event records link to a patient), while research-quality-level validation covers the actual content of the data. CPRD provides a patient-level data quality metric in the form of a binary 'acceptability' flag. This is based on recording and internal consistency of key variables including date of birth, practice registration date and transfer out date.

IQVIA Disease Analyser (DA) Germany, Germany

IQVIA Disease Analyzer (DA) Germany is a database of de-identified electronic medical records from specialised and general primary practices (GP) in Germany since 1992.[8] This dataset encompasses approximately 3% of all outpatient practices within Germany, ensuring a substantial representation of the national healthcare landscape. The sampling methods used for practice selection, taking into account physician's demographics, specialty focus, community size category and federal state location, were instrumental in constructing a database that accurately mirrors the diverse spectrum of healthcare providers in the country. Consequently, data within IQVIA DA Germany database has been demonstrated to be representative of general and specialised practices throughout Germany.

The database contains demographics records, basic medical data, disease diagnoses according to the International Classification of Diseases, 10th revision (ICD-10), and prescription records. While the database partly records information on deaths and procedures, it currently does not support linkage with external data sources and therefore, information on mortality is incomplete. Routine updates are conducted at regular intervals. Data quality is assessed based on several criteria, including completeness of information and correctness (e.g. linkage between diagnosis and prescriptions).

No registration or approval is required for drug utilisation studies. As previously demonstrated, IQVIA DA Germany is suitable for pharmacoepidemiologic and pharmacoeconomic studies.[9, 10]

FinOMOP-HILMO, Finland

This database covers both public and private, primary, and specialised inpatient and outpatient health care encounters in Finland starting from 2011. The entire public sector and private inpatient encounters have

been included since 2011, while private outpatient encounters, including occupational care, have been included since 2020. The main content of the THL CDM is The Finnish Care Register for Health Care, which is a continuation of the former Hospital Discharge Register, which originally gathered data on patients discharged from hospitals. The Care Register has comprehensive data on the use of services and service users from Finnish public inpatient and outpatient primary and specialised care nationwide. Since 1998, the register has covered both public outpatient and inpatient specialised care and private inpatient care (TerveysHilmo). From 2011, the register has covered public primary care (AvoHilmo). From 2020, the register has covered private outpatient care and occupational care. In addition, the CDM also contains the vaccination data from the Finnish National Vaccination Register, the vaccination data from the Finnish National Vaccination Register, and COVID-19 test results from the Finnish National Infectious Diseases Register, which is maintained by THL. The CDM includes all the above-mentioned data sources and is limited to observation periods commencing after 1.1.2011. The National Population is used to form the base population. This ensures up-to-date location (municipality of residence) of patients and complete death occurrences (although not the cause of death). Using the complete population as a basis for the person table also facilitates calculations on a population level, e.g. incidence rates. The current CDM population comprises all persons who have been alive and residing in Finland since the beginning of 2011.

National Public Health Information System (NAJS), Croatia

The National Public Health Information System (Nacionalni javnozdravstveni informacijski sustav - NAJS) is an organised system of information services by the Croatian Institute of Public Health (CIPH). This database was established in 1998, with nationwide coverage, representing approximately 4.9 million inhabitants. Settings covered include public primary, secondary/outpatient, and inpatient care. Data is retrieved primarily from EHR and holds information on demographics, inpatient and outpatient visits, conditions and procedures, drugs (outpatient and inpatient prescriptions), measurements, and inpatient and outpatient dates of death. NAJS provides linkage between medical and public health data collected and stored in health registries and other health data collections, including cancer registry, mortality, work injuries, occupational diseases, communicable and non-communicable diseases, health events, disabilities, psychosis and suicide, diabetes, drug abuse, and others. The CDM population comprises all publicly insured persons residing in Croatia starting in 2015. NAJS provided data from 2017 onwards only, as prior data might include information on duplicated patients.

Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària (SIDIAP), Spain

The Information System for Research in Primary Care (SIDIAP) is a clinical database of anonymised patient records in Catalonia, Spain. The Spanish public healthcare system covers more than 98% of the population, and more than two-thirds of the Catalan population see their GP at least once a year. The computerisation of the primary care patient records of the Catalan Health Institute (CHI) was complete in 2005. SIDIAP was designed to provide a valid and reliable database of information from clinical records of patients registered in primary care centres for use in biomedical research. SIDIAP contains data of anonymised patients' healthcare records for nearly six million people (approximately 80% of the Catalan population) registered in 287 primary care practices throughout Catalonia since 2005. It includes data collected by health professionals during routine visits in primary care, including anthropometric measurements, clinical diagnoses (International Classification of Diseases 10th revision ICD-10), laboratory tests, prescribed and dispensed drugs, hospital referrals, demographic and lifestyle information. It was previously shown that SIDIAP population is highly representative of the entire Catalan region in terms of geographic, age, and sex distributions. The high quality of these data has been previously documented, and SIDIAP has been successfully applied to epidemiological studies of key exposures and outcomes. Quality checks to identify duplicate patient IDs are performed centrally at each SIDIAP database update. Checks for logical values and

data harmonisation are performed. For biochemistry data, consistency for measurements taken in different laboratories is assessed, and unit conversion is undertaken when needed.

9.3. Study period

The study period was from 1st of January 2013 until the earliest of 31st of December 2023 or the date of the last database update for each respective database (please see **Table 3** for more details on the last update for each database).

9.4. Follow-up

For patient-level characterisation, study participants aged 65 years and older were followed from the date of newly diagnosed recurrent falls until the earliest of 1) loss to follow-up, 2) end of data availability, 3) death or 4) end of study period (31st December 2023). In the survival analysis, study participants were censored at the time of loss to follow-up. A minimum of 1 year of potential follow-up after the index date was required for survival analysis. Therefore, the individuals could enter the cohort until 1 year before the end of the study period or the end of data availability in the database.

For population-level utilisation of drug classes belonging to the STOPP section K criteria, study participants in the recurrent falls cohort were followed when they fulfilled inclusion criteria (i.e., individuals aged 65 years and older with a first recorded diagnosis of recurrent falls between 1st of January 2013 and 31st of December 2023 and with at least 1 year of data visibility). End of follow-up was defined as the earliest of loss to follow-up, end of data availability or end of study period (31st December 2023), whatever came first. For population-level utilisation of drug classes belonging to STOPP section K criteria, study participants in the cohort without recurrent falls were followed from the study start date (1st January 2013), the date at which they reached age of 65 or the date at which they had 1 year of prior history, whatever came last. End of follow-up was defined as the earliest of diagnosis of recurrent falls, loss to follow-up, end of data availability, date of death or end of the study period (31st December 2023).

For patient-level utilisation of drug classes belonging to the STOPP section K criteria, follow-up started from the new (incident) prescription of drug classes belonging to the STOPP section K criteria until loss to follow-up, end of data availability, end of observation period or end of study period (31st of December 2023), whatever came first. For treatment duration analysis, a minimum of 1 year of potential follow-up criterion after a new (incident) prescription of prespecified medicines was added. Therefore, the individuals could enter this cohort until 1 year prior to the end of study period or the end of data availability in the respective database.

The operational definition of primary time anchors is shown in **Table 4**.

Table 4. Operational Definition of Time 0 (index date) and other primary time anchors.

Study population name(s)	Time Anchor Description (e.g. time 0)	Number of entries	Type of entry	Washout window	Care Setting[1]	Code Type[2]	Diagnosis position	Incident with respect to…	Measurement characteristics /validation	Source of algorithm
Participants aged 65 years and older with newly diagnosed recurrent falls - Characterisation	Date of first diagnosis of recurrent falls	Single entry	Incident	Any time prior to recurrent falls	IP, OP, OT	SNOMED	n/a	Diagnosis of recurrent falls	n/a	n/a
Participants aged 65 years and older with newly diagnosed recurrent falls - Survival	Date of first diagnosis of recurrent falls	Single entry	Incident	Any time prior diagnosis	IP, OP, OT	SNOMED	n/a	Diagnosis of recurrent falls	n/a	n/a
All participants from the database eligible for the study - Incident use of STOPP section K criteria drug classes in cohort with recurrent falls	Individuals aged 65 years and older with first diagnosis of recurrent falls in the study period and at least 1 year of valid database history	Multiple entries	Incident	[-365, ID]	IP, OP, OT	RxNorm	n/a	Use of drug classes in STOPP section K criteria	n/a	n/a
All participants from the database eligible for the study - Prevalent use STOPP section K criteria medication	Individuals aged 65 years and older, with at least 1 year of valid database history	Multiple entries	Prevalent	n/a	IP, OP, OT	RxNorm	n/a	n/a	n/a	n/a
Individuals aged 65 years and older with recurrent falls initiating treatment with STOPP	Initiation of treatment with drug classes belonging to	Multiple entrie	Incident	[-365, ID]	IP, OP, OT	RxNorm	n/a	Use of drug classes	n/a	n/a

Study population name(s)	Time Anchor Description (e.g. time 0)	Number of entries	Type of entry	Washout window	Care Setting[1]	Code Type[2]	Diagnosis position	Incident with respect to…	Measurement characteristics /validation	Source of algorithm
section K criteria medication – Characterisation of new drug users	the STOPP section K criteria	s						in STOPP section K criteria		

[1] IP = inpatient, OP = outpatient, OT = other, n/a = not applicable

Both incidence and prevalence required an appropriate denominator population and their contributed observation time to first be identified. Study participants in the denominator population began contributing person time on the respective date of the latest of the following: 1) study start date (1st January 2013), 2) date at which they reached the age of 65 years or 3) date at which they had 1 year of prior history. Participants stopped contributing person time at the earliest date of the following: 1) study end date (31st December 2023) or 2) end of observation period. These individuals were categorised into those with recurrent falls and those without recurrent falls. The diagnosis of recurrent falls was assessed as a binary variable – either "ever" or "never".

An example of entry and exit into the denominator population is shown in **Figure 1**. In this example, person ID 1 had already sufficient prior history before the study start date and the observation period ends after the study end date, so they contributed during the complete study period. Person IDs 2 and 4 entered the study only when they had sufficient prior history. Person ID 3 left when exiting the database (the end of observation period). Lastly, person ID 5 had two observation periods in the database. The first period contributed time from study start until the end of observation period, the second started contributing time again once sufficient prior history was reached and exited at the study end date.

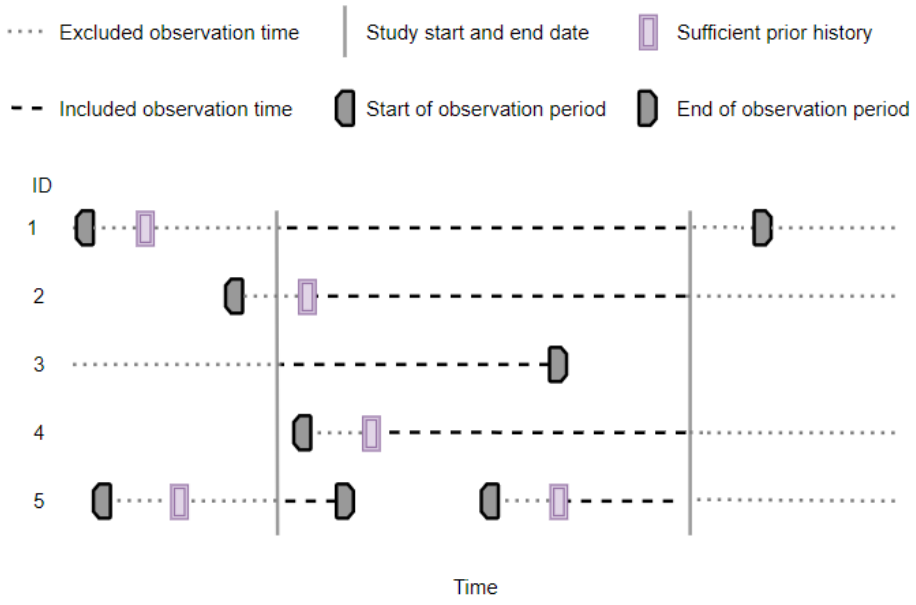


Figure 1. Included observation time for the denominator population.

9.5. Study population with in and exclusion criteria

Patient-level characterisation

The study cohort included individuals aged 65 years and older with newly diagnosed recurrent falls registered in the respective databases between 1st of January 2013 and 31st December 2023, with at least 1 year of data visibility prior to the date of recurrent falls diagnosis and no prior diagnosis of recurrent falls. Recurrent falls were defined as either 2 or more falls within a period of 12 months or a diagnosis of recurrent falls.

An additional eligibility criterion was applied for survival analysis: a minimum of 1 year of potential follow-up after the index date was applied for survival analysis. This included individuals aged 65 years and older with newly diagnosed recurrent falls between 1st of January 2013 and one year prior to the end of available data in the respective databases.

Population-level drug utilisation of drug classes belonging to the STOPP section K criteria

The study cohort included all individuals aged 65 years and older registered in the respective databases between 1st of January 2013 and 31st of December 2023, with at least 1 year of data visibility prior to becoming eligible for study inclusion.

Additional eligibility criteria were applied for:

- Calculation of incidence rates: The observation time of users of drug classes belonging to STOPP section K criteria was excluded during use and 1 year afterwards.
- Incidence rates and prevalence, stratified by age and sex: Age-specific cohorts had age-boundary eligibility criteria and sex-specific cohorts had sex eligibility criteria.
- Stratification by diagnosis of recurrent falls: Two cohorts were defined with recurrent falls and without recurrent falls. The diagnosis of recurrent falls was assessed as a binary variable – either “ever” or “never”.

Patient-level drug utilisation of drug classes belonging to the STOPP section K criteria

The study cohort included users of drug classes belonging to STOPP section K criteria aged 65 years and older with recurrent falls registered in the respective databases between 1st of January 2013 and one year prior to the end of available data of the respective databases or 31st of December 2023. Notably, all individuals needed to have at least 1 year of data visibility prior to the date of their new prescription. “New use” referred to the prescription of drug classes belonging to the STOPP section K criteria in the study period and without any use of the respective drug classes in the previous 1 year.

The operational definitions of the inclusion and exclusion criteria are presented by means of **Table 5**.

Table 5. Operational definitions of inclusion criteria.

Criterion	Details	Order of application*	Assessment window	Care Settings[1]	Code Type	Diagnosis position [2]	Applied to study populations:	Measurement characteristics/validation	Source for algorithm
Age	All individuals aged 65 years and older	After	n/a	IP, OP, OT	n/a	n/a	All individuals within selected databases	n/a	n/a
Recurrent falls	Individuals diagnosed with recurrent falls**	After	n/a	IP, OP, OT	SNOMED	n/a	All individuals aged 65 years and older	n/a	n/a
Observation period in the database during the period 2013-2023 (or the latest date available)	All individuals present in the databases during the study period 2013-2023 (or the latest date available)	After	n/a	IP, OP, OT	n/a	n/a	All individuals aged 65 years and older	n/a	n/a
Prior database history	Study participants were required to have 1 year of prior history observed before contributing observation time	After	365 days	IP, OP, OT	n/a	n/a	All individuals aged 65 years and older	n/a	n/a
Minimum potential follow-up (Objective 2 and Objective 6)	Potential follow-up time	After	365 days	IP, OP, OT	n/a	n/a	All individuals diagnosed with recurrent falls	n/a	n/a
Washout period	Individuals who initiated treatment were required to have not used pre-specified medication of interest 1 year before a 'new' prescription	After	365 days	IP, OP, OT	n/a	n/a	All individuals aged 65 years and older	n/a	n/a

[1] IP = inpatient, OP = outpatient, OT = other, n/a = not applicable

[2] Specify whether a diagnosis code is required to be in the primary position (main reason for encounter); *Order of application specifies whether the eligibility criterion is applied before or after selection of the study entry date. For example, selecting "before" means that all possible study entry dates are identified, and then one or more is chosen. For instance, selecting 'after' means that the first possible study entry date is chosen, followed by the application of the inclusion and/or exclusion criteria. If the patient does not meet the criterion, then the patient drops out. **Recurrent falls were defined as either 2 or more falls within a period of 12 months or a diagnosis of recurrent falls. Recurrent falls phenotype was established following input from EMA.

9.6. Variables

9.6.1. Exposure

For this study, exposure of interest was the use (during the study period) of drug classes belonging to STOPP section K criteria benzodiazepines, antipsychotics, vasodilating drugs (nitrates, ACE inhibitors, ARB inhibitors, calcium channel blockers), hypnotic z-drugs, anti-epileptics, first generation antihistamines, opioids, antidepressants, alpha-blockers, centrally acting antihypertensives, and antimuscarinic drugs (indicated for overactive bladder). The list of the medication of interest is described in **Appendix I**.

The operational definition of exposure is described by means of **Table 6**.

Table 6. Operational definitions of exposure.

Exposure group name(s)	Details	Washout window*	Assessment Window	Care Setting[1]	Code Type	Diagnosis position[2]	Applied to study populations	Incident with respect to[3]…	Measurement characteristics/ validation	Source of algorithm
Drug classes belonging to STOPP section K criteria	Final code list provided in Appendix I	[-365, ID]	Calendar year	IP, OP, OT	RxNorm	n/a	All individuals aged 65 years and older in the database during study period	Previous use of drug classes listed under STOPP section K criteria	n/a	n/a

[1] IP = inpatient, OP = outpatient, OT = other, n/a = not applicable.
[2] Specify whether a diagnosis code is required to be in the primary position (main reason for encounter).
[3] Provide a brief description of what patients are required to be incident to (e.g. when identifying incident users of the drug, the requirement may be that the patient is incident with respect to that drug).
*Washout window = Individuals who initiated treatment were required to have not used the respective drug classes belonging to the STOPP section K criteria for 365 days prior to the index date (ID).

9.6.2. Outcome

The main outcome of the study was death. Overall survival in patients with incident recurrent falls was calculated based on the registered date of death. Individuals contributed their survival time as per follow-up described in **section 8.4**.

The operational definition of the outcomes is presented in the **Table 7**.

Table 7. Operational definitions of outcome.

Outcome name	Details	Primary outcome?	Type of outcome	Washout window	Care Settings[1]	Code Type	Diagnosis Position[2]	Applied to study populations	Measurement characteristics/ validation	Source of algorithm
Overall survival	n/a	Yes	Time	n/a	IP and OP	Date of death	n/a	Participants aged 65 years and older diagnosed with recurrent falls	n/a	n/a

[1] IP = inpatient, OP = outpatient, n/a = not applicable.
[2] Specify whether a diagnosis code is required to be in the primary position (main reason for encounter).

9.6.3. Other covariates, including confounders, effect modifiers, and other variables

Covariates for patient-level characterisation

Covariate for stratification of patient characterisation (objective 1) included:

- Healthcare setting (where feasible): primary care, secondary care

Other variables for characterisation of patients with recurrent falls included:

- Recurrent falls – defined as either two or more falls within a period of 12 months or a diagnosis of recurrent falls. The phenotype of recurrent falls was defined following input from EMA. The list of concept ids is described in **Appendix I**.
- A list of predefined risk factors included chronic diseases and comorbidities that affect balance, mobility, and cognitive function, along with the use of medication:
    - Common conditions (osteoporosis, arthritis, stroke, Parkinson's disease, dementia, diabetes, chronic obstructive pulmonary disease (COPD), hypertension)
    - Conditions related to visual and hearing impairment (cataracts, glaucoma, hearing loss)
    - Balance and gait disorders including neurological or musculoskeletal issues (ataxia, gait abnormality), muscle weakness or sarcopenia (sarcopenia)
    - Cognitive decline (Alzheimer's disease, mild cognitive impairment)
    - Psychological factors (depression, anxiety)
    - Malnutrition or weight loss (malnutrition, underweight)
    - Urinary incontinence
    - Alcohol use (alcohol dependence)
    - Drug classes in STOPP section K medication (antidepressants, antipsychotics, benzodiazepines, sedatives, antihypertensives, diuretics, anticholinergics, opioids, vasodilating, hypnotic z-drugs, anti-epileptics, first generation antihistamines, alpha-blockers, centrally acting antihypertensives, and antimuscarinic drugs)

  The frequency of pre-specified risk factors was assessed for each condition or each drug class in STOPP section K criteria medication at the date of diagnosis of recurrent falls and in 1 year prior to this date.
- Top 10 of most frequent comorbidities (the frequency of comorbidities was assessed at the date of diagnosis of recurrent falls and in 1 year prior to this date).
- Top 10 of most frequent concomitant prescriptions in each data source (the frequency of comedication was assessed at the date of diagnosis of recurrent falls and in the 1 year prior to this date).

Covariates for population-level drug utilisation

Covariates for stratification of population-level drug utilisation included:

- Calendar year
- Age categories:
    - ≥ 65 - 74 years

- ≥ 75 - 84 years
- ≥ 85 years

- Sex: male or female

Covariates for patient-level drug utilisation

Variables for patient-level drug utilisation included:

- Top 10 of most frequent comorbidities (the frequency of comorbidities was assessed at the date of new (incident) prescription of drug classes belonging to the STOPP section K criteria and in 1 year prior to this date).
- Top 10 of the most frequent concomitant prescriptions in each data source (the frequency of comedication was assessed at the date of new (incident) prescription of drug classes belonging to the STOPP section K criteria and in the 1 year prior to this date).

The operational definition of the covariates is described in **Table 8**.

Table 8. Operational Definitions of Covariates.

Characteristic	Details	Type of variable	Assessment window	Care Settings [1]	Code Type	Diagnosis Position [2]	Applied to study populations	Measurement characteristics/ validation	Source for algorithm
Characterisation of individuals with recurrent falls	Characterisation in terms of age, sex, comorbidities, risk factors, and concomitant prescriptions	Counts	At index date (ID) and 365 days before ID [-365, -1]	IP, OP, OT	SNOMED	n/a	All individuals aged 65 years and older during the study period	n/a	n/a
Characterisation of new users	Characterisation in terms of age, sex, comorbidities, and concomitant prescriptions	Counts	At index date (ID) and 365 days before ID [-365, -1]	IP, OP, OT	SNOMED	n/a	All new users aged 65 years and older with recurrent falls	n/a	n/a

[1] IP = inpatient, OP = outpatient, ED = emergency department, OT = other, n/a = not applicable.
[2] Specify whether a diagnosis code is required to be in the primary position (main reason for encounter).

9.7. Study size

No sample size has been calculated for this drug utilisation descriptive study, as our primary focus was to describe characteristics of patients with recurrent falls and to provide an overview of drug classes belonging to STOPP section K criteria prescribing in Europe. Based on a preliminary feasibility assessment, the expected number of person counts for falls differed across databases and ranged from 4,300 to 155,100 while the expected number of person counts for drug classes belonging to STOPP section K criteria ranged from 100 to 283,100.

9.8. Data transformation

Analyses were conducted separately for each database. Before study initiation, test runs of the analytics were performed on a subset of the data sources and quality control checks were performed. After all the tests were passed (see **section 11 Quality Control**), the final package was released in the version-controlled Study Repository for execution against all the participating data sources.

The data partners locally executed the analytics in R Studio and reviewed and approved the - by default - aggregated results.

The study results of all data sources were checked after which they were made available to the team, and the Dissemination Phase started. All results were locked and timestamped for reproducibility and transparency.

9.9. Statistical methods

This section describes the details of the analysis approach and rationale for the choice of analysis, with reference to the D1.3.8.1 Draft Catalogue of Data Analysis which describes the type of analysis in function of the study type.

In principle the type of analysis by study type was fixed as could be observed from **Table 9**. In certain circumstances, depending on the study question, additional analysis might be considered.

Table 9. Description of study types and type of analysis.

Study type	Study classification	Type of analysis
Population Level DUS	Off-the-shelf	- Population-based incidence rates - Population-based prevalence of use of a drug/drug class
Patient Level DUS	Off-the-shelf	- Characterisation of patient-level features - Estimation of minimum, p25, median, p75, and maximum treatment duration - Estimation of frequency of individual drug substances within each drug class of interest - Product names with details on strength, formulation, and volume
Patient-level characterisation	Off-the-shelf	- Large-scale characterisation (comorbidities and comedication) - Patient-level characteristics (age, sex) - Prognosis / progression to a pre-specified outcome (death)

9.9.1. Patient privacy protection

Cell suppression was applied as required by databases to protect people's privacy. Cell counts <5 were masked.

9.9.2. Main statistical methods

R-packages

We used the R packages "*CohortCharacteristics*" and "*CohortSurvival*" for patient-level characterisation, "*IncidencePrevalence*" for population-level estimation of drug utilisation and for patient-level drug utilisation analyses "*CohortCharacteristics*" and "*DrugUtilisation*".

Drug exposure calculations

Drug eras were defined as follows: Exposure starts at the date of the first prescription after a washout of 1 year. For each prescription, the estimated duration of use was retrieved from the drug exposure table in the CDM, using the start and end date of the exposure. Subsequent prescriptions were combined into continuous exposed episodes (drug eras) using the following specifications:

Two drug eras were merged into one continuous drug era if the distance in days between the end of the first era and the start of the second era was ≤ 30 days. The time between the two joined eras was considered as exposed by the first era as shown in **Figure 2**, first row. If the number of days between the end of the first era and the start of the second era was >30 days, the drug eras were not merged and considered separate.

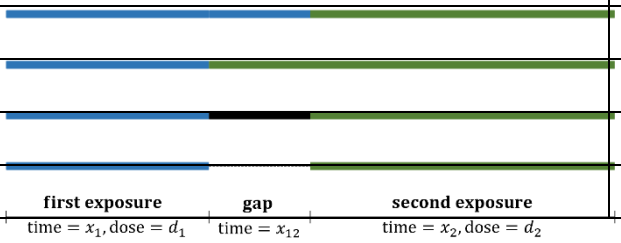
Gap era joint mode	Schematics	Dose in between	Cumulative dose	Cumulative time
"first"		d_1	$d_1 \cdot (x_1 + x_{12}) + d_2 \cdot x_2$	$x_1 + x_{12} + x_2$
"second"		d_2	$d_1 \cdot x_1 + d_2 \cdot (x_2 + x_{12})$	$x_1 + x_{12} + x_2$
"zero"		0	$d_1 \cdot x_1 + d_2 \cdot x_2$	$x_1 + x_{12} + x_2$
"join"		NA	$d_1 \cdot x_1 + d_2 \cdot x_2$	$x_1 + x_2$

Figure 2. Gap era joint mode.

New user cohort

New users were selected based on their incident prescriptions of the drug classes belonging to the STOPP section K criteria after the start of the study. For each patient, at least 1 year of data visibility was required prior to a prescription. Individuals who initiated treatment were required to not have been exposed to the drug of interest for at least 1 year prior to the current prescription. If the start date of a prescription did not fulfil the exposure washout criteria of 1 year of no use, the whole exposure was eliminated. A new drug user cohort study was used to characterise patient-level drug utilisation in terms of age, sex, comorbidities and comedication and proportion of the individual drugs at the date of incident prescription/dispensation of drug classes belonging to the STOPP section K criteria and duration of treatment with drug classes belonging to the STOPP section K criteria.

9.9.3. Methods to derive parameters of interest

Age

Age at the index date was calculated using January 1st of the year of birth as a proxy for the actual birthday. Date/month was either not present or could not be made available for governance reasons. If available, the date was often set to the first of the month for the patient's privacy. The following age groups were used for stratification for population-level analyses: ≥ 65–74 years, ≥ 75–84 years and ≥ 85 years.

Sex

Results for population-level analyses were presented stratified by sex.

Calendar time

Calendar time was determined on the calendar year during which the index prescription was issued. The calendar time for subsequent prescriptions was based on the year they were issued following the washout period of 1 year.

Characterisation of patient-level features

Large-scale patient-level characterisation was conducted. Concepts in the "condition" domain were assessed at the index date and 1 year before the index date. The top 10 conditions were presented.

9.9.4. Methods planned to obtain point estimates with confidence intervals of measure of occurrence

Population-level characterisation

Patient-level characterisation (objective 1) in terms of age and sex was described at the time of recurrent fall diagnosis. The index date was the date of the new recurrent fall diagnosis for each patient. Risk factors, comorbidities, and concomitant prescriptions were assessed up to 365 days before the index date and at the index date. These time windows were defined based on the options currently available in the standard analytical tools that were used in this project.

Overall survival (objective 2) was calculated using data on time at risk of death from any cause and the

Kaplan-Meier (KM) method. Results were reported as plots of the estimated survival curves as well as the

estimated probability of survival at years 1, 3, and 5. Individuals who were lost to follow-up were censored at the time of loss of follow-up. The KM approach implicitly assumed censoring occurs at random. This analysis was conducted only for databases that systematically collected data on mortality (all except IQVIA DA Germany).

Population-level drug utilisation study

Incidence and prevalence calculations were conducted for drug classes belonging to the STOPP section K criteria.

Incidence calculations

Annual incidence rates of the selected pre-specified medication of interest were calculated as the number of new users after 1 year of no use per 1,000 person-years of the population at risk of getting exposed during the period for each calendar year. Participants who used the drug class of interest prior to the date at which they would have otherwise satisfied the criteria to enter the denominator population (as described above) were excluded. For example, individuals with prior vasodilator use were excluded only when vasodilators were being considered. Those study participants who entered the denominator

population then contributed time at risk up to their first prescription during the study period. If they did not have a drug exposure, they contributed time at risk as described above. Time-at-risk of subjects who died was censored at the time of death. Similarly, time at risk of subjects who was lost to follow-up was censored at the time of loss to follow-up [last contact]. Subjects with data until the end of the study period without experiencing exposure were administratively censored at the end of the study period. Incidence rates were given together with 95% Poisson confidence intervals.

An illustration of the calculation of incidence of selected pre-specified medication of interest is shown below in **Figure 3**. Patient ID 1 and 4 contributed time at risk up to the point at which they became incident users of selected pre-specified medication of interest. Patient ID 2 and 5 were not seen to use pre-specified medication of interest and so contributed time at risk but no incident outcomes. Meanwhile, patient ID 3 first contributed time at risk starting at the day when the washout period of a previous exposure, before study start, has ended and ending when the next exposure of pre-specified medication of interest is starting. A second period of time at risk again started after the washout period. For person ID 4, only the first and third exposures of pre-specified medication of interest counted as incident use, while the second exposure started within the washout period of the first exposure. The time between the start of the first exposure until the washout period after the second exposure was not considered as time at risk.

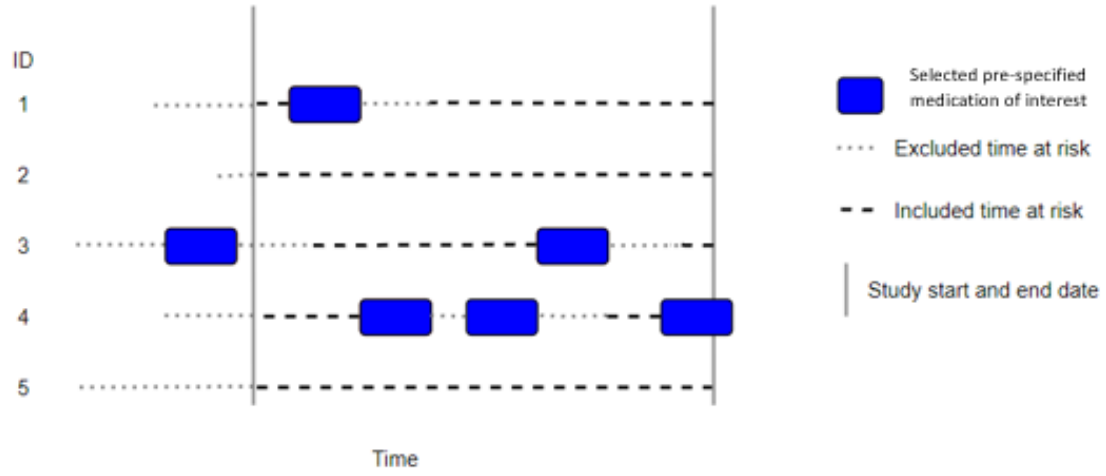


Figure 3. Incidence example.

Prevalence calculations

Prevalence was calculated as annual period prevalence which summarised the total number of individuals who use the drug classes of interest during a given year divided by the population at risk of getting exposed during that year. Therefore, period prevalence gave the proportion of individuals exposed at any time during a specified interval. Binomial 95% confidence intervals were calculated.

An illustration of the calculation of period prevalence was shown below in **Figure 4**. Between time t+2 and t+3, two of the five study participants were users of pre-selected medication of interest, giving a prevalence of 40%. Meanwhile, for the period t to t+1 all five also have some observation time during the year with one of the five study participants being a user of pre-selected medication of interest, giving a prevalence of 20%.

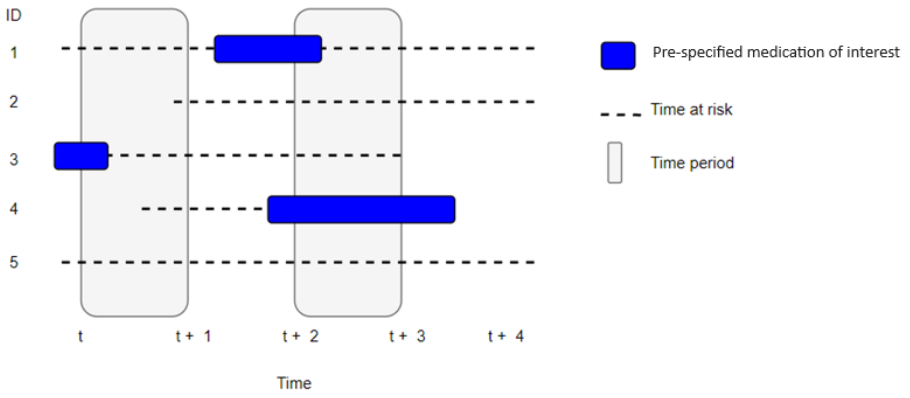


Figure 4. Period prevalence example.

Patient-level drug utilisation study

New drug user patient-level characteristics on index date

New drug user patient-level characterisation (objective 5) in terms of age and sex was described at the time of new (incident) prescription of drug classes listed under STOPP section K criteria (index date). Comorbidities and concomitant prescriptions were assessed up to 365 days before the index date and at the index date. These time windows were defined based on the options currently available in the standard analytical tools that were used in this project.

Additionally, proportion of the individual drugs in individuals aged 65 years and older with recurrent falls was provided.

Treatment duration

Treatment duration was calculated as the duration of each treatment episode of the medication of interest during the study period. Treatment duration was summarised providing the minimum, quartiles and maximum duration of treatment episodes. For databases, where duration could not be calculated due to e.g., missing information on quantity or dosing, treatment duration was not provided.

Product name (strength, formulation, volume)

Product names, along with details on strength, formulation, and volume, were retrieved from the large-scale characterisation. These names were drawn from drug classes of interest recorded in the database at the index date.

9.9.5. Missing Values

For the drug utilisation studies, we assumed that the absence of a prescription record means that the person did not receive the respective drug.

9.9.6. Sensitivity Analysis

None.

9.10. Evidence synthesis

Results from analyses described in **section 8.8 Data analysis** were presented separately for each database and no meta-analysis of results was conducted.

9.11. Deviations from the protocol

None.

10. DATA MANAGEMENT

10.1. Data management

All databases were mapped to the OMOP common data model. This enabled the use of standardised analytics and tools across the network since the structure of the data, and the terminology system were harmonised. The OMOP CDM was developed and maintained by the Observational Health Data Sciences and Informatics (OHDSI) initiative and was described in detail on the wiki page of the CDM: https://ohdsi.github.io/CommonDataModel and in The Book of OHDSI: http://book.ohdsi.org.

The analytic code for this study was written in R. Each data partner executed the study code against their database containing patient-level data and then returned the results set which only contained aggregated data. The results from each of the contributing data sites were then combined in tables and figures for the study report.

10.2. Data storage and protection

For this study, study team members from various EU member states processed personal data from patients that was collected in national/regional electronic health record databases. Due to the sensitive nature of this personal medical data, it was important to be fully aware of ethical and regulatory aspects and to strive to take all reasonable measures to ensure compliance with ethical and regulatory issues on privacy.

All databases used in this study were already used for pharmacoepidemiologic research and had a well-developed mechanism to ensure that European and local regulations dealing with ethical use of the data and adequate privacy control were adhered to. In agreement with these regulations, rather than combining person-level data and performing only a central analysis, local analyses were run, which generated non-identifiable aggregated summary results.

The output files were stored in the DARWIN Digital Research Environment (DRE). These output files did not contain any data that allowed identification of subjects included in the study. The DRE implemented further security measures in order to ensure a high level of stored data protection to comply with the local implementation of the General Data Protection Regulation (GDPR) (EU) 679/20161 in the various member states.

11. QUALITY CONTROL

General database quality control

A number of open-source quality control mechanisms for the OMOP CDM have been developed (see Chapter 15 of The Book of OHDSI http://book.ohdsi.org/DataQuality.html). In particular, it was expected that data partners ran the OHDSI Data Quality Dashboard tool (https://github.com/OHDSI/DataQualityDashboard). This tool provided numerous checks relating to the conformance, completeness, and plausibility of the mapped data. Conformance focused on checks that described the compliance of the representation of data against internal or external formatting, relational, or computational definitions, completeness in the sense of data quality was solely focused on quantifying missingness, or the absence of data, while plausibility seeks to determine the believability or truthfulness of data values. Each of these categories had one or more subcategories and were evaluated in two contexts: validation and verification. Validation related to how well data align with external benchmarks with

expectations derived from known true standards, while verification related to how well data conform to local knowledge, metadata descriptions, and system assumptions.

Study specific quality control

When defining cohorts for medicinal products, a systematic search of possible codes for inclusion was identified using the "*CodelistGenerator*" R package (https://github.com/darwin-eu/CodelistGenerator). This software allowed the user to define a search strategy and using this will then query the vocabulary tables of the OMOP common data model to find potentially relevant codes. In addition, "*DrugExposureDiagnostics*" was run if needed to assess the use of different codes across the databases contributing to the study.

The study code was based on five R packages namely the *"CohortCharacteristics"*, "*PatientProfiles*", "*Survival*", "*IncidencePrevalence",* and *"DrugUtilisation"* packages. These packages included numerous automated unit tests to ensure the validity of the codes, alongside software peer review and user testing. The R packages were made publicly available via GitHub.

12. RESULTS

The full set of the results from this study can be assessed through an interactive web-application ("Shiny app") at EUPAS1000000333.

12.1. Patient-level characterisation

12.1.1. Participants

Table 10 presents the number of individuals aged 65 years and older who have been newly diagnosed with recurrent falls during the study period, categorised by data source.

Overall, there were 271,244 individuals aged 65 years and older with newly diagnosed recurrent falls, defined as either 2 or more falls within a period of 12 months or a diagnosis of recurrent falls, registered in the respective databases between 1st of January 2013 and 31st of December 2023 (CPRD GOLD: 32,240, IQVIA DA Germany: 24,440, FinOMOP-HILMO: 33,956, NAJS: 168,377, SIDIAP: 12,231). These individuals had at least 1 year of data visibility prior to the date of recurrent falls diagnosis and no prior diagnosis of recurrent falls. NAJS contributed the largest proportion of individuals aged 65 years and older with recurrent falls, accounting for 62% of the total.

Table 10. Study attrition of participants based on new diagnosis of recurrent falls and relevant inclusion criteria, per data source.

Data source	Criteria	Number of records*	Number of individuals**
CPRD GOLD	Database population	-	17,521,504
	Qualifying initial records***	1,427,167	911,396
	First fall	253,810	140,320
	Index within study period	41,154	41,154
	1 year prior observation	38,053	38,053
	Aged >= 65	32,283	32,283
	At least 1 day observation****	32,240	32,240
IQVIA DA Germany	Database population	-	43,058,712
	Qualifying initial records	289,498	154,776

Data source	Criteria	Number of records*	Number of individuals**
	First fall	106,575	32,870
	Index within study period	32,217	32,217
	1 year prior observation	25,464	25,464
	Aged >= 65	24,662	24,662
	At least 1 day observation****	24,440	24,440
FinOMOP-HILMO	Database population	-	6,618,745
	Qualifying initial records***	1,400,389	636,260
	First fall	614,197	183,591
	Index within study period	153,065	153,065
	1 year prior observation	152,445	152,445
	Aged >= 65	33,967	33,967
	At least 1 day observation****	33,956	33,956
NAJS	Database population	-	4,853,340
	Qualifying initial records***	9,958,479	1,273,927
	First fall	8,064,954	878,381
	Index within study period	582,457	582,457
	1 year prior observation	569,213	569,213
	Aged >= 65	170,035	170,035
	At least 1 day observation****	168,377	168,377
SIDIAP	Database population	-	8,553,325
	Qualifying initial records***	337,209	284,262
	First fall	17,341	14,298
	Index within study period	13,650	13,650
	1 year prior observation	13,580	13,580
	Aged >= 65	12,232	12,232
	At least 1 day observation****	12,231	12,231

CPRD GOLD = Clinical Practice Research Datalink GOLD; IQVIA DA Germany = IQVIA Disease Analyzer Germany; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària; *Number of records = number of events; **Number of individuals = number of unique individuals; ***Qualifying initial records = second fall or diagnosis of recurrent falls. The next criterion, first fall, was applied to standalone concept ids for falls (**Appendix I**) occurring within a period of 12 months; ****At least 1 day observation after the index day or no recorded death after the index date.

12.1.2. Descriptive data

Table 11 describes demographic characteristics of individuals aged 65 years and older with newly diagnosed recurrent falls during the study period, categorised by data source. The median age at the time of newly diagnosed recurrent falls ranged from 76 years in registries such as FinOMOP-HILMO and NAJS to 82 years in primary care data source IQVIA DA Germany and 84 years in the primary care data sources CPRD GOLD and SIDIAP.

Most individuals with newly diagnosed recurrent falls during the study period were observed in the 75 to 84 years age group in IQVIA DA Germany (47.89%). In contrast, in FinOMOP-HILMO and NAJS, the highest number of individuals newly diagnosed with recurrent falls was in the 65 to 74 years age group (43.68% and 43.08%, respectively), while in SIDIAP and CPRD GOLD, the majority was in the 85 years or older age group (47.24% and 45.50%, respectively).

The proportion of females was higher than the proportion of males across all data sources, including CPRD GOLD (64.00% vs. 36.00%), IQVIA DA Germany (65.07% vs. 34.87%), FinOMOP-HILMO (66.00% vs. 33.99%), NAJS (65.93% vs. 34.07%) and SIDIAP (70.63% vs. 29.37%).

Table 11. Demographic characteristics of participants based on new diagnosis of recurrent falls and relevant inclusion criteria, per data source.

	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
Number of individuals	32,240	24,440	33,956	168,377	12,231
Age at index (years), median (IQR)	84 (77 – 89)	82 (77 – 87)	76 (70 – 84)	76 (70 – 83)	84 (78 – 88)
Age range (years)	65 – 107	65 – 99	65 – 108	65 – 108	65 – 105
Age group, n (%)					
• 65 to 74 years	5,352 (16.60)	3,785 (15.49)	14,833 (43.68)	72,533 (43.08)	1,640 (13.41)
• 75 to 84 years	12,220 (37.90)	11,704 (47.89)	11,494 (33.85)	65,575 (38.95)	4,813 (39.35)
• ≥ 85 years	14,668 (45.50)	8,951 (36.62)	7,629 (22.47)	30,269 (17.98)	5,778 (47.24)
Sex, n (%)					
• Female	20,632 (64.00)	15,903 (65.07)	22,412 (66.00)	111,004 (65.93)	8,639 (70.63)
• Male	11,608 (36.00)	8,522 (34.87)	11,541 (33.99)	57,373 (34.07)	3,592 (29.37)
• Missing	-	15 (0.06)	< 5	-	-

CPRD GOLD = Clinical Practice Research Datalink GOLD; IQVIA DA Germany = IQVIA Disease Analyzer Germany; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària.

12.1.3. Main results

12.1.3.1. Pre-specified risk factors

Table 12 presents the frequency of pre-specified risk factors for recurrent falls at the date of newly diagnosed recurrent falls (index date). These pre-specified risk factors included recorded medical conditions and STOPP section K criteria drug class prescriptions. The results for a different time window, from 365 days to 1 day before the index date, are shown in **Table 1** in **Appendix II**.

At the index date, the most frequently recorded pre-specified conditions in IQVIA DA Germany were hypertension (27.97%), abnormal gait (22.12%), arthritis (19.38%), diabetes mellitus (14.61%) and dizziness (13.90%), while in NAJS hypertension (15.46%) and diabetes mellitus (5.44%). In contrast, the frequency of these conditions at the index date was consistently very low in other data sources, including CPRD GOLD, FinOMOP-HILMO and SIDIAP, with most frequencies below 1%. The most frequently prescribed drug classes belonging to STOPP section K criteria medication were vasodilating drugs (ranging from 3.49% in FinOMOP-HILMO to 28.75% in SIDIAP), opioids (ranging from 5.59% in IQVIA DA Germany to 17.30% in FinOMOP-HILMO), antidepressants (from 2.19% in FinOMOP-HILMO to 26.11% in SIDIAP), benzodiazepines (from 1.60% in IQVIA DA Germany to 19.08% in SIDIAP), and antipsychotics (from 1.95% in FinOMOP-HILMO to 13.26% in SIDIAP).

When examining the frequency of pre-specified conditions in the 365 to 1 day time window prior to the index date (**Table 1** in **Appendix II**), the frequencies were significantly higher across data sources compared to measurements at the index date. The most frequent pre-specified conditions were hypertension (ranging from 1.19% in CPRD GOLD to 77.79% in NAJS), arthritis (from 6.11% in CPRD GOLD to 36.91% in IQVIA DA Germany), diabetes mellitus (from 2.12% in CPRD GOLD to 28.59% in IQVIA DA Germany), dizziness (from 5.92% in FinOMOP-HILMO to 22.19% in IQVIA DA Germany), depression (from 2.52% in CPRD GOLD to 20.13% in IQVIA DA Germany), dementia (from 4.52% in NAJS to 17.82% in IQVIA DA Germany), and urinary incontinence (3.26% in FinOMOP-HILMO to 18.17% in IQVIA DA Germany). The least frequent pre-specified conditions were alcohol dependence, malnutrition or weight loss, muscle weakness, and stroke. Similarly to the conditions, the frequency of pre-specified drug classes prescriptions was higher in the year prior to recurrent falls diagnosis compared to the index date. The most frequently prescribed STOPP section K criteria drug classes were vasodilating drugs (ranging from 16.67% in NAJS to 32.33% in SIDIAP), opioids (from 15.11% in IQVIA DA Germany to 32.45% in FinOMOP-HILMO), antidepressants (from 5.08% in NAJS to 31.31% in SIDIAP), benzodiazepines (from 4.74% in IQVIA DA Germany to 25.81% in SIDIAP), and antipsychotics (from 4.19% in NAJS to 19.45% in SIDIAP). The least frequently prescribed STOPP section K criteria drug class was centrally acting antihypertensives in CPRD GOLD, IQVIA DA Germany, FinOMOP-HILMO, and SIDIAP, and first generation antihistamines in NAJS.

Additionally, the analyses were stratified by healthcare setting where applicable and the results are presented in **Table 2** in **Appendix II**. The setting indicated where recurrent falls were diagnosed and captured the risk factors specific to that environment. In IQVIA DA Germany, the results stratified by healthcare setting show a higher frequency of pre-specified risk factors in primary care compared to secondary care. The observed pattern is consistent with the overall analysis.

Table 12. Number and frequency of pre-specified risk factors among individuals aged 65 years and older with newly diagnosed recurrent falls during the study period, categorised by data source, at the index date.

		CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
Abnormal gait	Condition	9 (0.03)	5,407 (22.12)	6 (0.02)	24 (0.01)	32 (0.26)
Alcohol dependence	Condition	26 (0.08)	160 (0.65)	34 (0.10)	0	8 (0.07)
Anxiety	Condition	66 (0.20)	768 (3.14)	23 (0.07)	5,413 (3.21)	24 (0.20)
Arthritis	Condition	144 (0.45)	4,737 (19.38)	319 (0.94)	6,130 (3.64)	55 (0.45)
Chronic pain	Condition	0	2,619 (10.72)	16 (0.05)	38 (0.02)	14 (0.11)
COPD	Condition	63 (0.20)	1,262 (5.16)	89 (0.26)	1,746 (1.04)	6 (0.05)
Dementia	Condition	101 (0.31)	2,499 (10.23)	745 (2.19)	1,720 (1.02)	43 (0.35)
Depression	Condition	22 (0.07)	2,421 (9.91)	58 (0.17)	4,099 (2.43)	23 (0.19)
Diabetes mellitus	Condition	26 (0.08)	3,571 (14.61)	404 (1.19)	9,153 (5.44)	20 (0.16)
Dizziness	Condition	132 (0.41)	3,396 (13.90)	163 (0.48)	1,422 (0.84)	78 (0.64)
Hearing impairment	Condition	46 (0.14)	648 (2.65)	38 (0.11)	421 (0.25)	32 (0.26)
Hypertension	Condition	34 (0.11)	6,837 (27.97)	800 (2.36)	26,029 (15.46)	28 (0.23)
Malnutrition or weight loss	Condition	9 (0.03)	7 (0.03)	6 (0.02)	324 (0.19)	< 5
Muscle weakness	Condition	44 (0.14)	0	0	0	< 5
Osteoporosis	Condition	77 (0.24)	1,984 (8.12)	164 (0.48)	3,170 (1.88)	28 (0.23)
Parkinson’s disease	Condition	37 (0.11)	588 (2.41)	170 (0.50)	640 (0.38)	14 (0.11)
Stroke	Condition	< 5	0	0	< 5	< 5
Urinary incontinence	Condition	122 (0.38)	2,194 (8.98)	41 (0.12)	4,959 (2.95)	115 (0.94)
Visual impairment	Condition	39 (0.12)	201 (0.82)	7 (0.02)	39 (0.02)	21 (0.17)

		CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
Alpha blockers	Medication	1,345 (4.17)	610 (2.50)	277 (0.82)	3,150 (1.87)	872 (7.13)
Antidepressants	Medication	4,417 (13.70)	1,472 (6.02)	745 (2.19)	4,008 (2.38)	3,193 (26.11)
Antiepileptics	Medication	812 (2.52)	261 (1.07)	170 (0.50)	1,441 (0.86)	626 (5.12)
Antimuscarinic drugs	Medication	1,128 (3.50)	263 (1.08)	168 (0.49)	1,434 (0.85)	449 (3.67)
Antipsychotics	Medication	1,050 (3.26)	964 (3.94)	662 (1.95)	3,672 (2.18)	1,622 (13.26)
Benzodiazepines	Medication	955 (2.96)	392 (1.60)	889 (2.62)	13,499 (8.02)	2,334 (19.08)
Centrally acting antihypertensives	Medication	51 (0.16)	231 (0.95)	59 (0.17)	2,526 (1.50)	5 (0.04)
First generation antihistamines	Medication	355 (1.10)	310 (1.27)	78 (0.23)	9 (0.01)	64 (0.52)
Hypnotic z drugs	Medication	759 (2.35)	289 (1.18)	398 (1.17)	3,900 (2.32)	103 (0.84)
Opioids	Medication	2,728 (8.46)	1,367 (5.59)	5,875 (17.30)	17,106 (10.16)	1,442 (11.79)
Vasodilating drugs	Medication	5,219 (16.19)	4,993 (20.43)	1,185 (3.49)	16,292 (9.68)	3,517 (28.75)

COPD = chronic obstructive pulmonary disease; CPRD GOLD = Clinical Practice Research Datalink GOLD; IQVIA DA Germany = IQVIA Disease Analyzer Germany; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària;

12.2. Comorbidities

Table 13 shows the number and frequency of the top 10 recorded conditions among the individuals aged 65 years and older with newly diagnosed recurrent falls during the study period, categorised by data source, at the index date. These conditions were disease codes rather than aggregated codes for specific pre-specified conditions of interest. The results are also displayed for the time window prior to the index date (365 days to 1 day before the index date) (**Table 3 Appendix II**).

At the index date, the most frequently observed comorbidities included hypertension (27.97% in IQVIA DA Germany, 15.46% in NAJS), dizziness (13.75% in IQVIA DA Germany), and urinary incontinence (8.77% in IQVIA DA Germany, 0.87% in SIDIAP) (**Table 13**). A significant proportion of the top 10 recorded conditions were related to injuries and fractures and were rather the result of a fall, particularly in CPRD GOLD, FinOMOP-HILMO, NAJS, and SIDIAP. Notably, injury whilst engaged in leisure activity (41.03%) was the most frequent condition in FinOMOP-HILMO, while traumatic and non-traumatic injury was most common in SIDIAP (3.99%). Other conditions included fracture of distal end of radius (FinOMOP-HILMO: 9.7%, NAJS: 4.19%), dislocations/sprains/strains (FinOMOP-HILMO: 5.46%, NAJS: 3.63%) and fracture of upper end of humerus (FinOMOP-HILMO: 5.1%, NAJS: 3.36%).

The frequency of the most recorded conditions in the time window before the index date (365 days to 1 day before the index date) was substantially higher than at the index date (**Table 3** of **Appendix II**). Conditions such as hypertension (56.54% in IQVIA DA Germany, 27.92% in FinOMOP-HILMO, 77.79% in NAJS), dizziness (21.88% in IQVIA DA Germany, 8.63% in SIDIAP), urinary incontinence (17.79% in IQVIA DA Germany, 13.23% in SIDIAP) and type 2 diabetes mellitus (19% in IQVIA DA Germany, 10.32% In FinOMOP-HILMO and 22.77% in NAJS) were notably prevalent. Additionally, injuries, fractures, wounds, and pain were also frequently recorded among the top 10 conditions, particularly in FinOMOP-HILMO (injury whilst engaged in leisure activity (44.05%), open wound (10.90%), fracture of distal end of radius (10.76%)) and SIDIAP (traumatic and non-traumatic injury (24.05%).

Additionally, the analyses were stratified by healthcare setting, where applicable (**Table 4** in **Appendix II**). In IQVIA DA Germany, the frequency of conditions in primary care was higher than in secondary care. The observed pattern is consistent with the overall analysis.

Table 13. Number and frequency of top 10 recorded conditions among individuals aged 65 years and older with newly diagnosed recurrent falls during the study period, categorised by data source, at the index date.

CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
Urinary tract infectious disease	620 (1.92)	Essential hypertension	6,837 (27.97)	Injury whilst engaged in leisure activity	13,932 (41.03)	Essential hypertension	26,029 (15.46)	Traumatic or non-traumatic injury	488 (3.99)
Injury of head	493 (1.53)	Senility	3,657 (14.96)	Fracture of distal end of radius	3,294 (9.7)	Superficial injury of head	7,450 (4.42)	Urinary incontinence	107 (0.87)
Fracture of neck of femur	301 (0.93)	Dizziness and giddiness	3,360 (13.75)	Dislocations/sprains/strains	1,853 (5.46)	Fracture of distal end of radius	7,049 (4.19)	Injury of head	94 (0.77)
Acute renal failure syndrome	279 (0.87)	Type 2 diabetes mellitus without complication	2,304 (9.43)	Fracture of upper end of humerus	1,733 (5.1)	Open wound of head	7,046 (4.18)	Patient dependence on care provider	85 (0.69)
Orthostatic hypotension	260 (0.81)	Chronic pain	2,268 (9.28)	Injury of rotator cuff	1,685 (4.96)	Fracture of neck of femur	6,966 (4.14)	Urinary tract infectious disease	78 (0.64)
Clouded consciousness	252 (0.78)	Urinary incontinence	2,143 (8.77)	Contusion of knee	1,004 (2.96)	Type 2 diabetes mellitus	6,924 (4.11)	Dizziness and giddiness	78 (0.64)
Constipation	247 (0.77)	Osteoarthritis of knee	1,939 (7.93)	Open wound of scalp	903 (2.66)	Pertrochanteric fracture	6,243 (3.71)	Closed fracture of femur	70 (0.57)
Lower respiratory tract infection	228 (0.71)	Nerve root disorder	1,786 (7.31)	Fracture of neck of femur	874 (2.57)	Dislocations/sprains/strains	6,114 (3.63)	Minimal cognitive impairment	70 (0.57)
Fragility fracture	223 (0.69)	Pure hypercholesterolemia	1,755 (7.18)	Fracture of lateral malleolus	853 (2.51)	Fracture of upper end of humerus	5,662 (3.36)	-	-

CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Condition	**n (%)**	**Condition**	**n (%)**	**Condition**	**n (%)**	**Condition**	**n (%)**	**Condition**	**n (%)**
Minor head injury	201 (0.62)	Chronic ischemic heart disease	1,652 (6.76)	Fracture of rib	852 (2.51)	Pain in spine	5,564 (3.30)		

CPRD GOLD = Clinical Practice Research Datalink GOLD; IQVIA DA Germany = IQVIA Disease Analyzer Germany; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària;

12.3. Comedication

Table 14 presents the number and frequency of the top 10 comedications among individuals aged 65 years and older newly diagnosed with recurrent falls during the study period. These data are stratified by data source and are provided for the index date. Additionally, the frequencies of the top 10 comedications were also estimated for the time window prior to the index date (365 days to 1 day before the index date), as shown in **Table 5** of **Appendix II**.

At the index date, the most frequently observed comedications across all data sources were antipyretics and analgesics, specifically acetaminophen products (ranging from 3.06% in CPRD GOLD to 5.32% in FinOMOP-HILMO) and dipyrone products (1.38% in IQVIA DA Germany, 5.71% in SIDIAP). Non-steroidal anti-inflammatory drugs (NSAIDs) including aspirin products (0.77% in IQVIA DA Germany, 1.10% SIDIAP, 1.15% in CPRD GOLD) and ibuprofen (1.39% in FinOMOP-HILMO, 2.27% in NAJS), were also among the top 10 medications in all data sources. Omeprazole, a proton pump inhibitor (PPI), was also frequently listed (1.77% in CPRD GOLD, 3.34% in SIDIAP).

