Multiplexity

The 5th Geriatric "M"

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1

Disclosures

Dakota GERIATRICS

A HRSA Geriatrics Workforce Enhancement Program

2

What one thing do you expect to be a good outcome for discussing this topic?

Andrew Wyeth

3

Why Multi-Complexity?

- 3+ conditions projected to rise from 30.8M (2015) to 83.4M by 2030
- Aging population
- Multimorbidity labeled as a "global pandemic"
- No dent in demographics of chronic disease
- Need to understand when comfort subsumes curative care.
- Single disease management mismatched to patient needs
- Redesign care around function and patient priorities

World Health Organization (WHO). *Decade of Healthy Ageing 2020–2030*

The Lancet 2023 DOI:10.1016/j.eclinm.2023.101860

4

Goals

- Report the demographics of multiple chronic conditions
- Integrate the competencies for MCC into clinical practice
- Create action plans to manage MCC and Geriatric syndromes
- Describe methods for practice - based learning and quality improvement

5

Multi – complexity costs

- 78.7% of all prescription costs
- 5.91 X more prescriptions per patient
- 2.58 X more hospitalizations

British Journal of General Practice 2018; 68 (669): e245-e251. DOI: 10.3399/bjgp18X695465

6

What are the competencies for MCC?

Goal oriented care based on what matters most	Prognostication and life span assessments	Comprehensive and functional assessments
Identification and management of geriatric syndromes	Safe prescribing and deprescribing	Navigate conflicting guidelines
Interprofessional team coordination	Transitions of care	Caregiver support and SDOH

7

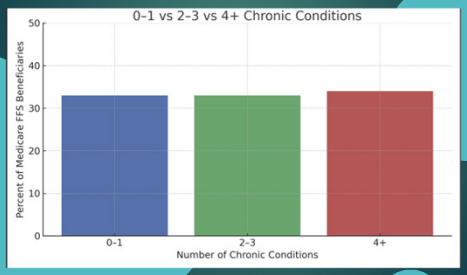
Chronic Disease Definition

- Key elements:
  - Multi morbidity
  - Long lasting medical conditions (months and years)
  - Controllable but not cured
  - Persistent and recurring health problems
  - Disability / functional impairment
- Accounts for 70% of all US deaths.

CDC review in *Preventive Chronic Disease Journal (2013)* 10:120239.

8

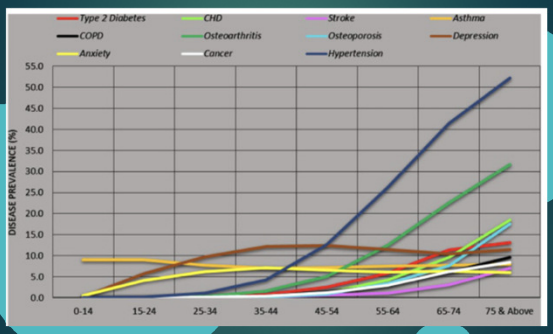
Epidemiology 1



CMS Chronic Conditions Chartbook

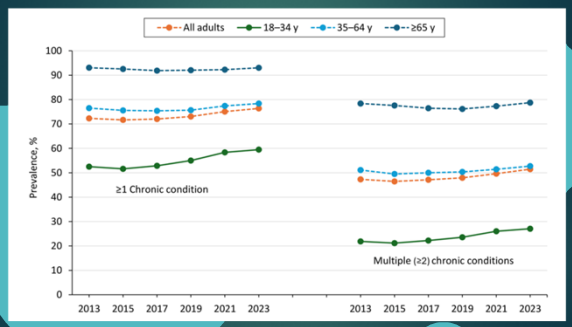
9

Epidemiology 2



10

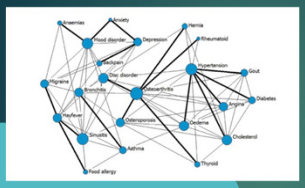
U.S. Health Care: no impact on chronic disease burden



