



多重用藥與不適當用藥 評估原則

國立成功大學醫學院附設醫院 內科部老年科 主任
國立成功大學 醫學系/老年學研究所 副教授
台灣高齡照護暨教育協會 理事長

大綱

- 台灣老年人用藥概況
- 老年人潛在性不適當用藥
- 老人用藥基本原則

台灣老年人用藥概況



Drug consumption among the general and the elderly population, Taiwan.

	General population		
	Overall (n = 999,418)	Outpatient visitors (n = 881,857)	Patients with chronic diseases ^a (n = 124,299)
No. of drugs	0.47 ± 1.63	0.53 ± 1.72	3.75 ± 3.00 ^b
5+	3.75	4.25	30.16 ^b
10+	0.63	0.71	5.03 ^b

	Elderly		
	Overall ^a (n = 104,273)	Outpatient visitors ^a (n = 99,756)	Patients with chronic diseases ^a (n = 38,864)
No. of drugs	1.71 ± 3.02	1.79 ± 3.07	4.59 ± 3.37 ^b
5+	15.50	16.20	41.59 ^b
10+	3.13	3.27	8.39 ^b

老年人用藥缺少實證醫學支持

- 大多數的用藥是使用於老年人
- 目前老年人用藥少有實證醫學的證據支持
 - 大多數的研究卻將老年人排除在外
 - 只有3%是針對老人來進行
 - 研究樣本也都是比較健康的老人
 - 研究結果是否可以安全無虞的應用在體弱多病的老人身上？
 - 長期的療效較難/少評估
 - 多無評估對生活品質的影響

Potential Pitfalls of Disease-Specific Guidelines for Patients with Multiple Conditions

- Most guidelines did not:
 - Modify or discuss the applicability for older patients with multiple comorbidities
 - Comment on burden, short- and long-term goal, and quality of evidence
 - Give guidance for incorporating patient preferences into treatment plans
 - Address interaction between recommendations, life expectancy, quality of life

JAMA 2005;294:716-
NEJM 2004;351:2870-

多種疾病與多重用藥

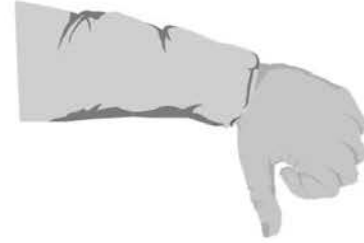
- 80%的老年人有一種以上的疾病，40%有兩種以上的疾病，每位老年人平均罹患1.4種疾病
- 因為罹病的種類多，所以用藥的機率與種類也隨之增加
 - 有60-70%的老年人正在使用藥物
 - 每位老人平均每天服用 4.1 ± 2.4 種藥物
 - 平均給藥頻率為一日 2.8 ± 1.3 次 (2004健保抽樣檔)
- 發生藥物交互作用的機率也隨之增加
 - 2種藥物: 6%; 5種藥物: 50%; ≥ 8 種藥物: 100%

Definition of Polypharmacy

- Definition: concomittant ingestion of $\geq ?$ drugs
 - ?2, ?3, ?4, ?5, ?6, ?9, ?10
 - Two or more drugs for ≥ 240 days
- Not considering the adequacy of the prescriptions in populations with multiple comorbidities
- \rightarrow use of medications that are not clinically indicated

Consequences of Polypharmacy

- Nonadherence
- Adverse drug reactions
- Drug-drug interactions
- Increase risk of hospitalizations
- Medication errors
- Increased costs



Drugs Aging 2003;20:817-

Appropriate polypharmacy

- The appropriate use of multiple medications in the management of several coexisting medical conditions
- The appropriateness of the treatment is often more suitable than simply attempting to reduce the number of medications

Drugs Aging 1994;4:449-61
Drugs Aging 2003;20:817-

如何避免藥物不良反應

- 許多藥會產生窘迫不適，有時可能會產生妨礙或威脅生命的不良反應。由於這些徵候並沒有特定性或是與其他病情類似的情況，因此藥物不良反應可能會遭到忽視或者不易辨識出來。
- 首要之務是新近之任何變化，都必須將藥物不良反應列為可能之選項之一

老年人潛在性不適當用藥



老年人不適當用藥的評估

- 概括式(Implicit)：是指制定一套所有藥物皆適用的規範，並依該規範逐一評估每一種用藥是否符合條件，
 - 優點：較精確地深入評估用藥的適當性，可顧及個案本身的病情及特異性，
 - 缺點：需要較多的人力及文獻佐證，故不適合於大型資料的研究評估，且評估者之間的看法差異不易克服，
 - 1992年Hanlon等人發展的“藥物適當性指標”(Medication Appropriateness Index, MAI)。
- 條列式(Explicit)：條列出文獻或專家們討論出特定的不適當藥物或藥物類別，
 - 優點：簡單易用，可用於大量資料的處理及評估，且不易有評估者之間的差異產生，
 - 缺點：無法兼顧病患本身的病情及特異性，也可能因為不同區域在用藥型態上的差異性，而無法完全反映出不適當用藥的情況
 - 1991年的“Beers老年人潛在性不適當用藥規範”及1997年的“加拿大老年人不適當用藥規範”等。

