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Older Person as an Agent in the Health Care Provision:

an example of (non)compliance with the medication

17. rijn 2016

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Novosti

objavljeno 02.06.2015 oznake:

Opće preporuke za zaštitu od vrućine

Cijelo vrijeme trajanja velike vrućine pridržavajte se preporuka

objavljeno 15.05.2015 oznake: toplinski val

Upozorenje na toplinske valove i zaštita zdravlja od visokih temperatura

- Potvrde HAA o akreditaciji i certifikati
- Oznaka kontrolirane kvalitete
  Štiti potrošače i jača povjerenje u proizvod
- Zdravlje za sve
  e-časopis - vaš prozor u svijet javnog zdravstva
- Savjetovalište za zdravlje
  Sve što ste htjeli znati, a niste se usudili pitati
- Centar za preventivnu medicinu
- Imenik zdravstvenih ordinacija i ustanova Grada Zagreba
- Alergo Alert
  Skinite najnoviju mobilnu aplikaciju o alergo zonama
- Peludna prognoza
  Što možemo učiniti sami za sebe u prevenciji pojave simptoma?
- Biometeorološka prognoza
  Kako vrijeme utječe na vas?

10:48 15.6.2015.

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Myth #1

- To be old is to be sick

- FACTS based on Research

- People are much more likely to age well than become decrepit & dependent
- Age-related disabilities declining; of those 65-74 in 1994, a full 89% reported no disability whatever

Myth #2

- The secret is choose your parents wisely

- FACT

- Swedish Twins Study: only 30% of physical aging can be blamed on genes, & about half the changes in mental function

- “We are, in large part, responsible for our old age.”

Ageism can be coupled with other forms of oppression

- sexism, racism, beautyism…

  a powerful combination

– It all adds up to the beliefs that –

- AGING is bad
- AGING is ugly
- AGING is to be avoided
- AGING is a social and economic crisis
- We need to FIGHT AGING

The Truth About Aging

The truth is that most older people are more vulnerable due to losses

- Physical losses
  - May not be able to walk, drive, grocery shop, clean house, talk on telephone, see instructions or watch television, etc.
- Social losses
  - Loss of parents, spouse, siblings, friends
  - Coupled with physical, income, and cognitive, may lose ability to get to and enjoy social activities
- Income losses
  - Retirement
- Cognitive losses
  - Some processing changes and memory loss are normal

Age Discrimination & Health Care

- 60% of adults aged 65+ do not receive recommended
  - Glaucoma preventive services
  - 40% do not receive flu and pneumonia vaccines
- Only 10% of elders receive screening tests for
  - Bone density
  - Colorectal and prostate cancer

    Despite the fact that the average age of colorectal cancer patients is 70, more than 70% of prostate cancer is diagnosed in men 65+, and people over 60 are 6 times more likely to have glaucoma

Age Discrimination & Health Care

- Chemotherapy is underused in the treatment of breast cancer patients aged 65+ even though survival could improve
- Older patients are significantly underrepresented in clinical trials for all types of cancer but notably in trials for breast cancer
- Older persons are the biggest users of prescription drugs, yet 40% of clinical trials between 1991 and 2000 excluded older persons

Race and Gender Discrimination in Health Care

The Effect of Race and Sex on Physicians' Recommendations for Cardiac Catheterization

Article in *The New England Journal of Medicine*, 2/25/99

by Schulman, Berlin, Harless, Kerner, Sistrunk, Gersh, Dube, Taleghani, Burke, Williams, Eisenberg, & Escarce

More Examples of Age-Related Vulnerability in Today's World

Out of sight, out of mind?

- 14,802 persons, mostly elderly, died in France during a 2003 heat wave
- 20% of health care providers were gone, most French families were on vacation
- Should government have provided? Should people have not vacationed?

Noncompliance in older adults

aspects of ageism, research tools and practical recommendations

COST Action IS1402

Ageism a multi-national, interdisciplinary perspective

Ageism (i.e., the complex and often negative social construction of old age) is highly prevalent. There is unequivocal evidence concerning the negative consequences associated with ageism at the individual, familial, and societal levels. The long term goal of this Action is to challenge the practice of ageism and allow older people to realize their full potential.

COST Action IS1402 Ageism

Healthcare system

This Action will focus on various health care settings, and evaluate the healthcare provision and medication management of older adults.

Potential areas of focus would be:

the various stakeholders involved in this system:

- physicians,
- social workers,
- nurses,
- patients,
- etc

NONCOMPLIANCE

Compliance with medication

"…the extent to which a person's behaviour – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider." (WHO)

Difference between ADHERENCE and COMPLIANCE

ADHERENCE TO….

partnership between doctor and patient

The patient's conformance with the provider's recommendation with respect to timing, dosage and frequency of medication taking

COMPLIANCE WITH …..

you must, you have to take (one-way street)

Patient's passive following of provider's orders

CONCORDANCE

is a related term used to describe a shared agreement between a health professional and a patient about therapeutic goals. It's less a measure, and more a **philosophical approach** to implementing treatment plans.

PERSISTENCE

refers to the **duration** of conformance to a particular treatment plan, and is usually defined by the interval between when therapy is started, and when it is discontinued.

Methods of Measuring Compliance

Direct methods

- Directly observed therapy
- Measurement of the level of medicine or metabolite in blood
- Measurement of the biologic marker in blood

Indirect methods

- Patient questionnaires, patient self-reports
- Pill counts
- Rates of prescription refills - Medication Possession Ratio (MPR)
- Assessment of the patient's clinical response
- Electronic medication monitors
- Patient diaries

Table 1. Methods of Measuring Adherence.

Test	Advantages	Disadvantages
Direct methods		
Directly observed therapy	Most accurate	Patients can hide pills in the mouth and then discard them; impractical for routine use
Measurement of the level of medicine or metabolite in blood	Objective	Variations in metabolism and "white-coat adherence" can give a false impression of adherence; expensive
Measurement of the biologic marker in blood	Objective; in clinical trials, can also be used to measure placebo	Requires expensive quantitative assays and collection of bodily fluids
Indirect methods		
Patient questionnaires, patient self-reports	Simple; inexpensive; the most useful method in the clinical setting	Susceptible to error with increases in time between visits; results are easily distorted by the patient
Pill counts	Objective, quantifiable, and easy to perform	Data easily altered by the patient (e.g., pill dumping)
Rates of prescription refills	Objective; easy to obtain data	A prescription refill is not equivalent to ingestion of medication; requires a closed pharmacy system
Assessment of the patient's clinical response	Simple; generally easy to perform	Factors other than medication adherence can affect clinical response
Electronic medication monitors	Precise; results are easily quantified; tracks patterns of taking medication	Expensive; requires return visits and downloading data from medication vials
Measurement of physiologic markers (e.g., heart rate in patients taking beta-blockers)	Often easy to perform	Marker may be absent for other reasons (e.g., increased metabolism, poor absorption, lack of response)
Patient diaries	Help to correct for poor recall	Easily altered by the patient
When the patient is a child, questionnaire for caregiver or teacher	Simple; objective	Susceptible to distortion

**Table 1. Methods of Measu
Adherence.**

Osterberg L, Blaschke T. Adherence to Medication. *N Engl J Med* 2005;353:487-97

The most common indirect method
Self-reported questionnaire

	Advantages	Disadvantages
Patient self-report questionnaire	• simple • inexpensive • easy to administer • non-intrusive • the most useful method	• susceptible to error with increases in time between visits • results are easily distorted by the patient

Noncompliance in older patients

1. aspects of ageism

Noncompliance in the elderly can be termed as **"epidemic"**

- **more than 10%** of older adult **hospital admissions** may be due to noncompliance with medication regimens
- **one-third (33%)** of older persons admitted to the hospital had a history of noncompliance
- Nearly one-fourth **(25%)** of **nursing home admissions** may be due to older person's inability to self-administer medications
- approximately 125 000 deaths occur annually in the US due to noncompliance with cardiovascular medications

- approximately one half of the elders who take at least one medication find compliance challenging and **average compliance decreases** from approximately:
    - 80% in patients taking medication **once** daily to
    - 50% in those taking medications **four times** a day or taking **polypharmacy**.

For a number of chronic medical conditions

- diabetes,
- hypertension,
- hypercholesterolemia, and
- congestive heart failure

higher rates of medication **compliance**
were associated with:

- lower rates of hospitalization, and

- a reduction in total medical cost

Helping older patients to improve their compliance requires:

1. knowledge of their current medication use
2. reasons for noncompliance
3. knowledge of personal beliefs and
4. health goals.

By discussing concerns, patients can learn that

1. denial of their illness and

2. misconceptions about their treatment

can lead to **noncompliance**, resulting in complications, **side effects and adverse drug events.**

While discussing medications with elders, physicaian and pharmacist should **educate** the patient and/or caregiver.

1. oral counselling is imperative, but insufficient,

2. the elders need also written information in a readable font and patient-friendly language, especially if changes are being made.

TIP !

Asking the **elder** to describe the drug's purpose, its use instructions, and its potential side effects (called **"back teaching"**) can help to identify knowledge gaps in the older patient.

Compliance is a multidimensional phenomenon determined by the interplay of five sets of factors, termed “dimensions” by the World Health Organization:

1. Social/economic factors
2. Provider-patient/health care system factors
3. Condition-related factors
4. Therapy-related factors
5. Patient-related factors

1. Social and Economic Factors

The most consistently reported factors to impact medication compliance:

- low literacy
- limited access to health care
- lack of health insurance coverage
- poor social support
- family instability
- homelessness

2. Health Care System-Related Factors

The quality of the doctor-patient relationship is one of the most important health care system-related factors

Health care systems create barriers to compliance by limiting access to health care in the following ways:

- making appointments difficult to schedule
- lacking continuity of provider care
- using restrictive formularies and changing formularies
- through high drug costs, copayments, or both.

3. Condition-Related Factors

Compliance with a treatment regimens often declines significantly over time;

especially true for chronic illnesses that have **few or no symptoms**:

- high blood pressure,
- diabetes
- osteoporosis,
- hyperlipidemia

Without symptoms, a person may not be motivated to compliance with a treatment regimen.

Important!

- to understand the illness and
- what will happen if it is not treated.