CDC: Preventing Chronic Disease V22.E15, 2025

11

Common Condition Clusters



Gender differences

3 key categories

- Cardio – metabolic
- Musculo – skeletal
- Neuropsych

Validity

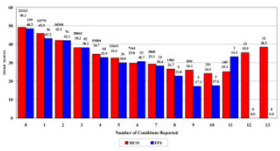
- Common biology pathways
- Shared risk factors
- Social drivers

Int J. Epi 2018 doi.org/10.1093/ije/dyy134
Nature 2022 doi.org/10.1038/s41598-022-23617-8

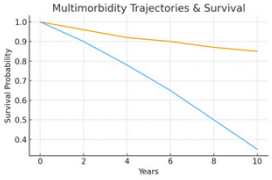
12

Trajectories

SF36 Physical status vs. Number Chronic Conditions



Multimorbidity Trajectories & Survival



Health Status of Medicare Fee-For-Service and Managed Care Enrollees (2000) HCFA.

13

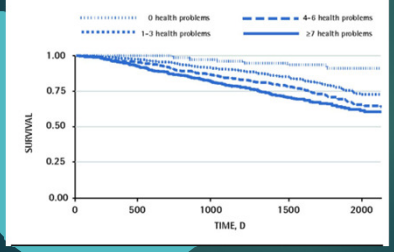
Absolute life expectancy vs Functional life expectancy

Age	Initial Functional Category	Life Expectancy in Years in Each Functional Status							
		Women				Men			
		Independent Years	Mobility-Disabled Years	ADL-Disabled Years	Total Years	Independent Years	Mobility-Disabled Years	ADL-Disabled Years	Total Years
70	Independent	10.0	4.0	2.7	16.7	8.5	2.6	1.0	12.1
	Mobility disabled	7.3	5.6	2.8	15.7	5.6	4.1	1.1	10.7
	ADL disabled	3.0	2.9	5.6	11.5	1.6	1.5	3.4	6.5
75	Independent	7.0	3.6	2.6	13.2	6.0	2.4	1.0	9.4
	Mobility disabled	4.0	5.2	2.8	12.0	2.9	3.8	1.1	7.9
	ADL disabled	1.1	1.8	5.3	8.2	0.5	0.8	3.1	4.4
80	Independent	4.7	3.2	2.4	10.3	4.1	2.2	0.9	7.2
	Mobility disabled	2.0	4.4	2.7	9.0	1.4	3.3	1.0	5.7
	ADL disabled	0.4	1.0	4.7	6.0	0.2	0.4	2.6	3.1
85	Independent	3.3	2.9	1.8	8.0	2.9	2.1	0.7	5.8
	Mobility disabled	1.0	3.6	2.3	6.9	0.7	2.8	0.9	4.4
	ADL disabled	0.1	0.5	4.0	4.6	0.0	0.2	2.1	2.3

14

Mortality Data

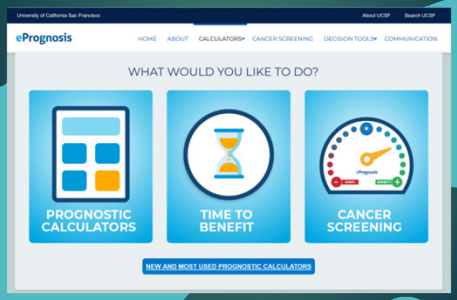
Figure 1. Multimorbidity predicts death over a 5-year interval: *Those with fewer self-reported health problems had lower mortality rates than those with more health problems.*



Canadian Family Physician 2014; 60 (5) e272-e280;

