Polymedication in nursing home

UNIVERSITÀ CATTOLICA del Sacro Cuore

Graziano Onder
Centro Medicina dell'Invecchiamento
Università Cattolica del Sacro Cuore
Rome - Italy

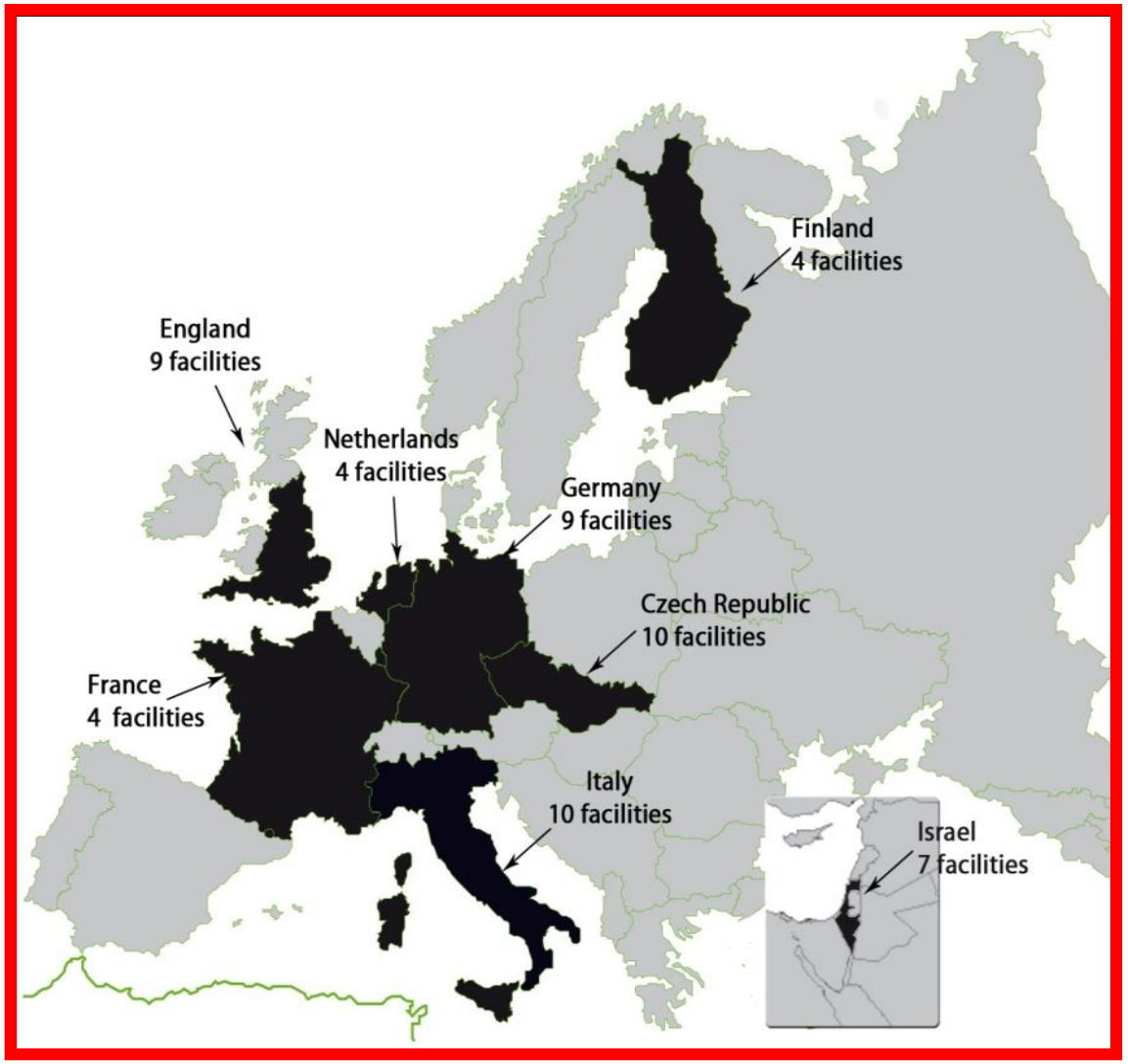
Services and Health for Elderly in Long TERm care (SHELTER)

4156 residents

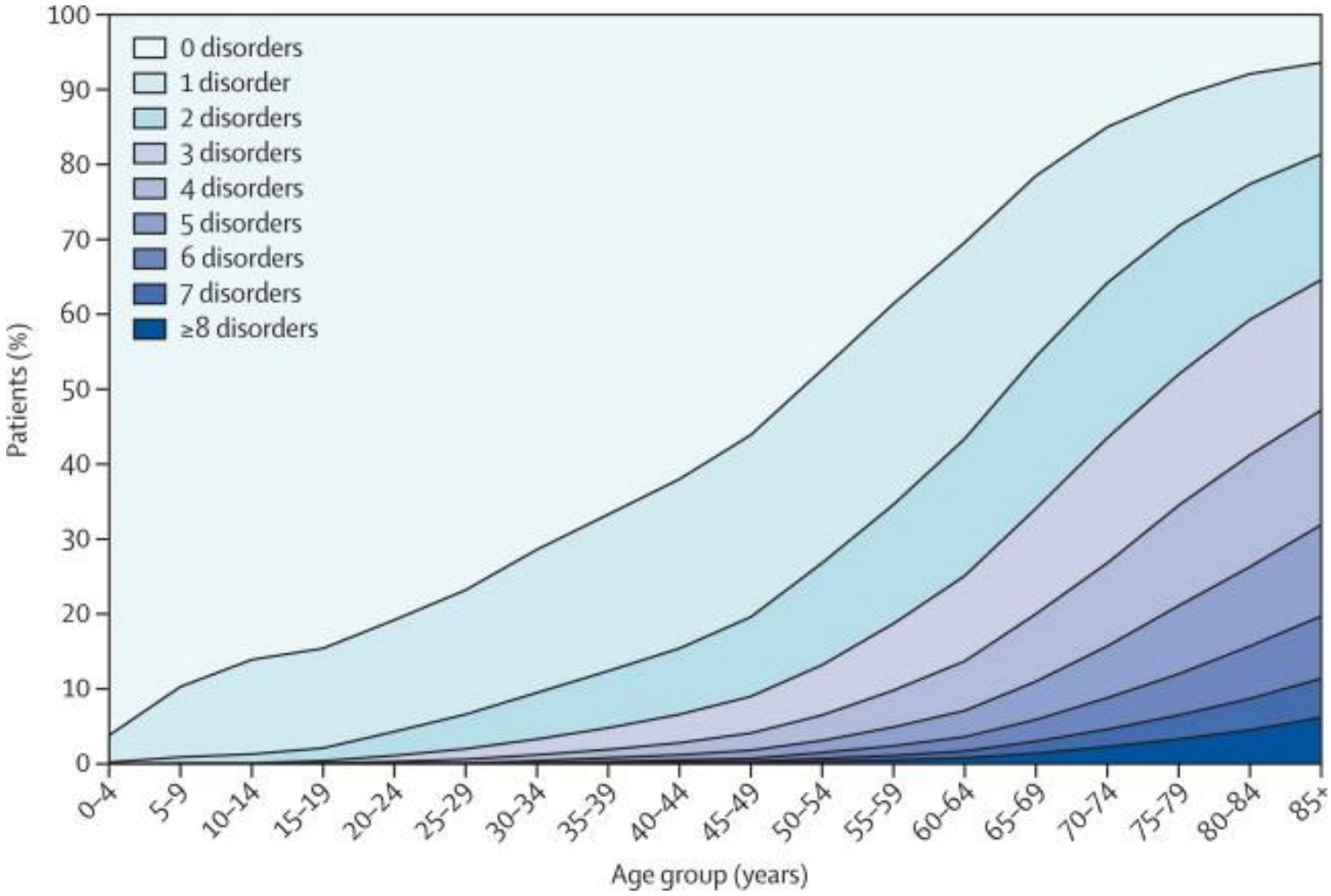
57 NH

7 EU + Israel

Funded by FP7



Number of chronic disorders by age-group



The Lancet 2012;380:37-43

Polypharmacy in NH

Europe (SHELTER)