4. Therapy-Related Factors

have been also associated with decreased compliance:

- complexity of the medication regimen
  - number of medications
  - number of daily doses required
- duration of therapy
- therapies that are inconvenient or interfere with a person's lifestyle
- medications with a social stigma attached to its use medications such as antidepressants, are slow to produce effects
- administration of a medication requires the mastery of specific techniques (injections and inhalers)
- medication side effects or adverse drug reaction

5. Patient-Related Factors

Physical factors

- Physical impairments and cognitive limitations may increase the risk for noncompliance in older adults.
- Visual Impairment
- Hearing Impairment
- Cognitive Impairment
- Impaired Mobility
- Dexterity
- Swallowing Problems

5. Patient-Related Factors

Psychological/behavioral factors

- Knowledge
- Motivation
- Readiness to Change Assessment
- Self Efficacy
- Alcohol and substance abuse

Consequences of medication noncompliance

Increased use of medical resources:

- physician visits,
- laboratory tests,
- unnecessary additional treatments,
- emergency department visits,
- hospital or nursing home admissions

Treatment failure

Noncompliance in older patients

2. research tools

Adherence scales are identified mostly in the last few years (2005-2015). One of the main sources was article (Lavsa et. al) which evaluated literature describing medication adherence surveys/scales to gauge patient behaviours at the point of care.

1

Medication Adherence Questionnaire (MAQ)

MMAS – Morisky Medication Adherence Scale

4-item scale (MMAS-4)

8-item scale (MMAS-8)

Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. Med Care. 1986 Jan;24(1):67-74.

1

Medication Adherence Questionnaire (MAQ)

- the shortest
- the easiest
- the fastest
- wide range of diseases

1

Medication Adherence Questionnaire (MAQ)
(Morisky, et al. 1986)

1. Do you ever forget to take your medicine?	Yes	No
2. Are you careless at times about taking your medicine?	Yes	No
3. When you feel better do you sometimes stop taking your medicine?	Yes	No
4. Sometimes if you feel worse when you take the medicine, do you stop taking it?	Yes	No

4 -item scale

MMAS-4

1

You indicated that you are taking medication for your (identify health concern, such as "high blood pressure"). Individuals have identified several issues regarding their medication-taking behavior and we are interested in your experiences. There is no right or wrong answer. Please answer each question based on your personal experience with your [health concern] medication. Interviewers may self identify regarding difficulties they may experience concerning medication-taking behavior.

(Please circle the correct number)

	No=0	**Yes=1**
1. Do you sometimes forget to take your [health concern] pills?		
2. People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your [health concern] medicine?		
3. Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it?		
4. When you travel or leave home, do you sometimes forget to bring along your [health concern] medication?		
5. Did you take your [health concern] medicine yesterday?		
6. When you feel like your [health concern] is under control, do you sometimes stop taking your medicine?		
7. Taking medication everyday is a real inconvenience for some people. Do you ever feel hassled about sticking to your blood pressure treatment plan?		

8. How often do you have difficulty remembering to take all your medications? **(Please circle the correct number)**

   Never/Rarely……**0**

   Once in a while……**1**

   Sometimes……**2**

   Usually……**3**

   All the time……**4**

Source: Morisky DE, Ang A, Krousel-Wood M, Ward H. Predictive Validity of a Medication Adherence Measure for Hypertension Control. *Journal of Clinical Hypertension* 2008; 10(5):348-354.

For additional information, contact: Donald E. Morisky, Sc.D., M.S.P.H., Sc.M., e-mail: dmorisky@ucla.edu; phone: (310) 825-8508

8-item scale

MMAS-8

2

Self-efficacy for Appropriate Medication Use Scale

SEAMS

”self-efficacy”

- 13-item scale had good internal consistency reliability
- a reliable and valid instrument that may provide a valuable assessment of medication self-efficacy in chronic disease management
- appropriate for use in patients with low literacy skills

Source

Risser J, Jacobson TA, Kripalani S. Development and psychometric evaluation of the Self-efficacy for Appropriate Medication Use Scale (SEAMS) in low-literacy patients with chronic disease. *J Nurs Meas*. 2007;15(3):203-19.

3

The Brief Medication Questionnaire

BMQ

a new self-report tool for screening adherence and barriers to adherence

BMQ tool is:

- useful in identifying patients who need assistance with their medications,
- assessing patient concerns, and
- evaluating new programs.

Svarstad BL, Chewning BA, Sleath BL, Claesson C. The Brief Medication Questionnaire: a tool for screening patient adherence and barriers to adherence. Patient Educ Couns. 1999;37(2):113-24.

3

The Brief Medication Questionnaire

BMQ

includes:

- 5-item Regimen Screen that asks patients how they took each medication in the past week,
- 2-item Belief Screen that asks about drug effects and bothersome features, and
- 2-item Recall Screen about potential difficulties remembering
- 2-item Access Screen about difficulties in buying and refilling

3

Patient Name: _____ **Patient Study ID** __ __ __ __

Brief Medication Questionnaire 1 (BMQ 1)

This form asks about the medications you currently take for high blood pressure. Please include any medication that you might be taking for high blood pressure, including water pills.

1. Did you bring your medications with you today?

1 ☐ No 2 ☐ Yes

2. How many medications do you currently take for high blood pressure?

___ medication(s)

3. What medication(s) do you currently take for high blood pressure?

Medication name(s) or description	Leave blank
Drug A:	
Drug B:	
Drug C:	
Drug D:	

4. Did you STOP taking any blood pressure medication in the past six months?

1 ☐ Yes 2 ☐ No (Skip to next page)

5. What blood pressure medication was stopped? For what reason was it stopped?

a. Medication Stopped b. Reason stopped

1._____ _____

2._____ _____

3

The following questions ask about your use of certain medication(s) in the PAST WEEK. For each question, please **circle the number** that best describes your experience. Answer the questions for each drug listed. Use extra pages if needed.

Drug A: _____

5. How often does your doctor want you to take this drug?	1 Every day 2 As needed 3 Don't know
6. How is this drug supposed to help you? (CIRCLE ALL THAT APPLY.)	1 Get rid of water 2 Lower my pressure 3 Prevent a stroke 4 Prevent heart problems 5 Relieve headaches 6 Other: _____ 7 Don't know
7. In the **PAST WEEK**	
a. Did you take **any** of this drug?	1 Yes 2 No
b. How many **days** did you take this drug?	I took it: 0 1 2 3 4 5 6 7 days
c. How many **times a day** did you usually take it?	I took it: 0 1 2 3 times a day
d. How much did you usually take each time?	I took: 0 pills, 1 pill, 2 pills, 3 pills each time
e. How many times did you MISS taking it?	I missed it: 0 1 2 3 4 5 6 7 times
8 How well does this drug work for you?	1 Not at all well 2 Moderately well 3 Very well 4 Don't know
9. How much does this drug bother you?	1 Not at all 2 Bothers a little 3 Bothers a lot 4 Don't know

10. How much difficulty are you having in each area?	0 None	1 A little	3 A lot
a. It is hard to remember all the doses	0	1	2
b. It is hard to pay for this drug	0	1	2
c. It is hard to get my refill on time	0	1	2
d. I still get unwanted side effects from this drug.	0	1	2
e. I worry about the long-term effects of this drug.	0	1	2
f. This drug causes other concerns or problems.	0	1	2

Regimen screen

Belief screen

Recall screen

Access screen

4

Hill-Bone Compliance to High Blood Pressure Therapy Scale

The Hill-Bone Compliance Scale assesses patient behaviors for three important behavioral domains of high blood pressure treatment:

1) reduced sodium intake;

2) appointment keeping, and

3) medication taking.

Kim MT, Hill MN, Bone LR, Levine DM. Development and testing of the Hill-Bone Compliance to High Blood Pressure Therapy Scale. Prog Cardiovasc Nurs. 2000 Summer;15(3):90-6.

4

HILL-BONE HIGH BLOOD PRESSURE COMPLIANCE SCALE							
(NA=not applicable / DK=don't know)		None of the time	Some of the time	Most of the time	All the time	NA	DK
1.	How often do you forget to take your HBP medicine?	1	2	3	4	8	9
2.	How often do you decide not to take your HBP medicine?	1	2	3	4	8	9
3.	How often do you eat salty food?	1	2	3	4	8	9
4.	How often do you shake salt, fondor, or aromat on your food before you eat it?	1	2	3	4	8	9
5.	How often do you eat fast food? (KFC, McDonalds, fat cook, fish and chips)	1	2	3	4	8	9
6.	How often do you get the next appointment before you leave the clinic?	1	2	3	4	8	9
7.	How often do you miss scheduled appointments?	1	2	3	4	8	9
8.	How often do you leave the dispensary without obtaining your prescribed pills? (due to long line, closure of clinic, forgot)	1	2	3	4	8	9
9.	How often do you run out of HBP pills?	1	2	3	4	8	9
10.	How often do you skip your HBP medicine 1–3 days before you go to the clinic?	1	2	3	4	8	9
11.	How often do you miss taking your HBP pills when you feel better?	1	2	3	4	8	9
12.	How often do you miss taking your HBP pills when you feel sick?	1	2	3	4	8	9
13.	How often do you take someone else's HBP pills?	1	2	3	4	8	9
14.	How often do you miss taking your HBP pills when you care less?	1	2	3	4	8	9

4

This brief instrument provides:

- a simple method for clinicians in various settings to use to assess patients' self reported compliance levels and

- to plan appropriate interventions.

5

Medication Adherence Rating Scale
MARS

10-item scale includes:

- a valid and reliable measure of compliancy for psychoactive medications

- diagnosed with schizophrenia

Thompson K, Kulkarni J, Sergejew AA. Reliability and validity of a new Medication Adherence Rating Scale (MARS) for the psychoses. Schizophr Res. 2000 May 5;42(3):241-7.

5

	Item	Compliant	Non-compliant
1	Do you ever forget to take your medication?		
2	Are you careless at times at taking medication?		
3	When you feel better do you sometimes stop taking your medication?		
4	Sometimes if you feel worse when you take the medication do you stop taking it?		
5	I take my medication only when I am sick		
6	It is unnatural for my mind and body to be controlled by medication		
7	My thoughts are clearer on medication		
8	By staying on medication, I can prevent getting sick		
9	I feel weird, like a zombie, on medication		
10	Medication makes me feel tired and sluggish		

Compliant = 'No' response for questions 1-6, 9–10.
'Yes' response for questions 7 and 8.

6

Adherence to Refills and Medications Scale

ARMS

14 and 12-item scale:

- chronic disease.
- low-literacy patients

Kripalani S, Risser J, Gatti ME, Jacobson TA. Development and evaluation of the Adherence to Refills and Medications Scale (ARMS) among low-literacy patients with chronic disease. 2009;12(1):118-23.

