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Deprescribing: Achieving Better Health Outcomes for Older People Through Reducing Medications

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ABSTRACT

Older people are prescribed a disproportionate number of medications. Polypharmacy leads to reduced compliance, increases the risk of adverse drug effects and may lead to poor medication outcomes. There is considerable evidence of inappropriate as well as excessive prescribing for older people. Although there are risks, medication outcomes can be improved through deprescribing.

The principles of deprescribing include reviewing all current medications, identifying medications to be ceased, substituted or reduced, planning a deprescribing regimen in partnership with the patient and frequently reviewing and supporting the patient. Medications to be used with caution will be discussed and practical deprescribing advice offered in this review.

A clear understanding of the purpose and risk of medication by the prescribing team and the patient, and a considered deprescribing plan, can improve health outcomes in older people.

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INTRODUCTION

The population of older people in our society is steadily rising¹ and older people have a higher use of medications. The 12% of people over 65 years in Australia currently, will rise to 17% by 2030.² This group uses 20 to 33% of the national drug expenditure—this will rise to 40% by 2030.² This increasing use of drugs in older people is associated with the use of multiple medications (polypharmacy). The Macklin report in 1992 found that 18% of older people living in the community had more than 26 prescriptions dispensed in a six-month period.³ A recent study of nursing home residents found the mean number of prescribed medications per patient was 6.75.⁴

Polypharmacy leads to reduced compliance, increases the risk of adverse drug effects and may lead to poor medication outcomes. In a recent study of admissions to the Royal Hobart Hospital, 30.4% of admissions, mainly in older people, may have been a result of an adverse drug event and these patients were taking more medications than those admitted for other reasons.⁵ A review of Australian studies found 2.4 to 3% of all hospital admissions were reported to be drug-related.⁶ The number of medications used is a consistent contributor to the risk of drug-related admission.⁷⁻¹¹

Commonly used drugs increase the risk of serious adverse events including falls^{12,13} and confusion.¹⁴ Polypharmacy also leads to medication wastage with the associated financial cost to society. The contribution of polypharmacy to poor compliance is exemplified by a study which showed that in patients with either diabetes or congestive heart failure, medication errors increased from about 15% when only one drug was prescribed to 25% when two or three drugs were prescribed.¹⁵ Errors exceeded 35% when more than four drugs were taken.¹⁵

It is apparent that reducing drugs used by older people should reduce the risk of adverse medication outcomes, improve compliance and reduce costs, although evidence of improved outcomes from randomised controlled trials of deprescribing as the sole intervention is lacking. Conversely, there may be some situations where multiple medications are appropriate and reducing them could worsen health outcomes.

EVIDENCE OF INAPPROPRIATE PRESCRIBING

There is a large body of evidence showing inappropriate prescribing for older people. This includes overprescribing (polypharmacy), underprescribing and prescribing of inappropriate drugs or doses. Often studies demonstrating inappropriate prescribing use explicit, consensus criteria such as those of Beers¹⁶ about which drugs should be avoided in older people. A number of other instruments and approaches have also been used.¹⁷ An algorithm of appropriateness of prescribing has been developed and applied to a large Australian inpatient population.^{18,19} This approach revealed that the appropriateness of benzodiazepine usage was only 20% at the time of an initial audit of patients.²⁰ Similarly, the appropriateness of antithrombotic prescribing was only 72%.²¹ While inappropriateness does not equate to polypharmacy, these studies did show excessive prescribing of some drugs contributed to the issue of inappropriate prescribing.

Other studies have shown inappropriate and excessive use of some drugs in older people, such as loop diuretics in those without heart failure²² and anticholinergics in those with dementia.²³

Inappropriate and excessive prescribing to the elderly has been shown in a number of settings and clinical situations including the community,²⁴⁻²⁸ inpatients²⁷ and in those with dementia.²⁹

IMPROVING MEDICATION OUTCOMES

Many approaches have been trialed to improve medication outcomes in older people. These include medication reviews by general practitioners, pharmacists

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or both,³⁰⁻³⁴ development of therapeutic guidelines,³⁵ medication audits with prescriber feedback^{20,21} and educational outreach visits.³⁶ While this review is not aimed at extensively reviewing all quality use of medicines interventions in older people, it is noteworthy that many of these approaches have indeed improved medication use and outcomes. For instance, an ongoing educational outreach service in metropolitan Adelaide, reduced nonsteroidal anti-inflammatory drug use by 9% and 28% (using two different measures) relative to a comparison area.³⁷ Most usage was in older patients. This reduced usage was associated with a 70% reduction in hospital admissions for gastrointestinal disorders, including bleeding in the service area, compared to no reduction in the comparison area. This is one study which has shown that deprescribing can both be achieved and reduce adverse drug events.

