Optimisation of medication in Parkinson's disease

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Aims and Objectives

- Understand the role of Medicines Reconciliation
- Principles of prescribing stewardship in patients with Parkinson's disease
- Specific issues
  - prescribing cascade disasters
  - anticholinergics
  - pet hates

Case

76 year-old-male, lives at home with wife, supported by PoC three times daily.

Background of Idiopathic Parkinson's Disease for 5 years, Parkinson's disease dementia, postural instability and gait disturbance, T2DM and IHD. He had a long-term catheter to manage prostatism.

Admitted with a fall, delirium and worsening mobility.

Medication history in clerking notes.

- Co-beneldopa tablets 12.5mg/50mg three times daily
- Metformin 500mg twice daily
- Gliclazide 80mg twice daily
- Clonazepam 5mg night
- Aspirin 75mg daily
- Rivastigmine 1.5mg twice daily
- Tamsulosin 400mcg daily

Medicines Reconciliation

So what is it exactly?

It's simply a process

Comparing…….

A patient's accurate and comprehensive medication history

Medications prescribed at Admission, Transfer and Discharge

….and it is intended to ensure accurate and consistent communication of patient's medication information through transitions of care.[1]

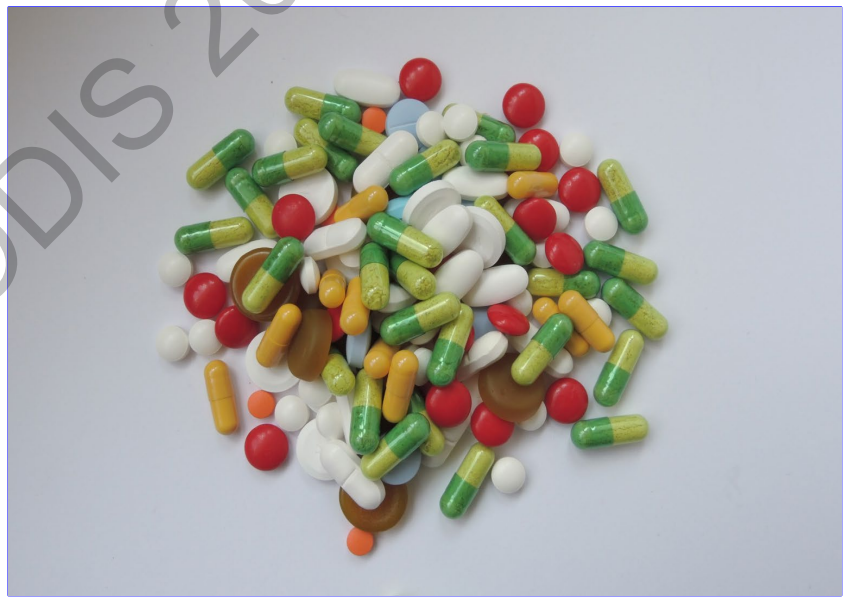
1. Action on Patient Safety (WHO High5s) – Medication Reconciliation Implementation Guide Version 4. October 2014, available at https://www.who.int/patientsafety/implementation/solutions/high5s/h5s-guide.pdf?ua=1 (accessed Jan 2020)

Spot the difference

Spot the difference

?

Spot the difference



Spot the difference

Spot the difference

Simply a process

But one which is:

- Systematic
- Rigorous
- Robust

And vital to ensuring patient safety

Who cares about it?

Globally recognised

National initiatives:

- NICE and NPSA
  - Technical patient safety solutions for Medicines Reconciliation on admission of adults to hospital (2007)
  - Medicines Optimisation: the safe and effective use of medicines to enable the best possible outcomes (2015)

International initiatives:

- Institute for Healthcare Improvement (USA)
  - 5 million lives campaign (2006)
- World Health Organisation
  - High 5s, Medicines Reconciliation Project (2006)

Definitions

National Institute for Health and Care Excellence:

"The process of identifying an accurate list of a person's current medicines and comparing them with the current list in use, recognising any discrepancies, and documenting any changes, thereby resulting in a complete list of medicines, accurately communicated." [1]

NHS England Medication Safety team:

"The collection and accurate identification of a patient's current list of medicines prior to hospital admission PLUS the identification AND recording of any discrepancies compared with the list of medicines prescribed since the hospital admission. Resolution of any discrepancies identified should occur as soon as possible using clinical judgement to ensure safe and effective patient care." [2]

1. National Institute for Health and Clinical Excellence (NICE). Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes. March 2015, available at: https://www.nice.org.uk/guidance/ng5 (Accessed Jan 2020).
2. Specialist Pharmacy Service. Improving the Quality of Medicines Reconciliation A Best Practice Resource and Toolkit version 1.1. June 2017, available at: https://www.sps.nhs.uk/wp-content/uploads/2015/06/Medicines_Reconciliation_Best_Practice_Standards_Toolkit_Vs1.1_June-15-links-updated-Aug-17.pdf (Accessed Jan 2020).

When should you do it?