The frequency of the top 10 medications in the time window before the index date (365 days to 1 day before the index date) was substantially higher than at the index date (**Table 5** of **Appendix II**). The pattern was similar to that observed at the index date, with the most frequently prescribed medications including analgesics and antipyretics such as acetaminophen products (ranging from 42.86% in CPRD GOLD to 52.03% in FinOMOP-HILMO and 62.46% in SIDIAP) and dipyrone products (within a range of 10.41% in IQVIA DA Germany to 41.95% in SIDIAP) and NSAIDs including aspirin products (spanning from 8.31% in IQVIA DA Germany to 21.6% in SIDIAP and 22.86% in CPRD GOLD) and ibuprofen (within a range of 12.52% in NAJS to 12.79% in FinOMOP-HILMO), across all data sources. Additionally, influenza (ranging from 35.87% in FinOMOP-HILMO to 69.02% in SIDIAP) and SARS-CoV-2 vaccinations (within a range of 10.73% in IQVIA DA Germany to 21.07% in FinOMOP and 21.09% in SIDIAP) were among the top 10. PPIs such as omeprazole (26.57% in CPRD GOLD and 62.26% in SIDIAP) and pantoprazole products (within a range of 4.97% in IQVIA DA Germany to 12.72% in NAJS), as well as diuretics, including furosemide products (16.66% in CPRD GOLD and 28.75% in SIDIAP) and torsemide (8.62% in IQVIA DA Germany), were among the most frequent medications in almost all data sources except for FinOMOP-HILMO.

Additionally, the analyses were stratified by healthcare setting, where applicable (**Table 6** in **Appendix II**). In IQVIA DA Germany, the frequency of comedication in primary care was higher compared to secondary care. The observed pattern is consistent with the overall analysis.

Table 14. Number and frequency of top 10 comedication among individuals aged 65 years and older with newly diagnosed recurrent falls during the study period, categorised by data source, at the index date.

CPRD GOLD		IQVIA DA Germany*		FinOMOP-HILMO		NAJS		SIDIAP	
Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
acetaminophen 500 MG Oral Tablet	987 (3.06)	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	338 (1.38)	Acetaminophen 1000 MG Oral Tablet Box of 100	1,808 (5.32)	Acetaminophen 325 MG / Tramadol 37.5 MG Oral Tablet Box of 30	6,925 (4.11)	dipyrone	699 (5.71)
omeprazole 20 MG Delayed Release Oral Capsule	572 (1.77)	Dipyrone 500 MG Oral Tablet Box of 50 by Sanofi	220 (0.90)	acetaminophen	791 (2.33)	Amoxicillin 875 MG / Clavulanate 125 MG Oral Tablet Box of 14	4,598 (2.73)	acetaminophen 1000 MG Oral Tablet	646 (5.28)
acetaminophen 500 MG / codeine phosphate 8 MG Oral Tablet	373 (1.16)	Aspirin 100 MG Oral Tablet [Ass 1a Pharma] Box of 100 by 1 A	189 (0.77)	oxycodone	632 (1.86)	Diazepam 5 MG Oral Tablet Box of 30	4,170 (2.48)	omeprazole 20 MG Delayed Release Oral Capsule	409 (3.34)
aspirin 75 MG Disintegrating Oral Tablet	371 (1.15)	torsemide 10 MG Oral Tablet [Torasemid 1a Pharma] Box of 100 by 1 A	165 (0.68)	naloxone	541 (1.59)	Warfarin 3 MG Oral Tablet Box of 100	3,985 (2.37)	lorazepam 1 MG Oral Tablet	210 (1.72)
clopidogrel 75 MG Oral Tablet	258 (0.8)	Ramipril 5 MG Oral Tablet [Ramipril 1a Pharma] Box of 100 by 1 A	138 (0.56)	Ibuprofen 600 MG Oral Tablet Box of 100	473 (1.39)	Ibuprofen 600 MG Oral Granules	3,830 (2.27)	acetaminophen 325 MG / tramadol hydrochloride 37.5 MG Oral Tablet	174 (1.42)
influenza virus vaccine. unspecified formulation	255 (0.79)			Acetaminophen 500 MG / Codeine 30 MG Oral Tablet Box of 50	465 (1.37)	Furosemide 40 MG Oral Tablet Box of 20	3,328 (1.98)	acetaminophen 650 MG Oral Tablet	173 (1.41)

CPRD GOLD		IQVIA DA Germany*		FinOMOP-HILMO		NAJS		SIDIAP	
Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
alendronic acid 70 MG Oral Tablet	250 (0.77)			Acetaminophen 500 MG / Codeine 30 MG Oral Tablet Box of 20	458 (1.35)	Ibuprofen 600 MG Oral Tablet Box of 30	3,271 (1.94)	furosemide 40 MG Oral Tablet	162 (1.32)
simvastatin 40 MG Oral Tablet	245 (0.76)			polyethylene glycol 3350	389 (1.15)	Pantoprazole 40 MG Oral Tablet Box of 28	2,947 (1.75)	aspirin 100 MG Delayed Release Oral Tablet	135 (1.10)
amoxicillin 500 MG Oral Capsule	245 (0.76)			oxycodone hydrochloride 5 MG Oral Capsule	353 (1.04)	Bisoprolol 2.5 MG Oral Tablet Box of 30	2,498 (1.48)	quetiapine 25 MG Oral Tablet	115 (0.94)
1000 ML bicarbonate ion 0.017 MMOL/ML / POLYETHYLENE GLYCOL 3350 105 MG/ML / Potassium 0.0054 MMOL/ML / Sodium 0.065 MMOL/ML Oral Powder [Laxido] by Galen	245 (0.76)			Ibuprofen 600 MG Oral Tablet Box of 30	234 (0.69)	Ibuprofen 400 MG Oral Tablet Box of 30	2,199 (1.31)	Influenza. seasonal. injectable	114 (0.93)

CPRD GOLD = Clinical Practice Research Datalink GOLD; IQVIA DA Germany = IQVIA Disease Analyzer Germany; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària; * = Results were presented without applying a minimum count threshold, no additional medications were recorded on the index date.

12.4. Survival

12.4.1. Participants

Overall, 214,750 individuals aged 65 years and older who have been newly diagnosed with recurrent falls during the study period were included in the survival analysis (CPRD GOLD: 30,444, FinOMOP-HILMO: 27,805, NAJS: 145,818, SIDIAP: 10,683) (**Table 15**). These individuals had at least 1 year of potential follow-up time after the new diagnosis of recurrent falls. Since IQVIA DA Germany does not systematically collect data on mortality, the survival analysis was not conducted for this data source.

12.4.2. Descriptive data and main results

Of the 214,750 individuals included in survival analysis, 74,141 individuals from CPRD GOLD, FinOMOP-HILMO, NAJS, and SIDIAP had a subsequent death record during the study period. The proportion of deaths among individuals aged 65 years and older newly diagnosed with recurrent falls was 38.94% in CPRD GOLD, 37.64% in FinOMOP-HILMO, 31.69% in NAJS, and 52.51% in SIDIAP during the study period (**Table 15**).

Overall survival was calculated using data on time at risk of death from any cause and the Kaplan-Meier (KM) method. Results are reported as plots of the estimated survival curves (**Figure 5–8**) as well as estimated probability of survival at years 1, 3, and 5. The overall median survival for individuals aged 65 years and older newly diagnosed with recurrent falls ranged from 1,507 days (95% Confidence Interval (CI): 1,474 – 1,541 days) in CPRD GOLD to 2,770 days (95% CI: 2,714 – 2,836 days) in FinOMOP-HILMO (**Table 15**).

Table 15. Survival of individuals aged 65 years and older with newly diagnosed recurrent falls during the study period, per data source.

	N records	N events	Median survival (days) (95% CI)*	Restricted mean survival (SE)
CPRD GOLD	30,444	11,856	1,507.00 (1,474.00 – 1,541.00)	1,908.00 (14.00)
FinOMOP-HILMO	27,805	10,467	2,770.00 (2,714.00 – 2,836.00)	2,627.00 (12.00)
NAJS	145,818	46,208	-	2,168.00 (3.00)
SIDIAP	10,683	5,610	1,590.00 (1,544.00 – 1,640.00)	1,821.00 (16.00)

CPRD GOLD = Clinical Practice Research Datalink GOLD; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària.

*The median survival is defined as the point at which the survival curve reaches 0.5. In NAJS, median survival time was not reached and therefore no estimate is provided.

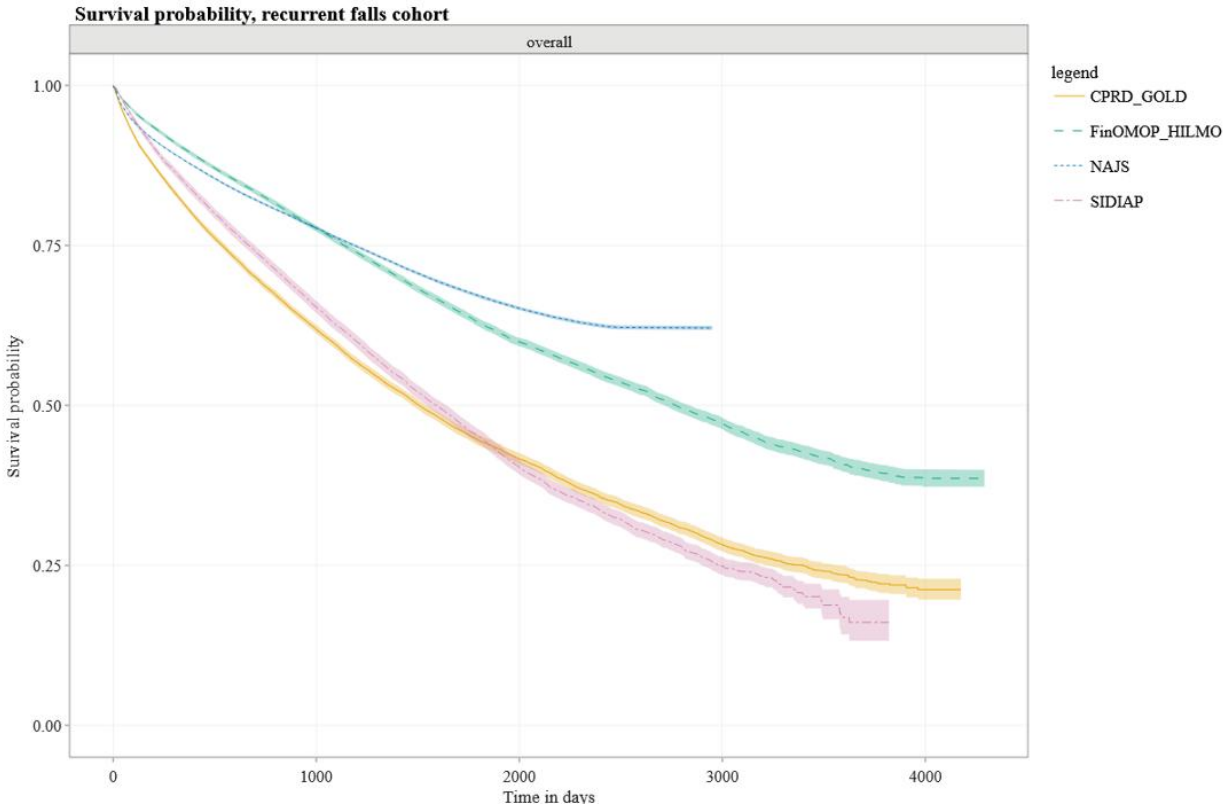


Figure 5. Overall survival probability of individuals aged 65 years and older newly diagnosed with recurrent falls, by data source.

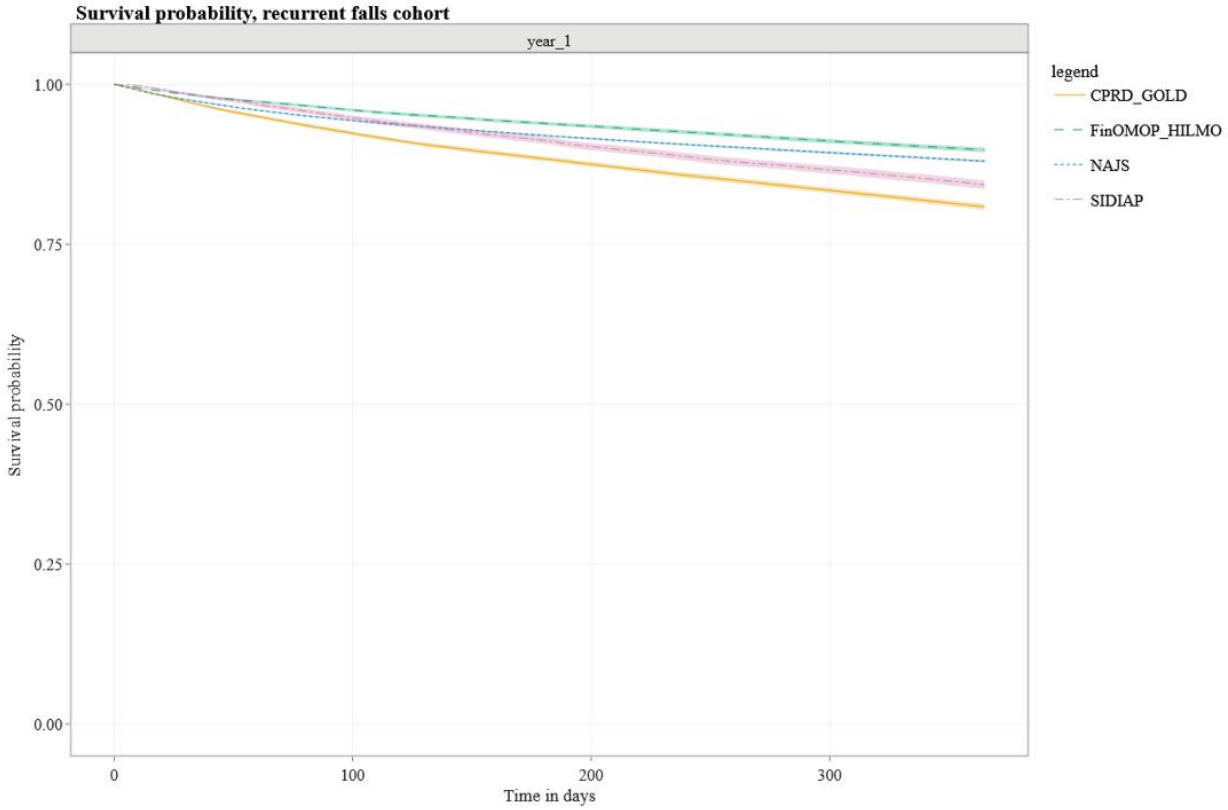


Figure 6. 1-year survival probability for individuals aged 65 years and older newly diagnosed with recurrent falls, by data source.

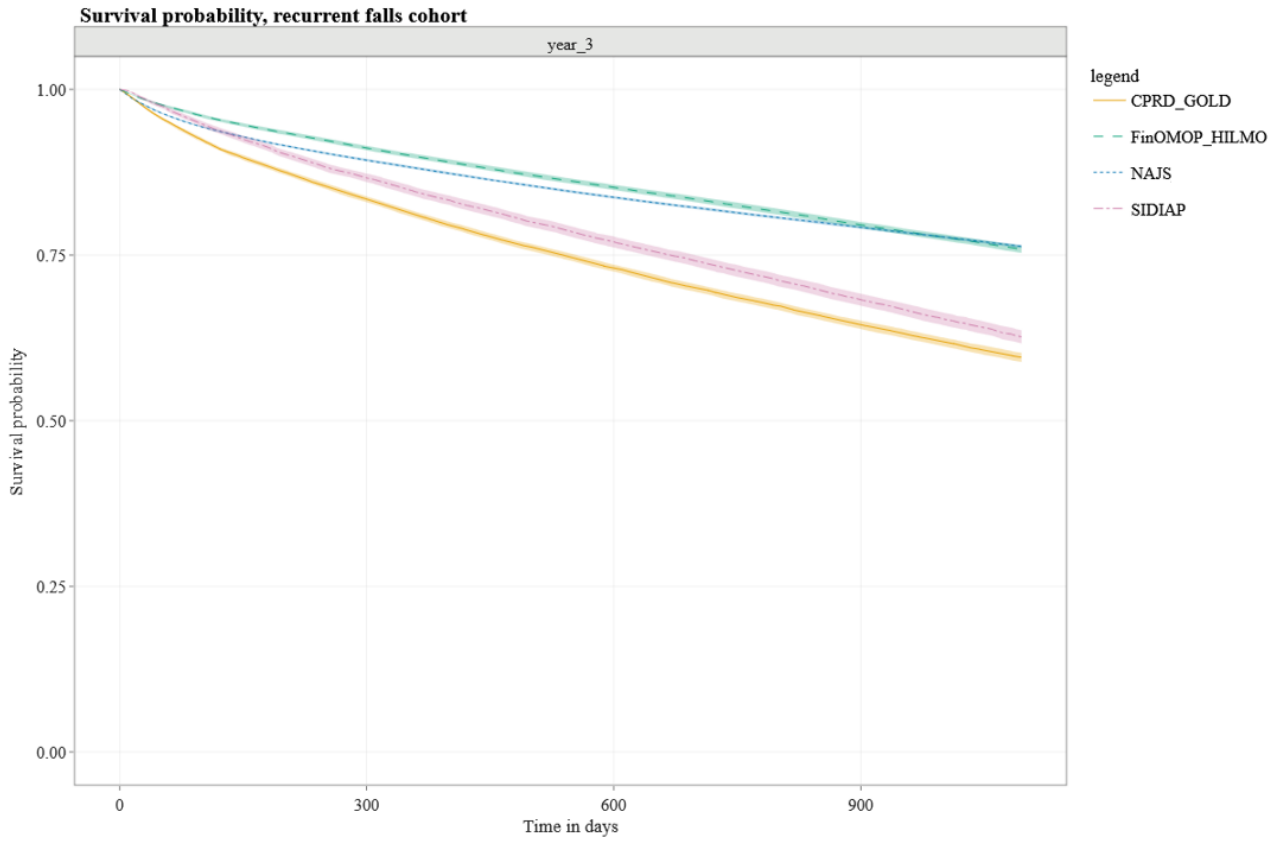


Figure 7. 3-year survival probability for individuals aged 65 years and older newly diagnosed with recurrent falls, by data source.

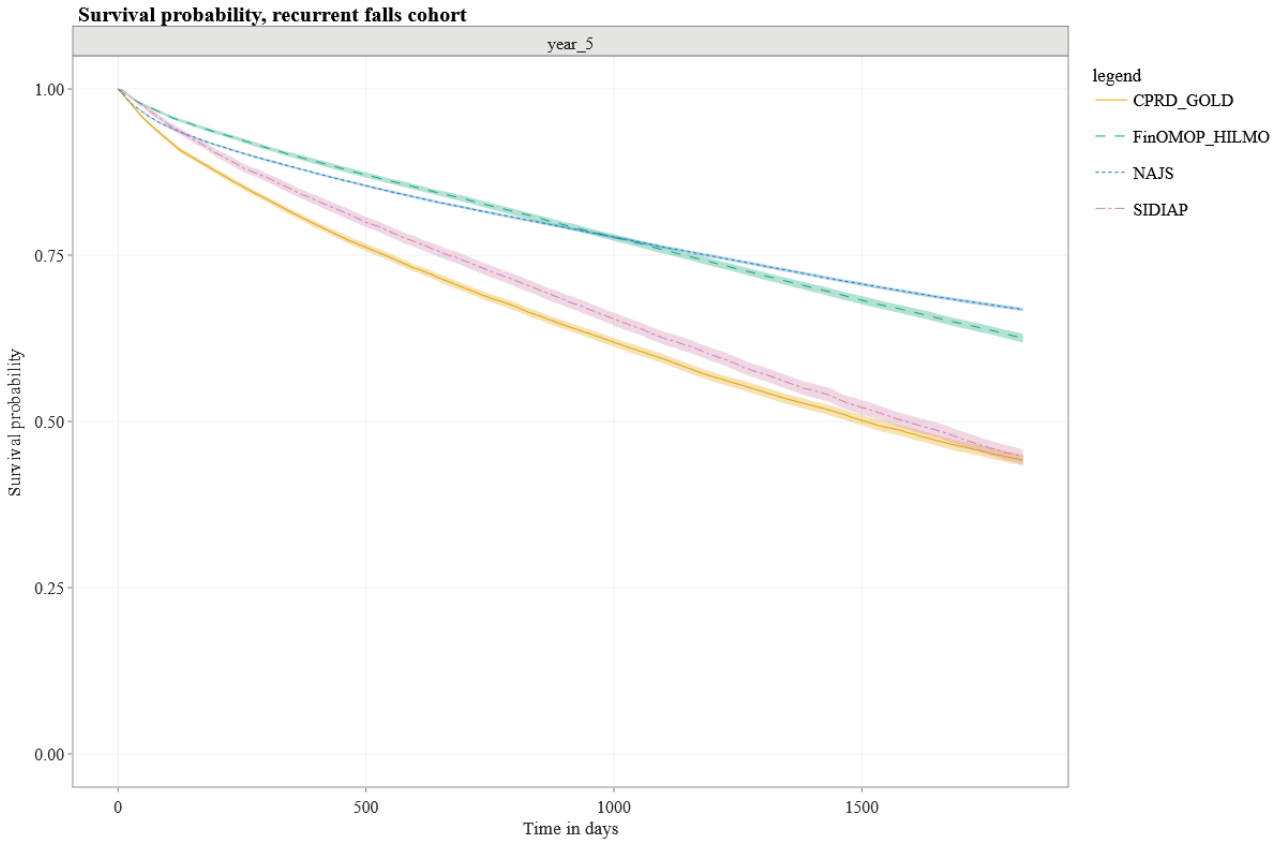


Figure 8. 5-year survival probability for individuals aged 65 years and older newly diagnosed with recurrent falls, by data source.

12.5. Population-level drug utilisation

12.5.1. Participants

The total number of individuals aged 65 years and older newly diagnosed with recurrent falls and without recurrent falls included in population-level drug utilisation study for each of the drug classes listed under of STOPP section K criteria can be found in the Shiny app at EUPAS1000000333. This includes the number of events, population size, and person-years for each data source and per calendar year during the study period.

12.5.2. Descriptive data and main results

12.5.2.1. Prevalence of STOPP section K criteria drug classes over time

Figure 9 illustrates the prevalence of STOPP section K criteria drug classes among individuals aged 65 years and older, as estimated across different data sources for two distinct cohorts, those with recurrent falls and those without, during the study period. The cohort with recurrent falls included individuals aged 65 years and older newly diagnosed with recurrent falls during the study period. Inclusion criteria required at least one year of data visibility prior to study inclusion and no previous history of recurrent falls. Use of STOPP section K criteria drug classes in older adults with recurrent falls was assessed after the new diagnosis of recurrent falls, which may have occurred a considerable time afterwards. Conversely, the cohort without recurrent falls comprised individuals aged 65 years and older with no recorded recurrent falls in the

respective databases during the study period, also with at least one year of prior data visibility and no history of recurrent falls.

Overall, a distinct trend emerged in prevalence between the two cohorts. The prevalence of STOPP section K criteria drug classes during the study period was similar or even greater in individuals aged 65 years and older following their initial diagnosis of recurrent falls compared to that of individuals aged 65 years and older without recurrent falls across data sources. Prevalence varied greatly among different STOPP section K criteria drug classes. Vasodilating drugs, opioids, antidepressants, and benzodiazepines were the most frequently prescribed STOPP section K criteria drug classes in both cohorts.

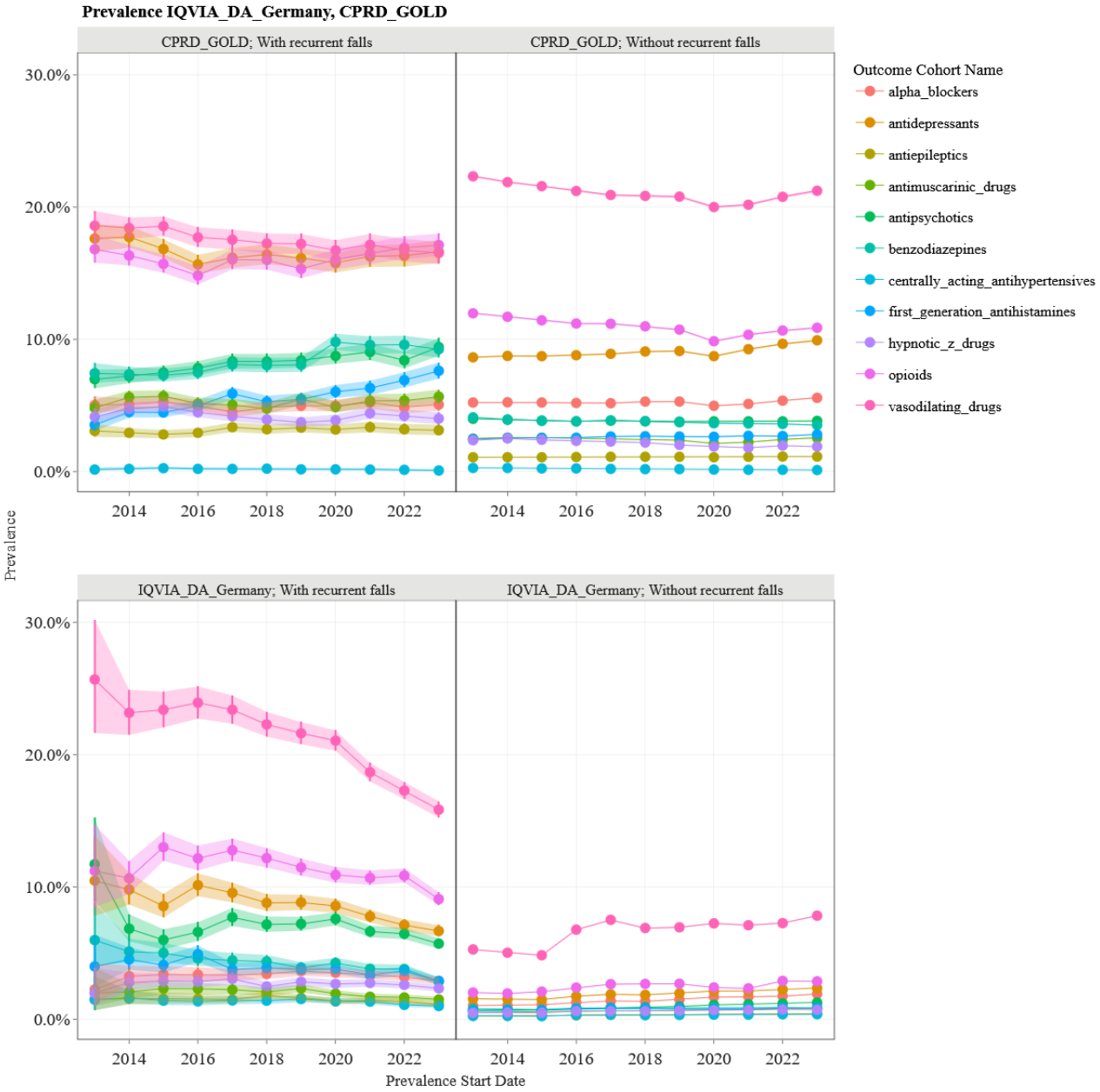


Figure 9. Prevalence of STOPP section K criteria drug classes prescriptions in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period (part 1/3).

Figure 9. Prevalence of STOPP section K criteria drug classes prescriptions in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period (part 2/3).

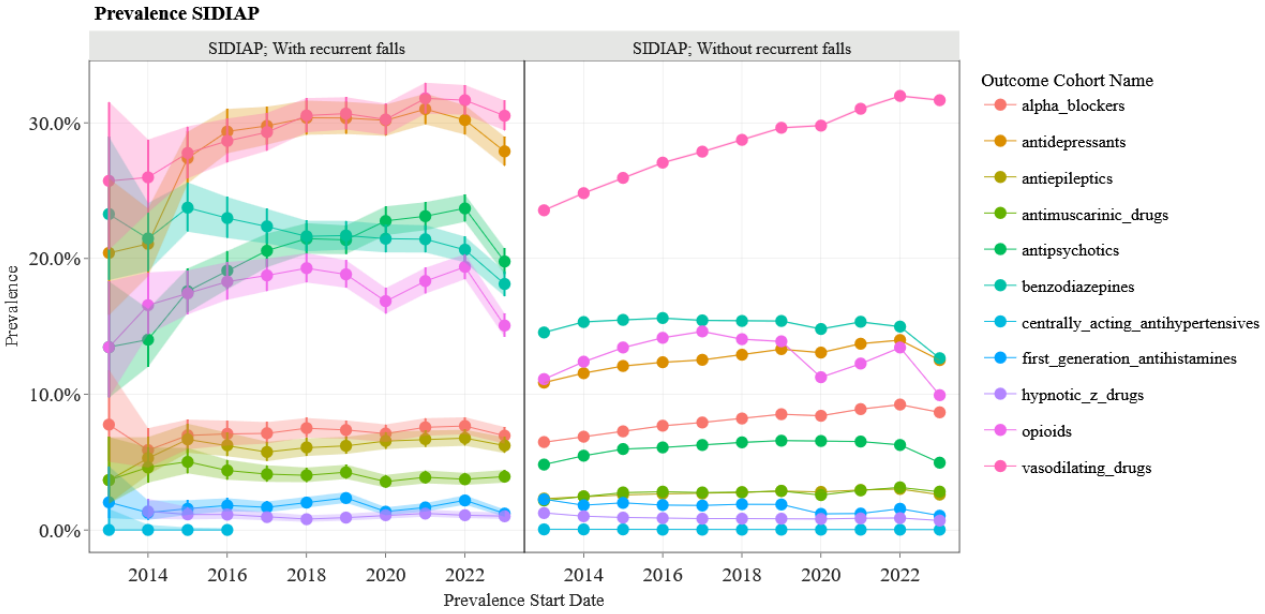


Figure 9. Prevalence of STOPP section K criteria drug classes prescriptions in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period (part 3/3).

Benzodiazepines

The prevalence of benzodiazepine use in individuals aged 65 years and older, stratified by those newly diagnosed with recurrent falls and those without recurrent falls, is illustrated in **Figure 10**. In individuals with recurrent falls, benzodiazepine use was assessed following the diagnosis of recurrent falls, which may have occurred a considerable time afterwards.

In 2013, the prevalence of benzodiazepine use in older adults following their initial diagnosis of recurrent falls ranged from 6% in IQVIA DA Germany to 23% in SIDIAP. By 2023, this prevalence declined to 3% in IQVIA DA Germany to 18% in SIDIAP. Overall, most data sources demonstrated relatively stable trends with a slight decline over the study period, except for CPRD GOLD, which showed a modest increase in prevalence.

A comparable pattern was observed among older adults without recurrent falls, where the prevalence of benzodiazepine use was consistently lower compared to the prevalence in older individuals following their initial diagnosis of recurrent falls throughout the study period.

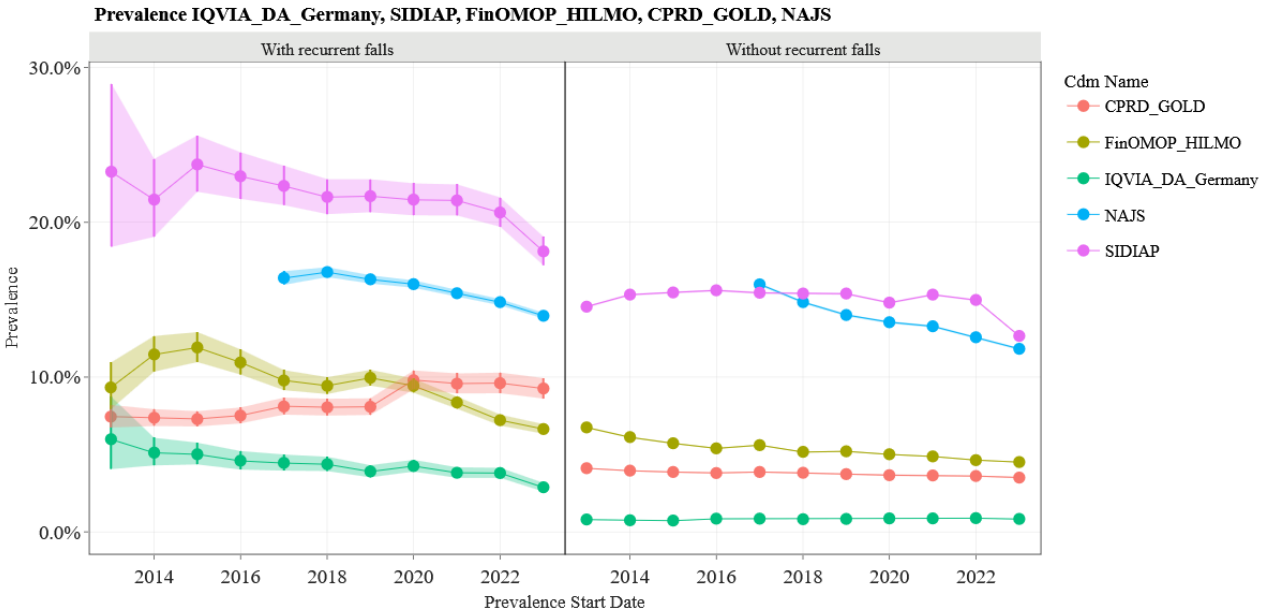


Figure 10. Prevalence of benzodiazepine use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Antipsychotics

Figure 11 depicts prevalence of antipsychotic use in older adults, stratified by those newly diagnosed with recurrent falls and those without recurrent falls. In older adults with recurrent falls, antipsychotic use was assessed following the diagnosis of recurrent falls, which may have occurred a considerable time afterwards.

Among older adults with recurrent falls, the prevalence of antipsychotic use following their initial diagnosis of recurrent falls ranged from 7% in CPRD GOLD to 13% in SIDIAP in 2013. By 2023, this prevalence ranged from 5% in FinOMOP-HILMO to 9% in CPRD GOLD. While most data sources showed an initial decline in prevalence followed by stabilisation during the study period, SIDIAP showed a marked increased from 13% in 2013 to 24% in 2022. Prevalence in NAJS remained stable at approximately 5% from 2017 to 2023.

In contrast, among older adults without recurrent falls, the prevalence of antipsychotic use was lower throughout the study period compared to that of older adults following their initial diagnosis of recurrent falls, exhibiting a relatively stable trend across all data sources.

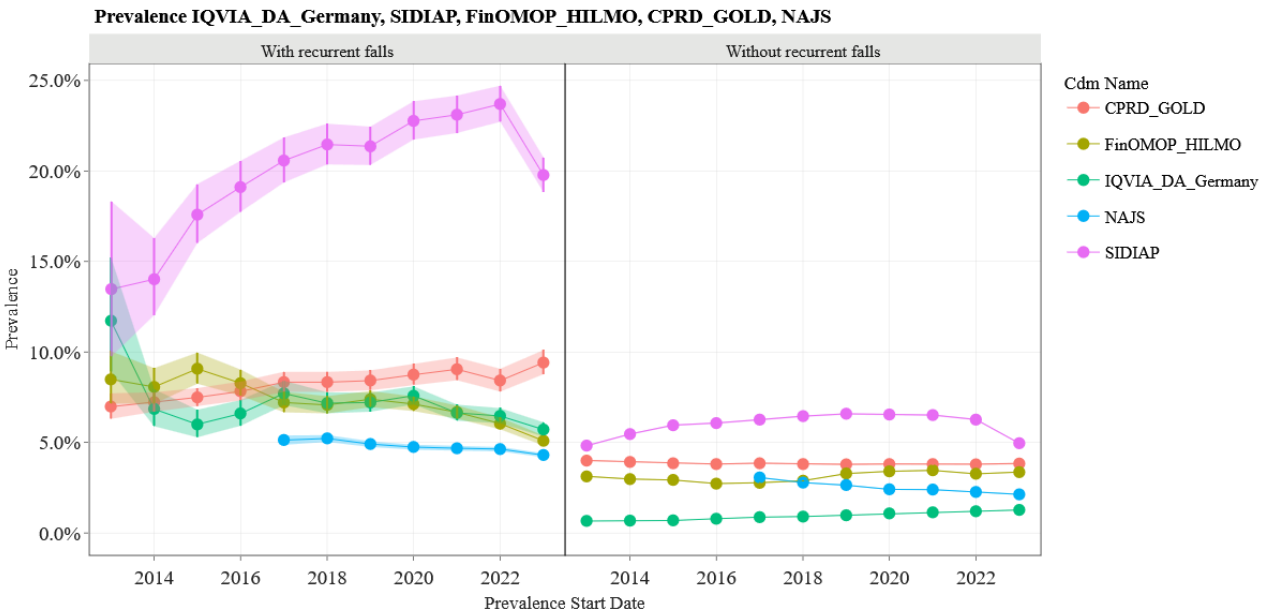


Figure 11. Prevalence of antipsychotic use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Vasodilating drugs (nitrates, ACE inhibitors, ARB inhibitors, calcium channel blockers)

The prevalence of vasodilating drug use in older adults, stratified by those newly diagnosed with recurrent falls and those without recurrent falls is presented in **Figure 12**. In older adults with recurrent falls, vasodilating drug use was evaluated after the diagnosis of recurrent falls, which may have occurred a considerable time afterwards.

In 2013, the prevalence of vasodilating drug use among older adults following their initial diagnosis of recurrent falls ranged from 11% in FinOMOP-HILMO to 26% in SIDIAP in 2013. Over the study period, a decline in prevalence was observed in IQVIA DA Germany, CPRD GOLD, and NAJS. Conversely, the prevalence in SIDIAP and FinOMOP-HILMO increased over time, reaching 31% and 25%, respectively, by 2023.

For older adults without recurrent falls, the prevalence of vasodilating drug use was comparable to that of older adults following their initial diagnosis of recurrent falls in SIDIAP, FinOMOP-HILMO, and NAJS. However, the prevalence was consistently higher in CPRD GOLD, while it was lower in IQVIA DA Germany throughout the study period.

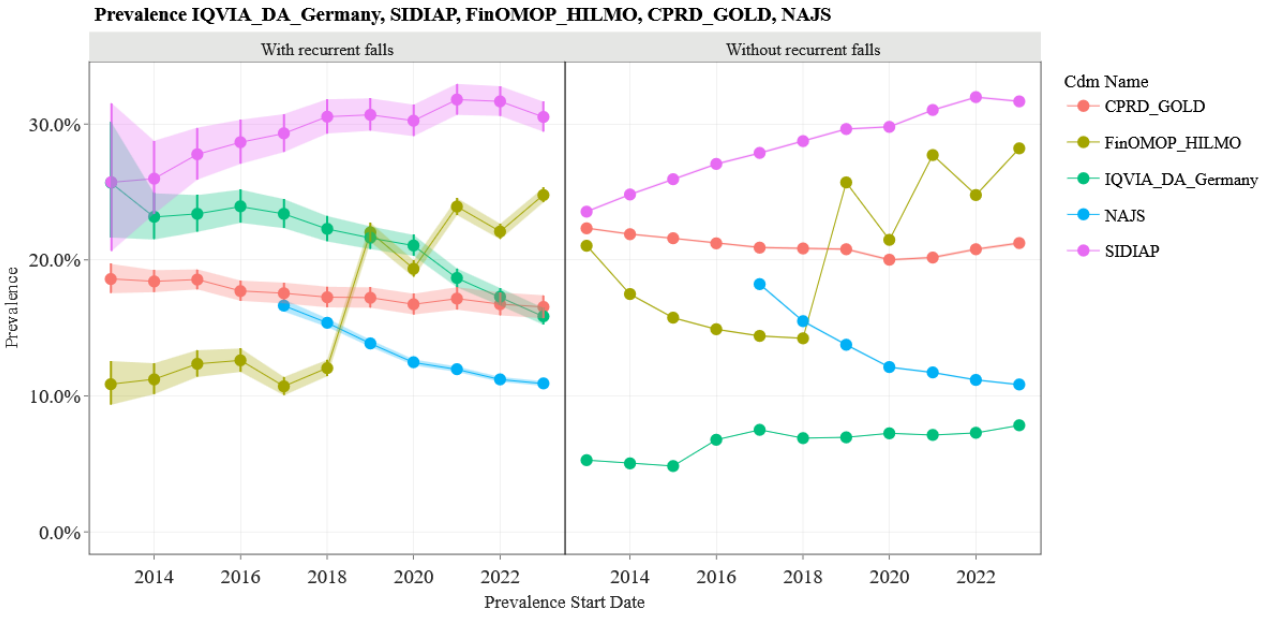


Figure 12. Prevalence of vasodilating dugs use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Hypnotic z-drugs

The prevalence of hypnotic z-drug use in individuals aged 65 years and older, stratified by newly diagnosed recurrent falls and those without recurrent falls during the study period between 2013 and 2023, is shown in **Figure 13.**

The prevalence of hypnotic z-drug use in older adults following their initial diagnosis of recurrent falls was low, ranging from 2% in IQVIA DA Germany to 7% in FinOMOP-HILMO in 2013. Throughout the study period, the prevalence remained relatively stable across all data sources, except for FinOMOP-HILMO, which showed a decline from 7% in 2013 to 3% by 2023.

A similar trend was observed among individuals aged 65 years and older without recurrent falls. In FinOMOP-HILMO and SIDIAP, the prevalence was comparable to that observed in individuals aged 65 years and older following their new diagnosis of recurrent falls. However, across other data sources, the prevalence was slightly lower in older adults without recurrent falls compared to that of older adults following their initial diagnosis of recurrent falls.

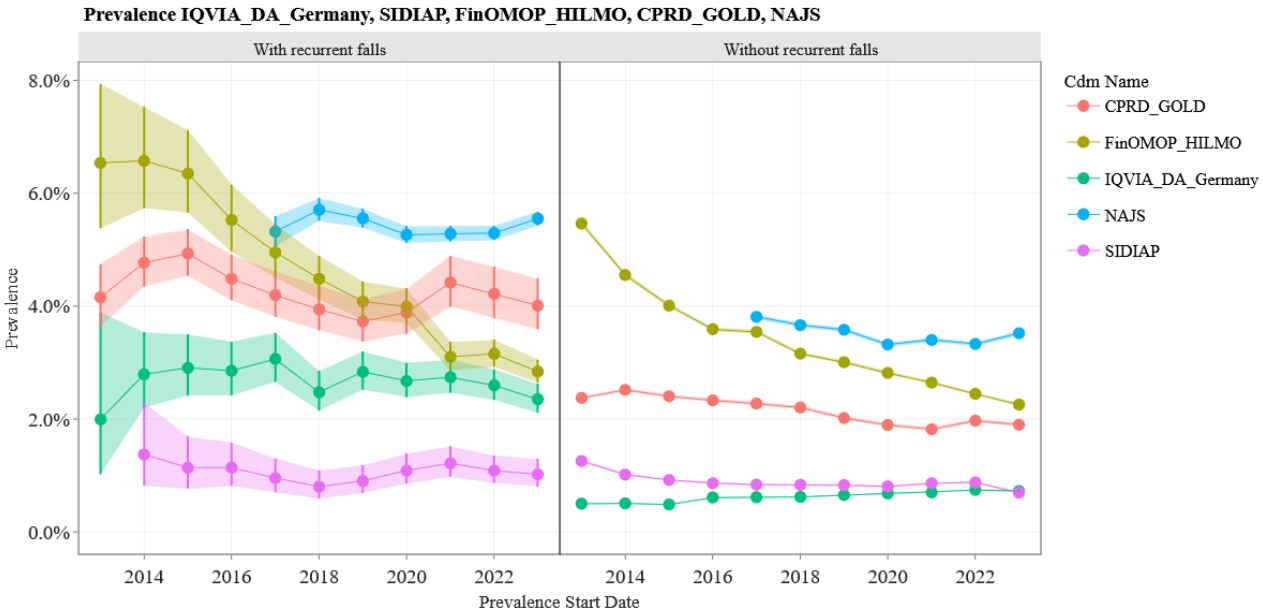


Figure 13. Prevalence of hypnotic z-drug use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Antiepileptics

The prevalence of antiepileptic use in older adults, stratified by those newly diagnosed with recurrent falls and those without recurrent falls is illustrated in **Figure 14**.

In general, the prevalence of antiepileptic use was low in older adults following their new diagnosis of recurrent falls. For instance, the prevalence ranged from 2% in IQVIA DA Germany to 4% in SIDIAP in 2013. Over the study period, the prevalence of antiepileptic use remained stable across data sources, except in SIDIAP, where a slight increase was observed, rising from 4% in 2013 to 6% by 2023.

Among individuals aged 65 years and older without recurrent falls, the prevalence of antiepileptic use was lower than in individuals aged 65 years and older after a new diagnosis of recurrent falls and remained stable throughout the study period. In IQVIA DA Germany, the prevalence was negligible, approximately 0%, while in SIDIAP, it consistently remained around 3% throughout the study period.

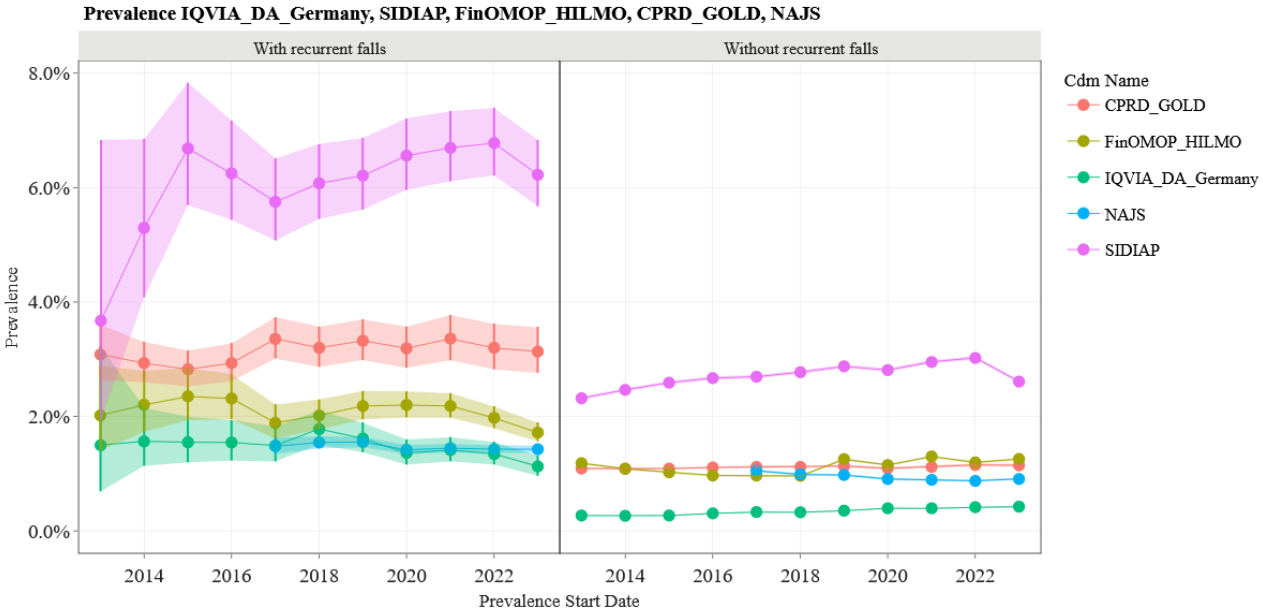


Figure 14. Prevalence of antiepileptic use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

First generation antihistamines

The prevalence of first generation antihistamine use in older adults aged 65 years and older, stratified by those with recurrent falls and those without, is depicted in **Figure 15**.

Among older adults following their initial diagnosis of recurrent falls, the prevalence of first generation antihistamine use was low, ranging from 2% in FinOMOP-HILMO to 4% in IQVIA DA Germany. The prevalence remained relatively stable across most data sources, including IQVIA DA Germany, SIDIAP, and FinOMOP-HILMO throughout the study period. In CPRD GOLD, however, prevalence increased from 4% in 2013 to 8% in 2023. NAJS data indicated negligible use during the study period, with prevalence estimates remaining stable below 0.09%of 7% in 2018 and lowest prevalence of 3% in 2020 throughout the study period.

For individuals aged 65 years and older without recurrent falls, the prevalence was generally lower than in individuals aged 65 years and older after a new diagnosis of recurrent falls but followed similar trends across the data sources.

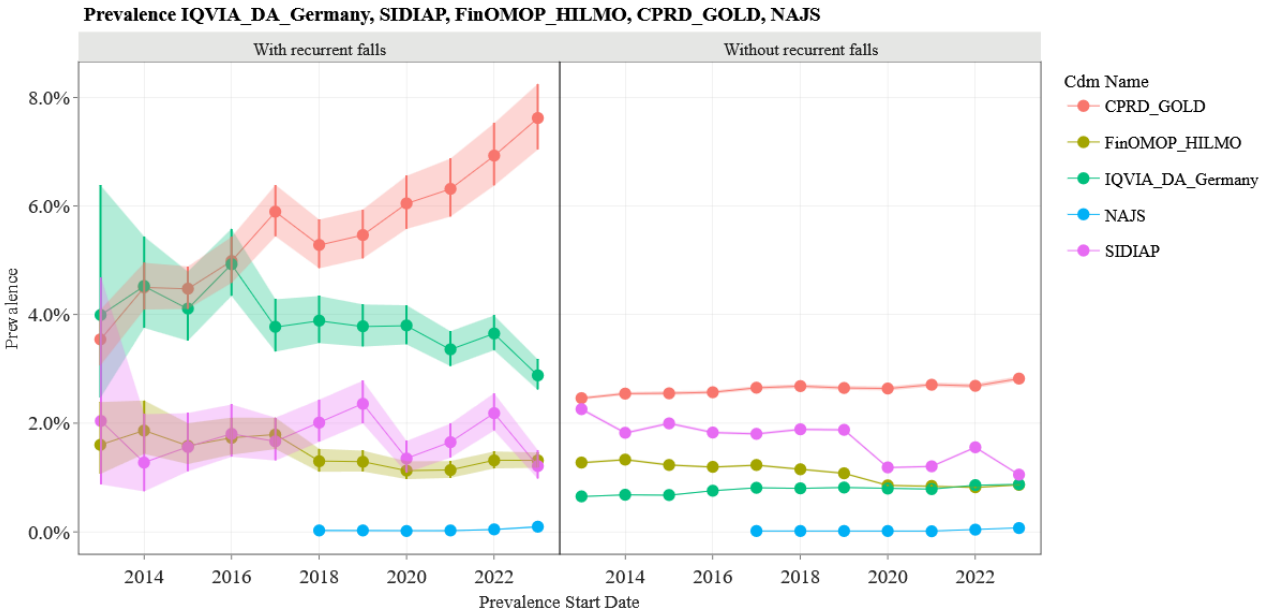


Figure 15. Prevalence of first-generation antihistamine use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period.

Opioids

Figure 16 illustrates the prevalence of opioids use in older adults aged 65 years and older, stratified by those with recurrent falls and those without recurrent falls, between 2013 and 2023. In individuals with recurrent falls, opioid use was assessed following the diagnosis of recurrent falls, which may have occurred a considerable time afterwards.

Among older adults following their new diagnosis of recurrent falls, the prevalence of opioid use ranged from 11% in IQVIA DA Germany to 28% in FinOMOP-HILMO in 2013. In IQVIA DA Germany and CPRD GOLD, the prevalence remained relatively stable during the study period. In contrast, FinOMOP-HILMO showed a decline, from 28% in 2013 to 18% in 2023. In SIDIAP, the prevalence of opioid use increased from 13% in 2013 to 19% in 2018, followed by fluctuations around 2020 and a subsequent decline to 15% in 2023. In NAJS, the prevalence ranged from 17% in 2017 declining to 13% in 2023.

For individuals aged 65 years and older without recurrent falls, the prevalence was substantially lower (ranging from 2% in IQVIA DA Germany to 12% in CPRD GOLD in 2013) but exhibited similar trends as for individuals aged 65 years and older with a new diagnosis of recurrent falls across data sources.

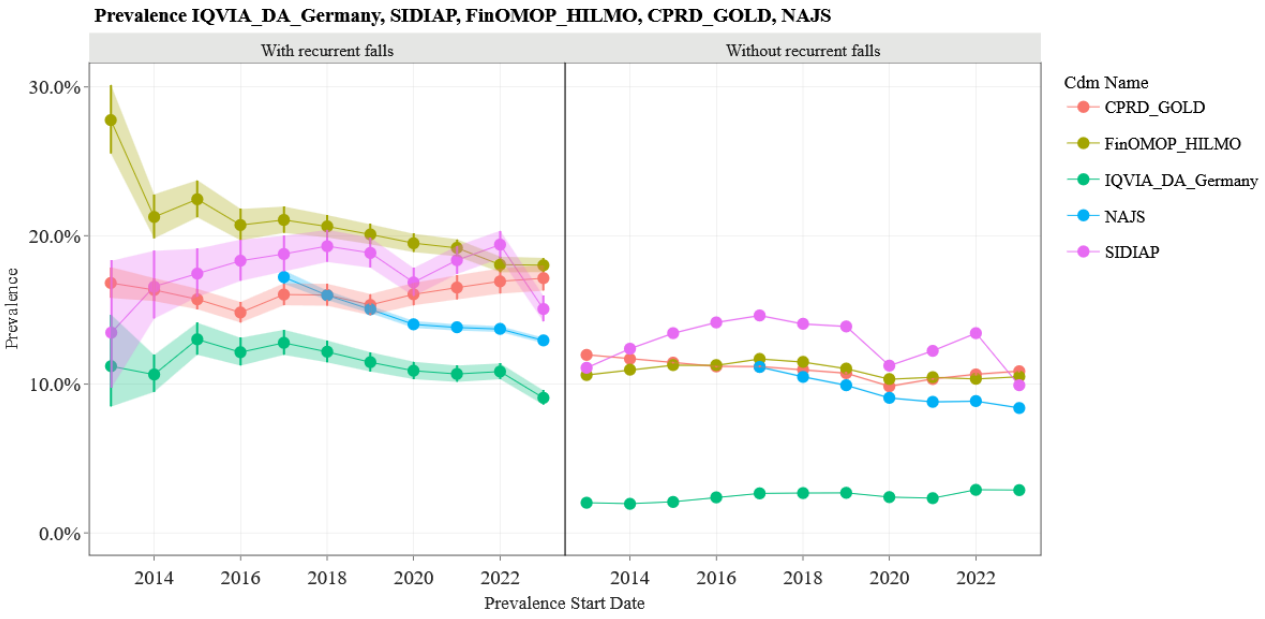


Figure 16. Prevalence of opioid use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Antidepressants

Figure 17 presents the prevalence of antidepressant use in older adults, stratified by those newly diagnosed with recurrent falls and those without recurrent falls.

In general, the prevalence of antidepressant use in individuals aged 65 years and older following their new diagnosis of recurrent falls ranged from 10% in IQVIA DA Germany to 20% in SIDIAP in 2013. Across most data sources, the prevalence remained relatively stable throughout the study period, except in SIDIAP, where it increased from 20% in 2013 to 30% in 2017 and remained stable for the remainder of the study period. Prevalence was lowest in NAJS with stable estimates around 4% throughout the study period.

Among individuals aged 65 years and older without recurrent falls, the prevalence of antidepressant use was generally lower compared to the prevalence in individuals aged 65 years and older following their new diagnosis of recurrent falls but followed similar trends. In IQVIA DA Germany, the prevalence was around 2% while in SIDIAP the use of antidepressant drugs remained stable at approximately 13% during the study period. Contrary to the other data sources, the prevalence was very similar in both cohorts in NAJS.

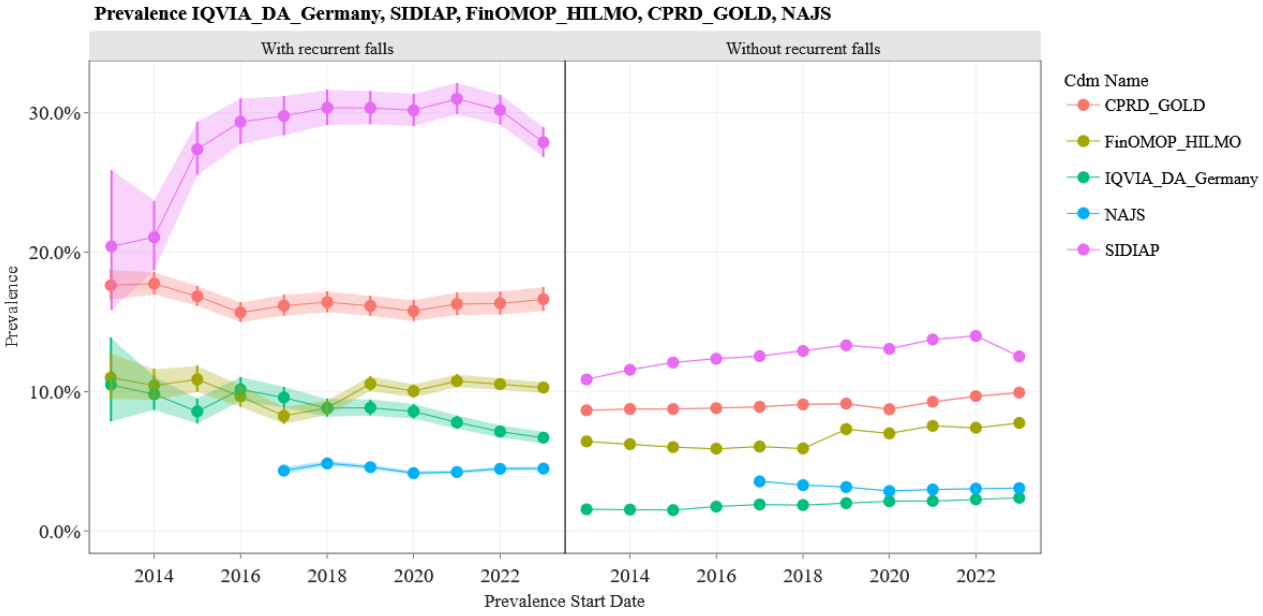


Figure 17. Prevalence of antidepressant use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Alpha-blockers

Figure 18 shows the prevalence of alpha-blocker drug use in individuals aged 65 years and older, stratified by those newly diagnosed recurrent falls and those without, between 2013 and 2023.

The prevalence of alpha-blocker use was low in individuals aged 65 years and older following their new diagnosis of recurrent falls, ranging from 2% in FinOMOP-HILMO to 8% in SIDIAP in 2013. Throughout the study period, the prevalence remained relatively stable across most data sources, except for FinOMOP-HILMO, where it increased slightly from 2% in 2013 to 6% in 2023.

Among those without recurrent falls, prevalence patterns in FinOMOP-HILMO, NAJS, and CPRD GOLD were similar to patterns observed in individuals aged 65 years and older following their new diagnosis of recurrent falls. In IQVIA DA Germany, the prevalence was slightly lower compared to that of older adults following their new diagnosis of recurrent falls, while in SIDIAP, it was slightly higher from 2019 onwards.