Other successful approaches to improving quality use of medicines in older people include educational meetings and discussion groups,^{38,39} and a pharmacist-led approach called pharmaceutical care which includes obtaining the medical history, evaluating laboratory data, reviewing patient records and patient counselling.⁴⁰ Intrinsic to all these approaches is the avoidance of unnecessary medications and a reduction in polypharmacy. Sometimes however, underutilisation of necessary medication also needs to be addressed.^{41,42}

CAN DEPRESCRIBING BE ACHIEVED?

Many of the approaches to improve medication outcomes have successfully reduced medication use in older people. The Australian Department of Veterans' Affairs have a prescriber feedback program that, amongst other goals, targets polypharmacy generically and also specific drugs. Prescribers are sent an individualised list of patients receiving the targeted drugs, along with an information brochure on how to review these medications. The program recently succeeded in reducing long-acting benzodiazepine prescribing from 16 337 items in 15 609 patients to 10 401 items in 10 078 patients six months after the feedback program—a 36% reduction of targeted drugs and 35% of recipients.⁴³

The use of indicators of prescribing appropriateness to inform prescriber feedback can also reduce polypharmacy, although this may not be the primary aim. The use of benzodiazepines in an elderly inpatient population was reduced insignificantly from 36% of patients to 31% in a recent study involving audit and prescriber feedback. The appropriateness of medication usage increased significantly, mainly through attempts at withdrawal or dose reduction.²⁰

Pharmacist-led medication reviews in nursing homes can reduce medication usage and costs. In one study of 128 residents, a single medication review reduced medication costs by \$3824 over 6 months.⁴⁴ Pharmacist-led interventions in acute hospitals can be similarly effective—in one study such an intervention reduced drug costs by 41% over a 30-day period.⁴⁵ Medication reviews by general practitioners can also reduce polypharmacy; in one nursing home study, 51% of patients had at least one item ceased.⁴⁶

ARE THERE RISKS WITH DEPRESCRIBING?

Medications should be ceased cautiously. The original condition may recur, or there may be specific adverse

withdrawal effects. In the Australian National Blood Pressure Study, 503 patients who had all of their antihypertensives ceased during a two-week washout period initially remained normotensive.⁴⁷ However, older patients (over 74 years) were more likely to become hypertensive again over the subsequent 12 months. It is important to ensure close surveillance of all older patients in whom antihypertensives are ceased. Withdrawal effects can occur when antidepressants, benzodiazepines⁴⁸ and anticholinergics are ceased and, again, close surveillance and support is important. The risk of ceasing a medication should be balanced against the risk of remaining on a potentially unnecessary medication. It is often acceptable to misjudge cessation to test the hypothesis that the medication is no longer needed. Most medications can however be stopped without an adverse drug withdrawal effect.⁴⁹

DEPRESCRIBING PRINCIPLES

The deprescribing process requires a commitment from both prescriber and patient, and is best undertaken as a collaborative partnership. The prescribing team includes the doctor and the pharmacist, but other health professionals, including nursing staff, are often also important in the deprescribing process.

Review all Current Medications

Accurate List of Medications

The patient should be asked to produce all the medications being taken. While a list of medications is a good start, current medications are frequently omitted. In one study only 19% of older patients were able to give a complete list of their medications.⁵⁰ Congruence between what a physician believes a patient is on and what they are actually taking is frequently poor; in one study congruence was as low as 58%.⁵¹ In a recent Australian study, the proportion of patients with drug regimens accurately recorded improved significantly (from 25.9 to 42.0%, $p=0.03$) in the group asked to bring their medication to consultations.⁵² A structured interview by a pharmacist can also reveal medications missed by the admitting doctor in an inpatient setting.⁵³ Common medications omitted from a list by the patient include over-the-counter medications, as required medications, herbal and nutritional supplements and medications not taken orally or in solid form. It is far better for the patient to bring everything they use in a bag. A visit to the patient's home may frequently reveal additional medications.⁵⁴