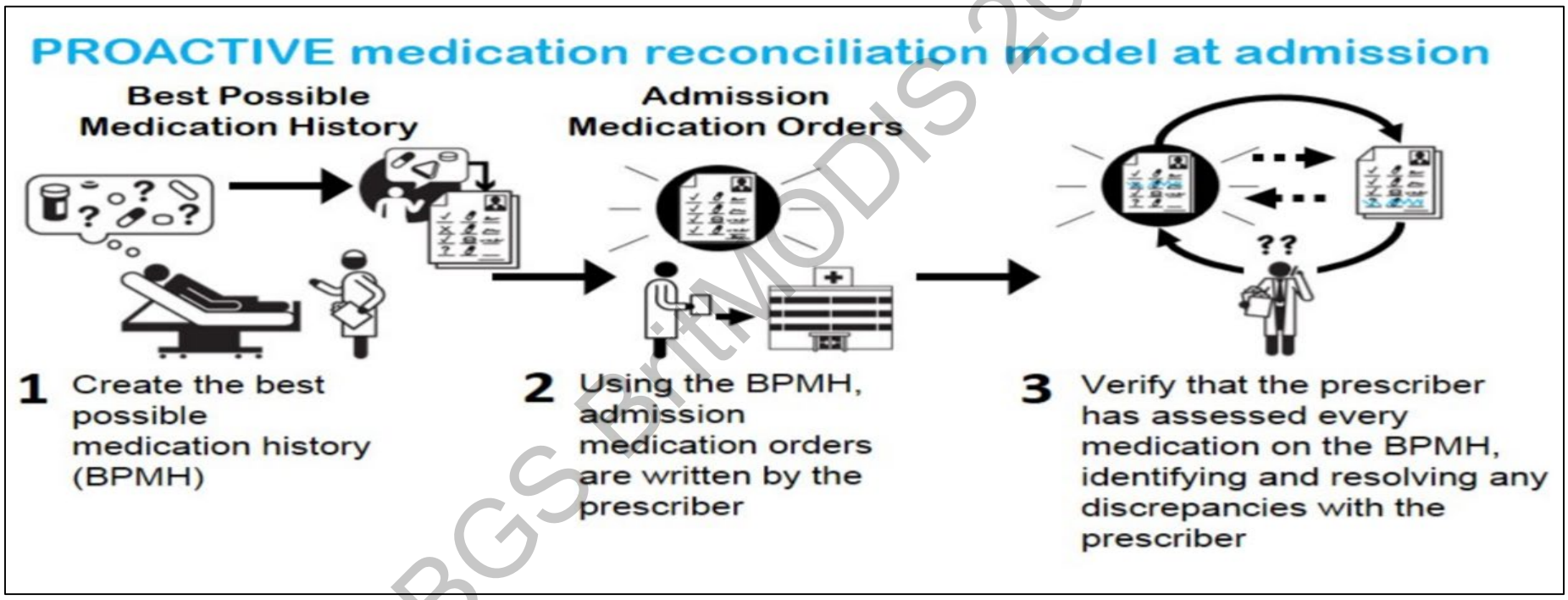
Where the patient is at highest risk of medication errors

Transfer of care

- Around half of the medication errors that occur in hospital are estimated to occur on admission or discharge,[1] around 30% of these errors have the potential to cause harm.[2, 3]
- Up to 67% of medication histories recorded on admission to hospital have one or more errors.[4-5]
- 30 – 80% of patients have a discrepancy between the medicines ordered in hospital and those they were taking at home.[5]
- Between 30% and 70% of patients may have an unintentional change to their medication when transferred from one care setting to another.[6]
- 23% of patients experienced an adverse event on discharge and 72% of these were medication related.[7]

1. Sullivan C et al. Medication reconciliation in the acute care setting: opportunity and challenge for nursing. J Nurs Care Qual 2005; 20(2):95-98.
2.Vira T, Colquhoun M, Etchells EE. Reconcilable differences: correcting medication errors at hospital admission and discharge. Qual Saf Healthcare 2006; 0001: 1-6.
3. Cornish PL, Knowles SR, Marcheso R, Tam V, Shadowitz S, Juurlink DN, Etchells EE. Unintended medication discrepancies at the time of hospital admission. Arch Intern Med. 2005; 165: 424-429
4. Tam VC, Knowles SR, Cornish PL, Fine N, Marchesano R, Etchells EE. Frequency, type and clinical importance of medication history errors at admission to hospital: a systematic review. CMAJ, 2005; 173:510-515.
5. NICE NPSA Guidance: Technical patient solutions for medicines reconciliation on admission of adults to hospital.
6. RPSGB. Keeping patients safe when they transfer between care providers – getting the medicines right. July 2012.
7. Forster AJ, Clark HD, Menard A, Dupuis N. Chernish R, et al. Adverse events among medical patients after discharge from hospital. Can Med Assoc. J. 2004; 170(3):345-349.

In an ideal world



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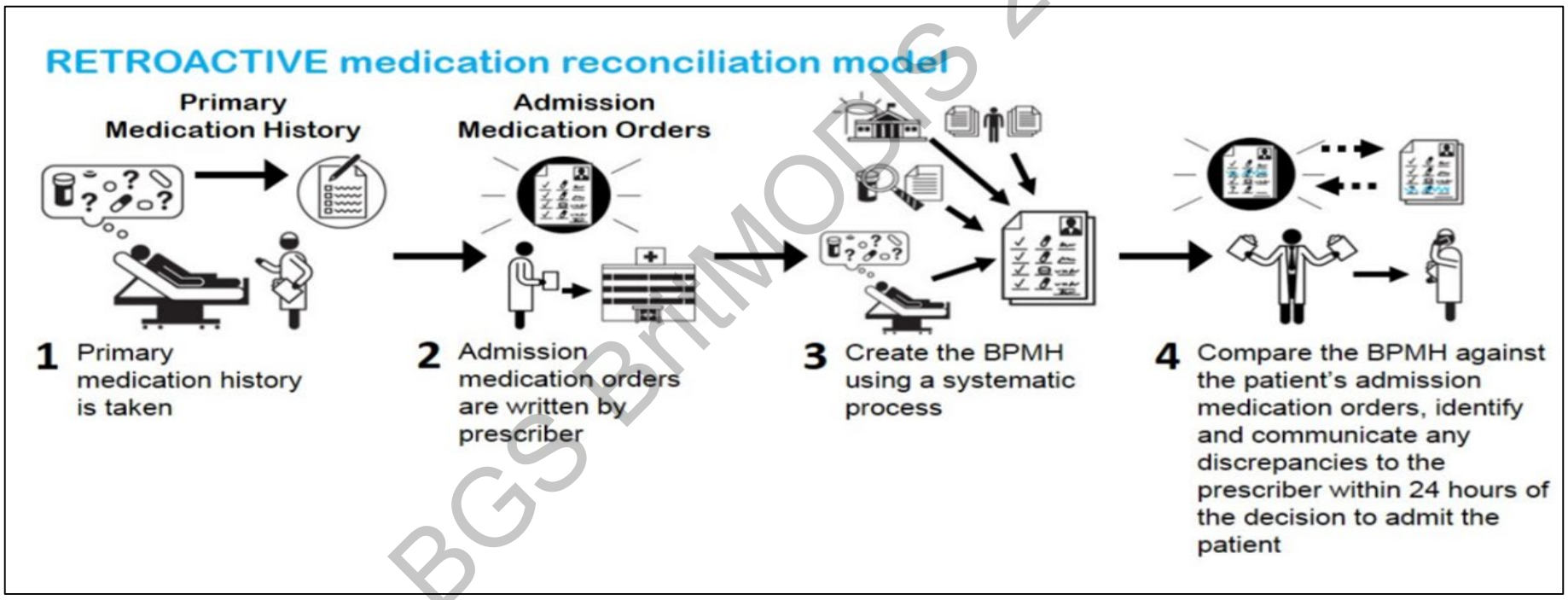
In reality



