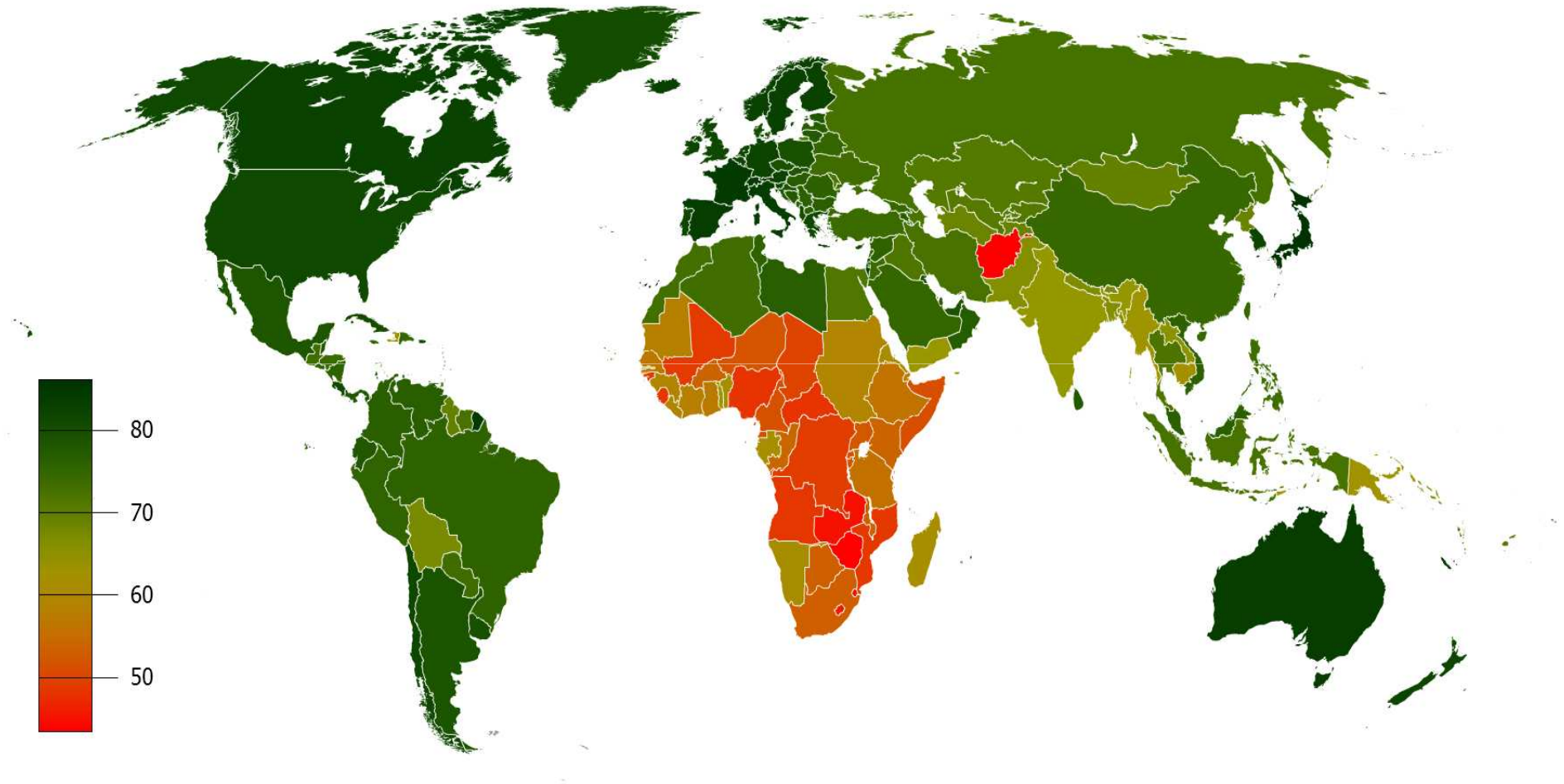


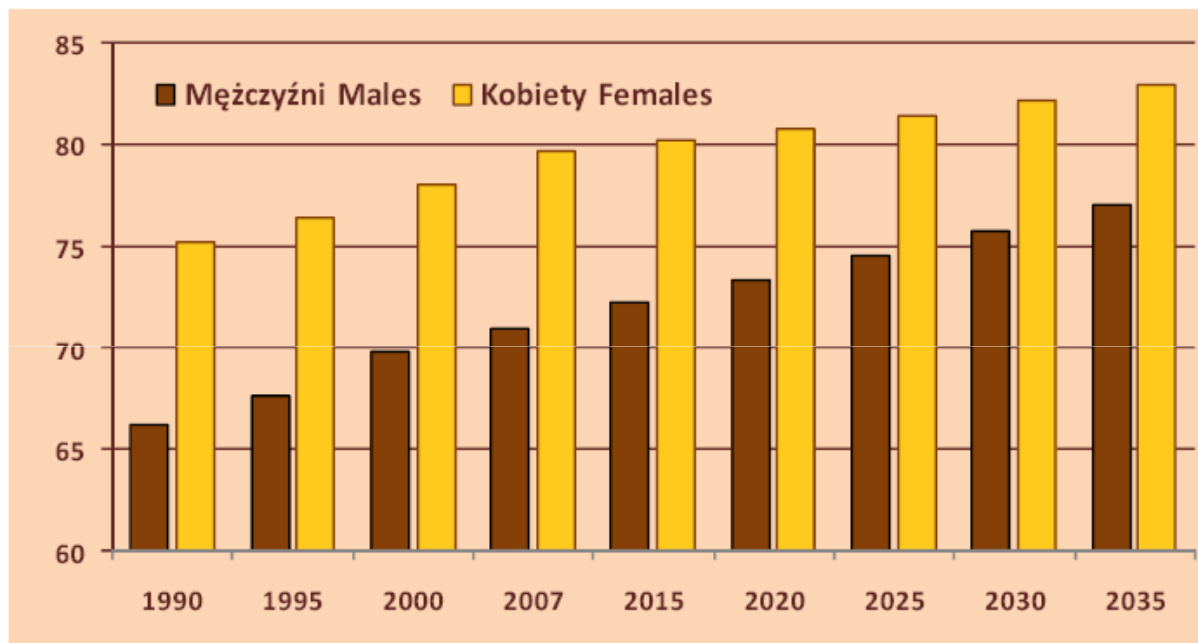
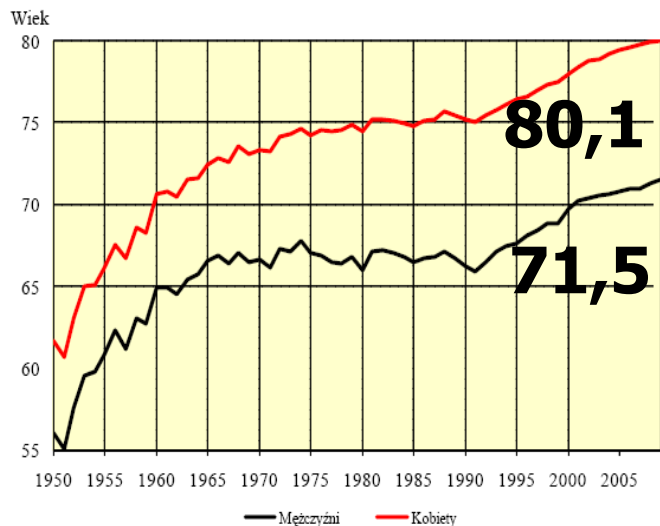
Innovative hospital Friendly hospital for elderly patients

Dr Barbara Gryglewska Prof. Tomasz Grodzicki
Department of Internal Medicine and Geriatrics
University Hospital, Cracow

Life expectancy



Life expectancy in Poland



13,5% ≥ 65 y.

