Royal College of Physicians

Acute care toolkit 17

Managing multiple medications

November 2024

Who should read this toolkit?

This toolkit aims to support clinicians caring for patients with multiple medications who are admitted to acute care. It outlines key presentations and complications of polypharmacy. It provides service recommendations for acute hospitals and guidance on quality improvement measures and sustainability.

Introduction

The prescription of a medicine is the most frequent intervention in the NHS and has saved countless lives. But as the population ages and more people take treatments for multiple long-term conditions, patients are exposed to a concerning number of medicines, not all of which are beneficial.

As physiological reserve declines with biological ageing, these medicines can expose older patients to harm, which may even be the cause of their hospital admission. This is termed problematic polypharmacy and can also affect younger people.

In September 2021, the Department of Health and Social Care published the *National overprescribing review report*.[1] This report highlights the complexity of polypharmacy and makes several recommendations. It explains that the traditional model of healthcare encourages prescribing following single disease guidelines without consideration of the effect of concurrent conditions or alternatives to medicines. We also know that prescribers overestimate the benefits of medicines and underestimate the risks.[2,3]

Patients often describe feeling 'done to' rather than being part of a shared decision-making process about which medicines may benefit them, and which may not. In older people, too often we can ignore what matters most to them. 'What matters most' might not involve taking large numbers of medicines to try to prevent a health event. Patients may make very different decisions about their care from the decisions that we each think we would make in their position. This does not make their decisions wrong.

In England, we prescribe over 1 billion prescription items every year in primary care and over 1 million people in this country take 10 or more medicines for their long-term conditions.[4] Almost half of these patients are aged 75 and over.

> "Healthcare contributes over 5% to the global carbon footprint, and the largest single contributory factor is prescribed medications. The NHS was the first healthcare system in the world to commit to reaching net zero, and if it is to achieve this then reducing the carbon footprint of prescriptions must be part of the solution.'

The consequences of multiple medicines

In one study, 16.5% of unplanned hospital admissions were due to adverse drug reactions (ADRs), with polypharmacy in older people being a major cause.[5] Patients taking antiplatelet drugs alongside anticoagulants or combinations of medicines known to increase their risk of acute kidney injury (AKI) are common examples of medicines-related hospital admission.

Many medicines are associated with an increased risk of falls, and this should be considered when assessing patients, when reviewing medicines with a view to deprescribing and particularly before initiating additional medications.[6,7]

National Institute for Health and Care Excellence (NICE) guidelines remind us that 'People have the right to be involved in discussions and make informed decisions about their care, as described in *Making decisions about your care*'.[8] No clinical guideline is intended to be applied in a blanket fashion to all patients. It is important that, regardless of our good intentions, our prescribing does not cause more harm than good.

We need to consider whether our patient is older, is frail, or is taking multiple medicines, as well as understanding their goals and wishes. Many require a holistic medication review with a reduction of unnecessary medicines. Doctors and pharmacists are well placed to ensure that patients are discharged only on the medicines that they and their medical team together have agreed may be beneficial to them, and all prescribers play a role in responsible, responsive prescribing.

> "Prescription of medicines, like all medical interventions, should be viewed based on risk and benefit, whether a medication is being initiated, continued or stopped.'

Clinical context

Appropriate polypharmacy is defined as prescribing for an individual for complex conditions or for multiple conditions in circumstances where medicines use has been optimised and where the medicines are prescribed according to best evidence and in line with the patient's wishes.

Problematic polypharmacy is defined as the prescribing of multiple medications inappropriately, or where the intended benefit of the medication is not realised.

Prescription of medicines, like all medical interventions, should be viewed based on risk and benefit, whether a medication is being initiated, continued or stopped. Medications do not only elicit a response from the individual's body, but in addition influence the effects of other concomitant medications being administered. These interactions can affect all aspects of pharmacokinetics and pharmacodynamics.

Risk stratification in polypharmacy

The King's Fund has identified the following factors in relation to problematic polypharmacy.