N=4023

Excessive polypharmacy (≥10 drugs) in 24.3% residents

Mean n of drugs=7

Onder, J Gerontol Med Sci. 2012

US

N=13403

Concurrent use of ≥9 medications in 39.7% residents

Mean n of drugs=8

Dwyer , Am J Geriatr Pharmacother 2010

Polypharmacy in NH

Europe (SHELTER)

Drug Class	All $n = 4,023$ (%)
Laxatives	1,680 (41.8)
Antiulcer drugs	1,645 (40.9)
Aspirin and antiaggregants	1,518 (37.7)
Benzodiazepines	1,448 (36.0)
Antidepressants	1,431 (35.6)
Diuretics	1,429 (35.5)
Analgesics	1,382 (34.4)
Antipsychotics	1,063 (26.4)
Angiotensine converting enzyme inhibitors	925 (23.0)
Beta blockers	910 (22.6)
Antiosteoporosis drugs (including vitamin D)	753 (18.7)
Calcium channel blockers	674 (16.8)
Statins	595 (14.8)
Antidementia drugs	429 (10.7)

Onder, J Gerontol A Biol Sci Med Sci. 2012

US

Therapeutic Class	Residents Taking Medication, %
Laxatives	47.5
Antidepressants	46.3
Nonnarcotic analgesics	43.6
Gastrointestinal agents for acid/ peptic disorders	43.3
Antipyretics	41.2
Diuretics	35.0
Antiarthritics	31.2
Replenishers/regulators of electrolytes/ water balance	31.2
Antipsychotics or antimanics	25.9
Angiotensin-converting enzyme inhibitors	23.6

Dwyer , Am J Geriatr Pharmacother 2010

Consequences of polypharmacy

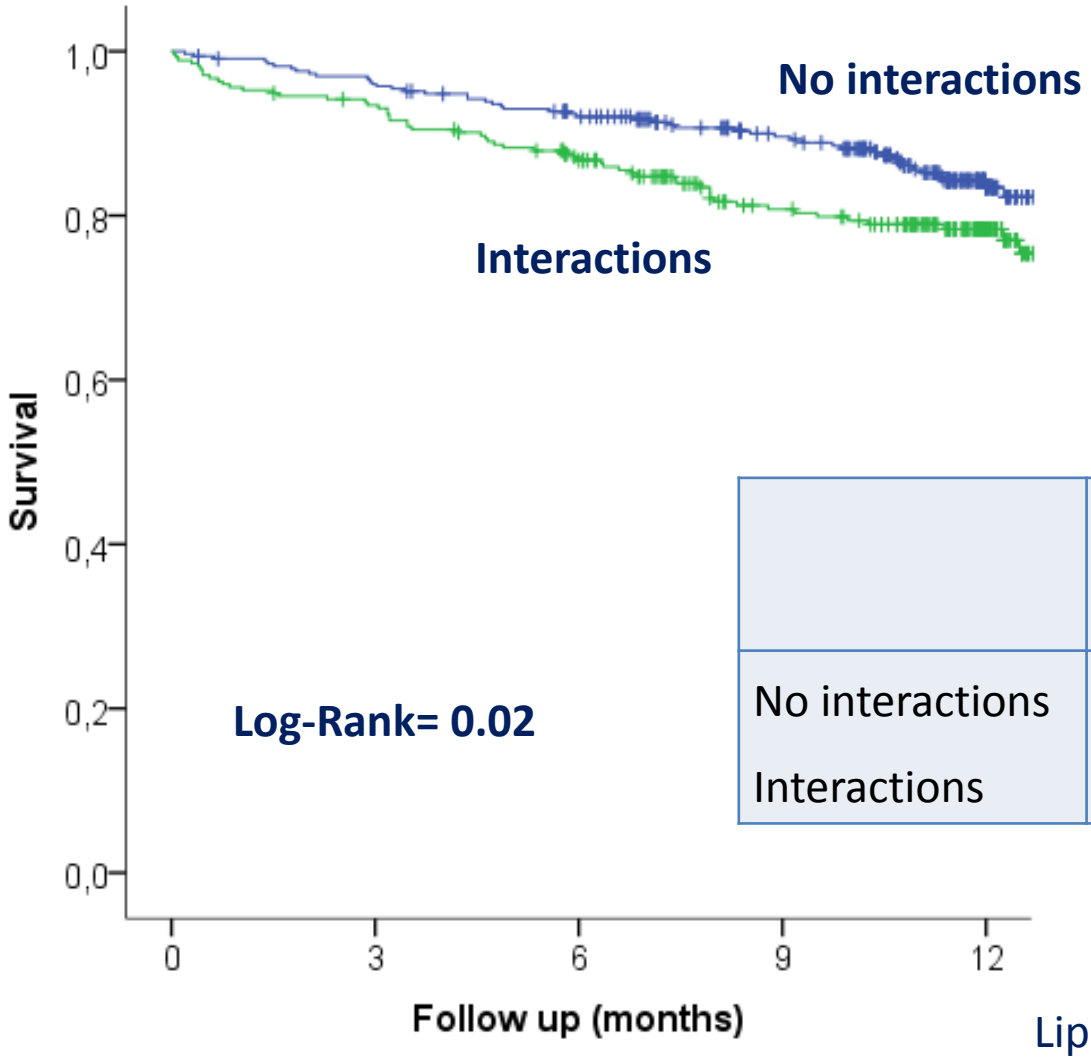
Drug-drug interactions

Antipsychotic drug interactions: SHELTER (n=604)

Potential Adverse Effects caused from interactions with antipsychotics	n (%)
• Decreased blood pressure and falls	210 (34.8%)
• QT prolongation	44 (7.3%)
• Sedation	43 (7.1%)
• Interactions with inhibitors of cytochrome p450	9 (1.5%)
• Anticholinergic effects	2 (0.3%)
All	**278 (46.0%)**

