

IMPROVING QUALITY AND OUTCOMES OF PRESCRIBING FOR OLDER PEOPLE

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OLDER PEOPLE CONSUME MORE MEDICATION

- 13% are over 65, but consume 22% of all prescribed medication: by 2050, 25% over 65
- 40% of national expenditure on medication will be for those over age 65, by 2030¹
- 18% of older people in the community used more than 26 prescriptions over a 6-month period²
- mean of 4.1 drugs for women and 3.5 for men³
- Mean number of drugs per nursing home resident: 6.75⁴

1. Le Couteur, Modern Medicine Sept 1997

2. Macklin, 1992

3. Cohen, J Clin Pharm Ther 1998

4. Roberts, Age Ageing, 1998; 27:385-92

EXTREME POLYPHARMACY IN OLDER PEOPLE

- Older people referred for medication review take an average of 9 drugs¹
- Of Australia's (then) 333,000 veterans and dependents, 20% receive more than 10 prescription drugs and 6.7% more than 15²
- Factor associated with multiple drug use include³
 - age
 - female
 - number of diagnoses
 - recent hospitalisation
 - depression

1. Sorensen 2004; Br J Clin Pharmacol
2. Parkes 1997, ANZ J Public Health
3. Simons 1992, MJA

POLYPHARMACY & PRESCRIBING QUALITY

- 196 VA outpatients on ≥ 5 medications
- Inappropriate prescribing assessed using combination of Beers & subscales of medication appropriateness index (MAI)
- Underuse assessed using “assessment of underutilisation of medications” instrument
- Results:
 - Mean 8.1 medications
 - 65% ≥ 1 inappropriate medication
 - 64% underusing
 - » 42% both
 - » 13% neither
 - inappropriate use rose with number of medications used
 - » 0.4 if 5-6 drugs
 - » 1.1 if 7-9 drugs
 - » 1.9 if ≥ 10 drugs ($p < .001$)

PRESCRIBER AWARENESS OF PATIENT MEDICATIONS

- Prescribers often unaware of medications taken
 - in one study GP's unaware of a median of 2 drugs taken by each patient (range 0-10)¹
- Especially a problem at community/hospital interface
 - only 38% of GP's provide medication information to hospitals²
 - 73% of discharge summaries contain medication errors³
 - and often GP's do not receive any summary

1. Atkin 1998, MJA

2. Stowasser 1997, Aust J Hosp Pharm

3. Mant 2002, MJA

UNDER PRESCRIBING

- Also a problem in older people
 - At home medication review¹
 - 25% under prescribing
 - 10% over prescribing
 - Commonly underprescribed drugs included
 - ACE inhibitors
 - β blockers
 - Aspirin
 - Warfarin
 - Anti-osteoporosis drugs
 - Anaalgescics
 - Anti-hypertensives

OLDER PEOPLE MORE SENSITIVE TO MEDICATIONS

- PHARMACOKINETIC CHANGES
- PHARMACODYNAMIC CHANGES

EFFECTS OF POLYPHARMACY

- Reduced compliance (convergence, concordance, adherence)
- More drug-drug interactions and adverse effects
- Drug wastage
- Poorer medication outcomes

REDUCED COMPLIANCE

- Non-compliance contributes to 50% of drug-related admissions¹
- Overall, prescription adherence is about 50%²
 - ie taking >85% and <115% of prescribed doses
- Most is undercompliance
 - 20% completely omit one or more drugs²
- 40% of undercompliance not reported to the doctor³

1. Roughead 1998, MJA
2. Stewart 1999, ANZ J Med
3. Thompson 2001, Int J Pharm Pract

MEDICATIONS NON-ADHERENCE AS A RISK FACTOR FOR HOSPITALISATION & MORTALITY

- One year prospective study of older high-risk adults receiving “home care” in Alberta, Canada (n=319)
- Non-adherence 38.5%
 - Increased (but non significantly) risk of ED attendance, hospitalisation or death (HR 1.24, 95% CI 0.93 – 1.65)

