Table B.51: Reducing Adverse Events in Older Adults, Using STOPP (Screening Tool of Older Peron’s Inappropriate Prescriptions)

Note: Full references are available in the [Section 9.3 reference list](#Section9point3refs).

| Author, Year | Description of Patient Safety Practice | Study Design;Sample Size;Patient Population | Setting | Outcomes: Benefits | Outcomes: Harms | Implementation Themes/Findings | Risk of Bias (High, Moderate, Low) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Campins et al., 20171 | Clinical pharmacist-led review based on algorithm and STOPP/START criteria (Screening Tool of Older People’s Prescriptions/Screening Tool to Alert to Right Treatment) | Design: Randomized controlled trial (RCT) Sample: 251 control group; 252 intervention group Patient Population: Community-dwelling older adults, aged 70 years and older, receiving six or more drugs and resident in municipalities of Martaro and Argentona, Spain. | Primary Health Care Centers in Spain | Primary Outcomes: About 26.5% of prescriptions were rated as potentially inappropriate and 21.5% were changed (9.1% discontinuation, 6.9% dose adjustment, 3.2% substitution, and 2.2% new prescription). The mean number of prescriptions per patient was significantly lower in the intervention group at 3- and 6-month followup. | Not provided  | Not provided | Moderate |
| Cossette et al., 201715 | Use of a computer alert system-based pharmacist-physician intervention model to compare change in the use of potentially inappropriate medications (PIMs) with usual clinical care. A panel of experts used STOPP criteria to develop the model | Design: RCT with block randomization. Patients were randomly assigned to control and intervention groups with a 1:1 ratio using block sizes of 2, 4, and 6, and stratification by hospital site. Sample: 139 intervention (126 analyzed); 133 control group (128 analyzed).Patient Population: Older adults, 65 years and older. with at least one geriatric-explicit criterion for PIMs  | University hospital in Canada | Primary outcome: Drug cessation or dosage decrease implemented in targeted PIMs. Secondary outcome: Length of stay, in-hospital death, ED visits, and readmissions within 30 days of discharge. | Not provided  | 1. Clinical relevance of the computer alert system alerts: 50% in control group and 30% in intervention group.2. Significant drug cessation and dosage decreases in intervention compared with control group at 48 hours post alert: (30%) and hospital discharge (20.8%). Average time (means) to analyze a patient file and complete the interventions was about 44.25 minutes in intervention group. 3. No significant decrease in readmissions or inpatient death rates for intervention vs. control group. | Moderate |
| De Bock et al., 201816 | Medication review process that used STOPP to assess appropriateness of medication  | Design: RCT Sample: 52 patients who were taking a median of 10 medications at the time of the study. Patient Population: Older adults, 70 years of age or older, with an unplanned admission to the geriatric ward; took at least five drugs chronically; not hospitalized in the preceding 3 months; and no documented cognitive impairments | University Hospital in Belgium (235 beds) | Primary Outcome: Reduction in number of drug discrepancies and potentially inappropriate prescriptions (PIPs).Secondary Outcome: Positive reports of satisfaction with services and opinions on interprofessional communication. | Medication reconciliation was time consuming and did not involve an integrated electronic patient file to record diagnoses, lab results, and medications | 1. Time needed to review and make recommendations was considered reasonable. 2. Successes for medication review: full access to patient file; relatively fast screening; identification of significant amount of PIMs; improvement in prescribing appropriateness; 20% of recommendations accepted. 3. Barriers for medication review: scattered information; inefficient communication; lack of continuity of care. There were no service level agreements in place prior to intervention implementation. | Moderate |
| Frankenthal et al., 20177 | Review by study pharmacist using STOPP/START criteria at beginning of study and 6 months later  | Design: Retrospective cohort studySample: 160 intervention; 146 control group Patient Population: Older adults, 65 years and older  | Chronic care geriatric facility in Israel | Primary Outcome: The prevalence of PIPs was significantly lower in the intervention group (33.3%) than the control group (48.4%) at 24-month followup (p=0.02). | Not provided  | Between baseline and 24 months, there was a significant reduction in costs of medications in the intervention group (113 Israeli shekels [$29]] per patient per month, p<0.001) but not in the control group. | Low |
| Gibert et al., 20182 | STOPP used during primary care general practitioner consultations on PIMs | Design: Intervention studySample: 170 patientsPatient Population: Older adults, 75 years and older  | Primary care in Isere County, France | Primary Outcome: The number of PIMs decreased by 37.6% (n=170 vs. 106) with the application of STOPP criteria by general practitioners. This intervention reduced PIMs for 44.9% of patients (n=44, p<0.001).  | Not provided  | Not provided | High |
| Hannou et al., 20173 | Clinical pharmacist medication reviews to reduce potentially inappropriate drug prescriptions  | Design: Prospective interventional study Sample: 102 intervention; no control group Patient Population: Older adults, 65 years and older, being admitted to an acute psychiatric geriatric facility | Geriatric psychiatry admission unit of a university hospital in Switzerland (16 beds)  | Primary Outcome: Global pharmacist intervention acceptance rate was 68% (78% for standard pharmacist recommendations [recs], and 47% for STOPP/START recs). Of 186 STOPP recs, 82 were accepted (44%). | Not provided  | Not provided | High |