Table 2 Item analysis of original and reduced scale

Items	Mean ± SD	Original 14-item scale: Item-total correlation coefficient	Original 14-item scale: Cronbach's α if item is deleted	Reduced-12 item scale: Item-total correlation coefficient	Reduced-12 item scale: Cronbach's α if item is deleted	Lexile score
1. How often do you miss scheduled appointments?	1.51 ± 0.58	0.364	0.810	—	—	680L
2. How often do you forget to take your medicine?	1.41 ± 0.54	0.589	0.794	0.579	0.791	630L
3. How often do you decide not to take your medicine?	1.26 ± 0.50	0.468	0.803	0.451	0.802	680L
4. How often do you forget to get prescriptions filled?	1.19 ± 0.45	0.466	0.804	0.466	0.801	730L
5. How often do you run out of medicine?	1.58 ± 0.67	0.481	0.802	0.475	0.799	520L
6. How often do you skip a dose of your medicine before you go to the doctor?	1.40 ± 0.59	0.492	0.801	0.485	0.798	970L
7. How often do you miss taking you medicine when you feel better?	1.23 ± 0.53	0.574	0.796	0.571	0.792	840L
8. How often do you miss taking your medicine when you feel sick?	1.23 ± 0.52	0.405	0.807	0.412	0.804	850L
9. How often do you take someone else's medicine?	1.20 ± 0.15	0.153	0.819	—	—	640L
10. How often do you miss taking your medicine when you are careless?	1.32 ± 0.51	0.515	0.800	0.500	0.798	860L
11. How often do you change the dose of your medicines to suit your needs (like when you take more or less pill than you're supposed to)?	1.17 ± 0.44	0.356	0.810	0.353	0.809	960L
12. How often do you forget to take your medicine when you are supposed to take it more than once a day?	1.31 ± 0.53	0.548	0.797	0.548	0.794	1110L
13. How often do you put off refilling your medicines because they cost too much money?	1.32 ± 0.63	0.497	0.800	0.509	0.796	1100L
14. How often do you plan ahead and refill your medicines before they run out?*	1.89 ± 0.99	0.411	0.820	0.417	0.820	1000L

*This item was reverse coded.

Nevertheless, when factor analysis was performed on the reduced 12-item scale (without questions 1 and 9), and a 2-factor solution was forced, the items clustered as expected (Table 3). This instrument ranged from 12 to 34 [mean = 16.32, standard deviation (SD) = 4.06]. On the eight-item taking medications subscale, scores ranged from 8 to 29 (mean = 10.33, SD = 2.66).

Scales suitable for measuring adherence at certain diseases

No	Scale	1	2	3	4	5	6	7	8
1.	Morisky-Green		+				+		+
2.	SEAMS	+		+				+	
3.	BMQ		+		+		+		
4.	Hill-Bone		+						
5.	MARS					+			
6.	ARMS	+							

1 – Chronic disease
2 – Arterial hypertension
3 – Coronary heart disease
4 – Diabetes
5 – Psychosis
6 – AIDS/HIV
7 – Osteoporosis
8 – Smoking cessation

Cronbach α at some articles regarding to adherence measuring

No	Scale	Literature	Cronbach α
1.	Morisky-Green	Morisky-Green	0.61
		Toll BA, McKee SA	-
		Duong M, Piroth L	-
2.	SEAMS	Risser	0.89
		Reynolds	0.82
3.	BMQ	Svarstad	-
		Mini	-
		Ben	0.66
4.	Hill-Bone	Kim	0.84
		Lambert	0.79
		Koschack	0.25 & 0.73
		Karademir	0.72
		Krousel-Wood	-
5.	MARS	Fialko	0.60
		Thompson	0.75
6.	ARMS	Kripalani	0.81

Compliance with medication survey conducted in Croatia

MATERIALS AND METHODS

the study was designed as a **cross-sectional survey**

by use of a **self-administered 33-item questionnaire**

The study included **635 individuals** collecting or buying drugs for the treatment of **chronic diseases**, with special reference to subjects taking **antihypertensive** agents (n=361).

Study was conducted at **Zagreb pharmacies** and the questionnaire was filled out by study subjects with instructions and help provided by the pharmacist as questionnaire administrator.

questionnaire listed **16 common reasons** for nonadherence.

RESULTS

The noncompliant subjects prevailed over compliant subjects (n=370; 58.3% vs. n=265; 41.7%)

The total number of 1357 diseases was reported by survey respondents (an average of 2.1 per respondent)

The most common diseases were the cardiovascular (n=500; 36.8%), followed by endocrine, nutritional and metabolic group of diseases (n=285; 21.0%).

Culig J, Leppée M, Boskovic J. Eric M. Determining the difference in medication compliance between the general patient population and patients receiving antihypertensive therapy: A case study. Arch Pharm Res 2011;34(7):1143-52. DOI 10.1007/s12272-011-0712-0

Rank of reasons for patients' noncompliance with medication

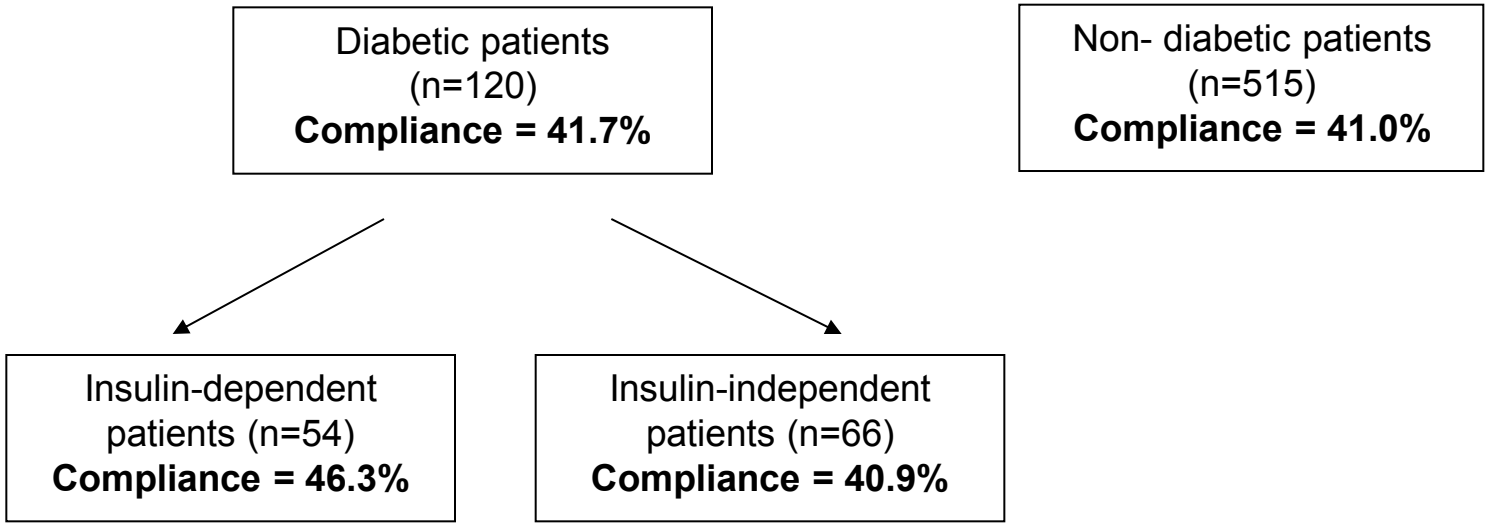
Reasons for non-compliance	Hypertension		Dislipidemia		Diabetes		Back pain		Depression	
	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%
Forgetfulness	1	60,9	1	62,4	1	61,7	1	63,5	1	63,0
Away from home	3	45,2	2	48,8	2	45,8	2	50,0	5	47,8
Out of medication	2	46,8	3	43,2	3	45,8	3	48,6	7	47,8
Different medication several times a day	4	43,8	4	40,0	4	42,5	7	39,2	6	47,8
Medication shortage in pharmacies	6	37,1	6	35,2	6	36,7	4	47,3	3	52,2
Problem in taking medication at a certain time	5	41,3	5	38,4	5	37,5	5	45,9	2	58,7
Feeling well	7	34,9	7	35,2	7	30,0	6	41,9	4	50,0

Number of diagnoses in hypertensive patients and compliance with medication

Diagnosis of arterial hypertension	n	%	Compliant patients		Noncompliant patients	
			n	%	n	%
alone	75	20,7	28	19,5	47	21,5
+ one diagnosis	126	34,7	53	37,1	73	33,5
+ two or more diagnosis	160	44,6	62	43,4	98	45,0
T o t a l	361	100,0	143	100,0	218	100,0

Medication compliance and noncompliance according to age groups

Age (years)	Study population			
	Compliant		Noncompliant	
	n	%	n	%
26-35	16	32.0	34	68.0
36-45	22	42.3	30	57.7
46-55	50	41.0	72	59.0
56-65	62	38.3	100	61.7
66+	115	46.2	134	53.8
Total	265	41.7	370	58.3



Insulin-dependent patients' compliance with medication is significantly higher than Insulin-independent patients'

Reasons for Self-Reported Noncompliance in Common Chronic Diseases

Essential (primary) hypertension	Disorders of lipoprotein metabolism and other lipidemia	Insulin-dependent and non insulin-dependent diabetes mellitus	Dorsalgia	Depressive episode
I just forgot	I just forgot	I just forgot	I just forgot	I just forgot
I had consumed all of it	I was not at home	I was not at home	I was not at home	I had problems with the timing of the medication
I was not at home	I had consumed all of it	I had consumed all of it	I had consumed all of it	The drug was not available due to shortage of supply

MORE THAN ONE ….

The existence of more than one **cause of risk** considerably increases the noncompliance risk of a patient.

Special attention should be paid to frail older people (those which experience complex problems: disease, dependency and disability) and which often suffer from more chronic diseases.

Understanding the concept of frailty may help to optimize medication prescribing for older people.

Noncompliance in older patients

3. practical recommendations

How to improve compliance?

