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| **Topic** | **Multiple medicines of moderate to high Anticholinergic Burden (ACB 1)** |
| Title | Patients prescribed 2, 3 or 4 (or more) medicines with moderate to high anticholinergic burden  |
| Description | Number of patients (all ages, aged 17 or under, 18 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, 65 to 74, 75 to 84 and 85 or over) prescribed 2, 3 or 4 (or more) unique medicines with moderate to high anticholinergic burden as a percentage of patients (all ages, aged 17 or under, 18 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, 65 to 74, 75 to 84 and 85 or over) prescribed one or more medicines with moderate to high anticholinergic burden in the same reporting period. |
| Numerator | Number of patients (all ages, aged 17 or under, 18 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, 65 to 74, 75 to 84 and 85 or over) prescribed 2, 3 or 4 (or more) unique medicines (chemical substances) with moderate to high anticholinergic burden (see Appendix 1) in the same reporting period. |
| Denominator  | Number of patients (all ages, aged 17 or under, 18 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, 65 to 74, 75 to 84 and 85 or over) prescribed one or more medicines (chemical substances) with moderate to high anticholinergic burden (see numerator list). |
| Rationale /Comments | Users should be aware that there is no one definitive, evidence-based way to calculate a ACB score. This method has been developed by the working group with the best of intentions. It is experimental and we are open to suggestions for improvement. The comparator is intended to firstly alert health care professionals to the issues of the impact of prescribing multiple medicines with anticholinergic side effects and then help practices to identify how their prescribing compares to the rest of the country, identify patients deemed to be at greatest risk from harm and to call them in for a medication review with the aim of reducing anticholinergic burden where appropriate. The current comparator measures number of patients with ACB score 6/9/12 using the following AgingBrainCare scoring system of anticholinergic burden.1 = low 2 = moderate3 = highThe previous scoring system can no longer be used as the original source of this work has been removed. To review the evidence base for assessing a drug’s anticholinergic burden, UKMI conducted a literature review. This formed the basis of the scoring system used here. Over time, and working with NHS Digital, we aim to be able to work backward from unplanned admissions and link to real world data to understand which drugs cause the most harm. For now, this is a consensus scoring system agreed by the polypharmacy working group.Several differing scales were identified, including some that are validated tools for assessing anticholinergic burden. There are significant differences between the scales but there is insufficient evidence to recommend one over the others. Medicines with varying degree anticholinergic burden (activity, risk) have been identified through a literature review undertaken NHS England Specialised Pharmacy Services (SPS) on the topic of anticholinergic burden. 12 primary references were identified in the literature search detailing several differing scales, including some that are validated tools for assessing anticholinergic burden. There are significant differences between the scales but there is insufficient evidence to recommend one over the others. The numerator list contains medicines that are considered by as having moderate to high anticholinergic burden. The list was created using the following criteria: 1. For each medicine, the number of references (papers) for each of the following categories is calculated as a percentage of the total number of references for zero, low (L), medium (M), or high (H) anticholinergic burden (activity, risk) for that medicine.
2. **Moderate to high ACB**

Number of references that state a medicine as having moderate (M) or high (H) ACB as a percentage of the total number of references for that medicine (zero, L, M or H )1. **Low to Moderate ACB**

Number of references that state a medicine as having low (L) or moderate (M) ACB as a percentage of the total number of references for that medicine (zero, L, M or H )1. **Zero ACB**

Number of references that state a medicine as having zero ACB as a percentage of the total number of references for that medicine (zero, L, M or H )1. Based on the highest percentage figure for the above groupings, each medicine is then allocated to the appropriate comparator

a) **Moderate to high** anticholinergic burden (this comparator) or b) **Low to moderate** anticholinergic burden (see comparator ACB2)  1. If **zero** is the highest percentage, the medicine is excluded and not included in either of the above comparators.
2. If necessary, further rules are applied:
3. If the figure for a) and b) are the same, a) is selected (i.e. moderate to high rather than low to moderate)
4. If the figure for b) and c) are the same, b) is selected (i.e. low to moderate rather than zero)
5. If the figure for a) and c) are the same, a) is selected (i.e. moderate to high rather than zero)
6. If the figure for a), b) and c) are the same, b) is selected (i.e. low to moderate rather than moderate to high or zero)

