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| **Topic** | **Multiple medicines with unintended hypotensive effects.** |
| Title | Patients prescribed 2, 3 or 4 (or more) medicines that can have an unintended hypotensive effect. |
| 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 that can have an unintended hypotensive effect and are who NOT concurrently prescribed a medicine recommended by NICE for the management of hypertension1,2, or a medicine that is only licenced for hypertension3, as a percentage of patients prescribed one or more medicine that can have a hypotensive effect. |
| 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) that can have an unintended hypotensive effect (list 1) and who are NOT concurrently prescribed a medicine recommended by NICE for the management of hypertension1,2 (list 2) or a medicine that is only licenced for hypertension3 (list 3)  List 1: Medicines that can have a hypotensive effect  List 2: Medicines recommended by NICE for the management of hypertension1, 2  List 3: Medicines that are only licenced for hypertension3 and not included in list 2  See appendix 1 for list of medicines (chemical substances) |
| 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 that can have an unintended hypotensive effect (list 1) and who are NOT concurrently prescribed a medicine recommended by NICE for the management of hypertension1,2 (list 2) or a medicine that is only licenced for hypertension3 (list 3)  .  See numerator and appendix 1 for details of medicine lists |
| Comments/ Rationale | Patients who are prescribed multiple medicines that can have an unintended hypotensive effect (as a pharmacological action or adverse-effect) and are not prescribed medicines for the management of diagnosed hypertension may not have their blood pressure routinely monitored and may therefore at risk of hypotension (including postural/orthostatic hypotension) resulting in falls or fractures resulting from falls. There may be patients included in the comparator whose blood pressure is being routinely monitored.  Appendix 1, table 8 (attached) of the print version of British National Formular lists of some of the medicines that cause hypotension noting that “concurrent use of two or more drugs from the list may increase the risk” and that “the list is not exhaustive”.  In August 2019, UKMI provided a literature review of medicines/medicine classes, in descending order of most frequently cited in the reference resources), associated with hypotension.    Both BNF table 8 and the UKMI literature review have been used to identify medicines associated with hypotension and create a list of medicines that can have a hypotensive effect (List 1). Please note that the list of medicines (list 1):   * is not an exhaustive list of all medicines that may cause unintended hypotension i.e. as an undesirable or adverse effect. * Does not consider the frequency or severity of unintended hypotension.   Not all medicines recommended by NICE for the management of hypertension1, 2 are solely indicated for the management of hypertension (list 2). Some of these medicines have other indicated uses e.g. ACE inhibitors/heart failure |