5, 161 5 mln

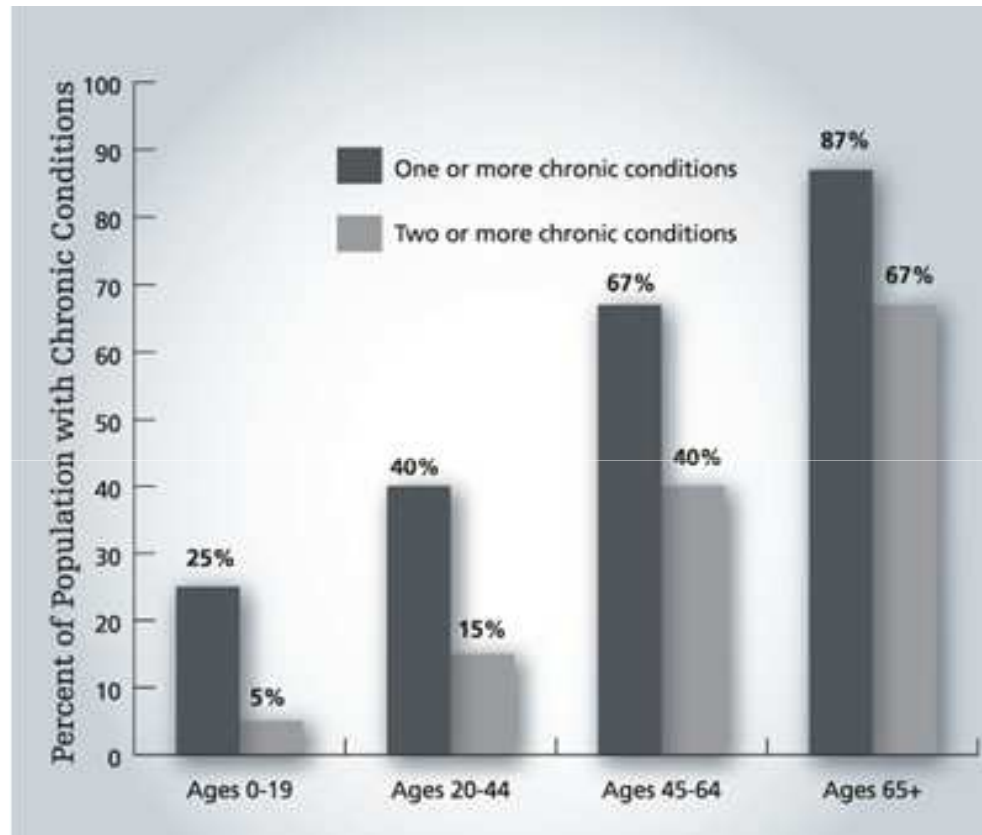
62,3% female

a) dla lat: 1990, 1995, 2000, 2007 – dane rzeczywiste
for: 1990, 1995, 2000, 2007 – actual data

