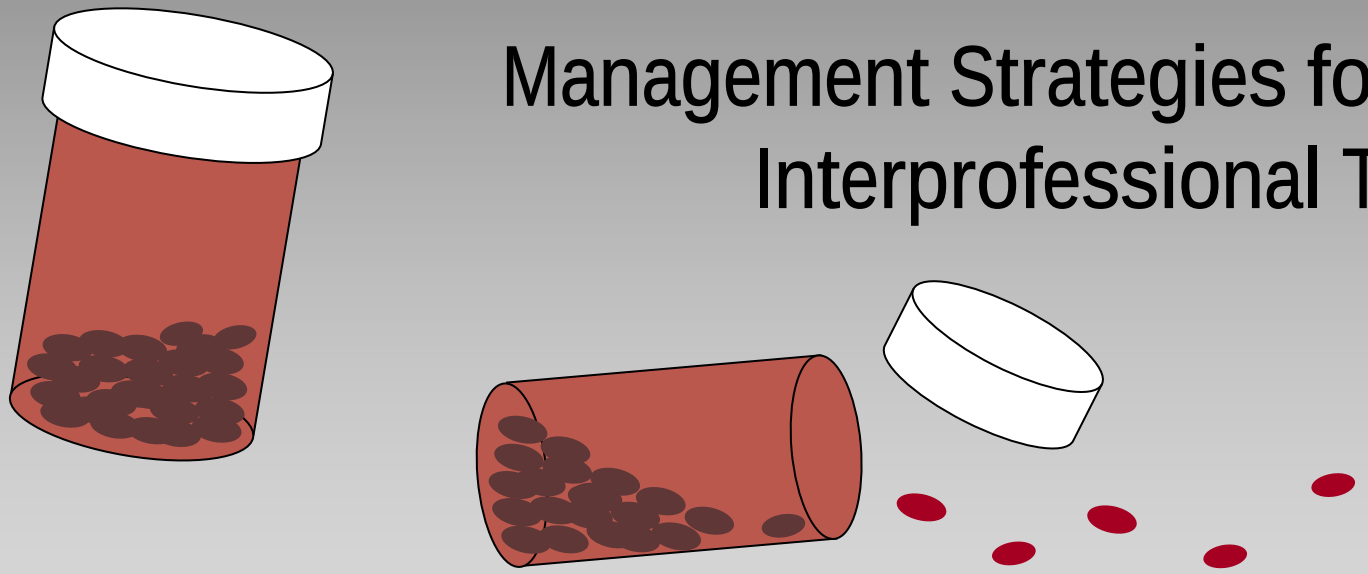
GiiC
geriatrics
interprofessional
interorganizational
collaboration

Polypharmacy
in the Frail Elderly



Management Strategies for the Interprofessional Team

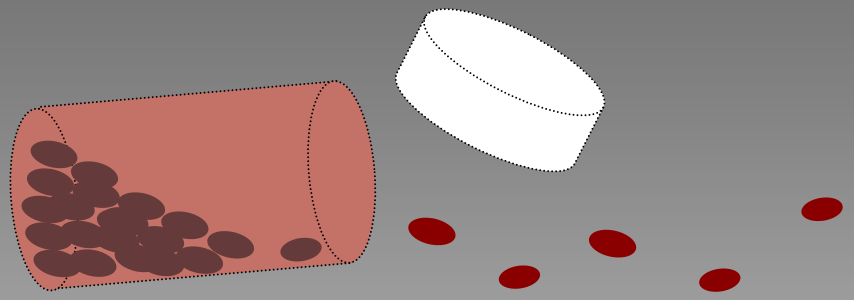
RGPs OF ONTARIO

RGP Regional Geriatric Program of Toronto
Affiliated with the University of Toronto

CERAH Centre for Education & Research on Aging & Health

Older people take more medications

- people aged 65 and over have a higher prevalence of chronic disease and disability than those under 65



- they are more likely to be taking multiple medications to treat concurrent disease processes
- in most industrialized nations, older patients take 3 times as many prescription medications as younger patients and purchase 70% of non-prescription medications (reviewed in Gallagher et al, 2007)
- as the number of medications increases, it becomes more difficult to balance the risks and benefits of each medication

The physiology of aging has an effect on medications

Altered Pharmacokinetics

- decrease in lean body mass and total body water causes decreased volume of distribution for water-soluble medications – they may accumulate in the plasma in higher than planned concentrations (eg. lithium, ethanol, digoxin)

