Intervening on multimorbidity: Lessons learned and future directions

Cynthia M. Boyd, MD MPH
Professor of Medicine, Epidemiology and Health Policy and Management
Director, Division of Geriatric Medicine and Gerontology
Johns Hopkins University

DISCLOSURE

Cynthia Boyd, MD MPH is a co-author of a chapter on multimorbidity in UpToDate and reviewed a chapter on Falls for Dyna-Med

“Treating an Illness Is One Thing. What About a Patient With Many?”

New York Times, March 31, 2009

Image: Brendan Smialowski for the New York Times

Mrs. M

- Atrial fibrillation
  ? warfarin
- Arthritis
  acetaminophen
- Congestive heart failure:
  several BP meds, diuretics
- Dizziness: new report
- Diabetes Mellitus:
  HgbA1c 8 → 6.2 over past few years
  On 2 meds – metformin and glyburide
- Urinary urgency and incontinence:
  pads
- Visual impairment

<u>Consequences of Conditions and our Treatments:</u>

- Orthostatic
- Stays home because she is fearful of incontinence episodes (on diuretics)
- Reluctant to take warfarin due to monthly visits (before alternatives)
- Sometimes feels shaky in the morning before she eats breakfast
- “It’s too many pills.”

It's Not Easy Living with Multiple Chronic Conditions

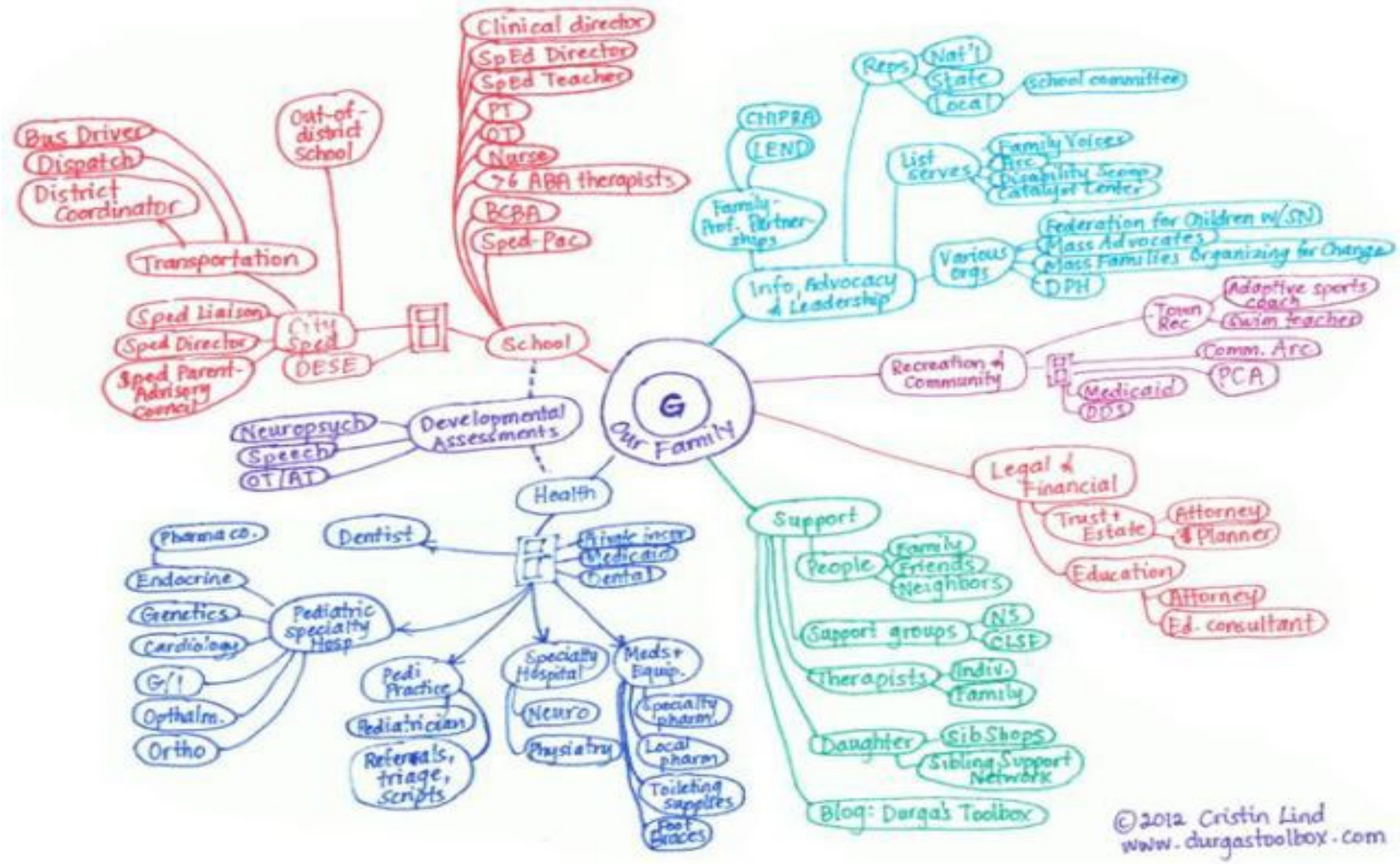
Time	Medications	Non-pharmacologic Therapy	All Day	Periodic
7 AM	Ipratropium MDI Alendronate 70mg weekly	Check feet Sit upright 30 min. Check blood sugar	Joint protection Energy conservation Exercise (non-weight bearing if severe foot disease, weight bearing for osteoporosis) Muscle strengthening exercises, Aerobic Exercise ROM exercises Avoid environmental exposures that might exacerbate COPD Wear appropriate footwear Albuterol MDI prn Limit Alcohol Maintain normal body weight	Pneumonia vaccine, Yearly influenza vaccine All provider visits:Evaluate Self-monitoring blood glucose, foot exam and BP Quarterly HbA1c, biannual LFTs Yearly creatinine, electrolytes, microalbuminuria, cholesterol Referrals: Pulmonary rehabilitation Physical Therapy DEXA scan every 2 years Yearly eye exam Medical nutrition therapy Patient Education: High-risk foot conditions, foot care, foot wear Osteoarthritis COPD medication and delivery system training Diabetes Mellitus
8 AM	Eat Breakfast HCTZ 12.5 mg Lisinopril 40mg Glyburide 10 mg ECASA 81 mg Metformin 850mg Naproxen 250mg Omeprazole 20mg Calcium + Vit D 500mg	2.4gm Na, 90mm K, Adequate Mg, ↓ cholesterol & saturated fat, medical nutrition therapy for diabetes, DASH		
12 PM	Eat Lunch Ipratropium MDI Calcium+ Vit D 500 mg	Diet as above		
5 PM	Eat Dinner	Diet as above		
7 PM	Ipratropium MDI Metformin 850mg Naproxen 250mg Calcium 500mg Lovastatin 40mg			
11 PM	Ipratropium MDI			