Current criteria for PIM Use in Older Adults

Criteria	Year of publication	Country	Delphi method	Age
Beers	2015	USA	X	≥65 years
STOPP	2015	UK	X	≥65 years
EU(7)-PIM	2015	Europe	X	≥65 years
FORTA	2014	Germany and Austria	X	≥65 years
Chang et al.	2012	Taiwan	X	≥65 years
Mann et al.	2012	Austria	X	≥65 years
Mimica Metanovic et al.	2012	Croatia		≥65 years
PRISCUS	2010	Germany	X	≥65 years
Kim et al.	2010	South Korea	X	≥65 years
NORSEP	2009	Norway	X	≥70 years
Basger et al.	2008	Australia		>65 years
Winit-Watjana et al.	2008	Thailand	X	N/S
Laroche et al.	2007	France	X	≥75 years
HEDIS 2006	2006	USA	X	≥65 years

N/S: Not specified. Authors mentioned "geriatric patients."

治療合理性之指標

Medication Appropriateness Index (MAI)

- 所使用的藥物有相對的適應症？
- 適應症符合實證嗎？
- 劑量是否正確？
- 用藥指示正確嗎？
- 用藥指示是否合理？
- 有無明顯之藥物交互作用？
- 有無與疾病相關的禁忌症？
- 有無重複用藥？
- 使用療程是否合理？
- 符合藥物經濟學嗎？

J Clin Epidemiol 1992

Beers潛在性不適當用藥準則

- 於大部分老年人避免使用
- 於有某些病況時避免使用
- 需小心使用之藥物
- 藥物-藥物交互作用
- 需依照腎功能調整使用之藥物

J Am Geriatr Soc 2019; 67:674–694.

Beers潛在性不適當用藥的定義

- 潛在危險性遠勝過醫療的好處
- 僅敘述藥物不良反應極可能發生
- 傾向以「潛在性不適當用藥」、「非首選藥物」稱之

判定為不適當藥物的理由

- 有更安全且有效的替代藥物
- 療效不明確
- 易造成副作用
- 老年人無法耐受其副作用
- 藥物作用延長，增加危險性
- 敏感性增加，不應超過建議劑量
- 惡化原有疾病