- increase in total body fat increases volume of distribution of lipid-soluble drugs, which may delay their maximal effect and lead to accumulation with prolonged use (eg. long-acting benzodiazepines)

The physiology of aging has an effect on medications

Altered Pharmacokinetics

- liver mass and blood flow decreases, as well as first-pass liver metabolism, leading to higher concentrations of medications processed via this pathway (eg. beta-blockers, nitrates, tricyclic antidepressants, benzodiazepines, thioridazine, theophylline)
- kidney clearance decreases, prolonging the half-life of drugs

Cockcroft-Gault Formula (1976):

$$\text{CREATININE CLEARANCE} = \frac{(140 - \text{AGE}) \times \text{WEIGHT(kg)}}{72 \times \text{SERUM CREATININE}} \times 0.85 \text{ (FOR WOMEN)}$$

- serum albumin decreases, resulting in larger concentrations of drugs normally bound by the protein (eg. digoxin, warfarin, phenytoin, theophylline)

The physiology of aging has an effect on medications

Altered Pharmacodynamics

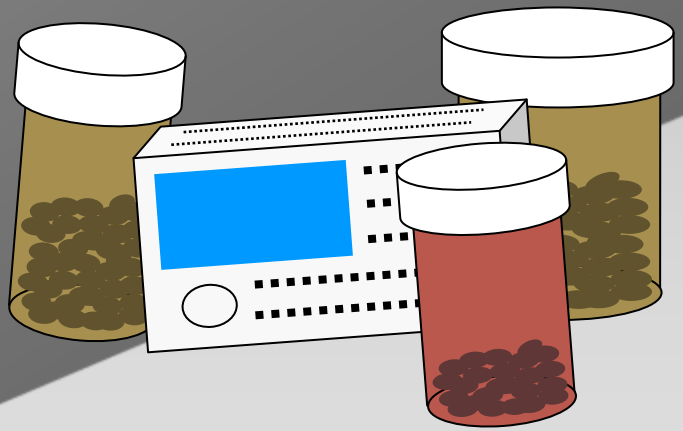
- decrease in sensitivity to beta-receptors, causing decrease in response to beta-blockers and beta-agonists
- changes to the blood-brain barrier causing an increased response to drugs that act on the CNS (eg. benzodiazepines and opiates)
- increased sensitivity to warfarin

Heterogeneity in the Elderly Population

- multiple co-occurring illnesses that differ from patient to patient
- changes in medical status over time may alter sensitivity or tolerance of medications that have been previously well tolerated

Challenges in prescribing for older people

- older people have more chronic disease and take more drugs
- must cope with increased spectrum of disease symptoms as well as more medication side effects
- increased likelihood of drug-disease interactions
- increased likelihood of drug-drug interactions
- increased risk of an inappropriate medication within the regimen
- physiological effects of aging are variable and affect dosing of drugs differently
- decreased patient adherence with more complicated drug regimens



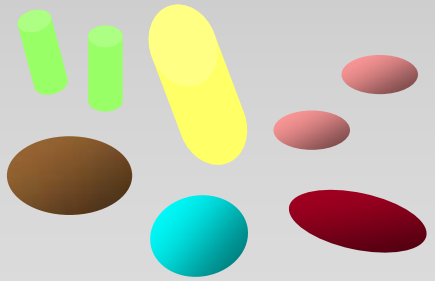
Adverse Drug Events (ADEs)

"A reaction that is noxious and unintended, and which occurs at dosages normally used in humans for prophylaxis, diagnosis, or therapy." (World Health Organization)

Adverse drug events are strongly associated with:

- presence of multiple comorbidities
- use of specific high-risk medications (eg. warfarin)
- increasing number of drugs taken (Goldberg et al, 1996)

2 drugs.....13% risk of ADE
4 drugs.....38% risk of ADE
7 or more drugs.....82% risk of ADE



Characteristics of patients most vulnerable to ADEs

- 85 years of age or older
- low body weight or body mass index
- more than 6 active chronic medical diagnoses
- atypical presentation of illness
- recent hospital discharge
- impairment in cognition, vision, hearing, or dexterity
- 5 or more prescribed medications, or more than 12 doses/day
- multiple health providers prescribing drugs
- history of previous adverse drug event
- factors affecting adherence to medications (eg. cultural, economic, physical, psychological, insufficient education about medications)