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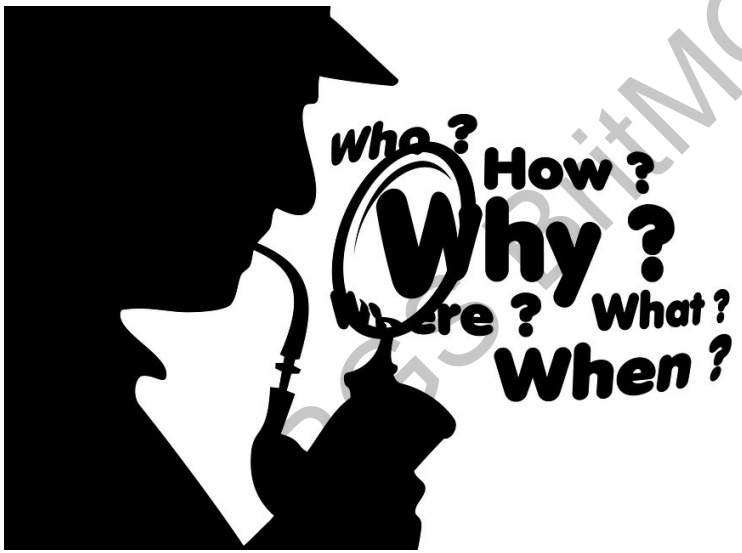
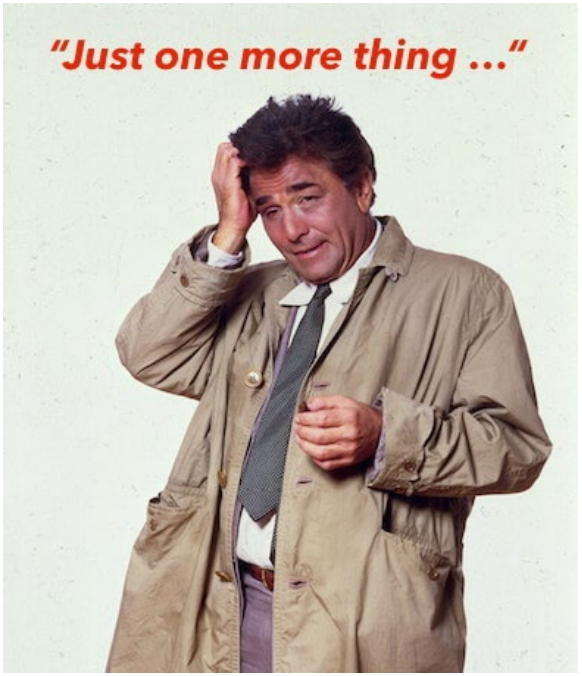
So how exactly do you do it?

1. Put on your detective hat
2. Start digging
3. Keep digging until all the information has been uncovered and all of the the pieces fall into place





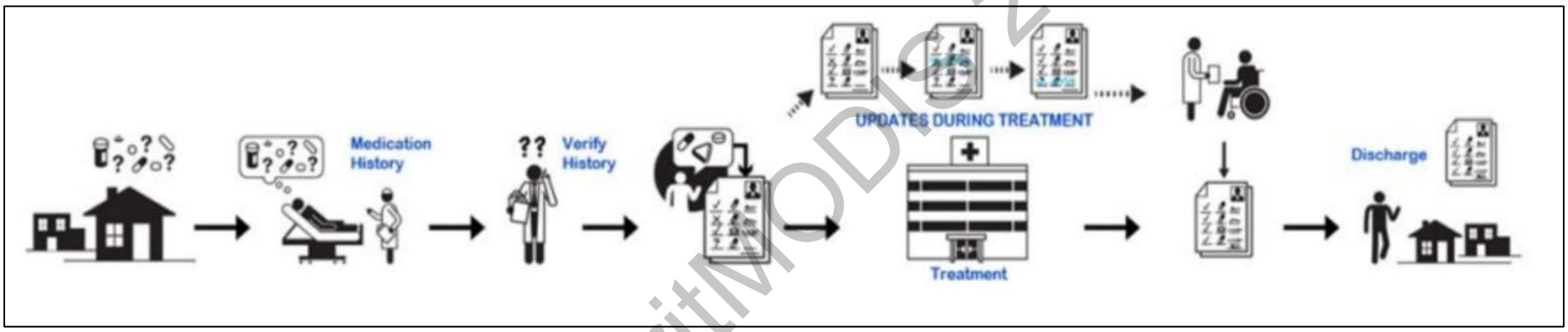
Three step approach (3 C's)[1]

Collecting: Taking a medication history.

Checking: Ensuring that the medicines and doses that are now prescribed for the patient are correct.

Communicating: Documenting and dating any changes that have been made to the patient's medications.