Indications for Use

Once an accurate list has been compiled, the indication and duration of use of each medication should be established. This may not be immediately apparent, and may not be reflected in the reviewing doctor's healthcare record for medications whose cessation could be life-threatening (e.g. beta-blocker, diuretic). It may be necessary to seek information from other prescribers the patient has had contact with. Specialists have a strong influence on general practitioner prescribing and many general practitioners are unwilling to alter specialist-initiated medication without consultation with the specialist. For instance, in one recent study specialists initiated 29% of prescriptions for beta-blockers and 19% of prescriptions for angiotensin converting enzyme inhibitors.⁵⁵

Assessment of Compliance

Current compliance should then be assessed. While detailed and more accurate methods are available, a discussion with the patient and, where relevant, their carer(s) is a good start. Indicators of poor compliance include poor or inaccurate patient knowledge of frequency of use, excess medication remaining since last dispensing (leftover medication from earlier dispensing or samples need to be considered), expired medication and inadequate therapeutic response (e.g. a resting heart rate of 100 in a person said to be on substantial doses of a beta-blocker). Therapeutic drug monitoring, when appropriate, can also indicate potentially poor compliance.

Identify Adverse Drug Reactions

Adverse drug reactions should then be identified. This requires a good understanding of the adverse effects of each drug, the risk profile for the individual, awareness that older people may develop different adverse effects to those seen in younger people, and an awareness that adverse effects may present atypically in older people. For instance, impaired mobility may be a presentation of postural hypotension or dehydration in an older person, and many medications can cause confusion in older people. Any new symptom that occurs soon after a medication is initiated should be suspected of being an adverse drug reaction, although drug reactions can also occur some time after commencement. Patients may not recognise that new symptoms are due to an adverse drug reaction—in one study only 78% of hospitalised patients had a correct opinion (true positive and true negative) about the presence of an adverse drug reaction and asking the patient about adverse drug effects had a sensitivity of only 0.70 and a specificity of 0.85. Severe adverse drug reactions occurred in 21 patients but were recognised by only 7 of these patients.⁵⁶

Identify Medications to be Targeted for Cessation

Medications which are not being used should be discarded, and repeat prescriptions destroyed. Other medications that should be targeted for cessation include those being used for conditions that have resolved, and those causing adverse effects. Also, some medications are to be used primarily to combat an adverse effect of another medication and should be ceased when the offending medication is ceased. For instance, a diuretic may have been prescribed for oedema caused by a nonsteroidal anti-inflammatory drug, and allopurinol prescribed for gout precipitated by a thiazide diuretic.

High-risk medications which are not improving the patient's health should also be considered for cessation. Some medications are almost always inappropriate for older people due to a high risk of adverse effects (e.g. amantadine, barbiturates, benzhexol, benztropine, chlorpropamide, flunitrazepam) and should be ceased. Amantadine also has anticholinergic effects and can cause rash and oedema. Barbiturates cause sedation, confusion and mobility impairment, and should be weaned gradually. Benzhexol and benztropine are anticholinergic agents with a high propensity to cause adverse effects such as confusion, postural hypotension and urinary retention in older people. Chlorpropamide (no longer available in Australia) has a long half-life and its use carries a high risk of hypoglycaemia. Flunitrazepam

has an extremely long half-life in older people and is associated with falls, confusion and memory impairment.¹⁴ For each of these drugs, safer alternative are available.

A number of medications are generally inappropriate for older people for similar reasons but may be the best therapy in some situations (e.g. aminophylline, amitriptyline, chlorpromazine, dextropropoxyphene, diazepam, dothiepin, doxepin, glibenclamide, glimepiride, indomethacin, methyl dopa, nitrazepam, piroxicam, propantheline, tenoxicam, thioridazine, trimethoprim/sulfamethoxazole, theophylline). Amitriptyline, doxepin and dothiepin carry a high risk of anticholinergic sedation and other adverse effects. Chlorpromazine and thioridazine can cause hypotension and over-sedation. Dextropropoxyphene has narcotic-type adverse effects and offers little additional analgesia above that of paracetamol. Diazepam and nitrazepam risk the adverse effects of other long half-life benzodiazepines.¹⁴ Diuretic combinations containing hydrochlorothiazide 50mg risk electrolyte and metabolic disturbances—most older people only require 25mg. Indomethacin, piroxicam and tenoxicam carry a considerable risk of gastrointestinal toxicity. Methyl dopa can cause depression and a granulomatous hepatitis. Propantheline has a strong anticholinergic profile. Combination of sulfamethoxazole and trimethoprim risk adverse reactions to sulfur while having a similar antimicrobial spectrum to trimethoprim alone. Theophylline and aminophylline are now recognised as having minimal additional effectiveness above inhaled alternatives for airways disease, and can cause a wide spectrum of adverse effects. Glibenclamide and glimepiride have relatively long half-lives carrying a considerable risk of hypoglycaemia. Again, for each of these drugs, a safer alternative exists.