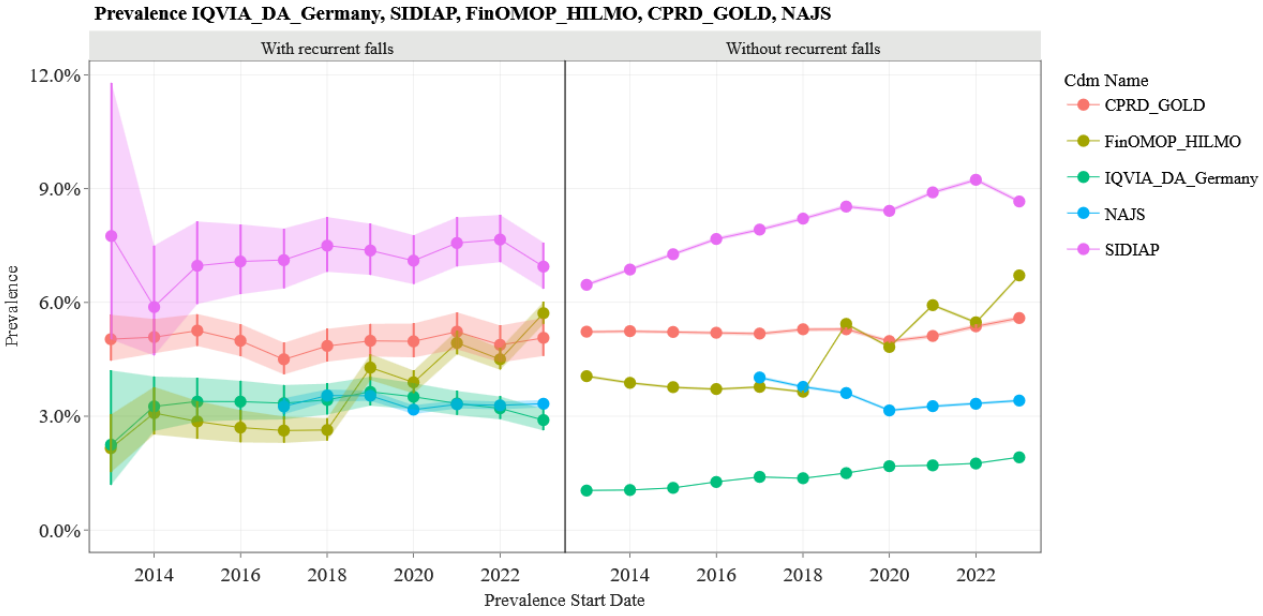


Figure 18. Prevalence of alpha-blockers use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Centrally acting antihypertensives

The prevalence of centrally acting antihypertensive use in the cohorts of interest is depicted in **Figure 19.**

Overall, the prevalence of centrally acting antihypertensive use remained very low, below 2%, in individuals aged 65 years and older following their new diagnosis of recurrent falls and remained stable across most data sources throughout the study period. In NAJS, the prevalence increased from 2% in 2017 to 3% in 2023. A similar pattern was observed among individuals aged 65 years and older without recurrent falls, with a similar or lower prevalence than in those with recurrent falls.

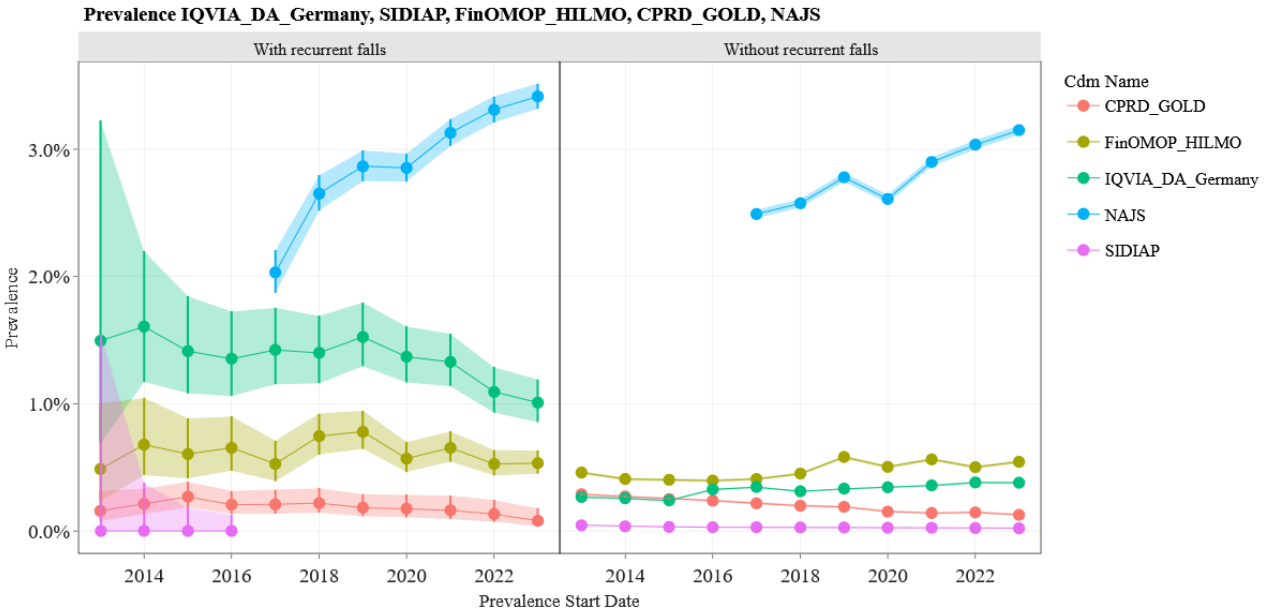


Figure 19. Prevalence of centrally acting antihypertensive use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Antimuscarinic drugs (indicated for overactive bladder)

Figure 20 presents prevalence of antimuscarinic drug use in older adults, stratified by those with newly diagnosed recurrent falls and those without recurrent falls.

Prevalence of antimuscarinic drug use in older adults following their new diagnosis of recurrent falls ranged from 1% in FinOMOP-HILMO to 5% in CPRD GOLD in 2013. Prevalence remained relatively stable across all data sources during the study period. A similar trend was observed among older adults without recurring falls, although prevalence was consistently lower than that of older adults with recurrent falls.

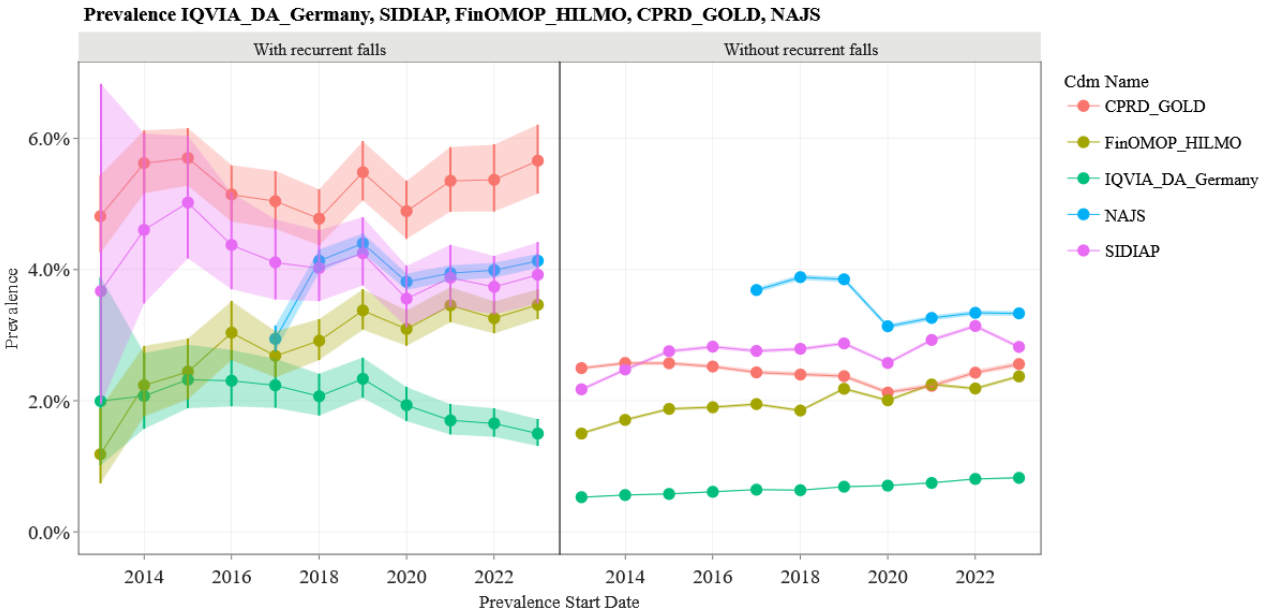


Figure 20. Prevalence of antimuscarinic drug use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

12.5.2.2. Prevalence of STOPP section K criteria drug classes over time by age group

Figure 1 to **Figure 11** in **Appendix III** illustrate the prevalence of STOPP section K criteria drug classes from 2013 to 2023, stratified by age groups. The results are presented separately for individuals aged 65 years and older following their new diagnosis of recurrent falls and individuals aged 65 years and older without recurrent falls. Overall, the prevalence of STOPP section K criteria drug class use increased gradually with increasing age.

Notably, the most pronounced differences in prevalence were observed in older adults, particularly with benzodiazepines and antipsychotics, where the prevalence was consistently higher among the individuals aged 85 years and older, regardless of recurrent fall status. A comparable trend was noted for z-hypnotics and opioids use across all data sources, with exception of SIDIAP, where the prevalence was slightly higher in the 65 to 74 and 75 to 84 years age groups rather than in individuals aged 85 years and older.

For antidepressants, a distinct pattern emerged among individuals aged 65 years and older without recurrent falls, with the highest prevalence in the older age groups. However, this trend was less pronounced among individuals aged 65 years and older following their new diagnosis of recurrent falls. Vasodilators exhibited a noticeable increase in prevalence among individuals aged 75-84 years in the CPRD

GOLD, FinOMOP-HILMO, NAJS, and SIDIAP databases, particularly in individuals without recurrent falls. Conversely, differences in prevalence were less apparent for older adults following their new diagnosis of recurrent falls.

The prevalence of antiepileptic use was generally similar across age groups and recurrent fall status, except in CPRD GOLD, IQVIA DA Germany, and SIDIAP, where prevalence was the highest for the 65 to 74 years age group and lowest in the individuals aged 85 years and older, particularly in individuals following their new diagnosis of recurrent falls.

Lastly, the prevalence of alpha blockers, antimuscarinic drugs and centrally acting antihypertensives showed varying trends across age groups and data sources. Alpha blockers and antimuscarinic drugs were most prevalent among individuals aged 75-84 years without recurrent falls, but no distinct pattern emerged for individuals of the same age group following their new diagnosis of recurrent falls. Prevalence of centrally acting antihypertensives was highest in younger age groups in NAJS, whereas no distinct trend was observed in other data sources, irrespective of whether individuals have been newly diagnosed with recurrent falls or in those of the same age group without recurrent falls.

More details can be found in the Shiny app at EUPAS1000000333.

12.5.2.3. Prevalence of STOPP section K criteria drug classes over time by sex

Figure 12 to **Figure 22** in **Appendix III** present the prevalence of STOPP section K criteria drug use during the study period from 2013 to 2023, stratified by sex. The findings are reported separately for individuals aged 65 years and older following their initial diagnosis of recurrent falls and individuals aged 65 years and older without recurrent falls.

Among older adults without recurrent falls, the prevalence of benzodiazepine and hypnotic z-drug use was slightly higher in women compared to men. In contrast, among individuals following their new diagnosis of recurrent falls, no notable differences were observed between sexes, except in NAJS, where women exhibited a higher prevalence of benzodiazepine and hypnotic z-drug use than men. For antipsychotic use, in general women also demonstrated higher prevalence than men among individuals aged 65 years and older without recurrent falls. However, among individuals aged 65 years and older following their new diagnosis of recurrent falls, no clear sex-based differences emerged, except in NAJS, where prevalence was higher in women, and in SIDIAP, where prevalence was higher in men.

The prevalence of vasodilating drug use was slightly higher in men aged 65 years and older without recurrent falls in CPRD GOLD, FinOMOP-HILMO, and SIDIAP. Among individuals aged 65 years and older after they have been newly diagnosed with recurrent falls, no sex differences were observed. The use of antiepileptics was slightly higher in men after they have been newly diagnosed with recurrent falls compared to women, whereas the prevalence was comparable between sexes among those without recurrent falls.

First generation antihistamine use was higher in women than in men among individuals aged 65 years and older without recurrent falls in almost all data sources except NAJS. This trend persisted among individuals after new recurrent falls diagnosis in IQVIA DA Germany and CPRD GOLD. In other data sources, prevalence of first generation antihistamine use in women and men was roughly equivalent.

Opioids use was generally higher in women among both individuals aged 65 years and older after they have been newly diagnosed with recurrent falls and individuals aged 65 years and older without recurrent falls. Exceptions included CPRD GOLD and FinOMOP-HILMO, where no distinct sex-based patterns emerged in individuals after they have been newly diagnosed with recurrent falls. Antidepressant use was also higher in women than men among those without recurrent falls. For individuals aged 65 years and older following

their new diagnosis of recurrent falls, antidepressant use remained higher in women, except in SIDIAP, where it was similar between sexes.

Alpha-blockers use was consistently higher in males regardless of recurrent falls status during the study period across all data sources. For antimuscarinic drugs (indicated for overactive bladder), prevalence was higher in women FinOMOP-HILMO, while it was slightly higher in men in SIDIAP. Other data sources showed no consistent differences between sexes, regardless of recurrent falls status. Centrally acting antihypertensives demonstrated no clear differences in prevalence between sexes, except in NAJS, where prevalence was higher in women.

More detailed data can be found in the Shiny app at EUPAS1000000333.

12.5.2.4. Incidence rates of STOPP section K criteria drug classes over time

Figure 21 depicts the incidence rates of STOPP section K criteria drug classes, measured as the number of new users of drug classes belonging to the STOPP section K criteria per 1,000 person-years (PYs), in individuals aged 65 years and older after they have been newly diagnosed with recurrent falls and in individuals aged 65 years and older without recurrent falls, across different data sources during the study period from 2013 to 2023. In individuals with recurrent falls, use of STOPP section K criteria drug classes was assessed following the diagnosis of recurrent falls, which may have occurred a considerable time afterwards.

Overall, a distinct trend emerged in the incidence rates between the two cohorts. The incidence rates of STOPP section K criteria drug class use were similar or higher in older adults after they have been newly diagnosed with recurrent falls compared to those without recurrent falls. The incidence rates varied greatly among different STOPP section K criteria drug classes across cohorts. Opioids, vasodilating drugs, and benzodiazepines were the most commonly prescribed STOPP section K criteria drug classes in the study population during the study period.

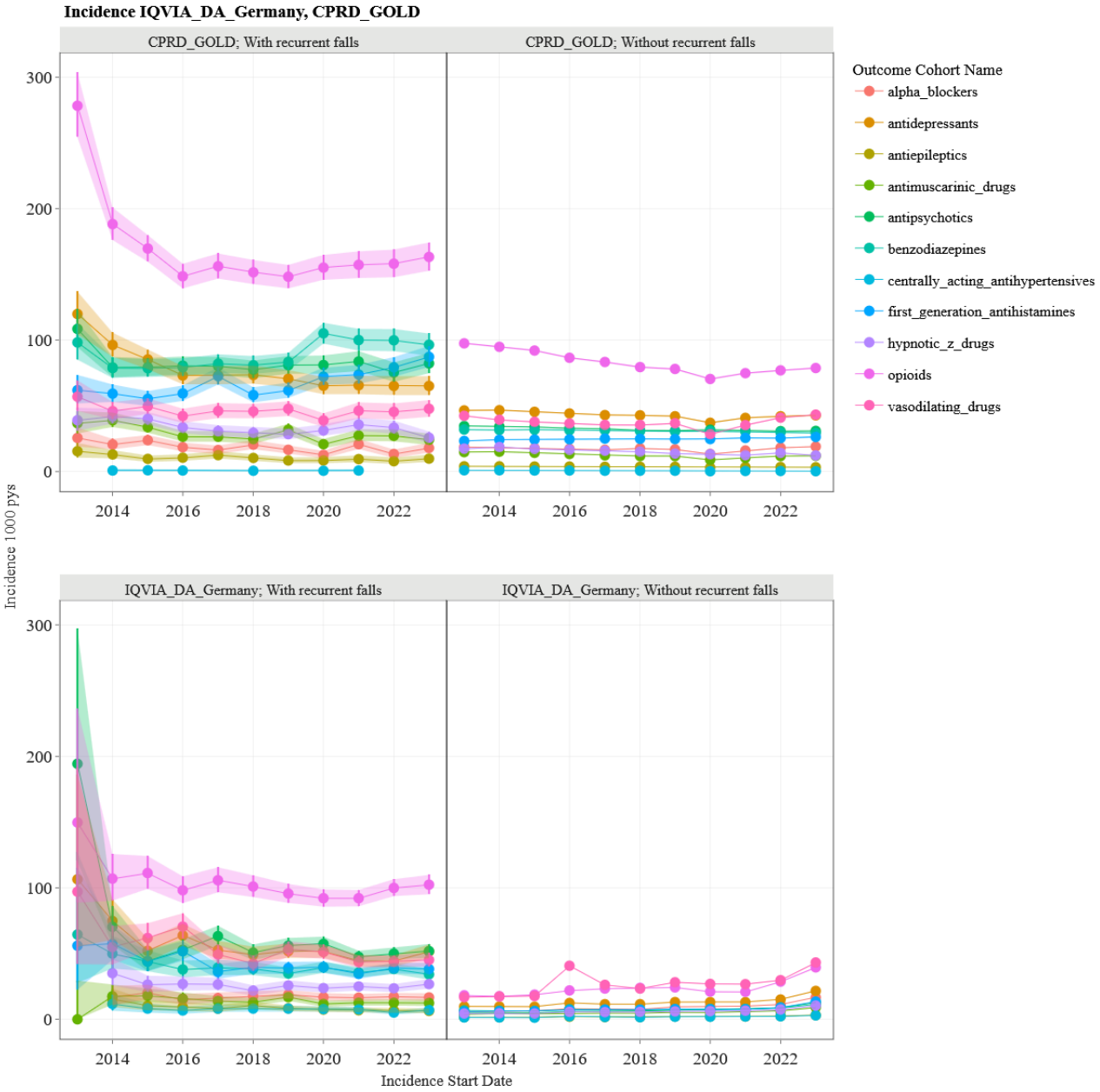


Figure 21. Incidence rates of STOPP section K criteria drug class use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period (part 1/3).

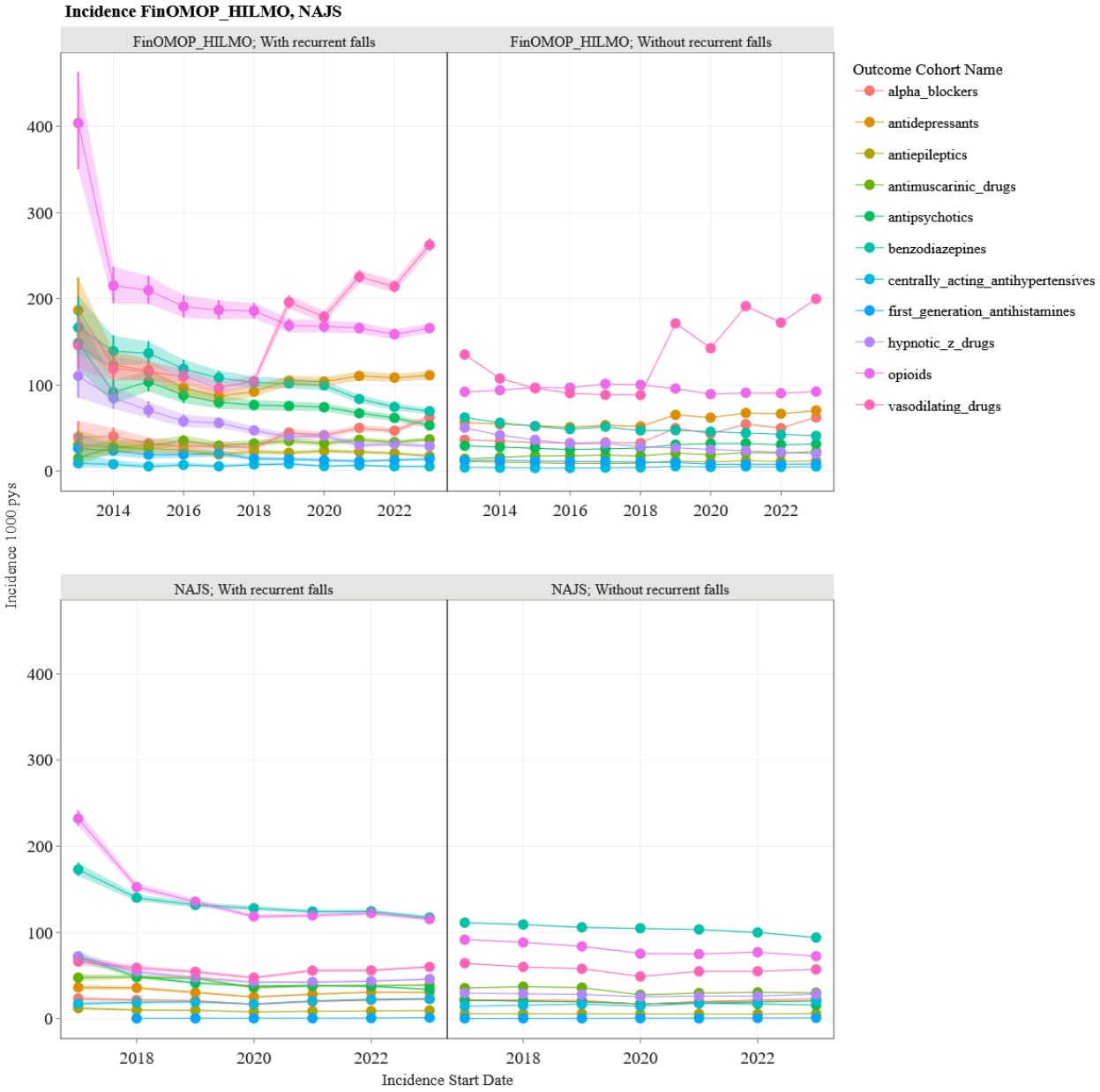


Figure 21. Incidence rates of STOPP section K criteria drug classes in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period (part 2/3).

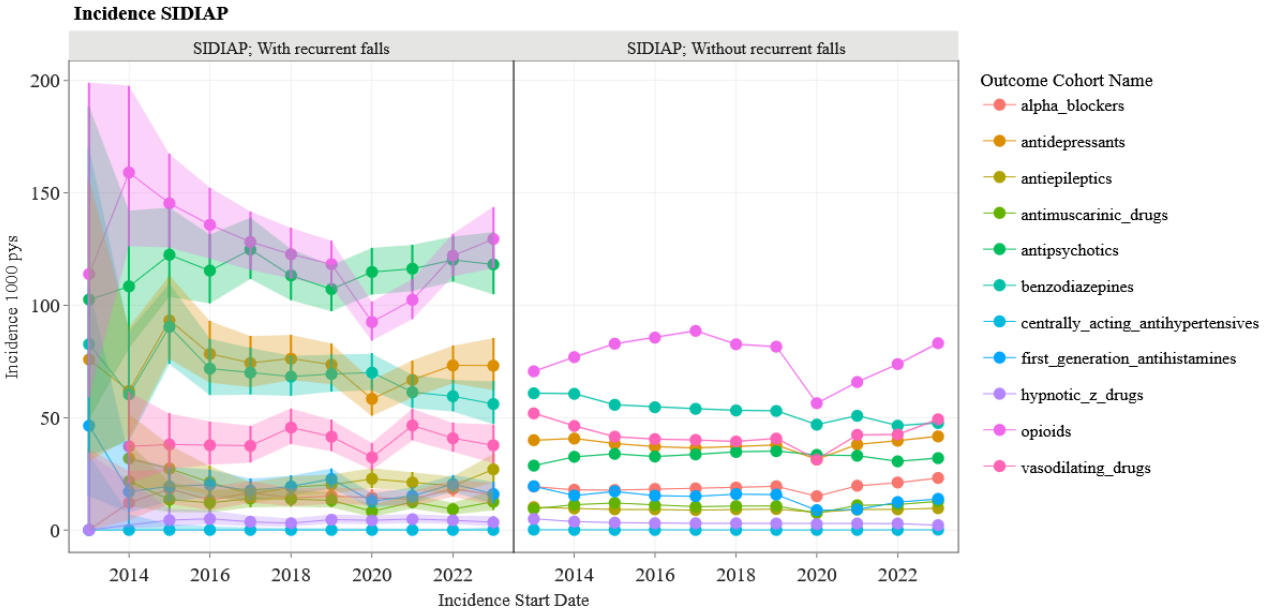


Figure 21. Incidence rates of STOPP section K criteria drug classes in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period (part 3/3).

Benzodiazepines

The incidence of benzodiazepine use in individuals aged 65 years and older, stratified by those with newly diagnosed recurrent falls or those without recurrent falls, across all data sources during the study period, is illustrated in **Figure 22**. In individuals with recurrent falls, benzodiazepine use was assessed following the diagnosis of recurrent falls, which may have occurred a considerable time afterwards.

In individuals aged 65 years and older following their new diagnosis of recurrent falls, the incidence rate of benzodiazepine use showed distinct trends across various data sources. In 2013, incidence ranged from 64 per 1,000 PYs in IQVIA DA Germany to 167 per 1,000 PYs in FinOMOP-HILMO. Over the study period, most data sources exhibited a decline in incidence of benzodiazepine use, except for CPRD GOLD. CPRD GOLD showed an initial decline from 98 per 1,000 PYs in 2013 to 79 per 1,000 PYs in 2014, followed by stabilisation and a return to the initial rates by 2019. NAJS consistently reported higher incidence rates compared to the other sources, with incidence rates ranging from 173 per 1,000 PYs in 2017 to 117 per 1,000 PYs in 2023.

Among individuals aged 65 years and older without recurrent falls, the incidence rates of benzodiazepine use were substantially lower across all data sources. In 2013, incidence rates ranged from 7 per 1,000 PYs in IQVIA DA Germany to 62 per 1,000 PYs in FinOMOP-HILMO. Incidence rates remained substantially lower compared to that of individuals aged 65 years and older following their new diagnosis of recurrent falls cohort across all data sources, with generally stable or slightly decreasing incidence rates over time.

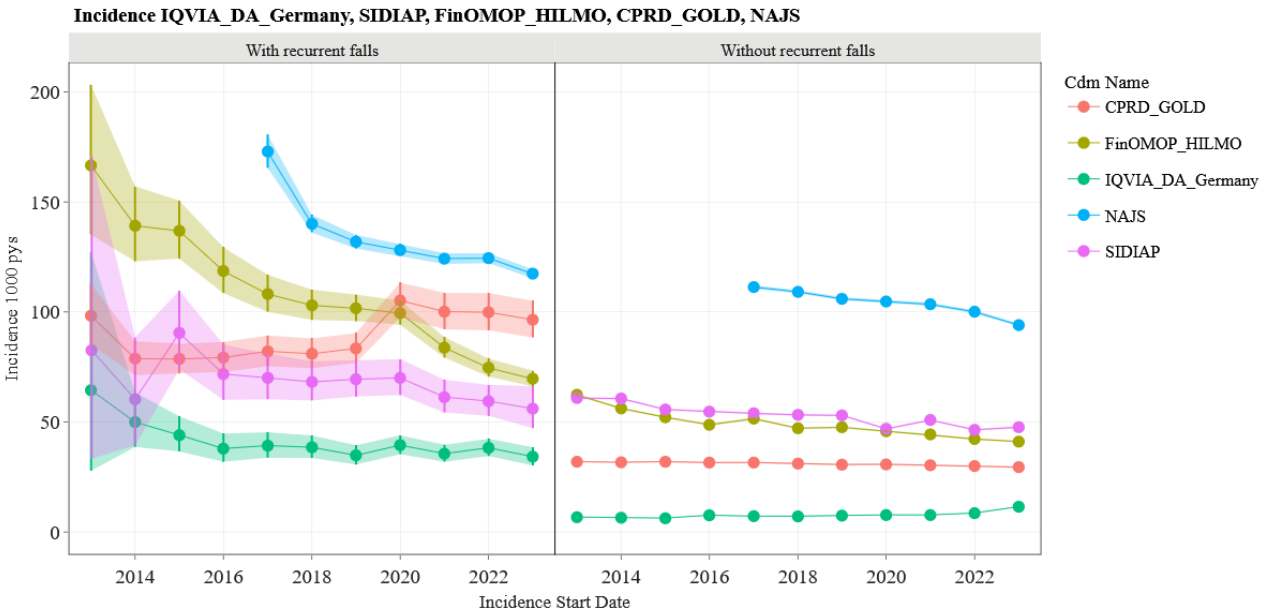


Figure 22. Incidence rates of benzodiazepines in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Antipsychotics

Figure 23 depicts the incidence of antipsychotic prescriptions across all data sources and during the study period, stratified by recurrent falls status.

For individuals aged 65 years and older following their new diagnosis of recurrent falls in IQVIA DA Germany, FinOMOP-HILMO, and CPRD GOLD, an initial sharp decline in incidence of antipsychotic use was observed, followed by stabilisation and a slight decline over time. Conversely, SIDIAP exhibited a slight increase from 103 per 1,000 PYs in 2013 to 118 per 1,000 PYs in 2023, while NAJS showed decline over time.

Among individuals aged 65 years and older without recurrent falls, the incidence rates of antipsychotic use were substantially lower than those in individuals aged 65 years and older following their new diagnosis of recurrent falls, ranging from 5 per 1,000 PYs in IQVIA DA Germany to 35 per 1,000 PYs in CPRD GOLD in 2013. The incidence rates remained stable across data sources, with little variability over time.

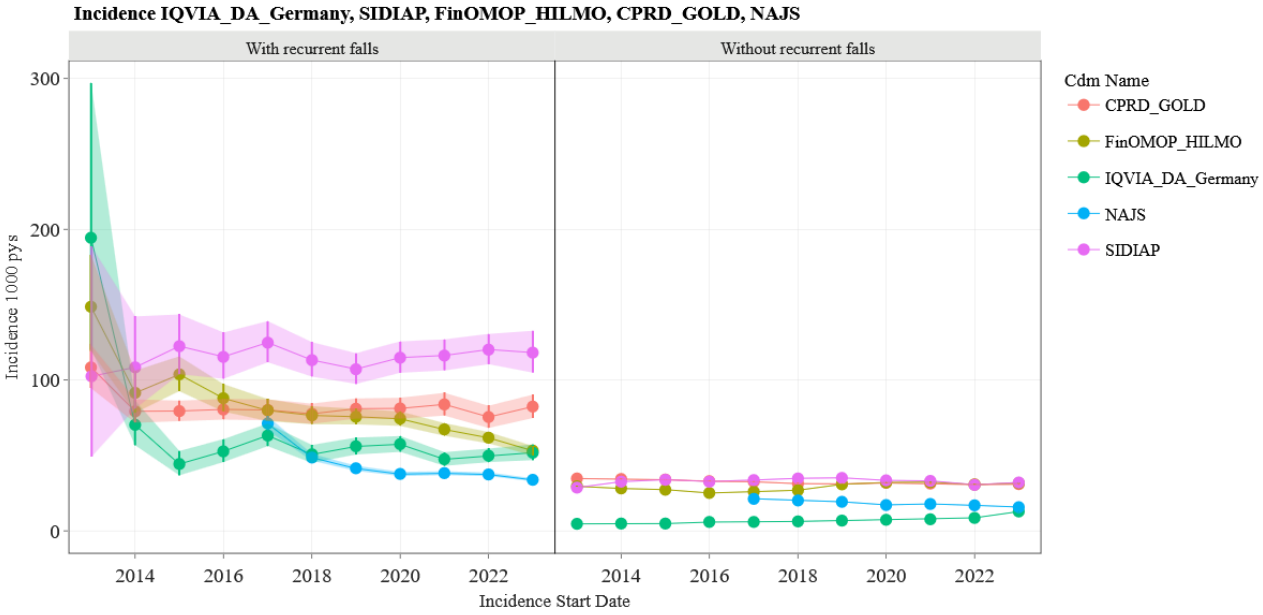


Figure 23. Incidence rates of antipsychotic use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Vasodilating drugs (nitrates, ACE inhibitors, ARB inhibitors, calcium channel blockers)

The incidence of vasodilating drug use, including nitrates, ACE inhibitors, ARB inhibitors and calcium channel blockers, in adults aged 65 years and older, stratified by those with newly diagnosed recurrent falls and those without, is presented in **Figure 24**. In individuals with recurrent falls, vasodilating drug use was assessed following the diagnosis of recurrent falls, which may have occurred a considerable time afterwards.

For older individuals following their new diagnosis of recurrent falls, the incidence rates of vasodilating drugs exhibited distinct trends across different data sources. In IQVIA DA Germany and CPRD GOLD, incidence rates initially declined from 97 per 1,000 PYs in IQVIA DA Germany and 57 per 1,000 PYs in CPRD GOLD to approximately 46 per 1,000 PYs in 2018 and then stabilised. In SIDIAP, incidence rates were relatively stable during the study period. FinOMOP-HILMO showed a contrasting pattern, with incidence rates declining from 146 per 1,000 PYs in 2013 to 96 per 1,000 PYs in 2017, followed by a marked increase to 263 per 1,000 PYs in 2023. NAJS demonstrated relatively stable incidence rates ranging from 66 per 1,000 PYs in 2017, followed by decline to 47 per 1,000 PYs in 2020 and subsequent increase to 60 per 1,000 PYs.

Among individuals aged 65 years and older without recurrent falls, trends were similar to those with recurrent falls. The highest incidence rate of vasodilating drug use was again observed in FinOMOP-HILMO, where incidence rates decreased from 135 per 1,000 PYs in 2013 to 88 per 1,000 PYs in 2018, followed by an increase to 200 per 1,000 PYs in 2023.

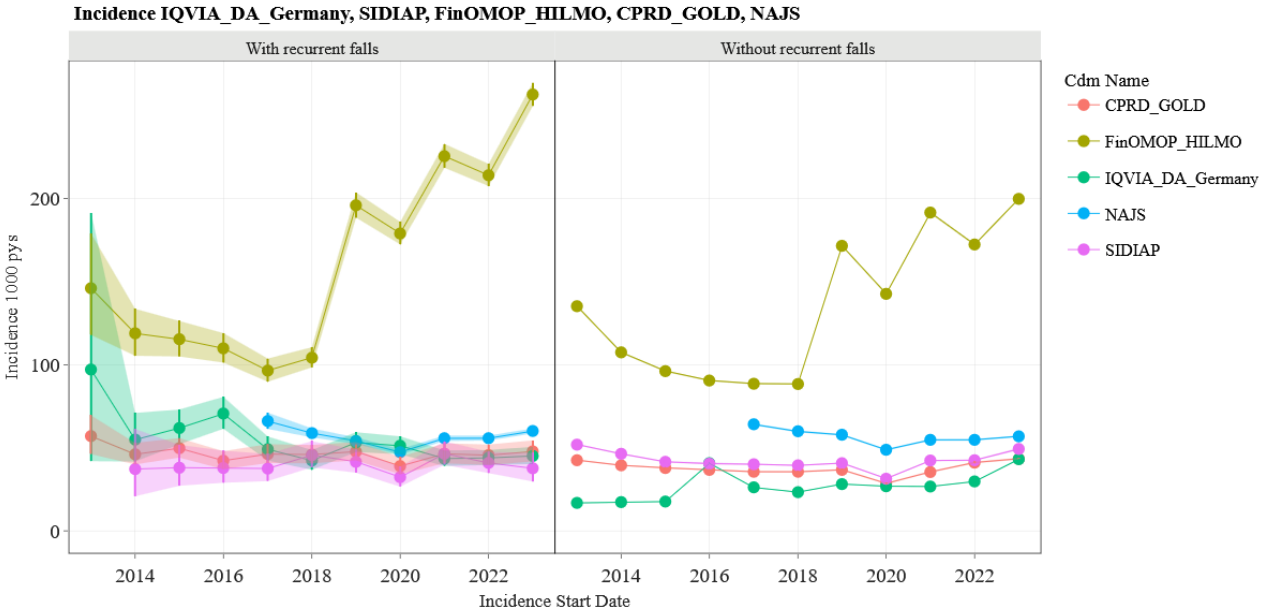


Figure 24. Incidence rates of vasodilating drug use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Hypnotic z-drugs

Figure 25 presents the incidence rates of hypnotic z-drug use among individuals aged 65 years and older following their new diagnosis of recurrent falls and individuals without recurrent falls.

Across data sources, incidence in older adults following their new diagnosis of recurrent falls exhibited an initial decline from 2014 to 2016, followed by a gradual stabilisation or slight decline through the remainder of the study period. The FinOMOP-HILMO reported the highest incidence rates of hypnotic z-drug prescriptions in 2013 at 111 per 1,000 PYs, decreasing to 29 per 1,000 PYs in 2023. SIDIAP reported relatively stable incidence rates throughout the study period, consistently ranging below 5 per 1,000 PYs.

Incidence rates among older adults without recurrent falls remained consistently lower or similar and relatively stable across all datasets during the study period, with minimal variability or slight downward trend.

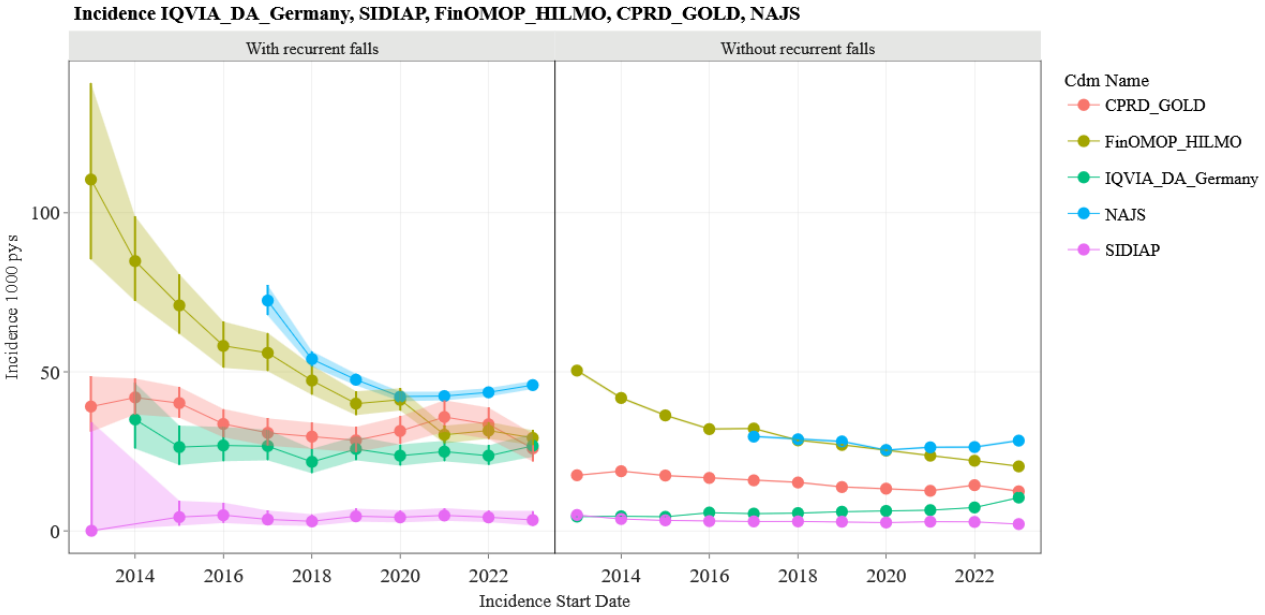


Figure 25. Incidence rates of hypnotic z-drug use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Antiepileptics

Incidence rates of antiepileptic use among individuals aged 65 years and older, stratified by those with recurrent falls and those without recurrent falls, across the data sources during the study period, is presented in **Figure 26.**

For older adults following their new diagnosis of recurrent falls, the incidence rates of antiepileptic use in 2013 ranged from 16 per 1,000 PYs in CPRD GOLD to 31 per 1,000 PYs in FinOMOP-HILMO. The incidence rates declined over time across all data sources.

Among the older adults without recurrent falls, the incidence rates of antiepileptic use were lower than in older adults following their new diagnosis of recurrent falls but remained stable throughout the study period.

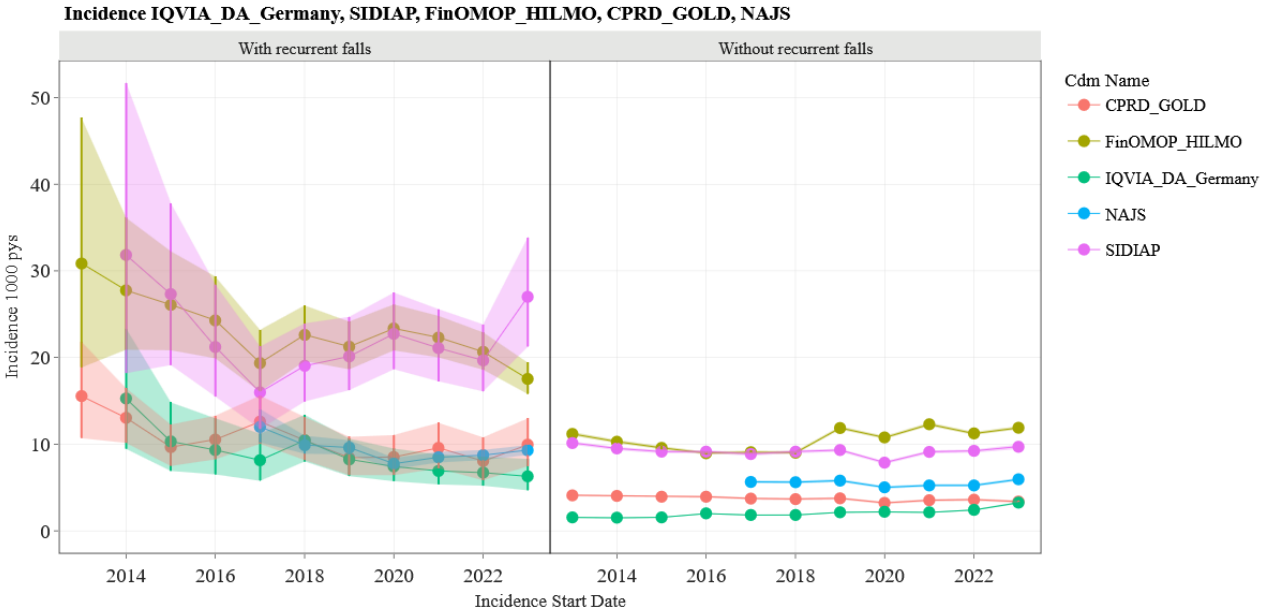


Figure 26. Incidence rates of antiepileptic use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

First generation antihistamines

Figure 27 illustrates the incidence rates of first generation antihistamine use in individuals aged 65 years and older following their new diagnosis of recurrent falls and individuals aged 65 years and older without recurrent falls, across the data sources and during the study period.

Among older adults following their new diagnosis of recurrent falls, incidence rates in 2013 ranged from 26 per 1,000 PYs in FinOMOP-HILMO to 62 per 1,000 PYs in CPRD GOLD. While incidence rates declined slightly over time in FinOMOP-HILMO, IQVIA DA Germany, and SIDIAP, CPRD GOLD exhibited an increase to 87 per 1,000 PYs by 2023. The incidence rates in NAJS was low and stable throughout the study period with estimates below 0.95 per 1,000 PYs.

For older adults without recurrent falls, the incidence rates remained consistently lower and relatively stable across most datasets over the study period, mirroring the trends observed in individuals aged 65 years and older following their new diagnosis of recurrent falls.

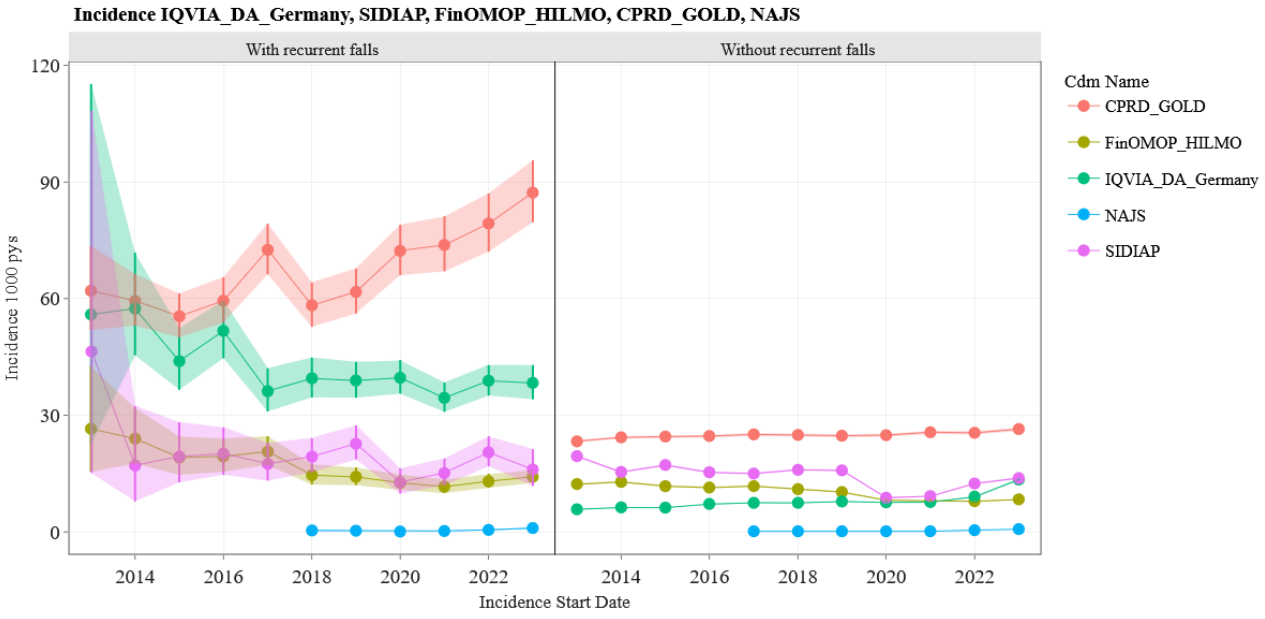


Figure 27. Incidence rates of first generation antihistamine use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Opioids

The incidence rates of opioids prescriptions in individuals aged 65 years and older, stratified by those with newly diagnosed recurrent falls and those without, across various data sources during the study period are presented in **Figure 28.** In individuals with recurrent falls, opioid use was assessed following the diagnosis of recurrent falls, which may have occurred a considerable time afterwards.

In older adults following their new diagnosis of recurrent falls, distinct trends were observed across data sources. Incident rates ranged from 114 per 1,000 PYs in SIDIAP to 404 per 1,000 PYs in FinOMOP-HILMO in 2013. Generally, a steep decline was observed between 2013 and 2014, followed by gradual decrease through the remainder of the study period, reaching 102 per 1,000 PYs in IQVIA DA Germany to 166 per 1,000 PYs in FinOMOP-HILMO in 2023. In SIDIAP, a dip in incidence rate was observed around 2020 with rate of 93 per 1,000 PYs.

In older individuals without recurrent falls, incidence rates ranged from 18 per 1,000 PYs in IQVIA DA Germany to 98 per 1,000 PYs in CPRD GOLD in 2013. The incidence remained consistently lower than those in individuals aged 65 years and older following their new diagnosis of recurrent falls and relatively stable across almost all data sources over the study period, with minimal variability. In 2023, incidence rates ranged from 40 in 1,000 PYs in IQVIA DA Germany to 92 per 1,000 PYs in FinOMOP-HILMO.

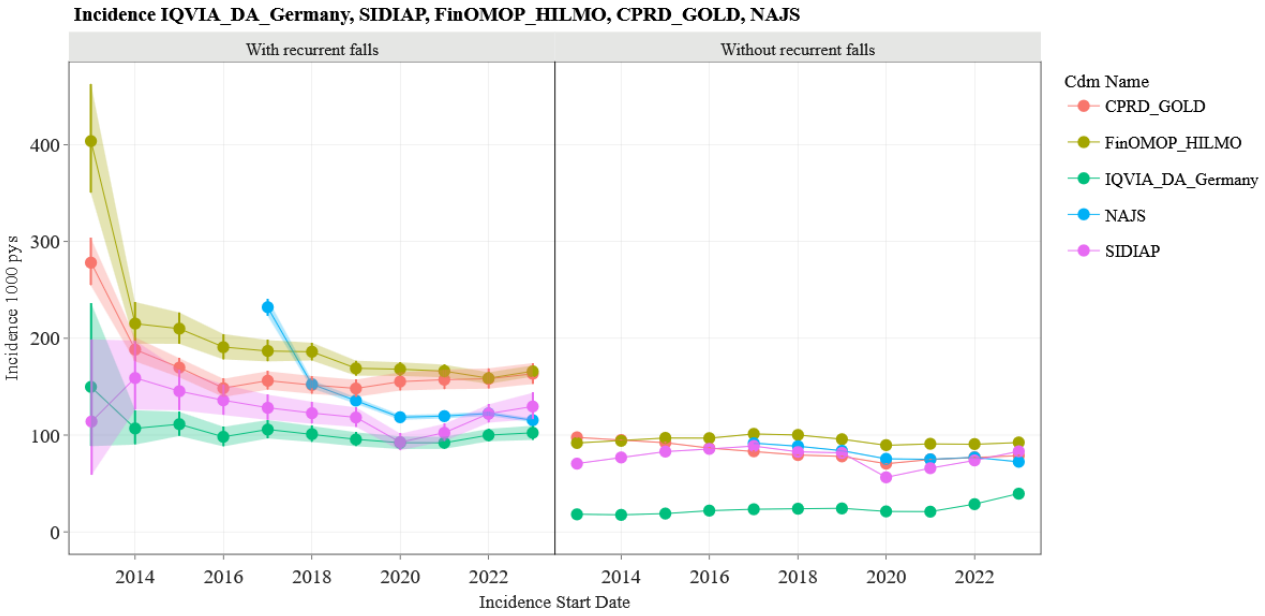


Figure 28. Incidence rates of opioid use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Antidepressants

Incidence rates of antidepressant use in individuals aged 65 years and older, stratified by those newly diagnosed with recurrent falls and those without, across the data sources during the study period is shown in **Figure 29**. In individuals with recurrent falls, antidepressant use was assessed after they have been newly diagnosed with recurrent falls, which may have occurred a considerable time afterwards.

Incidence rates of antidepressant use in older adults following their new diagnosis of recurrent falls, ranged from 76 per 1,000 PYs in SIDIAP to 187 per 1,000 PYs in FinOMOP-HILMO in 2013. The incidence rates declined during the study period in FinOMOP-HILMO, CPRD GOLD, and IQVIA DA Germany, while incidence rates of antidepressant use in SIDIAP remained relatively stable over the time. In NAJS, incidence rates remained relatively stable during the study period.

The pattern in individuals without recurrent falls remained the same, incidence rates were lower than in older adults following their new diagnosis of recurrent falls and exhibited similar trends.

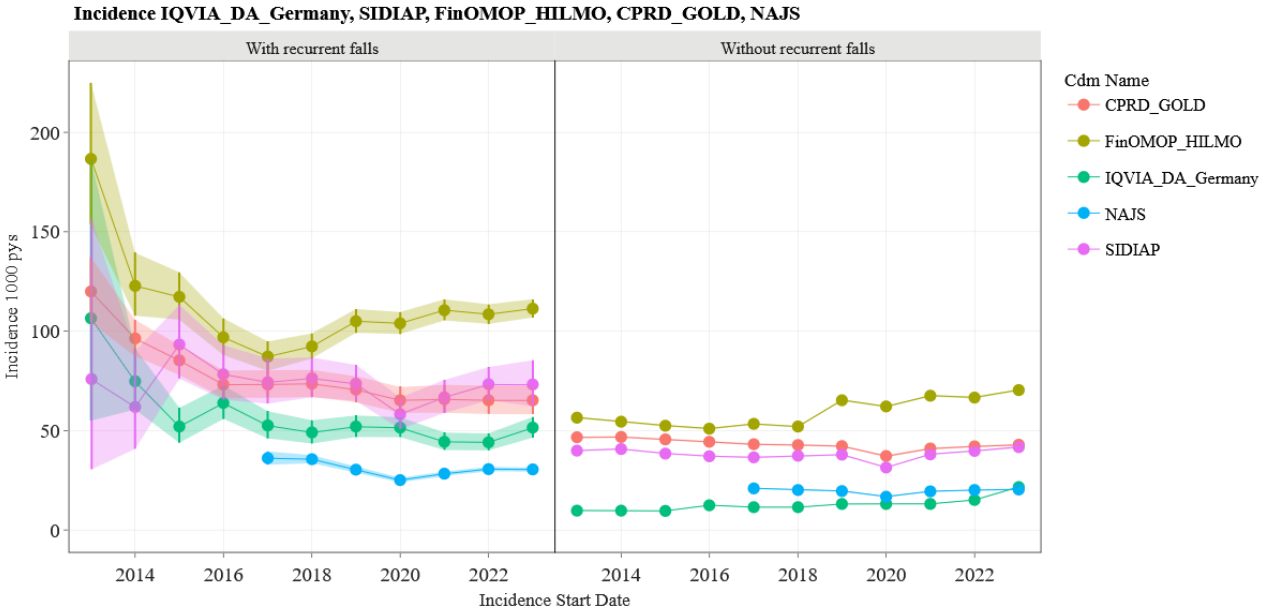


Figure 29. Incidence rates of antidepressant use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Alpha-blockers

Figure 30 shows the incidence rate of alpha blocker use in older adults, stratified by those newly diagnosed with recurrent falls and those without recurrent falls.

Incidence rates in older adults following their new diagnosis of recurrent falls were stable across most data sources and very comparable, except for FinOMOP-HILMO. Initial incidence rates in FinOMOP-HILMO were slightly higher in 2013 compared to other data sources followed by a slight decline and a subsequent increase from 27 per 1,000 PYs in 2018 to 62 per 1,000 PYs in 2023.

Incidence rates in older adults without recurrent falls showed the same pattern and very comparable incidence rates as those in older adults following their new diagnosis of recurrent falls.

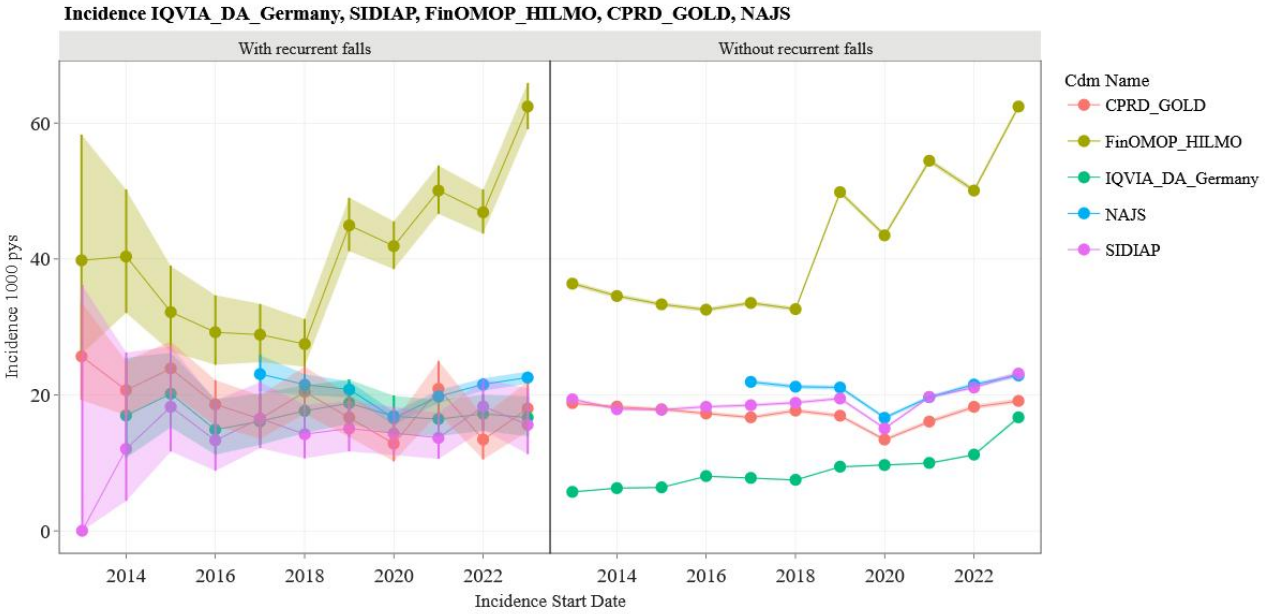


Figure 30. Incidence rates of alpha-blocker use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Centrally acting antihypertensives

Figure 31 presents incidence rates of centrally acting hypertensive use in older adults, stratified by those with recurrent falls and those without recurrent falls.

Incidence rates in older adults following their new diagnosis of recurrent falls was low and ranged from 0 per 1,000 PYs in SIDIAP to 12 per 1,000 PYs in IQVIA DA Germany in 2014. The incidence rates remained stable and low during the study period. In contrast, the incidence rate in NAJS was higher overall, ranging from 17 per 1,000 PYs in 2017 to 23 per 1,000 PYs in 2023, with a transient decline observed in 2020.

The same pattern and trend were observed in older adults without recurrent falls.

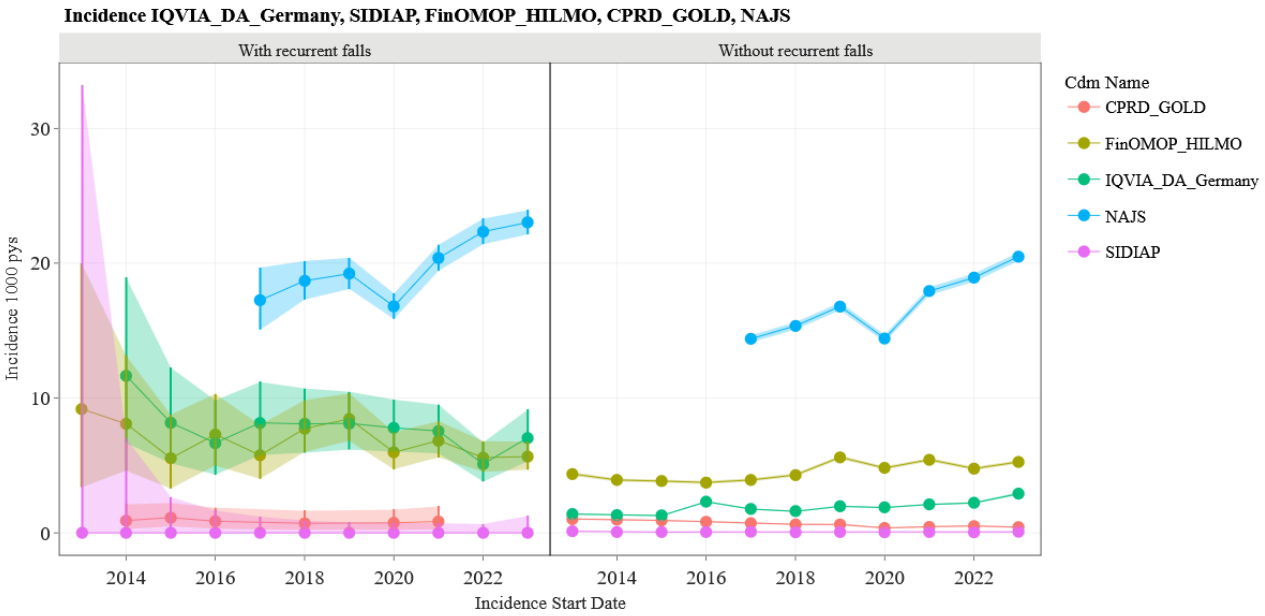


Figure 31. Incidence rates of centrally acting antihypertensive use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

Antimuscarinic drugs (indicated for overactive bladder)

Incidence rates of antimuscarinic drug use in older adults, stratified by those with recurrent falls and those without recurrent falls are presented in **Figure 32**.