Data GUS 2009

Chronic Disease

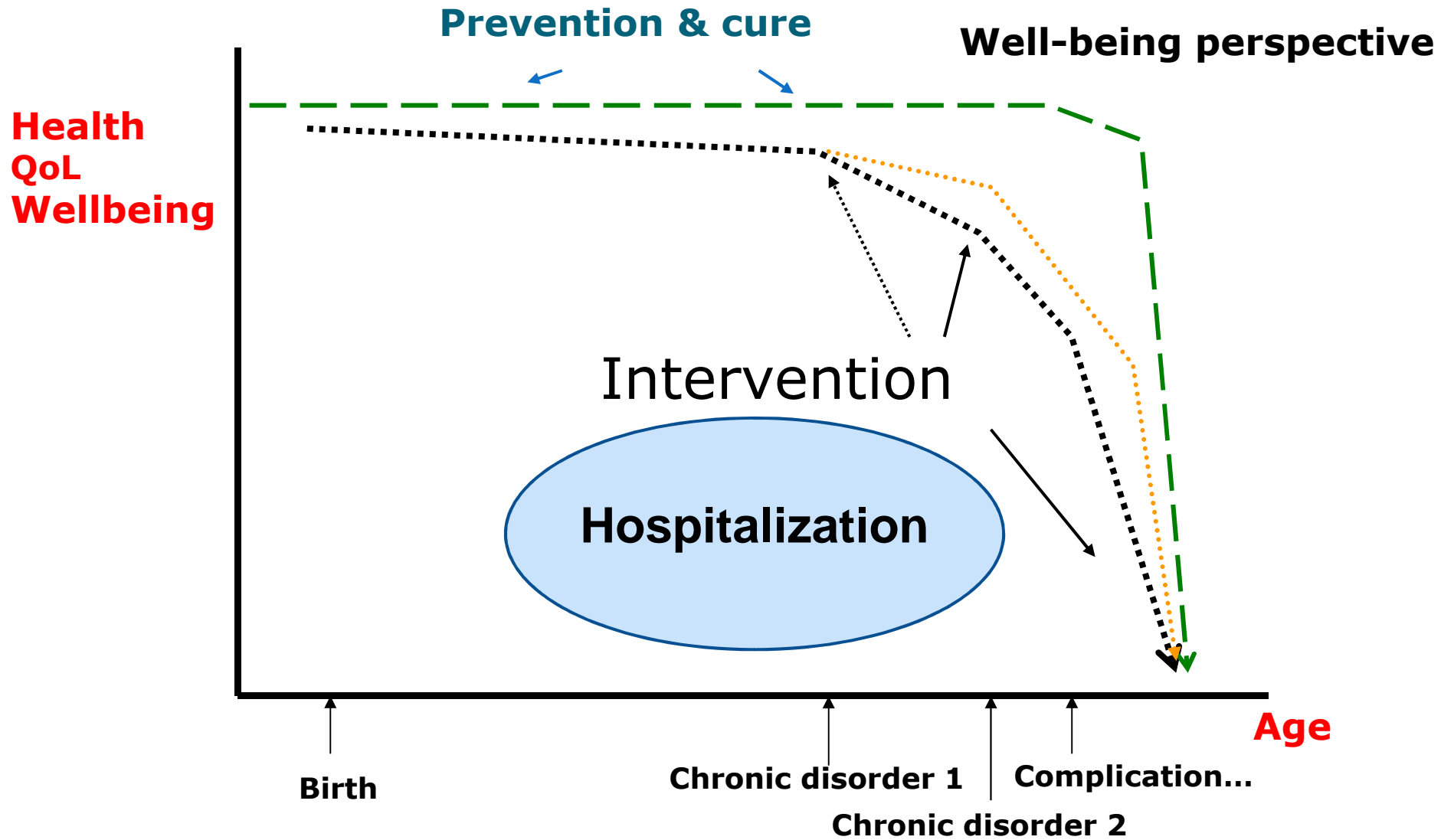
Age—A Major Risk Factor



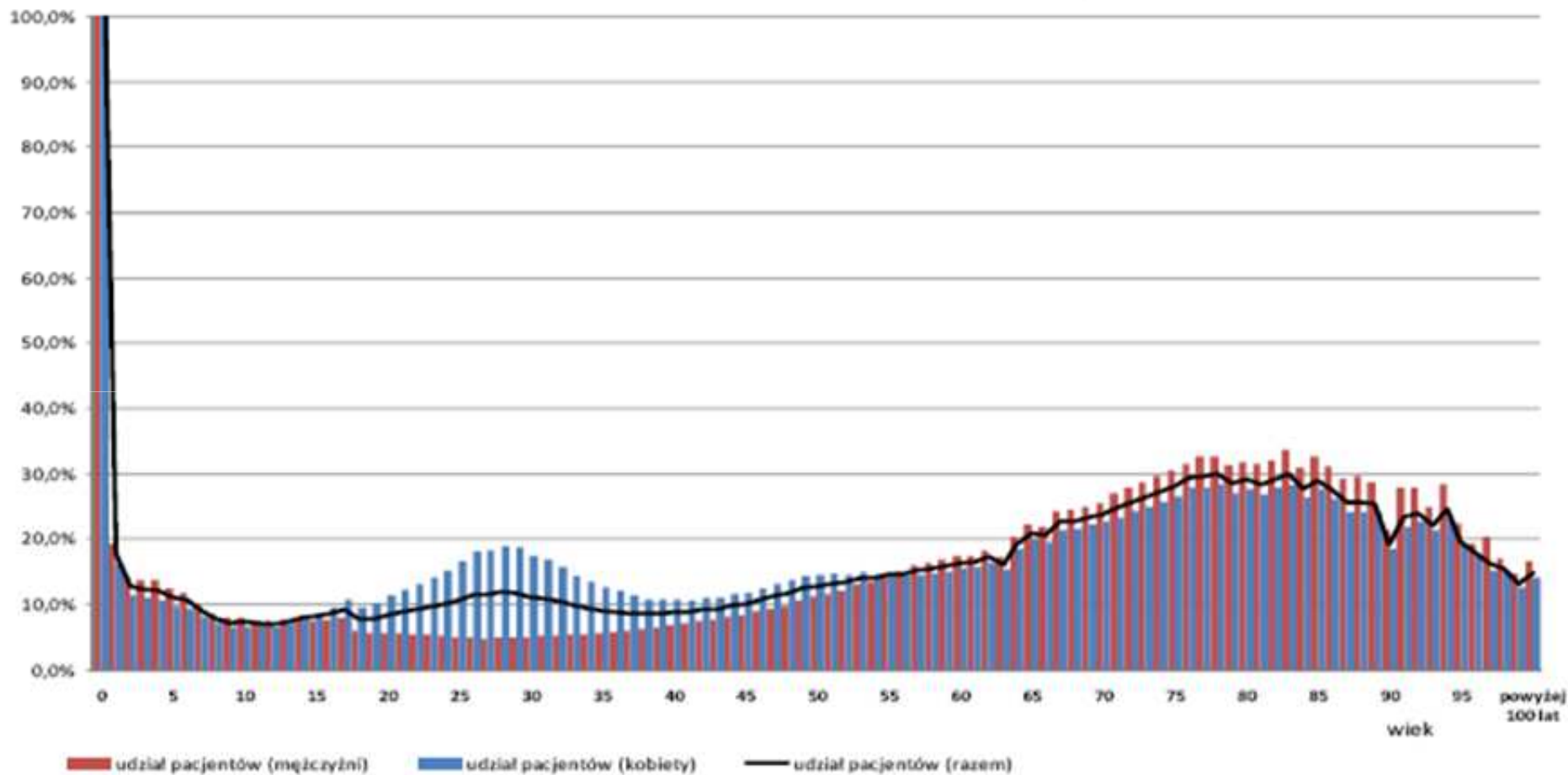
Older Adults are More Likely to Have Multiple Chronic Conditions