ADHERENCE & HEALTH OUTCOMES

- 2nd Australian national BP study (ANBP2)
- N = 4039
- “Did you ever forget to take your medication?”
defined (non) adherence
 - “Yes” : more likely to experience
 - Cardiovascular event or death (HR 1.28, 95% CI 1.04 – 1.57, P = 0.02)
 - First cardiovascular event or death (HR 1.31, 95% CI 1.07 – 1.60, p = 0.01)
 - First non-fatal cardiovascular event (HR 1.35, 95% ci 1.09 – 1.66, P = 0.01)
- “If you felt worse when you took your medication, did you stop taking it?”
 - “Yes : first occurrence of CCF more likely (HR 2.06, 95% CI 1.16 – 3.64 P = 0.01)

IMPROVING COMPLIANCE

- Patient education about medications
 - improves knowledge of medications
 - may not improve compliance¹
- Specific instructions
 - set time aside
 - combine written and verbal instructions
- Dose Administration Aids
 - eg Dosett, Webster
 - Report on DVA trial of effectiveness coming soon (U Qld)
- Combined approaches
 - pamphlets, workbooks, counselling, phone follow-up, support groups, dispensing aids

SIMPLIFY DRUG REGIME!

ADVERSE DRUG REACTIONS (ADR's)

- Review of Australian studies by Libby Roughead¹:
 - 2.4-3.0% of all hospital admissions drug-related
 - the number of medications used is a consistent contributor to the risk of a medication-related admission
- The risk of an ADR increases as the number of medications increases²

1. Roughead, MJA 1998; 168: 405-8
2. Carbonin, JAGS 1991; 39: 1093-9

RISK OF ADVERSE DRUG REACTIONS

- Estimates of the potential for ADR are
 - 6% if 2 drugs taken
 - 50% if 5 drugs taken
 - 100% if > 8 drugs taken
- Estimates of risk of serious ADR
 - 55 – 64 years 18.5%
 - 75 – 84 30%
 - > 85 41.9%

ADVERSE DRUG EVENTS CAUSING HOSPITALISATION IN THE ELDERLY

- Review of 219 consecutive unplanned admissions to acute medical units at Royal Hobart over 8 weeks
- 30.4% (73) may have been primarily due to ADE
 - most ADE's to single agent (46%) or to multiple agents (25%)
 - non compliance, omission or cessation of indicated treatment accounted for 26% of admissions
- Of all ADE admissions, 53% were preventable
- Commonest causative drugs
 - cardiovascular (48.4%)
- Commonest manifestations
 - falls and postural hypotension (24%)
 - CCF (17%)
 - delirium (15%)

DO DRUG INTERACTIONS LEAD TO HOSPITALISATION?

- Recent literature review – 23 studies
- Drug interactions in all age groups responsible for:
 - 0.054% of ED visits
 - 0.57% of hospitalisation
 - 4.8% in elderly
 - 0.12% of rehospitalisation
- Drugs most commonly involved
 - NSAIDs / cardiovascular
- Most common effects of drug interactions
 - GI bleeding
 - High or low BP
 - Cardiac rhythm disturbances

RISK OF ADVERSE EVENTS AFTER DISCHARGE

- Cohort study of 808 frail elderly discharged from 11 VA hospitals to OP care
- AE's assessed by blinded geriatrician and pharmacist using Naranjo's ADR criteria
- Results : 33% \geq one ADR
(0.71 per 1000 patient days followup)
 - : Independent risk factors
 - numbers of medications
 - use of warfarin
 - use of benzodiazepine

ADVERSE DRUG REACTIONS IN GENERAL PRACTICE

- 8,215 GP ENCOUNTERS
- 852 (10.4%) had experienced an adverse drug event in last 6 months
 - 10% self-rated as severe
 - 23% rated by a GP as preventable
- Risk factors included
 - Older age
 - Female
- Common events included
 - Recognised side effect
 - Allergy
 - Drug sensitivity