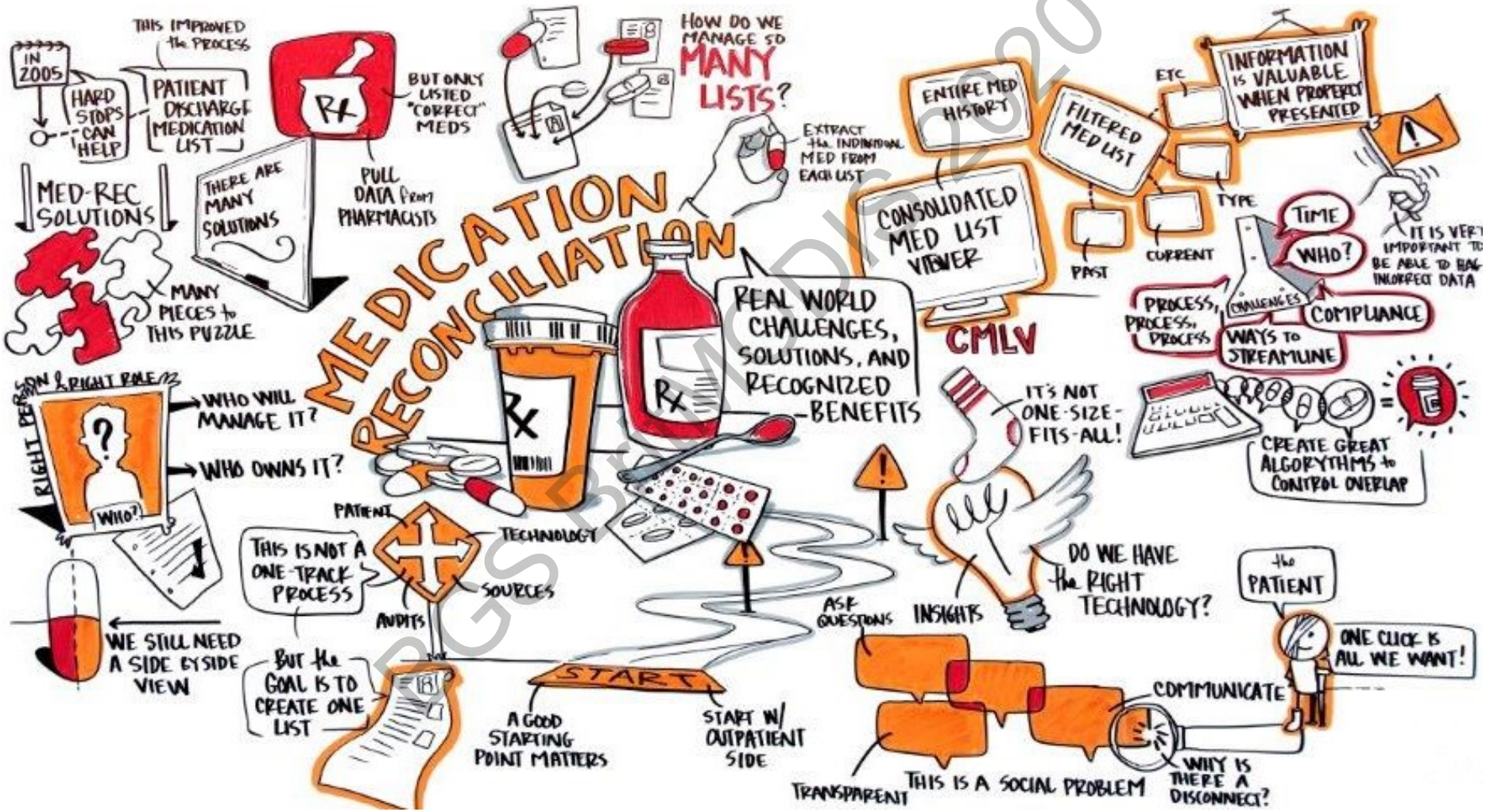
1. National Prescribing Centre (NPC) guidance Medicines Reconciliation: A guide to implementation. Published in 2007.



Action on Patient Safety (WHO High5s) – Medication Reconciliation Implementation Guide Version 4. October 2014

Word of warning though…….

It can get complicated….



Who should do it?

NICE/NPSA (2007[1]/2015[2]):

Pharmacy should be involved in the process within 24 hours of admission and that medicines reconciliation is carried out by a trained and competent health professional.

Increasing amounts of evidence to use pharmacists in the process has meant it has become a central responsibility for pharmacy departments in secondary care settings and increasingly in primary care.[3]

1. National Institute for Health and Clinical Excellence (NICE) and the National Patient Safety Agency (NPSA). Technical patient safety solutions for Medicines Reconciliation on admission of adults to hospital. December 2007.
2. National Institute for Health and Clinical Excellence (NICE). Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes. March 2015, available at: https://www.nice.org.uk/guidance/ng5 (Accessed Jan 2020).
3. 24 hours medicines reconciliation in hospital: 2017. Wright. D and Cadman. B. Hospital Pharmacy Europe. https://hospitalpharmacyeurope.com/news/editors-pick/24-hours-medicines-reconciliation-in-hospital/ (accessed Jan 2020)

Why do we need it?

1. To meet NHS policy and best practice recommendations.

1. To address a patient safety issue.

1. Potential financial return.[1]

1. Specialist Pharmacy Service. Improving the Quality of Medicines Reconciliation A Best Practice Resource and Toolkit version 1.1. June 2017, available at: https://www.sps.nhs.uk/wp-content/uploads/2015/06/Medicines_Reconciliation_Best_Practice_Standards_Toolkit_Vs1.1_June-15-links-updated-Aug-17.pdf (Accessed Jan 2020).

To meet NHS policy & best practice recommendations

2007 NPSA/NICE[1] recommendations included:

- All healthcare organisations that admit adult inpatients should make sure that they have policies in place for Medicines Reconciliation on admission
- Pharmacists are involved in Medicines Reconciliation as soon as possible after admission.

2015 NICE[2] recommended medicines reconciliations:

- In an acute setting should be carried out within 24 hours or sooner
- May need to be carried out on more than one occasion
- In primary care should be carried out for all people discharged from hospital or another care setting.

1. National Institute for Health and Clinical Excellence (NICE) and the National Patient Safety Agency (NPSA). Technical patient safety solutions for Medicines Reconciliation on admission of adults to hospital. December 2007.
2. National Institute for Health and Clinical Excellence (NICE). Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes. March 2015, available at: https://www.nice.org.uk/guidance/ng5 (Accessed Jan 2020).

It's a patient safety issue

Adverse drug events (ADE) - injuries resulting from a medical intervention related to a drug

WHO tells us that - Adverse drug events are a leading cause of injury and death in health care systems around the world.[1]

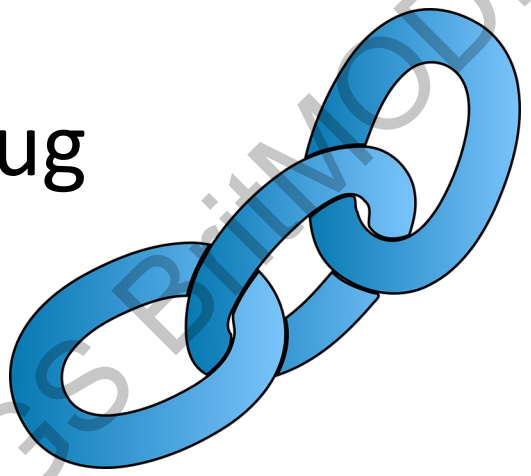
Common in most clinical settings including adult inpatients with a reported incidence of 6.5% and adult outpatients with an incidence of 27.4%.[2]

They have consequences including hospital admissions, prolonged hospital stay, additional resource utilisation, time away from work, as well as lower patient satisfaction.[2]

1. Action on Patient Safety (WHO High5s) – Medication Reconciliation Implementation Guide Version 4. October 2014, available https://www.who.int/patientsafety/implementation/solutions/high5s/h5s-guide.pdf?ua=1 (accessed Jan 2020)
2. Adverse drug events and medication errors: detection and classification methods. Morimoto et al. BMJ quality & safety vol 13 issue 4 (2004). https://qualitysafety.bmj.com/content/13/4/306.info (accessed Jan 2020).