The Silver Book: Chronic Disease and Medical Innovation in an Aging Nation

Ideal ageing

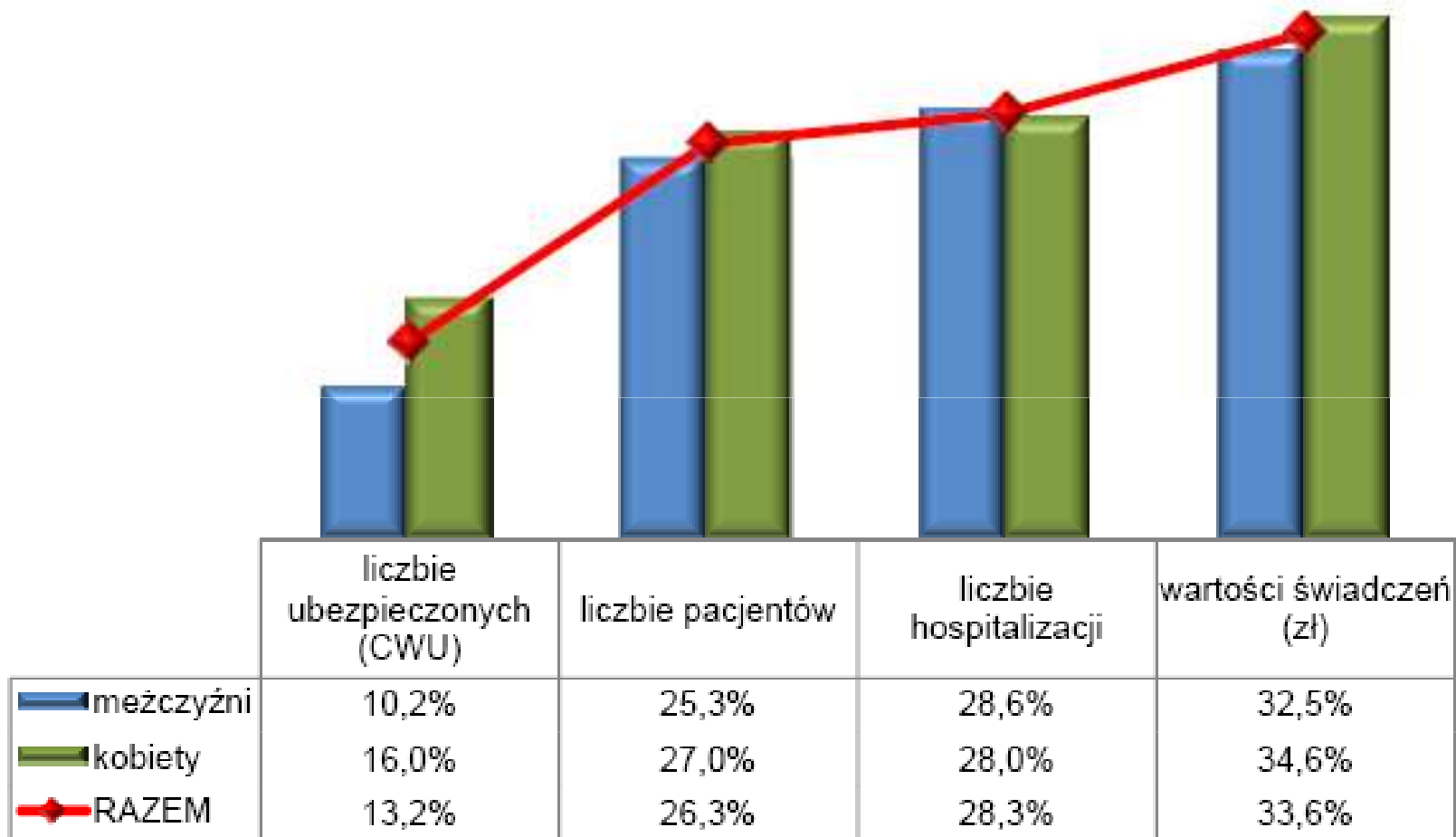


Hospitalizations in the elderly - Poland



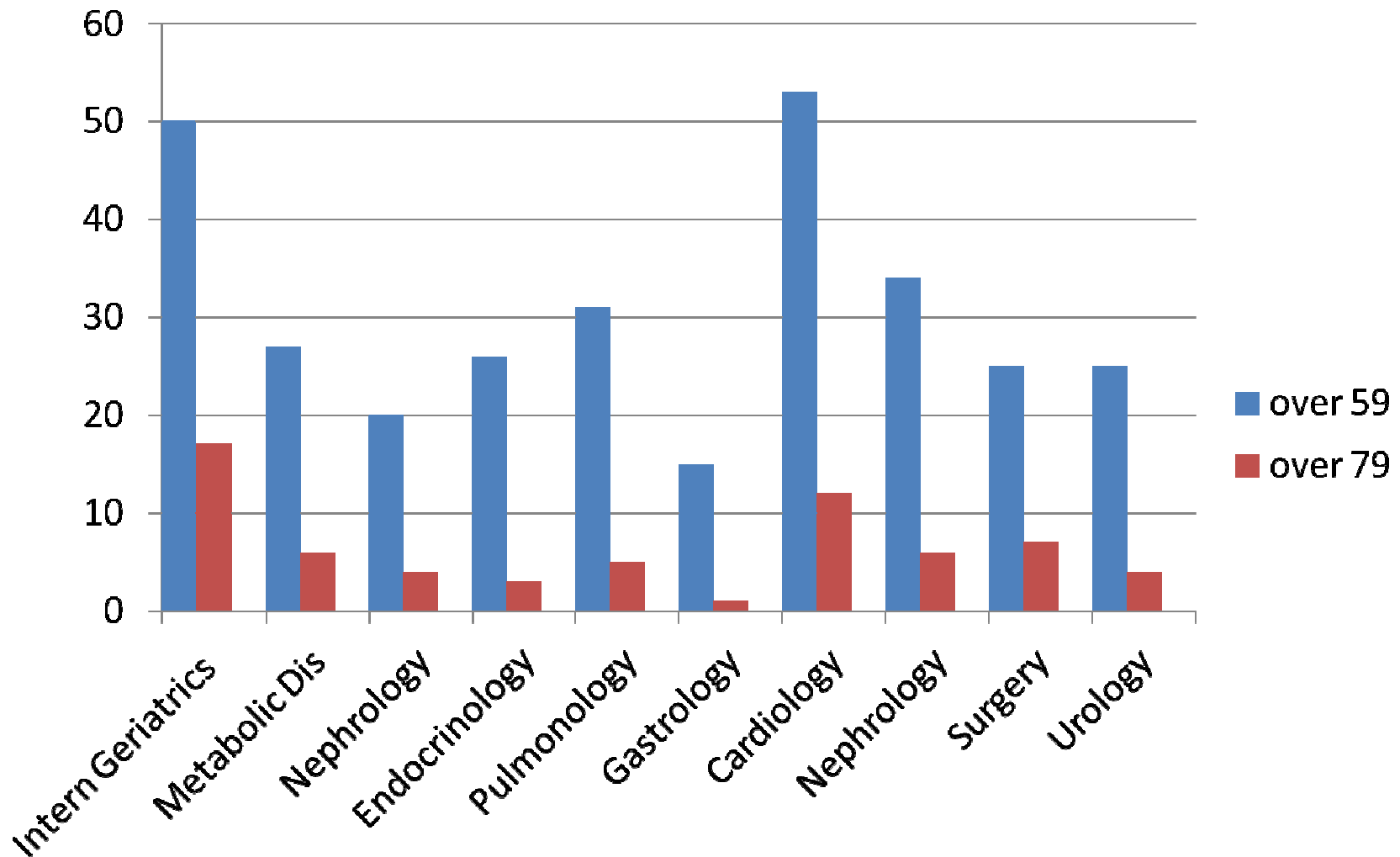
Data NFZ 2009

Hospitalizations in the elderly - Poland

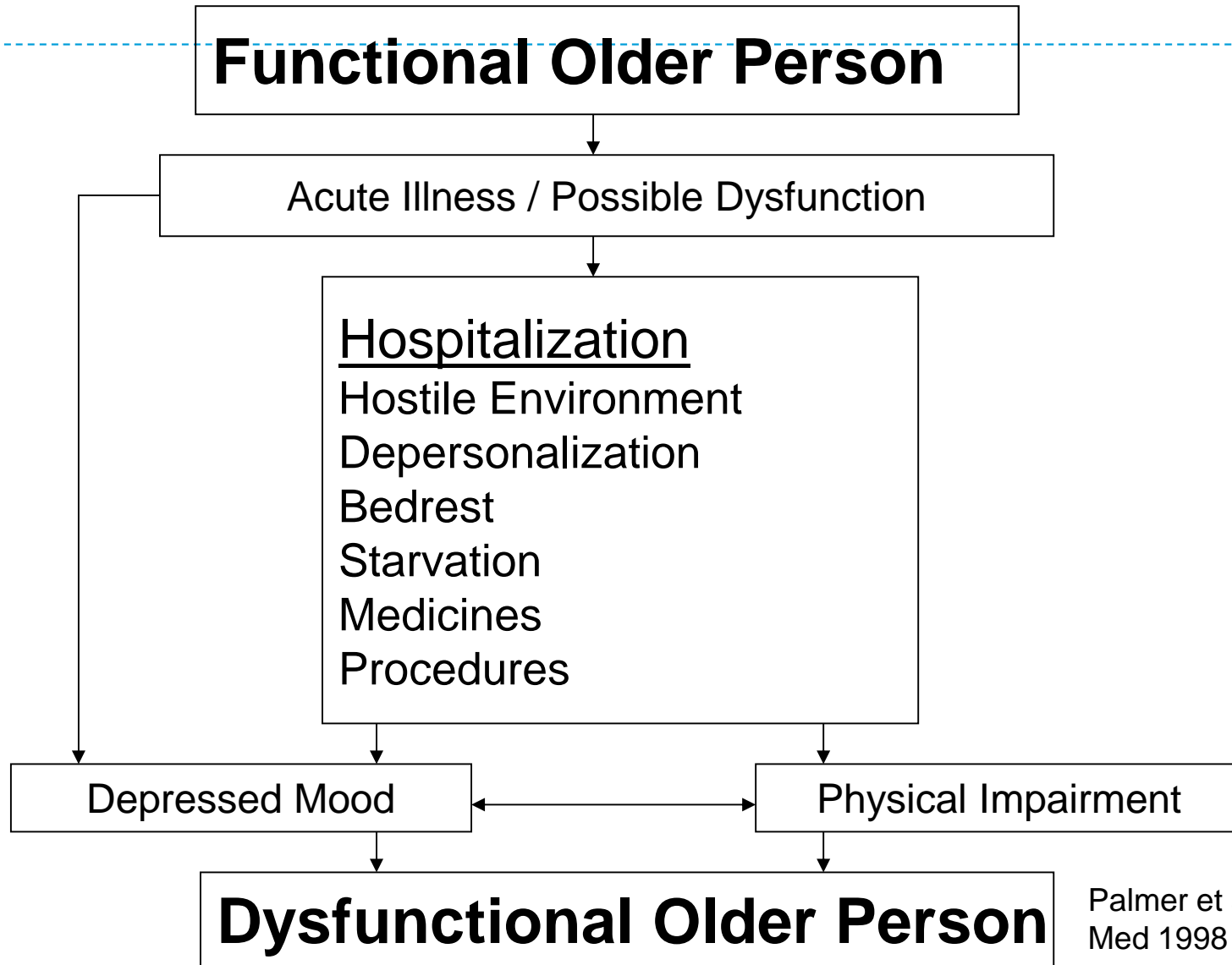


Data NFZ 2009