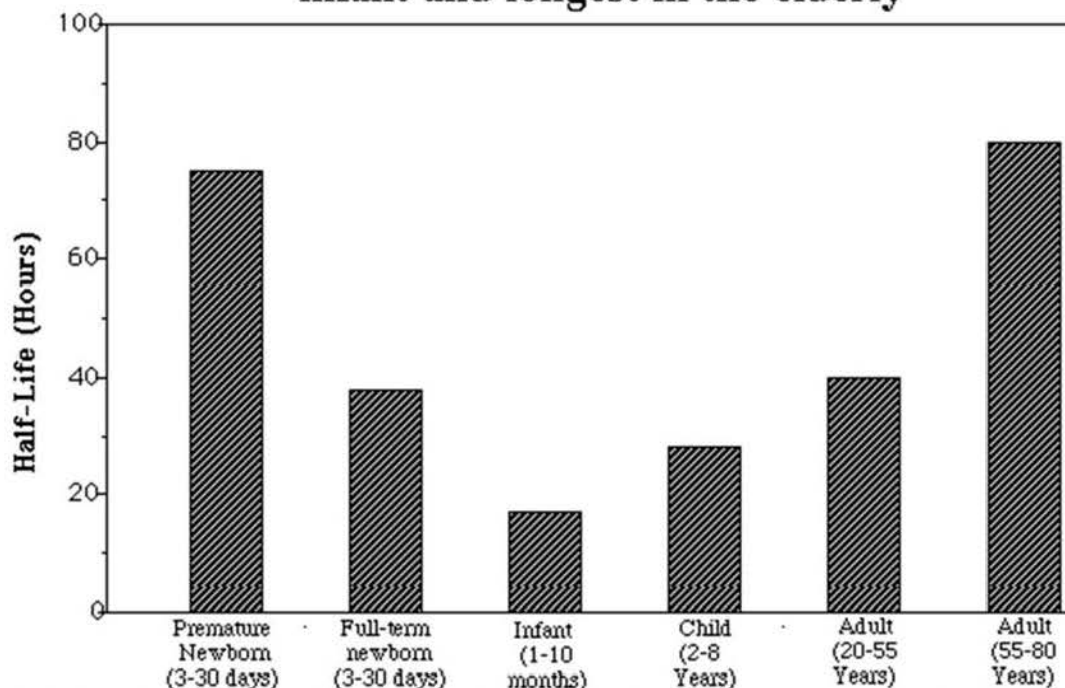
修訂後的潛在性不適當用藥準則
一般應避免之藥物類別^{1/2}



- First-generation antihistamines: (anticholinergics)
- Antidepressants: amitriptyline, imipramine, doxepine >6mg/d
- Antithrombotics: Dipyridamole, oral short acting (↑OH)
- Antiarrhythmics: disopyramide, dronedarone (↑CHF), amiodarone, digoxin (1st-line)
- Antihypertensives: methyldopa, reserpine, clonidine, nifedipine (short acting), α-1 blockers for HTN (↑OH)
- Sedatives/hypnotics: BZDs, non-BZDs, barbiturates
- Antipsychotics, 1st (conventional) & 2nd (atypical) generation

J Am Geriatr Soc 2019; 67:674–694.

Elimination half-life of Diazepam is shortest in the infant and longest in the elderly



Adapted from the data of Morselli, PL : Drug Disposition During Development. Spectrum Publications, New York, 197
pp. 311-360 and p 456; and from data of Klotz H, Avant G R, Huumma A, Schneker S, and Wilkinson G R.



一般應避免之藥物類別^{2/2}

- Hypoglycemic agents: chlorpropramide, glimepiride, glyburide, only short-acting insulin with sliding scale
- Analgesics: meperidine, non-COX NSAIDs, aspirin >325 mg/d
- Muscle relaxants: chlorzoxazone, methocarbamol
- Antispasmodics: hyoscyamine
- Others: metoclopramide, PPI, bisacodyl, cascara (long-term use), cimetidine, ergot mesylates, megestrol, GH, Estrogens, desmopressin

J Am Geriatr Soc 2019; 67:674–694

與診斷相關之Beers不適當用藥規範^{1/2}

- Heart failure: - Avoid (\uparrow mortality): cilostazol, dronedarone
 - Avoid in reduced EF/symptomatic CHF: Non-DHP CCBs, NSAIDs and COX-2 inhibitors, Thiazolidinediones
- Syncope: - AChEIs (bradycardia)
 - Nonselective α -1 blockers for HTN (\uparrow OH)
 - Tertiary TCAs & antipsychotics (bradycardia, \uparrow OH)
- Delirium: anticholinergics, antipsychotics, BZDs, non-BZDs, steroids, meperidine
- Dementia /cognitive impairment: anticholinergics, antipsychotics, BZDs, non-BZDs
- History of GU or DU: Aspirin >325 mg/d, NSAIDs

chlorpromazine
thioridazine
olanzapine

與診斷相關之Beers不適當用藥規範2/2

- History of falls or fractures:
 - antiepileptics, antipsychotics, BZDs, non-BZDs, antidepressants (TCAs, SSRIs, SNRIs, Opioids)
- Parkinson disease: Antiemetics, all antipsychotics (except quetiapine, clozapine, pimavanserin)
- CKD stage ≥ 4 : NSAIDs and COX-2 inhibitors
- Urinary incontinence (all types) in women:
 - Estrogen oral and transdermal (excludes intravaginal estrogen), Nonselective α -1 blockers
- Lower urinary tract symptoms, BPH:
 - Strongly anticholinergics, except antimuscarinics for urinary incontinence

Metoclopramide
Prochlorperazine
Promethazine

Drugs To Be Used With Caution 1/2

Drug(s)	Rationale	Recommendation
Aspirin for primary prevention of cardiovascular disease and colorectal cancer	Risk of major bleeding from aspirin increases markedly in older age. Several studies suggest lack of net benefit when used for primary prevention in older adult with cardiovascular risk factors, but evidence is not conclusive. Aspirin is generally indicated for secondary prevention in older adults with established cardiovascular disease.	Use with caution in adults ≥ 70 years
Dabigatran Rivaroxaban	Increased risk of gastrointestinal bleeding compared with warfarin and reported rates with other direct oral anticoagulants when used for long-term treatment of VTE or atrial fibrillation in adults ≥ 75 years.	Use with caution for treatment of VTE or atrial fibrillation in adults ≥ 75 years
Prasugrel	Increased risk of bleeding in older adults; benefit in highest-risk older adults (eg, those with prior myocardial infarction or diabetes mellitus) may offset risk when used for its approved indication of acute coronary syndrome to be managed with percutaneous coronary intervention.	Use with caution in adults ≥ 75 years