NB: The sum of the percentage of references may be greater than 100%. This is due to references for a medicine with moderate anticholinergic burden being counted as both moderate to high and low to moderate. As part of the initial analysis this proposed new comparator should be compared with the current comparator to see how many patients are included in both comparators and how many patients are unique to one of the comparators. Comparators are available for all ages and age ranges whilst recognising that the risks associated with anticholinergic burden increase with age. |

**Appendix 1:Medicines with moderate to high anticholinergic burden**



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| Alimemazine tartrate | 0304010Y0 |
| Amitriptyline hydrochloride | 0403010B0 |
| Amoxapine | 0403010C0 |
| Atropine sulfate | 0102000AC |
| Co-phenotrope (Diphenox hydrochloride/**atropin**e sulfate) | 0104020H0 |
| Belladonna alkaloids | 0102000H0 |
| Benzatropine mesilate | 0409020E0 |
| Brompheniramine maleate | 0304010F0 |
| Brompheniramine maleate combinations | 0309020U0 |
| Chlorphenamine maleate | 0304010G0 |
| Phenylprop hydrochloride/**chlorphenamine maleate** | 0304010AD |
| Chlorpromazine hydrochloride | 0402010D0 |
| Citalopram hydrobromide | 0403030D0 |
| Citalopram hydrochloride | 0403030Z0 |
| Clemastine fumarate | 0304010H0 |
| Clomipramine hydrochloride | 0403010F0 |
| Clozapine | 0402010C0 |
| Colchicine | 1001040G0 |
| Cyproheptadine hydrochloride | 0304010K0 |
| Darifenacin hydrobromide | 0704020AC |
| Dicycloverine hydrochloride | 0102000J0 |
| Dicycloverine hydrochloride compound preparations | 0102000K0 |
| Dimenhydrinate | 0406000H0 |
| Dimenhydrinate/cinnarizine | 0406000AC |
| Diphenhydramine hydrochloride | 0304010N0 |
| Diphenhydramine hydrochloride | 030902040 |
| Diphenhydramine hydrochloride/pholcodine | 0309020AB |
| Ammonium chloride/diphenhydramine hydrochloride | 0309020AH |
| Dosulepin hydrochloride | 0403010J0 |
| Doxepin | 0403010L0 |
| Doxylamine succinate/pyridoxine hydrochloride | 0406000AA |
| Fesoterodine fumarate | 0704020AD |
| Flavoxate hydrochloride | 0704020G0 |
| Fluphenazine hydrochloride | 0402010I0 |
| Hydroxyzine hydrochloride | 0304010J0 |
| Hyoscine | 0406000A0 |
| Hyoscine butylbromide | 0102000N0 |
| Hyoscine hydrobromide | 0406000L0 |
| Imipramine hydrochloride | 0403010N0 |
| Levomepromazine hydrochloride | 0402010L0 |
| Levomepromazine maleate | 0402010K0 |
| Lofepramine hydrochloride | 0403010R0 |
| Meclozine hydrochloride | 0406000N0 |
| Nefopam hydrochloride | 0407010P0 |
| Nortriptyline | 0403010V0 |
| Orphenadrine hydrochloride | 0409020N0 |
| Oxybutynin | 0704020J0 |
| Oxybutynin hydrochloride | 0704040G0 |
| Pericyazine | 0402010P0 |
| Perphenazine | 0402010Q0 |
| Pethidine hydrochloride | 0407020V0 |
| Procyclidine hydrochloride | 0409020S0 |
| Promethazine hydrochloride | 0304010W0 |
| Promethazine teoclate | 0406000V0 |
| Propantheline bromide | 0102000Y0 |
| Propiverine hydrochloride | 0704020P0 |
| Thioridazine | 0402010W0 |
| Tizanidine hydrochloride | 1002020T0 |
| Tolterodine | 0704020N0 |
| Trifluoperazine | 0402010X0 |
| Trihexyphenidyl hydrochloride | 0409020C0 |
| Trimipramine maleate | 0403010Y0 |