DRUG INTERACTIONS: CONCURRENT USE OF ANTICHOLINERGICS AND ACETYL CHOLINESTERASE INHIBITORS¹

- Medicaid population, Iowa
- Broad definition of anticholinergic
- 557 received an AChEI
 - 197 (35.4%) on concurrent anticholinergic
 - 74.5% of these anticholinergics identified as inappropriate (Beers)
 - Upon initiation of AChEI, increases in anticholinergic use **exceeded** decreases
- Swedish study showed anticholinergic drug use more common in those on than not on AChEIs²

1. Carnaban. *JAGS* 2004; 52: 2082-7

2. Johnell. *Drugs Aging* 2008; 25: 871-7

DO OLDER HOSPITAL PATIENTS RECOGNISE ADVERSE DRUG REACTIONS?

- 106 patients over age 70 in UK general medical ward
 - 36 believed they were experiencing side effects
 - correct opinion (true positive or true negative) in 79%
 - asking patients about side effects had sensitivity 0.70 and specificity 0.85
 - of 21 with severe adverse drug reactions, 14 did NOT recognise this

LACK OF MEDICATION EFFICACY & WASTAGE

- 50% OF MEDICATION RETURNED DURING 1992 AUSTRALIAN CAMPAIGN UNOPENED
- MOST WERE PRESCRIBED DRUGS
- CORRELATION BETWEEN COMPLIANCE AND POOR TREATMENT OUTCOMES
 - eg ASTHMA CONTROL
 - CONTROL OF PSYCHOSIS

UNNECESSARY STORAGE OF HOME MEDICATIONS

- 85 patients discharged from 2 hospitals in Melbourne
- Community liaison pharmacist conducted home visit
- Results: Mean 4.6 (range 1-21) expired or unnecessary medications removed
 - mean cost of these was \$65 per patient

REDUCING POLYPHARMACY

ROLE OF PHARMACIST

- Cochrane reviews^{1,2}
- Pharmacist intervention leads to:
 - Decreased prescribing
 - Reduced cost of drugs
 - Reduced use of health services
 - Improved patient care and outcomes

1. Kaboli. Archives Intern Med 2006; 166: 955-64

2. Bero et al. The Cochrane library, 1998

PHARMACIST-LED MEDICATION REVIEW IN PATIENTS OVER 65 :RANDOMISED CONTROLLED TRIAL IN PRIMARY CARE

- Pharmacists reviewed drug therapy of 332 patients
 - 50% : care plan recommended
- Outcomes : GP's agreed with 96% of all care issues
 - at follow-up, 70% of issues resolved in intervention group; only 14% in control group
 - no changes in medication costs or quality of life in either group

HOME-BASED MEDICATION REVIEW - RCT

- Pharmacist medication review (2 home visits and meeting with GP)
- Primary care elderly patients
 - On at least 4 medications
 - At least one medication-related risk factor
- N = 136 (half randomised to intervention)
- Results: at 6 months, no differences in
 - hospital admissions
 - mortality
 - admission to RCF
 - Quality of Life

There were significant differences in mean number of medication prescribed (-0.87; 95% CI -1.66 – 0.08. P = 0.03)

- Conclusion : reduces medications but no clear health gain (Roberts – similar results)

MEDICATION REVIEW IN RCF-RCT

- 65 care homes in UK (661 residents over age 64 on \geq one medication)
- Results:
 - 95.2% of patients in pharmacist review arm were seen over 6 months
 - compared with 18.8% having a GP review in control arm
 - number of medication changes 3.1 versus 2.4 ($p < 0.0001$)
 - number of falls less! (0.8 versus 1.3 ($p < 0.0001$))
 - 75.6% of pharmacist-reviewed patients had recommendations accepted by the GP
 - 76.6% of these were implemented
 - No change in GP consultation rate, hospitalisations, mortality, Barthel, MMSE, number of drugs or cost