Drugs To Be Used With Caution 2/2

Antipsychotics Carbamazepine Diuretics Mirtazapine Oxcarbazepine SNRIs SSRIs TCAs Tramadol	May exacerbate or cause SIADH or hyponatremia; monitor sodium level closely when starting or changing dosages in older adults	Use with caution
Dextromethorphan/ quinidine	Limited efficacy in patients with behavioral symptoms of dementia (does not apply to treatment of PBA). May increase risk of falls and concerns with clinically significant drug interactions. Does not apply to treatment of pseudobulbar affect.	Use with caution
Trimethoprim- sulfamethoxazole	Increased risk of hyperkalemia when used concurrently with an ACEI or ARB in presence of decreased creatinine clearance	Use with caution in patients on ACEI or ARB and decreased creatinine clearance

Important Drug-Drug Interactions 1/2

Object Drug and Class	Interacting Drug and Class	Risk Rationale
RAS inhibitor (ACEIs, ARBs, aliskiren) or potassium-sparing diuretics (amiloride, triamterene)	Another RAS inhibitor (ACEIs, ARBs, aliskiren)	Increased risk of hyperkalemia
Opioids	Benzodiazepines	Increased risk of overdose
Opioids	Gabapentin, pregabalin	Increased risk of severe sedation-related adverse events, including respiratory depression and death
Anticholinergic	Anticholinergic	Increased risk of cognitive decline
Antidepressants (TCAs, SSRIs, and SNRIs) Antipsychotics Antiepileptics Benzodiazepines and nonbenzodiazepine, benzodiazepine receptor agonist hypnotics (ie, "Z-drugs") Opioids	Any combination of three or more of these CNS-active drugs ^a	Increased risk of falls (all) and of fracture (benzodiazepines and nonbenzodiazepine, benzodiazepine receptor agonist hypnotics)

Important Drug-Drug Interactions 2/2

Corticosteroids, oral or parenteral	NSAIDs	Increased risk of peptic ulcer disease or gastrointestinal bleeding
Lithium	ACEIs	Increased risk of lithium toxicity
Lithium	Loop diuretics	Increased risk of lithium toxicity
Peripheral α -1 blockers	Loop diuretics	Increased risk of urinary incontinence in older women
Phenytoin	Trimethoprim-sulfamethoxazole	Increased risk of phenytoin toxicity
Theophylline	Cimetidine	Increased risk of theophylline toxicity
Theophylline	Ciprofloxacin	Increased risk of theophylline toxicity
Warfarin	Amiodarone	Increased risk of bleeding
Warfarin	Ciprofloxacin	Increased risk of bleeding
Warfarin		Increased risk of bleeding
	Macrolides (excluding azithromycin)	
Warfarin	Trimethoprim-sulfamethoxazole	Increased risk of bleeding
Warfarin	NSAIDs	Increased risk of bleeding

Dosage Reduced With Poor Kidney Function 1/2

Medication Class and Medication	Creatinine Clearance at Which Action Required, mL/min	Rationale	Recommendation
Anti-infective			
Ciprofloxacin	<30	Increased risk of CNS effects (eg, seizures, confusion) and tendon rupture	Doses used to treat common infections typically require reduction when CrCl <30 mL/min
Trimethoprim-sulfamethoxazole	<30	Increased risk of worsening of renal function and hyperkalemia	Reduce dose if CrCl 15-29 mL/min Avoid if CrCl <15 mL/min
Cardiovascular or hemostasis			
Amiloride	<30	Increased potassium and decreased sodium	Avoid
Apixaban	<25	Lack of evidence for efficacy and safety in patients with a CrCl <25 mL/min	Avoid
Dabigatran	<30	Lack of evidence for efficacy and safety in individuals with a CrCl <30 mL/min. Label dose for patients with a CrCl 15-30 mL/min based on pharmacokinetic data.	Avoid; dose adjustment advised when CrCl >30 mL/min in the presence of drug-drug interactions
Dofetilide	<60	QTc prolongation and torsade de pointes	Reduce dose if CrCl 20-59 mL/min Avoid if CrCl <20 mL/min
Edoxaban	15-50 <15 or >95	Lack of evidence of efficacy or safety in patients with a CrCl <30 mL/min	Reduce dose if CrCl 15-50 mL/min Avoid if CrCl <15