Incidence rates of antimuscarinic use in older adults following their new diagnosis of recurrent falls ranged from 0 per 1,000 PYs in IQVIA DA Germany to 37 per 1,000 PYs in CPRD GOLD in 2013. The incidence rates showed slight fluctuation over time and across data sources but in general remained stable. The highest incidence rate of 48 per 1,000 PYs was observed in NAJS in 2017 and was followed by decline to 36 per 1,000 PYs in 2020 with a subsequent stable period.

The trends in incidence rates in individuals without recurrent falls remained similar, but incidence rates were similar or lower than those in older adults following their new diagnosis of with recurrent falls.

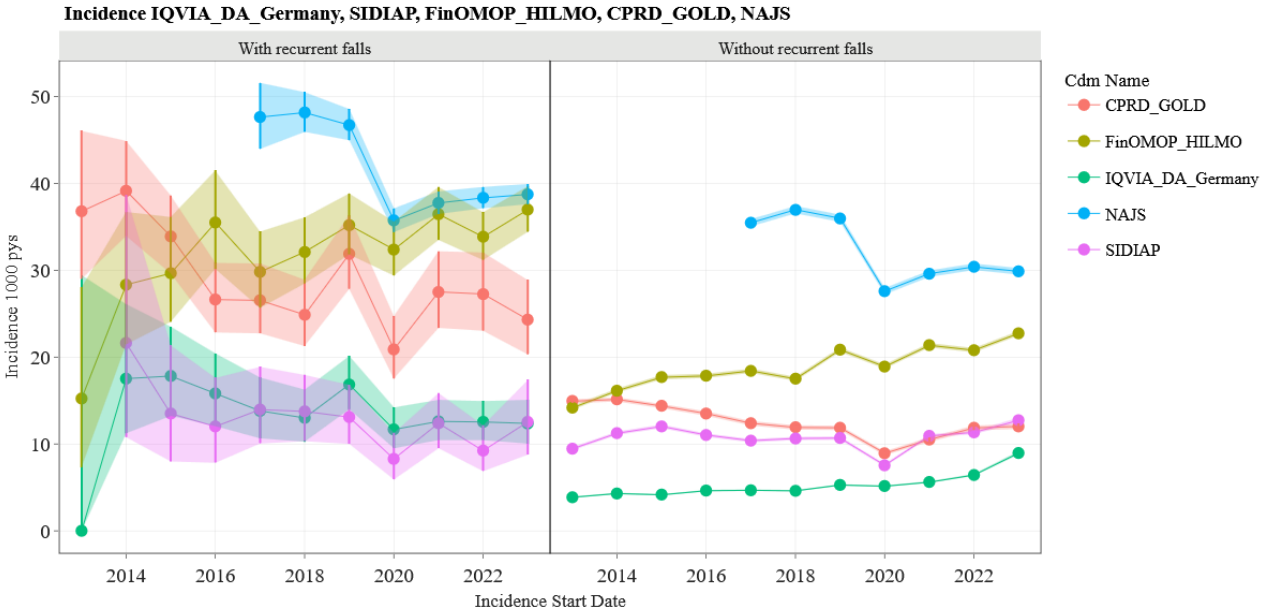


Figure 32. Incidence rates of antimuscarinic drug (indicated for overactive bladder) use in individuals aged 65 years and older, with and without recurrent falls, across the data sources during the study period.

12.5.2.5. Incidence rates of STOPP section K criteria drug classes over time by age group

Figures 23–33 in **Appendix III** present the incidence rates of drug class prescriptions belonging to STOPP section K criteria across various data sources from 2013 to 2023, categorised by age groups. The incidence rates are displayed separately for older adults following their new diagnosis of recurrent falls and older adults without recurrent falls.

In general, the incidence rates of STOPP section K criteria drug classes gradually increased with increasing age, with higher incidence rates observed predominately in older age groups across all data sources. This trend was consistently noted for benzodiazepines in older adults without recurrent falls and older adults following their new diagnosis of recurrent falls, particularly in CPRD GOLD and FinOMOP-HILMO. Similarly, antipsychotics, across all data sources, and antidepressants, particularly in FinOMOP-HILMO and SIDIAP, showed generally higher incidence rates in older age groups for both adults without and those following their new diagnosis of recurrent falls. First generation antihistamines exhibited this trend mainly in C GOLD and IQVIA DA Germany for those without recurrent falls. Opioid use followed a similar pattern in older adults without and those following their new diagnosis of recurrent falls, except for SIDIAP. The most pronounced difference in incidence rates between age groups was observed for opioids in FinOMOP-HILMO. Among older adults without recurrent falls in FinOMOP-HILMO, the incidence rate in the individuals aged 85 years and older was 185 per 1,000 PYs in 2013 compared to 77 per 1,000 PYs in the 65 to 74 years age group.

Stratification of incidence rate for vasodilating drugs by age groups did not show noticeable differences in those without and those following their new diagnosis of recurrent falls, except in FinOMOP-HILMO, where incidence rates increased with increasing age. For centrally acting antihypertensives, the same pattern was observed across all data sources. Slight differences were noted in older adults without recurrent falls in FinOMOP-HILMO for hypnotic-z-drugs, but no clear differences were observed in individuals following their new diagnosis of recurrent falls, except for NAJS. No significant differences were observed for antiepileptics across the age groups in the data sources of interest.

Finally, incidence rates of alpha blockers and antimuscarinic drug use showed varying trends across age groups and data sources. The highest incidence rates of alpha blocker use were in the 75 to 84 years age group, followed by those older than 85 years and then the 65 to 74 years age group in those without recurrent falls in FinOMOP-HILMO and CPRD GOLD. No clear pattern was observed in individuals following their new diagnosis of recurrent falls. For antimuscarinic drugs, the highest incidence rates were observed in the 75 to 84 years age group in those without recurrent falls in FinOMOP-HILMO, NAJS, and SIDIAP, while the highest incidence rates were in the 85+ years age group in IQVIA DA Germany. No clear pattern was observed in those with recurrent falls.

More details can be assessed through the Shiny app at EUPAS1000000333.

12.5.2.6. Incidence rates of STOPP section K criteria drug classes over time by sex

Figures 34–44 in **Appendix III** show the incidence of use of STOPP section K criteria drug classes during the study period from 2013 to 2023, stratified by sex. The incidence rates are displayed separately for older adults following their new diagnosis of recurrent falls and older adults without recurrent falls.

In general, a distinct trend emerged in the incidence rates. For benzodiazepines, incidence rates were consistently higher in women compared to men among older adults without recurrent falls. Conversely, among individuals after their new recurrent falls diagnosis, men showed a trend towards slightly higher incidence rates than women. A similar trend was observed for antipsychotics, with higher incidence rates in men compared to women among adult individuals following their new diagnosis of recurrent falls in SIDIAP.

For vasodilating drugs, incidence rates were slightly higher in males among those without recurrent falls, while incidence rates were roughly equivalent between sexes in older adults with recurrent falls.

Among those without recurrent falls, usage of hypnotic z-drugs was higher in women, while incidence rates were roughly equivalent between sexes among those with recurrent falls, except in NAJS, where women had higher incidence rates. In contrast, similar incidence rates of antiepileptic use were observed between sexes among older adults without recurrent falls, with exceptions in FinOMOP-HILMO (slightly higher incidence rates for men) and SIDIAP (slightly higher incidence rates for females). Among individuals aged 65 years and older following their new diagnosis of recurrent falls, men exhibited slightly higher incidence rates of antiepileptic use.

Females had higher incidence rates first generation antihistamines in those without recurrent falls, except in NAJS. This remained consistent among those with recurrent falls in IQVIA DA Germany and CPRD GOLD, while other data sources showed roughly equivalent incidence rates between sexes.

Opioids use was comparable between men and women among individuals without recurrent falls, while incidence rates were slightly higher in men in CPRD GOLD and FinOMOP-HILMO among older adults following their new diagnosis of recurrent falls. For antidepressants, higher incidence rates were observed in women both without recurrent falls and following their new diagnosis of recurrent falls, except in SIDIAP, where incidence rates were slightly higher in men with recurrent falls.

Incidence rates for alpha-blockers were higher in men compared to women, both among those with and without recurrent falls. Incidence rates for centrally acting antihypertensives were similar between women and men, while incidence rates for antimuscarinic drugs (indicated for overactive bladder) were higher in females in FinOMOP-HILMO and in males in SIDIAP among those without recurrent falls. No differences in incidence rates were observed between males and females among those with recurrent falls, except in SIDIAP.

More detailed data can be found in the Shiny app at EUPAS1000000333.

12.6. Patient-level drug utilisation

12.6.1. Participants

Table 16 presents the number of individuals aged 65 years and older with recurrent falls at the time of their new prescription of the drug classes belonging to the STOPP section K criteria.

Overall, there were 63,543 individuals aged 65 years and older with recurrent falls at the time of new prescription of benzodiazepines (CPRD GOLD: 5,254, IQVIA DA Germany: 2,090, FinOMOP-HILMO: 7,437, NAJS: 47,005, SIDIAP: 1,757) and 34,060 individuals at time of new antipsychotic prescriptions (CPRD GOLD: 4,791, IQVIA DA Germany: 2,957, FinOMOP-HILMO: 5,758, NAJS: 17,385, SIDIAP: 3,169). For other drug classes, the numbers were as follows: 41,595 individuals starting vasodilating drugs (CPRD GOLD: 2,390, IQVIA DA Germany: 2,314, FinOMOP-HILMO: 14,246, NAJS: 21,674, SIDIAP: 971), 26,398 individuals starting hypnotic z-drugs (CPRD GOLD: 1,998, IQVIA DA Germany: 1,385, FinOMOP-HILMO: 3,371, NAJS: 19,501, SIDIAP: 143), 7,532 individuals starting antiepileptics (CPRD GOLD: 655, IQVIA DA Germany: 467, FinOMOP-HILMO: 1,646, NAJS: 4,081, SIDIAP: 683) and 8,249 individuals starting first generation antihistamines (CPRD GOLD: 3,982, IQVIA DA Germany: 2,136, FinOMOP-HILMO: 1,325, NAJS: 213, SIDIAP: 593). Furthermore, 78,714 individuals started opioids (CPRD GOLD: 8,748, IQVIA DA Germany: 5,198, FinOMOP-HILMO: 13,415, NAJS: 48,074, SIDIAP: 3,279), 29,771 antidepressants (CPRD GOLD: 4,011, IQVIA DA Germany: 2,748, FinOMOP-HILMO: 8,294, NAJS: 12,947, SIDIAP: 1,771), 14,914 alpha-blockers (CPRD GOLD: 1,144, IQVIA DA Germany: 985, FinOMOP-HILMO: 3,317, NAJS: 8,983, SIDIAP: 485), 10,120 centrally acting antihypertensives (CPRD GOLD: 44, IQVIA DA Germany: 424, FinOMOP-HILMO: 561, NAJS: 9,091), and 22,236 antimuscarinic drugs (CPRD-GOLD: 1,696, IQVIA DA Germany: 781, FinOMOP-HILMO: 2,628, NAJS: 16,744, SIDIAP: 387). These individuals had at least 1 year of data visibility prior to study inclusion and no use of the respective drug classes belonging to the STOPP section K criteria in the 1 year prior to the index date.

12.6.2. Descriptive data

Table 16 describes demographic characteristics of individuals aged 65 years and older with recurrent falls at the time of their new prescription of the drug classes belonging to the STOPP section K criteria, categorised by data source. The median age at the time of new prescription of STOPP section K criteria drug classes ranged between 76 years and 86 years, across different drug classes and data sources.

In general, the proportion of females was consistently higher than the proportion of males across all STOPP section K criteria drug classes and data sources, except for alpha blockers where the proportion of males was higher than the proportion of females in CPRD GOLD (69.80% vs. 30.20%), IQVIA DA Germany (76.84% vs. 23.06%), FinOMOP-HILMO (91.47% vs. 8.53%), NAJS (81.80% vs. 18.20%) and SIDIAP (67.93% vs. 32.07%). The highest proportion of females was observed for individuals at the time of new prescription of centrally acting antihypertensives in CPRD GOLD (86.67% vs. 13.33%), IQVIA DA Germany (73.74% vs. 26.26%), and FinOMOP-HILMO (68.41% vs. 31.59%).

Table 16. Demographic characteristics of individuals aged 65 years and older with recurrent falls at the time of their new prescription of the drug classes belonging to the STOPP section K criteria, per data source.

STOPP section K criteria drug class	Variable	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
Benzodiazepines	Number of records	5,739	2,333	9,282	57,845	1,958
	Number of individuals	5,254	2,090	7,437	47,005	1,757
	Age at index (years), median (IQR)	86 (80-91)	85 (80-89)	82 (75-88)	77 (72-83)	85 (79-89)
	Sex, n (%)					
	• Female	3,773 (65.74)	1,642 (70.38)	6,420 (69.17)	38,912 (67.27)	1,458 (74.46)
	• Male	1,966 (34.26)	686 (29.40)	2,862 (30.83)	18,933 (32.73)	500 (25.54)
	• Missing		5 (0.21)			
Antipsychotics	Number of records	5,243	3,171	6,991	18,370	3,436
	Number of individuals	4,791	2,957	5,758	17,385	3,169
	Age at index (years), median (IQR)	85 (79-90)	85 (81-90)	83 (76-89)	82 (77-87)	86 (82-91)
	Sex, n (%)					
	• Female	3,643 (69.48)	2,033 (64.11)	4,740 (67.80)	13,204 (71.88)	2,466 (71.77)
	• Male	1,600 (30.52)	1,134 (35.76)	2,251 (32.20)	5,166 (28.12)	970 (28.23)
	• Missing		<5			
Vasodilating	Number of records	2,564	2,503	22,039	24,566	1,015
	Number of individuals	2,390	2,314	14,246	21,674	971
	Age at index (years), median (IQR)	83 (77-88)	83 (78-87)	78 (73-85)	76 (71-83)	84 (78-88)
	Sex, n (%)					

STOPP section K criteria drug class	Variable	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	• Female	1,794 (69.97)	1,672 (66.80)	15,062 (68.34)	15,978 (65.04)	804 (79.21)
	• Male	770 (30.03)	830 (33.16)	6,975 (31.65)	8,588 (34.96)	211 (20.79)
	• Missing		<5	<5		
Hypnotic z-drugs	Number of records	2,162	1,551	4,102	21,477	143
	Number of individuals	1,998	1,385	3,371	19,501	143
	Age at index (years), median (IQR)	83 (77-89)	84 (80-88)	80 (73-86)	79 (73-85)	83 (76-88)
	Sex, n (%)					
	• Female	1,465 (67.76)	1,044 (67.31)	2,941 (71.70)	15,162 (70.60)	107 (74.83)
	• Male	697 (32.24)	507 (32.69)	1,161 (28.30)	6,315 (29.40)	36 (25.17)
	• Missing					
Antiepileptics	Number of records	667	494	2,206	4,308	703
	Number of individuals	655	467	1,646	4,081	683
	Age at index (years), median (IQR)	82 (76-87)	82 (78-87)	77 (72-84)	77 (72-82)	84 (78-88)
	Sex, n (%)					
	• Female	404 (60.57)	303 (61.34)	1,408 (63.83)	2,824 (65.55)	531 (75.53)
	• Male	263 (39.43)	190 (38.46)	798 (36.17)	1,484 (34.45)	172 (24.47)
	• Missing		<5	<5		
First generation antihistamines	Number of records	4,425	2,450	1,488	218	631
	Number of individuals	3,982	2,136	1,325	213	593

STOPP section K criteria drug class	Variable	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	Age at index (years), median (IQR)	84 (78-90)	84 (80-88)	78 (72-85)	78 (73-84)	84 (78-89)
	Sex, n (%)					
	• Female	3,204 (72.41)	1,823 (74.41)	1,090 (73.25)	155 (71.10)	481 (76.23)
	• Male	1,221 (27.59)	621 (25.35)	398 (26.75)	63 (28.90)	150 (23.77)
	• Missing		6 (0.24)			
Opioids	Number of records	10,501	5,975	17,490	57,323	3,956
	Number of individuals	8,748	5,198	13,415	48,074	3,279
	Age at index (years), median (IQR)	84 (78-90)	84 (80-88)	81 (74-87)	78 (72-84)	84 (79-89)
	Sex, n (%)					
	• Female	7,012 (66.77)	4,178 (69.92)	11,930 (68.21)	39,450 (68.82)	3,068 (77.55)
	• Male	3,489 (33.23)	1,793 (30.01)	5,559 (31.78)	17,873 (31.18)	888 (22.45)
	• Missing		<5	<5		
Antidepressants	Number of records	4,391	3,000	11,070	14,026	1,878
	Number of individuals	4,011	2,748	8,294	12,947	1,771
	Age at index (years), median (IQR)	84 (78-89)	83 (78-87)	80 (74-86)	77 (72-83)	86 (81-90)
	Sex, n (%)					
	• Female	3,068 (69.87)	2,199 (73.3)	8,155 (73.67)	10,513 (74.95)	1,342 (71.46)
	• Male	1,323 (30.13)	800 (26.67)	2,914 (26.32)	3,513 (25.05)	536 (28.54)
	• Missing		<5	<5		
Alpha-blockers	Number of records	1,179	1,045	4,736	9,784	502

STOPP section K criteria drug class	Variable	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	Number of individuals	1,144	985	3,317	8,983	485
	Age at index (years), median (IQR)	83 (77-88)	83 (78-87)	77 (73-84)	76 (71-82)	84 (78-88)
	Sex, n (%)					
	• Female	356 (30.20)	241 (23.06)	404 (8.53)	1,781 (18.20)	161 (32.07)
	• Male	823 (69.80)	803 (76.84)	4,332 (91.47)	8,003 (81.80)	341 (67.93)
	• Missing		<5			
Centrally acting antihypertensives	Number of records	45	457	668	9,722	-
	Number of individuals	44	424	561	9,091	-
	Age at index (years), median (IQR)	80 (72-82)	83 (78-87)	80 (74-86)	76 (71-81)	-
	Sex, n (%)					
	• Female	39 (86.67)	337 (73.74)	457 (68.41)	6,943 (71.42)	-
	• Male	6 (13.33)	120 (26.26)	211 (31.59)	2,779 (28.58)	-
	• Missing					
Antimuscarinic drugs	Number of records	1,824	839	3,546	19,009	404
	Number of individuals	1,696	781	2,628	16,744	387
	Age at index (years), median (IQR)	82 (77-87)	83 (79-88)	79 (74-85)	76 (71-82)	80 (75-85)
	Sex, n (%)					
	• Female	1,254 (68.75)	571 (68.06)	2,528 (71.29)	12,966 (68.21)	269 (66.58)
	• Male	570 (31.25)	268 (31.94)	1,016 (28.65)	6,043 (31.79)	135 (33.42)

STOPP section K criteria drug class	Variable	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	• Missing			<5		

CPRD GOLD = Clinical Practice Research Datalink GOLD; IQVIA DA Germany = IQVIA Disease Analyzer Germany; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària;

12.6.3. Main results

12.6.3.1. Comorbidities

Table 17 presents the top recorded conditions of individuals aged 65 years and older with recurrent falls at the time of their new prescription of the drug classes belonging to the STOPP section K criteria.

In individuals prescribed benzodiazepines essential hypertension was frequently observed, with the highest prevalence in NAJS (33%) and lower rates in FinOMOP-HILMO (3%) and IQVIA DA Germany (9%). Anxiety disorders were more prevalent in NAJS (17%), but also recorded in CPRD GOLD, IQVIA DA Germany, and SIDIAP. Nonorganic insomnia was primarily reported in SIDIAP (2%) and restlessness and agitation in IQVIA DA Germany (9%).

Among individuals prescribed antipsychotics, essential hypertension was observed in IQVIA DA Germany (10%), and NAJS (22%), with lower prevalence in FinOMOP-HILMO (3%). Dementia was frequently reported in IQVIA DA Germany (7%) and NAJS (12%). Restlessness and agitation were more common in IQVIA DA Germany (12%) and SIDIAP (3%), while organic personality disorder was frequently recorded in NAJS (14%).

Essential hypertension was notably prevalent in individuals prescribed vasodilators, with the highest prevalence in NAJS (82%) and IQVIA DA Germany (35%). Atrial arrhythmia, heart failure, and type 2 diabetes were commonly observed in FinOMOP-HILMO, NAJS, and IQVIA DA Germany, although rates varied. Cardiovascular comorbidities were less frequently reported in SIDIAP.

In individuals prescribed hypnotic z-drugs, nonorganic sleep disorders were prevalent in NAJS (42%), sleep disorder was frequently reported in IQVIA DA Germany (27%), insomnia in CORD GOLD (14%), and nonorganic insomnia in FinOMOP-HILMO (3%). Essential hypertension was commonly reported in NAJS (27%), IQVIA DA Germany (12%), and less so in FinOMOP-HILMO (4%). Nonorganic insomnia was observed in NAJS (17%) but were less prevalent in other datasets. Hypertension remained one of the most frequently reported conditions among other STOPP section K criteria drugs classes across the data sources.

Epilepsy was the most frequent diagnostic code in individuals prescribed antiepileptics, with high prevalence in IQVIA DA Germany (20%) and NAJS (24%), compared to CPRD GOLD (3%), FinOMOP-HILMO (3%), and SIDIAP (2%). Seizures were notably associated with antiepileptic use across datasets.

In individuals prescribed first-generation antihistamines, dizziness and giddiness were consistently reported across datasets, with a higher prevalence in IQVIA DA Germany (13%) and NAJS (31%). Additionally, nausea and vomiting were also frequently reported.

In individuals prescribed opioids, pain-related conditions, such as low back pain and pain in the spine, were prevalent in NAJS (20%) and moderately frequent across other datasets.

Depressive disorders were highly prevalent in patients prescribed antidepressants, particularly in IQVIA DA Germany (16%) and NAJS (26%). Anxiety disorders and sleep disturbances were recurrent comorbidities.

Hyperplasia of the prostate was the most common comorbidity among individuals prescribed alpha-blockers, particularly in NAJS (67%), IQVIA DA Germany (24%), and FinOMOP-HILMO (10%). Urinary conditions, including retention of urine and increased frequency of urination, were frequently observed, with variations across datasets.

Among individuals prescribed centrally acting antihypertensives, essential hypertension was commonly observed, with the highest prevalence in NAJS and IQVIA DA Germany. Atrial arrhythmia was reported in FinOMOP-HILMO and NAJS. Heart failure and cerebrovascular disorders were also documented with variable prevalence.

In individuals receiving antimuscarinic drugs, urinary conditions, including retention of urine, urinary incontinence and increased frequency of urination, were prevalent, especially in NAJS and IQVIA DA Germany.

The results for the 1 year window prior to the time of the new prescription of the drug classes belonging to the STOPP section K criteria are available in the interactive web application “Shiny app” at EUPAS1000000333.

Table 17. Top recorded conditions of individuals aged 65 years and older with recurrent falls at the time of their new prescription of the drug classes belonging to the STOPP section K criteria.

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
Benzodiazepines	Anxiety	111 (2)	Restlessness and agitation	219 (9)	Essential hypertension	320 (3)	Essential hypertension	18,990 (33)	Nonorganic insomnia	33 (2)
	Feeling agitated	97 (2)	Essential hypertension	217 (9)	Atrial arrhythmia	203 (2)	Anxiety disorder	9,754 (17)	Urinary incontinence	7 (0)
	Patient's condition deteriorating	75 (1)	Sleep disorder	192 (8)	Primary degenerative dementia of the Alzheimer type, senile onset	158 (2)	Pain in spine	5,632 (10)	Anxiety disorder	5 (0)
	Backache	68 (1)	Falls	108 (5)	Heart failure	115 (1)	Non-organic sleep disorder	4,482 (8)	Neck pain	<5
	Neck pain	50 (1)	Anxiety disorder	103 (4)	Pneumonia	110 (1)	Type 2 diabetes mellitus	3,947 (7)	Acute pharyngitis	<5
	Low back pain	49 (1)	Depressive disorder	80 (3)	Alzheimer's disease	91 (1)	Neurosis	3,408 (6)	Esophagitis	<5
	Insomnia	48 (1)	Chronic pain	73 (3)	Parkinson's disease	89 (1)	Atrial arrhythmia	3,220 (6)	Primary malignant neoplasm of rectum	<5
	Lower respiratory tract infection	45 (1)	Disorders of initiating and maintaining sleep	66 (3)	Injury whilst engaged in leisure activity	79 (1)	Mixed anxiety and depressive disorder	2,639 (5)	Constipation	<5
	Anxiety disorder	38 (0.66)	Panic disorder	62 (3)	Coronary arteriosclerosis	75 (1)	Disorder of lipid metabolism	2,611 (5)	Closed fracture of one rib	<5

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
	Cough	34 (0.59)	Acute stress disorder	50 (2)	Fracture of neck of femur	74 (1)	Depressive disorder	2,449 (4)	Joint pain	<5
Antipsychotics	Dizziness	266 (5)	Restlessness and agitation	379 (12)	Essential hypertension	185 (3)	Essential hypertension	3,964 (22)	Restlessness and agitation	93 (3)
	Vomiting	171 (3)	Essential hypertension	318 (10)	Primary degenerative dementia of the Alzheimer type, senile onset	169 (2)	Organic personality disorder	2,616 (14)	Dementia	46 (1)
	Benign paroxysmal positional vertigo or nystagmus	122 (2)	Dementia	236 (7)	Atrial arrhythmia	130 (2)	Dementia	2,168 (12)	Minimal cognitive impairment	40 (1)
	Vertigo	119 (2)	Falls	216 (7)	Alzheimer's disease	99 (1)	Mental disorder	1,637 (9)	Delirium	35 (1)
	Nausea	111 (2)	Sleep disorder	112 (4)	Parkinson's disease	83 (1)	Anxiety disorder	1,506 (8)	Urinary incontinence	28 (1)
	Feeling agitated	69 (1)	Depressive disorder	95 (3)	Pneumonia	72 (1)	Urinary incontinence	1,206 (7)	Dizziness and giddiness	26 (1)
	Labyrinthitis	36 (1)	Chronic pain	90 (3)	Nonorganic insomnia	66 (1)	Organic mental disorder	1,175 (6)	Disorientated	21 (1)
	Lower respiratory tract infection	35 (1)	Dizziness and giddiness	81 (3)	Fracture of neck of femur	56 (1)	Dizziness and giddiness	1,074 (6)	Nonorganic insomnia	16 (0)
	Patient's condition deteriorating	30 (0.57)	Urinary incontinence	77 (2)	Heart failure	54 (1)	Depressive disorder	1,057 (6)	Urinary tract infectious disease	15 (0)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
	Abdominal pain	27 (0.51)	Type 2 diabetes mellitus without complication	75 (2)	Dementia	53 (1)	Atrial arrhythmia	1,054 (6)	Alzheimer's disease	13 (0)
Vasodilating	Essential hypertension	159 (6)	Essential hypertension	886 (35)	Essential hypertension	1,875 (9)	Essential hypertension	20,139 (82)	Essential hypertension	10 (1)
	Chest pain	54 (2)	Falls	178 (7)	Atrial arrhythmia	364 (2)	Type 2 diabetes mellitus	1,960 (8)	Urinary tract infectious disease	5 (0)
	Elevated blood pressure	37 (1)	Chronic ischemic heart disease	105 (4)	Type 2 diabetes mellitus	230 (1)	Atrial arrhythmia	1,934 (8)	Acute pharyngitis	<5
	Hypertensive disorder	31 (1)	Heart failure	90 (4)	Coronary arteriosclerosis	195 (1)	Disorder of lipid metabolism	1,452 (6)	Dysphagia	<5
	Dyspnea	24 (1)	Chronic pain	85 (3)	Chest pain	193 (1)	Pain in spine	1,163 (5)	Benign tumor of breast	<5
	Exercise grading	22 (1)	Type 2 diabetes mellitus without complication	83 (3)	Type 2 diabetes mellitus without complication	168 (1)	Gastroesophageal reflux disease	1,028 (4)	Proteinuria	<5
	Cough	15 (1)	Atrial arrhythmia	67 (3)	Pure hypercholesterolemia	145 (1)	Angina pectoris	947 (4)	Anal fissure	<5
	Clinical finding	14 (1)	Dizziness and giddiness	61 (2)	Hypercholesterolemia	145 (1)	Anxiety disorder	913 (4)	Peripheral vertigo	<5
	Allergic reaction to drug	14 (1)	Coronary arteriosclerosis	54 (2)	Heart failure	140 (1)	Inflammatory disorder of digestive tract	872 (4)	Hypertrophy of breast	<5

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
	Headache	13 (1)	Hyperlipidemia	52 (2)	Primary degenerative dementia of the Alzheimer type, senile onset	139 (1)	Hyperplasia of prostate	862 (4)	Breast lump	<5
Hypnotic z-drugs	Insomnia	298 (14)	Sleep disorder	413 (27)	Essential hypertension	175 (4)	Non-organic sleep disorder	8,917 (42)	Urge incontinence of urine	<5
	Poor sleep pattern	41 (2)	Essential hypertension	179 (12)	Nonorganic insomnia	111 (3)	Essential hypertension	5,868 (27)	Gallstone	<5
	Feeling agitated	22 (1)	Disorders of initiating and maintaining sleep	173 (11)	Atrial arrhythmia	105 (3)	Nonorganic insomnia	3,568 (17)	Hemiplegia	<5
	Depressed mood	19 (1)	Falls	80 (5)	Injury whilst engaged in leisure activity	51 (1)	Anxiety disorder	2,225 (10)	Parkinson's disease	<5
	Disorders of initiating and maintaining sleep	15 (1)	Type 2 diabetes mellitus without complication	49 (3)	Heart failure	45 (1)	Type 2 diabetes mellitus	1,511 (7)	Pseudomembranous conjunctivitis	<5
	General symptom	12 (1)	Chronic pain	48 (3)	Pain in limb	42 (1)	Pain in spine	1,259 (6)	Alcohol abuse	<5
	Clouded consciousness	12 (1)	Depressive disorder	37 (2)	Pneumonia	38 (1)	Atrial arrhythmia	1,204 (6)	Generalized anxiety disorder	<5
	Anxiety disorder	11 (1)	Restlessness and agitation	35 (2)	Type 2 diabetes mellitus	33 (1)	Depressive disorder	1,160 (5)	Anxiety disorder	<5

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
	Pain	10 (1)	Non-organic sleep disorder	33 (2)	Asthma	33 (1)	Gastroesophageal reflux disease	929 (4)	Tremor	<5
	Constipation	9 (0.4)	Chronic ischemic heart disease	30 (2)	Osteoarthritis of knee	32 (1)	Mixed anxiety and depressive disorder	884 (4)	Patient dependence on care provider	<5
Antiepileptics	Epilepsy	18 (3)	Epilepsy	97 (20)	Epilepsy	73 (3)	Essential hypertension	1,126 (26)	Epilepsy	12 (2)
	Seizure	12 (2)	Essential hypertension	70 (14)	Essential hypertension	54 (2)	Epilepsy	1,045 (24)	Dysphagia	<5
	Trigeminal neuralgia	10 (2)	Falls	34 (7)	Parkinson's disease	39 (2)	Type 2 diabetes mellitus	313 (7)	Labyrinthine disorder	<5
	Neuralgia	9 (1)	Parkinson's disease	19 (4)	Seizure	36 (2)	Atrial arrhythmia	267 (6)	Urinary tract infectious disease	<5
	Headache	8 (1)	Seizure	18 (4)	Atrial arrhythmia	29 (1)	Urinary incontinence	220 (5)	Acute cystitis	<5
	Pain in face	6 (1)	Chronic pain	18 (4)	Localization-related cryptogenic epilepsy	28 (1)	Parkinson’s disease	216 (5)	Chronic pancreatitis	<5
	Essential tremor	6 (1)	Depressive disorder	18 (4)	Traumatic subdural hemorrhage	23 (1)	Gastroesophageal reflux disease	198 (5)	Intestinal volvulus	<5
	Heartburn	<5	Type 2 diabetes mellitus without complication	18 (4)	Sequelae of cerebral infarction	19 (1)	Anxiety disorder	196 (5)	Urinary incontinence	<5
	Inflammatory dermatosis	<5	Dementia	17 (3)	Primary degenerative dementia of the	19 (1)	Depressive disorder	189 (4)	Disorder of teeth	<5

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
					Alzheimer type, senile onset				AND/OR supporting structures	
	Simple partial epileptic seizure	<5	Localization-related symptomatic epilepsy	15 (3)	Trigeminal neuralgia	17 (1)	Disorder of lipid metabolism	183 (4)	Cough	<5
First generation antihistamines	Nausea	135 (3)	Dizziness and giddiness	316 (13)	Inflammatory dermatosis	63 (4)	Dizziness and giddiness	68 (31)	Dizziness and giddiness	9 (1)
	Eruption	106 (2)	Nausea and vomiting	286 (12)	Essential hypertension	60 (4)	Essential hypertension	50 (23)	Cough	5 (1)
	Vomiting	85 (2)	Essential hypertension	235 (10)	Nonorganic insomnia	52 (3)	Inflammatory dermatosis	33 (15)	Acute lower respiratory tract infection	5 (1)
	Pruritus of skin	78 (2)	Falls	136 (6)	Pruritic rash	34 (2)	Méniere's disease	22 (10)	Acute pharyngitis	<5
	Insomnia	64 (1)	Inflammatory disorder of digestive tract	120 (5)	Atrial arrhythmia	19 (1)	Itching of skin	13 (6)	Nausea and vomiting	<5
	Itching	56 (1)	Pruritic rash	102 (4)	Itching of skin	18 (1)	Allergic contact dermatitis	11 (5)	Nausea	<5
	Patient's condition deteriorating	47 (1)	Restlessness and agitation	95 (4)	Skin finding	16 (1)	Hearing loss	10 (5)	Constipation	<5
			Sleep disorder	65 (3)	Atopic dermatitis	14 (1)	Anxiety disorder	9 (4)	Chest pain	<5

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
	Allergic reaction to drug	42 (1)	Chronic pain	64 (3)	Urticaria	13 (1)	Urticaria	8 (4)	Shoulder joint pain	<5
	Cough	33 (1)	Depressive disorder	54 (2)	Type 2 diabetes mellitus	13 (1)	Non-organic sleep disorder	8 (4)	Labyrinthine disorder	<5
Opioids	Backache	333 (3)	Essential hypertension	549 (9)	Injury whilst engaged in leisure activity	725 (4)	Essential hypertension	13,276 (23)	Low back pain	33 (1)
	Low back pain	273 (3)	Chronic pain	537 (9)	Essential hypertension	606 (3)	Pain in spine	11,191 (20)	Cough	30 (1)
	Hip pain	223 (2)	Falls	345 (6)	Low back pain	580 (3)	Osteoarthritis of knee	3,825 (7)	Common cold	18 (0)
	Pain of knee region	204 (2)	Cough	295 (5)	Pain in limb	454 (3)	Type 2 diabetes mellitus	3,565 (6)	Joint pain	17 (0)
	Shoulder pain	165 (2)	Pain	232 (4)	Atrial arrhythmia	329 (2)	Atrial arrhythmia	3,355 (6)	Traumatic or non-traumatic injury	14 (0)
	Pain in lower limb	140 (1)	Nerve root disorder	226 (4)	Osteoarthritis of knee	305 (2)	Lumbago with sciatica	2,854 (5)	Chronic pain	12 (0)
	Pain	138 (1)	Acute bronchitis	188 (3)	Injury of rotator cuff	301 (2)	Gastroesophageal reflux disease	2,411 (4)	Acute lower respiratory tract infection	12 (0)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
	Neck pain	98 (1)	Osteoarthritis of knee	160 (3)	Fracture of rib	294 (2)	Inflammatory disorder of digestive tract	2,143 (4)	Closed fracture of one rib	10 (0)
	Cough	95 (1)	Type 2 diabetes mellitus without complication	135 (2)	Joint pain	281 (2)	Osteoarthritis of hip	2,120 (4)	Chest pain	10 (0)
	Sciatica	67 (1)	Spondylosis	134 (2)	Fracture of neck of femur	239 (1)	Disorder of lipid metabolism	2,071 (4)	Pain in limb	9 (0)
Antidepressants	Depressed mood	370 (8)	Depressive disorder	469 (16)	Essential hypertension	388 (4)	Depressive disorder	3,685 (26)	Major depression, single episode	24 (1)
	Depressive disorder	140 (3)	Essential hypertension	383 (13)	Nonorganic insomnia	244 (2)	Essential hypertension	3,529 (25)	Urinary incontinence	12 (1)
	Anxiety	96 (2)	Falls	197 (7)	Atrial arrhythmia	152 (1)	Mixed anxiety and depressive disorder	1,781 (13)	Dementia	11 (1)
	Pain in lower limb	72 (2)	Sleep disorder	151 (5)	Primary degenerative dementia of the Alzheimer type, senile onset	136 (1)	Anxiety disorder	1,665 (12)	Minimal cognitive impairment	10 (1)
	Mixed anxiety and depressive disorder	60 (1)	Moderate major depression	149 (5)	Pain in limb	124 (1)	Type 2 diabetes mellitus	1,033 (7)	Nonorganic insomnia	9 (0)
	Anxiety disorder	51 (1)	Chronic pain	122 (4)	Low back pain	92 (1)	Non-organic sleep disorder	798 (6)	Restlessness and agitation	8 (0)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
	Insomnia	48 (1)	Dementia	117 (4)	Type 2 diabetes mellitus	85 (1)	Organic mood disorder	722 (5)	Urinary tract infectious disease	5 (0)
	Neck pain	44 (1)	Restlessness and agitation	110 (4)	Parkinson's disease	81 (1)	Pain in spine	719 (5)	Anxiety disorder	5 (0)
	Sciatica	44 (1)	Type 2 diabetes mellitus without complication	93 (3)	Heart failure	73 (1)	Organic personality disorder	657 (5)	Nausea and vomiting	<5
	Backache	43 (1)	Severe major depression without psychotic features	83 (3)	Injury whilst engaged in leisure activity	71 (1)	Atrial arrhythmia	647 (5)	Constipation	<5
Alpha-blockers	Lower urinary tract symptoms	59 (5)	Hyperplasia of prostate	247 (24)	Hyperplasia of prostate	478 (10)	Hyperplasia of prostate	6,583 (67)	Urinary tract infectious disease	6 (1)
	Nocturia	35 (3)	Essential hypertension	242 (23)	Essential hypertension	162 (3)	Essential hypertension	3,287 (34)	Constipation	<5
	Urinary symptoms	34 (3)	Falls	74 (7)	Primary malignant neoplasm of prostate	122 (3)	Type 2 diabetes mellitus	710 (7)	Disorder of shoulder	<5
	Benign prostatic hyperplasia	30 (3)	Type 2 diabetes mellitus without complication	58 (6)	Retention of urine	75 (2)	Atrial arrhythmia	531 (5)	Retention of urine	<5
	Increased frequency of urination	27 (2)	Chronic ischemic heart disease	46 (4)	Atrial arrhythmia	64 (1)	Retention of urine	456 (5)	Acute prostatitis	<5
	Prostatism	23 (2)	Urinary incontinence	42 (4)	Coronary arteriosclerosis	50 (1)	Disorder of lipid metabolism	407 (4)	Acute cystitis	<5

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
	Allergic reaction to drug	22 (2)	Coronary arteriosclerosis	28 (3)	Polyuria	46 (1)	Cystitis	372 (4)	Acquired renal cystic disease	<5
	Urinary incontinence	13 (1)	Heart failure	27 (3)	Type 2 diabetes mellitus without complication	46 (1)	Prostatitis	332 (3)	Urinary incontinence	<5
	Elevated blood pressure	12 (1)	Chronic pain	27 (3)	Injury whilst engaged in leisure activity	33 (1)	Urinary incontinence	294 (3)	Dysuria	<5
	Essential hypertension	12 (1)	Hyperuricemia without signs of inflammatory arthritis and tophaceous disease	25 (2)	Type 2 diabetes mellitus	32 (1)	Pain in spine	288 (3)	Benign prostatic hyperplasia	<5
Centrally acting antihypertensives	Chest pain	<5	Essential hypertension	181 (40)	Essential hypertension	108 (16)	Essential hypertension	8,895 (91)	-	-
	Genuine stress incontinence	<5	Falls	23 (5)	Atrial arrhythmia	26 (4)	Type 2 diabetes mellitus	1,078 (11)	-	-
	Flushing	<5	Type 2 diabetes mellitus without complication	23 (5)	Cerebral infarction	25 (4)	Atrial arrhythmia	616 (6)	-	-
	Orthostatic hypotension	<5	Chronic pain	19 (4)	Traumatic subdural hemorrhage	19 (3)	Disorder of lipid metabolism	614 (6)	-	-
	Cellulitis	<5	Chronic ischemic heart disease	18 (4)	Coronary arteriosclerosis	13 (2)	Pain in spine	418 (4)	-	-

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
	Ataxia	<5	Urinary incontinence	14 (3)	Subcortical hemorrhage	13 (2)	Gastroesophageal reflux disease	379 (4)	-	-
	Clinical finding	<5	Dizziness and giddiness	14 (3)	Spontaneous hemorrhage of cerebral hemisphere	13 (2)	Anxiety disorder	365 (4)	-	-
	Muscle pain	<5	Coronary arteriosclerosis	13 (3)	Heart failure	10 (2)	Inflammatory disorder of digestive tract	354 (4)	-	-
	Chronic kidney disease stage 4	<5	Pure hypercholesterolemia	12 (3)	Type 2 diabetes mellitus without complication	9 (1)	Hyperplasia of prostate	288 (3)	-	-
	Essential tremor	<5	Left heart failure	12 (3)	Type 2 diabetes mellitus	8 (1)	Angina pectoris	284 (3)	-	-
Antimuscarinic drugs	Increased frequency of urination	142 (8)	Urinary incontinence	206 (25)	Urinary incontinence	408 (12)	Pain of truncal structure	3,896 (21)	Urinary incontinence	7 (2)
	Urinary incontinence	141 (8)	Essential hypertension	116 (14)	Essential hypertension	134 (4)	Essential hypertension	3,727 (20)	Urge incontinence of urine	5 (1)
	Urinary symptoms	87 (5)	Falls	48 (6)	Polyuria	123 (3)	Urinary incontinence	2,128 (11)	Sprain of ankle	<5
	Urge incontinence of urine	67 (4)	Polyuria	45 (5)	Hyperplasia of prostate	122 (3)	Hyperplasia of prostate	1,975 (10)	Urinary tract infectious disease	<5

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
	Nocturia	67 (4)	Disorder of bladder	34 (4)	Parkinson's disease	60 (2)	Cystitis	1,649 (9)	Retention of urine	<5
	Urgent desire to urinate	44 (2)	Type 2 diabetes mellitus without complication	31 (4)	Primary malignant neoplasm of prostate	57 (2)	Inflammatory disorder of digestive tract	1,476 (8)	Acute prostatitis	<5
	Idiopathic detrusor overactivity	44 (2)	Difficulty passing urine	28 (3)	Type 2 diabetes mellitus	39 (1)	Gastroesophageal reflux disease	1,259 (7)	Female stress incontinence	<5
	Lower urinary tract symptoms	37 (2)	Hyperplasia of prostate	27 (3)	Genuine stress incontinence	32 (1)	Type 2 diabetes mellitus	1,042 (5)	Lumbar spondylosis with myelopathy	<5
	Overactive bladder	16 (1)	Chronic ischemic heart disease	26 (3)	Overactive urinary bladder	30 (1)	Biliary calculus	957 (5)	Primary malignant neoplasm of prostate	<5
	Cough	16 (1)	Urinary tract infectious disease	21 (2)	Atrial arrhythmia	29 (1)	Pain in spine	913 (5)	Disorder of bladder	<5

CPRD GOLD = Clinical Practice Research Datalink GOLD; IQVIA DA Germany = IQVIA Disease Analyzer Germany; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System ; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària;

12.6.3.2. Comedication

Table 18 presents medication use among individuals aged 65 years and older with recurrent falls at the time of their new prescription of the drug classes belonging to the STOPP section K criteria.

Among individuals prescribed benzodiazepines, the most commonly utilised medications were midazolam, lorazepam, diazepam, and oxazepam across the data sources. Co-prescription patterns commonly included analgesics such acetaminophen in FinOMOP-HILMO (7.64%) and SIDIAP (26.64%), as well as omeprazole and furosemide in SIDIAP (32.18% and 15.32%, respectively). In addition, morphine was co-prescribed with benzodiazepines in CPRD GOLD (27.5%) and IQVIA DA Germany (1.97%). In NAJS, the most common co-prescriptions included diazepam (41.21%).

Among individuals prescribed antipsychotics, quetiapine emerged as the predominant agent across the data sources, particularly in SIDIAP (49.68%). Antipsychotics were frequently co-prescribed with acetaminophen, omeprazole, and benzodiazepines. In case of vasodilators, amlodipine and ramipril were the most frequently prescribed medications. Vasodilating agents were frequently co-prescribed with acetaminophen and omeprazole across multiple data sources.

For individuals receiving the hypnotic z-drug class, zopiclone and zolpidem were the most frequently prescribed z-drugs. These medications were frequently co-prescribed with acetaminophen, gastrointestinal medications, such as pantoprazole, omeprazole, and furosemide.

For individuals receiving antiepileptic medication, clonazepam, levetiracetam, and valproate were most frequently recorded across the data sources.

The co-prescription of first-generation antihistamines revealed the concurrent use of analgesics, with acetaminophen being among the most commonly co-prescribed medications. Moreover, there was also frequent co-prescription with other sedative-hypnotic agents like diphenhydramine, dimethindene, and pantoprazole and omeprazole.

The analysis of opioids reveals a high prevalence of co-prescription with other analgesic agents. Acetaminophen/codeine combinations were frequently co-prescribed. Additionally, the concurrent use of acetaminophen, pantoprazole and omeprazole with opioids also suggests a concern for gastric protection due to opioid-induced gastrointestinal effects, as does the inclusion of medications like naloxone, commonly used to mitigate opioid overdose risks. Other co-prescribed agents included tramadol hydrochloride and furosemide.

Similarly, the use of antidepressants, alpha blockers and centrally acting antihypertensives demonstrated a range of co-prescriptions, including analgesic agents, such as acetaminophen and omeprazole.

The results for different time window, 1 year prior to the time of the new prescription of the drug classes belonging to the STOPP section K criteria, are available in the interactive web application “Shiny app” at EUPAS1000000333.

Table 18. Medication of individuals aged 65 years and older with recurrent falls at the time of their new prescription of the drug classes belonging to the STOPP section K criteria.