Adverse drug events (ADEs) cause significant illness in the elderly

- examples of ADEs include falls, cognitive dysfunction, bowel and bladder problems, gastrointestinal problems, bleeding, postural hypotension, cardiac abnormalities, and electrolytic disorders
- ADEs are often misdiagnosed as they are often similar to signs of aging or to disease processes – this may cause them to be overlooked as a part of normal aging or, conversely, to be misrecognized as a disease symptom and treated with yet another drug (leading to a cascade of inappropriate prescribing)
- ADEs account for an estimated 10-17% of admissions to hospital involving elderly patients (Hayes et al, 2007), and it has been suggested that as many as 75% of these admissions could have been prevented if medications had been used appropriately (reviewed in Gallagher et al, 2007)

Reducing the risk of adverse drug events

Practice “thoughtful” polypharmacy

The use of multiple drugs concurrently is justified in the management of multiple co-morbid health conditions.

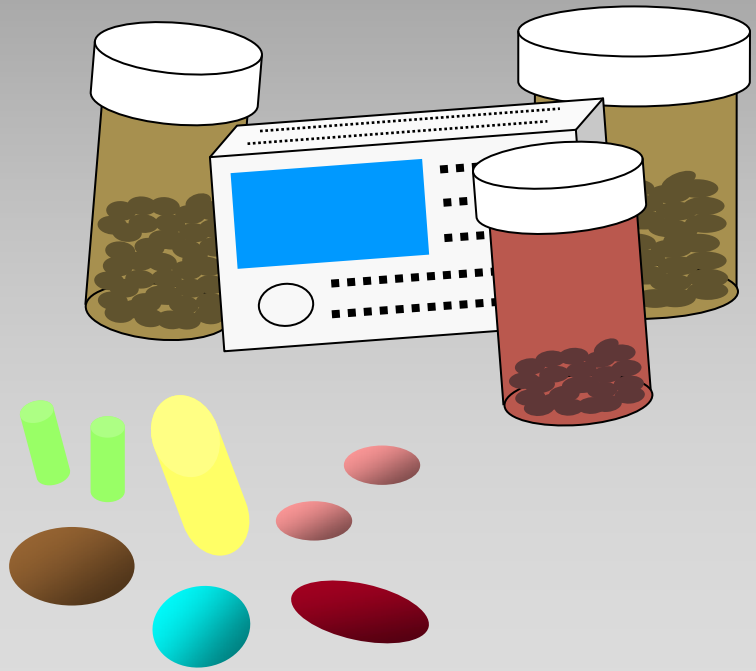
Underprescribing – failing to prescribe an indicated drug when there is no reason to avoid using it – can also result in unmet medical needs. Evidence suggests that the probability of underprescribing increases in patients who are already taking more drugs (Kuijpers et al, 2008).

Careful consideration needs to be made in the use of each medication within the context of the patient’s goals, health status, and drug regimen as a whole

Reducing the risk of adverse drug events

Regularly monitor the safety of the patient's drug regimen

- perform medication reviews every 6-12 months or after a significant event such as hospitalization so that unnecessary drugs can be discontinued and so that the dosages of other medications can be readjusted as needed
- use multiple sources of information (eg. ask the patient to "brown bag" all medications, remedies, and health supplements and to bring them into the office, verify pharmacy records, consider a home visit to assess the patient's management of their medications at home)



Reducing the risk of adverse drug events

Factors to consider in the safe use of medications (Hanlon et al, 1992; Hamdy et al, 1995; Liu and Jackson, 2008):

1) Is the medication indicated at present?

2) Is the medication the safest and most effective of available choices?

   - can use tools such as the Beers list (Fick et al, 2003), the Canadian guidelines (Mcleod et al, 1997), and IPET (Naugler et al, 2000) to screen for inappropriate drug choices

3) Is the dose correct (considering renal function and body weight)?

   - use Cockcroft-Gault formula to estimate renal function
   - when starting a new drug, “start low and go slow”

Reducing the risk of adverse drug events

Factors to consider in the safe use of medications (Hanlon et al, 1992; Hamdy et al, 1995; Liu and Jackson, 2008):

4) Are there duplications with other drugs (eg. in the same class?) Are simplifications possible?

5) Are there drugs prescribed for an adverse reaction? Can they be withdrawn?

6) Are there drug-drug interactions or drug-illness interactions that are of concern?

7) Are the dosing schedule, administration instructions, and cost of the drug feasible for this patient?