Dosage Reduced With Poor Kidney Function 2/2

Enoxaparin	<30	Increased risk of bleeding	Reduce dose
Fondaparinux	<30	Increased risk of bleeding	Avoid
Rivaroxaban	<50	Lack of efficacy or safety evidence in patients with a CrCl <30 mL/min	Nonvalvular atrial fibrillation: reduce dose if CrCl 15-50 mL/min; avoid if CrCl <15 mL/min
Spirololactone	<30	Increased potassium	Avoid
Triamterene	<30	Increased potassium and decreased sodium	Avoid
Central nervous system and analgesics			
Duloxetine	<30	Increased gastrointestinal adverse effects (nausea, diarrhea)	Avoid
Gabapentin	<60	CNS adverse effects	Reduce dose
Levetiracetam	≤80	CNS adverse effects	Reduce dose
Pregabalin	<60	CNS adverse effects	Reduce dose
Tramadol	<30	CNS adverse effects	Immediate release: reduce dose Extended release: avoid
Gastrointestinal			
Cimetidine	<50	Mental status changes	Reduce dose
Famotidine	<50	Mental status changes	Reduce dose
Nizatidine	<50	Mental status changes	Reduce dose
Ranitidine	<50	Mental status changes	Reduce dose
Hyperuricemia			
Colchicine	<30	Gastrointestinal, neuromuscular, bone marrow toxicity	Reduce dose; monitor for adverse effects
Probenecid	<30	Loss of effectiveness	Avoid

20 most common medications reported

Class	Drug	Beers 2015	STOPP	Laroche	NORSEP	PRISCUS	WINIT- WATJANA	MANN	EU (7)- PIM	Chang	Kim	FORTA	HEDIS 2006	Basger	Mimica Matanovic	Sum
Benzodiazepine	Diazepam	x*	x*	x	x	x	x	x	x	x	x	x*	x	x*	x	14
TCA	Amitriptyline	x	x	x	x	x	x	x	x	x	x	x*	x	x*	x	13
antidepressant																
TCA	Doxepine	x*	x	x	x	x	x	x	x	x	x	x*	x	x*		12
antidepressant																
Alpha-blocker	Clonidine	x*	x	x		x	x	x	x	x	x	x*			x	11
Antipsychotic	Clozapine	x*	x*			x	x	x	x	x	x*	x*		x*	x*	11
Inotropes	Digoxin	x*	x*	x		x	x	x	x	x*	x*			x*	x*	11
NSAIDs	Aspirin	x*	x*	x*			x*	x*	x*	x*	x*	x*		x*	x*	11
NSAIDs	NSAIDs	x*	x*	x*	x i		x	x	x*	x*	x*			x*	x*	11
Alpha-blocker	Methyldopa	x	x	x		x	x	x	x	x	x				x	10
Antihistamine	Diphenhydramine	x	x	x		x			x	x	x	x*	x		x	10
Antiplatelet	Ticlopidine	x	x	x		x	x	x	x	x	x				x	10
Antispasmodic	Oxybutynine	x*	x*	x		x	x	x	x	x	x	x*		x*		10
Benzodiazepine	Chlordiazepoxide	x*	x*	x		x	x	x	x	x	x		x			10
Bronchodilator	Theophylline	x*	x*		x		x	x	x	x	x*	x*		x*	x*	10
Calcium channel blocker	Nifedipine (short - acting)	x		x		x	x	x	x		x		x	x*	x	10
antihypertensive																
NSAIDs	Piroxicam	x*	x*	x*		x	x	x	x	x	x*				x*	10
Opioid	Pethidine/ Meperidine	x*	x*			x		x	x	x	x		x	x*	x	10
TCA	Clomipramine	x	x	x	x	x		x	x	x	x*			x*		10
antidepressant																
Antihistamine	Hydroxyzine	x	x	x	x	x		x	x		x		x			9
Antihistamine	Promethazine	x	x	x	x				x	x	x		x	x*		9
Antipsychotic	Chlorpromazine	x*	x*	x	x		x		x	x	x*			x*		9
Antipsychotic	Haloperidol	x*				x	x	x	x*	x*	x*	x*		x*	x*	9
Antipsychotic	Levomepromazine	x*		x	x	x		x	x	x	x*			x*	x*	9
Benzodiazepine	Alprazolam	x	x*	x		x	x	x	x	x	x*			x*	x*	9
Benzodiazepine	Flurazepam	x*	x*			x	x	x	x	x	x		x		x	9
Benzodiazepine	Oxazepam	x		x	x	x*		x	x	x	x*	x*			x*	9
Benzodiazepine	Triazolam	x		x		x	x	x	x	x*	x*	x*				9
Hormone	Estrogen	x*	x*			x		x	x	x	x*	x	x*	x*	x	9
NSAIDs	Indometacin	x		x		x		x	x	x	x*				x	9
NSAIDs	Naproxen	x*	x*	x*			x	x	x*	x*	x*				x*	9

x: Potentially inappropriate to avoid in older adults independent of disease/condition, x*: potentially inappropriate to avoid in older adults with a concomitant disease/condition, x i: potentially inappropriate to avoid in older adults due to drug-drug interactions and x*i: potentially inappropriate to avoid in older adults with a concomitant disease/condition and due to drug-drug interactions.