1. SMS reminder
2. Electronic devices which includes alerting system

1. SMS reminder

Through SMS, health care providers:

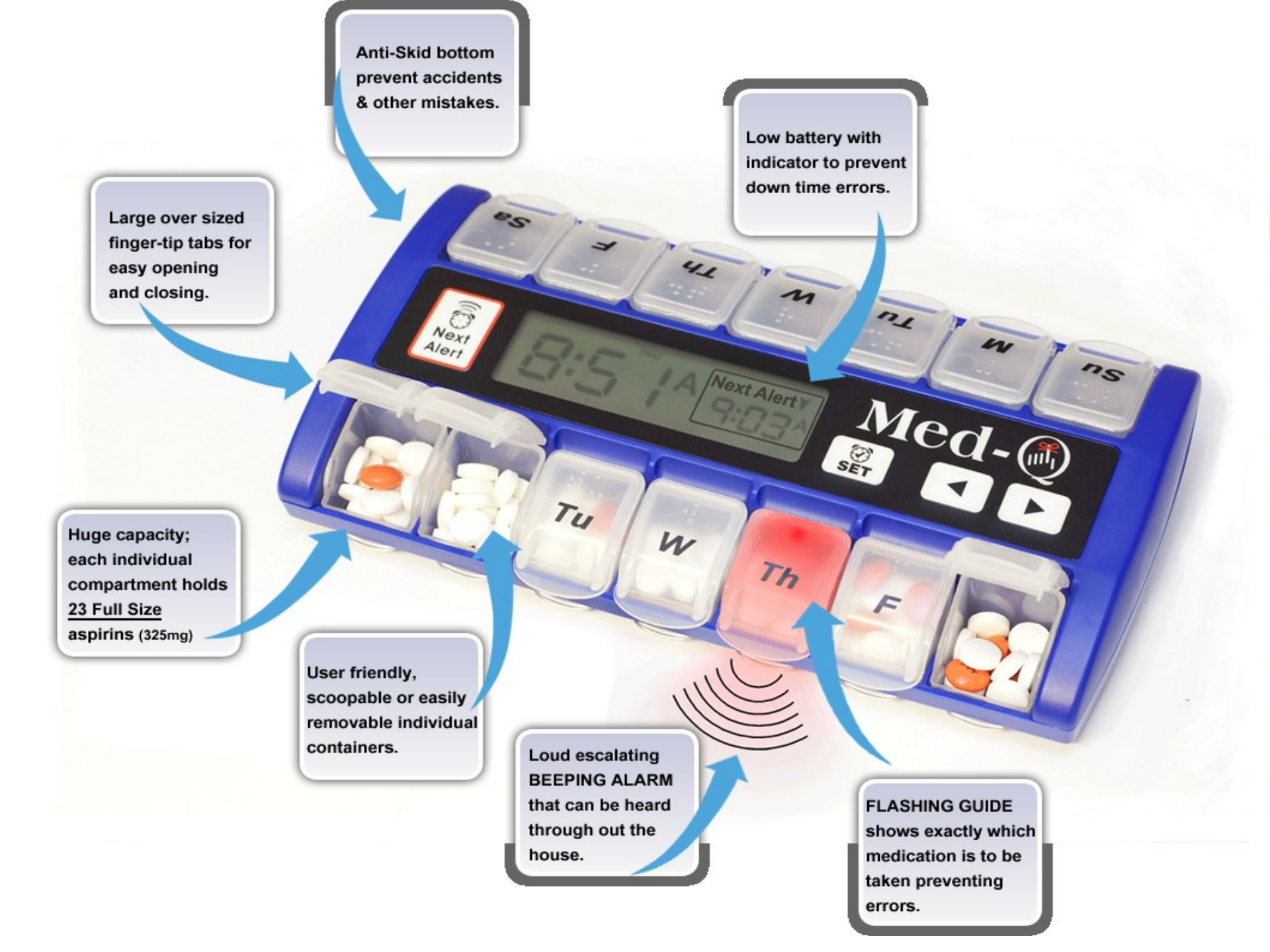
DOCTOR

PHARMACIST

can help their patients stay connected with medical professionals on an immediate basis.

SMS messages are personalized and time or context-sensitive, when having to do with a patient's health.

2. Electronic devices which includes alerting system


Anti-Skid bottom prevent accidents & other mistakes.
Low battery with indicator to prevent down time errors.
Large over sized finger-tip tabs for easy opening and closing.
Huge capacity; each individual compartment holds 23 Full Size aspirins (325mg)
User friendly, scoopable or easily removable individual containers.
Loud escalating BEEPING ALARM that can be heard through out the house.
FLASHING GUIDE shows exactly which medication is to be taken preventing errors.
Next Alert
Next Alert
9:03A
SET
Med-Q
Tu
W
Th
F

Two groups of patients

One is connected with their own **GP (general practitioners)**

The second one is connected with their **pharmacist**

difference between **doctor's** and **pharmacist's** action about compliance

difference between **SMS reminder** and **electronic devices system**

CONCLUSIONS 1

- Noncompliance with therapy has negative consequences on the health of the individual, and an adverse impact on the community
- There is no gold-standard medication compliance scale
- There are many self-report scales for measuring medication compliance and their derivatives (or subscales).
- MAQ (Morisky scale) is used frequently

CONCLUSIONS 2

- Research on compliance has typically focused on the barriers that patients face in taking their medications.
- Common barriers to compliance are under the patient's control (forgetfulness was the most common, so that attention to them is a necessary and important step in improving compliance)
- Additional reasons for medication noncompliance, such as being away from home, could also be associated with forgetfulness since the patient should have remembered to bring his medication along with him while going out
- Of great help could be various applications for alerting on mobile devices that are now in mass use.

CONCLUSIONS 3

- The main problem of long-term therapy is significantly decreased of compliance with medication in a very short time.

- It is important to remember that almost all the interventions effective for improving patient compliance in long-term care were complex, including a combination of:

  - more convenient care,
  - information, reminders,
  - self-monitoring,
  - manual telephone follow-up,
  - reinforcement,
  - counselling,
  - family therapy,
  - psychological therapy,
  - crisis intervention,
  - supportive care
  - etc.

Haynes RB, Ackloo E, Sahota N, McDonald HP, Yao X. Interventions for enhancing medication adherence. Cochrane Database Syst Rev. 2008 Apr 16;(2):CD000011. doi: 10.1002/14651858.CD000011.pub3.

CONCLUSIONS 4

SIMPLE

- S Simplifying regimen characteristics
- I Imparting knowledge
- M Modifying patient beliefs
- P Patient communication
- L Leaving the bias
- E Evaluating adherence

Polypharmacy and Adverse Drug Effects (ADE) in the Elderly

Polypharmacy

- Definition
- Causes
- Complications
- Prevention/management

Definition

Suboptimal prescribing

- Overuse = **Polypharmacy**
- Inappropriate prescribing
- Underuse

Hanlon JT et al. JAGS. 2001;49: 200-9.
Fisk D et al. Arch Intern Med. 2003;163: 2716-24.

Causes: Age and Chronic Diseases

- Increased prevalence of somatic complaints and chronic disease
- Community elders: 90% >1 med; 40% >5 meds; 12% >10 medications.
- Highest number of drugs per person in greater than 80 years olds

.

Gurwitz JH et al. JAMA. 2003;289(9): 1107-16

Causes: Drug regimen changes

- Any transition of care - discharges
- New medications, different dosses
- Changes from generic to brand-nomenclature, color and/or shape

Causes: Providers/Patients

- The more the providers and visits, the more the medications takes
- 2/3 of all physician visits end with a prescription
- Expectations to receive medication
- Not communicating with different physicians about medication changes
- Self-treatment

Complications of Polypharmacy

- Increased incidence of side effects and adverse drug reactions (ADRs)
- Noncompliance or nonadherence
- Increased cost

Take Home Message

- Polypharmacy is a reality of prescribing when patients have multiple comorbidities.
- We must all anticipate and guard against the potential complications of polypharmacy.
- Optimal prescribing is key!

Adverse Drug Reaction

Definitions

Adverse Drug Events (ADEs) is

‘any injury resulting from the use of drugs’

Five categories of ADEs:

1. Adverse drug reactions
2. Medication errors
3. Therapeutic failures
4. Adverse drug withdrawal events
5. Overdoses

Nebeker JR, Ann Intern Med. 2004;140(10):795-801

ADVERSE DRUG REACTION

DEFINITION 1

"ADR is a response to a drug that is noxious and unintended and occurs at doses normally used in man for the prophylaxis, diagnosis or therapy of disease, or for modification of physiological function"

WHO. International drug monitoring: The role of the hospital. WHO Tech Rep. 1969; 425: 5-24

DEFINITION 2

"An appreciably harmful or unpleasant reaction, resulting from an intervention related to the use of a medicinal product, which predicts hazard from future administration and warrants prevention or specific treatment, or alteration of the dosage regimen, or withdrawal of the product."

Edwards & Aronson. Adverse drug reactions: definitions, diagnosis, and management. Lancet 2000; 356: 1255-59.

Side Effects and ADRs

- **Side effects**: considered minor enough to allow continuation of therapy
- **Adverse Drug Reactions (ADRs):** May necessitate discontinuation of drug and require treatment of adverse event. Due to:
  - drug-drug interactions,
  - drug-disease interactions,
  - drug-herbal interactions,
  - drug-food interactions

- “One of the greatest hazards is the use of potent drugs is their inherent toxicity……

- …..the dangers of the drug appear to be greater now then ever before.”

David Barr. Hazards of modern diagnosis and therapy – the price we pay. Frank Billings Memorial Lecture. J Am Med Assoc 1955;159 (15): 1452-56.

In United States

ADR estimated to be between 4th and 6th leading cause of death.

Lazarou JAMA 1998

ADRs

- **Elderly** 7 times more likely to have unwanted side effect and 2-3 times more likely to have ADRs
- **Multiple medications** is the factor most strongly correlated with increased risk of ADRs
- Exponential increase in ADRs with addition of **more drugs** to a regimen (two drugs 15%, five drugs 50-60%)

For example NSAID

- 12,000 admissions/year due to GI bleed
- 2000 deaths/year
- 400 bed hospital working at capacity
- Impact greater for >65 years:
  - GI bleed,
  - Renal impairment

Blower et al. Aliment Pharmacol Therap (1997)

Type of reaction	Mnemonic	Features	Examples
			• Toxic effects: Digoxin toxicity; serotonin syndrome with SSRIs • Side effects: Anticholinergic effects of tricyclic antidepressants
B: Non-dose-related	Bizarre	• Uncommon • Not related to a pharmacological action of the drug • Unpredictable • High mortality	• Immunological reactions: Penicillin hypersensitivity • Idiosyncratic reactions: Acute porphyria Malignant hyperthermia Pseudoallergy (eg, ampicillin rash)
C: Dose-related and time-related	Chronic	• Uncommon • Related to the cumulative dose	• Hypothalamic-pituitary-adrenal axis suppression by corticosteroids
D: Time-related	Delayed	• Uncommon • Usually dose-related • Occurs or becomes apparent some time after the use of the drug	• Teratogenesis (eg, vaginal adenocarcinoma with diethylstilbestrol) • Carcinogenesis • Tardive dyskinesia
E: Withdrawal	End of use	• Uncommon • Occurs soon after withdrawal of the drug	• Opiate withdrawal syndrome • Myocardial ischaemia (β-blocker withdrawal)
F: Unexpected failure of therapy	Failure	• Common • Dose-related • Often caused by drug interactions	• Inadequate dosage of an oral contraceptive, particularly when used with specific enzyme inducers

SSRIs=serotonin-selective reuptake inhibitors.

Table 1: **Classification of adverse drug reactions**

Edwards & Aronson. Lancet. 2000;356: 1255-59

Why are the elderly at risk of ADRs?