- All patients with 10 or more regular medicines
- Patients receiving between four and nine regular medicines with:
  - at least one prescribing issue that meets criteria for potentially inappropriate prescribing
  - evidence of being at risk of a well-recognised potential drug–drug interaction
  - a clinical contraindication
  - evidence from clinical records of difficulties with medicine-taking
  - no or only one major diagnosis recorded in the clinical record
  - end-of-life or palliative care being received (where this has been explicitly recognised).

Interactions

As the number of medications increases, so does the likelihood of interactions. These can be due to summative pharmacodynamic effects, such as increased bleeding risk when a DOAC and antiplatelet agent are used together, or to antagonistic effects, for example when a non-selective beta-blocker like propanolol is used alongside a beta-agonist such as salbutamol. Pharmacokinetic interactions also occur, such as the inhibition of metabolic enzyme CYP 3A4 by clarithromycin, which means that co-administration of atorvastatin or simvastatin should be avoided. Therapeutic effects can interfere with other medications, such as the reduction in stomach acid production by proton pump inhibitors impeding absorption of other agents such as ketoconazole.

> “Certain medications are more problematic than others, and are often characterised by a fine line between safe and unsafe doses.’

Types of medication

Certain medications are more problematic than others, and are often characterised by a fine line between safe and unsafe doses as they have a low therapeutic index.

The APINCHS tool helps to identify these medications; ‘S’ for ‘systems’ has been added to include other evidence-based practices known to improve safety:[10]

A	Antibiotics
P	Potassium and other electrolytes
I	Insulin
N	Narcotics (opioids) and other sedatives
C	Chemotherapeutic agents
H	Heparin and other anticoagulants
S	System – medication safety systems such as independent double checks, safe administration of liquid medications, standardised order sets

The APINCHS tool correlates well with medication implicated in patient episodes with ADRs.

Drug class	Adverse drug reaction
Diuretics	Renal impairment, electrolyte derangement, postural hypotension
Steroid inhaler	Pneumonia, oral thrush
Anticoagulants	Minor bleeding, anaemia, intracranial haemorrhage, gastrointestinal (GI) bleed
Proton pump inhibitor	Hypomagnesaemia, hyponatraemia, Clostridium difficile
Antiplatelet	Intracranial haemorrhage, GI bleed, minor bleed, anaemia
Chemotherapy	Neutropenic sepsis, sepsis, constipation
ACE inhibitor	Renal impairment, postural hypotension
Antidepressants and antipsychotics	Confusion, hyponatraemia
Opiates	Constipation, confusion, respiratory depression, hallucinations.

Adapted from Osanlou *et al* (2022)[11]

Polypharmacy in people with frailty

'Frailty' describes a state of vulnerability due to advanced biological age (as opposed to chronological age), and confers increasing vulnerability to polypharmacy and (independently) medication-related harm. The degree of frailty can be assessed by scoring systems such as the Clinical Frailty Scale (CFS).[12] In patients with moderate to severe frailty, treatment targets and medications should be adjusted.[13]

Reviewing polypharmacy

The identification of potentially inappropriate medications (PIMs) and potential prescribing omissions (PPOs) is a key factor in older people, as conceptualised in the STOPP/START criteria.[14,15]

The STOPPFRAIL tool can be used to identify those medications that may be inappropriate in patients with a reduced life expectancy and high frailty score.[16,17]

In order to consider the most appropriate medicines and take a person-centred approach, the 7-step approach can be used to guide decision making.[18]