Boyd et al. JAMA 2005;294:716-724

Take Home:
We ask people with multiple chronic conditions and their family/friends to do a lot of tasks.

Recognizing this is first step towards focusing on what is most important and beneficial for individual person.

Care Maps



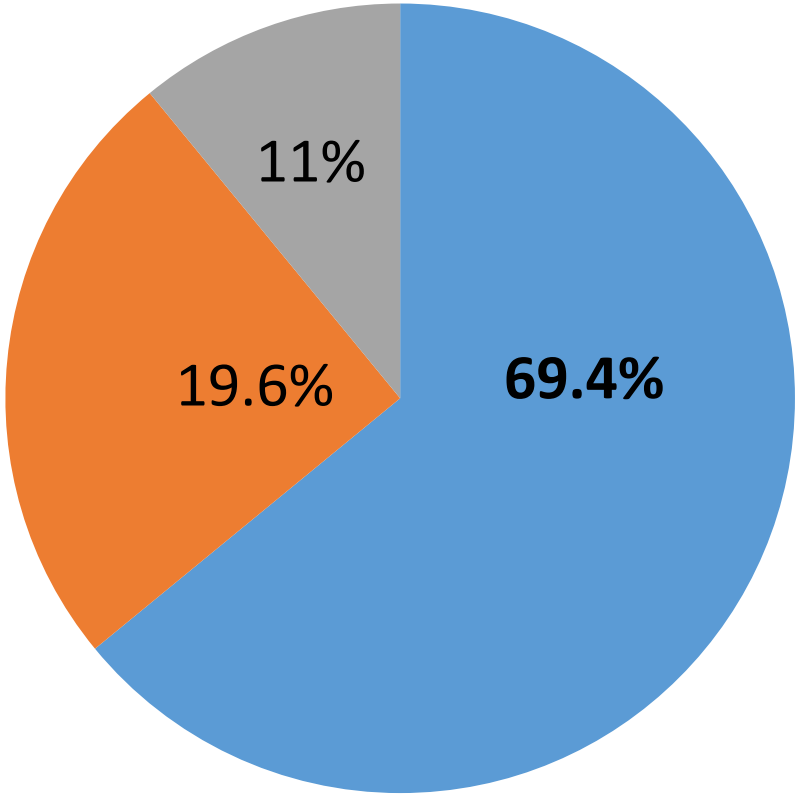
http://durgastoolbox.com/2012/09/19/durga-tool-9-my-care-map-or-the-picture-that-tells-a-thousand-words/