Medication classes most reported in all criteria

Top 100 medications					
Medications			Criteria indications		
Class	n	%	Class	n	%
Antihistamine	14	14,0%	Benzodiazepine	113	14,5%
Benzodiazepine	14	14,0%	Antihistamine	103	13,2%
NSAIDs	10	10,0%	NSAIDs	82	10,5%
Antipsychotic	9	9,0%	Antipsychotic	73	9,4%
Alpha-blocker	6	6,0%	TCA antidepressant	53	6,8%
TCA antidepressant	5	5,0%	Alpha-blocker	49	6,3%
Antiarrhythmic	4	4,0%	Antiarrhythmic	30	3,9%
Antispasmodic	3	3,0%	Antispasmodic	25	3,2%
Opioid	3	3,0%	Opioid	22	2,8%
Skeletal Muscle Relaxant	3	3,0%	Skeletal Muscle Relaxant	22	2,8%
Antiplatelet	2	2,0%	Antiplatelet	18	2,3%
Non-benzodiazepine hypnotics	2	2,0%	Sulfonylureas	13	1,7%
Selective serotonin reuptake inhibitor antidepressant	2	2,0%	Non-benzodiazepine hypnotics	12	1,5%
Sulfonylureas	2	2,0%	Selective serotonin reuptake inhibitor antidepressant	12	1,5%
ACE inhibitor	1	1,0%	Inotropes	11	1,4%
Antibiotic	1	1,0%	Bronchodilator	10	1,3%
Anticholinergic	1	1,0%	Calcium channel blocker antihypertensive	10	1,3%
Anticonvulsant	1	1,0%	Hormone	9	1,2%
Antiemetic	1	1,0%	Antibiotic	8	1,0%
Antiparkinsonian	1	1,0%	Steroids	8	1,0%
Grand Total	100	100%	Grand Total	779	100%

Arch Gerontol Geriatr 2017;68:55–61

European Geriatric Medicine 1 (2010) 45–51



Available online at
 ScienceDirect
www.sciencedirect.com

Elsevier Masson France

www.em-consulte.com



Pharmacology applied to geriatric medicine

STOPP & START criteria: A new approach to detecting potentially inappropriate prescribing in old age

- STOPP: screening tool of older persons' prescriptions
- START: screening tool to alert to right treatment

European Geriatric Medicine 2010;1:45-51

STOPP

The following prescriptions are potentially inappropriate in persons aged ≥ 65 years of age

Drugs that adversely affect those prone to falls (≥ 1 fall in past 3 months)

Benzodiazepines (*sedative, may cause reduced sensorium, impair balance*)

Neuroleptic drugs (*may cause gait dyspraxia, Parkinsonism*)

First generation antihistamines (*sedative, may impair sensorium*)

Vasodilator drugs known to cause hypotension in those with persistent postural hypotension i.e. recurrent > 20 mmHg drop in systolic blood pressure (*risk of syncope, falls*)

Long-term opiates in those with recurrent falls (*risk of drowsiness, postural hypotension, vertigo*)

Analgesic drugs

Use of long-term powerful opiates e.g. morphine or fentanyl as first line therapy for mild-moderate pain (*WHO analgesic ladder not observed*)

Regular opiates for more than 2 weeks in those with chronic constipation without concurrent use of laxatives (*risk of severe constipation*)

Long-term opiates in those with dementia unless indicated for palliative care or management of moderate/severe chronic pain syndrome (*risk of cognitive impairment*)

Duplicate drug classes

Any regular duplicate drug class prescription e.g. two concurrent opiates, NSAID's, SSRI's, loop diuretics, ACE inhibitors (*optimisation of mono drug class should be observed prior to considering a new class of drug*). This excludes duplicate prescribing of drugs that may be required inhaled beta 2 agonists (long and short acting) for asthma or COPD, and opiates for management of breakthrough pain

European Geriatric Medicine 2010;1:45-51

START

These medications should be considered for people ≥ 65 years of age with the following conditions, where no contra-indication to prescription exists

Cardiovascular system

Warfarin in the presence of chronic atrial fibrillation

Aspirin in the presence of chronic atrial fibrillation, where warfarin is contra-indicated, but not aspirin

Aspirin or clopidogrel with a documented history of atherosclerotic coronary, cerebral or peripheral vascular disease in patients with sinus rhythm

Antihypertensive therapy where systolic blood pressure consistently > 160 mmHg

Statin therapy with a documented history of coronary, cerebral or peripheral vascular disease, where the patient's functional status remains independent for activities of daily living and life expectancy is > 5 years

Angiotensin converting enzyme (ACE) inhibitor with chronic heart failure

ACE inhibitor following acute myocardial infarction

Betablocker with chronic stable angina

Respiratory system

Regular inhaled beta 2 agonist or anticholinergic agent for mild to moderate asthma or COPD