ADRs and Age

Incidence of ADR increases with age

- Elderly receive more medicines
- Incidence of ADR increases the more prescribed medicines taken exponentialy?
- For example:
  - *ADR rates increase to 5% for 1 or 2 medications*
  - *Increased to 20% when >5 medications*

Grymonpre et al (1988) – study >50 yrs

Table: The Prescribing Cascade

Initial treatment	Adverse effect	Subsequent treatment	Subsequent adverse effect
NSAIDs	Rise in blood pressure	Antihypertensive treatment	Orthostatic hypotension
Thiazide diuretics	Hyperuricaemia	Allopurinol	Hypersensitivity reaction (Skin rashes)
Metoclopramide treatment	Parkinsonian symptoms	Treatment with levodopa	Visual and auditory hallucination

Source: Adapted from Rochon and Gurwitz, 1997

The Evidence

- Elderly not extensively studied
- Usually part of general data-set
- Homogeneity of studies a problem

Table: ADR by Clinical Setting (Wiffen et al. 2002)

Speciality	Pre/Post 1985	No of subjects	ADR rate % (95% CI)
General medicine	Pre	60401	8.5 (8.2-8.7)
General medicine	Post	243803	2.9 (2.8-3.0)
Geriatric	Pre	11212	4.3 (3.9-4.7)
Geriatric	Post	3488	20 (19-21)
Paediatric	Pre	469	4.2 (2.4-6.0)
Paediatric	Post	837	3.1 (1.9-4.3)

Impact of inpatient ADR (Wiffen *et al* 2002)

Table 6: Range of estimates of impact of inpatient ADR

Estimate	Average length of stay (days)	ADRin (%)	Average extra days	ADR-related extra bed-days	400-bed hospital equivalents
High	5	7.3	4	3,295,895	27.2
Middle	8	5.4	3	1,142,840	9.4
Low	10	3.5	2	395,056	3.3
Best guess	5	7.3	2	1,647,947	13.6

Cost – £380 million/year to NHS England
Consuming 4% available bed-days

ADR causing hospital admission

1. Older patients more likely to be admitted with ADR
2. {76 yrs (65-83) vs 66 (46-79)}
3. 4% of hospital bed capacity
4. 0.15% fatality
5. Drug – drug interactions responsible for 1 in 6 ADRs
6. 72% were (possibly or definitely) preventable

Pirmohamed M. et al. Adverse drug reactions as cause of admission to hospital: prospective analysis of 18 820 patients. BMJ, 2004. 329(7456):15-9.

"Older drugs continue to be the most commonly implicated in causing admissions."

Table 4 Drugs causing adverse drug reactions

Drug group/drug	No (%) of cases
NSAIDs	363 (29.6)
Diuretics	334 (27.3)
Warfarin	129 (10.5)
ACE inhibitors/ AII receptor antagonists	94 (7.7)
Antidepressants	87 (7.1)
β blockers	83 (6.8)
Opiates	73 (6.0)
Digoxin	36 (2.9)
Prednisolone	31 (2.5)
Clopidogrel	29 (2.4)

ADR Studies and Causative Drugs

Study	Population	Most Frequent Causative Drugs/Drug Classes
Leach 1986 [10]	521 Admissions (elderly);	Antibiotics, diuretics, insulin, opiates
Evans 1994 [90]	79,719 Admissions and inpatients	Antibiotics, digoxin, morphine
Bowman 1994 [52]	1225 Admissions and inpatients	Anticoagulants, cardiac drugs, diuretics
Dartnell 1996 [82]	965 Admissions	Antihypertensives, corticosteroids, diuretics, NSAIDs
Classen 1997 [11]	91,574 Inpatients	Antibiotics, digoxin, morphine
Moore 1998 [51]	328 Admissions and inpatients	Antibiotics, Antidepressants, antidiabetics, antihypertensives, digitalics, NSAIDs
Suh DC 2000 [91]	9311 Inpatients	Antibiotics, anticoagulants, cardiovascular drugs
Dormann 2000 [92]	379 Inpatients	Antibiotics
Vargas 2003 [12]	401 Inpatients (Intensive care)	Opiates
Howard 2003 [21]	4091 Admissions	Antidiabetics, antiepileptics, diuretics
Pirmohamed 2004 [14]	18820 Admissions	Anticoagulants, diuretics, NSAIDs

Drug's Commonly Implicated

Drug	Common Issues
Antibiotics	Allergies & dosage adjustment in renal dysfunction
Anticoagulants	Bleeding; drug interactions, dynamic changes & environment
Cardiac glycosides	1 in 5 experience ADR, NTI & kinetic issues.
Diuretics	Dehydration, electrolyte imbalance
Hypoglycaemic agents (oral & insulin)	Hypoglycaemia, changes to diet, poor monitoring
NSAIDs	GI bleed, renal impairment
Opioid analgesia	Sedation – dynamic and kinetic changes

Strategies

- Identify patients – triggers
- Improve process of care
  - e-prescribing systems
  - Clinical pharmacists on rounds
  - Better communication across interface & with patients (carers)

Prescribing to Reduce ADRs

- Age, hepatic and renal disease may impair clearance of drugs so smaller doses may be needed.
- Prescribe as few drugs as possible and give clear instructions to patients and carers
- If serious ADRs are liable to occur warn the patient
- Where possible use familiar drugs.
- With new drugs be particularly alert for ADRs and unexpected event.

Assessing Medication Appropriateness in the Elderly

Using Beers & STOPP START Criteria

What is the Beers Criteria?

AGS **Beers Criteria** for Potentially Inappropriate Medication Use in Older Adults

AKA Beers List, Beers Criteria

- Originally conceived in 1991 by Mark Beers, MD (geriatrician)
- 1991 → 1997 → 2003 → **2012**

ORIGINAL INVESTIGATION

Updating the Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

Results of a US Consensus Panel of Experts

Donna M. Fick, PhD, RN; James W. Cooper, PhD, RPh; William E. Wade, PharmD, FASHP, FCCP; Jennifer L. Waller, PhD; J. Ross MacLean, MD; Mark H. Beers, MD

Background: Medication toxic effects and drug-related problems can have profound medical and safety consequences for older adults and economically affect the health care system. The purpose of this initiative was to revise and update the Beers criteria for potentially inappropriate medication use in adults 65 years and older in the United States.

Methods: This study used a modified Delphi method, a set of procedures and methods for formulating a group judgment for a subject matter in which precise information is lacking. The criteria reviewed covered 2 types of statements: (1) medications or medication classes that should generally be avoided in persons 65 years or older because they are either ineffective or they pose unnecessarily high risk for older persons and a safer alternative is available and (2) medications that should not be used in older persons known to have specific medical conditions.

Results: This study identified 48 individual medications or classes of medications to avoid in older adults and their potential concerns and 20 diseases/conditions and medications to be avoided in older adults with these conditions. Of these potentially inappropriate drugs, 66 were considered by the panel to have adverse outcomes of high severity.

Conclusions: This study is an important update of previously established criteria that have been widely used and cited. The application of the Beers criteria and other tools for identifying potentially inappropriate medication use will continue to enable providers to plan interventions for decreasing both drug-related costs and overall costs and thus minimize drug-related problems.

Arch Intern Med. 2003;163:2716-2724

From the Department of Medicine, Center for Health Care Improvement (Drs Fick and Maclean), and Office of Biostatistics (Dr Waller), Medical College of Georgia, Augusta; Pharmacy and Therapeutics Department, Medical Center, Augusta (Dr Fick); Department of Clinical and Administrative Pharmacy, College of Pharmacy, University of Georgia, Athens, (Drs Cooper and Wade); and Merck & Co Inc, West Point, Pa (Dr Beers). The authors have no relevant financial interest in this article.

TOXIC EFFECTS of medications and drug-related problems can have profound medical and safety consequences for older adults and economically affect the health care system. Thirty percent of hospital admissions in elderly patients may be linked to drug-related problems or drug toxic effects.[1] Adverse drug events (ADEs) have been linked to preventable problems in elderly patients such as depression, constipation, falls, immobility, confusion, and hip fractures.[2,3] A 1997 study of ADEs found that 33% of ambulatory older adults experienced an ADE and 28% required health care services (physician, emergency department, or hospitalization) for the ADE.[4] Some two thirds of nursing facility residents have ADEs over a 4-year period.[5] Of these ADEs, 1 in 7 results in hospitalization.[6]

Recent estimates of the overall human and economic consequences of medication-related problems vastly exceed the findings of the Institute of Medicine (IOM) on deaths from medical errors, estimated to cost the nation $8 billion annually.[7] In 2000, it is estimated that medication-related problems caused 100 000 deaths annually at a cost of $85 billion.[8] Others have calculated the cost of medication-related problems to be $76.6 billion to ambulatory care, $20 billion to hospitals, and $4 billion to nursing home facilities.[2,4,9] If medication-related problems were ranked as a disease by cause of death, it would be the fifth leading cause of death in the United States.[8] The prevention and recognition of drug-related problems in elderly patients and other vulnerable populations is one of the principal health care quality and safety issues for this decade.

CME course available at www.archinternmed.com

The aforementioned IOM report has focused increased attention on finding solutions for unsafe medication practices, polypharmacy, and drug-related problems in the care of older adults. There are many ways to define medication-related prob-

ARCH INTERN MED/ VOL 163, DEC 9/23, 2003 WWW.ARCHINTERN.COM 2716

(REPRINTED WITH CORRECTIONS)

http://www.americangeriatrics.org/files/documents/beers/2012BeersCriteria_JAGS.pdf

- Identifies medications that pose potential risks outweighing potential benefits for people ≥65 years

↓

- Informs clinical decision-making concerning the prescribing of medications for older adults

↓

- Improves medication safety & quality of care

AGS BEERS CRITERIA
FOR POTENTIALLY INAPPROPRIATE MEDICATION USE IN OLDER ADULTS

FROM THE AMERICAN GERIATRICS SOCIETY

This clinical tool, based on *The AGS 2012 Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults (AGS 2012 Beers Criteria)*, has been developed to assist healthcare providers in improving medication safety in older adults. Our purpose is to inform clinical decision-making concerning the prescribing of medications for older adults in order to improve safety and quality of care.

Originally conceived of in 1991 by the late Mark Beers, MD, a geriatrician, the *Beers Criteria* catalogues medications that cause adverse drug events in older adults due to their pharmacologic properties and the physiologic changes of aging. In 2011, the AGS undertook an update of the criteria, assembling a team of experts and funding the development of the AGS 2012 *Beers Criteria* using an enhanced, evidence-based methodology. Each criterion is rated (quality of evidence and strength of evidence) using the American College of Physicians' Guideline Grading System, which is based on the GRADE scheme developed by Guyatt et al.

The full document together with accompanying resources can be viewed online at www.americangeriatrics.org.