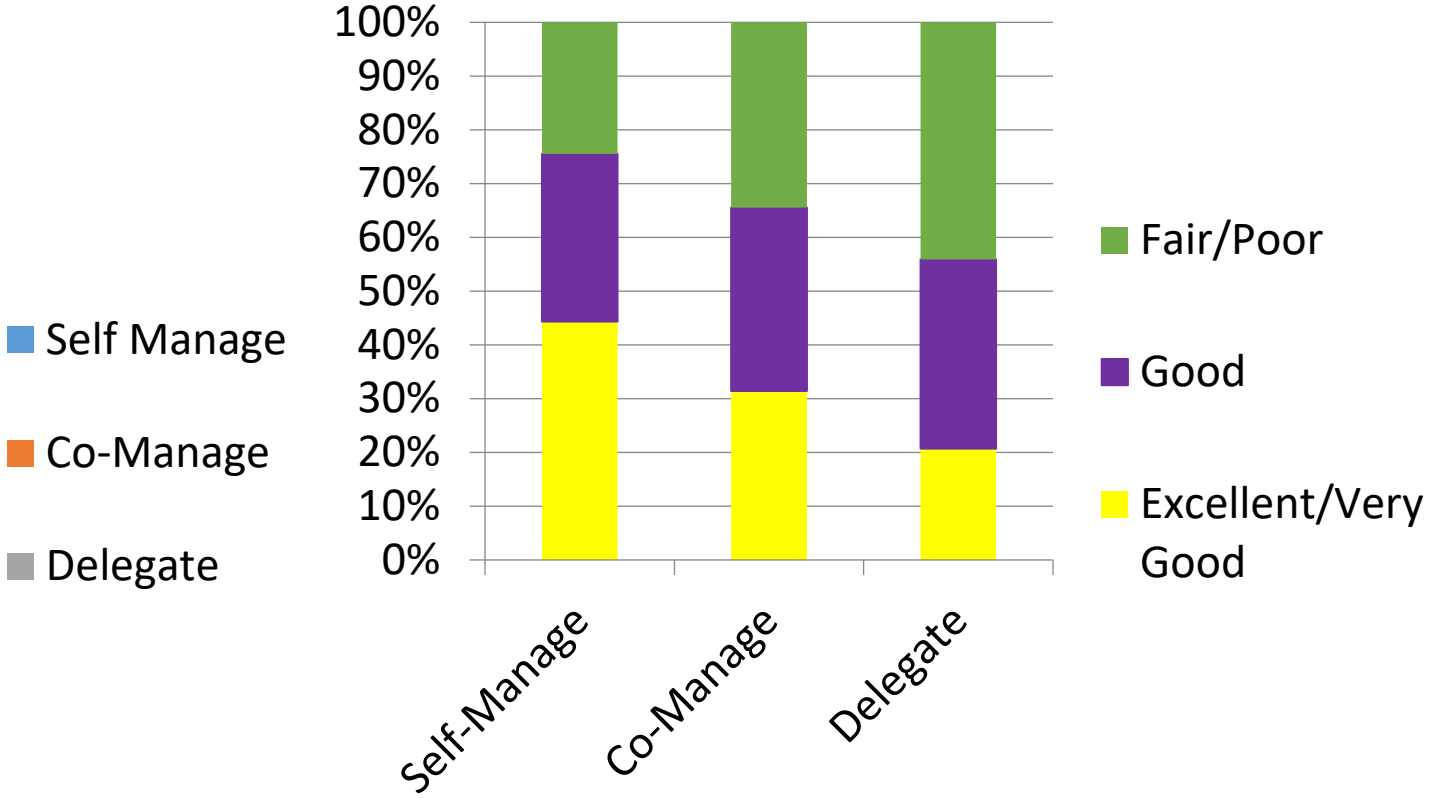
Role of Family/Friends: *Hidden in Plain Sight*

- 40% of older adults are routinely accompanied to medical visits
- Accompanied older adults are older, sicker, less educated, use more health services
- Companions are mainly family members who participate in logistics and visit communication
- Visit companion: same person over time

Wolff JL and Roter DL. Social Science and Medicine, 72(6) 823-31. 2011.
Wolff JL, Boyd CM, et al. J Am Geriatr Soc, 2012, 60(1):106-12.