15

Prognostic calculators



16

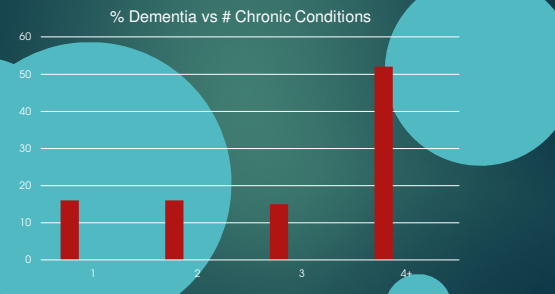
Overlap with Geriatric Syndromes

17

Multi faceted functional decline

18

Dementia increases with number of chronic conditions



Brain Communications (2025) https://doi.org/10.1093/braincomms/fcaf222

19

Clinical implication

- Screen for memory loss and change in executive functionality

20

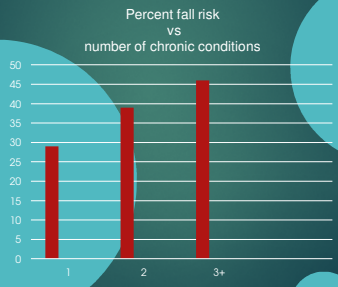
3+ Conditions & Fall Risk

Condition	Prevalence (%)	P value	95% CI
No chronic condition	19.0	<0.0001	17 – 19.8
HTN	21.4	.01	
Arthritis	24.4	<0.0001	22.9 – 25.9
Vision Impairment	24.1	<0.0001	22.3 - 25.9
Heart Disease	24.4	<0.0001	22.5 – 26.4
Osteoporosis	25.5	<0.0001	23.2 – 27.7
Diabetes	23.8	<0.0001	21.6 – 26.1
COPD	25.5	<0.0001	22.4 – 28.6
Cancer	22.9	0.14	18.4 – 27.4
Depression	36.0	<0.0001	31.0 – 41.1
Stroke	36.8	<0.0001	32.0 – 41.6
Dementia	38.5	<0.0001	30.4 – 46.6
Parkinson's Disease	30.8	0.029	19.5 – 42.1

BMC Geriatr **14**, 22 (2014). https://doi.org/10.1186/1471-2318-14-22

21

Fall risk increases with number of chronic conditions

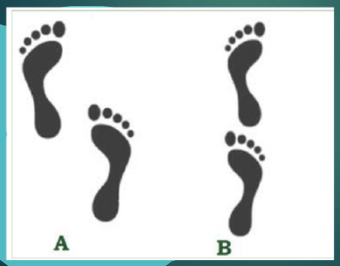


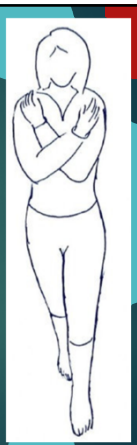
Open Med (2023) doi.org/10.1515/med-2023-0748

22

Clinical implication

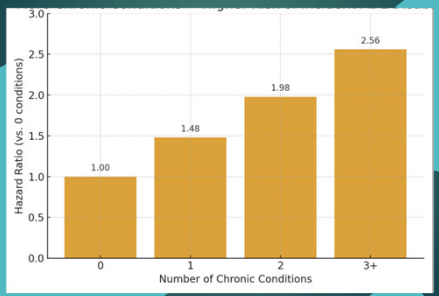
- Screen for fall risk





23

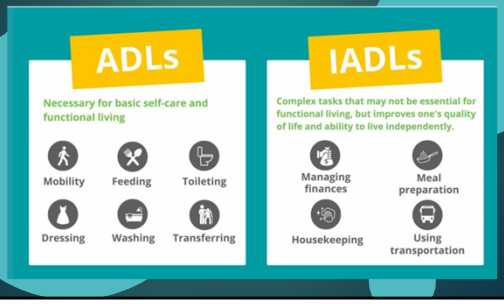
Functional Decline



24

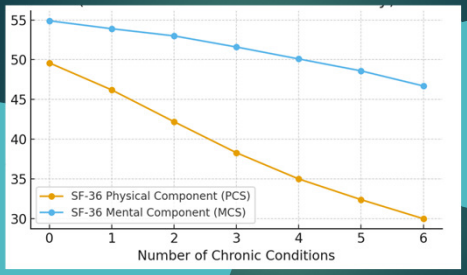
Clinical implication

- Screen for functional impairment



25

Quality of Life



Health Economics Research, Inc. — Health Status of Medicare FFS And Managed Care Enrollees: ii