MEDICATION REVIEWS

- In Australia, funded for
 - community elderly patients
 - nursing home and hostel residents (mandatory)
- GP/Pharmacist/nurse team model
- Much evidence for implementation efficacy
 - less for improved health outcomes
- Eg nursing home medication review
 - GP review
 - repeat prescriptions reduced by 65%
 - 51% had an item stopped

HOME MEDICATION REVIEWS: MEDICATION-RELATED RISK FACTORS ASSOCIATED WITH POOR HEALTH OUTCOMES

- Study of 204 patients reviewed in own home¹
- Factors associated with poorer health
 - Lack of medication administration routine
 - Therapeutic duplication
 - Hoarding
 - Retaining discontinued medications
 - Confusion between generic and trade names
 - Multiple prescribers
 - Multiple storage locations
 - Older age
 - Female gender

REDUCING MEDICATIONS IN NURSING HOMES

- In study of 128 residents, a single medication review by pharmacist reduced medication costs by \$3,824 over 6 months¹
- GP medication review : 51% of residents had at least one item ceased²

1. Elliott, Aust J Hosp Pharm 1999; 29: 253-60

2. Kunthi, Age Ageing 2000; 29: 451-3

REDUCING POLYPHARMACY

TARGETING SPECIFIC DRUGS

- Prescribing indicators
 - Benzodiazepines
 - Inhaled steroids
 - NSAID's

Batty et al : Educational interventions towards prescribing team reduced inappropriate prescribing

PRESCRIBING INDICATORS - BENZODIAZEPINES

- 1301 patients older than 65
Used evidence-based indicators
Audit, feedback of results then re-audit 4-6 weeks later

- Results

Baseline : 36% on a benzodiazepine
 20% were appropriate

4-6 weeks
after intervention: 31% on a benzodiazepine
 44% were appropriate (p < .0001)
- mainly attempts to withdraw
 inappropriate benzo.

6 months: 50% were appropriate (p=.002)

**OTHER APPROACHES TO IMPROVE
QUALITY USE OF MEDICATION AND
IMPROVE MEDICATION OUTCOMES**

DEPRESCRIBING

- In short, we can achieve this yes

- Many examples:

DVA Prescriber Feedback Program (“MATES”)

- Targets a prescribing issue each quarter
 - eg polypharmacy
 - inappropriate drugs
 - drug – drug interactions
 - drugs that cause/worsen incontinence
- Feedback/information letters sent to GP’s and sometimes to patients (eg vaccinations)
- Very large (> 20,000 letters on occasions)
- Successful
 - effect on targeted issue measured
- Medicare Australia cannot do as successfully as less specific data on prescribing
 - National Prescribing Service sends GP’s condition-specific information

DVA PRESCRIBER FEEDBACK POLYPHARMACY MODULE

- NUMBER OF PATIENTS ON MORE THAN 10 MEDICATIONS

Before Intervention: 23,308

After Intervention: 12,654

- ie 50% reduction

DVA PRESCRIBER FEEDBACK

Long acting benzodiazepines (LBZ)¹

	Before Feedback	After Feedback	% Reduction
LBZ – items	16,337	10,401	36
LBZ - patients	15,609	10,078	35

USING DVA DATABASE TO IMPROVE PRESCRIBING OUTCOMES

Other approaches also useful

- Detecting prescribing cascades
 - Prescription/event sequence analysis¹
 - Showed links btwn incident use of prochlorperazine, prior use of several drug classes and subsequent hip fracture
 - 49% increased risk of hip fracture after prochlorperazine initiated
 - Preceding initiations included diuretics, opioids and sedatives
- Module (2010) fed these issues back to prescribers, pharmacists and veterans