Liperoti et al. J Clin Psychiatry *in press*

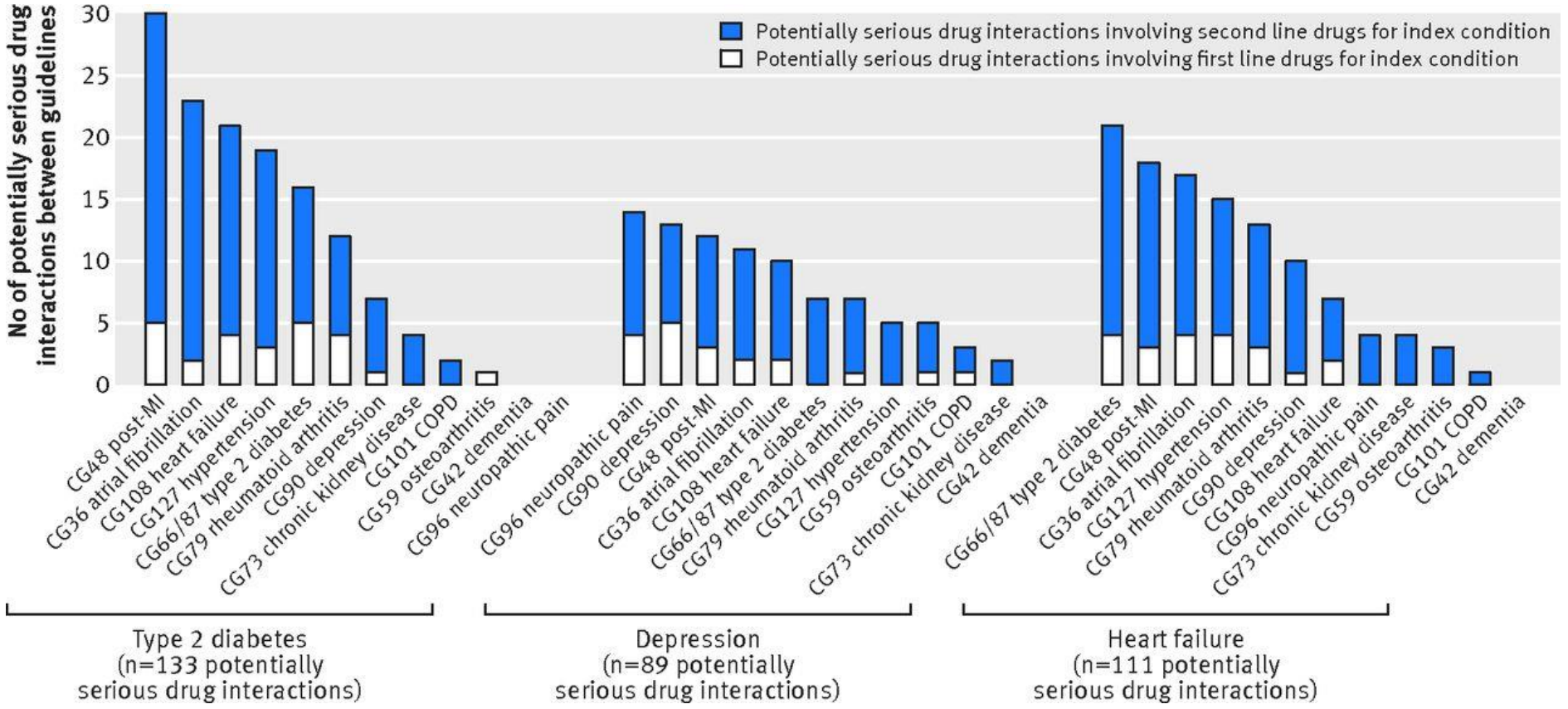
Antipsychotic drug interactions: SHELTER (n=604)



	Incident rate per person-year	RR (95% CI)
No interactions	0.17	1
Interactions	0.26	1.68 (1.13-2.49)

Liperoti et al. J Clin Psychiatry *in press*

Potentially serious drug-drug interactions between drugs recommended by clinical guidelines for 3 index conditions and drugs recommended by each of other 11 other guidelines



Dumbreck et al BMJ 2015

thebmj

BMJ 2015;350:h1059 doi: 10.1136/bmj.h1059 (Published 11 March 2015)

EDITORIALS

Guidelines, polypharmacy, and drug-drug interactions in patients with multimorbidity

A cascade of failure

Alessandra Marengoni *assistant professor*[1 2], Graziano Onder *assistant professor*[2 3]

One of the biggest challenges in preventing **drug-drug interactions is the substantial gap between theory and clinical practice**. Despite specific regulatory pathways for drug development and marketing, we have so far failed to consider pharmacological agents in a holistic way. **Drugs have a network of effects that go well beyond a single specific drug target, particularly in patients with multimorbidity.**

Consequences of polypharmacy

Drug-drug interactions

Drug-disease interactions

Poor adherence

Inappropriate drug use

Medication errors

Consequences of polypharmacy

Drug-drug interactions
Drug-disease interactions
Poor adherence
Inappropriate drug use
Medication errors

Poor quality of life
Hospitalization
Mortality
Increased costs

Primary care clinicians' experiences with treatment decision-making for older persons with multiple conditions

… clinicians would benefit from a number of tools to assist them in decision making for older persons with multiple conditions… the concept of tailoring therapy based on a consideration of patients' ability to adhere has not received much attention in the medical literature…

Fried et al. Arch Intern Med 2010

ARCHIVES OF INTERNAL MEDICINE

SPECIAL ARTICLES

Patient-Centered Care for Older Adults with Multiple Chronic Conditions: A Stepwise Approach from the American Geriatrics Society

American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity*

Guiding Principles:

1. Elicit and incorporate **patient preferences** into medical decision-making for older adults with multimorbidity.

The NEW ENGLAND JOURNAL of MEDICINE

Goal-Oriented Patient Care — An Alternative Health Outcomes Paradigm

David B. Reuben, M.D., and Mary E. Tinetti, M.D.

… focus on a patient's individual health goals within or across a variety of dimensions (e.g., symptoms; physical functional status, including mobility; and social and role functions) and determine how well these goals are being met…

NEJM FREE FULL TEXT Rubern DB NEJM 2012

Goal oriented care

Comparison of Traditional Disease-Specific and Goal-Oriented Outcomes.*

Measurement Domain	Examples of Diseases	Traditional Outcomes	Goal-Oriented Outcomes
Survival	Cancer, heart failure	Overall, disease-specific, and disease-free survival	None if survival not a high-priority goal; survival until personal milestones are met (e.g., grandchild's wedding)
Biomarkers	Diabetes, COPD	Change in indicators of disease activity (e.g., glycated hemoglobin level, CRP level, and pulmonary-function tests)	None (not a meaningful outcome observed or felt by patient)
Signs and symptoms	Heart failure, COPD, arthritis	Inventory of disease-specific signs and symptoms (e.g., dyspnea, edema, and back pain)	Symptoms that have been identified as important by the patient (e.g., control of dyspnea or pain sufficient to perform an activity such as bowling or walking grandchild to school)
Functional status, including mobility	Cancer, heart failure, COPD	Usually none or disease-specific (e.g., Karnofsky score, NYHA functional classification, and 6-minute walk test)	Ability to complete or compensate for inability to complete specific tasks identified as important by the patient (e.g., ability to get dressed without help)

NEJM FREE FULL TEXT Rubern DB NEJM 2012

Goal oriented care

1. Individually desired rather than universally applied health states;
2.It simplifies decision making for patients with multiple conditions by focusing on outcomes that span conditions and aligning treatments toward common goals
3. It prompts patients to articulate which health states are important to them and their relative priority

NEJM FREE FULL TEXT Rubern DB NEJM 2012

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1. Elicit and incorporate patient preferences into medical decision-making for older adults with multimorbidity.
2. Recognizing the **limitations of the evidence base**, interpret and apply the medical literature specifically to older adults with multimorbidity.

PREDICT study – Heart failure

Exclusion Criterion	Frequency, No. (%)
Upper age limit	64 (25.5)
Reduced life expectancy	91 (36.3)
Total comorbidity	201 (80.1)
Generic	26 (10.4)
Specific	190 (75.7)
Specific disease exclusions	
Renal	100 (39.8)
Liver	54 (21.5)
Neurologic	73 (29.1)
Lung	61 (24.3)
Cancer	42 (16.7)
Psychiatric	22 (8.8)
Other	85 (33.9)
Cognitive impairment	32 (12.7)
Physical disability	35 (13.9)
Exclusion by drug treatment	47 (18.7)
Polypharmacy[a]	14 (5.6)
Specific drug treatment	46 (18.3)
Inability to attend follow-up meeting	24 (9.6)
Hearing or visual deficits	11 (4.4)
Communication barriers	5 (2.0)

Among 251 trials, 64 (25.5%) excluded patients by an arbitrary upper age limit … 109 trials (43.4%) on heart failure had 1 or more poorly justified exclusion criteria …

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1. Elicit and incorporate patient preferences into medical decision-making for older adults with multimorbidity.
2. Recognizing the limitations of the evidence base, interpret and apply the medical literature specifically to older adults with multimorbidity.
3. Frame clinical management decisions within the context of risks, burdens, benefits, and **prognosis** for older adults with multimorbidity.