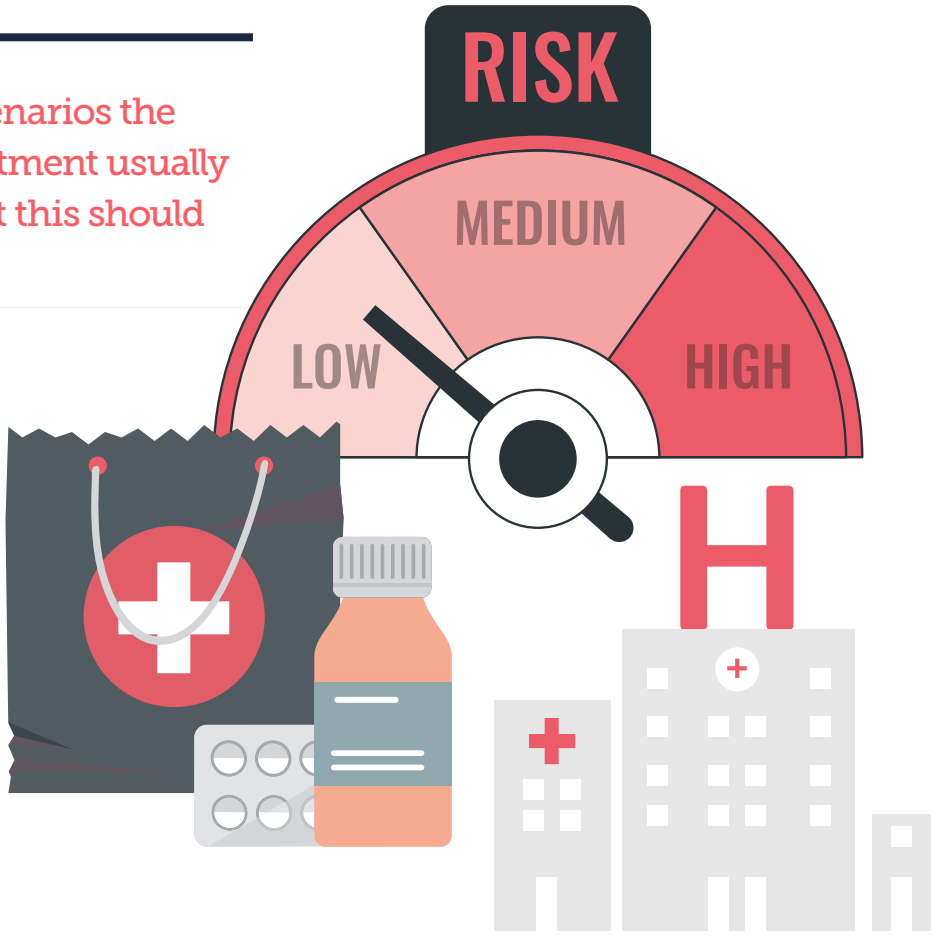
Adapted from the Scottish government.[19]

Acute hospital admission and initial clinical assessment

Most emergency admissions will necessitate prescription of a new medication to treat the presenting complaint or associated symptoms. Emergency medications given to preserve life must be given without delay. When initiating new medications, consider:

Consideration	Example	Action
The risk–benefit balance of the medication for the indication	The risk of bleeding vs the risk of venous thromboembolism (VTE) when prescribing VTE prophylaxis	In many acute scenarios the potential benefit of treatment usually outweighs the risks, but this should always be considered
Any contraindications	Use of a beta-blocker in a patient with asthma	Use alternative rate control agent, eg digoxin
Known allergies and intolerances	Avoiding cephalosporins in patients with penicillin anaphylaxis	Explore history of penicillin allergy, ie life-threatening anaphylaxis or rash
Potential drug–drug interactions with regular medications	Trimethoprim with methotrexate	Some regular medications may be held for the duration of treatment, while in others a dose adjustment may be considered

> “In many acute scenarios the potential benefit of treatment usually outweighs the risks, but this should always be considered.’



Consider regular medications

When assessing a patient on admission, it is important to consider whether medications could be the **cause** or a significant **contributing factor** to the presentation, as well as deciding whether continuing the prescription of the medication will be harmful in the current clinical state – continuation of a prescription is an 'active' act.

Key point

An understanding of all the patient's medication and its mechanism of action and indication is fundamental to the medicine safety process.