Hospitalizations in the elderly University Hospital, Cracow

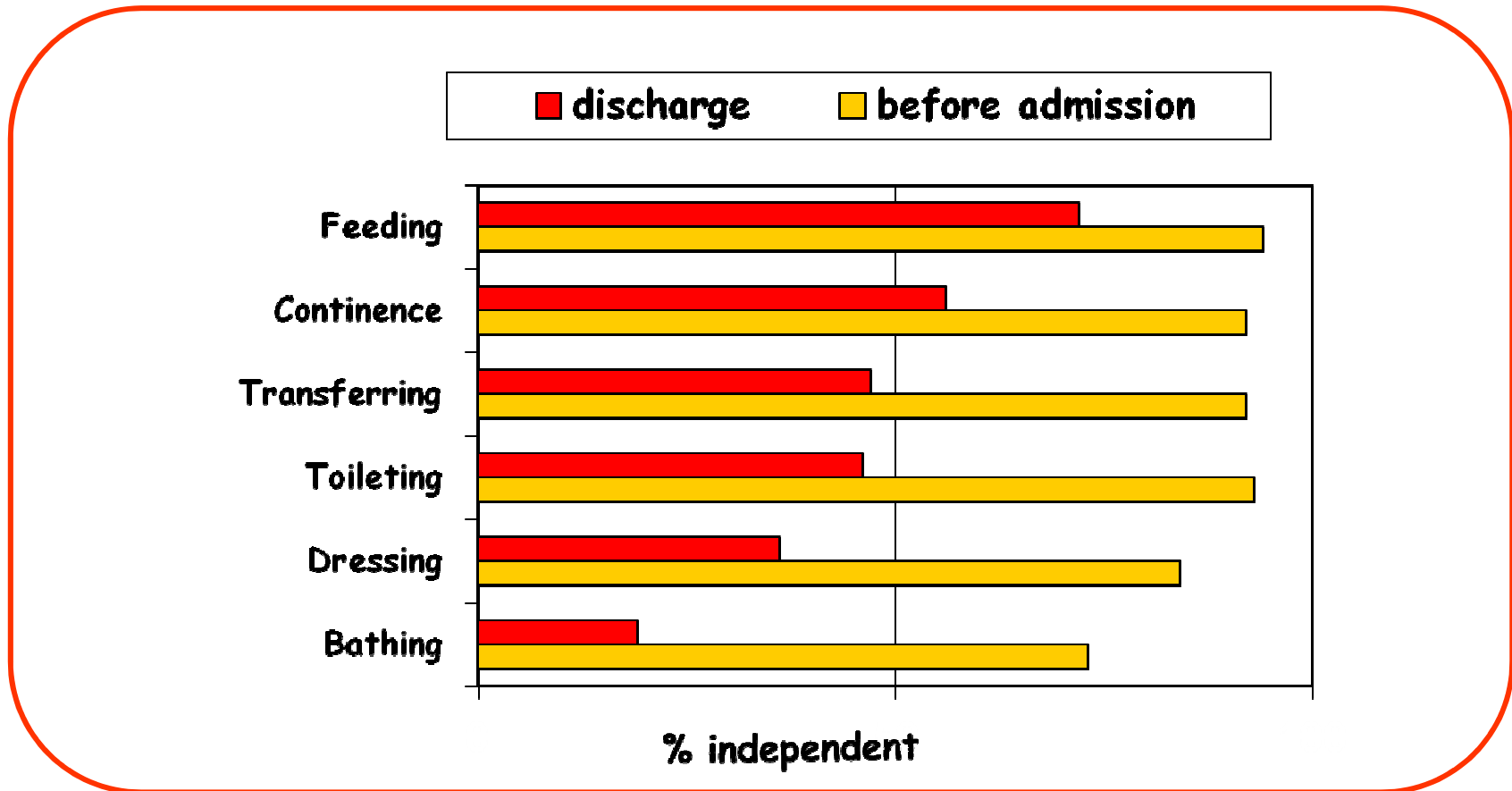


The Dysfunctional Syndrome



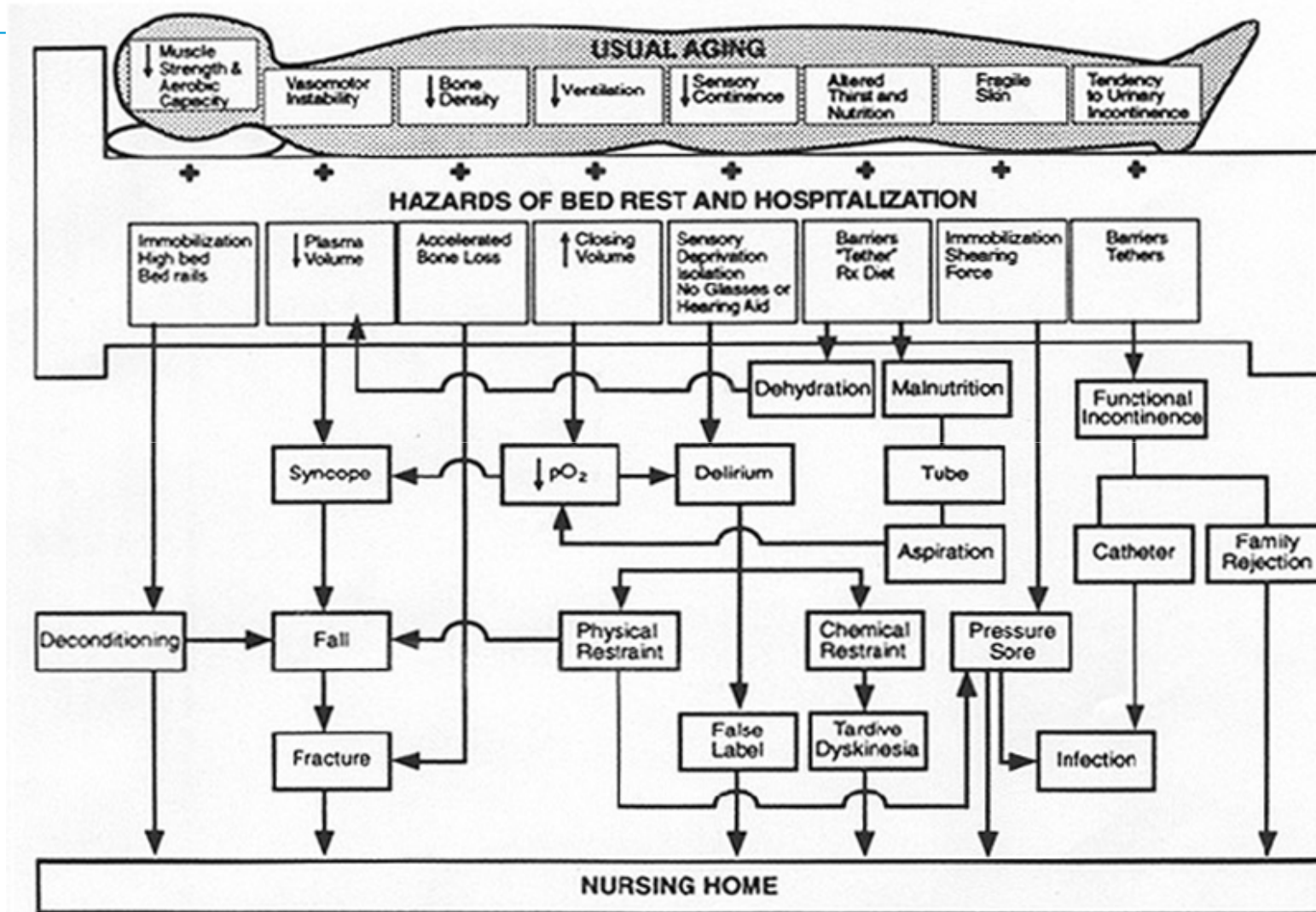
Palmer et al. Clin Ger Med 1998

Decrease of functional capacity during hospitalization



Sager i wsp 1996

Cascade to Dependency



Creditor. Ann Int Med. 1993.