1. Caughey, Roughead, Pratt et al. Pharmacoepidemiolog Drug Safety 2101;19:977-82

NATIONAL PRESCRIBING SERVICE

- Aims to improve prescribing nationally
 - Currently focuses on GPs
 - Selects topics to target then mails all GPs (4-6 per year)
 - Topic selected if
 - » New guideline
 - » Evidence of variable prescribing
 - » GPs request extra information
 - Recent topics
 - » Diabetic therapies
 - » Helicobacter eradication
 - » Hypertension
 - » Depression
 - » Asthma

USE OF QUALITY INDICATORS TO ASSESS & IMPROVE PRESCRIBING

- **ACOVE - 3**
 - Assessing Care of Vulnerable Elders - 3
 - A raft of quality indicators
 - Including indicators for (quality of) medication use in frail/vulnerable elderly
- Will undoubtedly be extensively utilised

QUM IN GP - RCT

- 849 patients of 20 Australian general practitioners
 - Randomised by practice
- Intervention: individual academic detailing, provisions of prescribing information, medication risk assessment, financial incentives, facilitation of medication review
- Outcome: composite score derived from
 - Benzodiazepine use
 - NSAID use
 - Thiazide use
- Results: composite score improved (OR 1.86; 95% CI 1.21 – 2.85) at 4 months but not 12 months
 - Especially reduced NSAID use

Other outcomes significantly improved

- Falls
- Injury

Quality of Life did not change

QUM IN RCF - ANTIMICROBIALS

- Cluster RCT; LTC facilities in Montreal
 - Unit = Physician (N = 36)
- Intervention: Education (mailed antibiotic guide with antibiotic prescribing profile for previous 3 months)
 - Repeated twice, 4 months apart
- Results: Non-adherent antibiotic prescribing decreased 20.5% in intervention group compared to 5.1% in control group
 - After 2nd education, physicians in that group were 64% less likely to prescribe non-adherent antibiotic (OR = 0.36; 95%, CI = 0.18 – 0.73)
 - Sustained for 2 years

RISKS OF DEPRESCRIBING

- Loss of therapeutic efficacy
 - ie original condition may recur
 - eg in ANBP study¹, 18% of the patients who had all medication ceased during initial washout remained normotensive for up to 76 weeks
 - patients over 74 more likely than younger patients to become hypertensive again over next 12 months

RISKS OF DEPRESCRIBING, cont'd

- Withdrawal effects
 - eg benzodiazepines¹
 - if on large doses best to substitute long acting agent then wean slowly
 - however, perceived insomnia on withdrawal not always real

DEPRESCRIBING PRINCIPLES

1. REVIEW ALL CURRENT MEDICATIONS
2. IDENTIFY MEDICATION TO BE TARGETED
3. PLAN A DEPRESCRIBING REGIME
4. PLAN IN PARTNERSHIP
(PATIENT, CARERS)
5. FREQUENT REVIEW AND SUPPORT

REVIEWING CURRENT MEDICATION

- Request patient to produce all current medications
 - plastic bag
 - BUT, will generally find more at home visit
- Specifically ask about OTC & CAM's
 - 41% of older people use at least one CAM¹

REVIEWING CURRENT MEDICATION, cont'd

- Identify ADR's
 - may be atypical
 - eg poor mobility
decline in ADL's
"frailty"
 - ANY new symptom may be an ADR
 - especially if occurs after new medication begun

IDENTIFYING MEDICATIONS TO BE TARGETED FOR CESSATION

- Cease medications causing (unacceptable) ADR
- Cease medications not being used
 - suggest they be discarded and any any repeat scripts be destroyed
- Cease medication used for condition that has resolved
- Try to cease higher risk medications