How do older adults manage their health? National Health and Aging Trend Survey





Wolff JL and Boyd CM JGIM 2015. DOI: 10.1007/s11606-015-3359-6

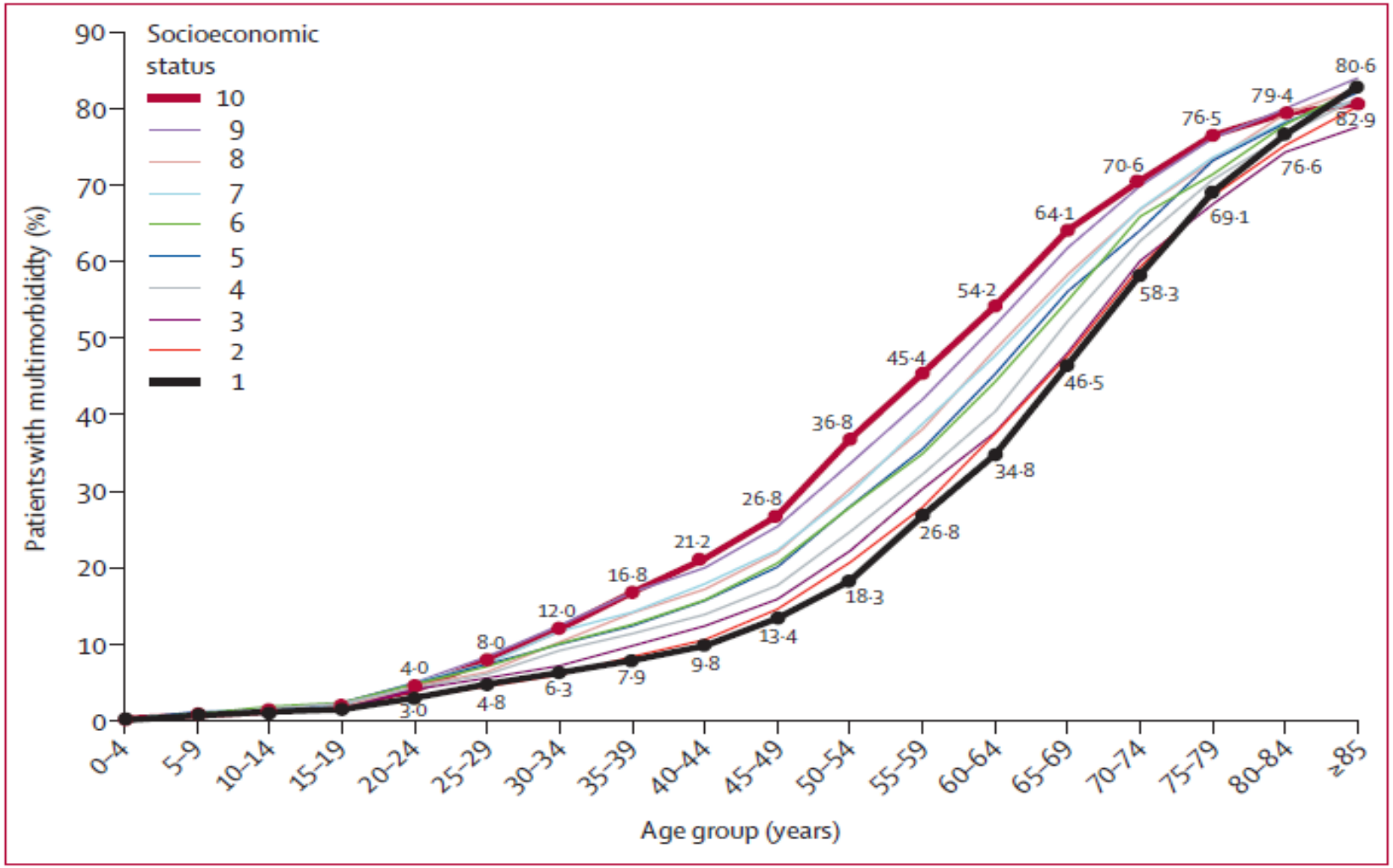
How much treatment burden? National Health and Aging Trend Survey

	Total	Self-Manage	Co-Manage	Delegate
Experience of Treatment Burden				
Hard for you	**24%**	22%	31%	25%
Hard for your family/close friends	**7%**	0%	20%	28%
Get delayed or not get done	**22%**	22%	20%	23%
Asked to do too much	**12%**	12%	13%	13%
Treatment burden – any 1 of above	**38%**	**34%**	**42%**	**54%**