Regular inhaled corticosteroid for moderate-severe asthma or COPD, where predicted FEV1 $< 50\%$

Home continuous oxygen with documented chronic type 1 respiratory failure ($pO_2 < 8.0$ kPa, $pCO_2 < 6.5$ kPa) or type 2 respiratory failure ($pO_2 < 8.0$ kPa, $pCO_2 > 6.5$ kPa)

Central nervous system

L-DOPA in idiopathic Parkinson's disease with definite functional impairment and resultant disability

Antidepressant drug in the presence of moderate-severe depressive symptoms lasting at least 3 months

Gastro-intestinal system

Proton pump inhibitor with severe gastro-oesophageal acid reflux disease or peptic stricture requiring dilatation

Fibre supplement for chronic, symptomatic diverticular disease with constipation

European Geriatric Medicine 2010;1:45-51

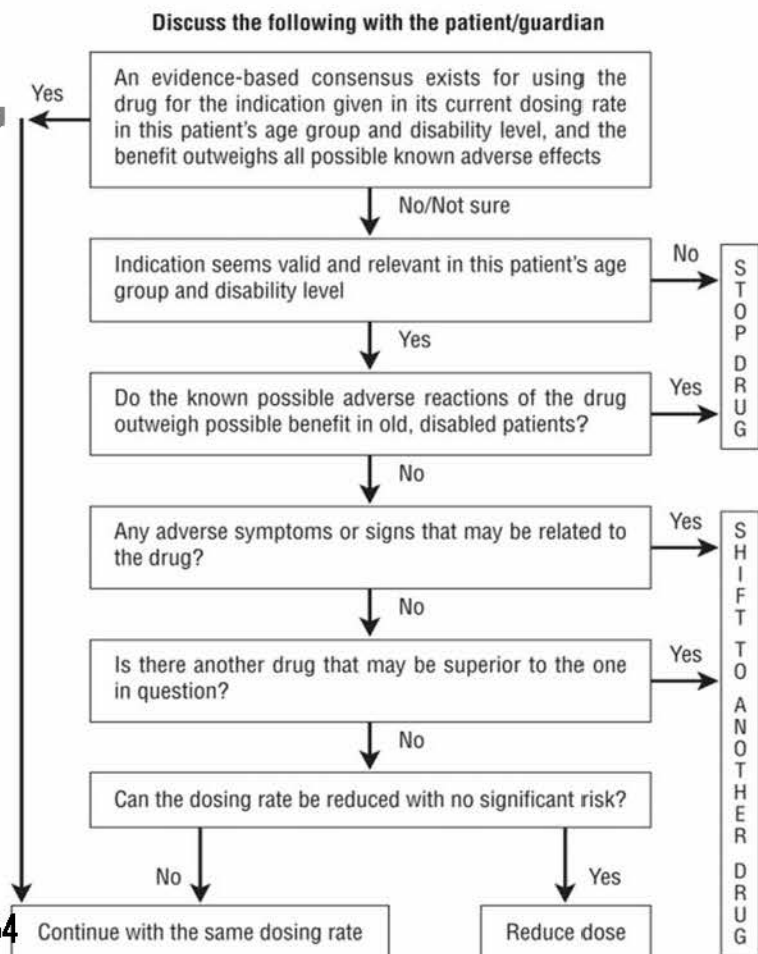
Proposed Drug Classification Fit for the Aged (FORTA)

FORTA Class	Description	Examples
A	Indispensable, clear-cut benefit for efficacy:safety ratio proven even in elderly patients for a given indication, morbidity and mortality data unanimous	ACE inhibitors or calcium antagonists for hypertension, 3-hydroxy-3-methyl-glutaryl coenzyme A reductase inhibitors (statins) for cardiovascular protection, anticoagulants for atrial fibrillation, ACE inhibitors or diuretics in heart failure treatment
B	Proven or obvious efficacy in elderly people but limited extent of effect or safety concerns; could be omitted in case of side effects or under pressure of too many class A drugs	Diuretics, beta-blockers in arterial hypertension, bisphosphonates for osteoporosis
C	Questionable efficacy and safety profiles in elderly people; should be omitted under any pressure of too many drugs or side effects	Spironolactone in arterial hypertension, ezetimibe for cholesterol lowering, amiodarone in atrial fibrillation
D	Avoid in elderly people, delete first	Benzodiazepines, promethazine, pentazocine

ACE = angiotensin-converting enzyme.