There are other drugs (e.g. carbamazepine, cimetidine, dicyclomine, disopyramide, doxazosin, lithium, metformin, oxybutynin, phenytoin, prazosin, timolol) which may be appropriate for older people but carry a high risk of causing adverse effects and for which alternatives may exist.

Plan a Deprescribing Regimen

Deprescribing should be undertaken as a team approach, involving doctor(s), pharmacist and, where appropriate, nursing staff as well as the patient. The team leader should contact other members to ensure all are aware of the plan and in agreement with the overall process.

The prescribing team should then prioritise drugs to be ceased, substituted or have their dose reduced. Higher priority should be given to deprescribing drugs:

- causing adverse effects;
- not being currently used;
- with no current indication;
- being used irregularly for non life-threatening conditions; and
- used to combat adverse effects of drugs which can be ceased.

Deprescribing should be planned. While it may be possible to cease or reduce several drugs simultaneously, it is often more appropriate to cease/withdraw sequentially. In this case, any emergent symptoms can be easily attributed to the drug ceased. Considerations for individual drug treatments are shown in Table 1.

The overall regimen should also be reviewed and simplified, aiming for once or twice daily dosing to maximise

Table 1. Considerations for treatment that can assist in establishing a deprescribing regimen

Treatment	Consideration
Benzodiazepine	
Short-acting	-cease or wean if not needed
Long-acting	-wean 10 to 15% of dose per week
Both	-combine with sleep hygiene/psychotherapy
Cholinesterase inhibitors	-consider cessation/switching to another drug if intolerable adverse effects -review compliance; may be poor if no carer
Antipsychotics	-preferred drugs: atypical, haloperidol (short-term) -cease if indication not clear or no longer needed (e.g. dementia with behavioural symptoms, which often resolve with time) -if extrapyramidal adverse effects, trial atypical antipsychotic or cease -avoid if dementia with Lewy bodies (if needed, quetiapine possibly best tolerated ^{57,58})
Anticholinergics (e.g. tricyclic antidepressants and drugs for detrusor instability)	-try to cease but be aware of withdrawal effect, if ceased abruptly in long-term users -if depressed, selective serotonin reuptake inhibitors preferred -trial off oxybutynin or propantheline, carefully charting bladder functions
Digoxin	-consider ceasing if not used to control rate in atrial fibrillation -consider using angiotensin converting enzyme inhibitor or beta-blocker for heart failure
Amiodarone, sotalol	-consider ceasing if not achieving sinus rhythm; even if sinus rhythm achieved it may not be better than a drug for atrial fibrillation rate control alone (e.g. digoxin)
Diuretics	-cease if not used for heart failure or hypertension -consider substituting or dose reduction if causing adverse metabolic or electrolyte effects
Beta-blockers	-use with caution if airways disease or peripheral vascular disease -now considered safe in diabetics with heart disease -cease if unacceptable bradycardia -do not stop abruptly if ischaemic heart disease
Calcium channel blockers	-substitute or cease if adverse effects, such as peripheral oedema, bradycardia or severe constipation -dihydropyridine calcium channel blockers have different adverse effects
Lipid lowering drugs	-cease if quality of life does not justify use (e.g. end-stage dementia)
Nonsteroidal anti-inflammatory drugs	-trial regular paracetamol, topical or physical therapy -if successfully ceased, may be able to cease peptic ulcer, diuretic or antihypertensive therapy -COX-2 inhibitors may not be safer, except for reduced gastric toxicity
Oral corticosteroids	-review original indication and cease/reduce dose if possible -if used long-term, wean slowly
Gout therapy	-rarely need as much as allopurinol 300mg -colchicine best not used long-term -aim to replace nonsteroidal anti-inflammatory drug with allopurinol
Glaucoma therapy	-topical prostaglandins or carbonic acid anhydrase inhibitors preferable -betaxolol may have less systemic effects than timolol, but may be less effective
Antiparkinsonian drugs	-cease anticholinergics and amantadine unless other therapies ineffective -withdraw all drugs if vascular parkinsonism -withdraw offending drug if drug-induced parkinsonism -role of l-dopa unclear in dementia with Lewy bodies; cease if trial ineffective
Diabetic management	-review dietary knowledge and compliance -avoid long-acting drugs -use metformin with caution if significant liver or renal impairment -cease glitazone if causing excess fluid accumulation
Anticonvulsants	-review accuracy of original indication -aim for monotherapy -wean off barbiturates
Peptic ulcer therapy	-review indication -avoid cimetidine -consider <i>Helicobacter pylori</i> eradication as definitive treatment -cease contributing drug (e.g. nonsteroidal anti-inflammatory drug)
Laxatives	-review diet, fluid intake, exercise, and drugs contributing to constipation -can be ceased in most cases
Inhaled steroids	-if chronic obstructive airways disease, check steroid responsiveness and consider ceasing if not established
Creams, ointments	-review indication -consider trial off if used long term
Antiemetics, antidizziness	-rarely needed long-term -trial cessation