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
benzodiazepines	2 ML Midazolam 5 MG/ML Injectable Solution	2,407 (41.94)	Lorazepam 1 MG Disintegrating Oral Tablet [Tavor] Box of 50 by Pfizer	645 (27.65)	oxazepam 15 MG Oral Tablet	3,231 (34.81)	Diazepam 5 MG Oral Tablet Box of 30	23,838 (41.21)	lorazepam 1 MG Oral Tablet	965 (49.28)
	1 ML Morphine 10 MG/ML Injectable Solution	1,578 (27.5)	Lorazepam 0.5 MG Oral Tablet [Tavor] Box of 20 by Pfizer	133 (5.7)	oxazepam	929 (10.01)	Diazepam 2 MG Oral Tablet Box of 30	10,996 (19.01)	omeprazole 20 MG Delayed Release Oral Capsule	630 (32.18)
	diazepam 2 MG Oral Tablet	1,543 (26.89)	Lorazepam 1 MG Oral Tablet [Tavor] Box of 20 by Pfizer	109 (4.67)	Lorazepam 1 MG Oral Tablet Box of 100	855 (9.21)	Alprazolam 0.25 MG Oral Tablet Box of 30	5,001 (8.65)	acetaminophen 1000 MG Oral Tablet	518 (26.46)
	Water 10000 MG Injectable Solution	1,363 (23.75)	Lorazepam 0.5 MG Oral Tablet [Tavor] Box of 50 by Pfizer	85 (3.64)	Acetaminophen 1000 MG Oral Tablet Box of 100	709 (7.64)	oxazepam 15 MG Oral Tablet	4,833 (8.36)	furosemide 40 MG Oral Tablet	300 (15.32)
	1 ML Methotrimeprazine 25 MG/ML Injectable Solution	1,205 (21)	Lorazepam 1 MG Oral Tablet [Tavor] Box of 50 by Pfizer	66 (2.83)	acetaminophen	671 (7.23)	Alprazolam 0.5 MG Oral Tablet Box of 30	3,193 (5.52)	dipyrone	267 (13.64)
	1 ML butylscopolamine 20 MG/ML Injectable Solution	1,026 (17.88)	25 ML Diazepam 10 MG/ML Oral Solution [Diazepam Abz] Box of 1 by AbZ-Pharma	65 (2.79)	polyethylene glycol 3350	628 (6.77)	Acetaminophen 325 MG / Tramadol 37.5 MG Oral Tablet Box of 30	2,664 (4.61)	diazepam 5 MG Oral Tablet	245 (12.51)
	1 ML Cyclizine 50 MG/ML Injectable Solution	965 (16.81)	25 ML Diazepam 0.4 MG/ML Oral Solution Box of 1 by Ratiopharm	49 (2.1)	lorazepam	616 (6.64)	Furosemide 40 MG Oral Tablet Box of 20	2,622 (4.53)	lormetazepam 1 MG Oral Tablet	235 (12)
	lorazepam 1 MG Oral Tablet	913 (15.91)	1 ML Morphine 10 MG/ML Injectable Solution Box of 10 by Hameln	46 (1.97)	oxycodone	528 (5.69)	pantoprazole 40 MG Oral Tablet Box of 28	2,353 (4.07)	aspirin 100 MG Oral Tablet	187 (9.55)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
	1 ML Scopolamine 0.4 MG/ML Injectable Solution	710 (12.37)	Lorazepam 1 MG Oral Tablet [Lorazepam Dura] Box of 20 by Mylan	46 (1.97)	diazepam	495 (5.33)	Oxazepam 10 MG Oral Tablet Box of 30	2,314 (4.00)	quetiapine 25 MG Oral Tablet	160 (8.17)
	Heroin 5 MG Injectable Solution	418 (7.28)	Lorazepam 1 MG Oral Tablet [Lorazepam Dura] Box of 50 by Mylan	43 (1.84)	Lorazepam 1 MG Oral Tablet Box of 30	454 (4.89)	Bisoprolol 2.5 MG Oral Tablet Box of 30	2,101 (3.63)	bisoprolol fumarate 2.5 MG Oral Tablet	150 (7.66)
antipsychotics	prochlorperazine 5 MG Oral Tablet	1,530 (29.18)	200 ML metylperon 0.125 MG/ML Oral Solution [Melperon 1a Pharma] Box of 1 by 1 A	143 (4.51)	quetiapine 25 MG Oral Tablet Box of 100	1,826 (26.12)	Promazine 25 MG Oral Tablet Box of 50	5,994 (32.63)	quetiapine 25 MG Oral Tablet	1,707 (49.68)
	1 ML Methotrimeprazine 25 MG/ML Injectable Solution	1,295 (24.7)	Risperidone 0.5 MG Oral Tablet [Risperidon 1a Pharma] Box of 100 by 1 A	127 (4.01)	risperidone	1,046 (14.96)	quetiapine 25 MG Oral Tablet Box of 60	3,383 (18.42)	omeprazole 20 MG Delayed Release Oral Capsule	948 (27.59)
	2 ML Midazolam 5 MG/ML Injectable Solution	1,286 (24.53)	metylperon 25 MG Oral Tablet [Melperon 1a Pharma] Box of 100 by 1 A	106 (3.34)	quetiapine	604 (8.64)	Sulpiride 50 MG Oral Capsule Box of 30	2,775 (15.11)	acetaminophen 1000 MG Oral Tablet	810 (23.57)
	1 ML Morphine 10 MG/ML Injectable Solution	994 (18.96)	200 ML metylperon 0.125 MG/ML Oral Solution [Melperon Al] Box of 1 by Aliud	105 (3.31)	Haloperidol 5 MG/ML Injectable Solution Box of 1	571 (8.17)	haloperidol 2 MG Oral Tablet	2,403 (13.08)	furosemide 40 MG Oral Tablet	542 (15.77)
	1 ML butylscopolamine 20 MG/ML Injectable Solution	956 (18.23)	quetiapine 25 MG Extended Release Oral Tablet [Quetiapin 1a Pharma] Box of 100 by 1 A	94 (2.96)	Acetaminophen 1000 MG Oral Tablet Box of 100	549 (7.85)	Diazepam 5 MG Oral Tablet Box of 30	1,367 (7.44)	lorazepam 1 MG Oral Tablet	461 (13.42)
	Water 10000 MG Injectable Solution	708 (13.5)	300 ML metylperon 0.0833 MG/ML Oral Solution [Melperon 1a Pharma] Box of 1 by 1 A	80 (2.52)	Risperidone 0.25 MG Oral Tablet Box of 100	499 (7.14)	oxazepam 15 MG Oral Tablet	1,320 (7.19)	haloperidol 2 MG/ML Oral Solution	418 (12.17)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
	prochlorperazine 3 MG Buccal Tablet	639 (12.19)	pipamperone 40 MG Oral Tablet [Pipamperon 1a Pharma] Box of 100 by 1 A	76 (2.4)	quetiapine 25 MG Oral Tablet Box of 10	449 (6.42)	Oxazepam 10 MG Oral Tablet Box of 30	1,193 (6.49)	risperidone 1 MG/ML Oral Solution	328 (9.55)
	risperidone 0.5 MG Oral Tablet	400 (7.63)	torsemide 10 MG Oral Tablet [Torasemid 1a Pharma] Box of 100 by 1 A	74 (2.33)	acetaminophen	434 (6.21)	Furosemide 40 MG Oral Tablet Box of 20	1,155 (6.29)	dipyrone	313 (9.11)
	quetiapine 25 MG Oral Tablet	314 (5.99)	Dipyrone 500 MG Oral Tablet Box of 50 by Sanofi	72 (2.27)	polyethylene glycol 3350	412 (5.89)	pantoprazole 40 MG Oral Tablet Box of 28	943 (5.13)	sulpiride 50 MG Oral Capsule	313 (9.11)
	acetaminophen 500 MG Oral Tablet	270 (5.15)	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	70 (2.21)	Risperidone 0.5 MG Oral Tablet Box of 20	397 (5.68)	Risperidone 1 MG Oral Tablet Box of 20	842 (4.58)	aspirin 100 MG Oral Tablet	276 (8.03)
vasodilating	amlodipine 5 MG Oral Tablet	929 (36.23)	Ramipril 2.5 MG Oral Tablet [Ramipril 1a Pharma] Box of 100 by 1 A	178 (7.11)	isosorbide dinitrate 1.25 MG/ACTUAT	1,766 (8.01)	Amlodipine 5 MG Oral Tablet Box of 30	3,422 (13.93)	omeprazole 20 MG Delayed Release Oral Capsule	282 (27.78)
	Nitroglycerin 0.4 MG/ACTUAT Oral Spray	451 (17.59)	Ramipril 5 MG Oral Tablet [Ramipril 1a Pharma] Box of 100 by 1 A	168 (6.71)	Acetaminophen 1000 MG Oral Tablet Box of 100	1,597 (7.25)	Furosemide 40 MG Oral Tablet Box of 20	1,984 (8.08)	enalapril maleate 5 MG Oral Tablet	267 (26.31)
	ramipril 1.25 MG Oral Capsule	284 (11.08)	Ramipril 5 MG Oral Tablet [Ramilich] Box of 100 by Sanofi	123 (4.91)	Losartan 50 MG Oral Tablet Box of 98	1,572 (7.13)	Diazepam 5 MG Oral Tablet Box of 30	1,475 (6.00)	acetaminophen 1000 MG Oral Tablet	226 (22.27)
	acetaminophen 500 MG Oral Tablet	284 (11.08)	Ramipril 2.5 MG Oral Tablet [Ramilich] Box of 100 by Sanofi	105 (4.19)	Amlodipine 5 MG Oral Tablet Box of 98	1,538 (6.98)	Ramipril 2.5 MG Oral Tablet Box of 28	1,384 (5.63)	furosemide 40 MG Oral Tablet	166 (16.35)
	clopidogrel 75 MG Oral Tablet	222 (8.66)	11800 MG Nitroglycerin 0.0000357 MG/MG Oral Solution [Nitrolingual] Box of 1 by G.Pohl-Boskamp Kg	88 (3.52)	amlodipine	1,219 (5.53)	Bisoprolol 2.5 MG Oral Tablet Box of 30	1,323 (5.39)	lorazepam 1 MG Oral Tablet	122 (12.02)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
	aspirin 75 MG Disintegrating Oral Tablet	219 (8.54)	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	83 (3.32)	Amlodipine 5 MG Oral Tablet Box of 100	1,086 (4.93)	pantoprazole 40 MG Oral Tablet Box of 28	1,138 (4.63)	enalapril maleate 10 MG Oral Tablet	115 (11.33)
	ramipril 2.5 MG Oral Capsule	201 (7.84)	Amlodipine 5 MG Oral Tablet [Amlodipin 1a Pharma] Box of 100 by 1 A	76 (3.04)	Bisoprolol 2.5 MG Oral Tablet Box of 100	949 (4.31)	potassium bicarbonate / potassium citrate Oral Tablet	1,095 (4.46)	amlodipine 5 MG Oral Tablet	91 (8.97)
	omeprazole 20 MG Delayed Release Oral Capsule	198 (7.72)	Aspirin 100 MG Oral Tablet [Ass 1a Pharma] Box of 100 by 1 A	72 (2.88)	Ramipril 2.5 MG Oral Tablet Box of 98	863 (3.92)	Indapamide 1.25 MG / Perindopril 4 MG Oral Tablet Box of 30	1,029 (4.19)	bisoprolol fumarate 2.5 MG Oral Tablet	89 (8.77)
	furosemide 40 MG Oral Tablet	166 (6.47)	torsemide 10 MG Oral Tablet [Torasemid 1a Pharma] Box of 100 by 1 A	68 (2.72)	nitroglycerin 0.5 MG Sublingual Tablet	856 (3.88)	Perindopril 4 MG Oral Tablet Box of 30	1,016 (4.14)	aspirin 100 MG Delayed Release Oral Tablet	84 (8.28)
	sennoside B 7.5 MG Oral Tablet	148 (5.77)	Ramipril 2.5 MG Oral Tablet [Ramipril Abz] Box of 100 by AbZ-Pharma	68 (2.72)	acetaminophen	829 (3.76)	Ramipril 1.25 MG Oral Tablet Box of 28	932 (3.79)	dipyrone	83 (8.18)
hypnotic z-drugs	zopiclone 3.75 MG Oral Tablet	1,759 (81.36)	zolpidem 10 MG Oral Tablet [Zolpidem 1a Pharma] Box of 20 by 1 A	177 (11.41)	zopiclone 7.5 MG Oral Tablet Box of 30	1,081 (26.35)	zolpidem tartrate 5 MG Oral Tablet	9,940 (46.28)	zolpidem tartrate 10 MG Oral Tablet	87 (60.84)
	zopiclone 7.5 MG Oral Tablet	290 (13.41)	zopiclone 7.5 MG Oral Tablet [Zopiclon 1a Pharma] Box of 20 by 1 A	152 (9.8)	zopiclone	817 (19.92)	zolpidem 10 MG Oral Tablet Box of 30	6,317 (29.41)	zolpidem tartrate 5 MG Oral Tablet	54 (37.76)
	acetaminophen 500 MG Oral Tablet	138 (6.38)	zopiclone 7.5 MG Oral Tablet [Zopiclon Abz] Box of 20 by AbZ-Pharma	144 (9.28)	zopiclone 7.5 MG Oral Tablet Box of 100	715 (17.43)	zolpidem 5 MG Oral Tablet Box of 20	2,969 (13.82)	omeprazole 20 MG Delayed Release Oral Capsule	38 (26.57)
	zolpidem tartrate 5 MG Oral Tablet	92 (4.26)	zopiclone 7.5 MG Oral Tablet [Zopiclodura] Box of 20 by Mylan	125 (8.06)	zopiclone 7.5 MG Oral Tablet Box of 10	694 (16.92)	Diazepam 5 MG Oral Tablet Box of 30	1,319 (6.14)	acetaminophen 1000 MG Oral Tablet	31 (21.68)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
	omeprazole 20 MG Delayed Release Oral Capsule	78 (3.61)	zopiclone 3.75 MG Oral Tablet [Zopiclon 1a Pharma] Box of 20 by 1 A	91 (5.87)	Acetaminophen 1000 MG Oral Tablet Box of 100	382 (9.31)	zolpidem 10 MG Oral Tablet Box of 20	1,163 (5.42)	furosemide 40 MG Oral Tablet	21 (14.69)
	1000 ML bicarbonate ion 0.017 MMOL/ML / POLYETHYLENE GLYCOL 3350 105 MG/ML / Potassium 0.0054 MMOL/ML / Sodium 0.065 MMOL/ML Oral Powder [Laxido] by Galen	56 (2.59)	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	69 (4.45)	zopiclone 5 MG Oral Tablet	360 (8.78)	Acetaminophen 325 MG / Tramadol 37.5 MG Oral Tablet Box of 30	1,117 (5.2)	trazodone hydrochloride 100 MG Oral Tablet	14 (9.79)
	sennoside B 7.5 MG Oral Tablet	54 (2.5)	zolpidem 10 MG Oral Tablet [Zolpidem Al] Box of 20 by Aliud	54 (3.48)	zolpidem 10 MG Oral Tablet Box of 20	334 (8.14)	Furosemide 40 MG Oral Tablet Box of 20	1,111 (5.17)	metformin hydrochloride 850 MG Oral Tablet	14 (9.79)
	furosemide 40 MG Oral Tablet	51 (2.36)	zopiclone 7.5 MG Oral Tablet Box of 20 by Ratiopharm	51 (3.29)	melatonin	270 (6.58)	zopiclone 7.5 MG Oral Tablet Box of 30	1,105 (5.15)	lorazepam 1 MG Oral Tablet	13 (9.09)
	clopidogrel 75 MG Oral Tablet	48 (2.22)	zopiclone 7.5 MG Oral Tablet [Zopiclon Al] Box of 20 by Aliud	48 (3.09)	polyethylene glycol 3350	248 (6.05)	pantoprazole 40 MG Oral Tablet Box of 28	965 (4.49)	aspirin 100 MG Oral Tablet	12 (8.39)
	aspirin 75 MG Disintegrating Oral Tablet	46 (2.13)	zolpidem 5 MG Oral Tablet [Zolpidem Al] Box of 20 by Aliud	45 (2.9)	acetaminophen	242 (5.9)	Bisoprolol 2.5 MG Oral Tablet Box of 30	702 (3.27)	simvastatin 20 MG Oral Tablet	12 (8.39)
anti-epileptics	clonazepam 0.5 MG Oral Tablet	117 (17.54)	Levetiracetam 500 MG Oral Tablet [Levetiracetam 1a Pharma] Box of 100 by 1 A	33 (6.68)	Valproate 300 MG Extended Release Oral Tablet Box of 100	282 (12.78)	Clonazepam 0.5 MG Oral Tablet Box of 50	1,534 (35.61)	omeprazole 20 MG Delayed Release Oral Capsule	176 (25.04)
	levetiracetam 250 MG Oral Tablet	97 (14.54)	Levetiracetam 500 MG Oral Tablet [Levetiracetam 1a Pharma] Box of 200 by 1 A	19 (3.85)	Levetiracetam 500 MG Oral Tablet Box of 100	244 (11.06)	Carbamazepine 200 MG Oral Tablet Box of 50	491 (11.40)	clonazepam 2.5 MG/ML Oral Solution	173 (24.61)
	lamotrigine 25 MG Oral Tablet	67 (10.04)	Amlodipine 5 MG Oral Tablet [Amlodipin 1a Pharma] Box of 100 by 1 A	14 (2.83)	Clonazepam 0.5 MG Oral Tablet Box of 150	240 (10.88)	Diazepam 5 MG Oral Tablet Box of 30	417 (9.68)	clonazepam 0.5 MG Oral Tablet	161 (22.9)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
	acetaminophen 500 MG Oral Tablet	65 (9.75)	torsemide 10 MG Oral Tablet [Torasemid 1a Pharma] Box of 100 by 1 A	13 (2.63)	Acetaminophen 1000 MG Oral Tablet Box of 100	164 (7.43)	Levetiracetam 250 MG Oral Tablet Box of 60	334 (7.75)	acetaminophen 1000 MG Oral Tablet	139 (19.77)
	levetiracetam 500 MG Oral Tablet	56 (8.4)	Aspirin 100 MG Oral Tablet [Ass 1a Pharma] Box of 100 by 1 A	12 (2.43)	oxcarbazepine 300 MG Oral Tablet Box of 100	161 (7.3)	Levetiracetam 500 MG Oral Tablet Box of 60	312 (7.24)	levetiracetam 500 MG Oral Tablet	117 (16.64)
	carbamazepine 100 MG Oral Tablet	47 (7.05)	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	11 (2.23)	Valproate 500 MG Extended Release Oral Tablet Box of 100	149 (6.75)	pantoprazole 40 MG Oral Tablet Box of 28	290 (6.73)	quetiapine 25 MG Oral Tablet	76 (10.81)
	sennoside B 7.5 MG Oral Tablet	47 (7.05)	Ramipril 5 MG Oral Tablet [Ramipril 1a Pharma] Box of 100 by 1 A	10 (2.02)	Valproate 100 MG Oral Tablet Box of 100	129 (5.85)	Carbamazepine 400 MG Oral Tablet Box of 30	280 (6.50)	furosemide 40 MG Oral Tablet	75 (10.67)
	omeprazole 20 MG Delayed Release Oral Capsule	44 (6.6)	Levetiracetam 1000 MG Oral Tablet [Levetiracetam 1a Pharma] Box of 100 by 1 A	9 (1.82)	acetaminophen	126 (5.71)	Furosemide 40 MG Oral Tablet Box of 20	267 (6.20)	trazodone hydrochloride 100 MG Oral Tablet	68 (9.67)
	clopidogrel 75 MG Oral Tablet	42 (6.3)	Levetiracetam 500 MG Oral Tablet Box of 100 by AAA-Pharma	9 (1.82)	polyethylene glycol 3350	111 (5.03)	oxcarbazepine 300 MG Oral Tablet Box of 50	221 (5.13)	lorazepam 1 MG Oral Tablet	64 (9.1)
	Carbamazepine 100 MG Oral Tablet [Tegretol] by Novartis	39 (5.85)	Clonazepam 0.5 MG Oral Tablet [Rivotril] Box of 100 by Roche	8 (1.62)	levetiracetam	102 (4.62)	potassium bicarbonate / potassium citrate Oral Tablet	210 (4.87)	dipyrone	59 (8.39)
first generation antihistamines	cyclizine 50 MG Oral Tablet	1,809 (40.88)	Cinnarizine / Dimenhydrinate Oral Tablet [Arlevert]	309 (12.61)	hydroxyzine	615 (41.33)	Dimethindene 1 MG/ML Oral Solution Box of 1	96 (44.04)	pyrilamine	259 (41.05)
	1 ML Cyclizine 50 MG/ML Injectable Solution	1,206 (27.25)	Dimenhydrinate 150 MG Rectal Suppository [Vomex A] Box of 10 by Astellas	152 (6.2)	Hydroxyzine 25 MG Oral Tablet Box of 25	205 (13.78)	Cinnarizine 20 MG / Dimenhydrinate 40 MG Oral Tablet Box of 50	75 (34.40)	hydroxyzine hydrochloride 25 MG Oral Tablet	239 (37.88)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
	2 ML Midazolam 5 MG/ML Injectable Solution	987 (22.31)	Dimenhydrinate 50 MG Oral Tablet [Vomex A] Box of 20 by Klinge	139 (5.67)	Hydroxyzine 25 MG Oral Tablet Box of 100	186 (12.5)	Cinnarizine 20 MG / Dimenhydrinate 40 MG Oral Tablet Box of 20	47 (21.56)	omeprazole 20 MG Delayed Release Oral Capsule	205 (32.49)
	1 ML Scopolamine 0.4 MG/ML Injectable Solution	766 (17.31)	Dimenhydrinate 50 MG Oral Tablet [Vomex A] Box of 20 by Astellas	125 (5.1)	doxepin	185 (12.43)	Furosemide 40 MG Oral Tablet Box of 20	14 (6.42)	acetaminophen 1000 MG Oral Tablet	179 (28.37)
	Water 10000 MG Injectable Solution	743 (16.79)	Dimenhydrinate 50 MG Oral Tablet [Vomacur] Box of 20 by Novartis	113 (4.61)	ketotifen	142 (9.54)	Diazepam 5 MG Oral Tablet Box of 30	11 (5.05)	furosemide 40 MG Oral Tablet	115 (18.23)
	chlorpheniramine maleate 4 MG Oral Tablet	596 (13.47)	Cinnarizine 20 MG / Dimenhydrinate 40 MG Oral Tablet [Arlevert] Box of 50 by Hennig	101 (4.12)	doxylamine	93 (6.25)	Bisoprolol 2.5 MG Oral Tablet Box of 30	8 (3.67)	lorazepam 1 MG Oral Tablet	79 (12.52)
	1 ML Morphine 10 MG/ML Injectable Solution	576 (13.02)	Dimenhydrinate 50 MG Oral Tablet [Vomex A] Box of 10 by Klinge	90 (3.67)	Acetaminophen 1000 MG Oral Tablet Box of 100	71 (4.77)	potassium bicarbonate / potassium citrate Oral Tablet	8 (3.67)	aspirin 100 MG Oral Tablet	68 (10.78)
	Heroin 10 MG Injectable Solution	304 (6.87)	30 ML Promethazine 0.625 MG/ML Oral Solution [Promethazin-Neuraxpharm] Box of 1 by Neuraxpharm	83 (3.39)	melatonin	55 (3.7)	Acetaminophen 325 MG / Tramadol 37.5 MG Oral Tablet Box of 30	7 (3.21)	dipyrone	67 (10.62)
	promethazine hydrochloride 25 MG Oral Tablet	264 (5.97)	Dimenhydrinate 150 MG Rectal Suppository [Vomex A] Box of 10 by Klinge	78 (3.18)	hydrocortisone	44 (2.96)	pantoprazole 40 MG Oral Tablet Box of 28	7 (3.21)	ketotifen 0.25 MG/ML	63 (9.98)
	acetaminophen 500 MG Oral Tablet	217 (4.9)	Dimethindene 1 MG Oral Tablet [Fenistil] by Glaxosmithkline	56 (2.29)	1000 MG Betamethasone 0.001 MG/MG Topical Cream	43 (2.89)	Betamethasone 0.0006 MG/MG Topical Cream	6 (2.75)	simvastatin 20 MG Oral Tablet	55 (8.72)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
opioids	acetaminophen 500 MG / codeine phosphate 8 MG Oral Tablet	2,529 (24.08)	Naloxone / Tilidine Extended Release Oral Tablet [Tilidin 1a Pharma]	919 (15.38)	oxycodone	3,574 (20.43)	Acetaminophen 325 MG / Tramadol 37.5 MG Oral Tablet Box of 30	32,549 (56.78)	acetaminophen 325 MG / tramadol hydrochloride 37.5 MG Oral Tablet	1,498 (37.87)
	codeine phosphate 15 MG Oral Tablet	1,559 (14.85)	naloxone / tilidine Extended Release Oral Tablet	769 (12.87)	acetaminophen	2,958 (16.91)	Acetaminophen 325 MG / Tramadol 37.5 MG Oral Tablet Box of 50	5,234 (9.13)	omeprazole 20 MG Delayed Release Oral Capsule	1,186 (29.98)
	1 ML Morphine 10 MG/ML Injectable Solution	1,013 (9.65)	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	319 (5.34)	Acetaminophen 1000 MG Oral Tablet Box of 100	2,710 (15.49)	Dexketoprofen 25 MG / Tramadol 75 MG Oral Tablet Box of 20	4,985 (8.70)	acetaminophen 1000 MG Oral Tablet	1,054 (26.64)
	2 ML Midazolam 5 MG/ML Injectable Solution	1,012 (9.64)	Dipyrone 500 MG Oral Tablet Box of 50 by Sanofi	226 (3.78)	Acetaminophen 500 MG / Codeine 30 MG Oral Tablet Box of 20	2,412 (13.79)	Diazepam 5 MG Oral Tablet Box of 30	3,263 (5.69)	dipyrone	778 (19.67)
	acetaminophen 500 MG Oral Tablet	861 (8.2)	30000 MG dihydrocodeine 0.000333 MG/MG Oral Solution [Paracodin] Box of 1 by Teofarma	186 (3.11)	naloxone	2,193 (12.54)	pantoprazole 40 MG Oral Tablet Box of 28	2,833 (4.94)	tramadol hydrochloride 50 MG Oral Capsule	598 (15.12)
	acetaminophen 500 MG / codeine phosphate 30 MG Oral Tablet	671 (6.39)	15000 MG dihydrocodeine 0.01 MG/MG Oral Solution [Paracodin] Box of 1	152 (2.54)	Acetaminophen 500 MG / Codeine 30 MG Oral Tablet Box of 50	1,977 (11.3)	Furosemide 40 MG Oral Tablet Box of 20	2,643 (4.61)	furosemide 40 MG Oral Tablet	547 (13.83)
	codeine phosphate 30 MG Oral Tablet	599 (5.7)	100 ML Dipyrone 5 MG/ML Oral Solution [Novaminsulfon 1a Pharma] Box of 1 by 1 A	123 (2.06)	oxycodone hydrochloride 5 MG Oral Capsule	1,717 (9.82)	Acetaminophen 325 MG / Tramadol 37.5 MG Oral Tablet Box of 20	2,576 (4.49)	lorazepam 1 MG Oral Tablet	479 (12.11)
	acetaminophen 500 MG / dihydrocodeine bitartrate 10 MG Oral Tablet	558 (5.31)	lauromacrogols / Potassium / Sodium Oral Solution	112 (1.87)	1 ML Oxycodone 10 MG/ML Oral Solution	1,690 (9.66)	Acetaminophen 650 MG / Tramadol 75 MG Oral Tablet Box of 30	1,662 (2.9)	tramadol hydrochloride 100 MG/ML Oral Solution	332 (8.39)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
	1 ML Methotrimeprazine 25 MG/ML Injectable Solution	551 (5.25)	Lorazepam 1 MG Disintegrating Oral Tablet [Tavor] Box of 50 by Pfizer	110 (1.84)	Buprenorphine 0.005 MG/HR Transdermal System Box of 4	1,230 (7.03)	Bisoprolol 2.5 MG Oral Tablet Box of 30	1,573 (2.74)	aspirin 100 MG Oral Tablet	308 (7.79)
	morphine 2 MG/ML Oral Solution [Oramorph] by Glenwood	531 (5.06)	Codeine Oral Solution [Tryasol]	108 (1.81)	codeine	1,110 (6.35)	Tramadol 50 MG Oral Capsule Box of 20	1,559 (2.72)	codeine	299 (7.56)
antidepressants	amitriptyline hydrochloride 10 MG Oral Tablet	1360 (30.97)	Mirtazapine 15 MG Delayed Release Oral Tablet [Mirtazapin 1a Pharma] Box of 100 by 1 A	142 (4.73)	Mirtazapine 15 MG Oral Tablet Box of 30	1,478 (13.35)	Escitalopram 10 MG Oral Tablet Box of 28	2,435 (17.36)	trazodone hydrochloride 100 MG Oral Tablet	694 (36.95)
	sertraline 50 MG Oral Tablet	766 (17.44)	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	98 (3.27)	mirtazapine	1,241 (11.21)	Sertraline 50 MG Oral Tablet Box of 28	1,715 (12.23)	omeprazole 20 MG Delayed Release Oral Capsule	568 (30.24)
	mirtazapine 15 MG Oral Tablet	712 (16.21)	Mirtazapine 15 MG Oral Tablet [Mirtazapin 1a Pharma] Box of 50 by 1 A	97 (3.23)	amitriptyline	1,172 (10.59)	tianeptine 12.5 MG Oral Tablet Box of 90	1,509 (10.76)	acetaminophen 1000 MG Oral Tablet	460 (24.49)
	citalopram 10 MG Oral Tablet	552 (12.57)	Citalopram 10 MG Oral Tablet [Citalopram 1a Pharma] Box of 100 by 1 A	72 (2.4)	Mirtazapine 15 MG Oral Tablet Box of 28	991 (8.95)	duloxetine 30 MG Oral Capsule Box of 28	1,391 (9.92)	sertraline 50 MG Oral Tablet	338 (18)
	acetaminophen 500 MG Oral Tablet	362 (8.24)	Dipyrone 500 MG Oral Tablet Box of 50 by Sanofi	67 (2.23)	Acetaminophen 1000 MG Oral Tablet Box of 100	889 (8.03)	Mirtazapine 15 MG Oral Tablet Box of 30	1,210 (8.63)	furosemide 40 MG Oral Tablet	310 (16.51)
	fluoxetine 20 MG Oral Capsule	193 (4.4)	Mirtazapine 15 MG Oral Tablet [Mirtalich] Box of 100 by Sanofi	66 (2.2)	Mirtazapine 15 MG Oral Tablet Box of 98	823 (7.43)	Diazepam 5 MG Oral Tablet Box of 30	1,100 (7.84)	lorazepam 1 MG Oral Tablet	281 (14.96)
	omeprazole 20 MG Delayed Release Oral Capsule	183 (4.17)	Citalopram 20 MG Oral Tablet [Citalopram 1a Pharma] Box of 100 by 1 A	57 (1.9)	melatonin	634 (5.73)	Alprazolam 0.5 MG Oral Tablet Box of 30	915 (6.52)	dipyrone	203 (10.81)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
	sennoside B 7.5 MG Oral Tablet	148 (3.37)	Aspirin 100 MG Oral Tablet [Ass 1a Pharma] Box of 100 by 1 A	54 (1.8)	Mirtazapine 15 MG Oral Tablet Box of 100	483 (4.36)	Alprazolam 0.25 MG Oral Tablet Box of 30	829 (5.91)	quetiapine 25 MG Oral Tablet	185 (9.85)
	1000 ML bicarbonate ion 0.017 MMOL/ML / POLYETHYLENE GLYCOL 3350 105 MG/ML / Potassium 0.0054 MMOL/ML / Sodium 0.065 MMOL/ML Oral Powder [Laxido] by Galen	139 (3.17)	torsemide 10 MG Oral Tablet [Torasemid 1a Pharma] Box of 100 by 1 A	53 (1.77)	acetaminophen	472 (4.26)	Paroxetine 20 MG Oral Tablet Box of 30	709 (5.05)	mirtazapine 15 MG Oral Tablet	155 (8.25)
	citalopram 20 MG Oral Tablet	138 (3.14)	Sertraline 50 MG Oral Tablet [Sertralin-1 A Pharma] Box of 100 by 1 A	53 (1.77)	polyethylene glycol 3350	468 (4.23)	Escitalopram 5 MG Oral Tablet Box of 28	698 (4.98)	aspirin 100 MG Oral Tablet	151 (8.04)
alpha-blockers	tamsulosin 0.4 MG Extended Release Oral Capsule	685 (58.1)	tamsulosin 0.4 MG Extended Release Oral Tablet [Tamsulosin 1a Pharma] Box of 100 by 1 A	187 (17.89)	tamsulosin 0.4 MG Extended Release Oral Capsule Box of 90	1843 (38.91)	tamsulosin 0.4 MG Extended Release Oral Capsule	3,372 (34.46)	tamsulosin hydrochloride 0.4 MG Oral Capsule	165 (32.87)
	doxazosin 1 MG Oral Tablet	225 (19.08)	tamsulosin 0.4 MG Extended Release Oral Capsule by Sanofi	68 (6.51)	tamsulosin	759 (16.03)	tamsulosin 0.4 MG Extended Release Oral Tablet Box of 30	1,276 (13.04)	omeprazole 20 MG Delayed Release Oral Capsule	127 (25.3)
	doxazosin 2 MG Oral Tablet	137 (11.62)	tamsulosin 0.4 MG Extended Release Oral Capsule [Tamsulosin Al] Box of 100 by Aliud	42 (4.02)	dutasteride 0.5 MG / tamsulosin hydrochloride 0.4 MG Oral Capsule	647 (13.66)	urapidil 30 MG Oral Capsule	1,112 (11.37)	tamsulosin hydrochloride 0.4 MG Extended Release Oral Tablet	107 (21.31)
	acetaminophen 500 MG Oral Tablet	99 (8.4)	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	40 (3.83)	alfuzosin hydrochloride 10 MG Extended Release Oral Tablet	572 (12.08)	tamsulosin 0.4 MG Extended Release Oral Capsule Box of 30	993 (10.15)	acetaminophen 1000 MG Oral Tablet	101 (20.12)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
	finasteride 5 MG Oral Tablet	70 (5.94)	Aspirin 100 MG Oral Tablet [Ass 1a Pharma] Box of 100 by 1 A	40 (3.83)	tamsulosin 0.4 MG Extended Release Oral Capsule Box of 30	547 (11.55)	Dutasteride 0.5 MG / tamsulosin 0.4 MG Oral Capsule Box of 30	844 (8.63)	furosemide 40 MG Oral Tablet	93 (18.53)
	sennoside B 7.5 MG Oral Tablet	65 (5.51)	tamsulosin 0.4 MG Extended Release Oral Capsule [Tamsulosin Abz] Box of 100 by AbZ-Pharma	39 (3.73)	Acetaminophen 1000 MG Oral Tablet Box of 100	314 (6.63)	Ciprofloxacin 500 MG Oral Tablet Box of 10	590 (6.03)	doxazosin 2 MG Oral Tablet	45 (8.96)
	omeprazole 20 MG Delayed Release Oral Capsule	63 (5.34)	torsemide 10 MG Oral Tablet [Torasemid 1a Pharma] Box of 100 by 1 A	38 (3.64)	dutasteride	262 (5.53)	urapidil 60 MG Oral Capsule	475 (4.85)	lorazepam 1 MG Oral Tablet	39 (7.77)
	clopidogrel 75 MG Oral Tablet	56 (4.75)	tamsulosin 0.4 MG Extended Release Oral Capsule [Tamsublock] Box of 100 by Dr R Pfleger	36 (3.44)	Dutasteride 0.5 MG / tamsulosin 0.4 MG Oral Capsule Box of 30	226 (4.77)	Furosemide 40 MG Oral Tablet Box of 20	460 (4.70)	dipyrone	39 (7.77)
	aspirin 75 MG Disintegrating Oral Tablet	54 (4.58)	tamsulosin 0.4 MG Extended Release Oral Capsule [Tamsulosin Basics] Box of 100 by Basics	35 (3.35)	Finasteride 5 MG Oral Tablet Box of 100	191 (4.03)	Solifenacin 6 MG / tamsulosin 0.4 MG Extended Release Oral Tablet Box of 30	410 (4.19)	dutasteride 0.5 MG / tamsulosin hydrochloride 0.4 MG Oral Capsule	39 (7.77)
	folic acid 5 MG Oral Tablet	52 (4.41)	urapidil 30 MG Extended Release Oral Capsule [Ebrantil] Box of 100 by Takeda	35 (3.35)	polyethylene glycol 3350	188 (3.97)	moxonidine 0.4 MG Oral Tablet Box of 28	348 (3.56)	amlodipine 5 MG Oral Tablet	38 (7.57)
centrally acting antihyperte nsives	moxonidine 0.2 MG Oral Tablet	19 (42.22)	moxonidine 0.2 MG Oral Tablet [Moxonidin 1a Pharma] Box of 100 by 1 A	91 (19.91)	moxonidine 0.2 MG Oral Tablet Box of 98	246 (36.83)	moxonidine 0.2 MG Oral Tablet Box of 28	5,513 (56.71)	-	-
	clonidine hydrochloride 0.025 MG Oral Tablet	16 (35.56)	moxonidine 0.3 MG Oral Tablet [Moxonidin 1a Pharma] Box of 100 by 1 A	48 (10.5)	clonidine	235 (35.18)	moxonidine 0.4 MG Oral Tablet Box of 28	4,221 (43.42)	-	-
	acetaminophen 500 MG Oral Tablet	6 (13.33)	moxonidine 0.2 MG Oral Tablet [Moxonidin	26 (5.69)	moxonidine	87 (13.02)	Diazepam 5 MG Oral Tablet Box of 30	629 (6.47)	-	-

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
			Heumann] Box of 100 by Heumann							
	methyldopa 250 MG Oral Tablet	5 (11.11)	Clonidine 0.075 MG Oral Tablet [Clonidin Ratiopharm] Box of 100 by Ratiopharm	20 (4.38)	acetaminophen	71 (10.63)	Furosemide 40 MG Oral Tablet Box of 20	609 (6.26)	-	-
	aspirin 75 MG Disintegrating Oral Tablet	5 (11.11)	moxonidine 0.2 MG Oral Tablet [Moxonidin Heumann] Box of 100 by Heunet	17 (3.72)	moxonidine 0.4 MG Oral Tablet Box of 98	62 (9.28)	Amlodipine 10 MG / Indapamide 2.5 MG / Perindopril 10 MG Oral Tablet Box of 30	565 (5.81)	-	-
	Albuterol 0.095 MG/ACTUAT Metered Dose Inhaler	<5	Amlodipine 5 MG Oral Tablet [Amlodipin 1a Pharma] Box of 100 by 1 A	15 (3.28)	Acetaminophen 1000 MG Oral Tablet Box of 100	58 (8.68)	Bisoprolol 2.5 MG Oral Tablet Box of 30	446 (4.59)	-	-
	mirtazapine 45 MG Oral Tablet	<5	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	15 (3.28)	labetalol	38 (5.69)	pantoprazole 40 MG Oral Tablet Box of 28	398 (4.09)	-	-
	mirtazapine 30 MG Oral Tablet	<5	moxonidine 0.2 MG Delayed Release Oral Tablet [Moxonidin Pharma] Box of 100 by AAA-Pharma	15 (3.28)	ondansetron	35 (5.24)	Amlodipine 5 MG Oral Tablet Box of 30	371 (3.82)	-	-
	sertraline 100 MG Oral Tablet	<5	Aspirin 100 MG Oral Tablet [Ass 1a Pharma] Box of 100 by 1 A	14 (3.06)	oxycodone	35 (5.24)	nebivolol 5 MG Oral Tablet Box of 28	362 (3.72)	-	-
	sertraline 50 MG Oral Tablet	<5	torsemide 10 MG Oral Tablet [Torasemid 1a Pharma] Box of 100 by 1 A	13 (2.84)	moxonidine 0.2 MG Oral Tablet Box of 28	34 (5.09)	potassium bicarbonate / potassium citrate Oral Tablet	338 (3.48)	-	-
antimuscarinic drugs	solifenacin succinate 5 MG Oral Tablet	565 (30.98)	Trospium 15 MG Oral Tablet [Spasmex] Box of 100 by Dr R Pfleger	83 (9.89)	mirabegron 50 MG Extended Release Oral Tablet Box of 90	1,355 (38.21)	Trospium 5 MG Oral Tablet Box of 30	12,808 (67.38)	24 HR mirabegron 50 MG Extended Release Oral Tablet	149 (36.88)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
	oxybutynin chloride 2.5 MG Oral Tablet	271 (14.86)	Trospium 15 MG Oral Tablet [Spasmex] Box of 30 by Dr R Pfleger	58 (6.91)	mirabegron 50 MG Extended Release Oral Tablet Box of 30	1,070 (30.17)	Solifenacin 5 MG Oral Tablet Box of 30	2,018 (10.62)	omeprazole 20 MG Delayed Release Oral Capsule	119 (29.46)
	mirabegron 50 MG Extended Release Oral Tablet	163 (8.94)	Solifenacin 5 MG Oral Tablet [Vesikur] Box of 90 by Astellas	33 (3.93)	mirabegron	907 (25.58)	trospium Injectable Solution	1,545 (8.13)	acetaminophen 1000 MG Oral Tablet	88 (21.78)
	mirabegron 25 MG Extended Release Oral Tablet	124 (6.8)	Trospium 15 MG Oral Tablet [Spasmex] Box of 50 by Dr R Pfleger	31 (3.69)	Estradiol 0.01 MG Vaginal Tablet	354 (9.98)	Solifenacin 6 MG / tamsulosin 0.4 MG Extended Release Oral Tablet Box of 30	1,229 (6.47)	solifenacin succinate 5 MG Oral Tablet	78 (19.31)
	acetaminophen 500 MG Oral Tablet	116 (6.36)	Trospium 45 MG Oral Tablet [Spasmex] Box of 100 by Dr R Pfleger	30 (3.58)	Acetaminophen 1000 MG Oral Tablet Box of 100	231 (6.51)	pantoprazole 40 MG Oral Tablet Box of 28	1,111 (5.84)	lorazepam 1 MG Oral Tablet	43 (10.64)
	oxybutynin chloride 5 MG Oral Tablet	91 (4.99)	Trospium 30 MG Oral Tablet [Spasmex] Box of 100 by Dr R Pfleger	30 (3.58)	calcium carbonate 500 MG / cholecalciferol 0.01 MG Oral Tablet	106 (2.99)	Metoclopramide 10 MG Oral Tablet Box of 40	950 (5.00)	tolterodine tartrate 4 MG Extended Release Oral Capsule	40 (9.9)
	tolterodine tartrate 1 MG Oral Tablet	90 (4.93)	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	28 (3.34)	acetaminophen	99 (2.79)	Diazepam 5 MG Oral Tablet Box of 30	682 (3.59)	Solifenacin 6 MG / tamsulosin 0.4 MG Extended Release Oral Tablet	38 (9.41)
	tolterodine tartrate 2 MG Oral Tablet	88 (4.82)	Solifenacin 5 MG Oral Tablet [Vesikur] Box of 30 by Astellas	28 (3.34)	Solifenacin 5 MG Oral Tablet Box of 90	96 (2.71)	Amoxicillin 875 MG / Clavulanate 125 MG Oral Tablet Box of 14	608 (3.2)	simvastatin 20 MG Oral Tablet	34 (8.42)
	omeprazole 20 MG Delayed Release Oral Capsule	64 (3.51)	Trospium 45 MG Oral Tablet [Spasmex] Box of 30 by Dr R Pfleger	21 (2.5)	Solifenacin 5 MG Oral Tablet Box of 30	89 (2.51)	pantoprazole 40 MG Injection Box of 1	580 (3.05)	bisoprolol fumarate 2.5 MG Oral Tablet	34 (8.42)

	CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Drug class	**Medication**	**n (%)**	**Medication**	**n (%)**	**Medication**	**n (%)**	**Medication**	**n (%)**	**Medication**	**n (%)**
	tolterodine tartrate 4 MG Extended Release Oral Capsule	62 (3.4)	Aspirin 100 MG Oral Tablet [Ass 1a Pharma] Box of 100 by 1 A	20 (2.38)	estradiol	83 (2.34)	Acetaminophen 325 MG / Tramadol 37.5 MG Oral Tablet Box of 30	544 (2.86)	aspirin 100 MG Oral Tablet	33 (8.17)

CPRD GOLD = Clinical Practice Research Datalink GOLD; IQVIA DA Germany = IQVIA Disease Analyzer Germany; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària;

12.6.3.3. Individual drug substances

Table 19 presents the proportion of individual drug substances within each drug class belonging to the STOPP section K criteria in individuals aged 65 years and older with recurrent falls, stratified per data source.

Among the benzodiazepines, lorazepam and diazepam were notable for their high frequencies in CPRD GOLD, FinOMOP-HILMO and SIDIAP (17.84%, 20.32%, 49.44% and 31.78%, 14.29% and 21.25%, respectively). Diazepam was also frequently prescribed in NAJS (64.43%) and lorazepam in IQVIA DA Germany (54.95%). Additionally, oxazepam was predominantly recorded in FinOMOP-HILMO (42.73%), while midazolam was predominately recorded in CPRD GOLD (46.4%). For antipsychotics, substances like quetiapine, haloperidol and risperidone showed significant representation across most datasets, with quetiapine particularly prominent in FinOMOP-HILMO (40.3%) and SIDIAP (52.24%). Vasodilating drugs such as amlodipine and ramipril had high frequencies across most data sources, with NAJS demonstrating the high representation for both medications (36.73% and 25.90%, respectively). Ramipril was frequently prescribed in IQVIA DA Germany (45.83%).

Among hypnotic z-drugs, zopiclone, and zolpidem were prominently observed in the data sources. Antiepileptics, such as levetiracetam and valproate, were frequent in FinOMOP-HILMO (20.49% and 34.27%, respectively), whereas clonazepam was notably prevalent in NAJS (40.13%) and SIDIAP (49.50%). Levetiracetam in IQVIA DA Germany showed frequency of 54.45%. Among first-generation antihistamines, hydroxyzine and cyclizine were the most frequently recorded substances in FinOMOP-HILMO and CPRD GOLD, respectively, while dimenhydrinate was the most frequently recorded in IQVIA DA Germany and NAJS.

In the opioid category, codeine and tramadol showed particularly high frequencies, with codeine being the most prevalent in CPRD GOLD (64.91%) and tramadol in SIDIAP and NAJS (64.43% and 98.20%, respectively). Oxycodone was particularly frequent in FinOMOP-HILMO (40.94%). Antidepressants displayed a wide variation in their frequencies across datasets, with amitriptyline being notably high in CPRD GOLD (32.18%), trazodone in SIDIAP (36.95%), and mirtazapine in FinOMOP-HILMO (45.82%).

Among alpha-blockers, tamsulosin was the most prominently observed across data sources including CPRD GOLD (62.85%), IQVIA DA Germany (67.27%), FinOMOP-HILMO (80.17%), NAJS (72.57%), and SIDIAP (70.52%). In the centrally acting hypertensives category, clonidine and moxonidine showed high frequency, while in antimuscarinic drug category, mirabegron and solifenacin were most frequently recorded in FinOMOP-HILMO, SIDIAP, and CPRD GOLD, and trospium in IQVIA DA Germany and NAJS.

Table 19. Individual drug substances within each drug class belonging to the STOPP section K criteria in individuals aged 65 years and older with recurrent falls, who are new users of respective drugs, stratified per data source.

STOPP section K criteria drug class	Substance	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
Benzodiazepines	lormetazepam	<5	46 (1.97)	0	0	278 (14.2)
	clobazam	10 (0.17)	11 (0.47)	22 (0.24)	0	<5
	lorazepam	1,024 (17.84)	1282 (54.95)	1,886 (20.32)	1,462 (2.53)	968 (49.44)
	clonazepam	106 (1.85)	25 (1.07)	239 (2.57)	469 (0.81)	141 (7.2)
	chlordiazepoxide	12 (0.21)	<5	464 (5)	0	0
	temazepam	164 (2.86)	31 (1.33)	1,246 (13.42)	0	0
	nitrazepam	17 (0.3)	13 (0.56)	13 (0.14)	1,836 (3.17)	0
	diazepam	1,824 (31.78)	325 (13.93)	1,326 (14.29)	37,267 (64.43)	416 (21.25)
	midazolam	2,663 (46.4)	28 (1.2)	392 (4.22)	313 (0.54)	14 (0.72)
	oxazepam	9 (0.16)	232 (9.94)	3,966 (42.73)	7209 (12.46)	0
	triazolam	0	<5	6 (0.06)	0	0
	flunitrazepam	0	7 (0.3)	0	0	0
	prazepam	0	6 (0.26)	0	0	0
	brotizolam	0	37 (1.59)	0	0	0
	clorazepate	0	9 (0.39)	0	0	11 (0.56)
	flurazepam	0	5 (0.21)	0	0	<5
	bromazepam	0	211 (9.04)	0	1,356 (2.34)	9 (0.46)
	alprazolam	0	34 (1.46)	100 (1.08)	8,511 (14.71)	136 (6.95)
	ketazolam	0	0	0	0	<5

STOPP section K criteria drug class	Substance	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	medazepam	0	37 (1.59)	0	0	<5
antipsychotics	clozapine	<5	40 (1.26)	14 (0.2)	339 (1.85))	<5
	sulpiride	<5	84 (2.65)	8 (0.11)	3,139 (17.09)	359 (10.45)
	zuclopenthixol	<5	0	13 (0.19)	<5	0
	trifluoperazine	<5	0	0	0	0
	chlorpromazine	11 (0.21)	0	<5	0	<5
	methotrimeprazine	1325 (25.27)	25 (0.79)	66 (0.94)	84 (0.46)	26 (0.76)
	periciazine	17 (0.32)	0	0	0	0
	prochlorperazine	2504 (47.76)	0	82 (1.17)	0	0
	quetiapine	325 (6.2)	469 (14.79)	2820 (40.34)	3,749 (20.41)	1795 (52.24)
	amisulpride	33 (0.63)	<5	0	5 (0.03)	0
	haloperidol	389 (7.42)	147 (4.64)	985 (14.09)	3,702 (20.15)	445 (12.95)
	promazine	43 (0.82)	0	<5	6,221 (33.86)	0
	risperidone	472 (9)	644 (20.31)	2442 (34.93)	1,181 (6.43)	735 (21.39)
	aripiprazole	62 (1.18)	10 (0.32)	42 (0.6)	122 (0.66)	24 (0.7)
	flupenthixol	8 (0.15)	<5	6 (0.09)	0	5 (0.15)
	olanzapine	91 (1.74)	36 (1.14)	451 (6.45)	498 (2.71)	53 (1.54)
	chlorprothixene	0	<5	27 (0.39)	0	0
	paliperidone	0	<5	5 (0.07)	<5	<5
	ziprasidone	0	<5	0	<5	0

STOPP section K criteria drug class	Substance	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	thioridazine	0	<5	0	0	0
	tiapride	0	11 (0.35)	0	0	0
	metylperon	0	1178 (37.15)	0	0	0
	prothipendyl	0	41 (1.29)	0	0	0
	pipamperone	0	536 (16.9)	0	0	0
	fluspirilene	0	66 (2.08)	0	0	0
	lithium	0	8 (0.25)	19 (0.27)	0	0
	perazine	0	9 (0.15)	0	0	0
	asenapine	0	0	<5	0	0
	brexpiprazole	0	0	<5	0	0
	sertindole	0	0	<5	0	0
	perphenazine	0	0	80 (1.14)	0	<5
	droperidol	0	0	92 (1.32)	0	0
	veralipride	0	0	0	0	0
	fluphenazine	0	0	0	422 (2.30)	0
	levosulpiride	0	0	0	0	92 (2.68)
vasodilating_drugs	isosorbide_dinitrate	<5	18 (0.72)	2226 (10.1)	627 (2.55)	0
	olmesartan	<5	27 (1.08)	86 (0.39)	40 (0.16)	7 (0.69)
	enalapril	<5	49 (1.96)	1781 (8.08)	195 (0.79)	479 (47.19)
	trandolapril	<5	0	0	248 (1.01)	0

STOPP section K criteria drug class	Substance	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	lacidipine	<5	0	0	606 (2.47)	0
	amlodipine	1005 (39.2)	416 (16.62)	4858 (22.04)	9,023 (36.73)	114 (11.23)
	valsartan	12 (0.47)	188 (7.51)	1208 (5.48)	1,132 (4.61)	25 (2.46)
	verapamil	17 (0.66)	22 (0.88)	88 (0.4)	295 (1.2)	<5
	nifedipine	32 (1.25)	45 (1.8)	49 (0.22)	31 (0.13)	9 (0.89)
	candesartan	33 (1.29)	363 (14.5)	2585 (11.73)	55 (0.22)	5 (0.49)
	lercanidipine	38 (1.48)	60 (2.4)	1075 (4.88)	518 (2.11)	5 (0.49)
	diltiazem	47 (1.83)	<5	96 (0.44)	23 (0.09)	9 (0.89)
	irbesartan	5 (0.2)	11 (0.44)	0	9 (0.04)	<5
	ramipril	524 (20.44)	1147 (45.83)	3031 (13.75)	6,362 (25.9)	87 (8.57)
	nitroglycerin	549 (21.41)	215 (8.59)	1026 (4.66)	901 (3.67)	87 (8.57)
	losartan	66 (2.57)	23 (0.92)	4189 (19.01)	521 (2.12)	60 (5.91)
	perindopril	67 (2.61)	8 (0.32)	357 (1.62)	8,195 (33.36)	<5
	lisinopril	73 (2.85)	36 (1.44)	311 (1.41)	1,116 (4.54)	73 (7.19)
	felodipine	74 (2.89)	<5	502 (2.28)	64 (0.26)	<5
	isosorbide	89 (3.47)	8 (0.32)	774 (3.51)	294 (1.2)	8 (0.79)
	nicorandil	9 (0.35)	0	0	0	0
	eprosartan	0	0	30 (0.14)	0	0
	captopril	0	7 (0.28)	0	0	25 (2.46)
	fosinopril	0	<5	0	13 (0.05)	0

STOPP section K criteria drug class	Substance	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	benazepril	0	<5	0	0	0
	molsidomine	0	20 (0.8)	0	0	0
	nitrendipine	0	40 (1.6)	0	0	0
	telmisartan	0	32 (1.28)	574 (2.6)	115 (0.47)	0
	pentaerythritol	0	11 (0.44)	0	0	0
	nimodipine	0	0	<5	0	<5
	nilvadipine	0	0	24 (0.11)	0	0
	quinapril	0	0	8 (0.04)	0	0
	zofenopril	0	0	0	67 (0.27)	0
	azilsartan	0	0	0	0	0
	etafenone	0	0	0	0	0
	cilazapril	0	0	0	7 (0.03)	0
	imidapril	0	0	0	0	<5
	nicardipine	0	0	0	0	<5
	heptaminol	0	0	0	0	41 (4.04)
	manidipine	0	0	0	0	7 (0.69)
Hypnotic z-drugs	zolpidem	111 (5.13)	490 (31.59)	659 (16.07)	20,373 (94.86)	140 (97.9)
	zopiclone	2052 (94.91)	1009 (65.05)	3446 (84.01)	1105 (5.15)	<5
Antiepileptics	oxcarbazepine	<5	5 (1.01)	241 (10.92)	249 (5.78)	11 (1.56)
	zonisamide	<5	<5	6 (0.27)	128 (2.97)	18 (2.56)

STOPP section K criteria drug class	Substance	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	cannabidiol	<5	0	0	0	0
	lamotrigine	100 (14.99)	40 (8.1)	169 (7.66)	259 (6.01)	24 (3.41)
	valproate	112 (16.79)	44 (8.91)	756 (34.27)	326 (7.57)	28 (3.98)
	phenytoin	12 (1.8)	<5	30 (1.36)	<5	<5
	clonazepam	123 (18.44)	23 (4.66)	291 (13.19)	1,729 (40.13)	348 (49.5)
	topiramate	17 (2.55)	6 (1.21)	18 (0.82)	29 (0.67)	17 (2.42)
	levetiracetam	178 (26.69)	269 (54.45)	452 (20.49)	692 (16.06)	182 (25.89)
	primidone	23 (3.45)	30 (6.07)	15 (0.68)	40 (0.93)	8 (1.14)
	carbamazepine	99 (14.84)	58 (11.74)	272 (12.33)	769 (17.85)	32 (4.55)
	lacosamide	0	22 (4.45)	52 (2.36)	22 (0.51)	21 (2.99)
	phenobarbital	0	0	<5	43 (1.00)	<5
	perampanel	0	0	<5	0	6 (0.85)
	fosphenytoin	0	0	<5	0	0
	brivaracetam	0	0	10 (0.45)	<5	<5
	mephobarbital	0	0	0	99 (2.30)	0
	ethosuximide	0	0	0	0	<5
	vigabatrin	0	0	0	0	<5
	eslicarbazepine	0	0	0	0	10 (1.42)
First generation antihistamines	cyproheptadine	<5	<5	0	0	<5
	doxepin	<5	122 (4.98)	283 (19.02)	0	<5

STOPP section K criteria drug class	Substance	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	triprolidine	<5	7 (0.29)	0	0	<5
	diphenhydramine	12 (0.27)	15 (0.61)	0	0	20 (3.17)
	buclizine	14 (0.32)	0	0	0	0
	hydroxyzine	184 (4.16)	74 (3.02)	967 (64.99)	0	244 (38.67)
	cyclizine	2998 (67.75)	0	<5	0	0
	promethazine	489 (11.05)	383 (15.63)	0	0	0
	chlorpheniramine	718 (16.23)	0	0	0	<5
	dimenhydrinate	9 (0.2)	1493 (60.94)	0	122 (55.96)	29 (4.6)
	ketotifen	0	<5	142 (9.54)	0	66 (10.46)
	dimethindene	0	268 (10.94)	0	96 (44.04)	0
	clemastine	0	39 (1.59)	0	0	0
	doxylamine	0	58 (2.37)	93 (6.25)	0	<5
	meclizine	0	0	<5	0	0
	tripelennamine	0	0	<5	0	0
	pyrilamine	0	0	0	0	259 (41.05)
Opioids	tapentadol	<5	133 (2.23)	0	182 (0.32)	89 (2.25)
	hydromorphone	<5	186 (3.11)	0	0	<5
	propoxyphene	<5	0	0	0	0
	meptazinol	10 (0.1)	0	0	0	0
	morphine	1710 (16.28)	420 (7.03)	759 (4.34)	59 (0.10)	344 (8.7)

STOPP section K criteria drug class	Substance	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	oxycodone	249 (2.37)	440 (7.36)	7160 (40.94)	85 (0.15)	31 (0.78)
	tramadol	424 (4.04)	791 (13.24)	2033 (11.62)	56,294 (98.20)	2549 (64.43)
	buprenorphine	545 (5.19)	271 (4.54)	2178 (12.45)	115 (0.20)	49 (1.24)
	codeine	6816 (64.91)	630 (10.54)	5878 (33.61)	113 (0.20)	617 (15.6)
	dihydrocodeine	782 (7.45)	431 (7.21)	0	0	0
	fentanyl	95 (0.9)	56 (3.61)	564 (9.44)	500 (0.87)	346 (8.75)
	tilidine	0	2153 (36.03)	0	0	0
	methadone	0	0	0	<5	<5
	meperidine	0	<5	0	114 (0.2)	<5
Antidepressants	bupropion	<5	7 (0.23)	105 (0.95)	24 (0.17)	<5
	moclobemide	<5	<5	16 (0.14)	<5	0
	agomelatine	<5	23 (0.77)	32 (0.29)	6 (0.04)	0
	doxepin	<5	105 (3.5)	133 (1.2)	0	<5
	paroxetine	<5	22 (0.73)	62 (0.56)	757 (5.4)	39 (2.08)
	reboxetine	<5	<5	<5	<5	0
	clomipramine	<5	<5	10 (0.09)	6 (0.04)	<5
	vortioxetine	<5	0	436 (3.94)	441 (3.14)	24 (1.28)
	amitriptyline	1413 (32.18)	284 (9.47)	1332 (12.03)	673 (4.8)	99 (5.27)
	duloxetine	150 (3.42)	163 (5.43)	696 (6.29)	1,577 (11.24)	56 (2.98)
	trazodone	153 (3.48)	25 (0.83)	44 (0.4)	348 (2.48)	694 (36.95)

STOPP section K criteria drug class	Substance	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	fluoxetine	206 (4.69)	14 (0.47)	131 (1.18)	81 (0.58)	15 (0.8)
	venlafaxine	25 (0.57)	106 (3.53)	485 (4.38)	262 (1.87)	37 (1.97)
	escitalopram	27 (0.61)	172 (5.73)	1180 (10.66)	3,573 (25.47)	43 (2.29)
	nortriptyline	33 (0.75)	<5	223 (2.01)	0	<5
	dothiepin	5 (0.11)	0	0	0	0
	imipramine	7 (0.16)	0	0	0	<5
	citalopram	700 (15.94)	401 (13.37)	810 (7.32)	75 (0.53)	242 (12.89)
	sertraline	781 (17.79)	176 (5.87)	426 (3.85)	1,973 (14.07)	375 (19.97)
	mirtazapine	893 (20.34)	985 (32.83)	5072 (45.82)	2,119 (15.11)	278 (14.8)
	mianserin	0	<5	64 (0.58)	0	<5
	trimipramine	0	141 (4.7)	8 (0.07)	0	0
	opipramol	0	315 (10.5)	0	0	0
	st_john_s_wort_extract	0	94 (3.13)	0	0	0
	esketamine	0	0	15 (0.14)	0	0
	fluvoxamine	0	0	8 (0.07)	677 (4.83)	<5
	tryptophan	0		<5	13 (0.09)	28056 (65.72)
	tianeptine	0	10 (0.33)	0	1,509 (10.76)	<5
	maprotiline	0	<5	0	138 (0.98)	0
	desvenlafaxine	0	0	0	0	6 (0.32)
Alpha-blockers	prazosin	<5	0	153 (3.23)	0	0

STOPP section K criteria drug class	Substance	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	indoramin	<5	0	0	0	0
	alfuzosin	13 (1.1)	23 (2.2)	792 (16.72)	0	<5
	doxazosin	422 (35.79)	158 (15.12)	<5	396 (4.05)	126 (25.1)
	tamsulosin	741 (62.85)	703 (67.27)	3797 (80.17)	7,100 (72.57)	354 (70.52)
	urapidil	0	146 (13.97)	0	1,966 (20.09)	0
	terazosin	0	8 (0.77)	0	0	<5
	silodosin	0	9 (0.86)	9 (0.19)	330 (3.37)	17 (3.39)
	prazosin	<5	0	153 (3.23)	0	0
Centrally acting antihypertensives	Rauwolfia alkaloids	0	0	0	0	0
	clonidine	18 (40)	80 (17.51)	249 (37.28)	0	0
	moxonidine	21 (46.67)	374 (81.84)	420 (62.87)	9,720 (99.98)	0
	methyldopa	6 (13.33)	<5	0	<5	0
	reserpine	0	<5	0	0	0
Antimuscarinic drugs	propiverine	<5	65 (7.75)	0	111 (0.58)	10 (2.48)
	flavoxate	12 (0.66)	<5	0	0	<5
	darifenacin	16 (0.88)	35 (4.17)	17 (0.48)	114 (0.60)	0
	tolterodine	296 (16.23)	30 (3.58)	57 (1.61)	0	55 (13.61)
	mirabegron	317 (17.38)	36 (4.29)	2952 (83.25)	512 (2.69)513 (2.69)	149 (36.88)
	fesoterodine	36 (1.97)	6 (0.72)	102 (2.88)	0	37 (9.16)
	oxybutynin	394 (21.6)	37 (4.41)	48 (1.35)	16 (0.08)	19 (4.7)

STOPP section K criteria drug class	Substance	CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
	solifenacin	661 (36.24)	146 (17.4)	311 (8.77)	3,685 (19.39)	132 (32.67)
	trospium	94 (5.15)	461 (54.95)	86 (2.43)	14,292 (75.19)	10 (2.48)
	desfesoterodine	0	21 (2.50)	0	299 (1.57)	0

CPRD GOLD = Clinical Practice Research Datalink GOLD; DA = Disease Analyzer; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària;

12.6.3.4. Treatment duration

Treatment duration, defined as the number of days between drug exposure start date and the drug exposure end date, is presented in **Table 20**. Treatment duration varied by STOPP section K criteria drug classes, stratification by those with recurrent falls and without recurrent falls and data source.

The median treatment duration for benzodiazepine use in individuals aged 65 years and older with recurrent falls ranged from 7 days in CPRD GOLD to 83 days in SIDIAP. Among older adults without recurrent falls, the median treatment duration ranged between 8 days in CPRD GOLD to 62 days in SIDIAP.

For antipsychotics, the median duration for older adults with recurrent falls varied from 10 days in CPRD GOLD to 146 days in SIDIAP, while for those without recurrent falls, it ranged from 10 days in CPRD GOLD to 61 days in SIDIAP. For opioids, the median treatment duration for those with recurrent falls ranged from 25 days in CPRD GOLD to 39 days in SIDIAP, while for those without recurrent falls, it ranged from 25 days in IQVIA DA Germany to 34 days in SIDIAP.

The median treatment duration for vasodilating drug use in individuals aged 65 years and older with recurrent falls had a wide range from 129 days in CPRD GOLD to 487 days in SIDIAP. For older adults without recurrent falls, it ranged from 100 days in IQVIA DA Germany to 764 days in SIDIAP.

In FinOMOP-HILMO and NAJS, the median treatment duration for these STOPP section K criteria drug prescriptions was set to 30 days and may therefore not represent a valid estimate. For SIDIAP, the median treatment duration was highest for all drug classes of interest.

The median treatment duration for hypnotic z-drugs, first-generation antihistamines, and antidepressants was generally very comparable between older adults with and without recurrent falls. However, the median treatment duration was longer for those without recurrent falls for alpha blockers in CPRD GOLD and SIDIAP. No clear pattern was observed for antiepileptics and antimuscarinic drugs. For centrally acting antihypertensives, the median duration among those with recurrent falls was 55 days in NAJS and 100 days in IQVIA DA Germany. In individuals without recurrent falls, it ranged from 56 days in CPRD GOLD to 345 days in SIDIAP.

Table 20. Treatment duration of STOPP section K criteria drug classes in individuals aged 65 years and older, stratified by those with recurrent falls and those without, during the study period and across the data sources.