Question	Action
What medication are you taking?	Ensure that you know what each drug is and why the patient usually takes it – and whether they are indeed taking it. If not, is this because they don't like or trust it, have forgotten or have run out?
Is the medication working?	Many patients take medication that doesn't work, eg eight in nine people do not benefit from anticholinergic medications for overactive bladder.
Does the indication still exist?	Beware the 'historic prescribing remnant', eg PPI after discontinuation of steroid, anti-anginals in patients who no longer get angina.
How do current medications affect planned treatment?	What impact will the medicines that the patient is taking for other conditions have on the treatment for their presenting complaint?
What interactions could there be?	Think about interactions between individual medicines or even between medicines and conditions. Use sources such as the British National Formulary (BNF).[20]
If I stop a medication, what could happen?	What will be the impact of withholding or stopping medicines on the patient's condition? Will it worsen the patient's pre-existing condition?
If I continue a medication, what could happen?	Do any medicines need amending on admission, either to better manage the condition that the patient has been admitted with or to reduce the risk of further harm?

Adapted from NHS Greater Glasgow and Clyde *Adult therapeutics handbook*.[21]

Common presentations of medicine-related harm

The table below highlights a selection of scenarios where medications commonly may contribute to the presentation, possible actions to take and likely implicated medications.

Presentation	Some implicated medications	Action/resources
Acute kidney injury	ACE inhibitors, diuretics, NSAIDs, SGLT2i	Consider withholding nephrotoxic medications. Check baseline creatinine and consider the need for dose reduction of other repeat medications, eg opiates. https://ukkidney.org/sites/renal.org/files/RPG/RPG%20AKI%20Leaflet%202020.pdf
Agitation	Anticholinergic medications – also see serotonin syndrome, dopaminergic drugs, eg for Parkinson's disease, antiepileptic medicines, steroids. Withdrawal syndromes – benzodiazepines, GABA analogues, tricyclic antidepressants, SSRIs, dementia drugs, alcohol.	Consider for specialist advice for certain medications including dopaminergic drugs. Never stop Parkinson's disease medications without consulting a specialist. https://doi.org/10.1002/gps.4507
Anticholinergic burden Constipation, dry mouth, dry eyes, urinary retention, falls, dizziness, sedation, confusion, agitation, delirium and cognitive impairment.	Group includes antihistamines, urinary antispasmodics, antipsychotics (eg olanzapine, quetiapine) some antidepressants. Co-prescription of these medicines increases the anticholinergic burden.	Minimise medications in older adults or those with or at risk of cognitive impairment. If not able to stop medications, consider reduction in dosage and ask for specialist advice for certain medications, including antipsychotics. Never stop Parkinson's disease medications without consulting a specialist. Online calculators www.acbcalc.com/
Bleeding	DOACs, warfarin, antiplatelets, NSAIDs, cholinesterase inhibitors eg donepezil, cumulative effect of SSRIs and corticosteroids	Ensure that the patient understands the risks and benefits of continuing, eg antidepressants may have been started many years ago and patient may be interested in a trial of dose reduction.
Bronchoconstriction (worsening asthma)	Beta-blockers, NSAIDs	Use an alternative analgesia or rate control agent. www.brit-thoracic.org.uk/quality-improvement/guidelines/asthma/
Dry mouth and/ or constipation	Anticholinergic medication	Manage symptoms and utilise anticholinergic calculators to identify likely causative medications. Utilise frameworks such as the '7 steps' to review medications with patients. https://doi.org/10.1002/gps.4507