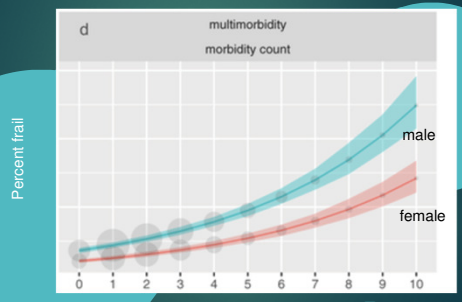
26

Clinical implication

SCREEN FOR DEPRESSION AND SOCIAL ISOLATION

27

Frailty



Communications Medicine (2021) doi:10.1038/s43856-021-00029-9
eClinical Med (2022) doi: 10.1016/j.eclinm.2022.101610

28

Clinical implications

Assess frailty
- 1. Weakness
- 2. Slow
- 3. Exhaustion
- 4. Weight loss
- 5. Low activity

Modify plan
- Cholesterol / LDL and deprescribe
- HA1c ~ 8.0
- Blood pressure 130 - 140 mmHg
- Surgery / Oncology

29

Frailty

- Emphasize interventions that improve
  - function,
  - comfort,
  - symptoms

30

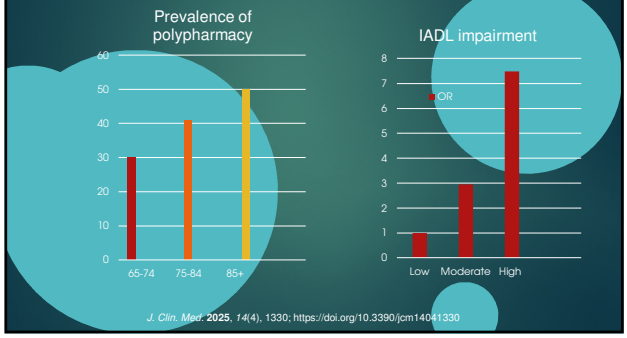
Guideline Limits

- evidence-based medicine alone does not provide an adequate guide to the best clinical management.
- use of condition-specific CPGs to dictate practice leads to regimens that can be overly complex, burdensome, and unrealistic for adherence.

American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity (2012) https://doi.org/10.1111/j.1532-5415.2012.04188.x

31

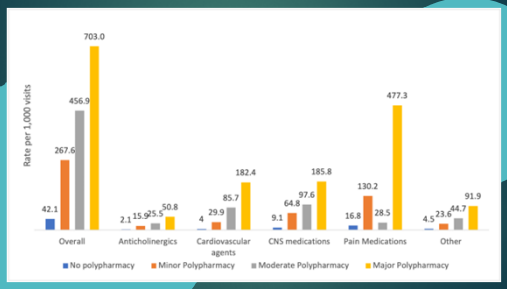
Polypharmacy (5+ Rx)



J. Clin. Med. **2025**, *14*(4), 1330; https://doi.org/10.3390/jcm14041330

32

Polypharmacy



Centers for Disease Control and Prevention's National Ambulatory Medical Care Survey from 2009 to 2016 PLOS One 2021 https://doi.org/10.1371/journal.pone.0255642

33

Deescalate / Deprescribing

Beers Criteria for Older Adults
Potentially Inappropriate Anticholinergic Meds

First Generation Antihistamines	Antiparkinsonian Agents	Antispasmodics
• Diphenhydramine • Doxylamine • Hydroxyzine • Promethazine	• Benztropine • Trihexyphenidyl	• Atropine • Dicyclomine • Hyoscyamine • Scopolamine

Recommendation: Avoid Use in Older Adults

Anticholinergic Side Effects

"Mad as a Hatter,
Hot as a Hare,
Red as a Beet,
Dry as a Bone,
Blind as a Bat"

"Can't See,
Can't Pee,
Can't Spit,
Can't Sh*t"

34

Deprescribing

Five principles for applying alternatives recommendations in clinical practice

1	Stopping a potentially inappropriate medication is not the end goal. The goal is to provide non-pharmacologic and/or pharmacologic management that helps people feel better and maintain health while reducing their risk of medication-associated harms.
2	Instead of replacing a potentially inappropriate medication with a "better" one, consider non-pharmacologic strategies where appropriate. Such strategies are often more effective and safer than medications for managing common chronic conditions.
3	Understanding the underlying cause(s) of a symptom or condition can help guide therapy.
4	Potentially inappropriate medications should often be avoided, but not always. Clinician judgement, consideration of individual circumstances, and shared decision-making should be used when selecting among treatment options.
5	Make use of resources and supports to aid deprescribing.