Reducing the risk of adverse drug events

Maximize use of non-drug therapy

Examples of alternative interventions (Liu and Jackson, 2008):

- for dementia: environmental modification, altered care approaches, behavioural strategies, sensory intervention
- for insomnia: stimulus control, sleep restriction, sleep hygiene
- for depression: psychotherapy, cognitive behavioural therapy
- for mobility issues: physiotherapy, exercise, mobility aids
- for urinary incontinence: bladder training, Kegel exercises, scheduled toileting
- for mild constipation: dietary modification, mobility, exercise
- for diabetes or hypertension: dietary modification, exercise, lifestyle changes

Reducing the risk of adverse drug events

Monitor for ADEs over the course of all team interactions

Be mindful of new symptoms that might be an ADE. Hints that suggest this include:

- documented reports of the symptom occurring with the drug
- adverse symptom appears after suspect drug was started
- symptom improves when drug is reduced or discontinued
- symptom worsens when drug is increased or restarted
- no evidence for another cause, such as a new illness or an exacerbation of a existing chronic condition
- suspect drug is present in toxic concentrations in the blood
- patient has had a similar reaction to the drug or drug class in the past

Common drug classes and adverse reactions

Drug/Drug Class	Adverse Reaction
ACE inhibitors	hyperkalemia
anti-inflammatory agents	gastric irritation, ulcers, hemorrhage, anemia, blood loss, sodium retention, renal failure, may decrease effectiveness of anti-hypertensive drugs
anticholinergics	dry mouth, reduced gut motility, constipation, urine retention, confusion, sedation, orthostatic hypotension, blurry vision, falls
anticoagulants	bleeding complications, hemorrhage
antidepressants (tricyclics)	anticholinergic effects, heart block, falls, confusion, urine retention
antipsychotics	sedation, tardive dyskinesia, extrapyramidal side effects, Parkinsonism, falls, dystonia, confusion, anticholinergic effects, hypotension

Data from Kane et al (1999), and Liu and Jackson (2008).

Common drug classes and adverse reactions

Drug/Drug Class	Adverse Reaction
beta blockers	bradycardia, heart failure, mild sedation, confusion, orthostatic hypotension, falls
digoxin	arrhythmias, nausea, gastrointestinal disturbance, anorexia
diuretics	thiazide diuretics and loop diuretics can cause hypokalemia, while potassium-sparing diuretics may lead to hyperkalemia
hypoglycemic agents	hypoglycemia, falls, confusion, brain injury
narcotics	decreased gut motility, constipation, sedation, confusion
sedative hypnotics	excessive sedation, confusion, gait disturbances, falls, impaired psychomotor skills

Data from Kane et al (1999), and Liu and Jackson (2008).

Reducing the risk of adverse drug events

ADEs are difficult to identify – don't be fooled!

- maintain a suspicion of adverse drug events with any new symptom – don't dismiss anything as a "normal" part of aging
- always consider the patient's medical history and query whether an existing medical condition, rather than an ADE, might be responsible for new symptoms
- seek evidence of a new illness, consistent with suspicious symptoms, that might rule out an ADE
- consider patient non-adherence if a drug does not appear to be working – ask the patient discretely whether they are missing any doses of the drug and provide counseling and education before prescribing a higher dose

Reducing the risk of adverse drug events

Empower the patient to place them at the centre of medication safety

Maximize patient adherence – involve the patient by considering their own goals and priorities in their drug treatment program.

- focus on the patient's functional goals, and not exclusively on optimizing their medical status
- distinguish between essential drugs (eg. those that are vital or curative) and non-essential drugs (eg. those for symptom relief)
- simplify dosing schedules, use combination medications as able
- assess the patient's ability to manage their medications and suggest assistive aids as needed (eg. memory or dexterity aids)
- encourage the patient to use a single pharmacy to simplify record-keeping and to help their pharmacist monitor medication safety