So what's the link?

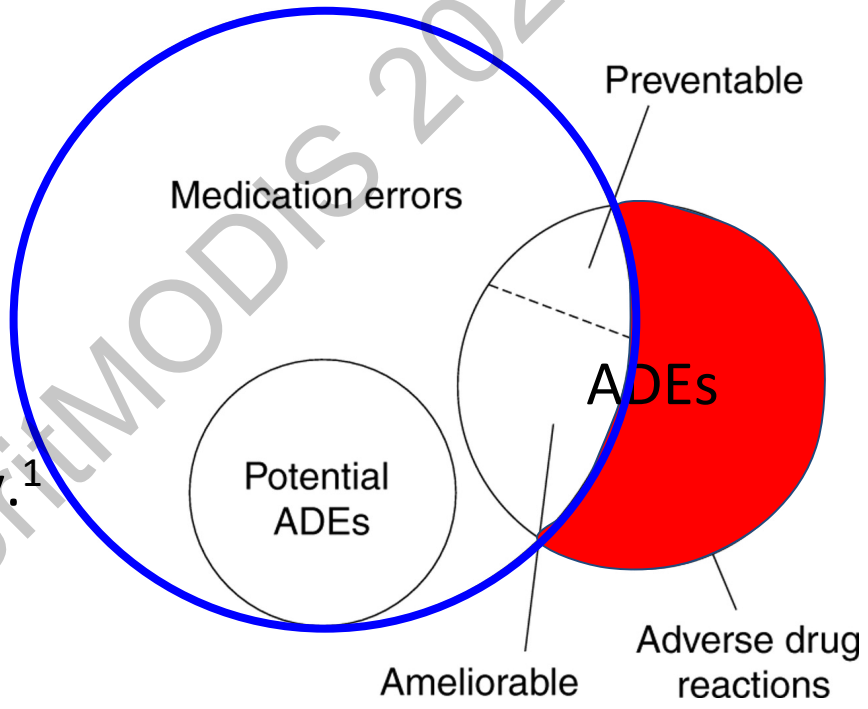
Adverse Drug Events



Medicines Reconciliation

Medication errors are a cause of ADE's

Some research suggests that the average hospitalised patient is subject to at least one medication error per day.[1]



Medicines reconciliation can target and reduce the number of medication errors

1. Institute of Medicine. Preventing medication errors. Washington, DC: National Academies Press; 2006.
Image: Adverse drug events and medication errors: detection and classification methods. Morimoto et al. BMJ quality & safety vol 13 issue 4 (2004). https://qualitysafety.bmj.com/content/13/4/306.info (accessed Jan 2020).

It's a patient safety issue

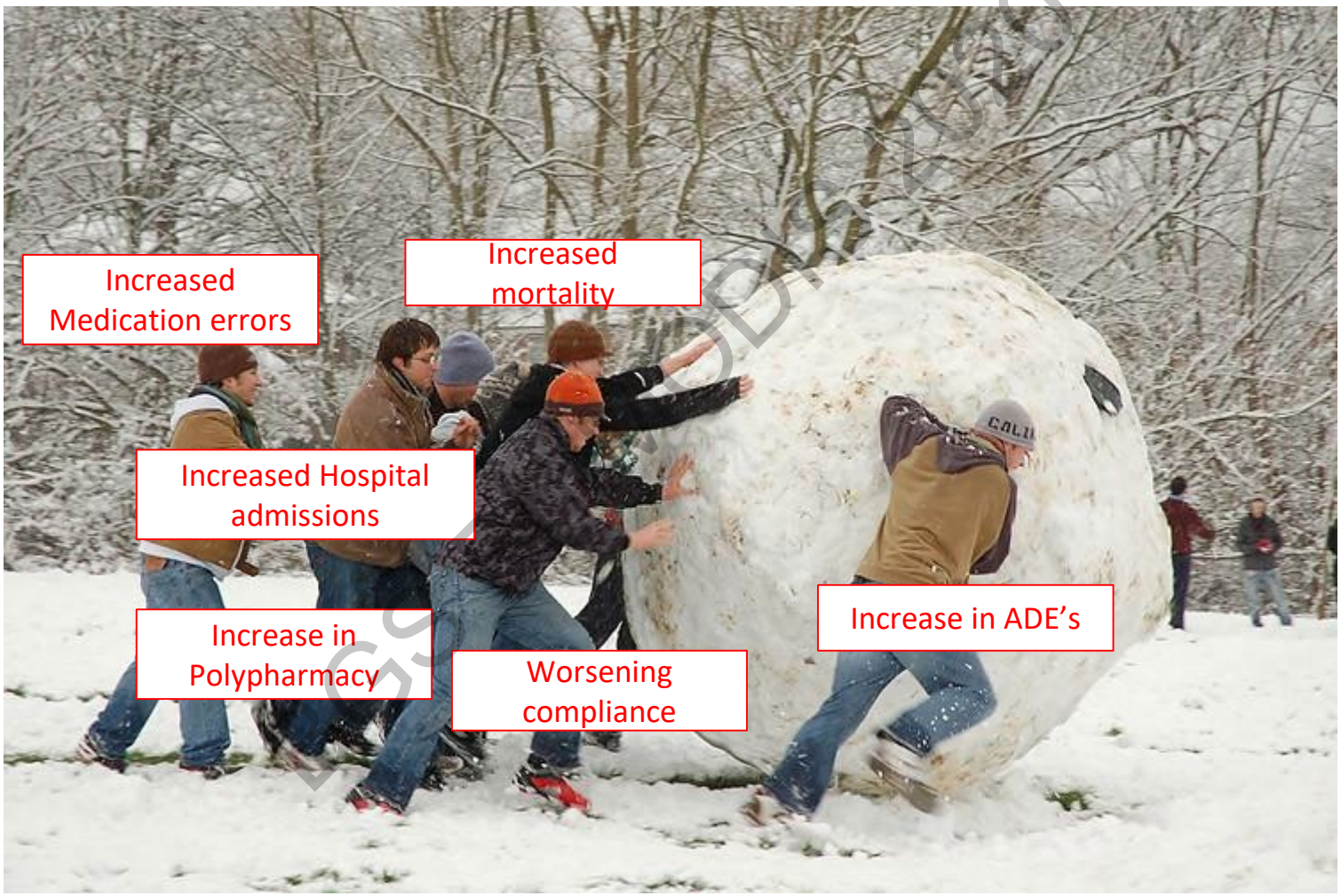
If not done, what's the potential result?