compliance.⁵⁹ Very few drugs in older people need to be given more than once a day (exceptions include paracetamol, some other analgesics, carbamazepine, sodium valproate, oral hypoglycaemic agents, some antibiotics, l-dopa preparations, galantamine and rivastigmine). Deprescribing should not lead to a more complicated regimen. Sometimes drugs need to be substituted to facilitate deprescribing. For instance, frequent use of short-acting benzodiazepines may require substitution with long-acting benzodiazepines followed by gradual weaning.⁴⁸

Plan in Partnership with Patient and Carers

Deprescribing should be undertaken with input from and consent of the patient and carer(s). The patient should first be informed of the purpose (or lack of purpose) of each medication, its (likely) current adverse effects and, for higher risk medications, the risks of that medication. The suggested deprescribing regimen should then be agreed upon—patients may have different priorities to the prescribing team, and may insist that certain medications be maintained. In the latter case, if the prescribing team remains convinced that the medication should be ceased, substituted or reduced, further consultations will usually lead to patient assent. Where irreconcilable differences remain, the prescribing team may choose to target other less controversial drugs first. Ultimately, prescribers are not obliged to continue prescribing drugs they deem unsafe or unnecessary, but the patient if still unsatisfied with this should be referred to another prescriber for a second opinion. Most misunderstandings between prescriber and patient are due to poor communication⁶⁰ and can be resolved with patient participation and better communication. It is very helpful if the patient is fully informed of the condition treated, the expected duration and likely adverse effects before a medication is begun, including knowledge of substituted drugs in a deprescribing regimen.

Frequent Review and Support

Patients should be regularly reviewed by the prescribing team to monitor their progress, to support them and to provide positive feedback. It may not be easy to cease a medication felt for many years to be necessary (e.g. hypnotic). The patient is more likely to persist with a deprescribing regime if benefits are noticed, such as feeling better, spending less money and having a less complicated regimen. These benefits should be sought and reinforced at reviews.

There may well be ‘relapses’ where patients fail to adhere to the deprescribing regimen, these should not be regarded as terminal or insurmountable and the patient should be counselled not to give up on the whole program. The program may need to be adjusted. Failure to successfully cease one medication may require another to be given higher priority, perhaps to return to the original drug after success with the new drug.

It is helpful to reassess all the medication being used through a further ‘plastic bag’ audit or home visit. The patient may have acquired a new medication from another prescriber, or the initial audit may not have been complete.

Once the deprescribing regimen has been completed, the patient should be reviewed regularly, to provide ongoing support and to review new drugs that have been commenced. Also, as cited above, the patient should

be reviewed to ensure conditions have not re-emerged (e.g. hypertension, anxiety, parkinsonism, arthritic pain).

CONCLUSIONS

Older people are prescribed a disproportionate number of medications. While this often represents good prescribing practice for sick older people, some medications are unnecessary, dangerous or cause undesirable effects and can be ceased, substituted or reduced. A clear understanding of the purposes and risk of medications by both the prescribing team and patient (and carer if appropriate) can enable a partnership approach to deprescribing and ultimately should improve health outcomes, with individual and societal benefits.

KEY POINTS

1. Older people are frequently prescribed unnecessary or dangerous medications.
2. It is possible and indeed an obligation to deprescribe; reduce, substitute or cease inappropriate medications.
3. Deprescribing should be planned and generally not overly hasty.
4. Deprescribing should be performed as a partnership between the patient and the prescribing team.
5. Regular patient review and support is required for successful deprescribing.

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