Reducing the risk of adverse drug events

Empower the patient to place them at the centre of medication safety

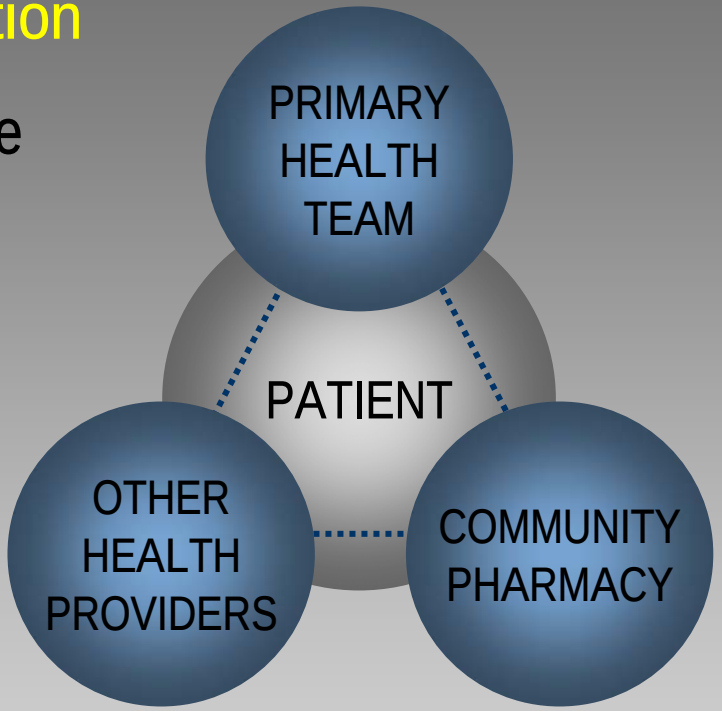
Educate the patient and encourage communication as the patient is an important team member in monitoring for ADEs. Things the patient should know include:

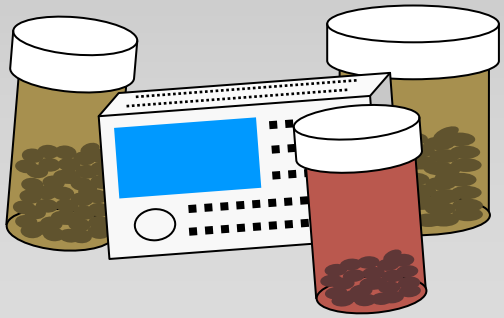
- the names of each drug and how to recognize them
- proper handling and storage of each drug
- how to take each drug, use of assistive aids as needed
- expected benefits and potential risks – side effects and what to do if an emergency arises
- what to do in the case of potential interactions with other drugs, over-the-counter remedies, health supplements, vitamins, food, and beverages
- how to keep good medication records and to provide them at all visits to health providers

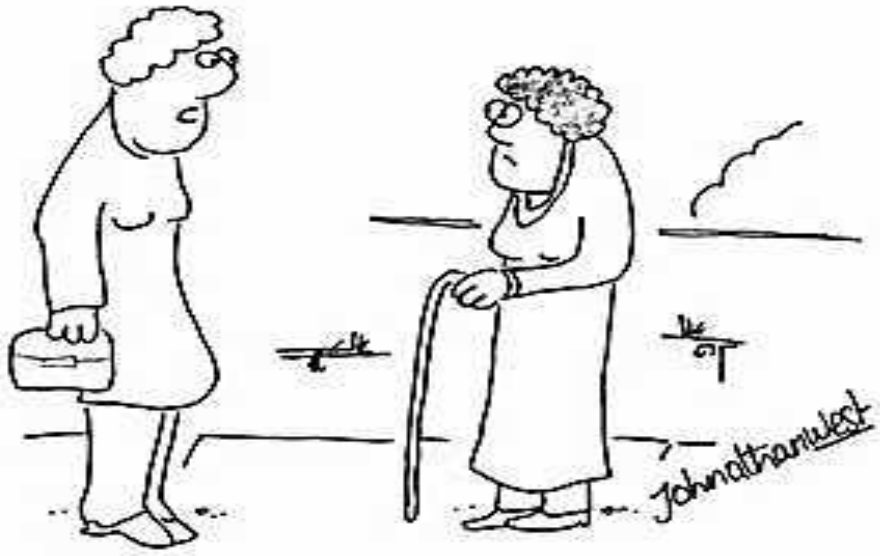
Reducing the risk of adverse drug events

Encourage communication and collaboration

- other healthcare providers who prescribe (eg. specialists, hospital staff, dentists) – reconciliation of medication changes
- community pharmacist – valuable team member in providing patient education, assisting with record-keeping, and monitoring drug safety
- open communication with the patient – report adverse symptoms, problems taking their medications, and intentional or unintentional non-adherence with any of their drugs







"Jerry doesn't do drugs anymore. He says he gets the same effect just standing up really fast these days."