J Am Geriatr Soc 2009; 57:560-1

Improving drug therapy in elderly patients



Isr Med Assoc J. 2007;9(6): 430-4

Arch Intern Med. 2010;170(18): 1648-54

Decision-making checklist for prescribing for comorbid conditions in people with chronic complex or chronic progressive illnesses

病期	Question 1			
	What phase of illness is this person in?	Terminal, deteriorating	Unstable	Stable
共病	Question 2			
	What is the activity level of this comorbid illness?	Inactive	Active	
Characteristics of the illness (減重改善) 生活習慣	Question 3			
	Is the comorbid illness improved by weight loss?	Yes	No	
減藥發病時間	Question 4			
	What is the likely time to onset of any increase in disease activity if the medication is reduced?	Short	Long	
瘦弱肝腎差 Medication characteristics	Question 5			
	Are there changes in the pharmacokinetics of the medication—absorption, volume of distribution (cachexia), metabolism or excretion (worsening renal or hepatic function)?	Yes	No	
戒斷症候	Question 6			
	Is there a known withdrawal syndrome from the medication?	No	Yes	
Intent of prevention 預防級	Question 7			
	What is the level of prevention being sought by the current therapy?	Primary	Secondary	Tertiary
有效需治人數	Question 8			
	Is the number needed to treat (NNT) high?	Yes	No	
傷害需治人數	Question 9			
	Is the number needed to harm (NNH) low?	Yes	No	
Characteristics of risk assessment 有效需治人數 vs 病程	Question 10			
	Will the NNT to avoid a single event be likely to increase with disease progression?	Yes	No	
傷害需治人數 vs 病程	Question 11			
	Will the NNH to cause an adverse event decrease with disease progression?	Yes	No	
	More likely to cease medication		More likely to continue medication until further reassessment	

Int J Gerontol 2009;3(1):1-8

Table 10.1—Framework for considering treatment goals for glycemia, blood pressure, and dyslipidemia in older adults with diabetes

老年人疾病治療目標需考慮的 3 D

Patient characteristics/ health status	Rationale	Reasonable A1C goal†	Fasting or preprandial glucose	Bedtime glucose	Blood pressure	Lipids
Healthy (few coexisting chronic illnesses, intact cognitive and functional status)	Longer remaining life expectancy	<7.5% (58 mmol/mol)	90–130 mg/dL (5.0–7.2 mmol/L)	90–150 mg/dL (5.0–8.3 mmol/L)	<140/90 mmHg	Statin unless contraindicated or not tolerated
Complex/intermediate (multiple coexisting chronic illnesses* or 2+ instrumental ADL impairments or mild-to-moderate cognitive impairment)	Intermediate remaining life expectancy, high treatment burden, hypoglycemia vulnerability, fall risk	<8.0% (64 mmol/mol)	90–150 mg/dL (5.0–8.3 mmol/L)	100–180 mg/dL (5.6–10.0 mmol/L)	<140/90 mmHg	Statin unless contraindicated or not tolerated
Very complex/poor health (LTC or end-stage chronic illnesses** or moderate-to-severe cognitive impairment or 2+ ADL dependencies)	Limited remaining life expectancy makes benefit uncertain	<8.5%† (69 mmol/mol)	100–180 mg/dL (5.6–10.0 mmol/L)	110–200 mg/dL (6.1–11.1 mmol/L)	<150/90 mmHg	Consider likelihood of benefit with statin (secondary prevention more so than primary)

**Diseases (Stage & No.)
Disability (IADLs, ADLs)
Dementia (severity)**

This represents a consensus framework for considering treatment goals for glycemia, blood pressure, and dyslipidemia in older adults with diabetes. The patient characteristic categories are general concepts. Not every patient will clearly fall into a particular category. Consideration of patient and caregiver preferences is an important aspect of treatment individualization. Additionally, a patient's health status and preferences may change over time. ADL, activities of daily living.



老年人用藥的原則

高齡照護考量面向

急性疾病

• 感染、急性腦中風、心臟病、出血、外傷骨折..

慢性疾病

• 高血壓、糖尿病、心血管疾病、失智、關節炎..

老年病症候群

• 譫妄、衰弱、功能退化、失智、憂鬱、失禁、行動不便、跌倒、營養不良..

醫源性問題

• 鼻胃管、尿管、氣切管、臥床、不適當藥物...

日常生活相關

• 吞嚥困難、臥床情況、照顧方式、生活品質、社經狀況、預立醫囑...



Prescribing in the Elderly

- Don't (Do no harm)
- Never start treatment without clear endpoints in mind
- Start low, Go slow
- One thing at a time
- Keep it simple
- Risk reducing drugs regularly

Protocols in Primary Care Geriatrics



Prescribing in the Elderly

- Always return to measure the outcome
- Beware of enforced compliance
- Review outpatient medications for appropriateness and efficacy
- Avoid prescribing cascade

秉持安全、有效、方便與便宜四大原則來開立處方

Protocols in Primary Care Geriatrics
Clin Geriatr Med 1998;14(4)