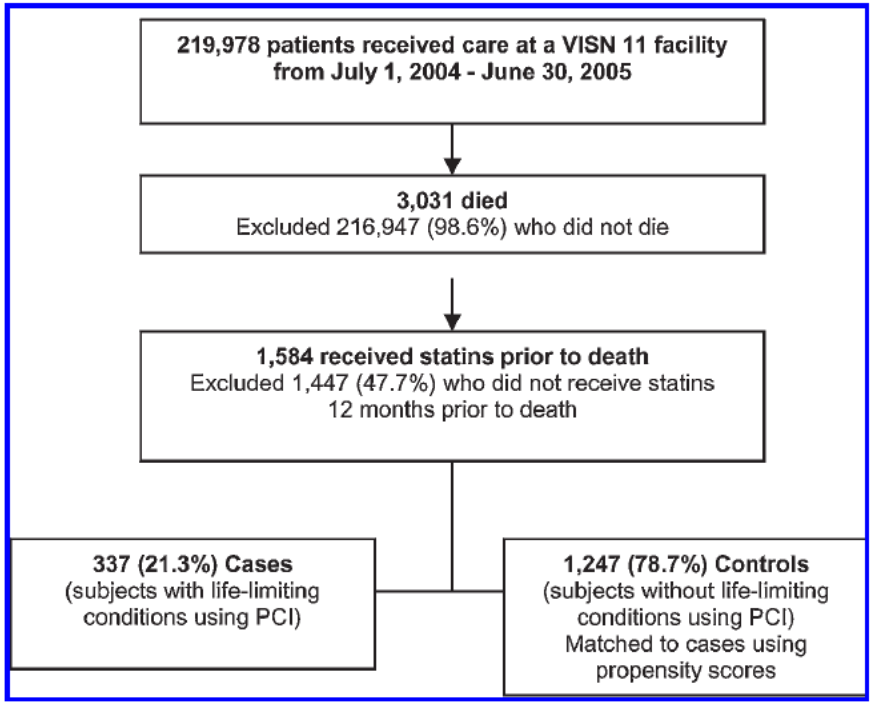
JOURNAL OF PALLIATIVE MEDICINE
Volume 11, Number 5, 2008

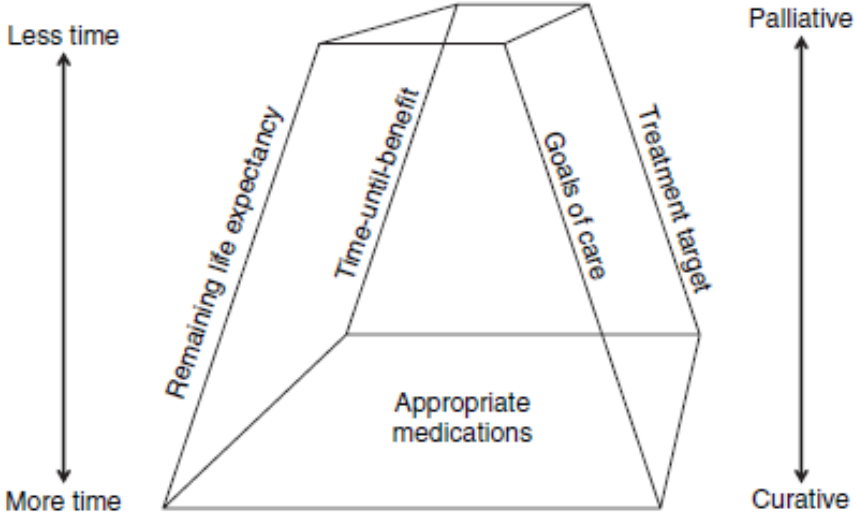
DOI: 10.1089/jpm.2007.0215

Statins in the Last Six Months of Life: A Recognizable, Life-Limiting Condition Does Not Decrease their Use

MARIA J. SILVEIRA, M.D., M.A., M.P.H.,[1,2] ANAMARIA SEGNINI KAZANIS, M.A., M.A.,[1] and MATTHEW P. SHEVRIN, B.A.[1]

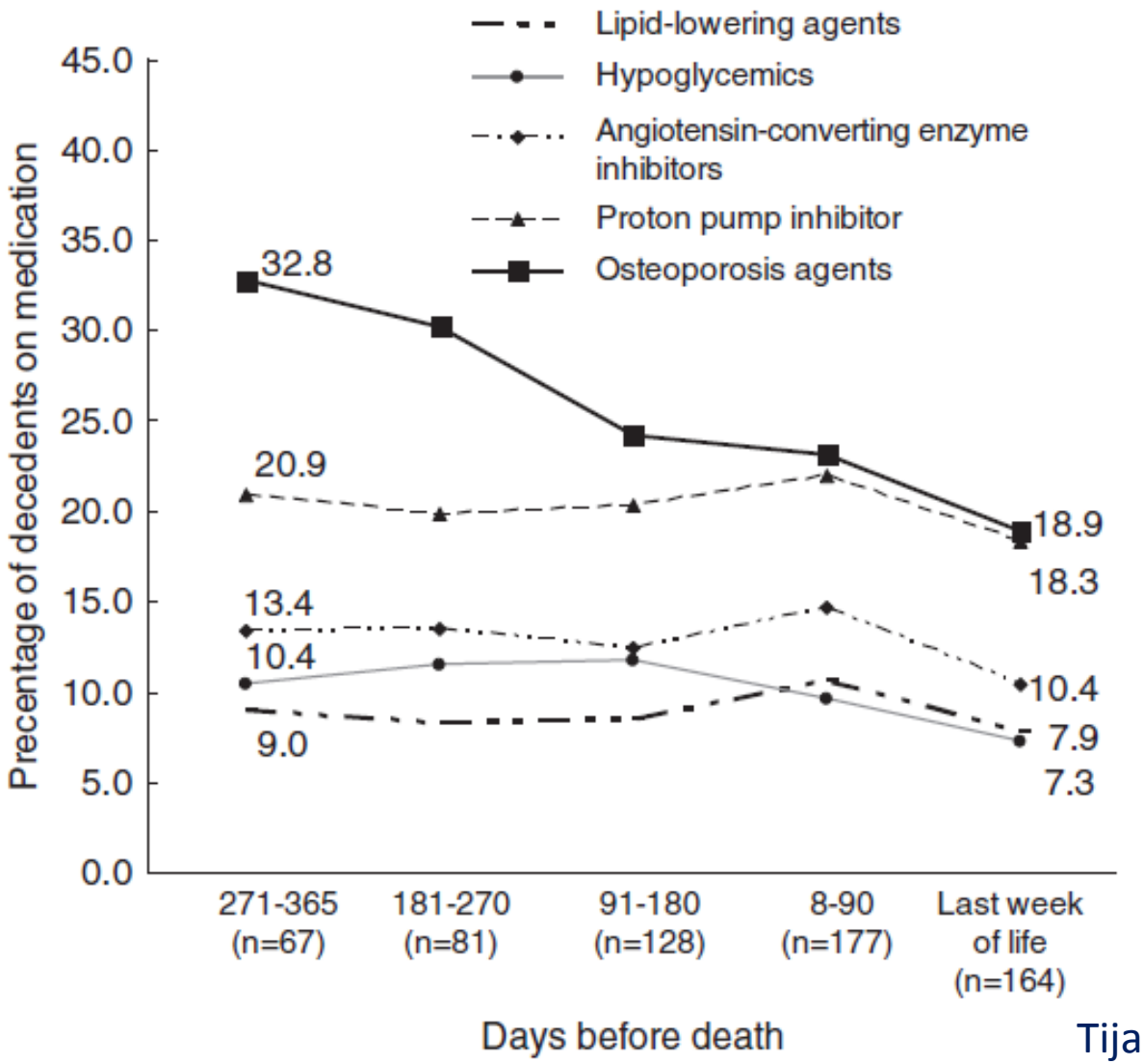
In conclusion, we find that statins are prescribed frequently in the last year of life for patients carrying recognizable, life-limiting conditions and that the patient's diagnosis does not appear to affect prescribing patterns. The small amount of discontinuation we did observe in the last 6 months of life occurs for reasons we have yet to understand. Still, our findings highlight an area for discussion as a specialty and potential intervention in the future.