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Presentation	Some implicated medications	Action/resources
Falls	Antipsychotics, antihypertensives, including alpha blockers for urinary symptoms, anticholinergics, benzodiazepines, opioids (in addition to others leading to postural hypotension and anticholinergic burden)	Assess frequency and severity of falls. Assess frailty level using CFS score. Utilise '7 steps' for reviewing medications with patients and refer to STOPPFall tool to identify medication classes and for practical deprescribing guidance. www.rpharms.com/Portals/0/RPS%20document%20library/Open%20access/Pharmacy%20guide%20docs/Medicines%20and%20falls%209%2023%20 https://doi.org/10.1093/ageing/afaa249
Hallucinations	Antidepressants, memory medications (eg donepezil, rivastigmine), opioids, epilepsy drugs, GABA drugs	If not able to stop medications, consider reduction in dosage and ask for specialist advice for certain medications.
Hyperglycaemia	Corticosteroids	For acute courses, use the lowest dose for the shortest period possible for the indication. For long-term use, refer for specialty advice to determine whether alternative medication can be used or if dosage reduction is possible. https://doi.org/10.1093/ageing/afaa249
Hyponatraemia Drowsiness, confusion, fits	Commonly thiazide diuretics, less often antidepressants, PPIs, analgesics, anticonvulsants, ACE/ARB and many others. **NB hyponatraemia in those on loop diuretics may be dilutional, needing more loop diuretic not less.**	Careful clinical assessment of fluid status and follow local hyponatraemia guidance. When reintroducing, identify medications at risk of causing or exacerbating hyponatraemia and follow '7 steps' to review with the patient. Use https://medichec.com to review medications.
Immunosuppression and immunomodulators	Chemotherapeutic agents, cyclosporin, tacrolimus, DMARDs	Seek expert advice www.cancerresearch.org/immunotherapy-side-effects
Nausea/dyspepsia	Nausea is a 'very common' or common adverse reaction to many medications.	Carefully review existing medication before prescribing an antiemetic.
Neuroleptic malignant syndrome	Initiation of antipsychotic medications	Exclude other causes eg sepsis, other drug reactions; seek expert advice https://rightdecisions.scot.nhs.uk/media/1804/mhs-mrg-31-neuroleptic-malignant-syndrome-nms.pdf

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Presentation	Some implicated medications	Action/resources
Sedation (decreased conscious level)	Opioids (remember patches), benzodiazepines, certain antidepressants such as mirtazepine and venlafaxine.	For people taking opiates for non-cancer pain, consider calculating the morphine equivalent daily dose. Opioids aware (www.fpm.ac.uk/opioids-aware) states: 'The risk of harm increases substantially at doses above an oral morphine equivalent of 120 mg/day, but there is no increased benefit: tapering or stopping high dose opioids needs careful planning and collaboration.' https://awttc.nhs.wales/files/guidelines-and-pils/polypharmacy-in-older-people-a-guide-for-healthcare-professionalspdf/
Serotonin syndrome (usually due to interaction between multiple medications)	SSRIs, tramadol, antipsychotics. Linezolid, fentanyl, illicit drug use (MDMA, amphetamines)	Take a careful drug history including OTC and herbal medicines; seek expert advice. https://rightdecisions.scot.nhs.uk/media/1831/management-of-serotonin-syndrome.pdf

Think – medicines

Thinking about medicines is a continuous process throughout a hospital stay. Medicines may be a factor in the initial presenting complaint, but may also contribute to secondary complications such as acute kidney injury.

New medicines may be started on admission, but also during a stay for problems such as hospital-acquired infections. Medicines may also be used to reduce the risk of complications, such as low-molecular-weight heparin to reduce risk of VTE.

Key point

It is important to factor medicines into our plan at each assessment, and to **communicate** this plan clearly.

Admission

Inpatient

Discharge

Consider	Plan	Communicate
Acute cause of admission	Initiation of new medicines with clear review and stop dates Consider interactions and side effects	Medication reconciliation
Medication causes for admission	Stop medications that have precipitated or contributed to admission	Shared decision making: Benefits? Risks? Alternatives? Do nothing?
Mitigate risks of medication that cannot be stopped	Reduce dose if possible or monitor closely	
Medications that could worsen acute presentation	Pause medications if possible and review when improving if they should be restarted	
Clinical changes or symptoms requiring new or adjusted medicines	Consider change of route eg Parkinson's medication with an unsafe swallow	
Could any clinical changes be medication related?	Review for new, reintroduced and held medicines	Any medication changes or initiations with patients, carers and on discharge paperwork
Clinical improvement	Reintroduction of regular medicines if appropriate that were held at admission	
Does the patient orGP need anymedicines information?	Is there a need to optimise chronic disease management?	