- Inappropriate discontinuation of therapy (with omission of a regular medicine being the most common error)
- Recommencement of discontinued medicines
- Inappropriate changes to therapy
- Failure to detect a drug related problem/misdiagnosis
- Hospital readmission/prolonged admissions
- Increased mortality.[1,2]
- Increased medication waste

In one study 39% of discrepancies were judged to have the potential to cause moderate to severe discomfort or clinical deterioration.[3]

1. Kripalani S, LeFevre F, Phillips CO, et al. Deficits in communication and information transfer between hospital-based and primary care physicians: implications for patient safety and continuity of care. JAMA 2007; 297:831–41.
2.Philbert I, Barach P. The European HANDOVER Project: a multi-nation program to improve transitions at the primary care—inpatient interface BMJ Qual Saf 2012;21:i1–i6. doi:10.1136/bmjqs2012-001598
3. Cornish PL, Knowles SR, Marcheso R, Tam V, Shadowitz S, Juurlink DN, Etchells EE. Unintended medication discrepancies at the time of hospital admission. Arch Intern Med. 2005; 165: 424-429.

Without medicines reconciliation….



How effective is it?

Some published medicines reconciliation interventions have shown:

- Over a 7 month period the rate of medication errors decreased by 70% & ADEs by over 15%.[1]
- Within 3 months of implementation potential adverse drug events were reduced by 80%.[2]
- After implementation, nursing time at admission was reduced by over 20 minutes per patient and pharmacist time at discharge was reduced by over 40 minutes.[3]
- Elderly patients admitted to hospital with one or more medication discrepancy was reduced from 62% to 32% after the implementation of the medication reconciliation.[4]
- A study that observed that the introduction of Pharmacy services, which included Medication Reconciliation, into a hospital's kidney transplant team created a statistically significant decrease in the mean length of stay among transplant recipients (from 7.8 days to 3.4 days). The cost savings attributed to this decrease was estimated at $279,180 USD per year.[5]

1. Institute for Innovation and Improvement. Quality Improvement: Theory and Practice in Healthcare. 2008.
2. Michels RD, Meisel S. Program using Pharmacy technicians to obtain medication histories. Am J Health-Sys Pharm. October 1, 2003;60:1982-1986
3. Rozich JD, Resar RK, et al. Standardization as a mechanism to improve safety in health care: Impact of sliding scale insulin protocol and reconciliation of medications initiatives. Joint Commission Journal on Quality and Safety. 2004;30(1):5-14.
4. Van den Bemt PM1, van der Schrieck-de Loos EM, van der linden C, Theeuwes AM, Pol AG, Dutch CBO WHO WHO High5s Study Group. Effect of medication reconciliation on unintentional medication discrepancies in acute hospital admissions of elderly adults: a multi-center study. J. Am Geriatr Soc. 2013 Aug: 61 (8): 1262-8.
5. Maldonado AQ, Weeks DL, Bitterman AN et al. Changing transplant recipient education and inpatient transplant Pharmacy practices: A single-center perspective. Am J Health Syst Pharm. 2013 May 15; 70 (10): 900-4.

Finally

My top tip

Before reviewing and/or prescribing

Polypharmacy (5+ medications)

- 1988 and 2010 median medications in adults >65 years doubled from 2 to 4, and the proportion taking ≥5 medications tripled from 12.8% to 39.0% [1]

- 10% of hospital admissions in the elderly due to ADRs [2]

Key consequences: falls/fractures, confusion, hypotension, electrolyte problems, bleeding

How does polypharmacy arise?

- Co-morbidities
- Guideline 'pressures' to treat (but not stop)
- Targets to treat
- Multiple prescribers
- Fear of stopping drugs started by another prescriber/health professional

1. Polypharmacy Among Adults Aged 65 Years and Older in the United States: 1988–2010. Charlesworth et al. J Gerontol A Biol Sci Med Sci. 2015 Aug; 70(8): 989–995

2. Hospital admissions due to adverse drug reactions in the elderly. A meta-analysis. Oscanoa TJ et al. European Journal of Clinical Pharmacology 2017. Jun;73(6):759-770

David Alldred @MedicinesDavid Sep 22

Colleague reduced medicines from 9 to 2 for a 92 year old. Patient was taking none of their meds due to concerns over side effects - now happy to take the essential ones. Here's a week's worth before and after #deprescribing

“If medication-related problems were ranked as a disease, it would be the fifth leading cause of death in the US”.

Beers. Archives of Internal Medicine 2003.

Solutions to polypharmacy

- Opportunities to review medications
  - Repeat prescriptions
  - Hospital admissions: discharge summary
  - Community pharmacists
  - Stop/review dates
  - Multidisciplinary community meetings