Hazards of Hospitalization

Falls

Delirium

Infections



Adverse drug
reactions

Immobilisation

Insomnia

Inpatient Falls

2-12% of patients will have a fall in the hospital

- 30% with minor injury, 4% with major injury
- Associated increased hospital charges (\$4233)
- Associated increased length of hospital stay (12 days)



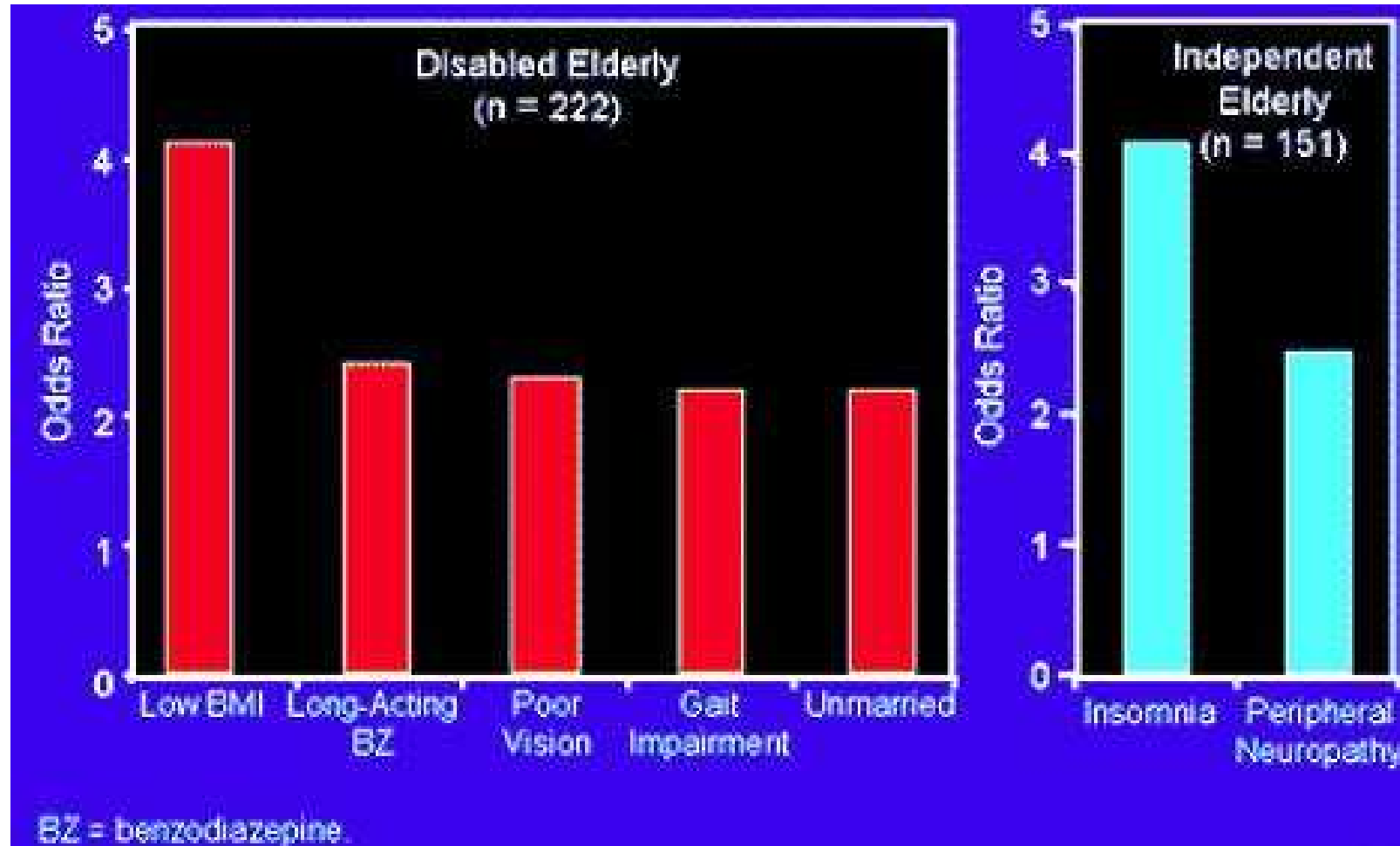
JAGS 2007;56:29-36

Risk Factors of Falls

- Prior fall history
- Gait instability
- Lower limb weakness
- Confusion
- Drugs (>3)
 - Sedative/hypnotics
- Urinary incontinence

Oliver D, et al.. Age and Ageing 2004;33:122-130

Risk factors of falls in the elderly



Koski K et al. Gerontology. 1998;44:232-238

Fall Prevention

Fall Prevention Monitors



Bed/Chair Sensor Pads



Weight-Sensing Floor Mats



Early Warning Seatbelts



Pull-String Fall Monitors



Motion Sensor Monitors



DELIRIUM

- Affects 20% of hospitalized patients over age 65
 - Up to 70-80% of older patients in intensive care
 - Up to 83% of older patients at the end-of-life
- Affects 36.8% of postoperative patients
 - Cataract Surgery 1-3%
 - General Surgery 10-15%
 - Orthopedic Surgery 28-61%

Miller MO. AAFP 2008;78:1265-1270

DELIRIUM

Health care setting	Hospital – intensive care units, aged care wards, and neurology wards (based on published high level evidence*)	Hospital – surgical wards in particular orthopaedic, cardiac and neurosurgery wards (based on published high level evidence*)	Residential care and Community care (no published high level evidence)
Risk factors	<ul style="list-style-type: none"> • Pre-existing cognitive impairment including dementia • Severe medical illness • Age ≥ 70 years • Visual impairment • Depression • Abnormal sodium • Use of indwelling catheter • Use of physical restraints • Adding three or more medications during hospitalisation 	<ul style="list-style-type: none"> • Pre-existing cognitive impairment including dementia • Severe medical illness • Age ≥ 70 years • Visual impairment • Depression • Abnormal sodium • Use of indwelling catheter • Use of physical restraints • Adding three or more medications during hospitalisation • Exposure to pethidine • Exposure to benzodiazepine • History of delirium • Alcohol related health concerns • Exposure to narcotic analgesics preoperatively 	<ul style="list-style-type: none"> • Pre-existing cognitive impairment including dementia • Illness / infection • Age ≥ 70 year • Visual impairment • Depression • Abnormal serum sodium • Use of indwelling catheter • Use of physical restraints • Multiple medication use • Alcohol related health concerns • Exposure to benzodiazepine • Return from hospitalisation • Hearing impairment