| References | 1 <https://www.nice.org.uk/guidance/ng136>  2 <https://www.nice.org.uk/guidance/ng136/resources/visual-summary-pdf-6899919517>  3 British National Formulary <https://bnf.nice.org.uk/> |

**Appendix 1**



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| **BNF Chemical Substance** | **BNF Chemical Substance Code** | **Medicine List** |
| Bumetanide | 0202020D0 | 1 |
| Furosemide | 0202020L0 | 1 |
| Torasemide | 0202020U0 | 1 |
| Eplerenone | 0202030X0 | 1 |
| Amiloride hydrochloride with loop diuretics | 0202040D0 | 1 |
| Co-amilofruse (Amiloride hydrochloride/frusemide) | 0202040B0 | 1 |
| Co-flumactone (**Hydroflumethiazide**/spironolactone) | 0202040G0 | 1 |
| Spironolactone with loop diuretics | 0202040T0 | 1 |
| Triamterene with loop diuretics | 0202040U0 | 1 |
| Bumetanide/potassium | 0202080C0 | 1 |
| Furosemide/potassium | 0202080K0 | 1 |
| Betaxolol hydrochloride | 0204000G0 | 1 |
| Sotalol hydrochloride | 0204000T0 | 1 |
| Hydralazine hydrochloride | 0205010J0 | 1 |
| Minoxidil | 0205010N0 | 1 |
| Riociguat | 0205010AB | 1 |
| Clonidine hydrochloride | 0205020E0 | 1 |
| Guanfacine hydrochloride | 0205020G0 | 1 |
| Doxazosin mesilate | 0205040D0 | 1 |
| Indoramin | 0205040I0 | 1 |
| Prazosin hydrochloride | 0205040S0 | 1 |
| Terazosin hydrochloride | 0205040V0 | 1 |
| Sacubitril/valsartan | 0205052AE | 1 |
| Glyceryl trinitrate | 0206010F0 | 1 |
| Isosorbide dinitrate | 0206010I0 | 1 |
| Isosorbide mononitrate | 0206010K0 | 1 |
| Nimodipine | 0206020M0 | 1 |
| Nicorandil | 0206030N0 | 1 |
| Moxisylyte hydorchloride | 0206040AI | 1 |
| Dipyridamole | 0209000L0 | 1 |
| Dipyridamole and aspirin | 0209000V0 | 1 |
| Flunitrazepam | 0401010I0 | 1 |
| Flurazepam hydrochloride | 0401010L0 | 1 |
| Loprazolam mesilate | 0401010N0 | 1 |
| Lormetazepam | 0401010P0 | 1 |
| Nitrazepam | 0401010R0 | 1 |
| Sodium oxybate | 0401010AC | 1 |
| Temazepam | 0401010T0 | 1 |
| Alprazolam | 0401020A0 | 1 |
| Buspirone hydrochloride | 0401020B0 | 1 |
| Chlordiazepoxide hydrochloride | 0401020E0 | 1 |
| Diazepam | 0401020K0 | 1 |
| Lorazepam | 0401020P0 | 1 |
| Meprobamate | 0401020R0 | 1 |
| Oxazepam | 0401020T0 | 1 |
| Amisulpride | 0402010A0 | 1 |
| Aripiprazole | 0402010AD | 1 |
| Benperidol | 0402010B0 | 1 |
| Cariprazine | 0402010AJ | 1 |
| Chlorpromazine hydrochloride | 0402010D0 | 1 |
| Clozapine | 0402010C0 | 1 |
| Droperidol | 0402010G0 | 1 |
| Flupentixol hydrochloride | 0402010H0 | 1 |
| Fluphenazine hydrochloride | 0402010I0 | 1 |
| Haloperidol | 0402010J0 | 1 |
| Levomepromazine hydrochloride | 0402010L0 | 1 |
| Levomepromazine maleate | 0402010K0 | 1 |
| Loxapine succinate | 0402010M0 | 1 |
| Lurasidone | 0402010AI | 1 |
| Olanzapine | 040201060 | 1 |
| Paliperidone | 0402010AE | 1 |
| Pericyazine | 0402010P0 | 1 |
| Perphenazine | 0402010Q0 | 1 |
| Pimozide | 0402010R0 | 1 |
| Promazine hydrochloride | 0402010S0 | 1 |