Wolff JL and Boyd CM JGIM 2015. DOI: 10.1007/s11606-015-3359-6

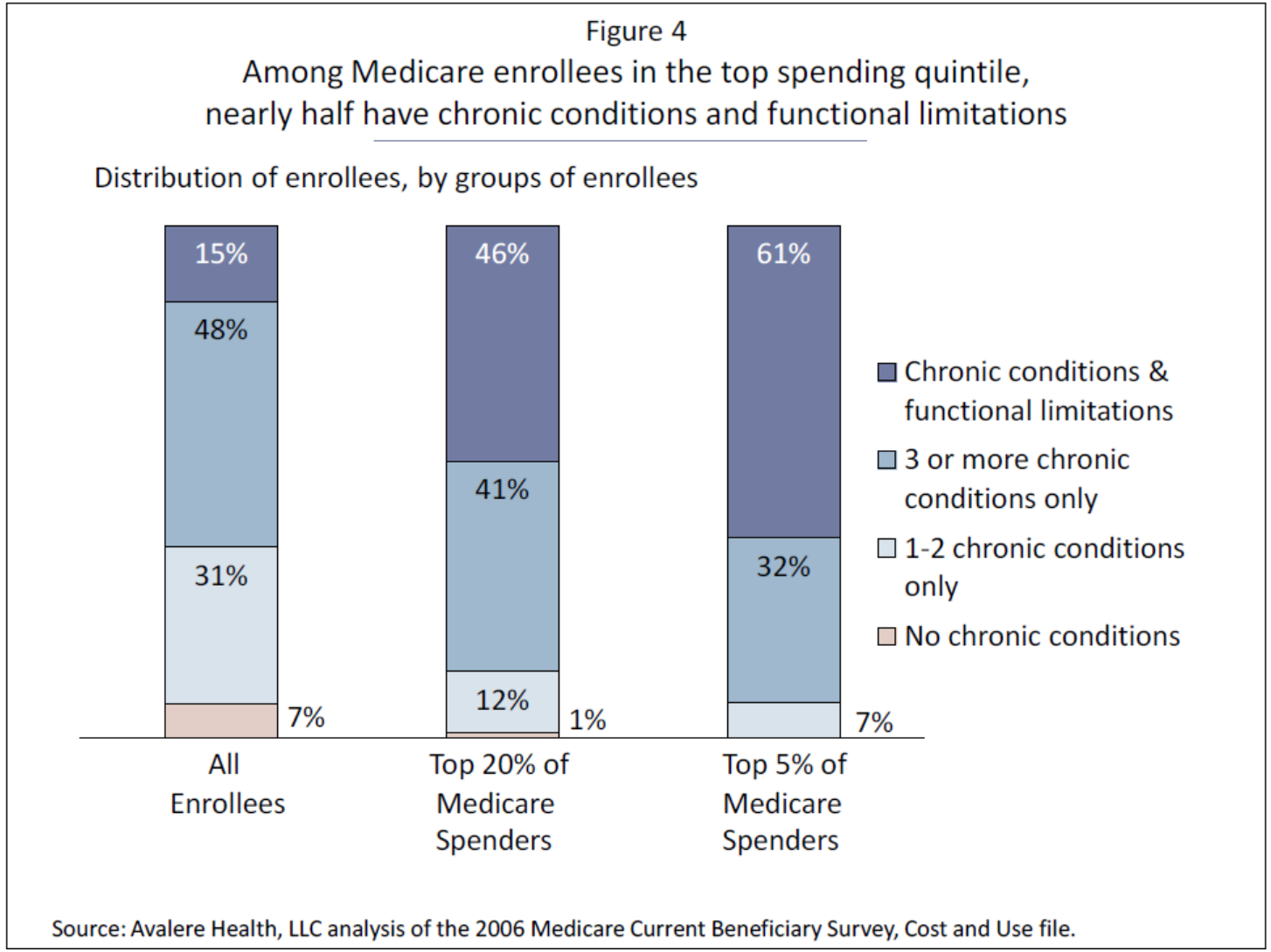
How many people have multiple chronic conditions?

Prevalence of multiple chronic conditions as a function of age, stratifying on socio-economic status



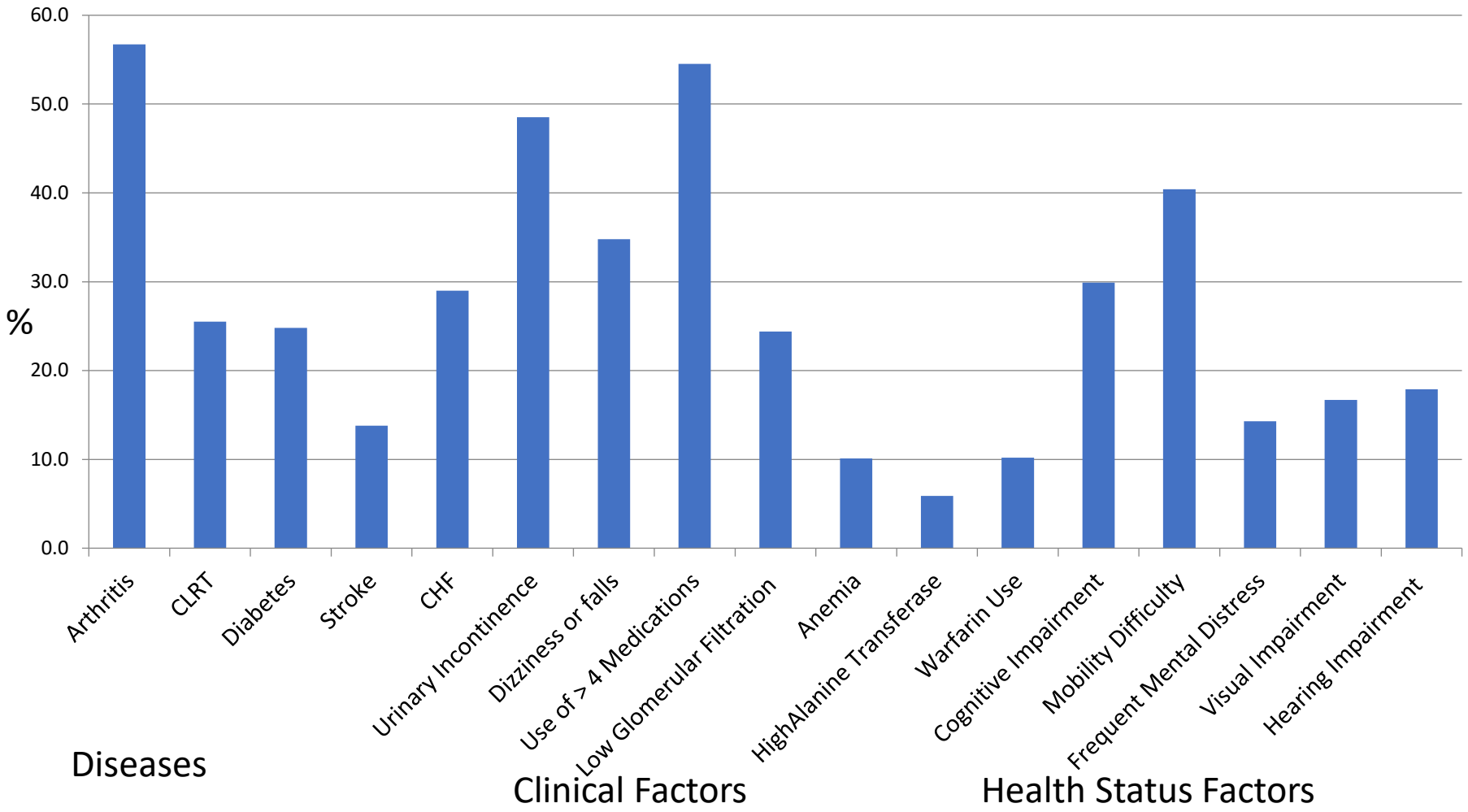
On socioeconomic status scale, 1=most affluent and 10=most deprived." *From Barnett et al, Lancet 2012, 380(9836): 37-43*