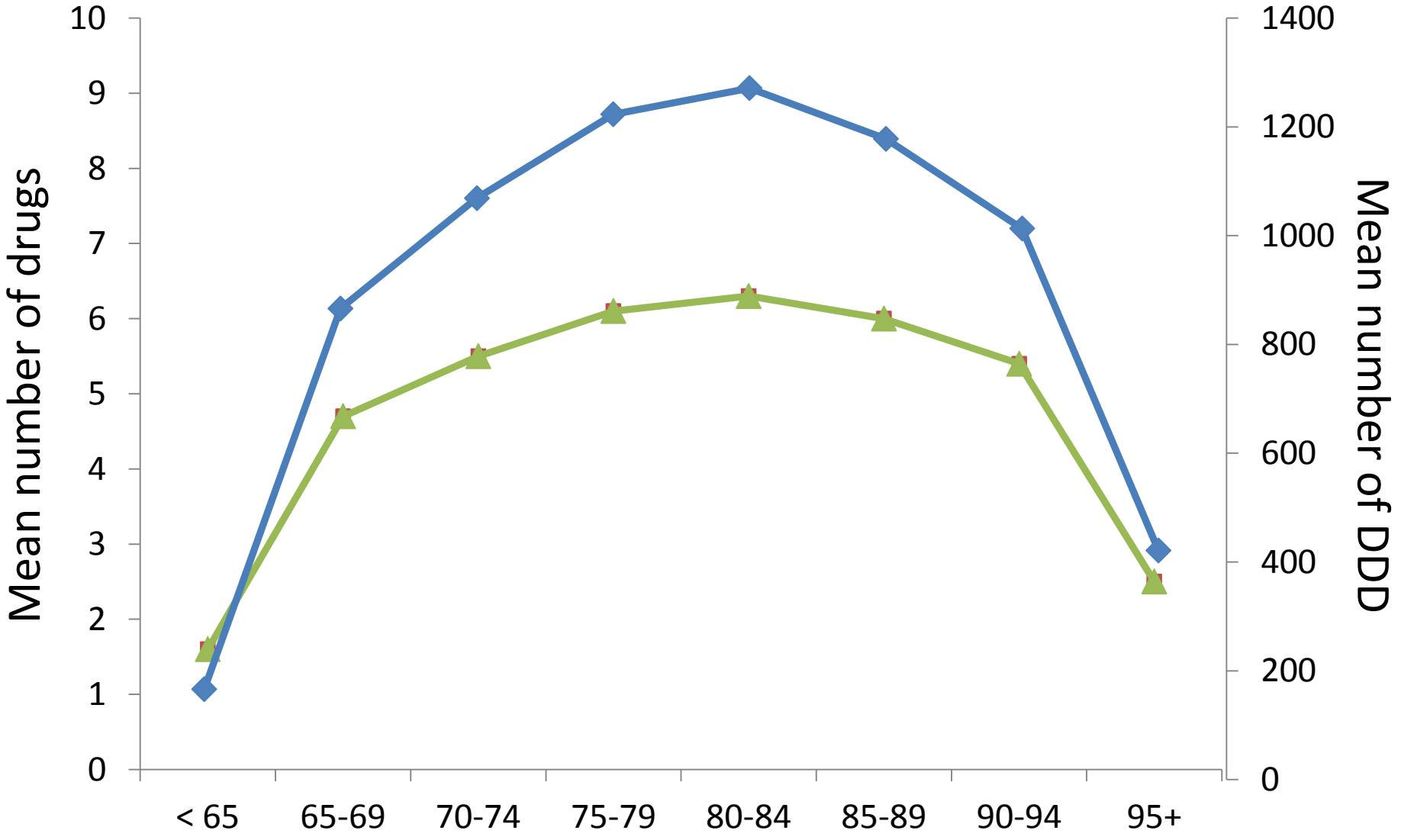
Holmes, Clin Pharmacol Ther 2009

Daily Medication Use in NH Residents with Advanced Dementia



Tija et al, J Am Geriatr Soc 2010

Drug use in Italy (n=15,931,642)



Onder G et al. JAMDA 2015

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Guiding Principles:

4. Consider **patients complexity** and **treatment feasibility** when making clinical management decisions for older adults with multimorbidity.

Treatment of non dementia illness in patients with dementia

Problems	Consequences	Responses
Cognition and language	Decreased decision-making capacity Increased caregiver burden Increased risk of diagnostic procedures Adherence problems Difficulty reporting adverse effects Difficulty titrating medicines based on reporting by patient	Consider altered risk-benefit ratio balancing safety and autonomy Adjust communication strategies
Decreased life expectancy	Decreased potential benefit	Consider altered risk-benefit ratio Reserve therapy/screening for those with sufficient life expectancy to realize benefit
Exclusion from studies	Increased uncertainty about effects of therapy in this group	Policy changes to include patients with dementia in appropriate studies