- Specific tools & resources
  - STOPP/START [1]
  - **deprescribing .org**

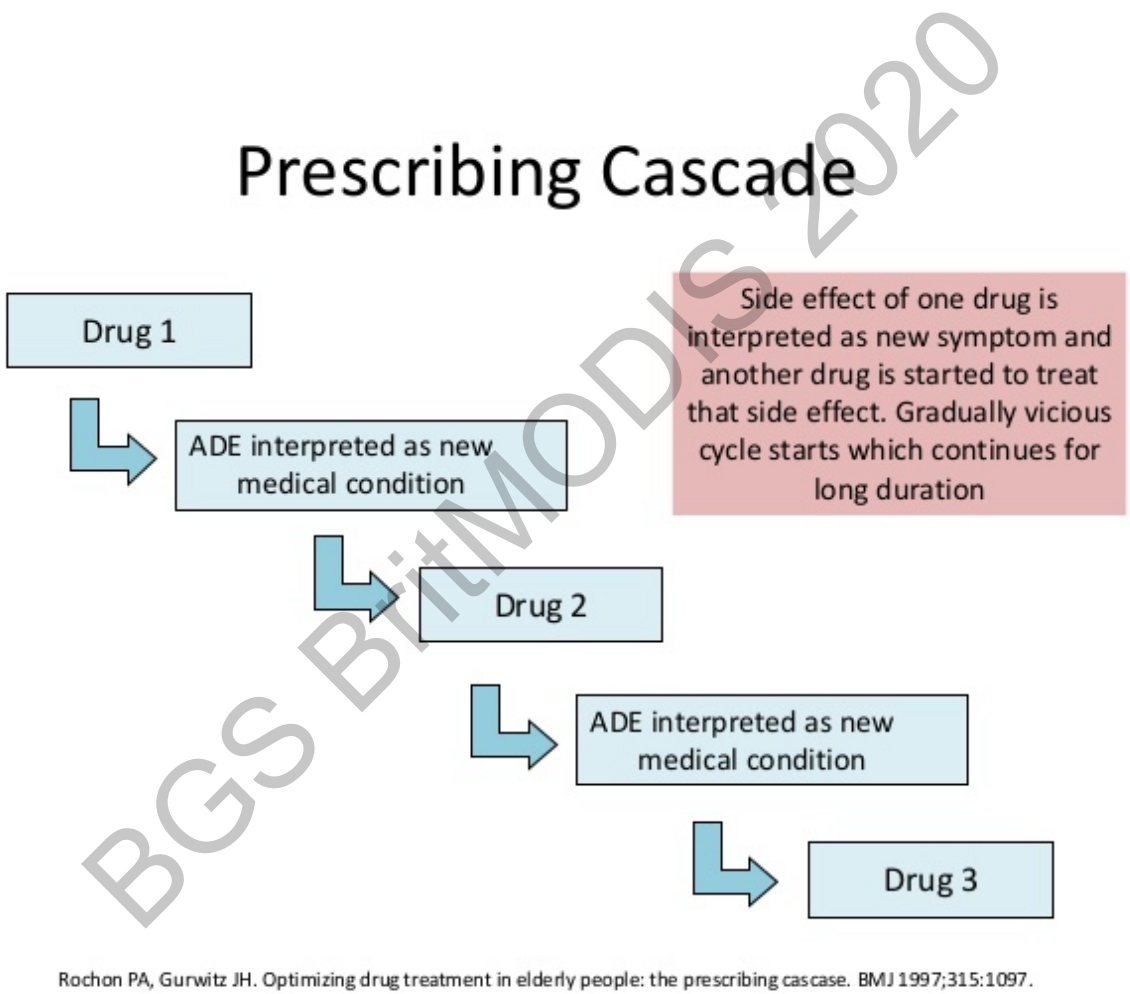
1. STOPP/START criteria for potentially inappropriate prescribing in older people: version 2. O'Mahony D et al. Age Ageing. 2015 Mar; 44(2): 213–218.

"More than 90% of patients are willing to stop a medication if their doctor says it is possible" [2]

Journal of the American Geriatrics Society

2. Reeve E, Wiese MD, Hendrix I, et al. People's attitudes, beliefs, and experiences regarding polypharmacy and willingness to deprescribe. J Am Geriatr Soc 2013;61:1508-1514.

Ripple effect



Rochon PA, Gurwitz JH. Optimizing drug treatment in elderly people: the prescribing cascase. BMJ 1997;315:1097.

Prescribing cascade

"Dizziness"

prochlorperazine

Parkinsonism

levodopa

Diarrhoea

loperamide

Prescribing cascade

Hypertension

amlodipine

Leg oedema

frusemide

Detrusor instability

oxybutynin

Postural hypotension/fall/fracture

codeine

Constipation

laxatives

Etc etc

Things to think about

- Every patient, every prescription, every time

- Over the counter drugs
- Sharing medications
- Explaining why it's being stopped
- Compliance
- Lack of patient's knowledge re medication

- Time to do this

Eye-off-the-ball prescribing in PD

- anti-muscarinics in dementia patients on acetylcholinesterase inhibitors
- antihypertensives in patients with OH
- midodrine & alpha-blocker combinations
- loop diuretics and fludrocortisone
- tamsulosin & finasteride in long-term catheterised men
- drugs exacerbating constipation

Things we often stop

- Oral iron supplements

Long-term tds or bd prescribing
Ongoing treatment despite normal Hb
What would you accept as 'satisfactory Hb' in frail elderly?

- Quinine sulphate

Poor evidence base
Prolongs the QTc
Not brilliant in CVD/arrhythmias
Cochrane review

- Betahistine

Some evidence for long-term prophylaxis in Meniere's disease
No evidence in unspecified "dizziness"

Anticholinergics

Indications

- Affective disorders
- Detrusor instability
- GI disorders

Side effects

- Confusion
- Constipation
- Urinary retention
- Dry mouth
- Postural hypotension

Anticholinergics: The Usual Suspects

- Amitriptyline
- Oxybutynin
- Hyoscine

Your turn

Patient 1

Warfarin, frusemide, nifedipine, digoxin, loperamide, ranitidine

Patient 2

Solifenacin, clopidogrel, nefopam, paracetamol, omeprazole, simvastatin

Patient 3

Aspirin, ISMN, theophylline, salbutamol, loratadine, paroxetine

Patient 4

Amitriptyline, cetirizine, fesoterodine, olanzapine, carbamazepine, fentanyl,

Anticholinergic Burden Score

(ACB score)

Drugs with ACB Score of 1

Generic Name	Brand Name
Alimemazine	Theralen™
Alverine	Spasmonal™
Alprazolam	Xanax™
Aripiprazole	Abilify™
Asenapine	Saphris™
Atenolol	Tenormin™
Bupropion	Wellbutrin™, Zyban™
Captopril	Capoten™
Cetirizine	Zyrtec™
Chlorthalidone	Diuril™, Hygroton™
Cimetidine	Tagamet™
Clidinium	Librax™
Clorazepate	Tranxene™
Codeine	Contin™
Colchicine	Colcrys™
Desloratadine	Clarinex™
Diazepam	Valium™
Digoxin	Lanoxin™
Dipyridamole	Persantine™
Disopyramide	Norpace™
Fentanyl	Duragesic™, Actiq™
Furosemide	Lasix™
Fluvoxamine	Luvox™
Haloperidol	Haldol™
Hydralazine	Apresoline™
Hydrocortisone	Cortef™, Cortaid™
Iloperidone	Fanapt™
Isosorbide	Isordil™, Ismo™
Levocetirizine	Xyzal™
Loperamide	Immodium™, others
Loratadine	Claritin™
Metoprolol	Lopressor™, Toprol™
Morphine	MS Contin™, Avinza™
Nifedipine	Procardia™, Adalat™
Paliperidone	Invega™
Prednisone	Deltasone™, Sterapred™
Quinidine	Quinaglute™
Ranitidine	Zantac™
Risperidone	Risperdal™
Theophylline	Theodur™, Uniphyl™
Trazodone	Desyrel™
Triamterene	Dyrenium™
Venlafaxine	Effexor™
Warfarin	Coumadin™