On discharge

Medication changes should be added to the discharge summary throughout admission, not left to the doctor completing the summary at the last moment. Prior to discharge, we need to ensure that regular medications are reintroduced where appropriate.

All new medications and medication changes should be explained, with indication stated, and plans for review if needed. Where medications have been intentionally stopped, document this clearly so that they are not reintroduced by mistake.

This is also a good point to check whether the patient or their next of kin has all the necessary information to manage their own medications. Are they aware of all changes to their regular medications? Do they understand the risks/benefits of their medications and the ongoing plan?

Verbal information should be reinforced with written information.

Key point

Remember: empowering patients and/or their next of kin to be fully informed and play an active role in their management is a key feature of consent and safety. Use the Royal College of Physicians (RCP) *Using medicines safely when you leave hospital checklist*[22] to empower patients and their family or carers to understand any changes.

Key point

Think: if you were a GP reading this discharge summary and were now responsible for ongoing review/prescription of medications, does this summarise all the necessary information? If you were the patient or their representative, could you understand the instructions and rationale behind each medication?

Communication

Decision making with patients

Encourage and empower patients to manage their own health.

- **Shared decision-making tools:** can help build trust, clarify goals, and ensure decisions reflect both medical advice and patient preferences.

  Make the most of your appointment using the BRAN questions:[23]

  - **What are the Benefits?**
  - **What are the Risks?**
  - **What are the Alternatives?**
  - **What if I do Nothing?**
- **Trusted information:** signpost reliable and up-to-date sources of information, such as NHS websites and condition-specific organisations
- **Decision aids:** leaflets, apps and interactive tools clarify the risks and benefits of stopping medications, eg NICE decision aids or GP Evidence.[24]
- **'Don't diss your predecessors':** acknowledge the rationale behind existing care plans and explain that the balance of risks and benefits changes as medical conditions progress and the patient's goals and wishes change.
- **Expectation management:** agree realistic goals to avoid disappointment and discuss the benefits of reducing medications, eg fewer side effects, reduced burden of pills.
- **Sick day rules:** give instructions how to adjust medications during acute illness, eg pause diuretics or ACE inhibitors, and when to ask for advice.[25]
- The RCP **medicine safety discharge checklist** provides a series of questions to help patients to better understand their medications at discharge.[22]

Communicating with healthcare professionals

Effective communication among healthcare professionals, especially across multidisciplinary teams (MDTs), ensures continuity of care and minimises medication errors. Key areas to focus on include:

- MDTs: pharmacists, doctors, nurses and other healthcare professionals collaborate to identify patients who might benefit from reducing medications. Structured tools, such as the '7 steps' approach for managing medications, can guide these discussions.[19] While not all steps may be completed during admission, detailed and accurate communication within the healthcare system should support continued progress post-discharge.
- Discharge summaries:
  - Send automatically to GPs to transfer information quickly and accurately, and give patients a copy before they leave hospital.
  - AI-driven systems can explain changes in medications and follow-up plans.
  - Write text that can be understood by patients and healthcare professionals.
- Discharge medicines service: collaboration between hospital teams and community pharmacists ensures that patients are supported to manage their medications at home.

Education

Guidelines and teaching tend to focus on organ-specific issues. Instead, we need to gauge the cumulative effect of medications, especially in complex patients with multiple health conditions. It can be difficult to spot when appropriate, optimised polypharmacy has become problematic polypharmacy.

An acute admission is a good moment for re-evaluation. There is a growing number of tools and resources available to aid in managing complex medication.

What we can do

- **Asking about medicines:** See the tips below on phrases that give permission for an honest discussion about current medications, and involve family if appropriate. The easiest way to reduce waste and risks is to stop medications that the patient does not want / is not taking; this also reduces the risk of inadvertent restarting.
- **Medicines optimisation tools:** Choose one or two that you find helpful (see helpful resources on p14) – consider discussing these with your team to standardise your approach.