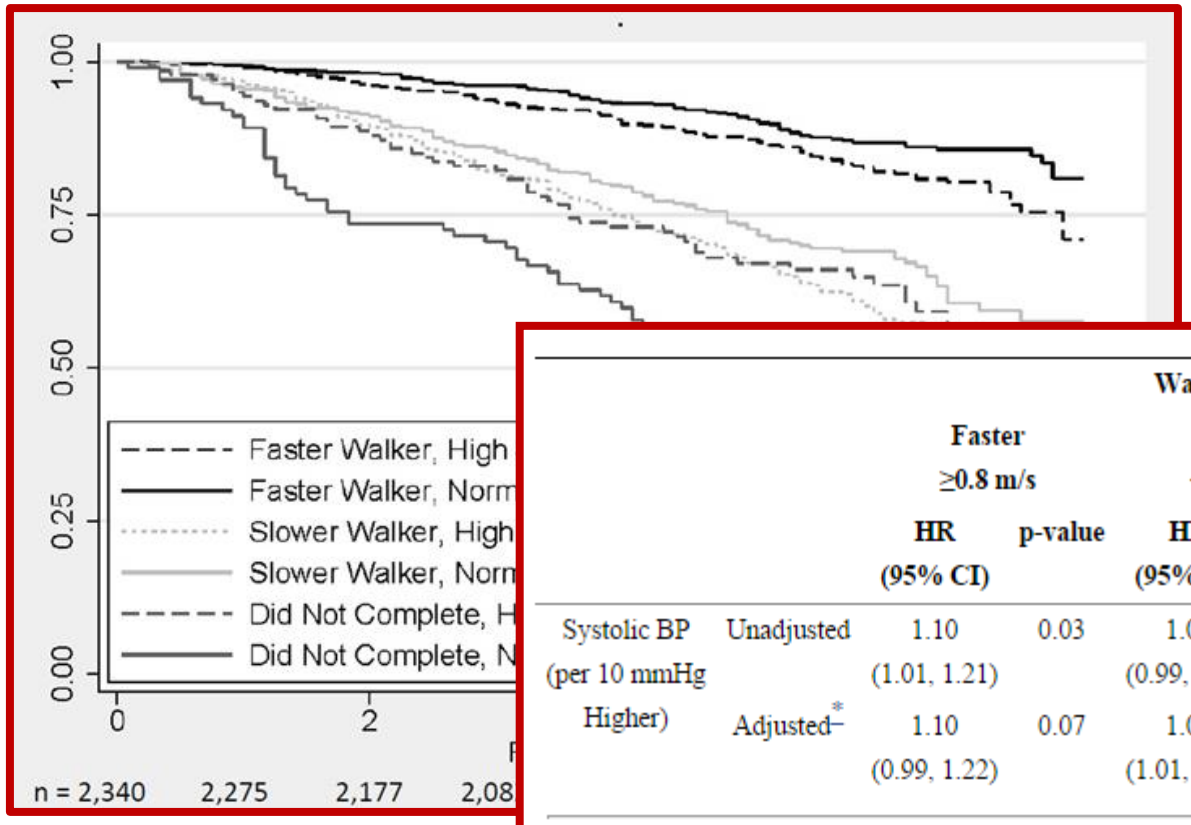
Brauner et al. JAMA 2000

The Care of Persons with Advanced Dementia: Identifying Appropriate Medication Use

Rarely appropriate		
Alpha blockers	Antiandrogens	Appetite stimulants
Digoxin	Bisphosphonates	Bladder relaxants
Clonidine	Mineralocorticoids	Tamsulosin
Antiarrhythmics	Heparin and low molecular-weight heparins	Antispasmodics
Hydralazine	Warfarin	
Never appropriate		
Lipid-lowering medications	N-methyl-D-aspartate receptor antagonists (memantine)	Cytotoxic chemotherapy
Antiplatelet agents, excluding aspirin	Antiestrogens	Hormone antagonists
Leukotriene receptor antagonists	Sex hormones	Immunomodulators
Acetylcholinesterase inhibitors		

Holmes HM et al. J Am Geriatr Soc. 2008

Hypertension, functional status and mortality



		Walking Speed: Faster ≥0.8 m/s HR (95% CI)	p-value	Slower < 0.8 m/s HR (95% CI)	p-value	Did not complete HR (95% CI)	p-value	p-value for interaction
Systolic BP (per 10 mmHg Higher)	Unadjusted	1.10 (1.01, 1.21)	0.03	1.04 (0.99, 1.09)	0.11	0.80 (0.73, 0.87)	<0.001	<s0.001
	Adjusted*	1.10 (0.99, 1.22)	0.07	1.06 (1.01, 1,11)	0.02	0.75 (0.67, 0.84)	<0.001	<0.001
Diastolic BP (per 10 mmHg Higher)	Unadjusted	0.97 (0.86, 1.11)	0.67	0.91 (0.82, 1.02)	0.10	0.70 (0.58, 0.85)	0.001	0.03
	Adjusted*	1.05 (0.92, 1.20)	0.44	0.95 (0.85, 1.06)	0.32	0.77 (0.60, 0.98)	0.04	0.04

Odden et al Arch Intern Med 2012

Drug-Geriatric Syndrome interactions

NH (SHELTER) *N=4023*	*Interacting drugs*
Delirium (n=691)	65.7%
Falls (n=774)	79.1%
Incontinence (n=3098)	72.2%
Malnutrition (n=391)	66.8%

HC (IBenC) *N=1778*	
Delirium (n=252)	77.8%
Falls (n=372)	36.3%
Incontinence (n=806)	60.4%
Malnutrition (n=161)	37.9%

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Guiding Principles:

4. Consider treatment complexity and feasibility when making clinical management decisions for older adults with multimorbidity.
5. Use strategies for choosing **therapies that optimize benefit, minimize harm, and enhance quality of life** for older adults with multimorbidity.

Avoid un-necessary drugs
Herbal medications

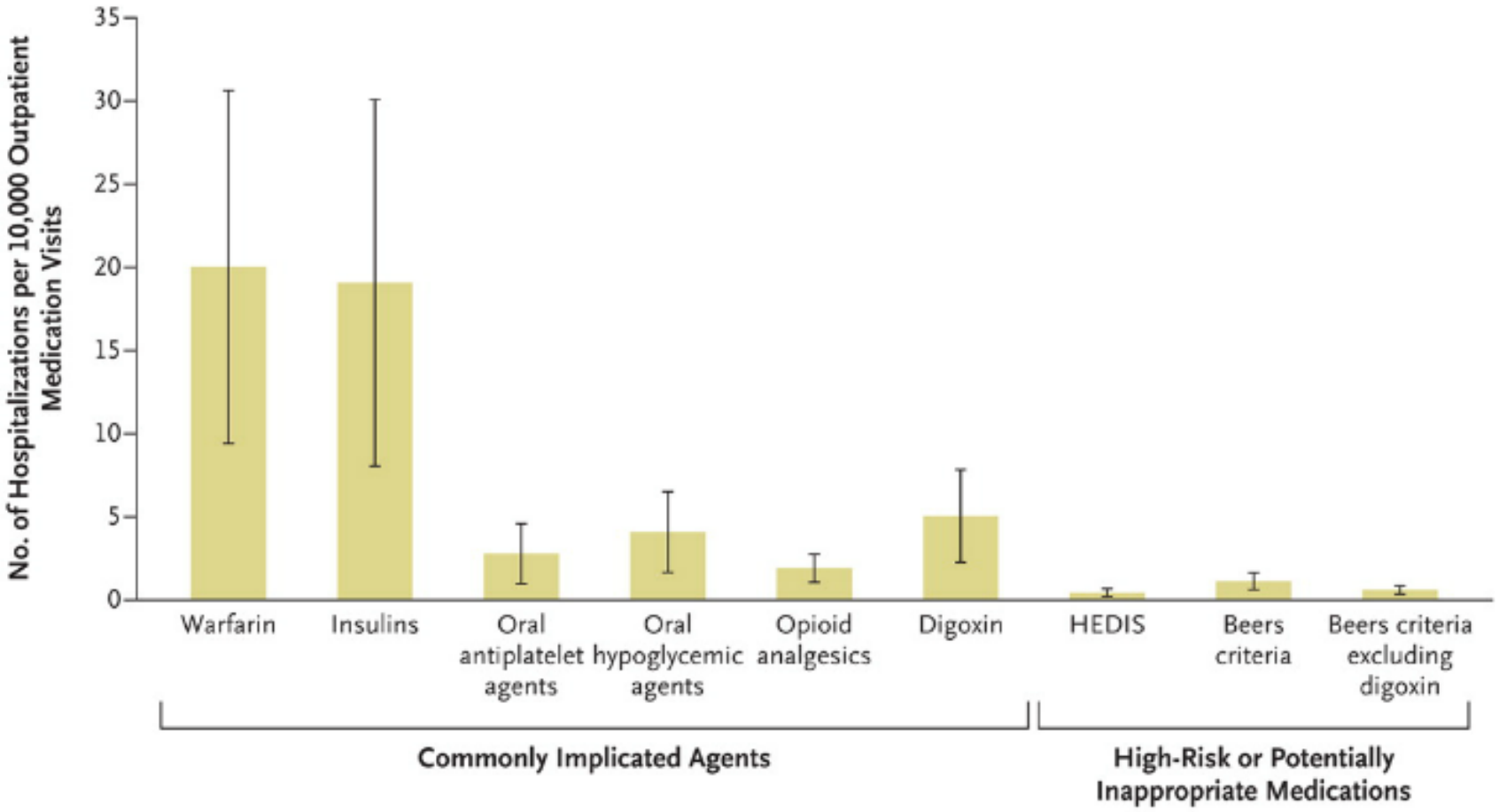
Herbal meds:

- Not regulated
- No proofs of safety and efficacy
- Contamination
- Concentration (?)
- Side effects

Onder G et al. JACC in press

Onder G et al. JAMA 2016

Rates of Emergency Hospitalizations for ADE in Older U.S. Adults.