| Quetiapine | 0402010AB | 1 |
| Risperidone | 040201030 | 1 |
| Sulpiride | 0402010U0 | 1 |
| Thioridazine | 0402010W0 | 1 |
| Trifluoperazine | 0402010X0 | 1 |
| Zuclopenthixol acetate | 040201010 | 1 |
| Zuclopenthixol hydrochloride | 0402010T0 | 1 |
| Asenapine | 0402030R0 | 1 |
| Amitriptyline hydrochloride | 0403010B0 | 1 |
| Clomipramine hydrochloride | 0403010F0 | 1 |
| Dosulepin hydrochloride | 0403010J0 | 1 |
| Doxepin | 0403010L0 | 1 |
| Imipramine hydrochloride | 0403010N0 | 1 |
| Lofepramine hydrochloride | 0403010R0 | 1 |
| Mianserin hydrochloride | 0403010T0 | 1 |
| Nortriptyline | 0403010V0 | 1 |
| Trazodone hydrochloride | 0403010X0 | 1 |
| Trimipramine maleate | 0403010Y0 | 1 |
| Isocarboxazid | 0403020H0 | 1 |
| Moclobemide | 0403020K0 | 1 |
| Phenelzine sulfate | 0403020M0 | 1 |
| Tranylcypromine sulfate | 0403020Q0 | 1 |
| Citalopram hydrobromide | 0403030D0 | 1 |
| Citalopram hydrochloride | 0403030Z0 | 1 |
| Escitalopram | 0403030X0 | 1 |
| Fluoxetine hydrochloride | 0403030E0 | 1 |
| Fluvoxamine maleate | 0403030L0 | 1 |
| Paroxetine hydrochloride | 0403030P0 | 1 |
| Sertraline hydrochloride | 0403030Q0 | 1 |
| Duloxetine hydrochloride | 0403040Y0 | 1 |
| Venlafaxine | 0403040W0 | 1 |
| Vortioxetine | 0403040AB | 1 |
| Buprenorphine | 0407020B0 | 1 |
| Codeine phosphate | 0407020C0 | 1 |
| Dextromoramide tartrate | 0407020D0 | 1 |
| Dextropropoxyphene | 0407020E0 | 1 |
| Diamorphine hydrochloride (Systemic) | 0407020K0 | 1 |
| Dihydrocodeine tartrate | 0407020G0 | 1 |
| Dipipanone hydrochloride | 0407020H0 | 1 |
| Fentanyl | 0407020A0 | 1 |
| Hydromorphone hydrochloride | 040702050 | 1 |
| Meptazinol hydrochloride | 0407020L0 | 1 |
| Methadone hydrochloride | 0407020M0 | 1 |
| Morphine (Opium Tincture) | 0407020W0 | 1 |
| Morphine hydrochloride | 0407020P0 | 1 |
| Morphine sulfate | 0407020Q0 | 1 |
| Morphine tartrate and cyclizine tartrate | 040702020 | 1 |
| Nalbuphine hydrochloride | 0407020Y0 | 1 |
| Oxycodone | 0407020Z0 | 1 |
| Oxycodone hydrochloride | 0407020AD | 1 |
| Oxycodone hydrochloride/naloxone hydrochloride | 0407020AF | 1 |
| Papaveretum | 0407020AB | 1 |
| Pentazocine hydrochloride | 0407020T0 | 1 |
| Pentazocine lactate | 0407020U0 | 1 |
| Pethidine hydrochloride | 0407020V0 | 1 |
| Tapentadol hydrochloride | 0407020AG | 1 |
| Tramadol hydrochloride | 040702040 | 1 |
| Amantadine hydrochloride | 0409010B0 | 1 |
| Apomorphine hydrochloride | 0409010A0 | 1 |
| Apomorphine hydrochloride hemihydrate | 0409010AC | 1 |
| Cabergoline | 0409010U0 | 1 |
| Co-beneldopa (Benserazide/levodopa) | 0409010K0 | 1 |
| Co-careldopa (Carbidopa/levodopa) | 0409010N0 | 1 |
| Levodopa | 0409010I0 | 1 |
| Levodopa/carbidopa/entacapone | 0409010X0 | 1 |
| Pergolide mesilate | 0409010P0 | 1 |
| Pramipexole | 0409010W0 | 1 |
| Rasagiline mesilate | 0409010Y0 | 1 |
| Ropinirole hydrochloride | 0409010H0 | 1 |
| Rotigotine | 0409010Z0 | 1 |
| Safinamide | 0409010AA | 1 |
| Selegiline hydrochloride | 0409010T0 | 1 |
| Lofexidine hydrochloride | 0410030D0 | 1 |
| Insulin aspart | 0601011A0 | 1 |