DRUGS THAT SHOULD NOT BE USED IN OLDER PEOPLE¹

- Modified Beers Criteria with DVA input

Amantadine

Barbiturates

Benzhexol

Benxtropine

Flunitrazepam

Flurazepam

DRUGS THAT ARE USUALLY INAPPROPRIATE FOR OLDER PEOPLE

Aminophylline

Amitriptyline

Antispasmodics

- Dicyclomine
- Hyoscyamine

Dextropropoxyphene

Diazepam

Dothiepin

Doxepin

Hydrochlorothiazide/amiloride*

Indomethacin

Methyldopa

* Combination containing 50 mg
of hydrochlorothiazide

DRUGS THAT ARE USUALLY INAPPROPRIATE FOR OLDER PEOPLE

Cont'd

Nitrazepam

Propantheline

Thioridazine

Trimethoprim/sulfamethoxazole
Theophylline

Glibenclamide

Glimepiride

DRUGS THAT SHOULD BE USED WITH EXTRA CAUTION IN OLDER PEOPLE

Carbamazepine

Cimetidine

Doxazosin

Lithium

Mianserin

Metformin

Oxybutinin

Phenothiazine antipsychotics

Phenytoin

Prazosin

Timolol

PLANNING A DEPRESCRIBING REGIME

- Immediately cease unnecessary drugs, those causing unacceptable ADR and highest risk medications
- Then cease/reduce medication sequentially
 - may take several months
- Simplify regime
 - only a few drugs need to be given more than once a day
 - may be able to substitute a once a day drug

QUM – AUSTRALIAN PERSPECTIVE

- Excellent recent review of problems with medication use in the elderly by Rohan Elliott in Geriatric Therapeutics¹
 - Covers
 - Extent of polypharmacy in various settings
 - Inappropriate prescribing
 - Monitoring
 - Adherence
 - Medication management
 - Adverse outcomes
 - Strategies to improve QUM
- Equally useful, clinically focussed review from Qld ² and excellent patient-orientated review in JAMA³

1. Elliott R. Pharm Prac Research 2006; 36: 58-66

2. Scott and Jayasatha. Int Med J 2010; 40: 7-18

3. Steinman and Hanlon. JAMA 2010; 304: 1592-601

Other deprescribing issues

- Ethical issues¹
 - Not just evidence-based medicine
 - Need to consider non- maleficence, autonomy, justice etc
- For instance, evidence supports warfarin in AF, but what about very elderly folks with cognitive impairment and falls?
 - Non-maleficence favours non-use, despite (inadequate) RCT evidence in younger, fitter people

1. Le Couteur et al. J Pharm Pract Res 2010; 40: 148-52

Deprescribing at end of life

- An important issue recently in the spotlight
 - Both in community and in RCF/hospital
- Is achievable
 - Eg achieved in 81% of 70 community-dwelling elderly in recent study¹
 - Reviewed recently also²
- An important issue in those with dementia

1. Garfinkel. Arch Intern Med 2010; 170: 1648-54

2. Parsons. Drugs Aging 2010; 27: 435-49

Other recent issues with research support

- Interruptions of medications and medication errors
- CAMs and adherence to non- CAMs¹
- Using clinical indicators to inform prescribing²
- Computerized decision support³
- Inappropriate medications and functional decline⁴

1. Krousel-Wood. JAGS 2010; 58: 54-61

2. Lowinger MJA 2010; 192: 180-1

3. Terriell. JAGS 2009; 57: 1388-94

4. Corsonelo. JAGS 2009; 57: 1007-14

Improving quality of prescribing and outcomes in older people-conclusions

- Polypharmacy and its consequences still a major issue
- We can improve compliance, reduce adverse events and improve medication outcomes with targeted, multi-faceted approaches
 - Role of pharmacist and medication reviews pivotal
 - Audits, feedback and other quality improvement initiatives should be routine
 - Deprescribing needs to be as actively promoted as prescribing
- Issues more relevant to older people need further research and effort
 - Dementia
 - Multiple co-morbidities
 - Residential care settings
 - End-of-life deprescribing