Drugs with ACB Score of 2

Generic Name	Brand Name
Amantadine	Symmetrel™
Belladonna	Multiple
Carbamazepine	Tegretol™
Cyclobenzaprine	Flexeril™
Cyproheptadine	Periactin™
Loxapine	Loxitane™
Meperidine	Demerol™
Methotrimeprazine	Levoprome™
Molindone	Moban™
Nefopam	Nefogesic™
Oxcarbazepine	Trileptal™
Pimozide	Orap™

Categorical Scoring:

- Possible anticholinergics include those listed with a score of 1; Definite anticholinergics include those listed with a score of 2 or 3

Numerical Scoring:

- Add the score contributed to each selected medication in each scoring category
- Add the number of possible or definite Anticholinergic medications

Notes:

- Each definite anticholinergic may increase the risk of cognitive impairment by 46% over 6 years. [3]
- For each on point increase in the ACB total score, a decline in MMSE score of 0.33 points over 2 years has been suggested. [4]
- Additionally, each one point increase in the ACB total score has been correlated with a 26% increase in the risk of death. [4]

Aging Brain Care

www.agingbraincare.org

Drugs with ACB Score of 3

Generic Name	Brand Name
Amitriptyline	Elavil™
Amoxapine	Asendin™
Atropine	Sal-Tropine™
Benztropine	Cogentin™
Brompheniramine	Dimetapp™
Carbinoxamine	Histex™, Carbihist™
Chlorpheniramine	Chlor-Trimeton™
Chlorpromazine	Thorazine™
Clemastine	Tavist™
Clomipramine	Anafranil™
Clozapine	Clozaril™
Darifenacin	Enablex™
Desipramine	Norpramin™
Dicyclomine	Bentyl™
Dimenhydrinate	Dramamine™, others
Diphenhydramine	Benadryl™, others
Doxepin	Sinequan™
Doxylamine	Unisom™, others
Fesoterodine	Toviaz™
Flavoxate	Urispas™
Hydroxyzine	Atarax™, Vistaril™
Hyoscyamine	Anaspaz™, Levsin™
Imipramine	Tofranil™
Meclizine	Antivert™
Methocarbamol	Robaxin™
Nortriptyline	Pamelor™
Olanzapine	Zyprexa™
Orphenadrine	Norflex™
Oxybutynin	Ditropan™
Paroxetine	Paxil™
Perphenazine	Trilafon™
Promethazine	Phenergan™
Propantheline	Pro-Banthine™
Propiverine	Detrunorm™
Quetiapine	Seroquel™
Scopolamine	Transderm Scop™
Solifenacin	Vesicare™
Thioridazine	Mellaril™
Tolterodine	Detrol™
Trifluoperazine	Stelazine™
Trihexyphenidyl	Artane™
Trimipramine	Surmontil™
Trospium	Sanctura™

Your turn

Patient 1 (scores 6)

Warfarin, frusemide, nifedipine, digoxin, loperamide, ranitidine

Patient 2 (scores 3)

Solifenacin, clopidogrel, nefopam, paracetamol, omeprazole, simvastatin

Patient 3 (scores 5)

Aspirin, ISMN, theophylline, salbutamol, loratadine, paroxetine

Patient 4 (scores 14)

Amitriptyline, cetirizine, fesoterodine, olanzapine, carbamazepine, fentanyl,

Anticholinergic burden

- Wide range of drugs with anticholinergic activity
- Wide range of anticholinergic activity across these drugs
- Common culprits
- Red flags

Orthostatic hypotension

Urinary retention

Delirium

Case outcome

76 year-old-male, lives at home with wife, supported by PoC three times daily.

Background of Idiopathic Parkinson's Disease for 5 years, Parkinson's disease dementia, postural instability and gait disturbance, T2DM and IHD. He had a long-term catheter to manage prostatism.

Admitted with a fall, delirium and worsening mobility.

Medication history in clerking notes.

- Co-beneldopa tablets 12.5mg/50mg three times daily
- Metformin 500mg twice daily
- Gliclazide 80mg twice daily
- Clonazepam 5mg night
- Aspirin 75mg daily
- Rivastigmine 1.5mg twice daily
- Tamsulosin 400mcg daily

Accurate drug history following medicines reconciliation

- Co-beneldopa 25mg/100mg capsules: 1 capsule at 9am, 1pm and 5pm.
- Co-beneldopa 25mg/100mg MR capsules: 1 capsule at 10pm
- Metformin MR tablets 1g at teatime
- Clonazepam tablets 500 micrograms at night
- Aspirin disp tablets 75mg in the morning
- Omeprazole capsules 20mg in the morning
- Atorvastatin tablets 40mg at night
- Rivastigmine capsules 1.5mg twice daily
- Humulin I Kwikpen: 16 units in the morning
- Tamsulosin MR capsules 400 micrograms at night

Discrepancies identified via medicines reconciliation

1. Co-beneldopa capsules had been increased and co-beneldopa MR started during a recent hospital admission. GP records not updated & new blister pack from pharmacy contained old doses.

2. Takes MR metformin as gets severe diarrhoea with non MR prep.

3. Clonazepam transcription error 0.5mg to 5mg.

4. Atorvastatin & omeprazole unintentionally omitted.

5. Gliclazide unintentionally restarted after being stopped during recent hospital admission.

6. Humulin I dose reduced during recent admission.. Not communicated to district nurses and old doses continued to be administered after being discharged.

Impact

- Diagnostically useful information
- Likely reduced length of stay
- Potential ADE's avoided
- Allows medications to be meaningfully reviewed

Aims and Objectives

- Understand the role of Medicines Reconciliation
- Principles of prescribing stewardship in patients with Parkinson's disease
- Specific issues
- Provide you with tips, hints and ideas for clinical practice

Optimisation of medication in Parkinson's disease

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