| Insulin glulisine | 0601011P0 | 1 |
| Insulin human | 0601011R0 | 1 |
| Insulin human inhaled | 0601011Q0 | 1 |
| Insulin Lispro | 0601011L0 | 1 |
| Soluble insulin (Neutral insulin) | 0601011N0 | 1 |
| Biphasic insulin aspart | 0601012W0 | 1 |
| Biphasic insulin lispro | 0601012F0 | 1 |
| Biphasic isophane insulin | 0601012D0 | 1 |
| Insulin degludec | 0601012Z0 | 1 |
| Insulin detemir | 0601012X0 | 1 |
| Insulin glargine | 0601012V0 | 1 |
| Insulin glargine/lixisenatide | 0601012AB | 1 |
| Insulin zinc suspension | 0601012G0 | 1 |
| Insulin zinc suspension (Crystalline) | 0601012N0 | 1 |
| Isophane insulin | 0601012S0 | 1 |
| Protamine zinc insulin | 0601012U0 | 1 |
| Canagliflozin | 0601023AM | 1 |
| Canagliflozin/metformin | 0601023AP | 1 |
| Dapagliflozin | 0601023AG | 1 |
| Dapagliflozin/metformin | 0601023AL | 1 |
| Empagliflozin | 0601023AN | 1 |
| Empagliflozin/linagliptin | 0601023AY | 1 |
| Empagliflozin/metformin | 0601023AR | 1 |
| Ertugliflozin | 0601023AX | 1 |
| Saxagliptin/dapagliflozin | 0601023AV | 1 |
| Sildenafil (Female Sex Hormone) | 0604012V0 | 1 |
| Bromocriptine | 0607010B0 | 1 |
| Cabergoline | 0607010C0 | 1 |
| Quinagolide hydrochloride | 0607010T0 | 1 |
| Alprostadil | 0701011D0 | 1 |
| Alfuzosin hydrochloride | 0704010A0 | 1 |
| Indoramin | 0704010M0 | 1 |
| Solifenacin/tamsulosin | 0704010W0 | 1 |
| Tamsulosin and dutasteride hydrochloride | 0704010V0 | 1 |
| Tamsulosin hydrochloride | 0704010U0 | 1 |
| Terazosin hydrochloride | 0704010T0 | 1 |
| Duloxetine hydrochloride | 0704020AA | 1 |
| Alprostadil | 0704050B0 | 1 |
| Avanafil | 0704050AC | 1 |
| Sildenafil (Erectile Dysfunction) | 0704050Z0 | 1 |
| Tadalafil | 0704050R0 | 1 |
| Vardenafil | 0704050AA | 1 |
| Dapoxetine hydrochloride | 0704060A0 | 1 |
| Baclofen | 1002020C0 | 1 |
| Methocarbamol | 1002020S0 | 1 |
| Tizanidine hydrochloride | 1002020T0 | 1 |
| Betaxolol | 1106000I0 | 1 |
| Brimonidine tartrate | 1106000AA | 1 |
| Brinzolamide and timolol | 1106000AJ | 1 |
| Brinzolamide/brimonidine | 1106000AL | 1 |
| Dorzolamide and timolol | 1106000AB | 1 |
| Latanoprost and timolol | 1106000AD | 1 |
| Levobunolol hydrochloride | 1106000T0 | 1 |
| Tafluprost and timolol | 1106000AM | 1 |
| Timolol | 1106000Z0 | 1 |
| Timolol and bimatoprost | 1106000AI | 1 |
| Timolol and brimonidine | 1106000AG | 1 |
| Timolol and travoprost | 1106000AH | 1 |
| Apraclonidine | 1108020J0 | 1 |
| Bendroflumethiazide | 0202010B0 | 2 |
| Chlorothiazide | 0202010D0 | 2 |
| Chlortalidone | 0202010F0 | 2 |
| Cyclopenthiazide | 0202010J0 | 2 |
| Hydrochlorothiazide | 0202010L0 | 2 |
| Indapamide | 0202010P0 | 2 |
| Metolazone | 0202010V0 | 2 |
| Xipamide | 0202010Y0 | 2 |
| Spironolactone | 0202030S0 | 2 |
| Amiloride hydrochloride with thiazides | 0202040A0 | 2 |
| Co-amilozide (Amiloride hydrochloride/hydrochlorothiazide) | 0202040C0 | 2 |
| Co-triamterzide(Triamterene/hydrochlorothiazide) | 0202040H0 | 2 |
| Spironolactone with thiazides | 0202040S0 | 2 |
| Triamterene with thiazides | 0202040V0 | 2 |
