**Additional file 1**

**Table S1:** List of included medicines and ATC codes as well as list of item codes excluded to define secondary indicator for antipsychotic polypharmacy

|  |  |  |  |
| --- | --- | --- | --- |
| **Medicine** | **Class** | **ATC code** | **Item codes excluded depot antipsychotics** |
| Alprazolam | Benzodiazepine | N05BA12 | - |
| Diazepam | Benzodiazepine | N05BA01 | - |
| Oxazepam | Benzodiazepine | N05BA04 | - |
| Nitrazepam | Benzodiazepine | N05CD02 | - |
| Temazepam | Benzodiazepine | N05CD07 | - |
| Amisulpride | Antipsychotic | N05AL05 | - |
| Aripiprazole | Antipsychotic | N05AX12 | 10219W, 10224D |
| Asenapine | Antipsychotic | N05AH05 | - |
| Clozapine | Antipsychotic | N05AH02 | - |
| Olanzapine | Antipsychotic | N05AH03 | 9294E, 9295F, 9303P |
| Paliperidone | Antipsychotic | N05AX13 | 11072R, 11094X, 5100K, 5103N, 5107T, 5102M, 11085K, 5109X, 11066K |
| Quetiapine | Antipsychotic | N05AH04 | - |
| Risperidone | Antipsychotic | N05AX08 | 8781E, 8782F, 8780D |
| Ziprasidone | Antipsychotic | N05AE04 | - |
| Chlorpromazine | Antipsychotic | N05AA01 | - |
| Flupenthixol Decanoate | Antipsychotic | N05AF01 | 2257T, 2255Q |
| Haloperidol | Antipsychotic | N05AD01 | - |
| Haloperidol Decanoate | Antipsychotic | N05AD01 | - |
| Pericyazine | Antipsychotic | N05AC01 | - |
| Thioridazine | Antipsychotic | N05AC02 | - |
| Trifluoperazine | Antipsychotic | N05AB06 | - |
| Zuclopenthixol Decanoate | Antipsychotic | N05AF05 | 8097E |
| Donepezil | Anti-dementia medicine | N06DA02 | - |
| Rivastigmine | Anti-dementia medicine | N06DA03 | - |
| Galantamine | Anti-dementia medicine | N06DA04 | - |
| Memantine | Anti-dementia medicine | N06DX01 | - |

**Table S2:** Low-value psychotropic prescribing practices, adjusted odds ratios of associated patient characteristics and direct medicine costs in 2016

|  |  |  |  |
| --- | --- | --- | --- |
| **2016** | **Low-value prescribing practice**† | | |
|  | Benzodiazepines in elderly | Antipsychotics in dementia | Antipsychotic polypharmacy |
| **Rate (% people)** | 15.3 | 0.5 | 0.2 |
| **Number of dispensings**  (in PBS 10% sample) | 240,460 | 11,777 | 51,310 |
| **Patient characteristics** |  |  |  |
| **Adjusted**‡ odds ratios  (95% CIs) |  |  |  |
| Sex |  |  |  |
| Male | ref | ref | ref |
| Female | 1.4 (1.3-1.4) | 1.1 (1.0-1.2) | 0.6 (0.5-0.6) |
| Age group|| |  |  |  |
| 1 | ref | ref | ref |
| 2 | 1.2 (1.1-1.2) | 4.6 (4.0-5.3) | 0.5 (0.5-0.6) |
| 3 | 1.4 (1.4-1.4) | 7.8 (6.8-9.0) | 0.2 (0.1-0.2) |
| Comorbidity (RxRisk) Score |  |  |  |
| 0-2 | ref | ref | ref |
| 3-5 | 1.8 (1.7-1.8) | 2.6 (2.2-3.0) | 5.1 (4.7-5.6) |
| 6-8 | 3.0 (2.9-3.1) | 3.9 (3.3-4.6) | 11.9 (10.6-13.3) |
| 9+ | 5.1 (4.9-5.3) | 5.3 (4.3-6.4) | 21.3 (18.0-25.2) |
| Extrapolated direct medicine costs (/$ million) |  |  |  |
| Patients | $13.8 | $0.7 | $0.5 |
| Government | $12.2 | $2.1 | $5.3 |
| Total | $26.0 | $2.8 | $5.8 |

† Primary indicators only, ‡ Calculated by multiple logistic regression, || age group 1 = 65-74, 2 = 75-84, 3 = 85+ for benzodiazepines in elderly and antipsychotics in dementia and 1 = 18-49, 2=50-64, 3 =65+ for antipsychotic polypharmacy

**Table S3:**,Crude odds ratios of associated patient characteristics in 2016 for each low-value psychotropic prescribing practice

|  |  |  |  |
| --- | --- | --- | --- |
| **Patient characteristics** | **Low-value prescribing practice**† | | |
| **Crude** odds ratios  (95% CIs) ‡ | Benzodiazepines in elderly | Antipsychotics in dementia | Antipsychotic polypharmacy |
| Sex |  |  |  |
| Male | ref | ref | ref |
| Female | 1.4 (1.3-1.4) | 1.2 (1.1-1.4) | 0.6 (0.6-0.6) |
| Age group |  |  |  |
| 1 | ref | ref | ref |
| 2 | 1.4 (1.4-1.4) | 5.6 (4.9-6.4) | 1 (0.9-1) |
| 3 | 1.8 (1.8-1.9) | 10.1 (8.8-11.7) | 0.5 (0.5-0.6) |
| Comorbidity (RxRisk) Score |  |  |  |
| 0-2 | ref | ref | ref |
| 3-5 | 1.9 (1.8-1.9) | 3.4 (2.9-4) | 3.2 (2.9-3.4) |
| 6-8 | 3.2 (3.1-3.3) | 6 (5.1-7.1) | 4.7 (4.2-5.2) |
| 9+ | 5.4 (5.2-5.6) | 8.6 (7-10.5) | 6.9 (5.9-8.1) |

† Primary indicators only, ‡ Calculated by unilogistic regression, || age group 1 = 65-74, 2 = 75-84, 3 = 85+ for benzodiazepines in elderly and antipsychotics in dementia and 1=18-49, 2=50-64, 3=65+ for antipsychotic polypharmacy

**Table S4:** Prevalence of each low-value practice in 2016 based on primary indicators by sex and age group

|  |  |  |  |
| --- | --- | --- | --- |
| Prevalence (%) | Benzodiazepines in elderly | Antipsychotics in dementia | Antipsychotic polypharmacy |
| Sex |  |  |  |
| M | 5.3 | 0.4 | 0.2 |
| F | 7.3 | 0.5 | 0.1 |
| Age group † |  |  |  |
| 1 | 12.6 | 0.1 | 0.2 |
| 2 | 17.7 | 0.8 | 0.2 |
| 3 | 21.5 | 1.4 | 0.1 |

† Age group 1=65-74, 2=75-84, 3=85+ for benzodiazepines in elderly and antipsychotics in dementia and 1=18-49, 2=50-64, 3=65+ for antipsychotic polypharmacy



a) 

b) 

**Figure S1:** Annual rate of low-value prescribing practice indicators; a) Antipsychotic use in dementia (defined by past anti-dementia medicine) b) Antipsychotic polypharmacy (all antipsychotics included)