INTENDED USE

The goal of this clinical tool is to improve care of older adults by reducing their exposure to Potentially Inappropriate Medications (PIMs).

- This should be viewed as a guide for identifying medications for which the risks of use in older adults outweigh the benefits.
- These criteria are not meant to be applied in a punitive manner.
- This list is not meant to supersede clinical judgment or an individual patient's values and needs. Prescribing and managing disease conditions should be individualized and involve shared decision-making.
- These criteria also underscore the importance of using a team approach to prescribing and the use of non-pharmacological approaches and of having economic and organizational incentives for this type of model.
- Implicit criteria such as the STOPP/START criteria and Medication Appropriateness Index should be used in a complementary manner with the 2012 AGS *Beers Criteria* to guide clinicians in making decisions about safe medication use in older adults.

The criteria are not applicable in all circumstances (eg, patient's receiving palliative and hospice care). If a clinician is not able to find an alternative and chooses to continue to use a drug on this list in an individual patient, designation of the medication as potentially inappropriate can serve as a reminder for close monitoring so that the potential for an adverse drug effect can be incorporated into the medical record and prevented or detected early.

TABLE 1: 2012 AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

Organ System/ Therapeutic Category/Drug(s)	**Recommendation**, Rationale, *Quality of Evidence (QE) & Strength of Recommendation (SR)*
Anticholinergics (excludes TCAs)	
First-generation antihistamines (as single agent or as part of combination products) ■ Brompheniramine ■ Carbinoxamine ■ Chlorpheniramine ■ Clemastine ■ Cyproheptadine ■ Dexbrompheniramine ■ Dexchlorpheniramine ■ Diphenhydramine (oral) ■ Doxylamine ■ Hydroxyzine ■ Promethazine ■ Triprolidine	**Avoid.** Highly anticholinergic; clearance reduced with advanced age, and tolerance develops when used as hypnotic; increased risk of confusion, dry mouth, constipation, and other anticholinergic effects/ toxicity. Use of diphenhydramine in special situations such as acute treatment of severe allergic reaction may be appropriate. *QE = High (Hydroxyzine and Promethazine), Moderate (All others); SR = Strong*
Antiparkinson agents ■ Benztropine (oral) ■ Trihexyphenidyl	**Avoid.** Not recommended for prevention of extrapyramidal symptoms

Table 1 (continued from page 1)

TABLE 1: 2012 AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

Organ System/ Therapeutic Category/Drug(s)	**Recommendation**, Rationale, *Quality of Evidence (QE) & Strength of Recommendation (SR)*
Antispasmodics ■ Belladonna alkaloids ■ Clidinium-chlordiazepoxide ■ Dicyclomine ■ Hyoscyamine ■ Propantheline ■ Scopolamine	**Avoid except in short-term palliative care to decrease oral secretions.** Highly anticholinergic, uncertain effectiveness. *QE = Moderate; SR = Strong*
Antithrombotics	
Dipyridamole, oral short-acting* *(does not apply to the extended-release combination with aspirin)*	**Avoid.** May cause orthostatic hypotension; more effective alternative available; IV form acceptable for use in cardiac stress testing. *QE = Moderate; SR = Strong*
Ticlopidine*	**Avoid.** Safer, effective alternatives available. *QE = Moderate; SR = Strong*
Anti-infective	
Nitrofurantoin	**Avoid for long-term suppression; avoid in patients wit CrCl <60 mL/min.** Potential for pulmonary toxicity; safer alternatives available; la efficacy in patients with CrCl <60 mL/min due to inadequate concentration in the urine. *QE = Moderate; SR = Strong*
Cardiovascular	
Alpha$_1$ blockers ■ Doxazosin ■ Prazosin ■ Terazosin	**Avoid use as an antihypertensive.** High risk of orthostatic hypotension; not recommended as ro treatment for hypertension; alternative agents have superior benefit profile. *QE = Moderate; SR = Strong*
Alpha agonists ■ Clonidine ■ Guanabenz* ■ Guanfacine* ■ Methyldopa* ■ Reserpine (>0.1 mg/day)*	**Avoid clonidine as a first-line antihypertensive. Avoid ers as listed.** High risk of adverse CNS effects; may cause bradycardia and orthostatic hypotension; not recommended as routine treatm for hypertension. *QE = Low; SR = Strong*
Antiarrhythmic drugs (Class Ia, Ic, III) ■ Amiodarone ■ Dofetilide ■ Dronedarone ■ Flecainide ■ Ibutilide ■ Procainamide ■ Propafenone ■ Quinidine ■ Sotalol	**Avoid antiarrhythmic drugs as first-line treatment of fibrillation.** Data suggest that rate control yields better balance of benefi harms than rhythm control for most older adults. Amiodarone is associated with multiple toxicities, including th disease, pulmonary disorders, and QT interval prolongation. *QE = High; SR = Strong*
Disopyramide*	**Avoid.** Disopyramide is a potent negative inotrope and therefore ma induce heart failure in older adults; strongly anticholinergic; o antiarrhythmic drugs preferred. *QE = Low; SR = Strong*
Dronedarone	**Avoid in patients with permanent atrial fibrillation or heart failure.** Worse outcomes have been reported in patients taking drone darone who have permanent atrial fibrillation or heart failure general, rate control is preferred over rhythm control for atri fibrillation. *QE = Moderate; SR = Strong*

Intended Use

Goal

To improve care of older adults by ↓ exposure to **Potentially Inappropriate Medications** (PIMs)

- Guide for identifying medications for which risks > benefits
- Not meant to be punitive
- Not meant to supersede clinical judgment or an individual patient's values & needs
- Underscore the importance of using a team approach & use of non-pharmacological approaches
- Implicit criteria such as the STOPP/START criteria & Medication Appropriateness Index should be used in a complementary manner

2012 AGS Beers Criteria - Categories

NEW

1st Category	2nd Category	3rd Category
PIMs for older people: • Pose high risks of adverse effects **OR** • Appear to have limited effectiveness in older patients **AND** • There are alternatives to these medications	PIMs for older people: • Who have certain diseases/disorders – these drugs may exacerbate the specified health problems	Use with caution in older adults • May be associated with more risks than benefits in general However, may be the best choice for a particular individual if administered with caution
• 53 medications or medication classes that should be avoided in older adults		• 14 that should be used with caution

BEERS Tables

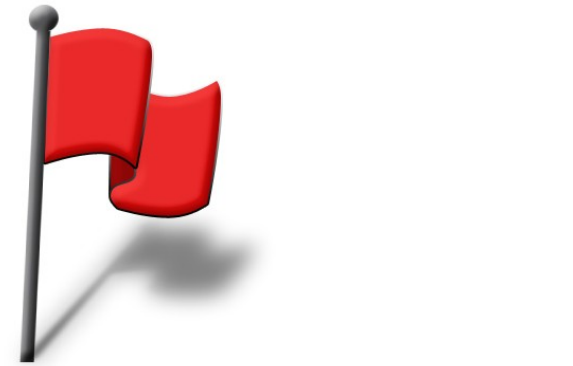
Table 1 – PIMs list (with select caveats)

Table 2 – PIMs due to Drug-Disease Interactions

Table 3 – Medications to be used with

Table 1 - Drugs to Avoid (except if….)

- **Table 1** in the pocket guide



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The goal of this clinical tool is to improve care of older adults by reducing their exposure to Potentially Inappropriate Medications (PIMs).

- This should be viewed as a guide for identifying medications for which the risks of use in older adults outweigh the benefits.
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- This list is not meant to supersede clinical judgment or an individual patient's values and needs. Prescribing and managing disease conditions should be individualized and involve shared decision-making.
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TABLE 1: 2012 AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

Organ System/ Therapeutic Category/Drug(s)	**Recommendation**, Rationale, *Quality of Evidence (QE) & Strength of Recommendation (SR)*
Anticholinergics (excludes TCAs)	
First-generation antihistamines (as single agent or as part of combination products) ■ Brompheniramine ■ Carbinoxamine ■ Chlorpheniramine ■ Clemastine ■ Cyproheptadine ■ Dexbrompheniramine ■ Dexchlorpheniramine ■ Diphenhydramine (oral) ■ Doxylamine ■ Hydroxyzine ■ Promethazine ■ Triprolidine	**Avoid.** Highly anticholinergic; clearance reduced with advanced age, and tolerance develops when used as hypnotic; increased risk of confusion, dry mouth, constipation, and other anticholinergic effects/ toxicity. Use of diphenhydramine in special situations such as acute treatment of severe allergic reaction may be appropriate. *QE = High (Hydroxyzine and Promethazine), Moderate (All others); SR = Strong*
Antiparkinson agents ■ Benztropine (oral) ■ Trihexyphenidyl	**Avoid.** Not recommended for prevention of extrapyramidal symptoms with antipsychotics; more effective agents available for treatment of Parkinson disease. *QE = Moderate; SR = Strong*

Table 1 (continued on page 2)

■ Belladonna alkaloids ■ Clidinium-chlordiazepoxide ■ Dicyclomine ■ Hyoscyamine ■ Propantheline ■ Scopolamine	**oral secretions.** Highly anticholinergic, uncertain effectiveness. *QE = Moderate; SR = Strong*
Antithrombotics	
Dipyridamole, oral short-acting* *(does not apply to the extended-release combination with aspirin)*	**Avoid.** May cause hypotension; more effective alternatives available. IV form available for use in cardiac stress testing. *QE = Moderate; SR = Strong*
Ticlopidine*	**Avoid.** Safer, effective alternatives available. *QE = Moderate; SR = Strong*
Anti-infective	
Nitrofurantoin	**Avoid for long-term suppression; avoid in patients with CrCl <60 mL/min.** Potential for pulmonary toxicity; safer alternatives available; lack of efficacy in patients with CrCl <60 mL/min due to inadequate drug concentration in the urine. *QE = Moderate; SR = Strong*
Cardiovascular	
Alpha$_1$ blockers ■ Doxazosin ■ Prazosin ■ Terazosin	**Avoid use as an antihypertensive.** High risk of orthostatic hypotension; not recommended as routine treatment for hypertension; alternative agents have superior risk/benefit profile. *QE = Moderate; SR = Strong*
Alpha agonists ■ Clonidine ■ Guanabenz*	**Avoid clonidine as a first-line antihypertensive. Avoid others as listed.** High risk of adverse CNS effects; may cause bradycardia and