Delirium Prevention

Modifiable risk factor Prospective Intervention

Cognitive impairment	→	Orienting communication
Immobility	→	Early mobilization, reduce restraints
Visual Impairment	→	Visual aides, adaptive equip
Hearing Impairment	→	Amplifiers, adaptive equip
Dehydration	→	Prevent and correct dehydration
Sleep deprivation	→	Uninterrupted sleep, nonpharmacologic aides

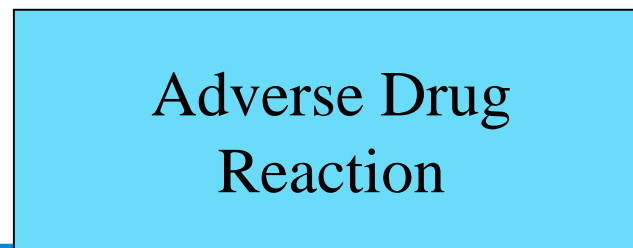
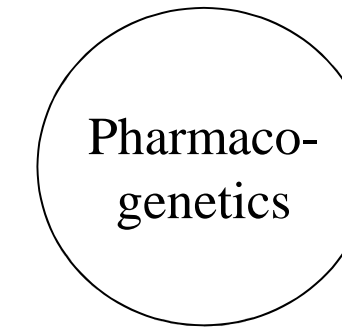
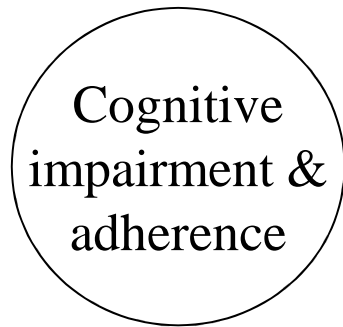
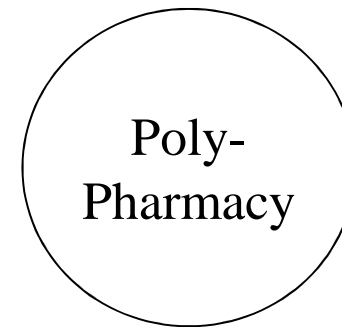
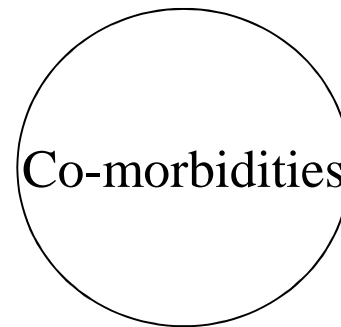
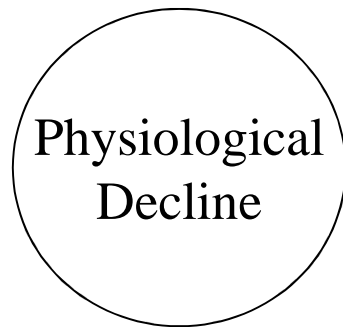
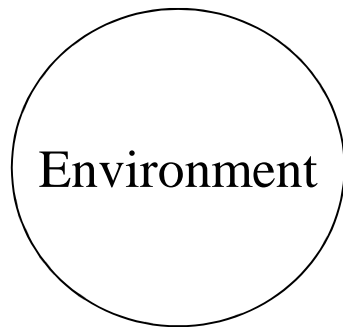
40% Relative Risk Reduction

Inouye SK et al. NEJM 1999;340:669-676
Vidan MT et al..JAGS 2009;57:2029-2036

Adverse Drug Reactions Inpatient Elderly

- ▶ **Prospective, observational design**
 - ADR in the very elderly (≥ 80 years old)
 - Preventability, severity and type of ADR
- ▶ **560 pts (mean 85 yrs; 63% female)**
 - 1 in 8 experienced ADR
 - Majority serious (69%) some life-threatening(4%). No deaths.
 - 63% preventable

Tangiisuran et al; J Nutr HealthAgeing.2009



DRUGS METABOLIZED BY KNOWN P450'S

Indiana University School of Medicine

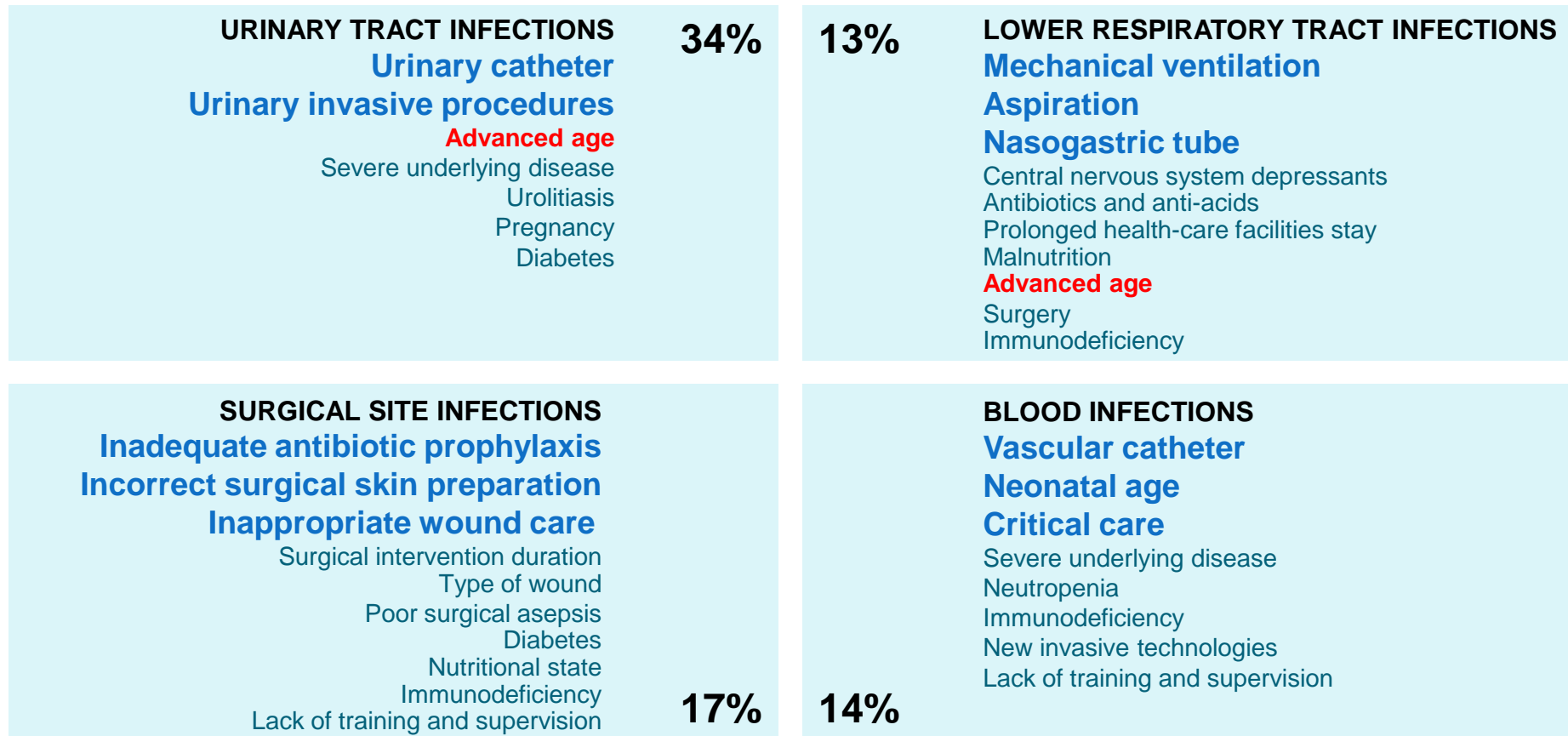
1A2	2B6	2C19	2C9	2D6	3A
Clozapine Cyclobenzaprine Duloxetine Fluvoxamine Haloperidol Olanzapine Tacrine Theophylline Tizanidine Triamterene Zileuton Zolmitriptan	Artemisinin Bupropion Cyclophosphamide Efavirenz Ifosfamide Ketamine Meperidine Methadone Nevirapine Propofol Selegiline Sibutramine ThioTEPA	Carisoprodol Citalopram Clopidogrel Clomipramine Clobazam Cyclophosphamide Diazepam Esomeprazole Fluoxetine Imipramine Lansoprazole Nelfinavir Omeprazole Phenytoin Pantoprazole Thalidomide Voriconazole	Angiotensin I receptor blocker Celecoxib Diclofenac Fluvastatin Flurbiprofen Ibuprofen Naproxen Oral Hypoglycemics Phenytoin Piroxicam Torsemide Valproic acid Warfarin Zafirlukast	Atomoxetine Carvedilol Clomipramine Codeine Desipramine Dextromethorphan Fluoxetine Metoprolol Ondansetron Oxycodone Paroxetine Propafenone Risperidone Tamoxifen Timolol Tramadol Venlafaxine	Alfentanil Alprazolam Buspirone Ca++ Channel Blockers Carbamazepine Cyclosporine Haloperidol HIV Protease Inhibitors 'statins (NOT pravastatin and rosuvastatin) Midazolam Nevirapine PDE-5 inhibitors Tacrolimus Tamoxifen Triazolam Vincristine
Amiodarone Celecoxib Cimetidine Ciprofloxacin Fluvoxamine Levofloxacin	Clopidogrel ThioTEPA Ticlopidine Voriconazole	Cimetidine Felbamate Fluoxetine Fluvoxamine Isoniazid Ketoconazole Lansoprazole Omeprazole Oral Contraceptives Ticlopidine Voriconazole	Amiodarone Fluconazole Fluoxetine Metronidazole Voriconazole Zafirlukast	Amiodarone Bupropion Diphenhydramine Fluoxetine Haloperidol Paroxetine Quinidine Terbinafine	Amiodarone Cimetidine Diltiazem & Verapamil Grapefruit Juice HIV Protease Inhibitors Itraconazole Ketoconazole Macrolide Antibiotics (NOT Azithromycin) Voriconazole
Carbamazepine Char-grilled Meat Rifampin Tobacco	Artemisinin Carbamazepine Efavirenz Nevirapine Phenytoin Rifampin Phenobarbital	Efavirenz Rifampin	Carbamazepine Nevirapine Phenobarbital Rifampin St. John's Wort		Carbamazepine Efavirenz & Nevirapine Phenytoin Phenobarbital Rifampin & Rifampin St. John's Wort
	Reduced in 10% of Caucasians	Absent in 15-30 % of Asians	Absent in ~ 1% of Caucasians	Absent in 7 % of Caucasians	