Journal of the American Geriatrics Society 2025 DOI: 10.1111/jgs.19500

35

Treatment Burden

36

Care Coordination

Comprehensive Geriatric Assessment & Management

- Better functional outcomes *Lancet*. 1993;342(8878):1032–1036
- Reduced hospitalizations and readmissions *J Am Geriatr Soc*. 2019;67(12):2609–2616.
- More likely to age in place *JAMA*. 2002;287(8):1022–1028.
- Reduced falls *BMJ*. 2006;334(7584):82.
- Improved QOL *Gerontology*. 2020;66(3):238–252.
- Better care coordination *JAMA Intern Med*. 2019;179(4):454–462.

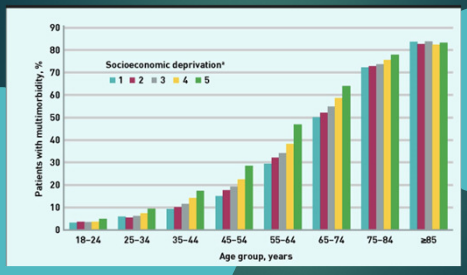
37

Caregiver support

- Assess caregiver stress
  - Zarit Caregiver Burden Interview
  - Caregiver Strain Index
- Refer to community resources
  - Area Agency on Aging
  - Respite services
  - ADRD training
  - Adult Day Care
  - Meal on Wheels
- Express appreciation
  - "You are doing an incredible job"

38

SDOH & Inequities



British Journal of General Practice 2018; 68 (669): e245-e251
DOI: 10.3399/bjgp18X695465

39

Shared Decisions

- Use ask – tell – ask methodology
- Start with what matters most
- Recognize the limits of single disease guidelines
  - e.g. statin and remaining life expectancy
- Reduce treatment burden
- Include caregivers and assess caregiver burden
- Document !

40

Self - management support

Ice Breakers in the Clinic

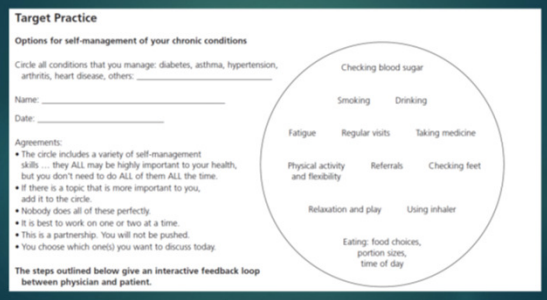
- What are you afraid might happen to you with (hypertension) ?
- Lots of patients have medication problems. How about you ?
- Sometimes people do things to make their condition better, but it doesn't work out. Have you tried anything that did not work ?
- Can you think of something that you did to help your disease that worked and you continue to do ?

Motivational interviewing

- Provocative questions
- Reflective listening

41

Target Practice



42

Promote self - efficacy

- Use open ended questions and reflective listening
- Motivational interviewing to strengthen autonomy and internal motivation
- Connect patients with community programs, digital monitors, and peer support (e.g., group visit)
- Use “target practice” or other methods to set collaborative goals
- Structured follow up and reinforcement

43

Navigating conflicting guidelines

- Polypharmacy with drug AE’s and drug – drug interactions
- Glycemic control vs falls
  Age and Ageing 2016, https://doi.org/10.1093/ageing/afw140
- Amiodarone and muscle weakness (with statins)
  JAMSU https://doi.org/10.1016/j.amsu.2022.104167
- CV guidelines are for long haul and may not align with what matters most to older adults (function, comfort)
- Lack of studies with 75 + year olds
- Biomarkers of disease do not align with aging