		CPRD_GOLD		IQVIA_DA_Germany		FinOMOP_HILMO***		NAJS***		SIDIAP	
Drug class	**Variable**	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****
Benzodiazepines	exposed time, median (q25, q75)	7 (1, 28)	8 (4, 28)	50 (20, 50)	31 (20, 50)	30 (29, 30)	30 (30, 30)	30 (30, 44)	30 (30, 30)	83 (31, 358)	62 (31, 366)
	exposed time, range (min - max)	1 - 2,447	1 - 4,015	1 - 1,536	1 - 3,914	1 - 546	1 - 3,946	1 - 2,481	1 - 2,554	2 - 3,013	1 - 3,833
Antipsychotics	exposed time, median (q25, q75)	10 (2, 28)	10 (5, 28)	64 (20, 140)	60 (20, 132)	30 (30, 50)	30 (30, 43)	30 (30, 108)	30 (30, 93)	146 (40, 517)	61 (31, 359)
	exposed time, range (min - max)	1 - 2,804	1 - 3,946	1 - 2,522	1 - 3,883	1 - 481	1 - 2,810	1 - 2,288	1 - 2,548	2 - 3,201	1 - 3,833
Vasodilating drugs	exposed time, median (q25, q75)	129 (55, 438)	222 (64, 757)	145 (98, 392)	100 (98, 372)	30 (30, 30)	30 (30, 30)	30 (30, 135)	30 (30, 123)	487 (95, 922)	764 (182, 1,854)
	exposed time, range (min - max)	1 - 3,263	1 - 4,016	1 - 2,999	1 - 3,924	1 - 345	1 - 879	1 - 2,476	1 - 2,555	3 - 3,103	1 - 3,833
Hypnotic z-drugs	exposed time, median (q25, q75)	28 (14, 60)	20 (14, 34)	20 (20, 49)	20 (20, 31)	30 (30, 30)	30 (30, 30)	30 (30, 83)	30 (30, 69)	93 (41, 395)	93 (34, 412)
	exposed time, range (min - max)	1 - 1,882	1 - 4,002	4 - 1,929	1 - 3,383	2 - 457	1 - 3,744	1 - 2, 505	1 - 2,554	2 - 1,620	1 - 3,833

		CPRD_GOLD		IQVIA_DA_Germany		FinOMOP_HILMO***		NAJS***		SIDIAP	
Drug class	**Variable**	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****
Antiepileptics	exposed time, median (q25, q75)	102 (30, 338)	71 (28, 311)	100 (50, 229)	100 (50, 200)	30 (30, 36)	30 (30, 30)	30 (30, 135)	30 (30, 118)	130 (40, 487)	160 (50, 636)
	exposed time, range (min - max)	2 - 2,701	1 - 4,002	1 - 1,553	1 - 3,901	1 - 297	1 - 1,202	1 - 2,374	1 - 2,555	3 - 2,953	1 - 3,833
First generation antihistamines	exposed time, median (q25, q75)	10 (4, 28)	14 (7, 28)	20 (7, 34)	20 (10, 34)	30 (30, 30)	30 (30, 30)	30 (30, 37)	30 (30, 42)	31 (31, 55)	31 (31, 59)
	exposed time, range (min - max)	1 - 2,278	1 - 3,829	1 - 1,215	1 - 3,596	2 - 367	1 - 827	2 - 497	5 - 705	2 - 2,007	1 - 3,833
Opioids	exposed time, median (q25, q75)	25 (8, 38)	27 (8, 29)	30 (20, 75)	25 (10, 50)	30 (30, 42)	30 (30, 36)	30 (30, 61)	30 (30, 55)	39 (31, 118)	34 (31, 94)
	exposed time, range (min - max)	1 - 2,534	1 - 4,015	1 - 2,505	1 - 3,923	1 - 875	1 - 2,305	1 - 2,463	1 - 2,548	2 - 2,922	1 - 3,833
Antidepressants	exposed time, median (q25, q75)	56 (28, 228)	46 (28, 163)	100 (50, 197)	100 (50, 162)	30 (30, 35)	30 (30, 30)	30 (30, 139)	30 (30, 122)	304 (73, 760)	273 (75, 840)
	exposed time, range (min - max)	1 - 3,224	1 - 4,015	1 - 2,291	1 - 3,912	1 - 344	1 - 769	1 - 2,527	1 - 2,552	2 - 3,499	1 - 3,833
Alpha blockers	exposed time,	129 (41, 412)	155 (54, 548)	100 (100, 290)	100 (100, 209)	30 (30, 30)	30 (30, 30)	30 (30, 142)	30 (30, 134)	273 (61, 623)	466 (101, 1,297)

		CPRD_GOLD		IQVIA_DA_Germany		FinOMOP_HILMO***		NAJS***		SIDIAP	
Drug class	**Variable**	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****	**Recurrent falls***	**Without recurrent falls****
	median (q25, q75)										
	exposed time, range (min - max)	1 - 2,688	1 - 4,011	10 - 2,330	2 - 3,918	2 - 211	1 - 385	1 - 2,547	1 - 2,555	2 - 3,070	1 - 3,833
Centrally acting antihypertensives	exposed time, median (q25, q75)	73 (30, 275)	56 (28, 199)	100 (50, 224)	100 (50, 248)	30 (29, 30)	30 (30, 30)	55 (30, 181)	58 (30, 202)	-	345 (65, 880)
	exposed time, range (min - max)	28 - 1,570	1 - 3,782	2 - 2,838	1 - 3,908	1 - 288	1 - 451	1 - 2,382	1 - 2,547	-	1 - 3,774
Antimuscarinic drugs	exposed time, median (q25, q75)	78 (30, 275)	60 (28, 234)	90 (34, 172)	90 (30, 116)	30 (30, 30)	30 (30, 30)	30 (30, 30)	30 (30, 30)	161 (61, 550)	197 (62, 659)
	exposed time, range (min - max)	2 - 3,351	1 - 4,004	5 - 2,742	1 - 3,609	3 - 429	1 - 539	1 - 2,393	1 - 2,537	3 - 2,916	1 - 3,833

CPRD GOLD = Clinical Practice Research Datalink GOLD; IQVIA DA Germany = IQVIA Disease Analyzer Germany; FinOMOP-HILMO = Finnish Care Register for Health Care; NAJS = Croatian National Public Health Information System; SIDIAP = Sistema d'Informació per al Desenvolupament de la Investigació en Atenció Primària; *= New drug users with recurrent falls; **= New drug users without recurrent falls; ***= FinOMOP-HILMO and NAJS native prescription dataset does not include explicit information for drug end date. Therefore, these end dates have been imputed into the OMOP CDM based on standard conventions and direct characterisation of this may not have a plausible interpretation.

12.6.3.5. STOPP section K criteria drug product names

A detailed overview of the top ten products in each of the STOPP section K criteria drug classes, focusing on benzodiazepines, antipsychotics, vasodilating drugs, hypnotic z-drugs, anti-epileptics, first generation antihistamines, opioids, antidepressants, alpha-blockers, centrally acting antihypertensives and antimuscarinic drugs can be found in Shiny app at EUPAS1000000333. It includes information on the drug name, strength, formulation, and the number of new drug users at treatment initiation, categorized by those with and without recurrent falls. This data is sourced from all data sources, highlighting the most commonly prescribed medications and their usage patterns in these specific patient groups.

In general, there is a significant overlap in the types of medications used by new drug users with and without recurrent falls for all drug classes of interest. However, the specific products and their prevalence can vary by data source. For example, for new drug users with recurrent falls and those without recurrent falls in CPRD GOLD, the commonly used benzodiazepines included diazepam 2 MG Oral Tablet, 2 ML Midazolam 5 MG/ML Injectable Solution, and diazepam 5 MG Oral Tablet. In IQVIA DA Germany, Lorazepam 1 MG Disintegrating Oral Tablet, Lorazepam 0.5 MG Oral Tablet, and Lorazepam 1 MG Oral Tablet were most commonly prescribed among those with and without recurrent falls. FinOMOP-HILMO shows oxazepam 15 MG Oral Tablet, temazepam 20 MG Oral Tablet, and Lorazepam 1 MG Oral Tablet as frequently used, while lorazepam 1 MG Oral Tablet, diazepam 5 MG Oral Tablet, and lormetazepam 1 MG Oral Tablet were common in SIDIAP. In NAJS, Diazepam 5 MG Oral Tablet Box of 30 and Acetaminophen 325 MG / Tramadol 37.5 MG Oral Tablet Box of 30 were the most frequently prescribed among new drug users with recurrent falls and those without recurrent falls.

13. MANAGEMENT AND REPORTING OF ADVERSE EVENTS/ADVERSE REACTIONS

Adverse events/adverse reactions were not collected or analysed as part of this evaluation. The nature of this non-interventional evaluation, through the use of secondary data, did not fulfil the criteria for reporting adverse events, according to module VI, VI.C.1.2.1.2 of the Good Pharmacovigilance Practices (https://www.ema.europa.eu/en/documents/regulatory-procedural-guideline/guideline-good-pharmacovigilance-practices-gvp-module-vi-collection-management-submission-reports_en.pdf).

Only in case of prospective data collection, there was a need to describe the procedures for the collection, management, and reporting of individual cases of adverse events/adverse reactions.

14. DISCUSSION

14.1. Key results

Characterisation of individuals with recurrent falls – Patient-level characterisation

The study identified 271,244 individuals aged 65 years and older newly diagnosed with recurrent falls between January 1, 2013, and December 31, 2023 (CPRD GOLD: 32,240, IQVIA DA Germany: 24,440, FinOMOP-HILMO: 33,956, NAJS: 168,377, SIDIAP: 12,231). The NAJS data source contributed the largest proportion (62%) of these cases. The median age at the time of newly diagnosed recurrent falls varied across data sources, ranging from 76 years in registries such as FinOMOP-HILMO and NAJS to 82 years in the primary care database IQVIA DA Germany and 84 years in the primary care databases CPRD GOLD and SIDIAP. The majority of cases were female, with proportions ranging from 64.00% in CPRD GOLD to 70.63% in SIDIAP.

The frequency of pre-specified risk factors at the index date varied significantly across data sources. In IQVIA DA Germany, the most common conditions were hypertension, abnormal gait, arthritis, diabetes mellites, and dizziness, while in NAJS hypertension and diabetes mellitus were the most frequent. In contrast, other data sources reported much lower frequencies of these conditions. The most frequently prescribed STOPP section K criteria medications included vasodilating drugs, opioids, antidepressants, benzodiazepines, and antipsychotics, with notable variations between data sources. When examining the period prior to the index date, the frequency of pre-specified conditions and medications was substantially higher compared to that at the index date.

Hypertension, dizziness, and urinary incontinence were the most frequently recorded conditions at the index date. Additionally, injuries and fractures were commonly observed among the top recorded conditions, which were rather the result of a fall. Acetaminophen products, dipyrone products, NSAIDs and proton pump inhibitor products were frequently prescribed medications at the index date. The frequency of these conditions and medications was higher in the period before the index date.

The survival analysis included 214,750 individuals aged 65 years and older newly diagnosed with recurrent falls, with data from CPRD GOLD, FinOMOP-HILMO, NAJS, and SIDIAP. Among these individuals, 74,141 had a subsequent death record during the study period. The proportion of deaths varied across data sources, with the highest observed in SIDIAP (52.51%) and the lowest in NAJS (31.69%).

Overall survival was assessed using the Kaplan-Meier method, with results indicating significant variability in median survival times across data sources. The median survival ranged from 1,507 days (95% CI: 1,474 – 1,541 days) in primary care data source CPRD GOLD to 2,770 days (95% CI: 2,714 – 2,836 days) in FinOMOP-HILMO registry.

Prevalence and incidence rates of STOPP section K criteria drug classes – Population-level utilisation

The prevalence and incidence rates of STOPP section K criteria drug class use among individuals aged 65 years and older, stratified in those newly diagnosed with recurrent falls and those without recurrent falls, revealed a distinct pattern over time. In individuals with recurrent falls, use of STOPP section K criteria drug classes was assessed following the diagnosis of recurrent falls, which may have occurred a considerable time afterwards. Vasodilating drugs, opioids, antidepressants, and benzodiazepines were the most frequently prescribed drug classes in both cohorts.

The prevalence of STOPP section K criteria drug classes was similar or greater among individuals aged 65 years and older following their new diagnosis of recurrent falls compared to individuals aged 65 years and older without recurrent falls, across all data sources. Individuals in the overall cohorts without recurrent falls were generally younger and had fewer comorbidities, which may partially explain the observed differences.

For instance, the prevalence of benzodiazepine use among older adults following their new diagnosis of recurrent falls ranged from 6% in IQVIA DA Germany to 23% in SIDIAP in 2013 and declined to 3% in IQVIA DA Germany and 18% in SIDIAP by 2023. Most data sources demonstrated relatively stable trends with a slight decline over the study period. A similar pattern was observed among those without recurrent falls, with consistently lower prevalence.

Vasodilating drug use showed varied trends, with some data sources reporting a decline and others an increase over the study period. Opioid use either remained stable, slightly decreased or increased among older individuals following their new diagnosis of recurrent falls. For those without recurrent falls, opioid use was substantially lower but exhibited similar trends as that in older adults after a new diagnosis of recurrent falls across data sources. Antidepressant use remained stable in most data sources or increased in older adults following their new diagnosis of recurrent falls, while lower prevalence was observed in

older adults without recurrent falls. Antipsychotic use declined in most data sources or increased or remained stable, while the use of hypnotic z-drug, antiepileptics, first generation antihistamines, alpha-blockers, centrally acting antihypertensives, and antimuscarinic drugs generally remained low and relatively stable across all data sources.

The prevalence of STOPP section K criteria drug classes increased gradually with increasing age, particularly for benzodiazepines and antipsychotics. However, the prevalence of drug use varied by age group, cohort, and drug class. Similarly, the prevalence of drug use by sex also varied by cohort and drug class, with some showing higher prevalence in women, others in men or no significant differences.

The incidence rates of STOPP section K criteria drug class use followed similar trends as prevalence. The incidence rates of STOPP section K criteria drug class use in older adults following their new diagnosis of recurrent falls were similar or higher compared to those without recurrent falls. The incidence of benzodiazepine use among older adults following their new diagnosis of recurrent falls ranged from 64 in IQVIA DA Germany to 167 per 1,000 person-years PYs in FinOMOP-HILMO in 2013, generally declining over the study period. In contrast, the incidence rates among those without recurrent falls were substantially lower, ranging from 7 per 1,000 PYs in IQVIA DA Germany to 62 per 1,000 PYs in FinOMOP-HILMO in 2013. Antipsychotic use showed an initial decline followed by stabilisation in most data sources, with higher incidence rates in the older adults following their new diagnosis of recurrent falls compared to those without recurrent falls. Vasodilating drug use exhibited varied trends, with some data sources showing a decline and others an increase over the study period. The highest incidence rates were observed in FinOMOP-HILMO, with a marked increase from 146 per 1,000 PYs in 2023 to 263 per 1,000 PYs by 2023. Hypnotic z-drug use showed an initial decline followed by stabilisation, with similar or lower incidence rates among those without recurrent falls. Antiepileptic use declined over time across all data sources, with lower incidence rates in the cohort without recurrent falls. First generation antihistamine use showed slight declines, stable trends or increase across the data sources, with higher incidence rates in older adults following their new diagnosis of recurrent falls cohort. Opioid use exhibited a steep decline initially, followed by a gradual decrease, with higher incidence rates in the older adults following their new diagnosis of recurrent falls compared to those without.

Antidepressant use showed slight declines or stable trends, with higher incidence rates in the recurrent falls cohort. Alpha-blocker use remained stable across most data sources or increased, with similar patterns observed in both cohorts. Centrally acting antihypertensive use remained low and stable, with similar or slightly higher incidence rates in the recurrent falls cohort. Antimuscarinic drug use showed slight fluctuations but remained generally stable, with higher incidence rates in the recurrent falls cohort.

Incidence rates of STOPP section K criteria drug class use by age and sex followed similar trends as prevalence.

Characterisation of new users of STOPP section K criteria – Patient-level utilisation

The number of individuals aged 65 years and older with recurrent falls at the time of new STOPP section K criteria prescriptions ranged from 7,532 individuals at the time of new antiepileptic prescriptions to 78,714 individuals at the time of new opioid prescriptions, with significant representation across different data sources. The median age at the time of new prescription ranged between 76 and 86 years across different drug classes and data sources. Generally, the proportion of females was higher than males across all drug classes, except for alpha-blockers, where males predominated.

Common comorbidities among individuals with recurrent falls at the time of their new prescription of the STOPP section K criteria drug classes varied across the respective drug classes of interest and data sources. Common comorbidities among older adults with recurrent falls prescribed benzodiazepines included essential hypertension and anxiety disorders. Hypertension remained one of the most frequently reported

conditions among the other STOPP section K criteria drug classes across the data sources. For antipsychotics, dementia, restlessness and agitation, and organic personality disorder were frequently observed. Vasodilator users commonly had cardiovascular comorbidities, while hypnotic z-drug users often had sleep disorders and anxiety. Epilepsy and seizures were prevalent among antiepileptic users, while dizziness and nausea were common among first-generation antihistamine users. Opioid users frequently had pain-related conditions, and depressive disorders, anxiety disorders, and sleep disturbances were prevalent among antidepressant users. Hyperplasia of the prostate and urinary conditions including retention of urine and increased frequency of urination were common among alpha-blocker users. Cardiovascular comorbidities were reported among those prescribed centrally acting antihypertensives and urinary conditions were prevalent in those using antimuscarinic drugs.

Co-prescription patterns revealed frequent use of analgesics, gastrointestinal medications such as pantoprazole and omeprazole and other sedative-hypnotic agents across various drug classes. For example, benzodiazepines were often co-prescribed with acetaminophen and omeprazole, while antipsychotics were frequently co-prescribed with acetaminophen, omeprazole, and benzodiazepines.

In terms of individual drug substances within each drug class belonging to the STOPP section K criteria, notable findings included high frequencies of lorazepam, diazepam, oxazepam, and midazolam among benzodiazepines, quetiapine, haloperidol, and risperidone among antipsychotics and amlodipine and ramipril among vasodilating drugs. Additionally, codeine, tramadol, and oxycodone were prevalent opioids, while tamsulosin was the most commonly prescribed alpha-blocker.

Treatment duration

The median treatment duration for benzodiazepine use among individuals with recurrent falls ranged from 7 days in CPRD GOLD to 83 days in SIDIAP. For antipsychotics, the median duration ranged from 10 days in CPRD GOLD to 146 days in SIDIAP, while for opioids from 25 days in CPRD GOLD to 39 days in SIDIAP and for vasodilating drug use from 129 days in CPRD GOLD to 487 days in SIDIAP. In general, treatment durations were shorter for the individuals without recurrent falls, except for vasodilating drugs where the duration was longer.

The treatment duration for hypnotic z-drugs, first-generation antihistamines, and antidepressants was generally comparable between those with and without recurrent falls. However, alpha-blockers had longer treatment durations for those without recurrent falls in CPRD GOLD and SIDIAP.

14.2. Limitations of the research methods

The study was informed by routinely collected healthcare data, and it was important to consider several factors that might have influenced the interpretation of the results.

General limitations:

Phenotype: A recording of falls varied across the databases and might have been incomplete if a patient did not report it or if the health care professional did not record it, which could occur in situations where the health care professional preferentially recorded the diagnosis leading to a fall. This might have led to an underestimate of people with recurrent falls.

Drug prescriptions: A recording of a prescription did not mean that the patient took the drug. Therefore, assumptions of actual use were made. The included primary care databases did not capture hospital drug exposure if a patient had been admitted during the observation period. Once a person was diagnosed with recurrent falls, defined as either having 2 or more falls within the past 12 months or a diagnosis of recurrent falls, they were assumed to remain in that cohort for the remainder of follow-up for the purpose of drug utilisation.

FinOMOP-HILMO native prescription dataset does not include explicit information for drug end dates. Therefore, the end dates have been imputed into the OMOP CDM based on standard conventions (https://ohdsi.github.io/Themis/drug_end_date_not_in_data.html). Therefore, the treatment duration in FinOMOP-HILMO may not have a plausible interpretation.

Characterisation: The accuracy and consistency of pre-defined condition recording, crucial for patient characterisation might have varied across the databases included in the study and might have been incomplete. Furthermore, in some data sources, the conditions were not recorded repeatedly, meaning that the frequency of conditions may differ depending on the selected time windows. The exact date of birth was not known, only the year of birth was known. Therefore, for some patients the measured age was off by one year.

Setting: For this study, we included data from 5 data sources (CPRD GOLD, IQVIA DA Germany, FinOMOP-HILMO, NAJS and SIDIAP). Results of these databases might not necessarily reflect prescriptions in other countries/databases. The study is focused on individuals with recurrent falls at aged 65 years and older and might have not been representative of younger people with recurrent falls.

Death: Since date of death was not available In IQVIA DA Germany, overall survival was not estimated in this database.

14.3. Interpretation

Falls among older adults represent a significant public health concern, being the most common type of accident and the leading cause of injury-related hospitalisations, disability, loss of independence and increased mortality.[11-13] Section K of the STOPP criteria identifies drug classes that increase the risk of falls in susceptible older individuals. However, the prevalence of potentially inappropriate medication prescriptions listed in Section K among those with recurrent falls has been uncertain across Europe.

Our study aimed to fill this gap by analysing 271,244 individuals aged 65 years and older newly diagnosed with recurrent falls between 2013 and 2023 across multiple European data sources. The median age at diagnosis ranged from 76 to 84 years, with a higher proportion of females across all data sources. This finding is consistent with literature indicating that risk of falls increases with age and that women are more likely to experience falls than men.[13-15]

The frequency of pre-specified risk factors and recorded conditions at the index date and in the year prior to newly diagnosed recurrent falls varied across data sources. Conditions such as hypertension, arthritis, abnormal gait, dizziness, diabetes mellitus, and urinary incontinence were highly prevalent, along with the prescription of vasodilating drugs, opioids, benzodiazepines, and antipsychotics. This aligns with known risk factors for falls in older adults. The substantial increase in these conditions and prescriptions before the index date is supported by literature indicating that chronic diseases are common among older adults with recurrent falls.[16] Additionally, a significant proportion of the top recorded conditions were related to injuries and fractures and were likely a direct consequence of falling, highlighting the physical vulnerability of this population. These findings reinforce the importance of falls as a serious public health issue, particularly in older adults with complex health needs.

In terms of comedications, the most commonly used drugs were antipyretics and analgesics, such as acetaminophen and dipyrone products, and NSAIDs like aspirin and ibuprofen. This suggests a high prevalence of pain management needs among older adults with recurrent falls, consistent with literature on chronic pain in this age group. The frequent use of proton pump inhibitors (PPIs) like omeprazole highlights the need for gastrointestinal protection, likely due to the concurrent use of NSAIDs.

The survival analysis revealed significant variability in median survival times across data sources. These differences may reflect variations in healthcare setting, access to care and underlying population health characteristics.

Our findings on prevalence and incidence rates of medication prescriptions listed in section K of the STOPP criteria indicated that these medications are prescribed at similar or greater rate among individuals aged 65 years and older following their new diagnosis of recurrent falls compared to individuals aged 65 years and older without recurrent falls. The analysis revealed that vasodilating drugs, opioids, antidepressants, and benzodiazepines were the most frequently prescribed drug classes among older adults following a recurrent fall diagnosis. These findings align with existing literature, which shows that these high-risk medications are widely prescribed for older people.[17] To further contextualise our results with the STOPP criteria timeline, it is important to note that version 2 of STOPP section K criteria,[18] published in 2015, included only four drug classes (benzodiazepines, neuroleptics, vasodilators, and hypnotic-Z drugs). However, STOPP version 3,[3] published in 2023, expanded this section by incorporating additional drug classes associated with an increased risk of falls. Since our analysis included historic data predating 2023, it is likely that the prevalence of these additional STOPP section K criteria medications would not be low or have changed. Given that the older adults with recurrent falls may be at an increased risk of adverse drug events, potentially exacerbating their risk of further falls and associated complications, this population may benefit from further assessment in the future, such as comprehensive medication review. This highlights the need for careful consideration of fall risk in current prescribing practices and underscores the importance of a multidisciplinary approach to medication management and patient safety.[17]

In characterising individuals aged 65 years and older with recurrent falls at the time of new prescriptions of STOPP Section K criteria drug classes, the median age ranged between 76 and 86 years across different drug classes and data sources. Generally, the proportion of females was higher than males across all drug classes, except for alpha-blockers, where males predominated. Comorbidities varied across the drug classes and data sources and were related to the use of the respective medications to manage and control these conditions. Regarding co-medications, the most commonly used drugs were analgesics, likely for pain management, and gastrointestinal protection medications, as well as other sedative-hypnotic agents.

14.4. Generalisability

While our study comprised data from 5 data sources in 5 European countries and covered a primary care, outpatient specialist settings and registries, findings from this study are not to be generalised to other countries or databases but only reflect the situation in the specific region and setting covered by the respective database.

15. CONCLUSION

In this study, we characterised 271,244 individuals aged 65 years and older newly diagnosed with recurrent falls between 2013 and 2023, utilising data from multiple European sources. Older adults with recurrent falls frequently presented with comorbid conditions, with many presenting conditions likely to be a consequence of the fall, such as injuries and fractures. This underscores the significant public health challenge posed by recurrent falls in the elderly population.

Our analysis demonstrated that STOPP section K criteria drug classes were prescribed at similar or even greater prevalence and incidence rates in individuals aged 65 years and older following a new diagnosis of recurrent falls compared to those without recurrent falls. The most commonly prescribed drug classes included vasodilating drugs, opioids, antidepressants, and benzodiazepines, with variation in prevalence and incidence rates across the cohorts.

These findings highlight the importance of identifying older adults with recurrent falls as a population at increased risk. This population may benefit from medication review. A comprehensive approach to medication management, with careful assessment of fall risk, may improve patient safety and reduce consequences of falls and related complications.

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17. ANNEXES

17.1. **Appendix I**: List of concept definitions

Concept sets for falls

Search terms were fall and findings related to falls. The final list of concepts is provided below. Standalone concepts ids for recurrent falls including unexplained recurrent falls and recurrent falls were used quantify for cohort entry, while other codes were required to appear twice within a period of 12 months for eligibility. Additionally, a separate table shows the concepts that were excluded. The concept sets were defined following input from EMA.

Name	Concept id
Unexplained recurrent falls	4224116
Recurrent falls	4087528
Accidental fall	435991
Accidental fall due to being struck by panicked crowd	37395655
Crumples to floor	4093694
Elderly fall	4184243
Engaged in falling	4301743
Fall	436583
Fall - collision/push/shove	4122064
Fall at construction site	4238555
Fall down elevator shaft	4029154
Fall down stairs of motor bus while boarding or alighting	4053568
Fall due to accidental trip by another person	4053865
Fall due to defective pavement	4053864
Fall due to discarded object	4054485
Fall due to failure of rail	4054089
Fall due to failure of support	4054486
Fall due to leaning on insecure furniture	4054487
Fall due to loss of equilibrium	4053866
Fall due to polished surface	4054484
Fall due to seizure	763084
Fall due to trip on loose carpet	4072955
Fall due to uneven surface indoors	4054088
Fall due to wet surface	4054087
Fall during current hospitalization	3178191
Fall from bed	436882
Fall from bench	4251922
Fall from bump against object	4311381

Name	Concept id
Fall from carousel	4248698
Fall from chair	4308870
Fall from chair or bed	440012
Fall from embankment	4316727
Fall from escalator	4314758
Fall from flagpole	4314762
Fall from furniture	433657
Fall from geological formation	4054092
Fall from gymnastic bars	4302323
Fall from haystack	4311376
Fall from heavy goods vehicle	4053478
Fall from high place	4329261
Fall from highchair	3169224
Fall from hospital gurney	4053870
Fall from ladder	432803
Fall from mountain	4054489
Fall from moving vehicle	435990
Fall from one level to another	436299
Fall from operating room table	37017172
Fall from playground equipment	437477
Fall from railway vehicle in motion	4072659
Fall from rigging on board vessel	4053723
Fall from scaffold	432804
Fall from slide	4028986
Fall from stairs	4310647
Fall from stationary railway vehicle	4053420
Fall from stationary vehicle	439615
Fall from steps	4310769
Fall from stool	4053869
Fall from swing	4027856
Fall from table	4207051
Fall from toilet seat	434549
Fall from tower	4312315
Fall from train, passenger injured	442495
Fall from train, railway employee injured	442496
Fall from turret	4314763

Name	Concept id
Fall from wheelchair	435443
Fall in bath or shower	4072954
Fall in bathtub	4236512
Fall in home	4222734
Fall in nursing home	4235672
Fall in shower	4196096
Fall in train	4061314
Fall in train, passenger injured	438651
Fall in train, railway employee injured	441740
Fall into canal	4054490
Fall into dock	4316723
Fall into hold on board vessel	4054364
Fall into hole	433393
Fall into manhole	439616
Fall into natural surface opening	443064
Fall into pit	4311374
Fall into pot-hole or cavern	4054491
Fall into quarry	4316724
Fall into septic tank	4054093
Fall into sewer	4073059
Fall into shaft	4311375
Fall into shaft of disused mine	4053873
Fall into shaft of operational mine	4053872
Fall into storm drain	437174
Fall into swallow hole	4053874
Fall into tank	4312319
Fall into well	435442
Fall on board vessel without accident to vessel	435982
Fall on concrete	4326992
Fall on escalator	4284118
Fall on hard surface	4323487
Fall on moving public service vehicle	4053476
Fall on moving sidewalk	4311377
Fall on or from escalator	435172
Fall on or from stairs	4312313
Fall on or from stairs or steps	441749

Name	Concept id
Fall on or from steps	433095
Fall on public service vehicle	4072777
Fall on same level	4140830
Fall on same level due to accidental impact with another person	4053867
Fall on same level due to deliberate assault by another person	4072956
Fall on same level due to impact against another person	433946
Fall on same level due to nature of surface	4168384
Fall on same level from impact against object	4151392
Fall on same level from slipping	4315647
Fall on same level from slipping, tripping or stumbling	437175
Fall on same level from stumbling	4316838
Fall on same level from tripping	4316837
Fall on soft surface	4323356
Fall on stairs	4190235
Fall on stairs in water transport	4070384
Fall on stairs in water transport, docker or stevedore injured	443683
Fall on stairs in water transport, occupant of small powered boat injured	442020
Fall on stairs in water transport, occupant of small unpowered boat injured	440306
Fall on stairs or ladders in water transport	443685
Fall on stationary public service vehicle	4053475
Fall on steps	4310768
Fall on train	4058663
Fall on train, passenger injured	442499
Fall on train, pedal cyclist injured	442497
Fall on train, pedestrian injured	442498
Fall on train, railway employee injured	442500
Fall through window	4169921
Fall while being carried	4244882
Fall while boarding or alighting from goods vehicle	4054303
Fall while boarding or alighting from public service vehicle	4053572
Fall while running	3175246
Falls	4059015
Falls caused by medication	4256754
Falls like log	4093213
Fell onto outstretched hand	4074322
Finding related to falls	4185197

Name	Concept id
Legs give way - falling	4097288
Noncollision motor vehicle traffic accident involving fall down stairs of motor bus while boarding or alighting	4066458
Noncollision motor vehicle traffic accident involving fall down stairs of motor bus while boarding or alighting, driver of motor vehicle injured	435705
Noncollision motor vehicle traffic accident involving fall down stairs of motor bus while boarding or alighting, motor cyclist injured	435153
Noncollision motor vehicle traffic accident involving fall down stairs of motor bus while boarding or alighting, occupant of tram injured	443048
Noncollision motor vehicle traffic accident involving fall down stairs of motor bus while boarding or alighting, passenger of motor vehicle injured	443049
Noncollision motor vehicle traffic accident involving fall down stairs of motor bus while boarding or alighting, pedal cyclist injured	443047
Noncollision motor vehicle traffic accident involving fall down stairs of motor bus while boarding or alighting, pedestrian injured	432524
Noncollision motor vehicle traffic accident involving fall down stairs of motor bus while boarding or alighting, rider of animal or occupant of animal-drawn vehicle injured	436614
Simple fall	44791210
Slipping	4182865
Stumbling	4220842
Tripping	4294262
Unexplained falls	4229566

List of concepts that are excluded.

Concept Name	Concept Id
Reduction in number of falls	606215
No fear of falls	44792532
Jump from burning travel trailer	4311641
Jump from burning theater	4311781
Jump from burning tenement	4318200
Jump from burning structure	4169949
Jump from burning store	4318351
Jump from burning school	4311780
Jump from burning rooming house	4313678
Jump from burning private garage	4318096
Jump from burning private dwelling	4312581
Jump from burning mobile home	4311643
Jump from burning lodging house	4313677
Jump from burning house	4315789

Concept Name	Concept Id
Jump from burning hotel	4316027
Jump from burning hospital	4313818
Jump from burning farmhouse	4311642
Jump from burning farm outbuilding	4318350
Jump from burning factory	4316026
Jump from burning dormitory of educational institution	4315928
Jump from burning convalescent home	4313817
Jump from burning church	4311779
Jump from burning camping place	4318095
Jump from burning boarding house	4312582
Jump from burning barn	4315926
Jump from burning apartment	4311640
Finding of frequency of falls	4185198
Fell off nest	42600294
Falls infrequently	4184244
Fall-stairs water transport - swimmer injured	443684
Fall-ladder water transport - swimmer injured	443678
Fall while on board aircraft	4309494
Fall through roof	4310774
Fall through height of more than two and less than five metres	44790550
Fall through height of more than five metres	44790549
Fall through height of less than one metre	44790548
Fall through height of between one and two metres	44790547
Fall on wet deck on board vessel	4072787
Fall on watercraft due to accident involving craft	4168032
Fall on stairs or ladders in water transport	443685
Fall on stairs in water transport, occupant of small unpowered boat injured	440306
Fall on stairs in water transport, occupant of small powered boat injured	442020
Fall on stairs in water transport, docker or stevedore injured	443683
Fall on stairs in water transport	4070384
Fall on snow	440308
Fall on same level from sports contact	438303
Fall on ladder in water transport, occupant of small unpowered boat injured	443682
Fall on ladder in water transport, occupant of small powered boat injured	443681
Fall on ladder in water transport, docker or stevedore injured	443680
Fall on ladder in water transport	4070385

Concept Name	Concept Id
Fall on ice wearing ice-skates	4054086
Fall on ice	4326742
Fall involving sports equipment	434236
Fall into water	4178908
Fall in, on, or from train	442504
Fall in, on, or from aircraft	442541
Fall in aircraft, not due to an accident to aircraft, parachutist injured	440903
Fall in aircraft, not due to an accident to aircraft, occupant of military aircraft injured	433662
Fall in aircraft, not due to an accident to aircraft, occupant of commercial aircraft in surface to air transport injured	438319
Fall in aircraft, not due to an accident to aircraft, member of ground crew or airline employee injured	439499
Fall in aircraft, not due to an accident to aircraft, member of crew of commercial aircraft in surface to surface transport injured	439500
Fall from window	4236629
Fall from wall	4314764
Fall from viaduct	4310773
Fall from tree	4307686
Fall from train	4064677
Fall from tackle in sport	4311378
Fall from roof	4053868
Fall from cliff	432806
Fall from chimney	4072958
Fall from building	441201
Fall from bridge	4212601
Fall from balcony	4316719
Fall from ambulance stretcher	4053871
Fall from aircraft, not due to an accident to aircraft, parachutist injured	439493
Fall from aircraft, not due to an accident to aircraft, occupant of unpowered aircraft, except parachutist, injured	439494
Fall from aircraft, not due to an accident to aircraft, occupant of military aircraft injured	439497
Fall from aircraft, not due to an accident to aircraft, occupant of commercial aircraft in surface to air transport injured	439495
Fall from aircraft, not due to an accident to aircraft, member of ground crew or airline employee injured	439492
Fall from aircraft, not due to an accident to aircraft, member of crew of commercial aircraft in surface to surface transport injured	439496
Fall from aircraft on ground	4072799

Concept Name	Concept Id
Fall from aircraft in flight	4054375
Fall from aircraft	4309613
Fall due to slipping on ice or snow	4053863
Fall due to roller skates or skateboard	433374
Fall due to impact against wheelbarrow	4054488
Fall due to impact against supermarket shopping cart	4054091
Fall due to impact against pedestrian conveyance	4054090
Fall due to impact against baby buggy	4072957
Does not fall	4182159
Accidental fall into storm drain	4316722
Accidental fall from skis	37395656
Accident in boarding aircraft, occupant of unpowered aircraft, except parachutist, injured	4070899
Accident in boarding aircraft, occupant of military aircraft injured	4065477
Accident in boarding aircraft, occupant of commercial aircraft in surface to air transport injured	4067978
Accident in boarding aircraft, member of ground crew or airline employee injured	4065587
Accident in boarding aircraft, member of crew of commercial aircraft in surface to surface transport injured	4065478
Accident in alighting from aircraft, parachutist injured	4310783
Accident in alighting from aircraft, occupant of unpowered aircraft, except parachutist, injured	4310782
Accident in alighting from aircraft, occupant of military aircraft injured	4310779
Accident in alighting from aircraft, occupant of commercial aircraft in surface to air transport injured	4314852
Accident in alighting from aircraft, member of ground crew or airline employee injured	4312584
Accident in alighting from aircraft, member of crew of commercial aircraft in surface to surface transport injured	4310780
Accident in alighting from aircraft	4310777
Accident boarding aircraft - parachutist injured	4069916
Accident boarding aircraft	4065476

List for exposure (drug classes listed under STOPP section K criteria)

List of drug classes listed at ingredient level. Only those with systematic absorption were included.

Benzodiazepines	Concept id	Excluded	Descendants
triazulenone	19042550	-	Yes
triazolam	704599	-	Yes
tofisopam	19100773	-	Yes
temazepam	836715	-	Yes
remimazolam	1146633	-	Yes
quazepam	731188	-	Yes
prazepam	19050461	-	Yes
pinazepam	2100521	-	Yes
oxazepam	724816	-	Yes
nordazepam	19080959	-	Yes
nitrazepam	19020021	-	Yes
nimetazepam	35197946	-	Yes
midazolam	708298	-	Yes
mexazolam	43009058	-	Yes
medazepam	19125106	-	Yes
lormetazepam	19007977	-	Yes
lorazepam	791967	-	Yes
ketazolam	19003946	-	Yes
halazepam	801396	-	Yes
flurazepam	756349	-	Yes
flunitrazepam	19055224	-	Yes
fludiazepam	35198139	-	Yes
etizolam	43009000	-	Yes
ethyl loflazepate	19095467	-	Yes
estazolam	748010	-	Yes
DOXEFAZEPAM	36849918	-	Yes
diazepam	723013	-	Yes
cloxazolam	19051096	-	Yes
clotiazepam	19068821	-	Yes
clorazepate	790253	-	Yes
clonazepam	798874	-	Yes
clobazam	19050832	-	Yes
CINOLAZEPAM	36852970	-	Yes
chlordiazepoxide	990678	-	Yes

Benzodiazepines	Concept id	Excluded	Descendants
Camazepam	40798714	-	Yes
brotizolam	19039262	-	Yes
bromazepam	19030353	-	Yes
BENTAZEPAM	36852894	-	Yes
alprazolam	781039	-	Yes
ADINAZOLAM	36858914	-	Yes
Prazepam Topical Solution	36274555	Yes	Yes
Clonazepam Topical Solution	36259252	Yes	Yes
Alprazolam Topical Solution	36272059	Yes	Yes

Antipsychotics	Concept id	Exclude	Descendants
Zuclopenthixol Topical Solution	36269455	Yes	Yes
zuclopenthixol	19010886		Yes
zotepine	19102109		Yes
ziprasidone	712615		Yes
veralipride	19043327		Yes
trifluprom azine	19005104		Yes
trifluperidol	19005101		Yes
trifluoperazine	704984		Yes
Tiapride Topical Solution	36259222	Yes	Yes
tiapride	19008012		Yes
thiothixene	700465		Yes
thioridazine	700299		Yes
thioproperazine	19000305		Yes
thiopropazate	19041817		Yes
sultopride	19100431		Yes
sulpiride	19136626		Yes
sertindole	19050633		Yes
Secuado Topical Product	37498033	Yes	Yes
risperidone	735979		Yes
remoxipride	19035226		Yes
quetiapine Topical Ointment	35862962	Yes	Yes
quetiapine	766814		Yes
prothipendyl	19115044		Yes
promazine	19052903		Yes
prochlorperazine	752061		Yes

Antipsychotics	Concept id	Exclude	Descendants
pipothiazine	19133992		Yes
pipamperone Topical Solution	36277114	Yes	Yes
pipamperone	19093225		Yes
pimozide	745790		Yes
pimavanserin	42628962		Yes
perphenazine	733008		Yes
periciazine	19053565		Yes
perazine	19131663		Yes
penfluridol	19028044		Yes
paliperidone	703244		Yes
oxypertine	19025922		Yes
olanzapine	785788		Yes
MOSAPRAMINE	36848724		Yes
Moperone	40798964		Yes
molindone	709699		Yes
metylperon	19072088		Yes
methotrimeprazine	19005147		Yes
mesoridazine	703083		Yes
lurasidone	40230761		Yes
lumateperone	37498659		Yes
loxapine	792263		Yes
Lithium Topical Gel	43025924		Yes
Lithium / Zinc Sulfate Topical Ointment	40986332	Yes	Yes
Lithium / Oxygen / Sodium Topical Gel	40986331	Yes	Yes
Lithium / Oxygen / SEA SALT Topical Gel	40892851	Yes	Yes
Lithium / Minerals Homeopathic Topical Gel	36421456	Yes	Yes
lithium	19124477		Yes
levosulpiride	43009023		Yes
iloperidone	19017241		Yes
Hypochlorite / Lithium Topical Gel	40861705	Yes	Yes
Hypochlorite / Lithium / Sodium Topical Gel	40923962	Yes	Yes
Hypochlorite / Lithium / SEA SALT Topical Gel	41298341	Yes	Yes
Haloperidol Topical Solution	36266912	Yes	Yes
haloperidol	766529		Yes
fluspirilene	19056465		Yes
fluphenazine	756018		Yes

Antipsychotics	Concept id	Exclude	Descendants
flupenthixol	19055982		Yes
Fluanisone	40798823		Yes
droperidol	739323		Yes
Dixyrazine	40798772		Yes
cyamemazine	19051234		Yes
clozapine	800878		Yes
clothiapine	19100363		Yes
CLOPENTHIXOL	36848877		Yes
chlorprothixene	19095002		Yes
chlorpromazine	794852		Yes
chlorproethazine	19122262		Yes
cariprazine	35603277		Yes
Butaperazine	40798666		Yes
bromperidol Topical Solution	36277136	Yes	Yes
bromperidol	19039227		Yes
brexpiprazole	46275300		Yes
benperidol	19016440		Yes
asenapine Topical Product	37497568	Yes	Yes
asenapine	40164052		Yes
aripiprazole	757688		Yes
amisulpride	19057607		Yes
acetophenazine	19029555		Yes
acepromazine	19018226		Yes
4-cymene / chlorproethazine Topical Product	36215883	Yes	Yes
4-cymene / chlorproethazine Topical Ointment	40001867	Yes	Yes

Vasodilating drugs*	Concept id	Exclude	Descendants
zofenopril	19102107		Yes
vericiguat	739665		Yes
verapamil	1307863		Yes
valsartan	1308842		Yes
Trolnitrate	40799158		Yes
trapidil	19009721		Yes
Transderm Nitro Topical Product	36229582	Yes	Yes
trandolapril	1342439		Yes
temocapril hydrochloride	43009010		Yes

Vasodilating drugs*	Concept id	Exclude	Descendants
telmisartan	1317640		Yes
TASOSARTAN	36851542		Yes
spirapril	19040051		Yes
SERELAXIN	36862602		Yes
ramipril	1334456		Yes
quinapril	1331235		Yes
propylene glycol dinitrate	1145790		Yes
PROPATYL NITRATE	36855663		Yes
prenylamine	19051285		Yes
perindopril	1373225		Yes
perhexiline	19032359		Yes
Percutol Topical Product	36239874	Yes	Yes
pentaerythritol	19022446		Yes
oxyfedrine	19129643		Yes
olmesartan	40226742		Yes
Nitrol Topical Product	36240106	Yes	Yes
Nitroglycerin Topical Spray	35137179	Yes	Yes
Nitroglycerin Topical Solution	41080019	Yes	Yes
nitroglycerin Topical Product	36225016	Yes	Yes
nitroglycerin Topical Ointment	40071543	Yes	Yes
nitroglycerin Topical Cream	36065540	Yes	Yes
nitroglycerin	1361711		Yes
Nitrodisc Topical Product	36240101	Yes	Yes
Nitro-Dur Topical Product	36242453	Yes	Yes
Nitro-Bid Topical Product	36242452	Yes	Yes
nitric oxide	19020068		Yes
nitric oxide	19020068		Yes
nitrendipine	19020061		Yes
Nitrek Topical Product	36242449	Yes	Yes
nisoldipine	1319880		Yes
nimodipine	1319133		Yes
nilvadipine	19113063		Yes
Nifedipine Topical Ointment	21152990	Yes	Yes
nifedipine	1318853		Yes
nicorandil	19014977		Yes

Vasodilating drugs*	Concept id	Exclude	Descendants
nicardipine	1318137		Yes
Niacin / Nitroglycerin Topical Ointment	40892805	Yes	Yes
nesiritide	1338985		Yes
molsidomine	19009819		Yes
moexipril	1310756		Yes
Minitran Topical Product	36231513	Yes	Yes
mibefradil	1345141		Yes
mepirodipine	19102106		Yes
manidipine	19071995		Yes
losartan	1367500		Yes
lisinopril	1308216		Yes
LINSIDOMINE	36852490		Yes
lidoflazine	19124331		Yes
levamlodipine	1146278		Yes
lercanidipine	19015802		Yes
lacidipine	19004539		Yes
isradipine	1326012		Yes
isosorbide Topical Spray	35865696	Yes	Yes
Isosorbide Dinitrate Topical Spray	41111415	Yes	Yes
Isosorbide Dinitrate Topical Solution	40830493	Yes	Yes
isosorbide dinitrate Topical Product	36224725	Yes	Yes
isosorbide dinitrate Topical Ointment	40051801	Yes	Yes
isosorbide dinitrate Topical Cream	40051800	Yes	Yes
isosorbide dinitrate	1383925		Yes
isosorbide	1383815		Yes
irbesartan	1347384		Yes
Imolamine	40798892		Yes
imidapril	19122327		Yes
hexobendine	19113060		Yes
heptaminol	19068433		Yes
gallopamil	19057715		Yes
fosinopril	1363749		Yes
flosequinan	19096489		Yes
FIMASARTAN	36860332		Yes
fendiline	19053866		Yes

Vasodilating drugs*	Concept id	Exclude	Descendants
felodipine	1353776		Yes
Etafenone	40798801		Yes
erythrityl tetranitrate	19045644		Yes
eprosartan	1346686		Yes
enalapril	1341927		Yes
efloxate	19057394		Yes
Diltiazem Topical Ointment	21076185	Yes	Yes
Diltiazem Topical Gel	36812377	Yes	Yes
Diltiazem Topical Cream	36409560	Yes	Yes
diltiazem	1328165		Yes
Dilazep	40798779		Yes
Deponit Topical Product	36237439	Yes	Yes
delapril hydrochloride	36878917		Yes
CLORIDAROL	36850326		Yes
clevidipine	19089969		Yes
CINEPAZET	36849006		Yes
cilnidipine	43009017		Yes
cilazapril	19050216		Yes
chromonar	19063698		Yes
captopril	1340128	Yes	Yes
candesartan	1351557		Yes
Camphor / Menthol / Nitroglycerin / Pinus sylvestris bark extract / Rosmarinus Officinalis Preparation Topical Ointment	41048964	Yes	Yes
bepridil	1319751		Yes
BENZIODARONE	36853561		Yes
BENIDIPINE	36851681		Yes
benazepril	1335471		Yes
azilsartan	40235485		Yes
amlodipine	1332418		Yes
Aconitum napellus extract / Amanita muscaria extract / Arnica extract / Cinnamomum camphora leaf extract / CRATAEGUS LAEVIGATA FRUIT / Gold / Nicotine / Nitroglycerin / Selenicereus grandiflorus stem extract / ... Topical Ointment	41206079	Yes	Yes

*Vasodilating drugs included nitrates, ACE inhibitors, ARB inhibitors, and calcium channel blockers;

Hypnotic z-drugs	Concept id	Exclude	Descendants
zopiclone	19044883	-	Yes
zolpidem	744740	-	Yes

Hypnotic z-drugs	Concept id	Exclude	Descendants
zaleplon	720727	-	Yes
eszopiclone	757352	-	Yes

Anti-epileptics	Concept id	Exclude	Descendants
zonisamide	744798	-	Yes
vigabatrin	19020002	-	Yes
Valpromide	36878958	-	Yes
valproate	745466	-	Yes
valeric acid	45775582	-	Yes
trimethadione	19005629	-	Yes
topiramate	742267	-	Yes
tiagabine	715458	-	Yes
sulthiame	19000921	-	Yes
stiripentol	35200286	-	Yes
rufinamide	19006586	-	Yes
progabide	19095776	-	Yes
primidone	751347	-	Yes
phenytoin	740910	-	Yes
phensuximide	19023842	-	Yes
phenobarbital	734275	-	Yes
PHENETURIDE	36854302	-	Yes
phenacemide	19023286	-	Yes
perampanel	42904177	-	Yes
paramethadione	19021932	-	Yes
oxcarbazepine	718122	-	Yes
methsuximide	759401	-	Yes
metharbital	19004254	-	Yes
mephenytoin	702661	-	Yes
mephenytoin	702661	-	Yes
levetiracetam	711584	-	Yes
lamotrigine	705103	-	Yes
lacosamide	19087394	-	Yes
ganaxolone	780003	-	Yes
fosphenytoin	713192	-	Yes
fenfluramine	753860	-	Yes
felbamate	795661	-	Yes

Anti-epileptics	Concept id	Exclude	Descendants
ezogabine	40239995	-	Yes
ethotoin	750146	-	Yes
ethosuximide	750119	-	Yes
eslicarbazepine	44507780	-	Yes
diethadione	43533046	-	Yes
clonazepam	798874	-	Yes
cenobamate	37497998	-	Yes
CARISBAMATE	36860359	-	Yes
carbamazepine	740275	-	Yes
cannabidiol	1510417	-	Yes
brivaracetam	35604901	-	Yes
beclamide	19018520	-	Yes
barbexaclone	19112534	-	Yes
phenytoin Topical Cream	1235769	Yes	Yes
Phenobarbital Topical Powder	40742692	Yes	Yes
Clonazepam Topical Solution [Rivotril]	36274784	Yes	Yes
Clonazepam Topical Solution	36259252	Yes	Yes
brivaracetam Topical Cream [Briviact]	1831818	Yes	Yes
brivaracetam Topical Cream	1831817	Yes	Yes
aminobutyrate Topical Gel [Geleisite]	35852458	Yes	Yes
aminobutyrate Topical Gel	35852399	Yes	Yes

First generation antihistamines*	Concept id	Exclude	Descendants
triprolidine	1105889	-	Yes
tripelennamine	1105853	-	Yes
pyrilamine	1159811	-	Yes
promethazine	1153013	-	Yes
phenyltoloxamine	1123904	-	Yes
pheniramine	933952	-	Yes
oxatomide	19071314	-	Yes
methdilazine	19009250	-	Yes
meclizine	994341	-	Yes
ketotifen	986117	-	Yes
hydroxyzine	777221	-	Yes
doxylamine	738818	-	Yes
doxepin	738156	-	Yes

First generation antihistamines*	Concept id	Exclude	Descendants
diphenylpyraline	19090000	-	Yes
diphenhydramine	1129625	-	Yes
dimethindene	19028947	-	Yes
dimenhydrinate	928744	-	Yes
cyproheptadine	1110727	-	Yes
cyclizine	909358	-	Yes
clemastine	1197677	-	Yes
chlorpheniramine	1192710	-	Yes
carbinoxamine	1141018	-	Yes
buclizine	19081195	-	Yes
brompheniramine	1130863	-	Yes
azatadine	1133993	-	Yes
antazoline	951237	-	Yes

*Topical products, shampoo, ophthalmic and otic solutions were excluded.

Opioids	Concept id	Exclude	Descendants
Tramadol Topical Solution	36261758	Yes	Yes
tramadol	1103314		Yes
tilidine	19002431		Yes
tapentadol	19026459		Yes
propoxyphene	1153664		Yes
pirinitramide	19134009		Yes
phenazocine	19132884		Yes
pentazocine	1130585		Yes
papaveretum	19129648		Yes
oxymorphone	1125765		Yes
oxycodone	1124957		Yes
opium	923829		Yes
oliceridine	37002667		Yes
Nicomorphine	37493805		Yes
Naloxone / Tilidine Topical Solution	36272016	Yes	Yes
nalbuphine	1114122		Yes
morphine Topical Solution	40061845	Yes	Yes
Morphine Topical Powder	40736133	Yes	Yes
Morphine Topical Gel	36813358	Yes	Yes
morphine	1110410		Yes
Methadone Topical Powder	40736927	Yes	Yes

Opioids	Concept id	Exclude	Descendants
Methadone Topical Ointment	40923906	Yes	Yes
methadone	1103640		Yes
meptazinol	19003010		Yes
meperidine	1102527		Yes
Ketobemidone	40798904		Yes
hydromorphone	1126658		Yes
hydrocodone	1174888		Yes
fentanyl Topical Solution	44785665	Yes	Yes
fentanyl	1154029		Yes
dihydrocodeine	1189596		Yes
dezocine	19088393		Yes
dextromoramide	19021940		Yes
Codeine Topical Powder	40738300	Yes	Yes
codeine	1201620		Yes
butorphanol	1133732		Yes
buprenorphine Topical Solution	779547	Yes	Yes
buprenorphine	1133201		Yes
Bezitramide	37493802		Yes

Antidepressants	Concept id	Exclude	Descendants
Zonalon Topical Product	36242891	Yes	Yes
Zimeldine	40799195		Yes
vortioxetine	44507700		Yes
viloxazine	19008261		Yes
vilazodone	40234834		Yes
venlafaxine	743670		Yes
Tryptophan Topical Solution	43583293	Yes	Yes
tryptophan Topical Gel	35857295	Yes	Yes
tryptophan	19006186		Yes
trimipramine	705755		Yes
trazodone	703547		Yes
tranylcypromine	703470		Yes
toloxatone	19100775		Yes
tianeptine	19041910		Yes
ST. JOHN'S WORT EXTRACT Topical Solution	36879875	Yes	Yes

Antidepressants	Concept id	Exclude	Descendants
ST. JOHN'S WORT EXTRACT Topical Ointment	43694508	Yes	Yes
ST. JOHN'S WORT EXTRACT Topical Oil	43694575	Yes	Yes
ST. JOHN'S WORT EXTRACT Topical Cream	43639376	Yes	Yes
ST. JOHN'S WORT EXTRACT Oral Ointment	41173959		Yes
St. John's wort extract	1398039		Yes
sertraline	739138		Yes
reboxetine	19084693		Yes
quinupramine	19098514		Yes
Prudoxin Topical Product	36238701	Yes	Yes
protriptyline	754270		Yes
PRIMULA VERIS FLOWER EXTRACT / Rosmarinus Officinalis Preparation / ST. JOHN'S WORT EXTRACT Topical Ointment	41080097	Yes	Yes
PRIMULA VERIS FLOWER EXTRACT / Rosmarinus Officinalis Preparation / ST. JOHN'S WORT EXTRACT Topical Oil	40830505	Yes	Yes
PIVAGABINE	36856232		Yes
phenelzine	733896		Yes
paroxetine	722031		Yes
OXAFLOZANE	36862328		Yes
opipramol	19129635		Yes
nortriptyline	721724		Yes
nomifensine	19128066		Yes
nialamide	19127550		Yes
nefazodone	714684		Yes
moclobemide	19010652		Yes
mirtazapine Topical Product	1559961	Yes	Yes
mirtazapine Topical Ointment	1559962	Yes	Yes
mirtazapine	725131		Yes
Mirataz Topical Product	1559967	Yes	Yes
minaprine	19072123		Yes
milnacipran	19080226		Yes
mianserin	19007737		Yes
melitracen	19110751		Yes
medifoxamine	19072021		Yes
maprotiline	794147		Yes
lofepramine	19091830		Yes
levomilnacipran	43560354		Yes

Antidepressants	Concept id	Exclude	Descendants
Lamium album extract / ST. JOHN'S WORT EXTRACT / Verbascum thapsus extract Topical Ointment	41267340	Yes	Yes
Lamium album extract / ST. JOHN'S WORT EXTRACT / Verbascum thapsus extract Topical Oil	44183250	Yes	Yes
isocarboxazid	781705		Yes
iproniazid	19122259		Yes
IPROCLOZIDE	36849601		Yes
iprindole	19122204		Yes
Inula helenium root extract / Malus domestica whole extract / Pelargonium graveolens flower oil / Prunus spinosa whole extract / ST. JOHN'S WORT EXTRACT Topical Cream	43657312	Yes	Yes
Inula helenium root extract / linden flower extract / Malus domestica whole extract / Pelargonium graveolens flower oil / Prunus spinosa whole extract / ST. JOHN'S WORT EXTRACT Topical Cream	36884664	Yes	Yes
imipramine	778268		Yes
Hypericum perforatum leaf extract	42899140		Yes
Hypericum extract Topical Solution	40750432	Yes	Yes
Hypericum extract	42899139		Yes
Hyoscyamus niger leaf extract / myocardium / PRIMULA VERIS FLOWER EXTRACT / rosemary oil / Silicon Dioxide / ST. JOHN'S WORT EXTRACT Topical Cream	43798111	Yes	Yes
Geranium robertianum extract / Malva sylvestris flower extract / Prunus spinosa whole extract / Sambucus nigra whole extract / ST. JOHN'S WORT EXTRACT / Tilia platyphyllos flower extract Topical Ointment	41111473	Yes	Yes
GEPIRONE	36858670		Yes
fluvoxamine	751412		Yes
fluoxetine	755695		Yes
ETOPERIDONE	36858847		Yes
esketamine Topical Solution	1970226	Yes	Yes
esketamine	1366610		Yes
escitalopram	715939		Yes
duloxetine	715259		Yes
doxepin Topical Product	36224517	Yes	Yes
Doxepin Topical Ointment	42480967	Yes	Yes
doxepin Topical Cream	40032305	Yes	Yes
doxepin	738156		Yes
dothiepin	19037989		Yes
Dimetacrine	40798767		Yes
dibenzepin	19023846		Yes
desvenlafaxine	717607		Yes

Antidepressants	Concept id	Exclude	Descendants
desipramine	716968		Yes
clomipramine	798834		Yes
citalopram	797617		Yes
Cinnamomum camphora leaf extract / european olive pollen extract / ST. JOHN'S WORT EXTRACT Topical Ointment	41267576	Yes	Yes
Camphor / ST. JOHN'S WORT EXTRACT Topical Ointment	43783807	Yes	Yes
Camphor / ST. JOHN'S WORT EXTRACT Topical Oil	40830778	Yes	Yes
Camphor / ST. JOHN'S WORT EXTRACT Topical Cream	43675385	Yes	Yes
Calendula officinalis extract / ST. JOHN'S WORT EXTRACT Topical Cream	40756173	Yes	Yes
Calendula officinalis extract / ST. JOHN'S WORT EXTRACT / Zinc Oxide Topical Ointment	40830791	Yes	Yes
Calendula officinalis extract / Hypericum perforatum leaf extract Topical Solution	21138421	Yes	Yes
Calendula officinalis extract / Hypericum extract Topical Ointment	21118767	Yes	Yes
Calendula officinalis extract / Hypericum extract Topical Cream	36405737	Yes	Yes
Calcium Chloride / Histidine / Magnesium Chloride / Mannitol / Potassium Chloride / potassium-hydrogen-2-oxopentandioat / Sodium Chloride / Tryptophan Topical Solution	43599037	Yes	Yes
butriptyline	19039883		Yes
bupropion	750982		Yes
brexanolone	1510996		Yes
bifemelane	19058055		Yes
Azadirachta indica whole extract / european olive pollen extract / ST. JOHN'S WORT EXTRACT Topical Solution	41017790	Yes	Yes
Arnica extract / Camphor / Capsicum extract / Hypericum perforatum leaf extract / juniper berry oil / lemon oil / Thuja occidentalis preparation Topical Ointment	21168336	Yes	Yes
Arnica extract / Camphor / Capsicum extract / Hypericum perforatum leaf extract / juniper berry oil / lemon oil / Thuja occidentalis preparation Topical Cream	36408031	Yes	Yes
Arnica extract / Calendula officinalis extract / Echinacea Preparation / Hypericum perforatum leaf extract / Ledum palustre whole extract Topical Solution	21079602	Yes	Yes
Arnica extract / Bellis perennis extract / Matricaria chamomilla flowering top oil / Plantago major extract / ST. JOHN'S WORT EXTRACT / Vinca minor extract Topical Ointment	40893347	Yes	Yes
amoxapine	713109		Yes
amitriptyline Topical Cream	1235428	Yes	Yes
Amitriptyline / Ketamine Topical Ointment	21150271	Yes	Yes
Amitriptyline / Ketamine Topical Cream	36403486	Yes	Yes
amitriptyline	710062		Yes
amineptin	19032424		Yes
ALAPROCLATE	36856226		Yes

Antidepressants	Concept id	Exclude	Descendants
Agomelatine	36878783		Yes
Acorus calamus extract / Agrimonia eupatoria extract / Chamaemelum Nobile Flower extract / flaxseed allergenic extract / formic acid / Geranium robertianum extract / Juglans regia leaf extract / Juniperus communis whole extract / ... Topical Ointment	41267951	Yes	Yes
Aconitum napellus extract / Arnica extract / Atropa belladonna fruiting top extract / Bellis perennis extract / Calendula officinalis extract / ECHINACEA ANGUSTIFOLIA Extract / Hamamelis virginiana whole extract / ... Topical Ointment	40955749	Yes	Yes
Achillea millefolium extract / Aconitum napellus extract / Arnica extract / Atropa belladonna fruiting top extract / Bellis perennis extract / Calendula officinalis extract / ECHINACEA ANGUSTIFOLIA Extract / ... Topical Cream	41206094	Yes	Yes
Achillea millefolium extract / Aconitum napellus extract / Arnica extract / Atropa belladonna fruiting top extract / Bellis perennis extract / Calendula officinalis extract / ECHINACEA ANGUSTIFOLIA Extract / ... Topical Cream	40986967	Yes	Yes
Achillea millefolium extract / Aconitum napellus extract / Aristolochia clematitis root extract / Arnica extract / Atropa belladonna fruiting top extract / Bellis perennis extract / Calendula officinalis extract / ... Topical Ointment	40986968	Yes	Yes
5-hydroxytryptophan	1363516		Yes

Alpha-blockers	Concept id	Exclude	Descendants
doxazosin	1363053	-	Yes
indoramin	19078808	-	Yes
prazosin	1350489	-	Yes
Trimazosin	40799160	-	Yes
urapidil	19101849	-	Yes

Centrally acting antihypertensives	Concept id	Exclude	Descendants
TOLONIDINE	36858182	-	Yes
rilmenidine	19115050	-	Yes
reserpine	1362225	-	Yes
rescinnamine	19062195	-	Yes
Rauwolfia alkaloids	19135932	-	Yes
moxonidine	19011021	-	Yes
methyldopa	1305447	-	Yes
methoserpidine	19055531	-	Yes
guanfacine	1344965	-	Yes
deserpidine	1387219	-	Yes

Antimuscarinic drugs (indicated for overactive bladder)	Concept id	Exclude	Descendants
vibegron	739438	-	Yes
trospium	991825	-	Yes
tolterodine	913782	-	Yes
terodiline	19100440	-	Yes
solifenacin	916005	-	Yes
propiverine	19077093	-	Yes
Oxytrol Topical Product	36228191	Yes	Yes
oxybutynin Topical Solution	41173871	Yes	Yes
oxybutynin Topical Product	36226234	Yes	Yes
oxybutynin Topical Gel	40157841	Yes	Yes
oxybutynin	918906	-	Yes
mirabegron	42873636	-	Yes
MELADRAZINE	36850477	-	Yes
imidafenacin	43009092	-	Yes
Gelnique Topical Product	36220043	Yes	Yes
flavoxate	954853	-	Yes
fesoterodine	19027958	-	Yes
emepronium	19041852	-	Yes
Desfesoterodine	36444847	-	Yes
darifenacin	916230	-	Yes
Anturol Topical Product	36238194	Yes	Yes

17.2. **Appendix II**: Supplementary Tables

Table 1. Number and frequency of pre-specified risk factors among individuals aged 65 years and older with newly diagnosed recurrent falls during the study period, in the time window prior to the index date (from 365 days to 1 day before the index date), categorised by data source.

		CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
Abnormal gait	Condition	107 (0.33)	6,848 (28.02)	145 (0.43)	211 (0.13)	187 (1.53)
Alcohol dependence	Condition	152 (0.47)	293 (1.20)	194 (0.57)	0	45 (0.37)
Anxiety	Condition	1,171 (3.63)	2,146 (8.78)	518 (1.53)	39,428 (23.42)	409 (3.34)
Arthritis	Condition	1,970 (6.11)	9,020 (36.91)	4,649 (13.69)	47,700 (28.33)	911 (7.45)
Chronic pain	Condition	127 (0.39)	4,597 (18.81)	221 (0.65)	329 (0.20)	150 (1.23)
COPD	Condition	1,078 (3.34)	2,492 (10.20)	970 (2.86)	12,987 (7.71)	167 (1.37)
Dementia	Condition	2,000 (6.20)	4,356 (17.82)	4,025 (11.85)	7,603 (4.52)	655 (5.36)
Depression	Condition	814 (2.52)	4,919 (20.13)	859 (2.53)	26,891 (15.97)	441 (3.61)
Diabetes mellitus	Condition	684 (2.12)	6,988 (28.59)	5,254 (15.47)	43,005 (25.54)	292 (2.39)
Dizziness	Condition	2,190 (6.79)	5,423 (22.19)	2,009 (5.92)	14,378 (8.54)	1,055 (8.63)
Hearing impairment	Condition	785 (2.43)	1,203 (4.92)	1,928 (5.68)	7,477 (4.44)	272 (2.22)
Hypertension	Condition	385 (1.19)	13,818 (56.54)	9,482 (27.92)	130,974 (77.79)	326 (2.67)
Malnutrition or weight loss	Condition	159 (0.49)	29 (0.12)	15 (0.04)	936 (0.56)	13 (0.11)
Muscle weakness	Condition	439 (1.36)	< 5	0	0	15 (0.12)
Osteoporosis	Condition	771 (2.39)	3,392 (13.88)	1,438 (4.23)	20,769 (12.33)	214 (1.75)
Parkinsons disease	Condition	330 (1.02)	1,040 (4.26)	954 (2.81)	3,113 (1.85)	123 (1.01)
Stroke	Condition	< 5	0	25 (0.07)	12 (0.01)	5 (0.04)
Urinary incontinence	Condition	1,110 (3.44)	4,441 (18.17)	1,107 (3.26)	26,188 (15.55)	1,749 (14.30)

		CPRD GOLD	IQVIA DA Germany	FinOMOP-HILMO	NAJS	SIDIAP
Visual impairment	Condition	205 (0.64)	341 (1.40)	149 (0.44)	855 (0.51)	232 (1.90)
Alpha blockers	Medication	2,215 (6.87)	1,116 (4.57)	1,854 (5.46)	6,810 (4.04)	1,073 (8.77)
Antidepressants	Medication	6,768 (20.99)	2,816 (11.52)	4,109 (12.10)	8,552 (5.08)	3,830 (31.31)
Antiepileptics	Medication	1,089 (3.38)	454 (1.86)	786 (2.31)	2,605 (1.55)	824 (6.74)
Antimuscarinic drugs	Medication	2,120 (6.58)	581 (2.38)	1,302 (3.83)	7,862 (4.67)	702 (5.74)
Antipsychotics	Medication	2,710 (8.41)	1,957 (8.01)	2,308 (6.80)	7,055 (4.19)	2,379 (19.45)
Benzodiazepines	Medication	2,607 (8.09)	1,158 (4.74)	3,368 (9.92)	32,104 (19.07)	3,157 (25.81)
Centrally acting antihypertensives	Medication	97 (0.30)	434 (1.78)	273 (0.80)	5,381 (3.20)	8 (0.07)
First generation antihistamines	Medication	1,773 (5.50)	1,256 (5.14)	560 (1.65)	51 (0.03)	292 (2.39)
Hypnotic z drugs	Medication	1,876 (5.82)	982 (4.02)	1,944 (5.73)	9,323 (5.54)	184 (1.50)
Opioids	Medication	7,290 (22.61)	3,692 (15.11)	11,018 (32.45)	29,424 (17.48)	3,101 (25.35)
Vasodilating drugs	Medication	7,740 (24.01)	7,257 (29.69)	7,899 (23.26)	28,071 (16.67)	3,954 (32.33)

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Table 2. Number and frequency of pre-specified risk factors among individuals aged 65 years and older with newly diagnosed recurrent falls during the study period in IQVIA DA Germany stratified by healthcare setting. The results are shown at the index date and in the time window prior to the index date (from 365 days to 1 day before the index date).

Variable_ level	Healthcare_ setting	N (%) at ID	Healthcare_ setting	N (%) at ID	Healthcare_ setting	N (%) at 365 to 1 day prior ID	Healthcare_ setting	N (%) at 365 to 1 day prior ID
Abnormal gait	Primary-care (GP)	4,672 (19.12)	Secondary-care (non-GP)	735 (3.01)	Primary-care (GP)	6,047 (24.74)	Secondary-care (non-GP)	801 (3.28)
Alcohol dependence	Primary-care (GP)	146 (0.60)	Secondary-care (non-GP)	14 (0.06)	Primary-care (GP)	264 (1.08)	Secondary-care (non-GP)	29 (0.12)
Anxiety	Primary-care (GP)	678 (2.77)	Secondary-care (non-GP)	90 (0.37)	Primary-care (GP)	1,975 (8.08)	Secondary-care (non-GP)	171 (0.7)
Arthritis	Primary-care (GP)	3,824 (15.65)	Secondary-care (non-GP)	913 (3.74)	Primary-care (GP)	7,720 (31.59)	Secondary-care (non-GP)	1,300 (5.32)
Chronic pain	Primary-care (GP)	2,306 (9.44)	Secondary-care (non-GP)	313 (1.28)	Primary-care (GP)	4,154 (17.00)	Secondary-care (non-GP)	443 (1.81)
COPD	Primary-care (GP)	1,153 (4.72)	Secondary-care (non-GP)	109 (0.45)	Primary-care (GP)	2,331 (9.54)	Secondary-care (non-GP)	161 (0.66)
Dementia	Primary-care (GP)	2,270 (9.29)	Secondary-care (non-GP)	229 (0.94)	Primary-care (GP)	4,011 (16.41)	Secondary-care (non-GP)	345 (1.41)
Depression	Primary-care (GP)	2,183 (8.93)	Secondary-care (non-GP)	238 (0.97)	Primary-care (GP)	4,486 (18.36)	Secondary-care (non-GP)	433 (1.77)
Diabetes mellitus	Primary-care (GP)	3,112 (12.73)	Secondary-care (non-GP)	459 (1.88)	Primary-care (GP)	6,283 (25.71)	Secondary-care (non-GP)	705 (2.88)
Dizziness	Primary-care (GP)	3,042 (12.45)	Secondary-care (non-GP)	354 (1.45)	Primary-care (GP)	4,921 (20.14)	Secondary-care (non-GP)	502 (2.05)

Variable_ level	Healthcare_ setting	N (%) at ID	Healthcare_ setting	N (%) at ID	Healthcare_ setting	N (%) at 365 to 1 day prior ID	Healthcare_ setting	N (%) at 365 to 1 day prior ID
Hearing impairment	Primary-care (GP)	579 (2.37)	Secondary-care (non-GP)	69 (0.28)	Primary-care (GP)	1,108 (4.53)	Secondary-care (non-GP)	95 (0.39)
Hypertension	Primary-care (GP)	6,235 (25.51)	Secondary-care (non-GP)	602 (2.46)	Primary-care (GP)	12,937 (52.93)	Secondary-care (non-GP)	881 (3.6)
Malnutrition or weight loss	Primary-care (GP)	7 (0.03)	Secondary-care (non-GP)	0	Primary-care (GP)	28 (0.11)	Secondary-care (non-GP)	<5
Muscle weakness	Primary-care (GP)	0	Secondary-care (non-GP)	0	Primary-care (GP)	< 5	Secondary-care (non-GP)	<5
Osteoporosis	Primary-care (GP)	1,405 (5.75)	Secondary-care (non-GP)	579 (2.37)	Primary-care (GP)	2,642 (10.81)	Secondary-care (non-GP)	750 (3.07)
Parkinson's disease	Primary-care (GP)	459 (1.88)	Secondary-care (non-GP)	129 (0.53)	Primary-care (GP)	880 (3.6)	Secondary-care (non-GP)	160 (0.65)
Stroke	Primary-care (GP)	0	Secondary-care (non-GP)	0	Primary-care (GP)	0	Secondary-care (non-GP)	0
Urinary incontinence	Primary-care (GP)	2,067 (8.46)	Secondary-care (non-GP)	127 (0.52)	Primary-care (GP)	4,186 (17.13)	Secondary-care (non-GP)	255 (1.04)
Visual impairment	Primary-care (GP)	182 (0.74)	Secondary-care (non-GP)	19 (0.08)	Primary-care (GP)	308 (1.26)	Secondary-care (non-GP)	33 (0.14)
Alpha blockers	Primary-care (GP)	1,326 (5.43)	Secondary-care (non-GP)	88 (0.36)	Primary-care (GP)	1,819 (7.44)	Secondary-care (non-GP)	121 (0.50)
Antidepressants	Primary-care (GP)	2,983 (12.21)	Secondary-care (non-GP)	239 (0.98)	Primary-care (GP)	4,362 (17.85)	Secondary-care (non-GP)	351 (1.44)
Antiepileptics	Primary-care (GP)	482 (1.97)	Secondary-care (non-GP)	46 (0.19)	Primary-care (GP)	691 (2.83)	Secondary-care (non-GP)	62 (0.25)

Variable_ level	Healthcare_ setting	N (%) at ID	Healthcare_ setting	N (%) at ID	Healthcare_ setting	N (%) at 365 to 1 day prior ID	Healthcare_ setting	N (%) at 365 to 1 day prior ID
Antimuscarinic drugs	Primary-care (GP)	562 (2.3)	Secondary-care (non-GP)	25 (0.10)	Primary-care (GP)	886 (3.63)	Secondary-care (non-GP)	51 (0.21)
Antipsychotics	Primary-care (GP)	1,534 (6.28)	Secondary-care (non-GP)	143 (0.59)	Primary-care (GP)	2,480 (10.15)	Secondary-care (non-GP)	193 (0.79)
Benzodiazepines	Primary-care (GP)	921 (3.77)	Secondary-care (non-GP)	62 (0.25)	Primary-care (GP)	1,933 (7.91)	Secondary-care (non-GP)	142 (0.58)
Centrally acting antihypertensives	Primary-care (GP)	549 (2.25)	Secondary-care (non-GP)	30 (0.12)	Primary-care (GP)	811 (3.32)	Secondary-care (non-GP)	46 (0.19)
First generation antihistamines	Primary-care (GP)	588 (2.41)	Secondary-care (non-GP)	41 (0.17)	Primary-care (GP)	1,633 (6.68)	Secondary-care (non-GP)	98 (0.40)
Hypnotic z drugs	Primary-care (GP)	736 (3.01)	Secondary-care (non-GP)	54 (0.22)	Primary-care (GP)	1,565 (6.40)	Secondary-care (non-GP)	111 (0.45)
Opioids	Primary-care (GP)	2,969 (12.15)	Secondary-care (non-GP)	234 (0.96)	Primary-care (GP)	5,339 (21.85)	Secondary-care (non-GP)	453 (1.85)
Vasodilating drugs	Primary-care (GP)	13,085 (53.54)	Secondary-care (non-GP)	719 (2.94)	Primary-care (GP)	15,546 (63.61)	Secondary-care (non-GP)	908 (3.72)

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Table 3. Number and frequency of top 10 comorbidities among individuals aged 65 years and older with newly diagnosed recurrent falls during the study period, in the time window prior to the index date (from 365 days to 1 day before the index date), categorised by data source.

CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)	Condition	n (%)
Cough	4424 (13.72)	Essential hypertension	13,818 (56.54)	Injury whilst engaged in leisure activity	14,959 (44.05)	Essential hypertension	130,974 (77.79)	Traumatic or non-traumatic injury	2,942 (24.05)
Urinary tract infectious disease	2948 (9.14)	Dizziness and giddiness	5,347 (21.88)	Essential hypertension	9,482 (27.92)	Pain in spine	46,069 (27.36)	Urinary tract infectious disease	2,140 (17.50)
Constipation	2607 (8.09)	Type 2 diabetes mellitus without complication	4,644 (19.00)	Joint pain	4,991 (14.7)	Type 2 diabetes mellitus	38,343 (22.77)	Urinary incontinence	1,618 (13.23)
Dyspnea	2513 (7.79)	Senility	4,567 (18.69)	Pain in limb	4,986 (14.68)	Disorder of lipid metabolism	32,448 (19.27)	Patient dependence on care provider	1,304 (10.66)
Allergic reaction to drug	2502 (7.76)	Urinary incontinence	4,347 (17.79)	Atrial arrhythmia	4,738 (13.95)	Cystitis	26,965 (16.01)	Acute lower respiratory tract infection	1,185 (9.69)
Lower respiratory tract infection	2410 (7.48)	Chronic pain	4,069 (16.65)	Open wound	3,701 (10.90)	Urinary incontinence	25,051 (14.88)	Dizziness and giddiness	1,055 (8.63)
Pain of knee region	2074 (6.43)	Nerve root disorder	3,856 (15.78)	Fracture of distal end of radius	3,652 (10.76)	Gastroesophageal reflux disease	24,995 (14.84)	Common cold	986 (8.06)
Backache	1957 (6.07)	Chronic ischemic heart disease	3,428 (14.03)	Type 2 diabetes mellitus	3,503 (10.32)	Inflammatory disorder of digestive tract	24,970 (14.83)	Impacted cerumen	872 (7.13)
Eruption	1867 (5.79)	Pure hypercholesterolemia	3,371 (13.79)	Dislocations/sprains/strains	3,014 (8.88)	Anxiety disorder	24,479 (14.54)	Low back pain	831 (6.79)
Dizziness	1787 (5.54)	Osteoarthritis of knee	3,167 (12.96)	Low back pain	2,805 (8.26)	Atrial arrhythmia	23,047 (13.69)	Minimal cognitive impairment	618 (5.05)

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Table 4. Number and frequency of top 10 conditions among individuals aged 65 years and older with newly diagnosed recurrent falls during the study period in IQVIA DA Germany stratified by healthcare setting. The results are shown at the index date and in the time window prior to the index date (from 365 days to 1 day before the index date).

Condition in primary care (GP) at ID	N (%)	Condition in secondary care (non-GP) at ID	N (%)	Condition in primary care (GP) 365 to 1 day prior ID	N (%)	Condition in secondary care (non-GP) 365 to 1 day prior ID	N (%)
Essential hypertension	6,235 (25.51)	Essential hypertension	602 (2.46)	Essential hypertension	12,937 (52.93)	Essential hypertension	881 (3.6)
Senility	3,444 (14.09)	Spondylosis	395 (1.62)	Dizziness and giddiness	4,851 (19.85)	Nerve root disorder	522 (2.14)
Dizziness and giddiness	3,010 (12.32)	Osteoarthritis of knee	386 (1.58)	Senility	4,305 (17.61)	Osteoporosis	514 (2.1)
Type 2 diabetes mellitus without complication	2,083 (8.52)	Nerve root disorder	352 (1.44)	Type 2 diabetes mellitus without complication	4,222 (17.27)	Osteoarthritis of knee	504 (2.06)
Urinary incontinence	2,022 (8.27)	Dizziness and giddiness	350 (1.42)	Urinary incontinence	4,101 (16.78)	Spondylosis	500 (2.05)
Chronic pain	1,987 (8.13)	Osteoporosis	347 (1.42)	Chronic pain	3,683 (15.07)	Dizziness and giddiness	496 (2.03)
Disorder of body system	1,873 (7.66)	Chronic pain	281 (1.15)	Nerve root disorder	3,334 (13.64)	Type 2 diabetes mellitus without complication	422 (1.73)
Pure hypercholesterolemia	1,587 (6.49)	Osteoarthritis of hip	256 (1.05)	Chronic ischemic heart disease	3,164 (12.95)	Chronic pain	386 (1.58)
Osteoarthritis of knee	1,553 (6.35)	Type 2 diabetes mellitus without complication	221 (0.90)	Pure hypercholesterolemia	3,070 (12.56)	Osteoarthritis of hip	364 (1.49)
Chronic ischemic heart disease	1,509 (6.17)	Arthropathy	216 (0.88)	Heart failure	2,840 (11.62)	Arthropathy	328 (1.34)

Table 5. Number and frequency of top 10 comedication among individuals aged 65 years and older with newly diagnosed recurrent falls during the study period, in the time window prior to the index date (from 365 days to 1 day before the index date), categorised by data source.

CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
influenza virus vaccine. unspecified formulation	19,099 (59.24)	SARS-CoV-2 (COVID-19) vaccine. mRNA-BNT162b2 0.1 MG/ML Injectable Suspension	2,622 (10.73)	Acetaminophen 1000 MG Oral Tablet Box of 100	17,666 (52.03)	Amoxicillin 875 MG / Clavulanate 125 MG Oral Tablet Box of 14	37,319 (22.16)	Influenza. seasonal. injectable	8,442 (69.02)
acetaminophen 500 MG Oral Tablet	13,817 (42.86)	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	2,543 (10.41)	Influenza A virus / Influenza B virus Injectable Suspension [VAXIGRIP]	12,180 (35.87)	Influenza A virus (H1N1) antigen / influenza A virus (H3N2) antigen / influenza B virus antigen Injection	37,235 (22.11)	acetaminophen 1000 MG Oral Tablet	7,639 (62.46)
omeprazole 20 MG Delayed Release Oral Capsule	8,565 (26.57)	torsemide 10 MG Oral Tablet [Torasemid 1a Pharma] Box of 100 by 1 A	2,106 (8.62)	acetaminophen	7,771 (22.89)	Diazepam 5 MG Oral Tablet Box of 30	36,628 (21.75)	omeprazole 20 MG Delayed Release Oral Capsule	7,615 (62.26)
aspirin 75 MG Disintegrating Oral Tablet	7,369 (22.86)	Aspirin 100 MG Oral Tablet [Ass 1a Pharma] Box of 100 by 1 A	2,031 (8.31)	SARS-CoV-2 (COVID-19) vaccine. mRNA spike protein Injectable Suspension [Comirnaty]	7,156 (21.07)	Furosemide 40 MG Oral Tablet Box of 20	32,367 (19.22)	dipyrone	5,131 (41.95)
amoxicillin 500 MG Oral Capsule	6,465 (20.05)	Dipyrone 500 MG Oral Tablet Box of 50 by Sanofi	1,923 (7.87)	polyethylene glycol 3350	4,814 (14.18)	Acetaminophen 325 MG / Tramadol 37.5 MG Oral Tablet Box of 30	29,812 (17.71)	furosemide 40 MG Oral Tablet	3,516 (28.75)

CPRD GOLD		IQVIA DA Germany		FinOMOP-HILMO		NAJS		SIDIAP	
Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)	Medication	n (%)
trimethoprim 200 MG Oral Tablet	6,099 (18.92)	Cholecalciferol 20 UNT Oral Capsule [Dekristol] Box of 50 by Mibe	1,686 (6.9)	oxycodone	4,428 (13.04)	COVID-19 vaccine Injectable Solution	25,710 (15.27)	lorazepam 1 MG Oral Tablet	3,515 (28.74)
1000 ML bicarbonate ion 0.017 MMOL/ML / POLYETHYLENE GLYCOL 3350 105 MG/ML / Potassium 0.0054 MMOL/ML / Sodium 0.065 MMOL/ML Oral Powder [Laxido] by Galen	5,593 (17.35)	Ramipril 5 MG Oral Tablet [Ramipril 1a Pharma] Box of 100 by 1 A	1,230 (5.03)	Ibuprofen 600 MG Oral Tablet Box of 100	4,342 (12.79)	Pantoprazole 40 MG Oral Tablet Box of 28	21,417 (12.72)	aspirin 100 MG Oral Tablet	2,642 (21.60)
furosemide 40 MG Oral Tablet	5,370 (16.66)	pantoprazole 40 MG Oral Tablet [Pantoprazol - 1a Pharma] Box of 100 by 1 A	1,214 (4.97)	calcium carbonate 500 MG / cholecalciferol 0.01 MG Oral Tablet	4,199 (12.37)	Ibuprofen 600 MG Oral Granules	21,085 (12.52)	SARS-CoV-2 (COVID-19) vaccine. mRNA-BNT162b2 0.1 MG/ML Injectable Suspension	2,579 (21.09)
simvastatin 40 MG Oral Tablet	4,762 (14.77)	Ramipril 5 MG Oral Tablet [Ramilich] Box of 100 by Sanofi	1,134 (4.64)	naloxone	4,020 (11.84)	Dexamethasone 1 MG/ML / neomycin 3500 IU/ML / polymyxin B 6000 IU/ML Ophthalmic Suspension	20,844 (12.38)	acetaminophen 325 MG / tramadol hydrochloride 37.5 MG Oral Tablet	2,175 (17.78)
furosemide 20 MG Oral Tablet	4,569 (14.17)	Amlodipine 5 MG Oral Tablet [Amlodipin 1a Pharma] Box of 100 by 1 A	1,129 (4.62)	Estradiol 0.01 MG Vaginal Tablet	3,916 (11.53)	Bisoprolol 2.5 MG Oral Tablet Box of 30	20,366 (12.10)	metformin hydrochloride 850 MG Oral Tablet	2,156 (17.63)

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Table 6. Number and frequency of top 10 comedication among individuals aged 65 years and older with newly diagnosed recurrent falls during the study period in IQVIA DA Germany stratified by healthcare setting. The results are shown at the index date and in the time window prior to the index date (from 365 days to 1 day before the index date).

Comedication in primary care (GP) at ID	N (%)	Comedication in secondary care (non-GP) at ID	N (%)	Comedication in primary care (GP) 365 to 1 day prior ID	N (%)	Comedication in secondary care (non-GP) 365 to 1 day prior ID	N (%)
Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	297 (1.22)	-	-	SARS-CoV-2 (COVID-19) vaccine, mRNA-BNT162b2 0.1 MG/ML Injectable Suspension	2,472 (10.11)	Dipyrone 500 MG Oral Tablet [Novaminsulfon 1a Pharma] Box of 50 by 1 A	233 (0.95)
Dipyrone 500 MG Oral Tablet Box of 50 by Sanofi	211 (0.86)	-	-	Dipyrone 500 MG Oral Tablet [Noaminsulfon 1a Pharma] Box of 50 by 1 A	2,310 (9.45)	Cholecalciferol 20 UNT Oral Capsule [Dekristol] Box of 50 by Mibe	233 (0.95)
Aspirin 100 MG Oral Tablet [Ass 1a Pharma] Box of 100 by 1 A	177 (0.72)	-	-	torsemide 10 MG Oral Tablet [Torasemid 1a Pharma] Box of 100 by 1 A	1,969 (8.06)	1 ML denosumab 60 MG/ML Prefilled Syringe [Prolia] Box of 1 by Amgen	168 (0.69)
torsemide 10 MG Oral Tablet [Torasemid 1a Pharma] Box of 100 by 1 A	154 (0.63)	-	-	Aspirin 100 MG Oral Tablet [Ass 1a Pharma] Box of 100 by 1 A	1,920 (7.86)	SARS-CoV-2 (COVID-19) vaccine, mRNA-BNT162b2 0.1 MG/ML Injectable Suspension	150 (0.61)
Ramipril 5 MG Oral Tablet [Ramipril 1a Pharma] Box of 100 by 1 A	126 (0.52)	-	-	Dipyrone 500 MG Oral Tablet Box of 50 by Sanofi	1,821 (7.45)	torsemide 10 MG Oral Tablet [Torasemid 1a Pharma] Box of 100 by 1 A	137 (0.56)
				Cholecalciferol 20 UNT Oral Capsule [Dekristol] Box of 50 by Mibe	1,453 (5.95)		
				Ramipril 5 MG Oral Tablet [Ramipril 1a Pharma] Box of 100 by 1 A	1,148 (4.70)		

Comedication in primary care (GP) at ID	N (%)	Comedication in secondary care (non-GP) at ID	N (%)	Comedication in primary care (GP) 365 to 1 day prior ID	N (%)	Comedication in secondary care (non-GP) 365 to 1 day prior ID	N (%)
				pantoprazole 40 MG Oral Tablet [Pantoprazol - 1a Pharma] Box of 100 by 1 A	1,136 (4.65)		
				Ramipril 5 MG Oral Tablet [Ramilich] Box of 100 by Sanofi	1,091 (4.46)		
				Amlodipine 5 MG Oral Tablet [Amlodipin 1a Pharma] Box of 100 by 1 A	1,049 (4.29)		

17.3. Appendix III: Supplementary Figures

Figure 1. Prevalence of benzodiazepine use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

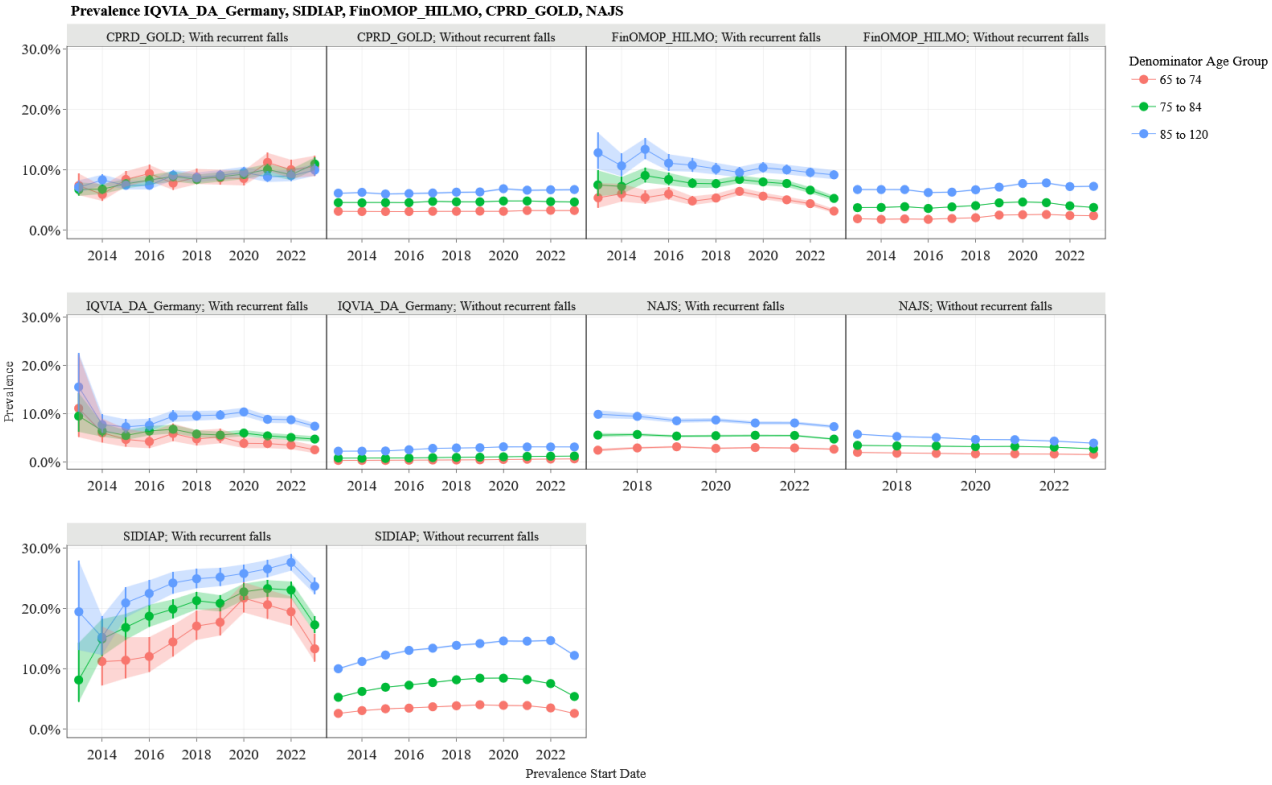

Figure 2. Prevalence of antipsychotic use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

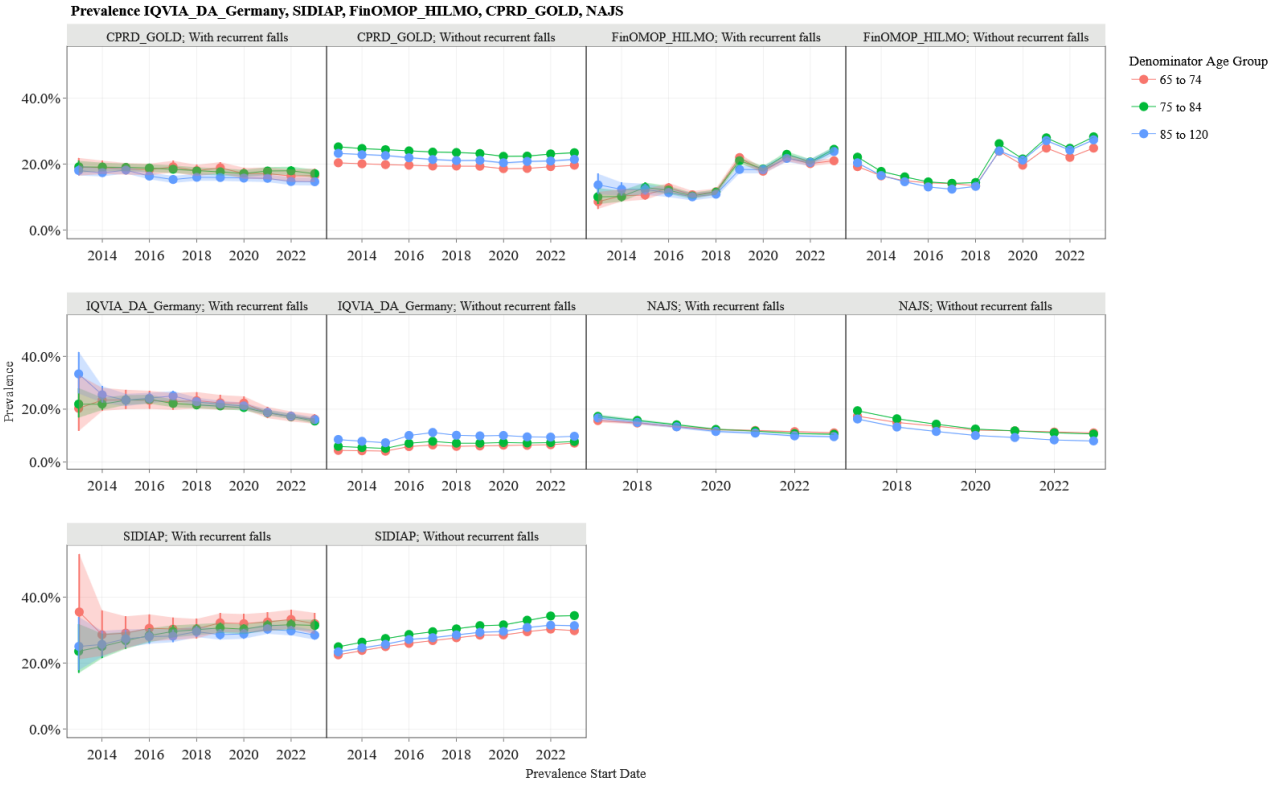

Figure 3. Prevalence of vasodilating drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

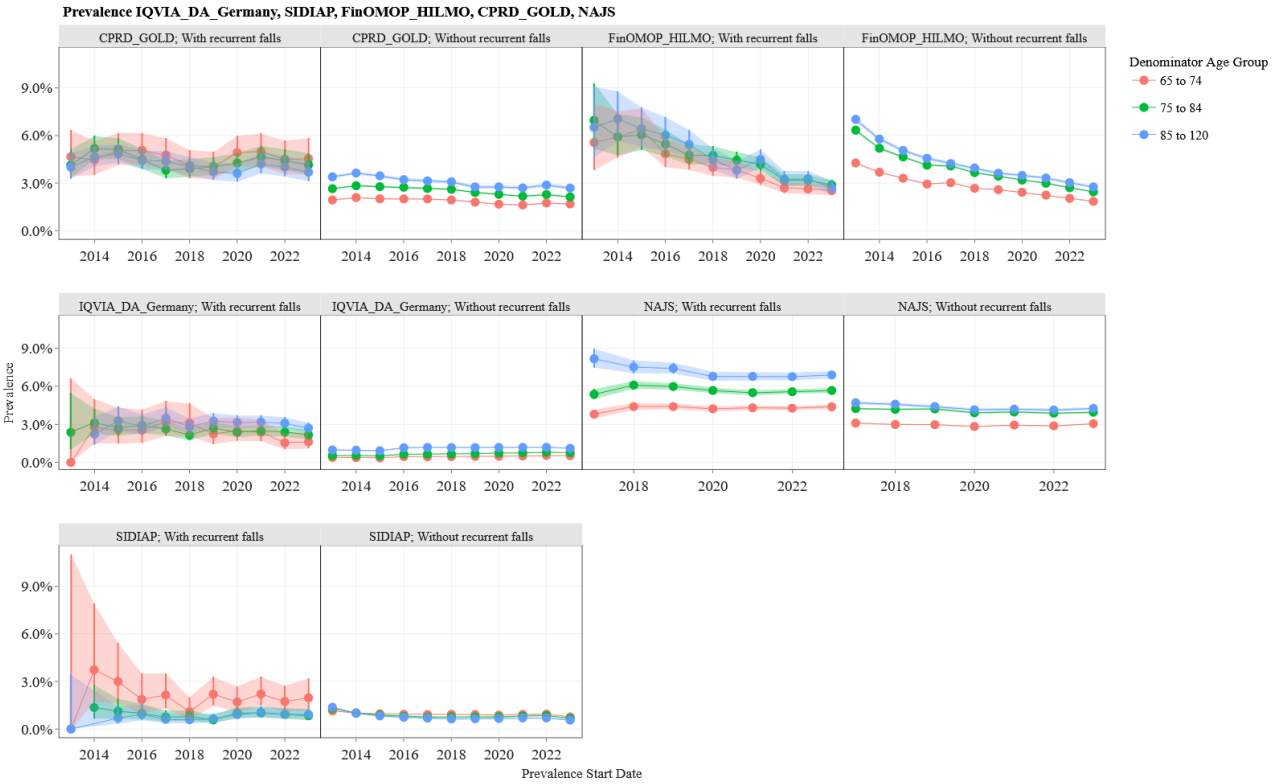

Figure 4. Prevalence of hypnotic z-drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

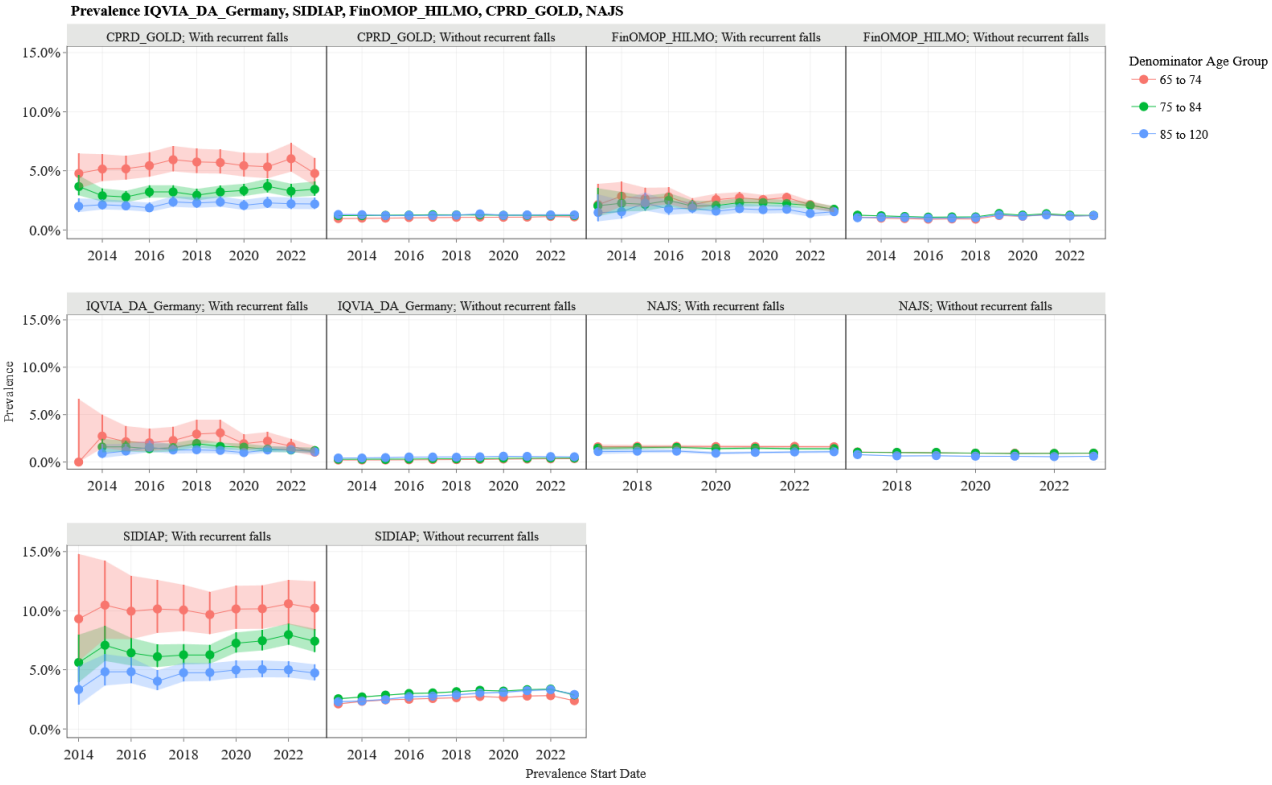

Figure 5. Prevalence of antiepileptic drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

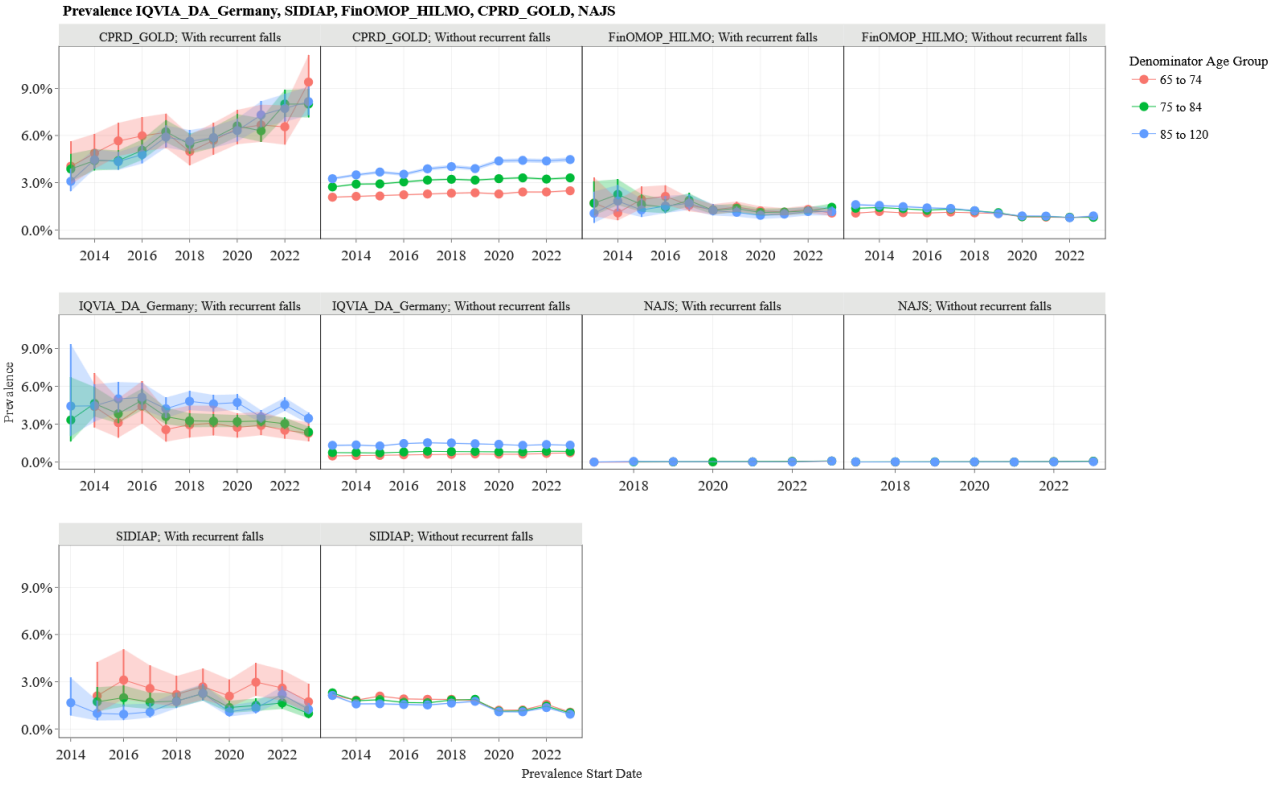

Figure 6. Prevalence of first generation antihistamine drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

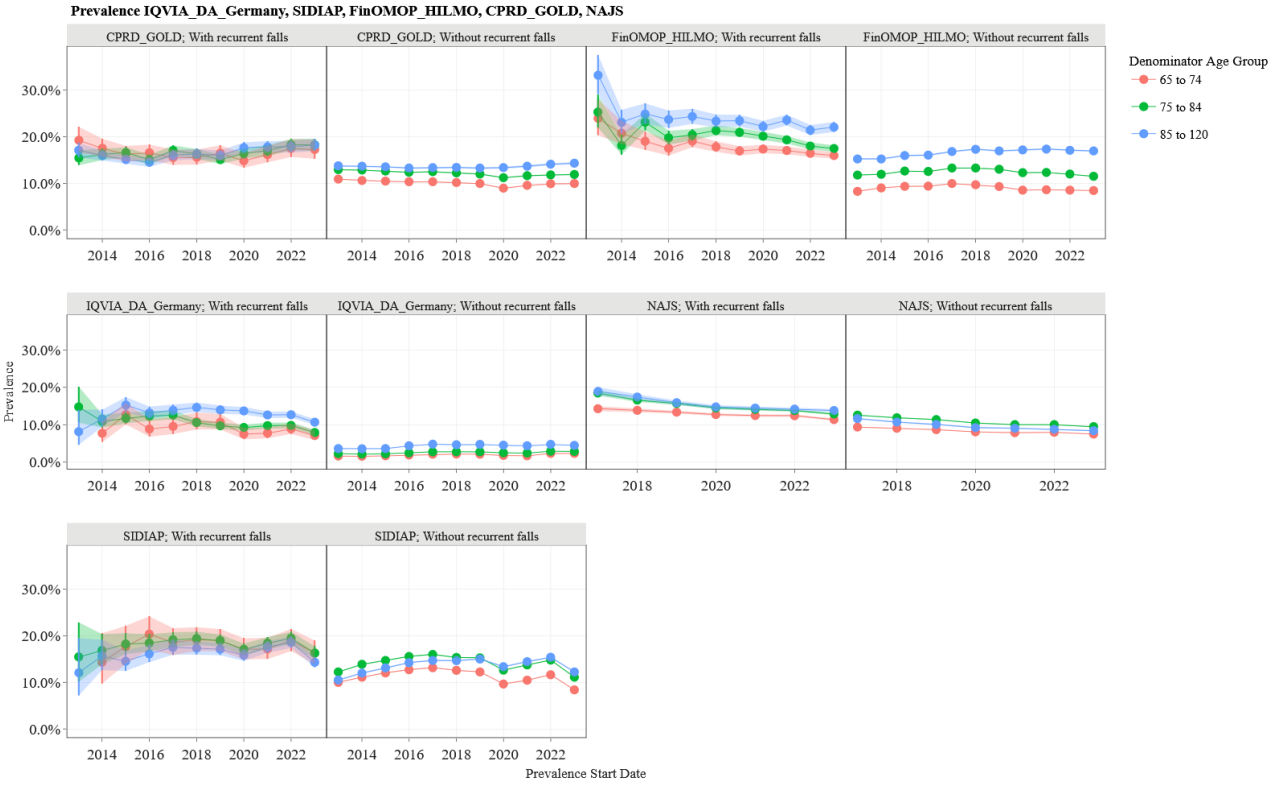

Figure 7. Prevalence of opioid use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

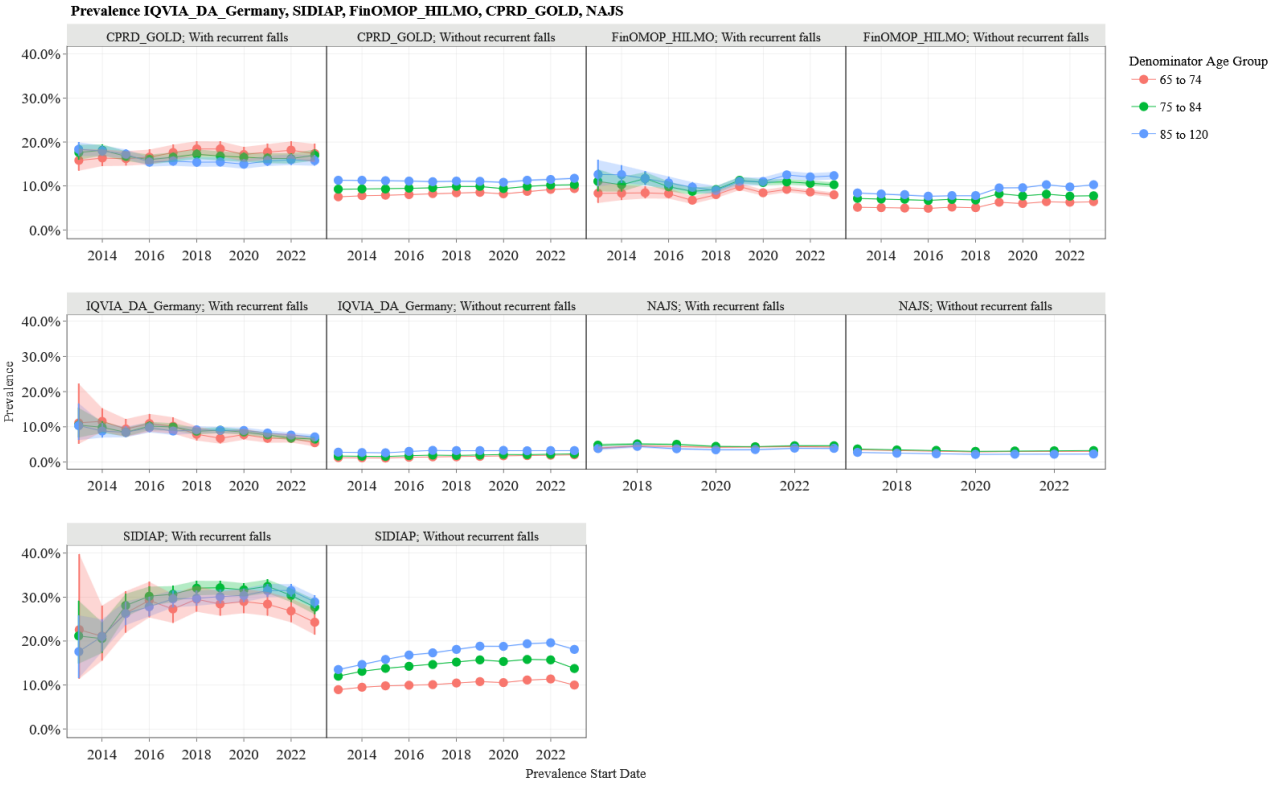

Figure 8. Prevalence of antidepressant use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

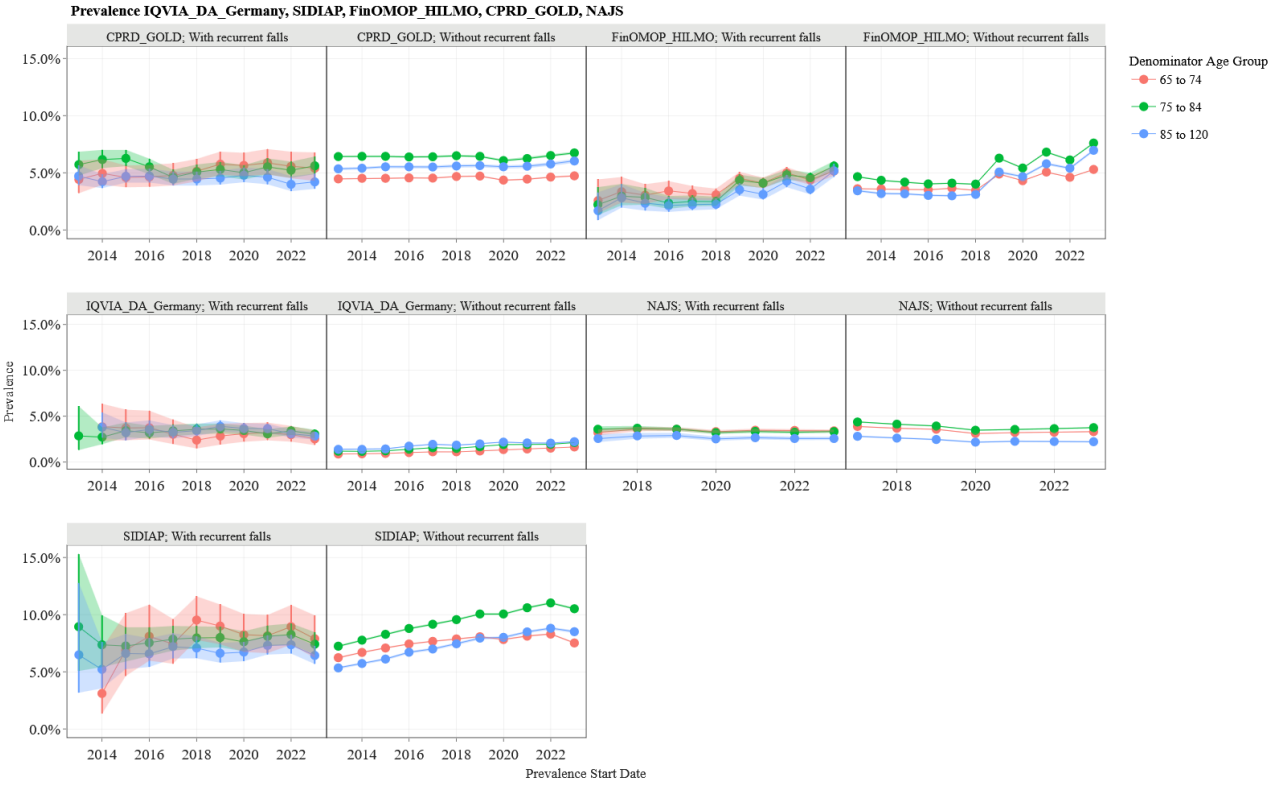

Figure 9. Prevalence of alpha-blocker use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

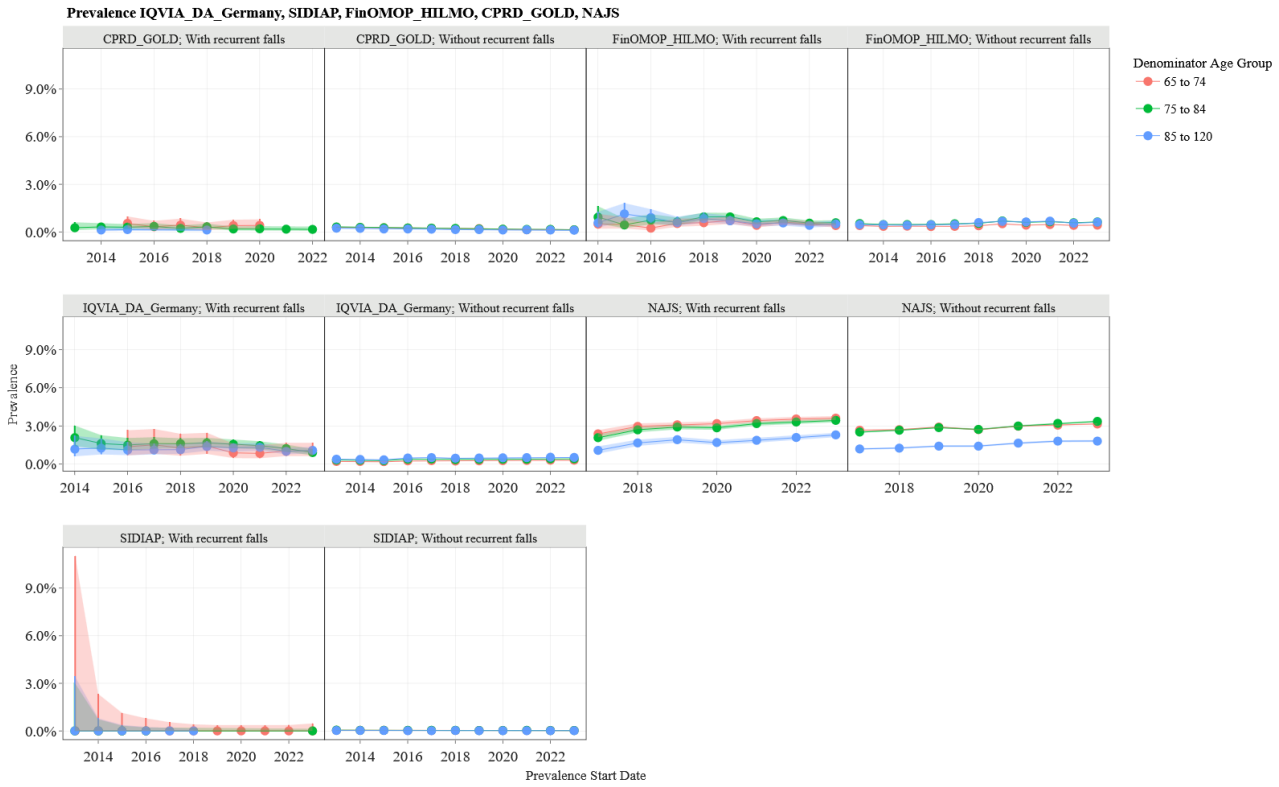

Figure 10. Prevalence of centrally acting antihypertensive use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