INHIBITORS

INDUCERS

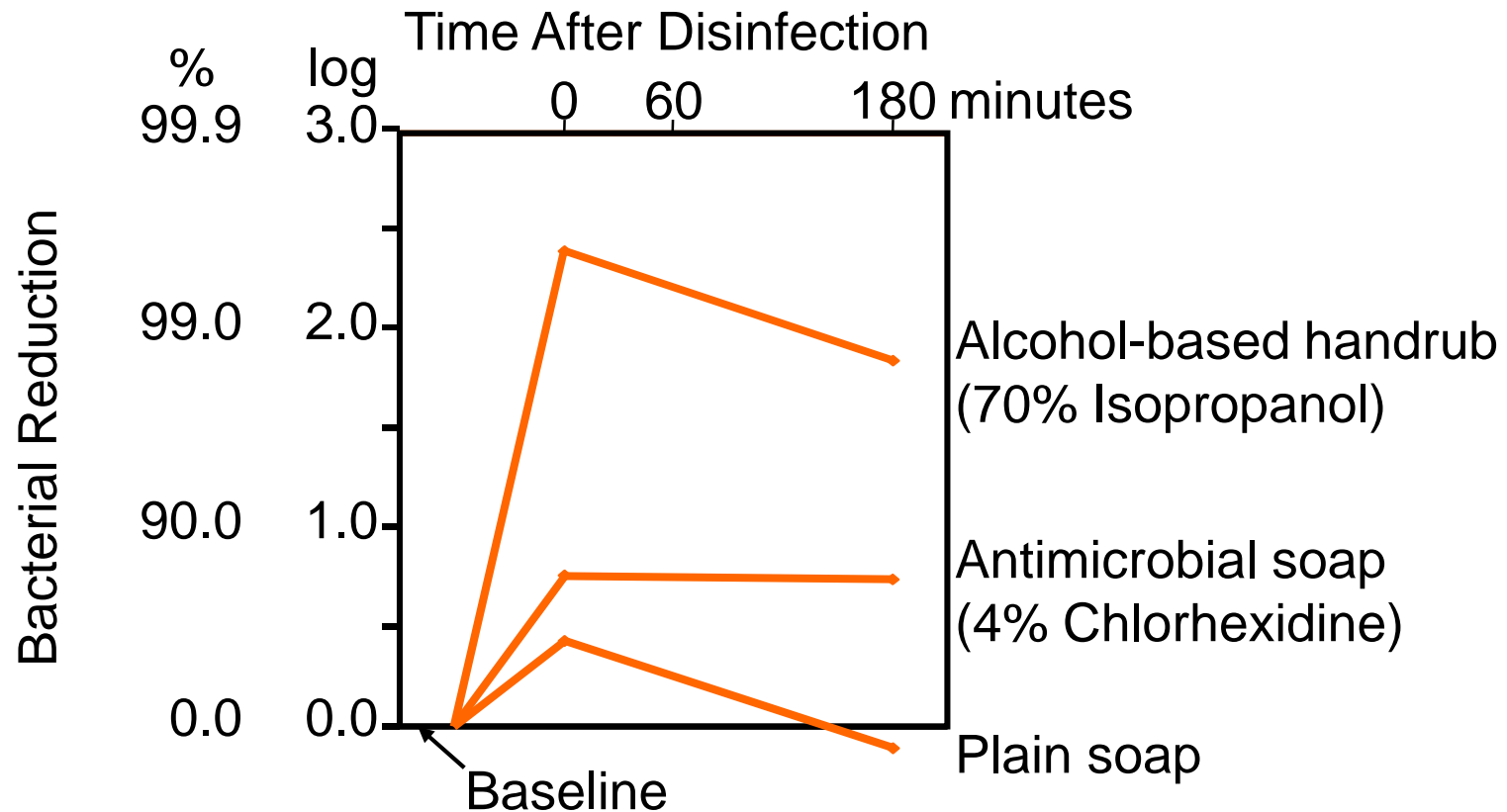
© June 2009. David A. Flockhart M.D, Ph.D.

Most frequent sites of infection and their risk factors



Hand hygiene is the single most important measure for control of nosocomial infections

Ability of Hand Hygiene Agents to Reduce Bacteria on Hands



Hosp Epidemiol Infect Control, 1999.

Sanitation Problem in Hospitals



Reducing invasive procedures

**BladderScan® Bladder Volume
Instruments**



Immobilisation Rehabilitation and Mobility Equipment



Hazards of Hospitalization



Can we change the hazards of hospitalization for elderly patients?

Yes, we can.