Most of Costliest 5% have Functional Limitations



http://www.cahpf.org/docuserfiles/georgetown_trnsfrming_care.pdf

Prevalence of Comorbidities in Adults with Coronary Heart Disease Aged ≥ 45 in NHANES, 1999-2004



Boyd et al JAGS 2011 May;59(5):797-805

Take Home: Multiple chronic conditions is common.

Decisions about which conditions to “count” should be made deliberatively, matching available measures to your purpose.

Choosing Measurement Approach: Match to purpose

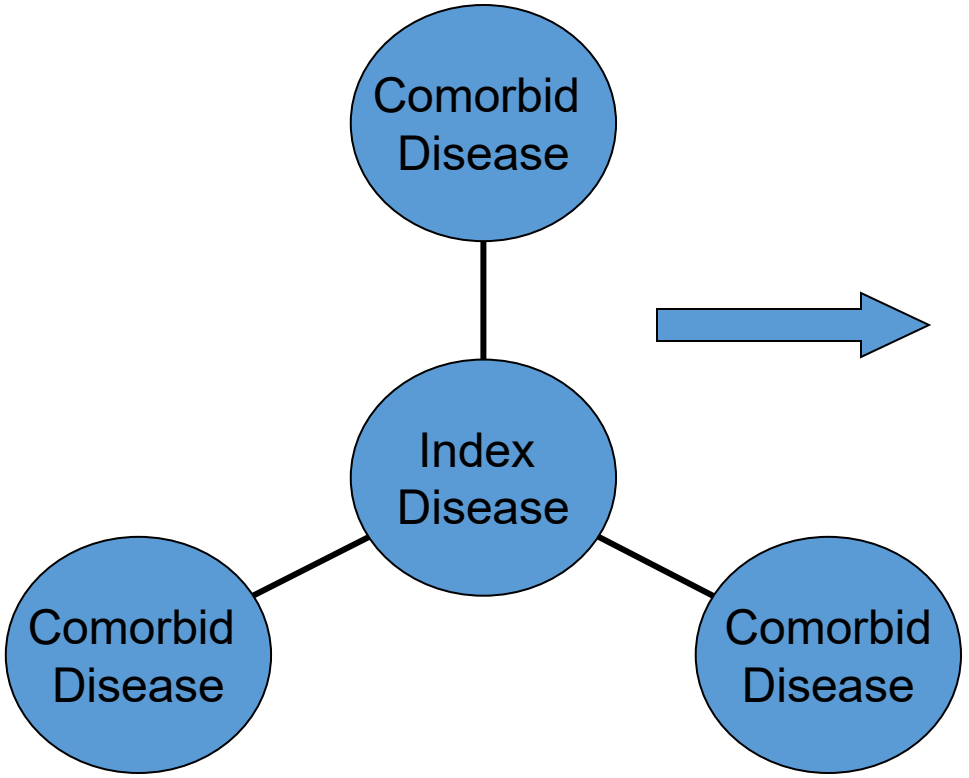
Example	Purpose	Instrument Options
1	Assess multimorbidity in primary care patients, including patients with low health literacy	Brief patient report questionnaires: SCQ-13 closed-ended+3 open-ended questions on health problems[28] Questionnaire by Fortin et al[30] includes 20 conditions relevant and prevalent in primary care
2	Estimate presence/severity of multimorbidity with minimal technology in hospital settings based on clinicians' brief assessment	Questionnaires based on patient examinations or medical records: CIRS-13 body systems; each rated for severity on a 5-point scale with ratings summed to yield a cumulative severity score[12,13]
3	Obtain an overall index of incidence/severity of multimorbidity in hospital or clinic(s) for: (1) descriptive purposes; (2) to serve as predictor (moderator/covariate) of another outcome (eg, health costs, rehospitalization, 1-y mortality)	Clinical assessments abstracted from EHR systems: CCI-17 medical diagnoses; simple disease counts used as an index or as an overall severity score[17]
4	Obtain an overall index of incidence/severity of multimorbidity on a larger scale, such as a health care system, for (1) descriptive purposes; (2) to serve as predictor (moderator/covariate) of another outcome (eg, health costs, rehospitalization, 1-y mortality)	Administrative claims data or EHR: CCI[17] or CCI adaptations[18,19,47] EI-binary code for 30 conditions[22]; EI adaptation yields a continuous quantitative score[23]
5	Predict health care utilization and costs, hospitalization, or mortality with baseline prescription drug use for medical conditions (as a proxy of multimorbidity) in hospitals or health care systems	Administrative claims data from pharmacies: CDS-empirically derived condition weights to classify people into chronic disease groups based on prescription fills[26] RxRisk-identifies chronic conditions and predicts health care costs[27]
6	Predict the morbidity, mortality, health care utilization of patients in large health care systems (obtain representative samples)	Administrative claims data or EHR: Combine diagnosis[17,22,23] and medication-based indices[26,27] to obtain a cumulative index of multimorbidity
7	Compare the cumulative and comparative predictive ability of multimorbidity, functional limitations, and geriatric syndromes to predict health outcomes (obtain representative samples)	Combine data sources and use regression/classification and regression trees[103]: Interview responses of Health and Retirement Study participants to list of chronic conditions,[104] functional limitations,[78] and geriatric syndromes[84] to predict health outcomes Function-related indicators in Medicare claims[45,83]
8	Assess cumulative disease burden and physical functioning in young to older community-dwelling adults	EHR using all diagnoses as separate predictors: MWI-presence of 81 conditions on physical functioning[35]
9	Assess prognosis of patients from the history of illness	Patient reports: EI-treats each diagnosis as a separate predictor using individual ICD-9 codes[22] HCUP or Veterans Affairs data warehouse-provides large samples
10	Estimate prevalence or predict health outcomes, including health care costs of multimorbidity in ambulatory health care settings	Administrative claims data or EHR: ACG system uses ICD diagnosis codes to classify a patient into one of 51 categories based on disease cluster, age, and sex[24] HCC system, originally designed to predict Medicare Beneficiaries' medical expenditures, ranks diagnoses into categories that represent conditions with similar cost patterns; higher categories represent higher predicted health care costs, resulting in higher risk scores[25]
11	Estimate the prevalence of multimorbidity in large representative population samples when clinical specificity or rare conditions are less critical	Various approaches include: Public health surveys administered in-person, online, or by mail/phone[38] National claims databases[25]