Mesoridazine	Highly anticholinergic and greater risk of QT-interval prolongation. *QE = Moderate; SR = Strong*
Barbiturates ■ Amobarbital* ■ Butabarbital* ■ Butalbital ■ Mephobarbital* ■ Pentobarbital* ■ Phenobarbital ■ Secobarbital*	**Avoid.** High rate of physical dependence; tolerance to sleep benefits; greater risk of overdose at low dosages. *QE = High; SR = Strong*
Benzodiazepines *Short- and intermediate-acting:* ■ Alprazolam ■ Estazolam ■ Lorazepam ■ Oxazepam ■ Temazepam ■ Triazolam *Long-acting:* ■ Chlorazepate ■ Chlordiazepoxide ■ Chlordiazepoxide-amitriptyline ■ Clidinium-chlordiazepoxide ■ Clonazepam ■ Diazepam ■ Flurazepam ■ Quazepam	**Avoid benzodiazepines (any type) for treatment of insomnia, agitation, or delirium.** Older adults have increased sensitivity to benzodiazepines and decreased metabolism of long-acting agents. In general, all benzodiazepines increase risk of cognitive impairment, delirium, falls, fractures, and motor vehicle accidents in older adults. May be appropriate for seizure disorders, rapid eye movement sleep disorders, benzodiazepine withdrawal, ethanol withdrawal, severe generalized anxiety disorder, periprocedural anesthesia, end-of-life care. *QE = High; SR = Strong*
Chloral hydrate*	**Avoid.** Tolerance occurs within 10 days and risk outweighs the benefits in light of overdose with doses only 3 times the recommended dose. *QE = Low; SR = Strong*
Meprobamate	**Avoid.** High rate of physical dependence; very sedating. *QE = Moderate; SR = Strong*

Growth ho
Insulin, slidi
Megestrol
Sulfonylure
■ Chlorpro
■ Glyburid
Gastrointest
Metoclopra
Mineral oil,
Trimethobe

Table 1 (continued from page 3)

TABLE 1: 2012 AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

Organ System/ Therapeutic Category/Drug(s)	**Recommendation**, Rationale, *Quality of Evidence (QE) & Strength of Recommendation (SR)*
Nonbenzodiazepine hypnotics ■ Eszopiclone ■ Zolpidem ■ Zaleplon	**Avoid chronic use (>90 days)** Benzodiazepine-receptor agonists that have adverse events similar to those of benzodiazepines in older adults (e.g., delirium, falls, fractures); minimal improvement in sleep latency and duration. *QE = Moderate; SR = Strong*
Ergot mesylates* Isoxsuprine*	**Avoid.** Lack of efficacy. *QE = High; SR = Strong*
Endocrine	
Androgens ■ Methyltestosterone* ■ Testosterone	**Avoid unless indicated for moderate to severe hypogonadism.** Potential for cardiac problems and contraindicated in men with prostate cancer. *QE = Moderate; SR = Weak*
Desiccated thyroid	**Avoid.** Concerns about cardiac effects; safer alternatives available. *QE = Low; SR = Strong*
Estrogens with or without progestins	**Avoid oral and topical patch. Topical vaginal cream: Acceptable to use low-dose intravaginal estrogen for the management of dyspareunia, lower urinary tract infections, and other vaginal symptoms.** Evidence of carcinogenic potential (breast and endometrium); lack of cardioprotective effect and cognitive protection in older women. Evidence that vaginal estrogens for treatment of vaginal dryness is safe and effective in women with breast cancer, especially at dosages of estradiol <25 mcg twice weekly. *QE = High (Oral and Patch), Moderate (Topical); SR = Strong (Oral and Patch), Weak (Topical)*
Growth hormone	**Avoid, except as hormone replacement following pituitary gland removal.** Effect on body composition is small and associated with edema, arthralgia, carpal tunnel syndrome, gynecomastia, impaired fasting

Table 2 – Drug - disease interactions

- **Table 2** in the pocket guide

Table 1 (continued from page 4)

TABLE 1: 2012 AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults

Organ System/ Therapeutic Category/Drug(s)	Recommendation, Rationale, *Quality of Evidence (QE) & Strength of Recommendation (SR)*
Pain Medications	
Meperidine	**Avoid.** Not an effective oral analgesic in dosages commonly used; may cause neurotoxicity; safer alternatives available. *QE = High; SR = Strong*
Non-COX-selective NSAIDs, oral ■ Aspirin >325 mg/day ■ Diclofenac ■ Diflunisal ■ Etodolac ■ Fenoprofen ■ Ibuprofen ■ Ketoprofen ■ Meclofenamate ■ Mefenamic acid ■ Meloxicam ■ Nabumetone ■ Naproxen ■ Oxaprozin ■ Piroxicam ■ Sulindac ■ Tolmetin	**Avoid chronic use unless other alternatives are not effective and patient can take gastroprotective agent (proton-pump inhibitor or misoprostol).** Increases risk of GI bleeding/peptic ulcer disease in high-risk groups, including those ≥75 years old or taking oral or parenteral corticosteroids, anticoagulants, or antiplatelet agents. Use of proton pump inhibitor or misoprostol reduces but does not eliminate risk. Upper GI ulcers, gross bleeding, or perforation caused by NSAIDs occur in approximately 1% of patients treated for 3–6 months, and in about 2%–4% of patients treated for 1 year. These trends continue with longer duration of use. *QE = Moderate; SR = Strong*
Indomethacin Ketorolac, includes parenteral	**Avoid.** Increases risk of GI bleeding/peptic ulcer disease in high-risk groups *(See Non-COX selective NSAIDs)* Of all the NSAIDs, indomethacin has most adverse effects. *QE = Moderate (Indomethacin), High (Ketorolac); SR = Strong*
Pentazocine*	**Avoid.** Opioid analgesic that causes CNS adverse effects, including confusion and hallucinations, more commonly than other narcotic drugs; is also a mixed agonist and antagonist; safer alternatives available. *QE = Low; SR = Strong*
Skeletal muscle relaxants ■ Carisoprodol ■ Chlorzoxazone ■ Cyclobenzaprine ■ Metaxalone ■ Methocarbamol ■ Orphenadrine	**Avoid.** Most muscle relaxants poorly tolerated by older adults, because of anticholinergic adverse effects, sedation, increased risk of fractures; effectiveness at dosages tolerated by older adults is questionable. *QE = Moderate; SR = Strong*

*Infrequently used drugs. Table 1 Abbreviations: ACEI, angiotensin converting-enzyme inhibitors; ARB, angiotensin receptor blockers; CNS, central nervous system; COX, cyclooxygenase; CrCl, creatinine clearance; GI, gastrointestinal; NSAIDs, nonsteroidal anti-inflammatory drugs; SIADH, syndrome of inappropriate antidiuretic hormone secretion; SR, Strength of Recommendation; TCAs, tricyclic antidepressants; QE, Quality of Evidence

TABLE 2: 2012 AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults Due to Drug-Disease or Drug-Syndrome Interactions That May Exacerbate the Disease or Syndrome

Disease or Syndrome	Drug(s)	Recommendation, Rationale, *Quality of Evidence (QE) & Strength of Recommendation (SR)*
Cardiovascular		
Heart failure	NSAIDs and COX-2 inhibitors Nondihydropyridine CCBs (avoid only for systolic heart failure) ■ Diltiazem ■ Verapamil Pioglitazone, rosiglitazone Cilostazol Dronedarone	**Avoid.** Potential to promote fluid retention and/or exacerbate heart failure. *QE = Moderate (NSAIDs, CCBs, Dronedarone), High (Thiazolidinediones (glitazones)), Low (Cilostazol); SR = Strong*

Table 1 (continued on page 5

Table 2 (continued from page 5)

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Disease or Syndrome	Drug(s)	**Recommendation**, Rationale, *Quality of Evidence (QE) & Strength of Recommendation (SR)*
Syncope	Acetylcholinesterase inhibitors (AChEIs) Peripheral alpha blockers ■ Doxazosin ■ Prazosin ■ Terazosin Tertiary TCAs Chlorpromazine, thioridazine, and olanzapine	**Avoid.** Increases risk of orthostatic hypotension or bradycardia. *QE = High (Alpha blockers), Moderate (AChEIs, TCAs and antipsychotics); SR = Strong (AChEIs and TCAs), Weak (Alpha blockers and antipsychotics)*
Central Nervous System		
Chronic seizures or epilepsy	Bupropion Chlorpromazine Clozapine Maprotiline Olanzapine Thioridazine Thiothixene Tramadol	**Avoid.** Lowers seizure threshold; may be acceptable in patients with well-controlled seizures in whom alternative agents have not been effective. *QE = Moderate; SR = Strong*
Delirium	All TCAs Anticholinergics *(see online for full list)*	**Avoid.**

Central Nervous System		
Chronic seizures or epilepsy	Bupropion Chlorpromazine Clozapine Maprotiline Olanzapine Thioridazine Thiothixene Tramadol	**Avoid.** Lowers seizure threshold; may be acceptable in patients with well-controlled seizures in whom alternative agents have not been effective. *QE = Moderate; SR = Strong*
Delirium	All TCAs Anticholinergics *(see online for full list)* Benzodiazepines Chlorpromazine Corticosteroids H_2-receptor antagonist Meperidine Sedative hypnotics Thioridazine	**Avoid.** Avoid in older adults with or at high risk of delirium because of inducing or worsening delirium in older adults; if discontinuing drugs used chronically, taper to avoid withdrawal symptoms. *QE = Moderate; SR = Strong*
Dementia & cognitive impairment	Anticholinergics *(see online for full list)* Benzodiazepines H_2-receptor antagonists Zolpidem Antipsychotics, chronic and as-needed use	**Avoid.** Avoid due to adverse CNS effects. Avoid antipsychotics for behavioral problems of dementia unless non-pharmacologic options have failed and patient is a threat to themselves or others. Antipsychotics are associated with an increased risk of cerebrovascular accident (stroke) and mortality in persons with dementia. *QE = High; SR = Strong*
History of falls or	Anticonvulsants Antipsychotics	**Avoid unless safer alternatives are not available; avoid anticonvulsants except for seizure.**

Table 3 - Use with Caution

- **Table 3** in the pocket guide

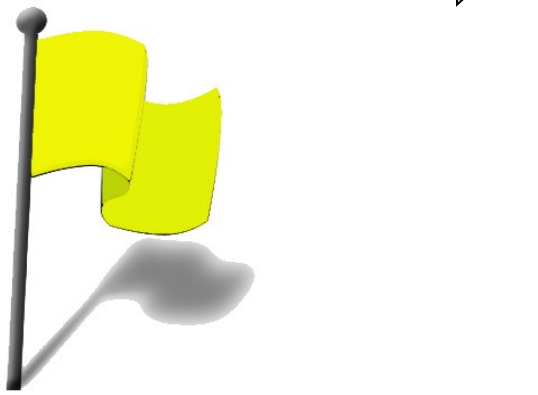

Table 2 (continued from page 7)