| Bendroflumethiazide/potassium | 0202080B0 | 2 |
| Acebutolol hydrochloride | 0204000C0 | 2 |
| Atenolol | 0204000E0 | 2 |
| Atenolol with calcium channel blocker | 0204000U0 | 2 |
| Atenolol with thiazides | 0204000A0 | 2 |
| Bisoprolol fumarate | 0204000H0 | 2 |
| Carvedilol | 020400080 | 2 |
| Celiprolol hydrochloride | 020400060 | 2 |
| Co-prenozide (Oxprenolol hydrochloride/cyclopenthiazide) | 0204000Y0 | 2 |
| Co-tenidone (Atenolol/chlortalidone) | 020400040 | 2 |
| Labetalol hydrochloride | 0204000I0 | 2 |
| Metoprolol tartrate | 0204000K0 | 2 |
| Nadolol | 0204000M0 | 2 |
| Nebivolol | 0204000AB | 2 |
| Oxprenolol hydrochloride | 0204000N0 | 2 |
| Pindolol | 0204000P0 | 2 |
| Propranolol hydrochloride | 0204000R0 | 2 |
| Timolol | 0204000V0 | 2 |
| Timolol with diuretic | 020400030 | 2 |
| Methyldopa | 0205020H0 | 2 |
| Moxonidine | 0205020M0 | 2 |
| Captopril | 0205051F0 | 2 |
| Cilazapril | 0205051E0 | 2 |
| Co-zidocapt (Hydrochlorothiazide/captopril) | 0205051G0 | 2 |
| Enalapril maleate | 0205051I0 | 2 |
| Enalapril maleate with diuretic | 0205051H0 | 2 |
| Fosinopril sodium | 0205051J0 | 2 |
| Imidapril hydrochloride | 0205051W0 | 2 |
| Lisinopril | 0205051L0 | 2 |
| Lisinopril with diuretic | 0205051K0 | 2 |
| Moexipril hydrochloride | 0205051C0 | 2 |
| Perindopril arginine | 0205051Y0 | 2 |
| Perindopril arginine with diuretic | 0205051Z0 | 2 |
| Perindopril erbumine | 0205051M0 | 2 |
| Perindopril tosilate | 0205051AA | 2 |
| Perindopril tosilate/indapamide | 0205051AB | 2 |
| Perindopril with calcium channel blocker | 0205051AC | 2 |
| Quinapril hydrochloride | 0205051Q0 | 2 |
| Quinapril hydrochloride with diuretic | 0205051P0 | 2 |
| Ramipril | 0205051R0 | 2 |
| Ramipril with calcium channel blocker | 0205051S0 | 2 |
| Trandolapril | 0205051U0 | 2 |
| Trandolapril with calcium channel blocker | 0205051V0 | 2 |
| Azilsartan medoxomil | 0205052AD | 2 |
| Candesartan cilexetil | 0205052C0 | 2 |
| Eprosartan | 0205052W0 | 2 |
| Irbesartan | 0205052I0 | 2 |
| Irbesartan with diuretic | 0205052A0 | 2 |
| Losartan potassium | 0205052N0 | 2 |
| Losartan potassium with diuretic | 0205052P0 | 2 |
| Olmesartan medoxomil | 0205052B0 | 2 |
| Olmesartan medoxomil/amlodipine | 0205052AB | 2 |
| Olmesartan medoxomil/amlodipine/hydrochlorothiazide | 0205052AC | 2 |
| Olmesartan medoxomil/hydrochlorothiazide | 0205052Y0 | 2 |
| Telmisartan | 0205052Q0 | 2 |
| Telmisartan with diuretic | 0205052R0 | 2 |
| Valsartan | 0205052V0 | 2 |
| Valsartan with diuretic | 0205052X0 | 2 |
| Aliskiren | 0205053A0 | 2 |
| Amlodipine | 0206020A0 | 2 |
| Diltiazem hydrochloride | 0206020C0 | 2 |
| Felodipine | 0206020F0 | 2 |
| Lacidipine | 0206020K0 | 2 |
| Lercanidipine hydrochloride | 0206020L0 | 2 |
| Nicardipine hydrochloride | 0206020Q0 | 2 |
| Nifedipine | 0206020R0 | 2 |
| Valsartan/amlodipine | 0206020Z0 | 2 |
| Verapamil hydrochloride | 0206020T0 | 2 |
| Phenoxybenzamine hydrochloride | 0205040M0 | 3 |
| Sildenafil(Vasodilator Antihypertensive) | 0205010Y0 | 3 |
| Tadalafil (Vasodilator Antihypertensive) | 0205010Z0 | 3 |