Suls J et al. Medical Care: August 2021 - Volume 59 - Issue 8 - p 743-756

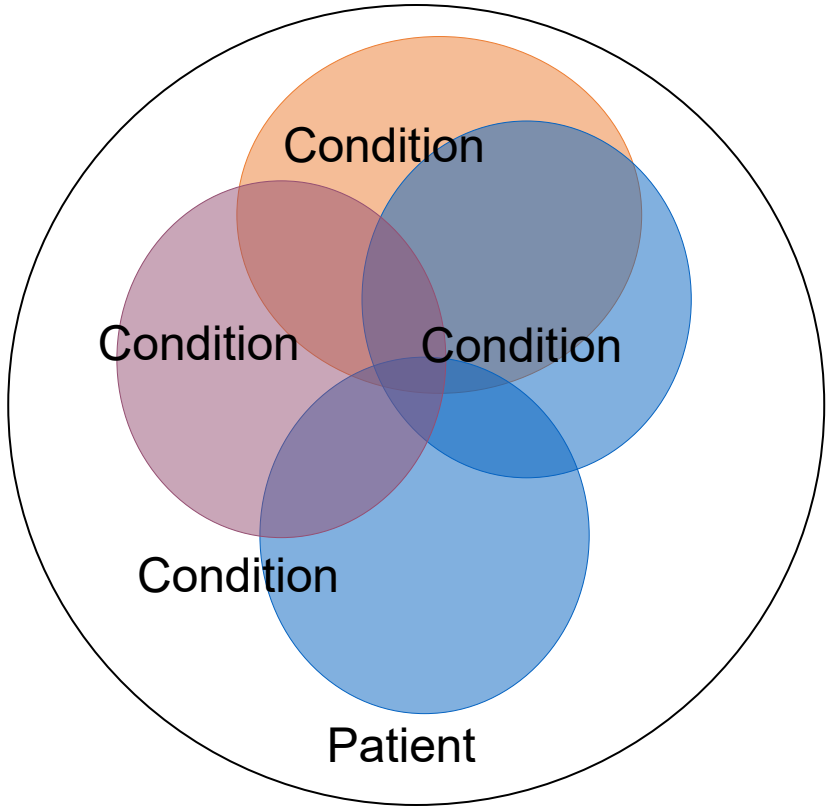
How can person- (and family-) centered care for people with multiple chronic conditions inform clinical decision-making?