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Disease or Syndrome	Drug(s)	Recommendation, Rationale, *Quality of Evidence (QE) & Strength of Recommendation (SR)*
Lower urinary tract symptoms, benign prostatic hyperplasia	Inhaled anticholinergic agents Strongly anticholinergic drugs, except antimuscarinics for urinary incontinence (see Table 9 for complete list).	**Avoid in men.** May decrease urinary flow and cause urinary retention. *QE = Moderate; SR = Strong (Inhaled agents), Weak (All others)*
Stress or mixed urinary incontinence	Alpha-blockers ■ Doxazosin ■ Prazosin ■ Terazosin	**Avoid in women.** Aggravation of incontinence. *QE = Moderate; SR = Strong*

Table 2 Abbreviations: CCBs, calcium channel blockers; AChEIs, acetylcholinesterase inhibitors; CNS, central nervous system; COX, cyclooxygenase; NSAIDs, nonsteroidal anti-inflammatory drugs; SR, Strength of Recommendation; SSRIs, selective serotonin reuptake inhibitors; TCAs, tricyclic antidepressants; QE, Quality of Evidence

TABLE 3: 2012 AGS Beers Criteria for Potentially Inappropriate Medications to Be Used with Caution in Older Adults

Drug(s)	Recommendation, Rationale, *Quality of Evidence (QE) & Strength of Recommendation (SR)*
Aspirin for primary prevention of cardiac events	**Use with caution in adults ≥80 years old.** Lack of evidence of benefit versus risk in individuals ≥80 years old. *QE = Low; SR = Weak*
Dabigatran	**Use with caution in adults ≥75 years old or if CrCl <30 mL/min.** Increased risk of bleeding compared with warfarin in adults ≥75 years old; lack of evidence for efficacy and safety in patients with CrCl <30 mL/min *QE = Moderate; SR = Weak*
Prasugrel	**Use with caution in adults ≥75 years old.** Greater risk of bleeding in older adults; risk may be offset by benefit in highest-risk older patients (eg, those with prior myocardial infarction or diabetes). *QE = Moderate; SR = Weak*
Antipsychotics Carbamazepine Carboplatin Cisplatin Mirtazapine SNRIs SSRIs TCAs Vincristine	**Use with caution.** May exacerbate or cause SIADH or hyponatremia; need to monitor sodium level closely when starting or changing dosages in older adults due to increased risk. *QE = Moderate; SR = Strong*
Vasodilators	**Use with caution.** May exacerbate episodes of syncope in individuals with history of syncope. *QE = Moderate; SR = Weak*

Table 3 Abbreviations: CrCl, creatinine clearance; SIADH, syndrome of inappropriate antidiuretic hormone secretion; SSRIs, selective serotonin reuptake inhibitors; SNRIs, serotonin–norepinephrine reuptake inhibitors; SR, Strength of Recommendation; TCAs, tricyclic antidepressants; QE, Quality of Evidence

The American Geriatrics Society gratefully acknowledges the support of the John A. Hartford Foundation, Retirement Research Foundation and Robert Wood Johnson Foundation.

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Print off the Pocket Card

Open access, available for free.

http://www.americangeriatrics.org/files/documents/beers/PrintableBeersPocketCard.pdf

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Version: 3.3.1_36
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Rated 4+

Requirements: Compatible with iPhone, iPod touch, and iPad.Requires iOS 3.1.2 or later

Customer Ratings

Current Version:
★★★★ 6 Ratings

All Versions:
★★★★ 12 Ratings

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Tarascon Pharmacopoeia

Description

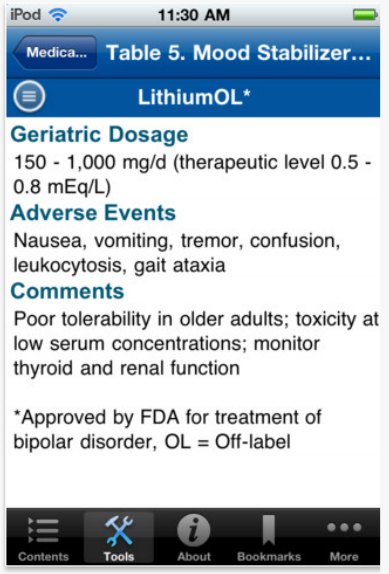
iGeriatrics combines all of the American Geriatrics Society's free clinical information offerings into one easy to use application. Aimed at healthcare providers and covering a wide range of topics relating to older adults, from medication safety to cross-cultural assistance, iGeriatrics is an excellent introduction to the information and services

USBMIS, Inc Web Site ▸ iGeriatrics Support ▸ ...More

What's New in Version 3.3.1_36

Combined American Geriatric Society's free offerings into an all-in-one app!

Screenshots iPhone | iPad

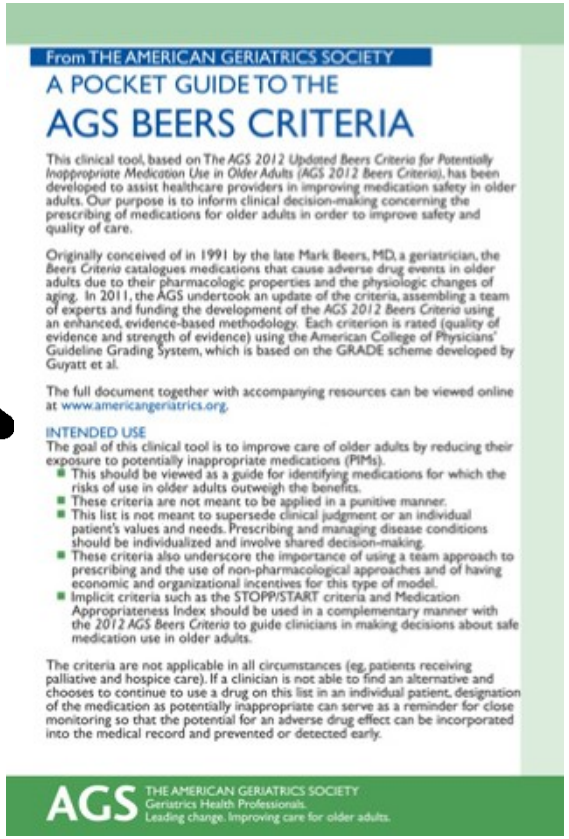


A walk through the pocket guide….

NEW

- **Quality of Evidence**
  - High
  - Moderate
  - Low
- **Strength of Recommendation**
  - Strong
  - Weak
  - Insufficient

Validated literature evaluation tool to support recommendations



From THE AMERICAN GERIATRICS SOCIETY

A POCKET GUIDE TO THE

AGS BEERS CRITERIA

This clinical tool, based on *The AGS 2012 Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults (AGS 2012 Beers Criteria)*, has been developed to assist healthcare providers in improving medication safety in older adults. Our purpose is to inform clinical decision-making concerning the prescribing of medications for older adults in order to improve safety and quality of care.

Originally conceived of in 1991 by the late Mark Beers, MD, a geriatrician, the *Beers Criteria* catalogues medications that cause adverse drug events in older adults due to their pharmacologic properties and the physiologic changes of aging. In 2011, the AGS undertook an update of the criteria, assembling a team of experts and funding the development of the *AGS 2012 Beers Criteria* using an enhanced, evidence-based methodology. Each criterion is rated (quality of evidence and strength of evidence) using the American College of Physicians' Guideline Grading System, which is based on the GRADE scheme developed by Guyatt et al.

The full document together with accompanying resources can be viewed online at www.americangeriatrics.org.

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Where does Beers fit into the big picture?

Beers Criteria are only one part of quality prescribing

- Correct drug for correct diagnosis
- Appropriate dose
- Avoid underuse of potentially important medication
  ***START Criteria**
- Avoid overuse
- **Avoid potentially inappropriate drugs**

  ***STOPP & Beers Criteria**
- Avoid withdrawal effects with discontinuation
- Consideration of cost

Remember….

- Not intended to mandate drug prescribing
- Intended to serve as guidance to good geriatric care & principles
- To help providers best monitor older patients, reduce risk & prevent complications

Fick D & Resnick B. 2012 Beers Criteria Update: How Should Practicing Nurses Use the Criteria? Journal of Gerontological Nursing. June 2012 - Volume 38 · Issue 6: 3-5

Other Tools/Resources

Other Tools/Resources

- RxFiles Reference List of Drugs with Anticholinergic Effects
- STOPP Criteria 2006
- START Criteria 2006
- Medication Appropriateness Index
- Others?
  - The Improving Prescribing in the Elderly Tool (IPET) 2000
  - McLeod Criteria 1997

RxFiles

- Academic detailing program
- Not-for-profit
- Funded by a grant from Saskatchewan Health
- 1997: began as a service to Saskatoon family physicians
- 2011: expanded to provide services to long-term care
- This program exists to support health care professionals in making the best possible drug therapy choices for patients.
- Value is found in the balanced perspectives on drug effectiveness, safety, cost, clinical evidence & patient considerations.

STOPP Criteria

Screening **T**ool of **O**lder **P**ersons' potentially inappropriate **P**rescriptions

65 rules relating to the most common and the most potentially dangerous instances of inappropriate prescribing in older people

8. Aspirin:

- **with a past history of peptic ulcer disease without histamine H2 receptor antagonist or**
- **Proton Pump Inhibitor** *(risk of bleeding).*
- **at dose > 150mg day** *(increased bleeding risk, no evidence for increased efficacy).*
- **with no history of coronary, cerebral or peripheral vascular symptoms or occlusive event** *(not indicated).*
- **to treat dizziness not clearly attributable to cerebrovascular disease** *(not indicated).*

9. Warfarin:

- **for first, uncomplicated deep venous thrombosis for longer than 6 months duration** *(no proven added benefit).*
- **for first uncomplicated pulmonary embolus for longer than 12 months duration** *(no proven benefit).*

10. Use of aspirin and warfarin in combination without histamine H2 receptor antagonist (except cimetidine because of interaction with warfarin) or proton pump inhibitor *(high risk of gastrointestinal bleeding).*

11. Aspirin, clopidogrel, dipyridamole or warfarin with concurrent bleeding disorder *(high risk of bleeding).*

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

1. **Benzodiazepines** *(sedative, may cause reduced sensorium, impair balance).*
2. **Neuroleptic drugs** *(may cause gait dyspraxia, Parkinsonism).*
3. **First generation antihistamines** *(sedative, may impair sensorium).*
4. **Vasodilator drugs known to cause hypotension in those with persistent postural hypotension i.e. recurrent > 20mmHg drop in systolic blood pressure** *(risk of syncope, falls).*
5. **Long-term opiates in those with recurrent falls** *(risk of drowsiness, postural hypotension, vertigo).*


THANK YOU FOR YOUR ATTENTION 😁