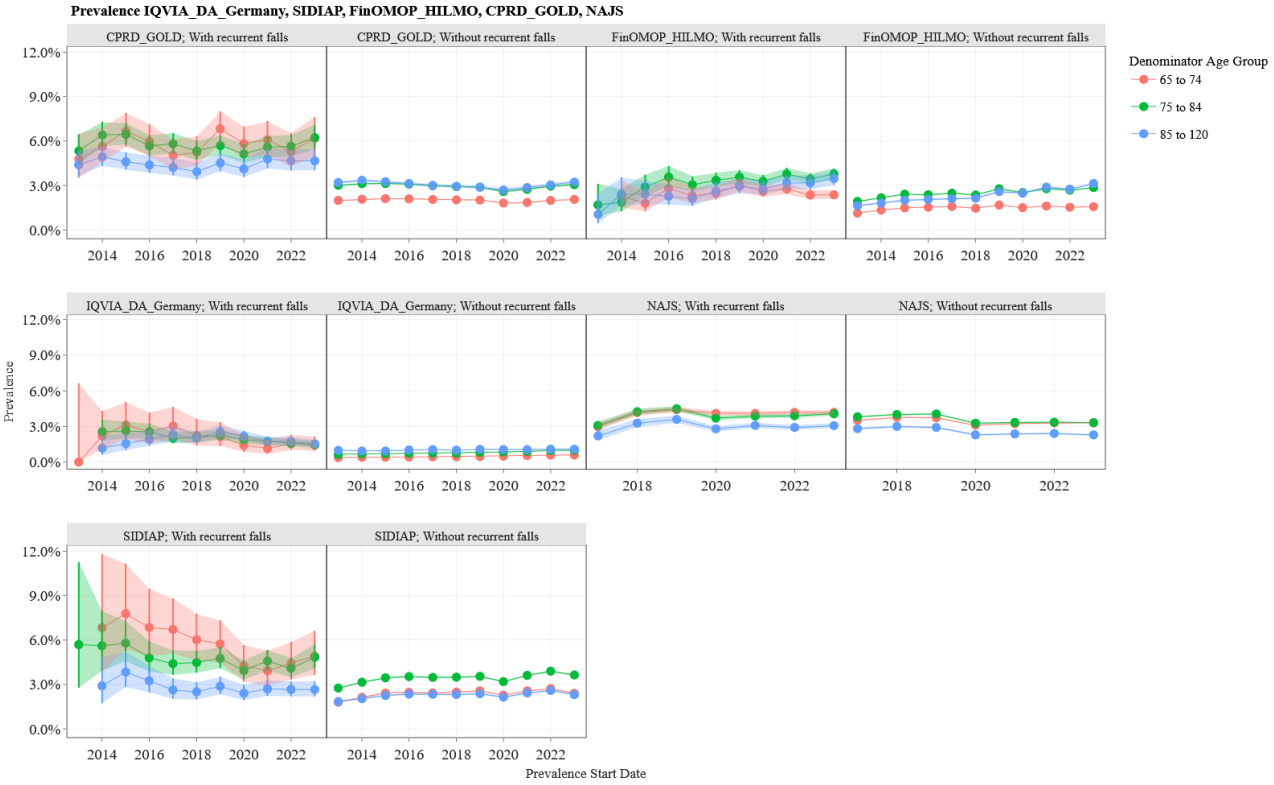

Figure 11. Prevalence of antimuscarinic drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

Figure 12. Prevalence of benzodiazepine drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 13. Prevalence of antipsychotic use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 14. Prevalence of vasodilating drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

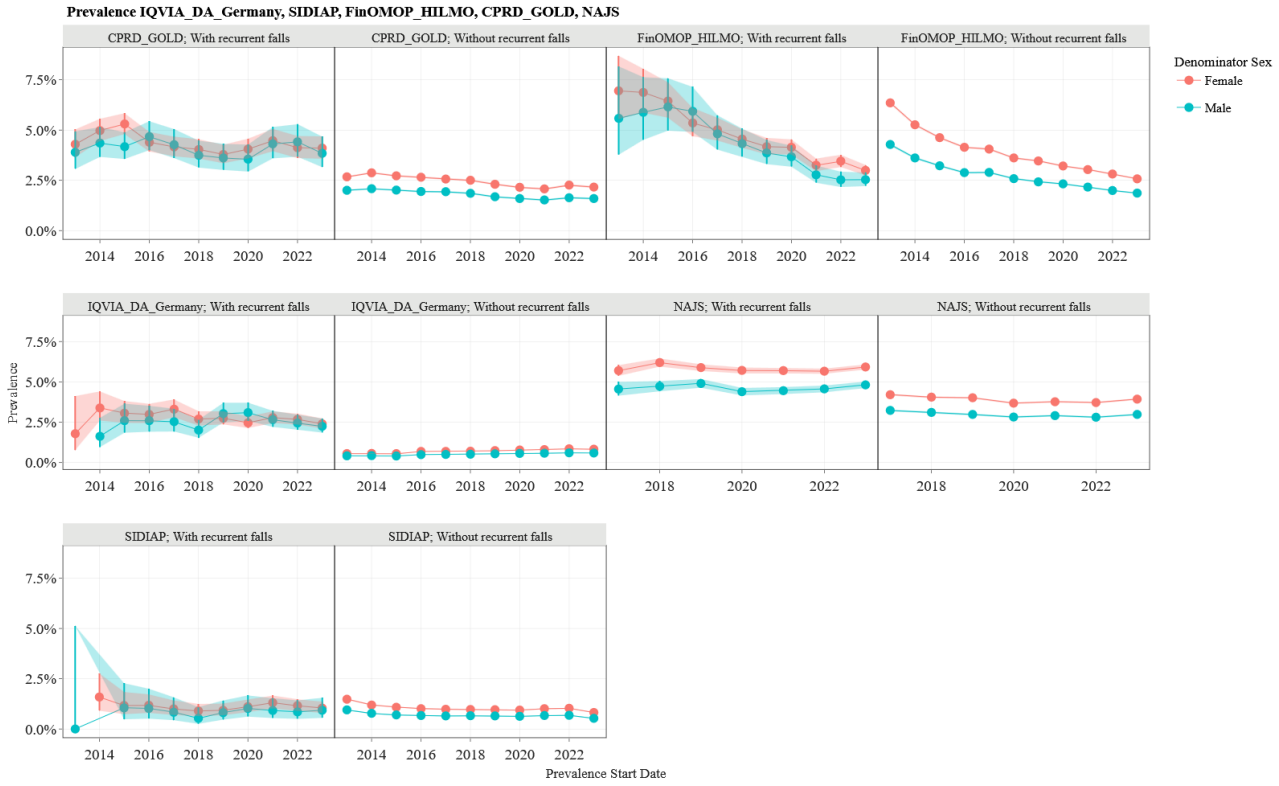

Figure 15. Prevalence of hypnotic z-drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 16. Prevalence of antiepileptic use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 17. Prevalence of first-generation antihistamine use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 18. Prevalence of opioid use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 19. Prevalence of antidepressant use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 20. Prevalence of alpha-blocker use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 21. Prevalence of centrally acting antihypertensive use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 22. Prevalence of antimuscarinic use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

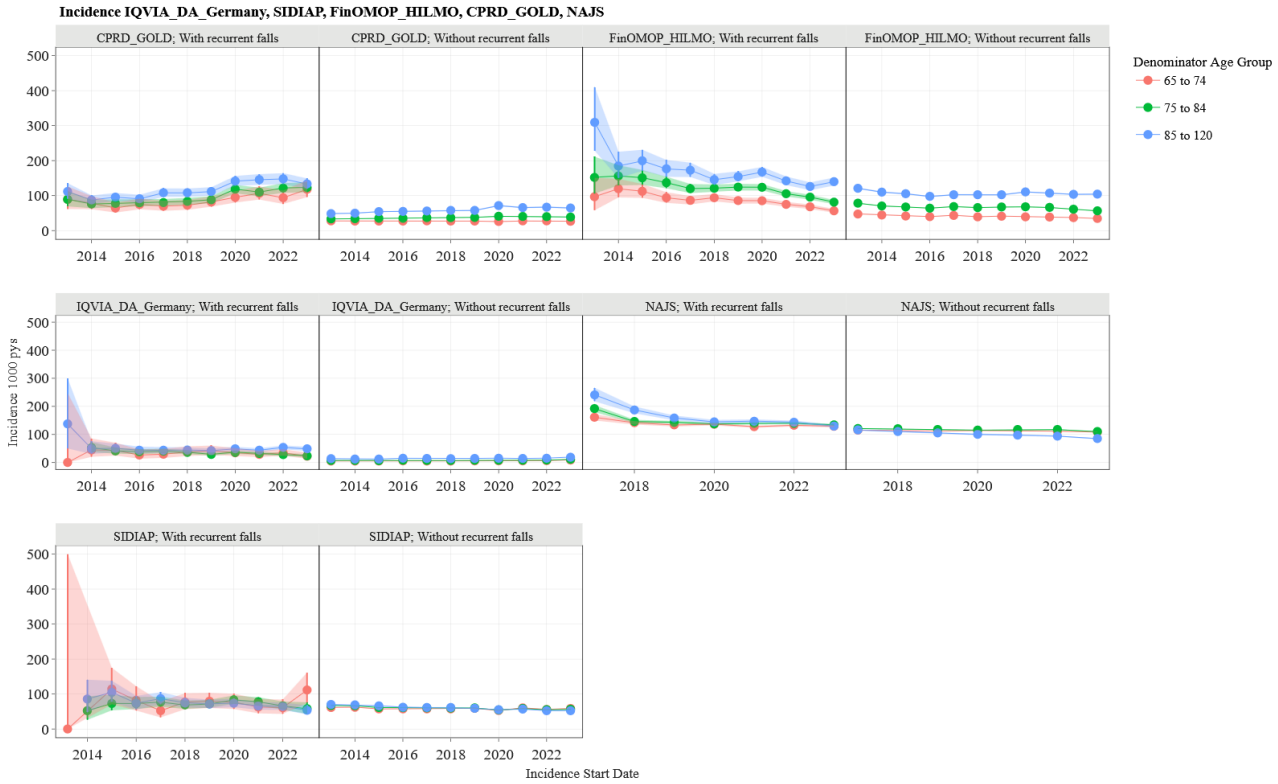

Figure 23. Incidence rates of benzodiazepine use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age groups.

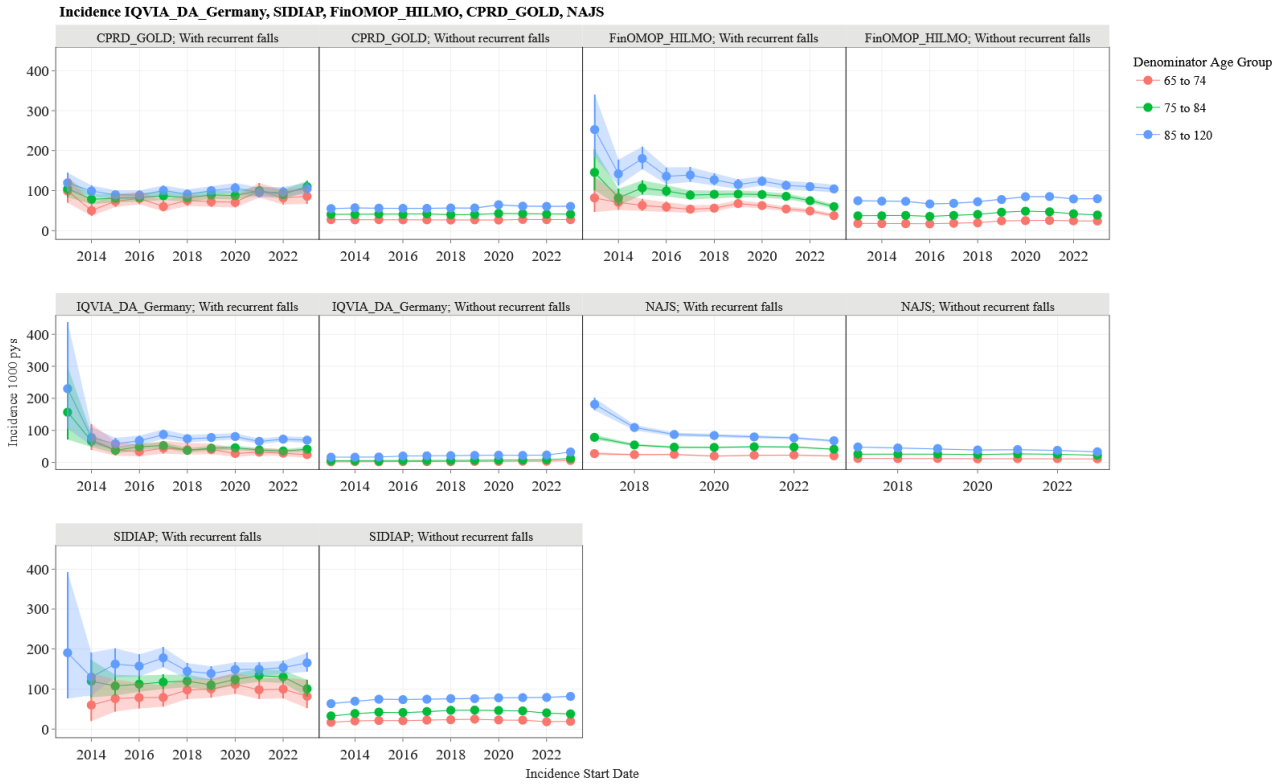

Figure 24. Incidence rates of antipsychotic use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age group.

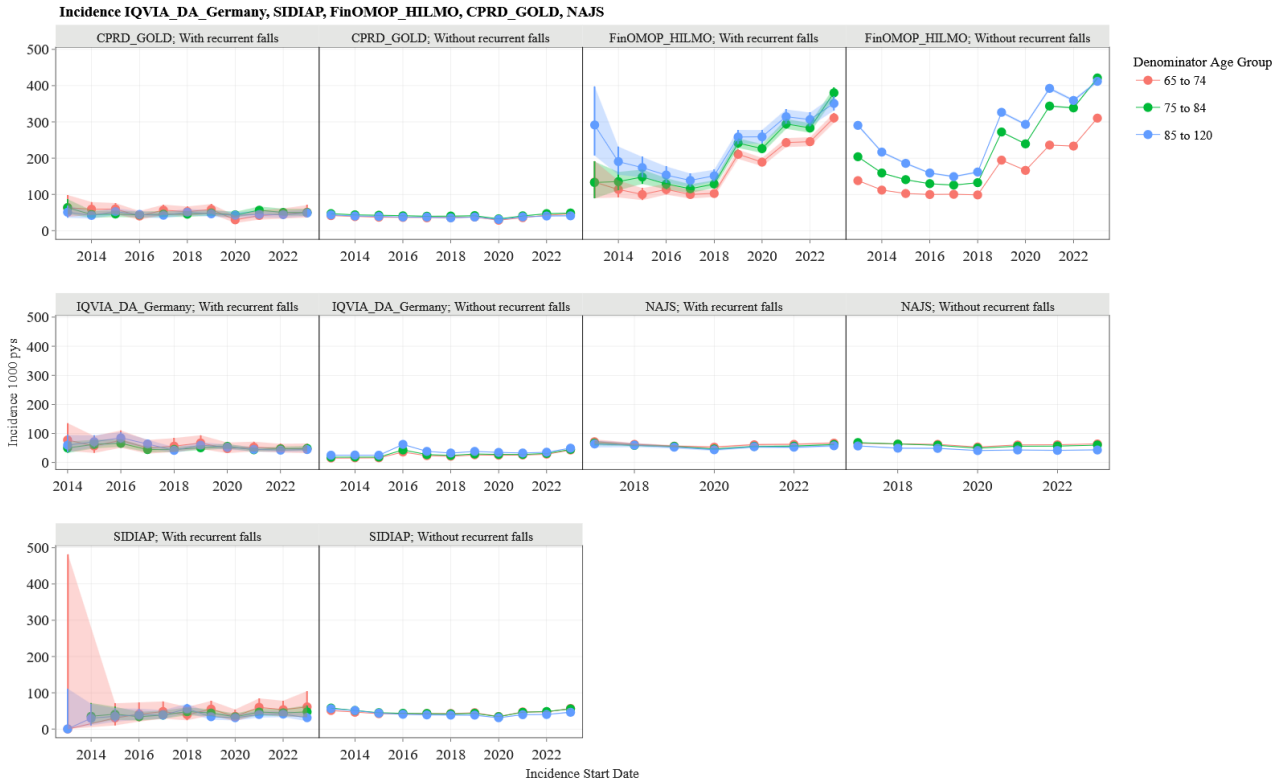

Figure 25. Incidence rates of vasodilating drug (nitrates, ACE inhibitors, ARB inhibitors, calcium channel blockers) use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age group.

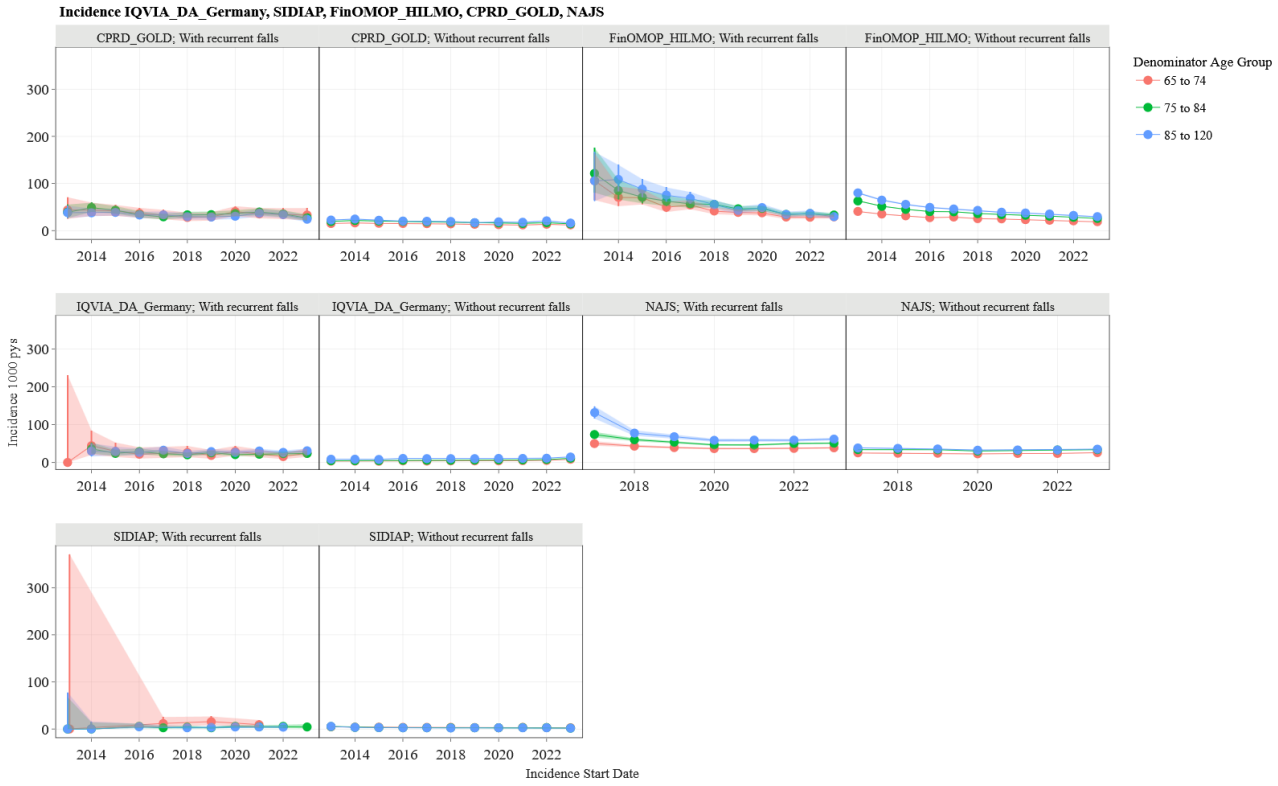

Figure 26. Incidence rates of hypnotic z-drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age group.

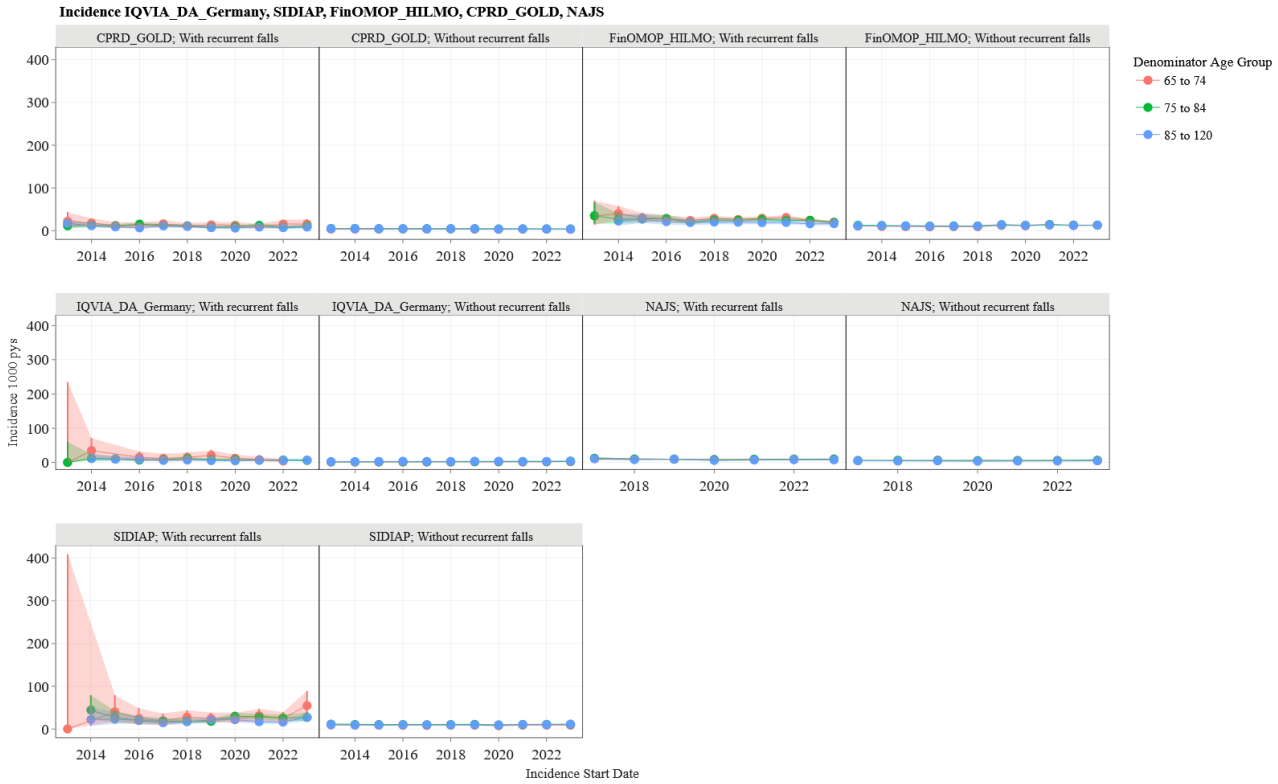

Figure 27. Incidence rates of antiepileptic use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age group.

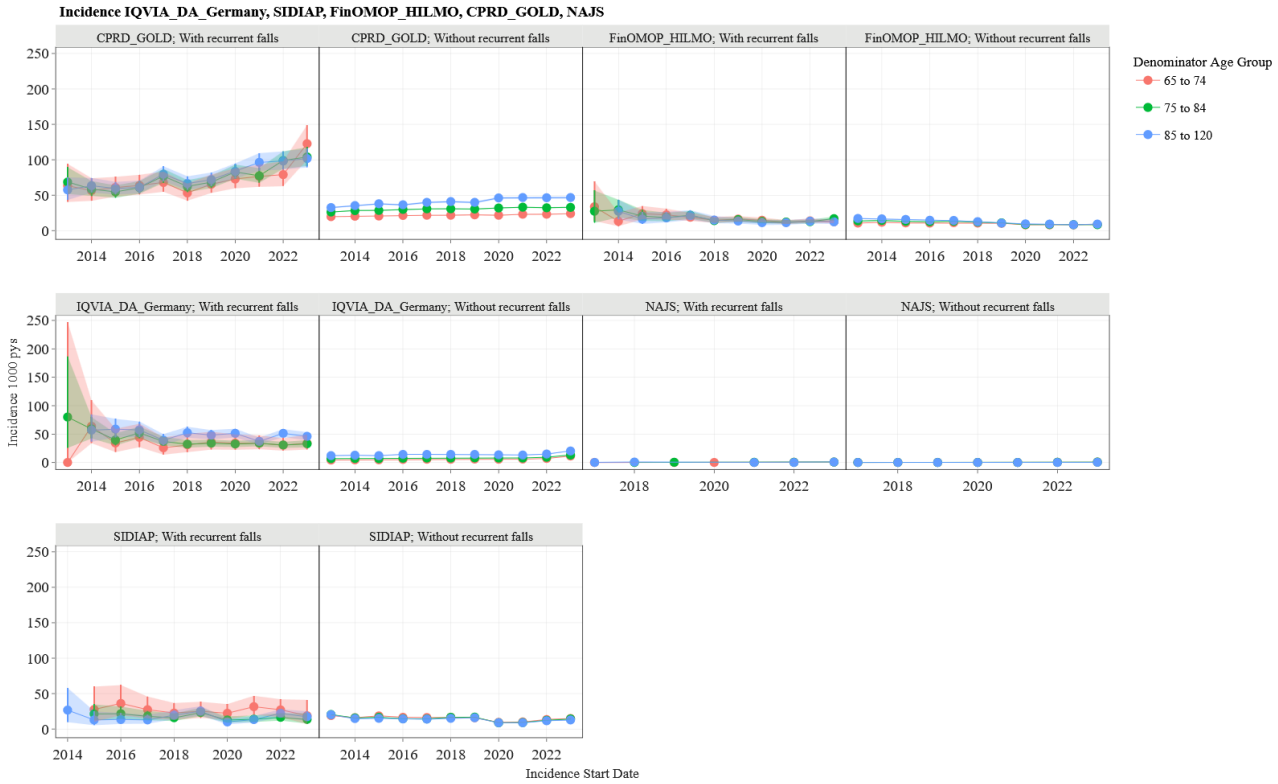

Figure 28. Incidence rates of first-generation antihistamine use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age group.

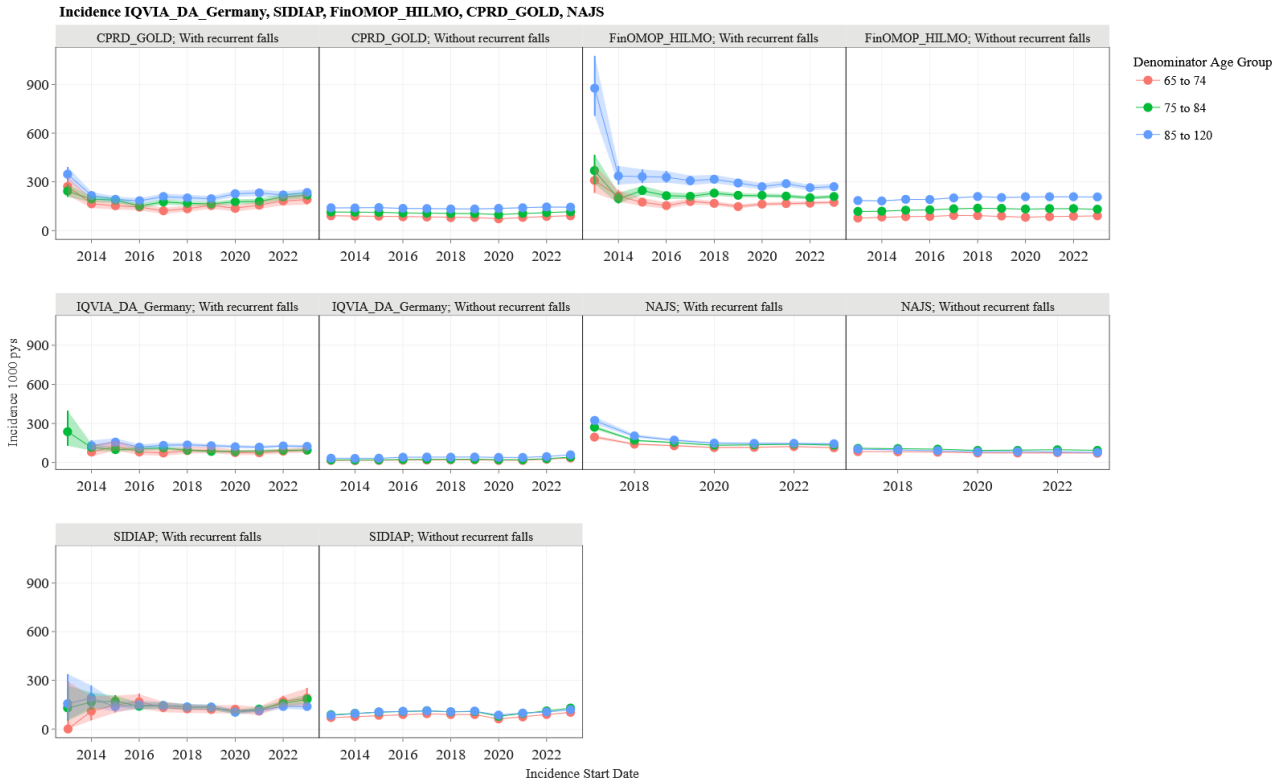

Figure 29. Incidence rates of opioid use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age group.

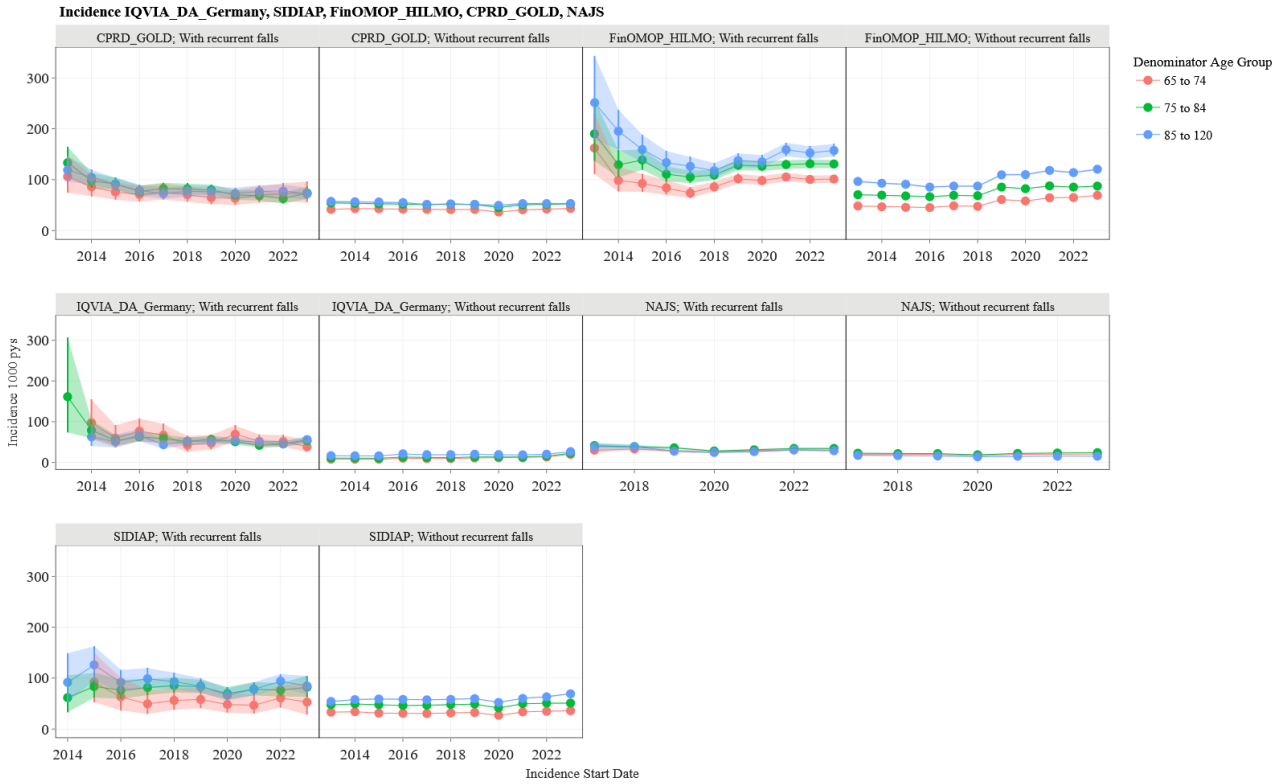

Figure 30. Incidence rates of antidepressant use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age group.

A)

B)

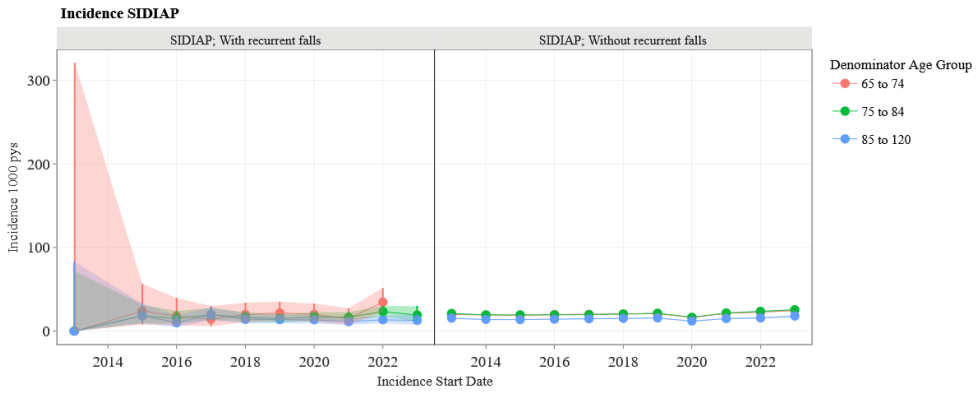

Figure 31. Incidence rates of alpha-blocker use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age group. Panel A presents incidence rates in most data sources, while panel B shows incidence rates in SIDIAP.

A)

B)

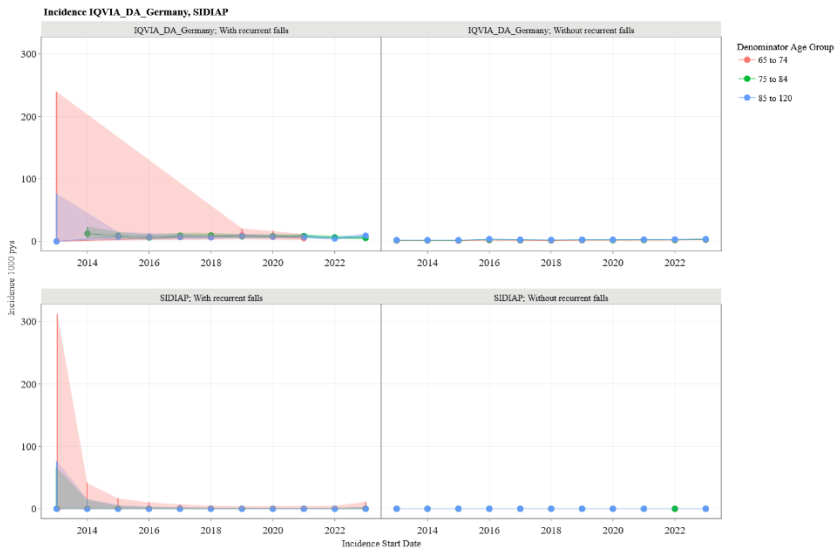

Figure 32. Incidence rates of centrally acting antihypertensive drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age group. Panel A presents incidence rates in most data sources, while panel B shows incidence rates in IQVIA DA Germany and SIDIAP.

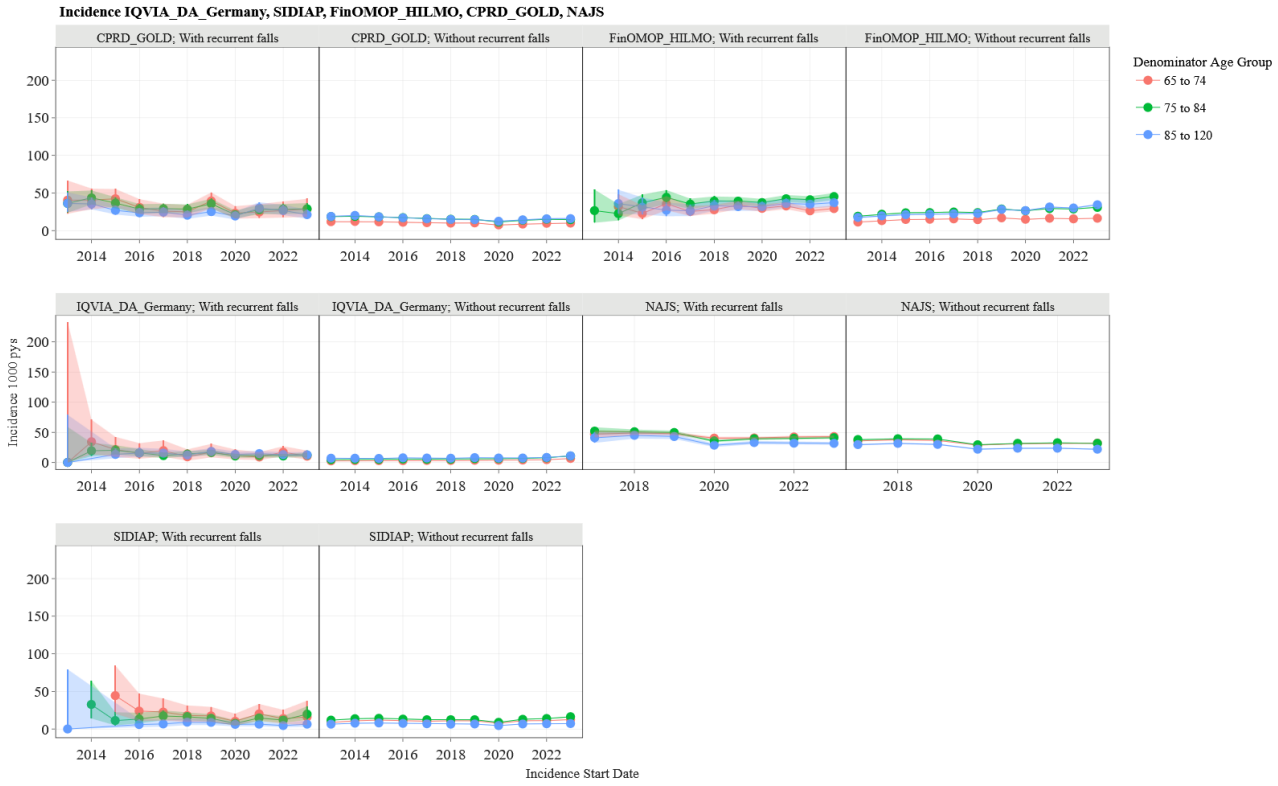

Figure 33. Incidence rates of antimuscarinic drug (indicated for overactive bladder) use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by age group.

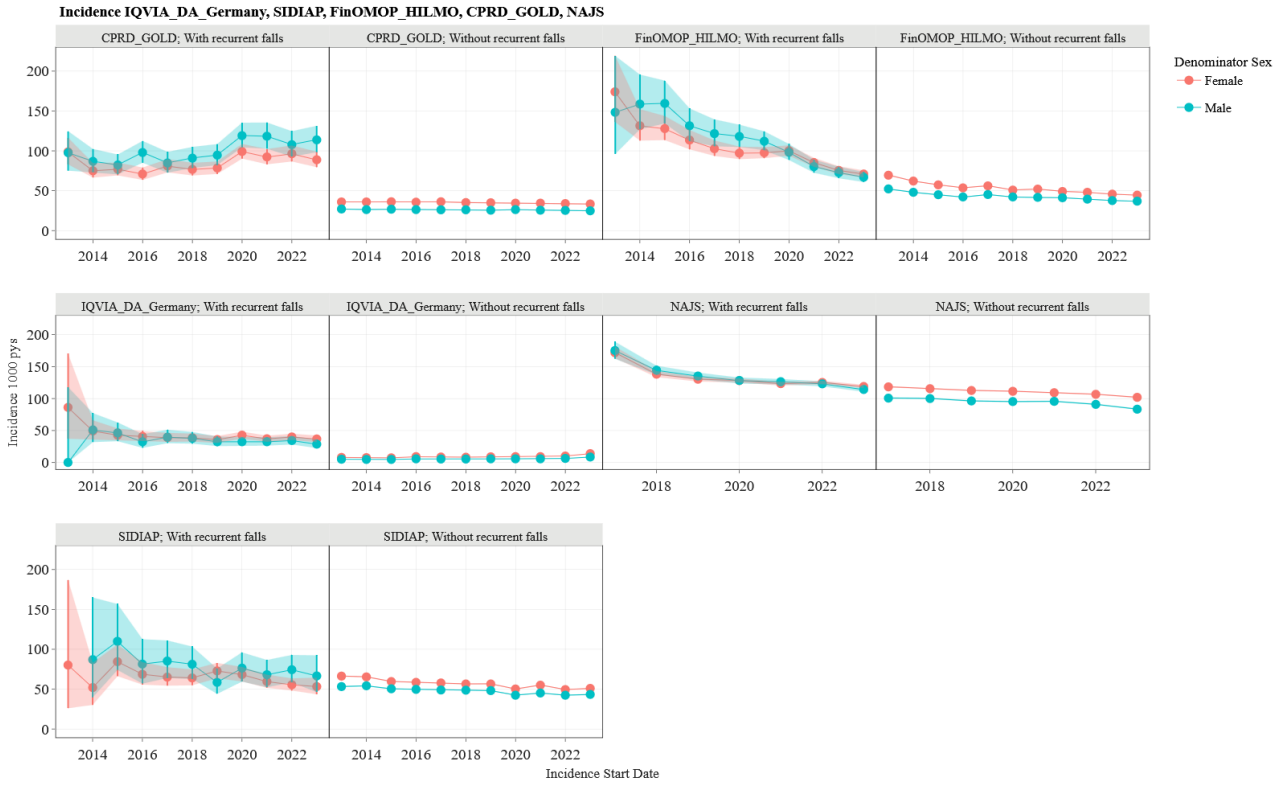

Figure 34. Incidence rates of benzodiazepine use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

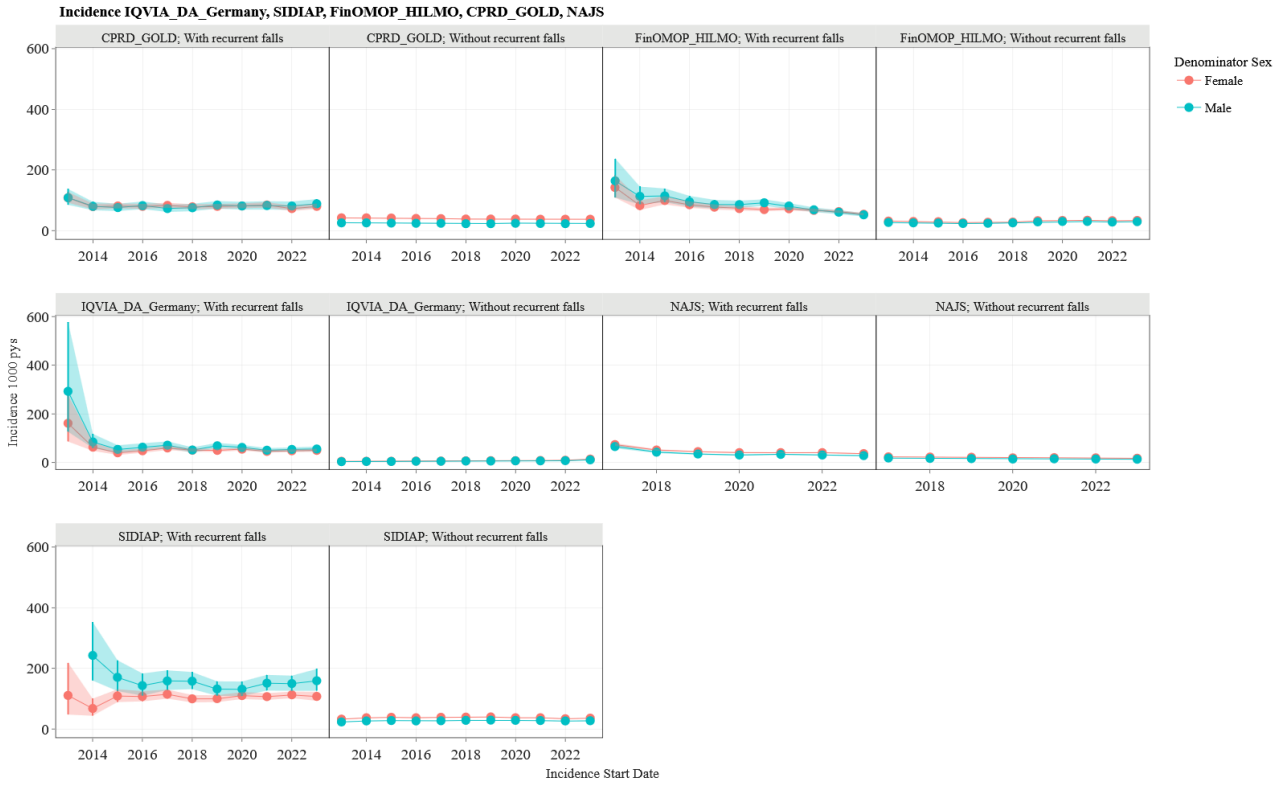

Figure 35. Incidence rates of antipsychotic use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 36. Incidence rates of vasodilating drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

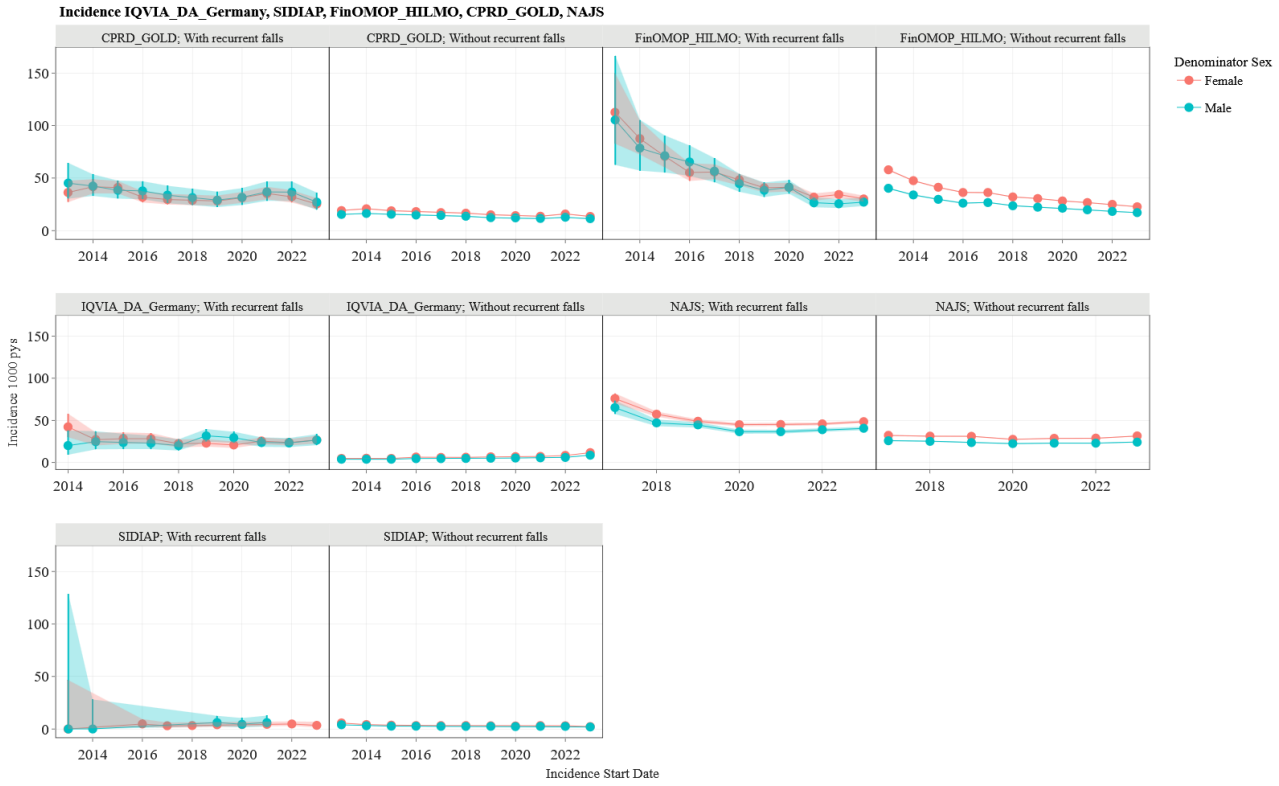

Figure 37. Incidence rates of hypnotic z-drug use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 38. Incidence rates of antiepileptic use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 39. Incidence rates of first-generation antihistamine use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

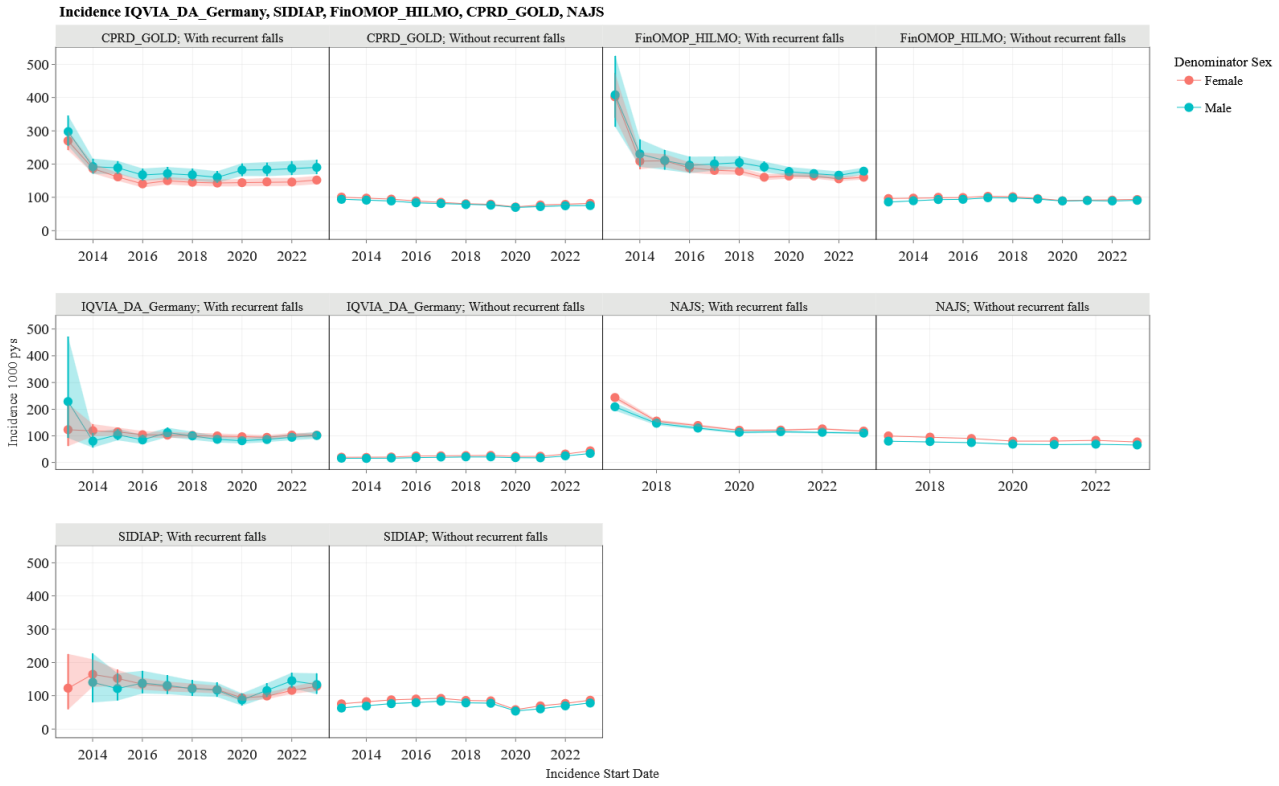

Figure 40. Incidence rates of opioid use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 41. Incidence rates of antidepressant use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

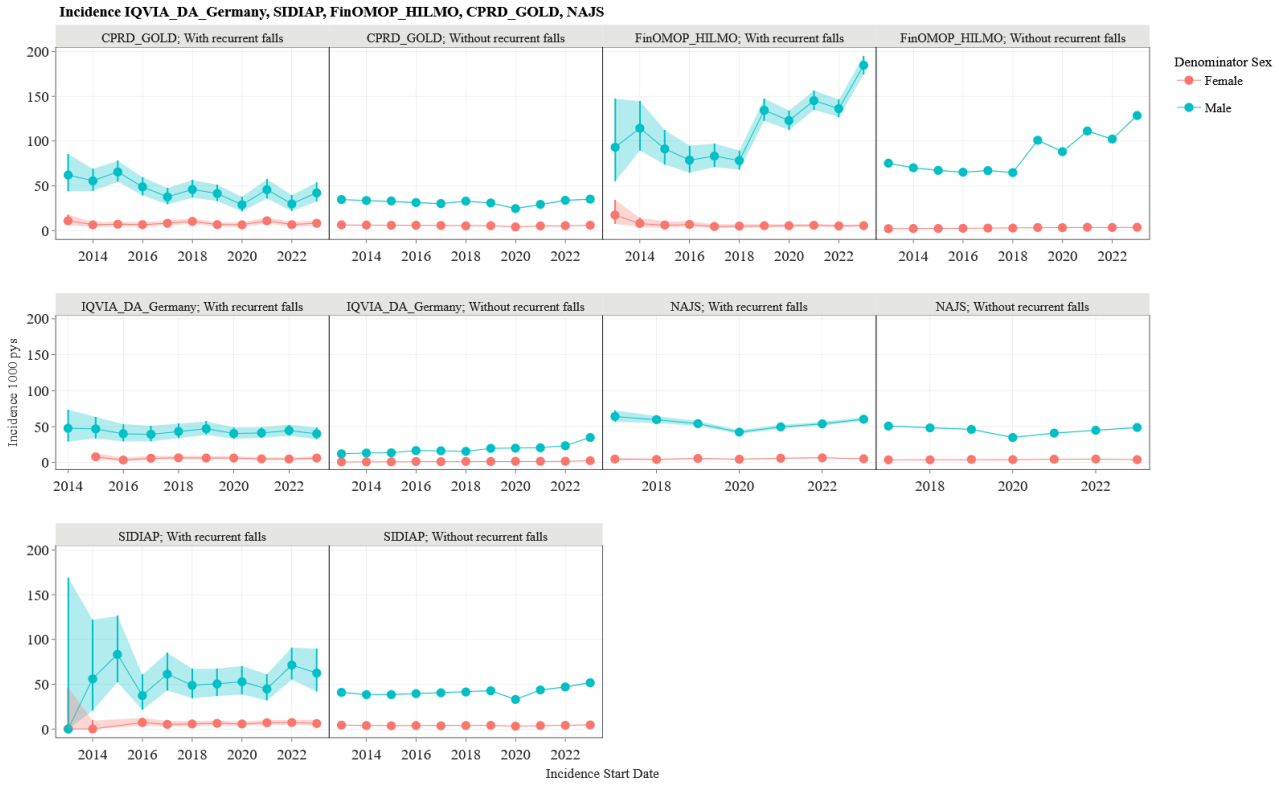

Figure 42. Incidence rates of alpha-blocker use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

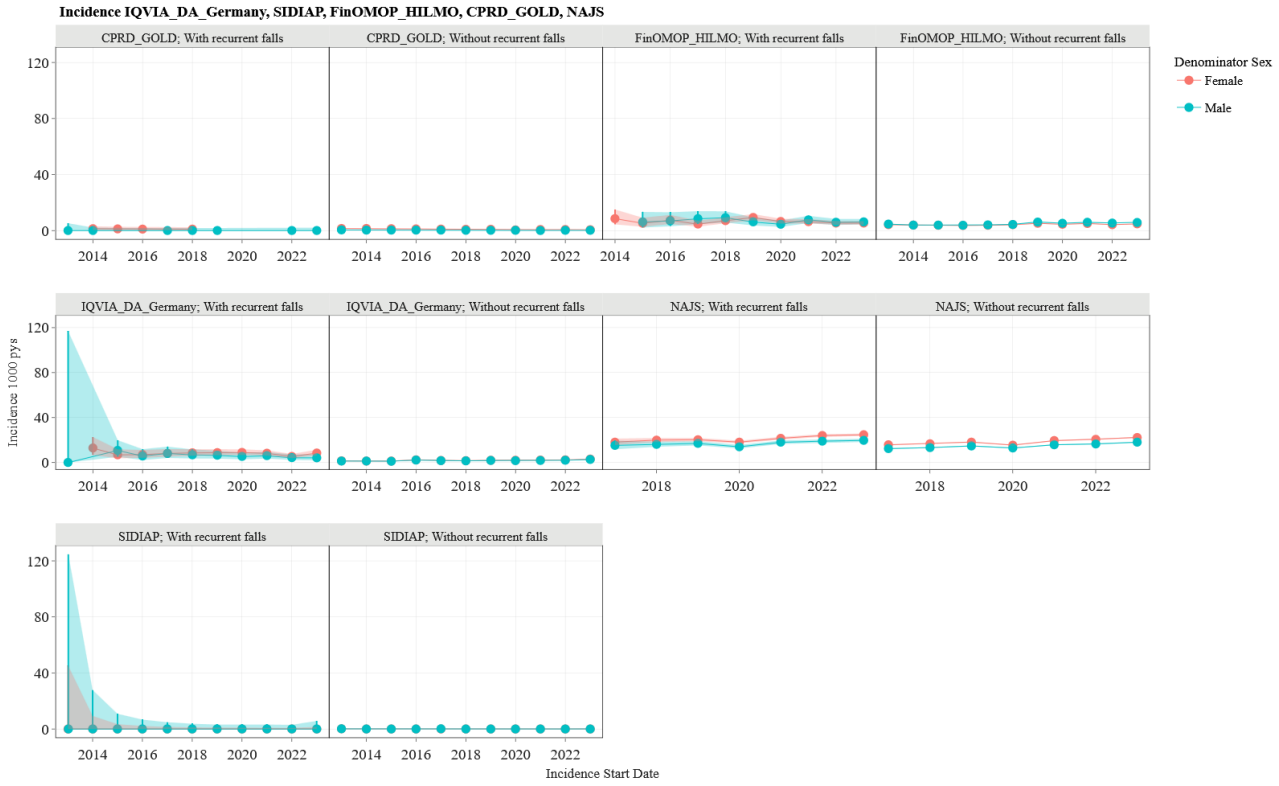

Figure 43. Incidence rates of centrally acting antihypertensives use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.

Figure 44. Incidence rates of antimuscarinic drugs (indicated for overactive bladder) use in individuals aged 65 years and older, with and without recurrent falls, across the data source during the study period, stratified by sex.