Ways of asking about medicines:

'Can you tell me what you take on a regular basis? I know lots of people don't take all their medicines, are there any that you "tend to forget"?'

'Some of these tablets aren't making you feel better today. Shall we talk about which ones you'd like to keep taking, given everything else going on?'

'Medications can also have a huge impact on climate change and the natural world. Is that something that is important to you?'

Phrases that give permission for an open conversation about concordance:

'Wow, that's a lot of medicines – I'd struggle to take all those.'

'OK, this is a lot of medicine, do you feel that some of them might not be doing you any good?'

Quality improvement

Quality improvement (QI) is a systematic approach designed to enhance patient outcomes, healthcare processes and organisational efficiency. For polypharmacy patients, QI can play a central role in instituting deprescribing initiatives. The RCP's QI guide provides a detailed framework.[26]

Metrics for improvement

Developing generic and specific metrics to evaluate the impact of deprescribing initiatives is critical. Specific metrics could include:

- number of medications deprescribed during admission
- reduction in ADRs – maybe by measuring the number of admissions as a result of side effects of medication started on the previous admission
- percentage of patients given an updated medication list on discharge
- patient-reported outcomes on medication burden and quality of life
- number of patients with complete medicines reconciliation within 24 hours of admission.

Target areas for improvement

- Deprescribing and medication review should focus on patient populations at high risk of harm, such as those with chronic or long-term conditions, older adults, or those taking multiple medications.

Sustainability and QI

An additional benefit of deprescribing is its impact on environmental sustainability. Measuring this impact is increasingly important, especially as the NHS aims to reach net zero carbon emissions by 2040.[27] The RCP has published the *Green physician toolkit* which advocates for shared decision-making to reduce the environmental burden of medications.[28]

The Centre for Sustainable Healthcare's framework assesses the sustainability of interventions, considering environmental, social, and economic factors.[29] Given that 86% of the UK general public say that protecting the environment is important, exploring the importance of environmental concerns in conversations about medications with patients is a valid approach, although clearly this should only be done if appropriate.

National initiatives and system-level approaches

At a national level, it is important to recognise and record ADRs, using systems like the Yellow Card scheme to report medication issues. NHS services such as the Discharge Medicines Service[30] and polypharmacy clinics play a crucial role in supporting safe medication management at discharge. However, it's important to note that the person identifying medication-related problems may not always be in the best position to implement changes. A system-wide approach is needed to support medicines optimisation and cost-effective delivery of services.

Conclusion

Tackling problematic polypharmacy is a rewarding activity: patients are often grateful to be offered fewer medicines. Patients who have been offered thoughtful, well-informed, shared decisions are more likely to take their medicines and are less likely to experience medication-related harm. And optimised prescribing is good for the health economy, and for the planet. When we prescribe with knowledge and care, in partnership with our patients, everyone wins.

Helpful resources

A number of resources to help with deprescribing

- **PrescQIPP IMPACT tool:** IMPACT provides suggestions to optimise medicines use, bringing together advice, for example STOPP-START criteria.
- **Stopping by indication tool:** A tool to facilitate prescribing by considering why a medication has been prescribed and possible risks.
- **7-step process** for medicines review, Health Improvement Scotland.
- **STOPP-START:** Screening Tool of Older Persons' Prescriptions (STOPP) and Screening Tool to Alert to Right Treatment (START).
- **STOPPFRAIL:** a list of potentially inappropriate prescribing indicators designed to assist physicians with stopping such medications in older patients.
- **All Wales Medicines Strategy Group, Polypharmacy in older people** – advice on when to consider stopping, and detailed advice on tapering and stopping.

Calculators

- Anticholinergic burden calculators.
- Medichec (South London and Maudsley NHS Trust) is similar, but also shows risk of QTc prolongation, hyponatraemia, bleeding, dizziness, drowsiness and constipation.
- BMJ Best practice includes management options according to adjustable comorbidities.

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