Budnitz et al. NEJM 2011

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Journals of Gerontology: Medical Sciences
cite as: *J Gerontol A Biol Sci Med Sci*, 2016, Vol. 00, No. 00, 1–2
doi:10.1093/gerona/glw115
Advance Access publication June 24, 2016

OXFORD

Potentially Inappropriate Drug Prescribing and the "Never Change a Winning Team" Principle

Graziano Onder,[1] Alessandro Nobili,[2] and Alessandra Marengoni[3]

The NCWT principle is based on the idea that **winning serves as an indicator that a particular combination of players functions well**. Can this principle apply to older patients on PID and stable health conditions?

1. Uncertainties related to prescribing in older adults;
2. Drug cessation may lead to adverse drug withdrawal reactions;

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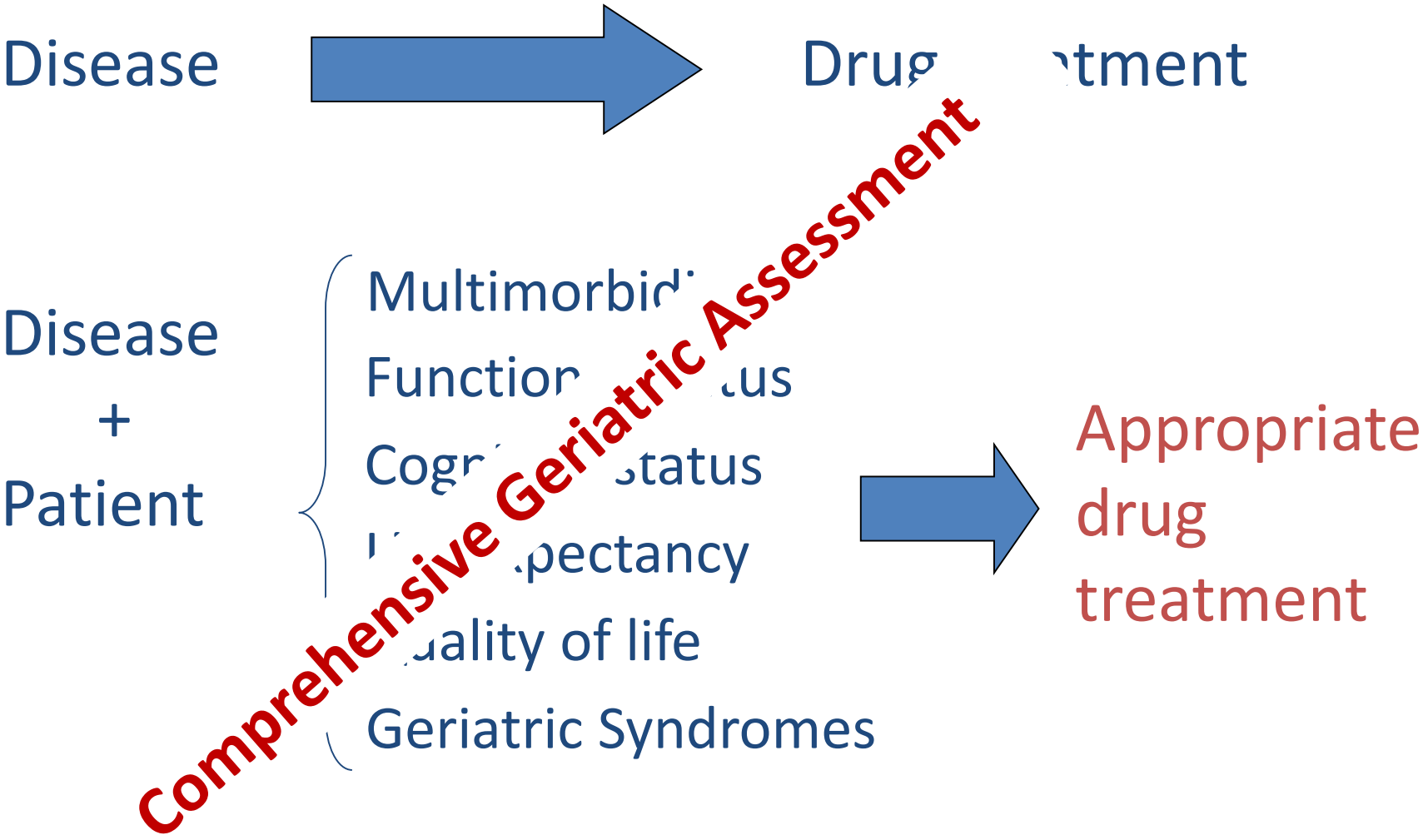
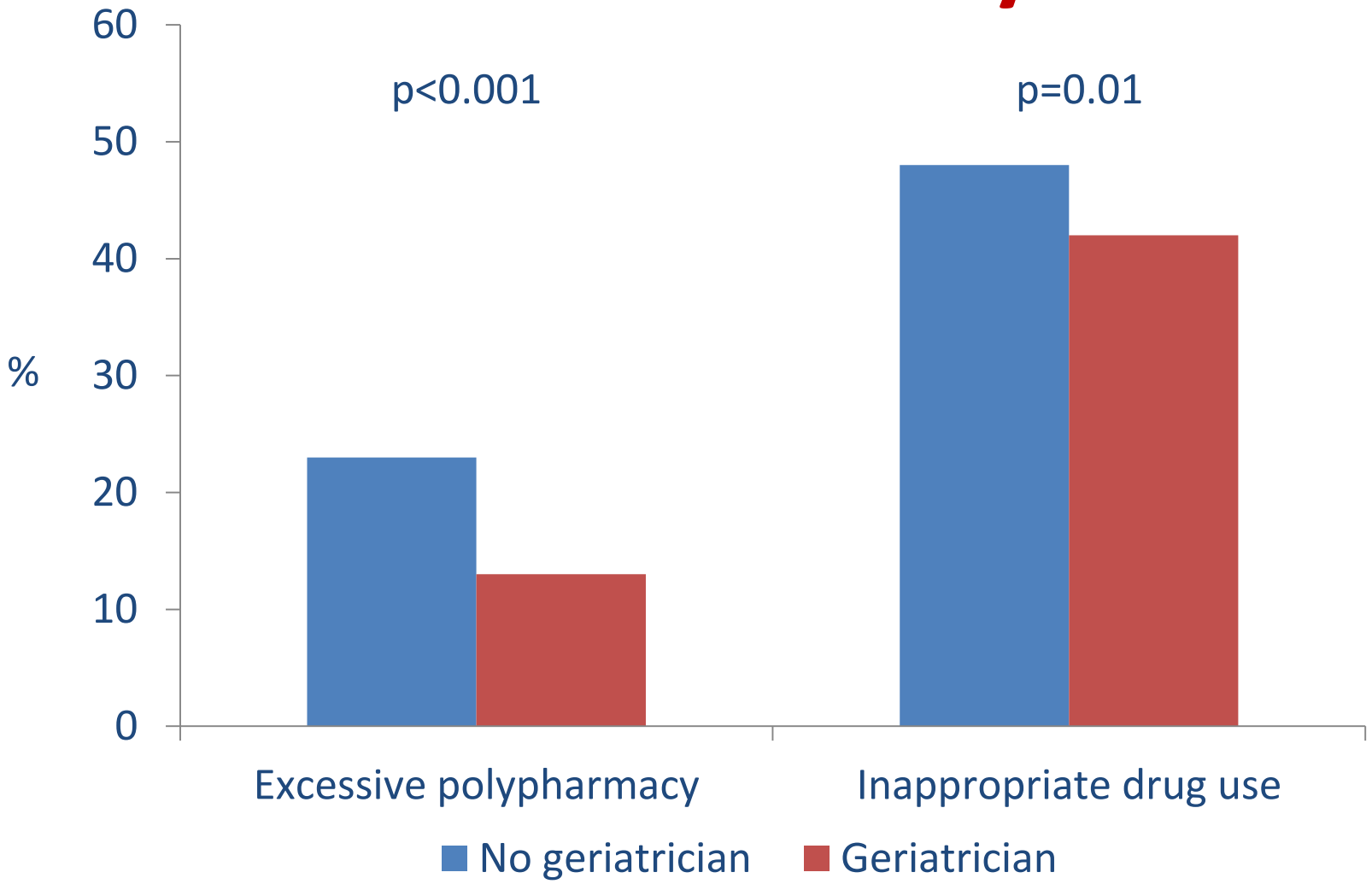
3. New drug to replace PID may be unrewarding and cause side effects;
4. Patient Individuality;
5. Selection Bias in Long-term Users of PID;
6. Ability to Adhere and Manage Treatment;
7. Patient Preferences