| Hill-Taylor et al., 20138 | Assessment of effectiveness of STOPP/START criteria on prescribing quality and clinical, humanistic, and economic outcomes in adults aged 65 and older (updating a 2013 review).  | Design: Systematic review with meta-analysis of PIM rates, and narrative summary of other outcomes. Four studies were included in analysis. Sample: 1,925 adults.Patient Population: Adults age 65 years and older; one study restricted participants to 75 years and older | Acute care admission, long-term care | Primary Outcomes: All followup rates showed improvement in PIM rates in both the intervention and control groups. At every time point in every study, the intervention demonstrated some success, with the intervention PIM rates being lower than control rates. Three studies reported a significant and sustained drop in potential prescribing omissions (PPOs) in the intervention group. There was also a reduction in PPOs in all control groups on followup. | Not provided  | Two studies reported cost outcomes and found cost efficiencies in medication choices in the intervention group compared with the control group. | Moderate |
| Ilic et al., 20154 | Using START/STOPP criteria to assess the appropriateness of prescribing before and 6 months after the intervention implementation | Design: Pre- and post-observation trial that included a 3-month pre-phase; a 1-month intervention phase; a 6-month post-intervention phase; and a 3-month period of repeated recording and analysis of prescribing practices.Sample: 104 nursing home residents and 27 nursing home physicians; no control group. Patient Population: Older adults, 65 years and older, who resided in the nursing home. Average age was 83 years, | Twenty nursing home facilities in Serbia | Primary Outcome: Seventy PIPs prescribed pre intervention and 20 PIPs 6 months post intervention (median 3.5, range 1–20 pre intervention, and median 1.5, range 0–6 post). The decrease in PIPs was significant (z=2.823; p<0.005).  | Not provided  | Not provided | Moderate |
| Kiel and Phillips, 201712 | Clinical pharmacist comprehensive medication reviews using START/STOPP criteria  | Design: Prospective cohort with post-hoc analysisSample: 26 intervention and 26 control group participantsPatient Population: Older adults, 65 years and older, taking at least five prescription medications  | Primary care clinic in Michigan | Primary Outcome: Difference in number of medication-related problems, as defined by the START and STOPP criteria. The acceptance rate for recommendations on STOPP/START med problems was 35% (n=17). | Not provided  | Not provided | High |
| Kimura et al., 201714 | Clinical pharmacist medication reviews using STOPP-2 criteria to reduce PIMs | Design: Prospective observational study Sample: 822 in intervention group; no control groupPatient Population: Older adults, 65 years and older, who were newly admitted into inpatient care and prescribed more than one prescription medication | University hospital in Japan | Primary outcomes: Number of PIMs was 651; of these, it was recommended to doctors that 310 (47.6%) be changed, and 292 (44.9%) were discontinued/ changed after the pharmacist’s assessment. Acceptance rate of pharmacists’ recommendations was 94.2%. | Not provided  | The mean time for pharmacist’s assessment was 6.2 +/- 3.1 minutes per patient. | High |
| O’ Connor et al., 20166 | Using START/STOPP criteria to help attending physicians identify PIMs  | Design: Single-blinded, clustered RCTSample: 732 in intervention group; no control groupPatient Population: Consecutively admitted adults aged 65 and older | Tertiary referral hospital in Ireland | Primary Outcome: When STOPP/START was applied, 451 recommendations were made on 233 participants (64.7%). Of these, 292 were STOPP recommendations; attending doctors accepted and implemented 237 STOPP recs (81.2%). | Not provided  | Application of STOPP/START criteria resulted in significant reductions in adverse drug reaction incidence and medication costs in acutely ill older adults but did not affect median length of stay. | Low |
| Price et al., 201714 | Using STOPP guidelines as part of an electronic medical records clinical decision support system to identify PIPs for older adults | Design: Mixed-method, pragmatic, cluster RCT Sample: 44,290 in intervention group; 37,615 in control group Patient Population: Consecutively admitted adults aged 65 and older | Primary care offices | Primary Outcome: Regression analysis showed no significant difference in change of recorded PIPs in control versus intervention group (p=0.80). | Not provided  | Barriers to implementation: The STOPP rules were presented in a different location from simple drug alerts; the guideline tool did not have a clear way to support users in prioritizing suggestions and alerts as recommended.  | Low |
| Unutmaz et al., 20185 | Comprehensive geriatric assessment (CGA) complemented by STOPP/START criteria | Design: Retrospective assessment of before and after interventionSample: 1,579 patientsPatient Population: Older adults, age 65 and older | Geriatrics outpatient clinic of tertiary hospital in Turkey | Primary Outcome: Mean number of drugs decreased from 5.3±3.4 before CGA to 4.6 ±2.5 (p<0.05). | Not provided  | After CGA, monthly saved total per capita cost of PIMs was $12.8 and monthly increased total per capita cost of PPOs was $5.6. | Moderate |