44

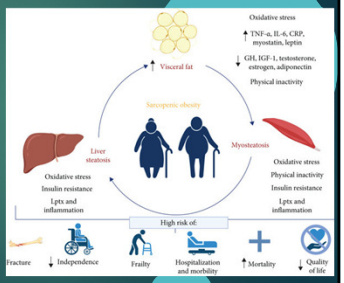
Navigating conflicting guidelines

GLP-1 receptor agonists

Obesity and DM control versus

Sarcopenia and Frailty

- Lean muscle loss
  Polypharm Res. (2025) doi.org/10.1016/j.phrs.2025.107927
- Bone loss *Osteoporos* (2025). doi.org/10.1007/s00198-025-07664-1



Oxidative Medicine and Cellular Longevity 2021 DOI:10.1155/2021/4493817

45

Case1

82F with HFrEF (NYHA III), HTN, DM, OA, osteoporosis, MCI, CKD3b reports not being able to do the things she used to do and does not want to be a burden. She lives with her 85Y husband and a daughter lives near by. Her spouse reports that she is napping a lot more, feels fatigued all of the time and is unsteady when getting up from a chair. She nearly fell twice when she had to rush to the bathroom. She is taking 11 medications, including basal insulin which she sometimes forgets to take.

46

Case1

- Husband reports multiple sleep disruptions to assist patient to bathroom
- He fears leaving her alone because of falls
- He assists with bathing and dressing as well as cooking meals, finances and transportation
- Daughter reports that her dad’s caregiving is taking a toll physically and emotionally

47

Case1
4 M Assessment

- What matters most: I want to stay in my home and enjoy my garden without feeling so exhausted, foggy and wobbly.
- Mobility: slow gait speed, unstable tandem stance
- Medications: PIM = Tylenol PIM
- Mind: SLUMS = 21 / 30, PHQ2 +

48

Case 1

- Vitals: BP 138 / 80, HR 58, O2 93% RA, wt decline 5lb
- Gen: temporal wasting, looks older than stated age
- HENT: bilateral cerumen impaction, decreased gag reflex
- Chest: Irreg irreg rhythm, bibasilar crackles
- Abd: fullness RUQ, tender
- Ext: Muscle atrophy, bilateral knee crepitus and tenderness
- Neuro: 4/5 UE and LE strength, TUG 22 seconds, antalgic gait with walker, left arm cogwheeling, unable to feel monofilament on feet
- Skin: stage I sacral ulcer

49

Case 1

- What are patient priorities based on What Matters Most?
- How would you describe her functional status ?
- Is the patient frail ?
- What is the likelihood of a fall with injury ?
- Is there caregiver stress ?

50

Case 1

Management recommendations

- ACP: continue full code status?
- Stay at home or ALF?
- Fall mitigation and home safety check?
- Frailty treatment?
- Opportunity to deprescribe?
- Caregiver interventions?

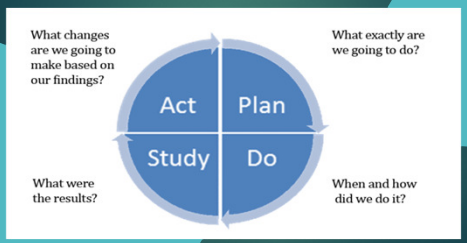
51

Case 1 summary

- Good candidate for CGA
- Align patient priorities with health care plan
- Home health care with PT and safety check
- Caregiver training / community services
- Deprescribe (PPI, bisphosphonates, diphenhydramine, anti cholinergic incontinence meds, statin & possibly insulin)
- Frailty management: resistance training / high protein
- Fall management: core training / assistive devices / neurosensory optimization / scheduled toileting
- Limit daytime naps
- w/u sleep apnea / thyroid / B12 or folate def / O2 desat with ambulation

52

Quality improvement



53

Takeaways

- Align care with what matters most to the older adult
- Assessments to include
  - Estimate functional and absolute life expectancy
  - Geriatric 4Ms
  - Geriatric syndromes
  - Caregiver
- Management plans
  - Team based care
  - De-escalate and deprescribe
  - Reconcile clinical practice guidelines and modify targets
  - Address transitions of care (curative → comfort and changes in care settings)

54

Resources

North Dakota:
Division of Health Promotion

NDC3 NORTH DAKOTA Community Clinical Collaborative

55

56