Prescribing



Geriatric care and prescribing in NH: SHELTER study



Onder G . J Gerontol Med Sci 2012

Available approaches

	Effect on clinical outcomes	Domain
Medication review	?	Drugs
Inappropriate meds	+/-	Drugs
Computer-based prescribing systems	?	Drugs
Comprehensive Geriatric Assessment	+ (few studies)	Global assessment

Combined approaches?

Onder G et al. Age Ageing 2013

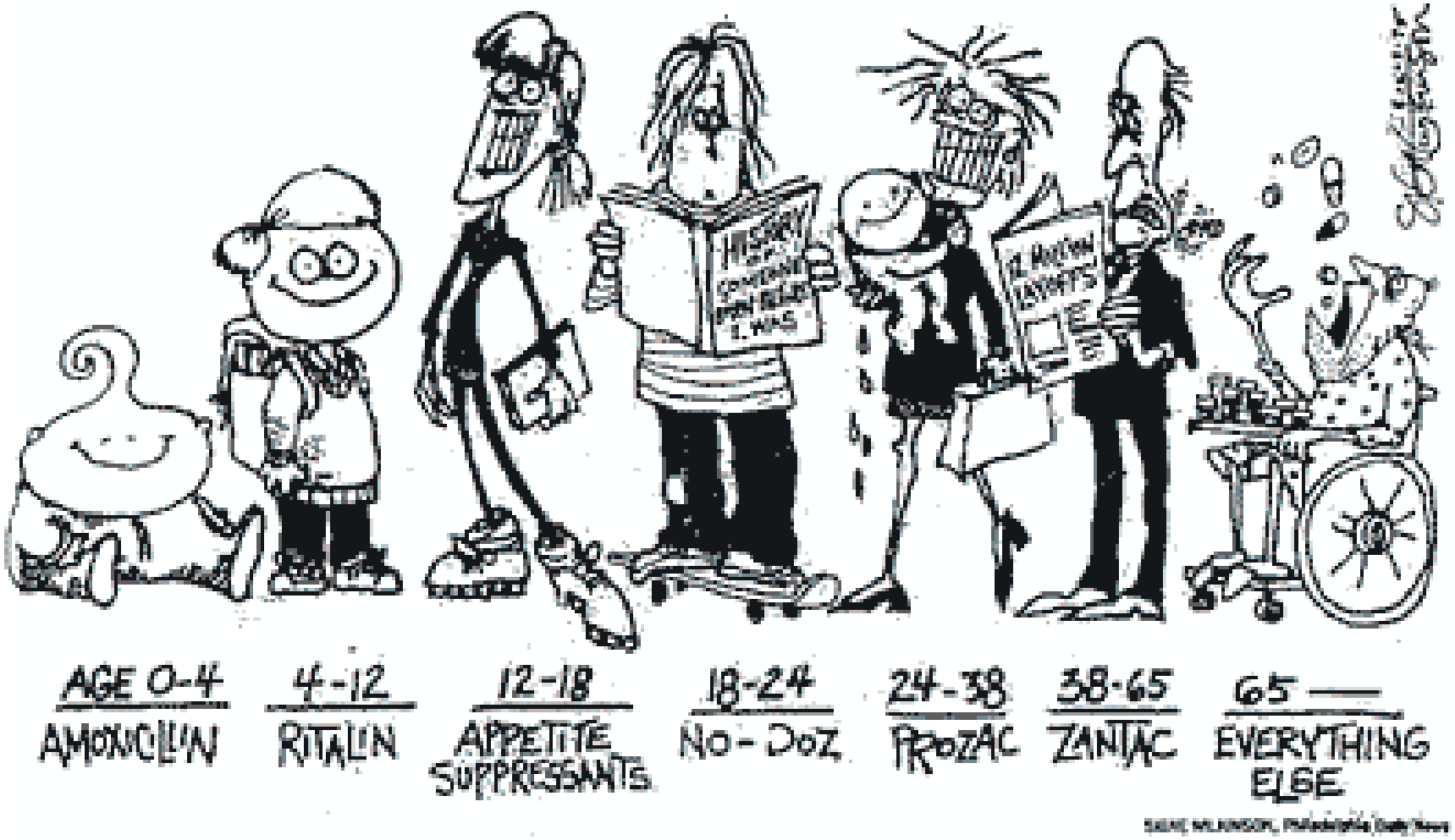
RCT on pharmacists working in the GEMU Meds review + CGA

Author	Population	Design	Intervention	Results
Klopotowska *et al.* [16]	115 patients in ICU (mean age 63 years)	RCT	Hospital pharmacist reviewed medication orders for patients admitted to the ICU and discussed those during patient review meetings with the attending ICU physicians	Preventable adverse drug events were reduced from 4.0 per 1,000 monitored patient-days during the baseline period to 1.0 per 1,000 monitored patient-days during the intervention period ($P = 0.25$).
Schnipper *et al.* [17]	322 in-hospital patients (62% age >60 years)	RCT	Computerised medication reconciliation tool and process redesign involving physicians, nurses and pharmacists	Adverse drug events rate was 1.44 per patient among control patients and 1.05 per patient among intervention patients (adjusted relative risk, 0.72; 95% CI: 0.52–0.99)
Kucukarslan *et al.* [18]	165 in-hospital patients (mean age 55 years)	RCT	Rounding team including a pharmacist	Rate of preventable adverse drug events was reduced by 78%, from 26.5 per 1000 hospital days to 5.7 per 1,000 hospital days
Leape *et al.* [19]	75 patients in ICU	RCT	A senior pharmacist made rounds with the ICU team and remained in the ICU for consultation in the morning and was available on call throughout the day	The rate of preventable ordering adverse drug events decreased by 66%, from 10.4 per 1,000 patient-days (95% confidence interval CI: 7–14) before the intervention to 3.5 (95% CI: 1–5; $P < 0.001$) after the intervention. In the control unit, the rate was essentially unchanged during the same time periods: 10.9 (95% CI: 6–16) and 12.4 (95% CI: 8–17) per 1,000 patient-days

Onder G et al. Age Ageing 2013

Conclusions

1. Polypharmacy is common in NH residents
2. Lack of rules on treatment
3. Consider patiens preferences
4. Evaluate of complexity to improve drug prescribing in NH
5. CGA and management have a key role in this process


AGE 0-4
AMOXICLLIN
4-12
RITALIN
12-18
APPETITE SUPPRESSANTS
18-24
NO-DOZ
24-38
PROZAC
38-65
ZANTAC
65 ——
EVERYTHING ELSE