A Shift in Perspective

Comorbidity



Multimorbidity / Multiple Chronic Conditions



Boyd, CM, Fortin M. Public Health Reviews, 2011.

Patient-Centered Care

Key Elements:

- patients' concerns and need for information;
- integrated understanding of the patients' world
- common ground on issue and management
- prevention and health promotion;
- continuing relationship

Stewart M *BMJ 2001;322:444*

Integrated care – *is care that is person-centred, coordinated, tailored to the needs and preferences of the individual, their carer and family. It means moving away from episodic care to a more holistic approach to health, care and support needs, that puts the needs and experience of people at the centre of how services are organized and delivered.*

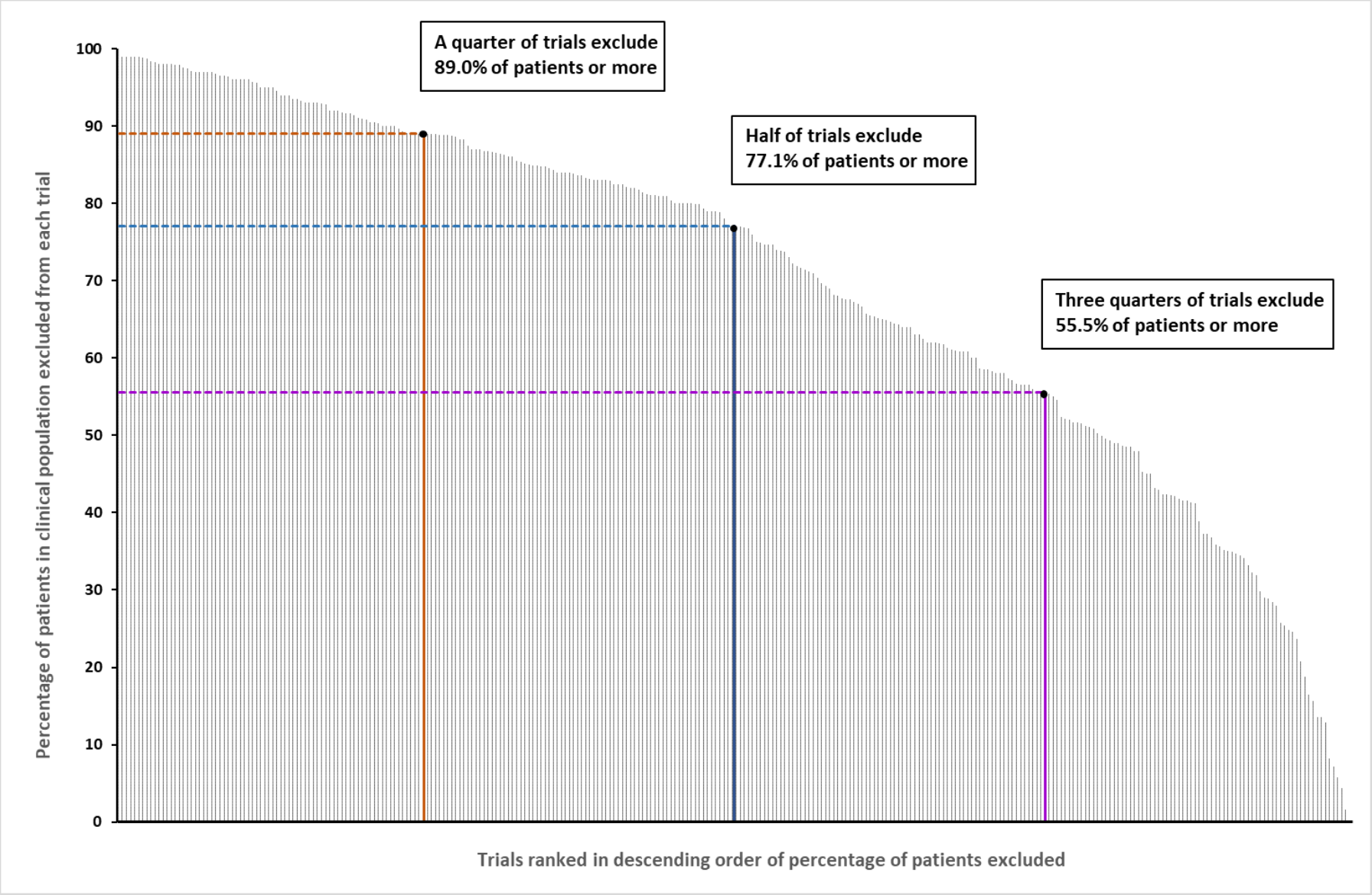
- UK, National Health Service

Take Home: Does the evidence apply to people with multiple chronic conditions?

We can work to include diverse populations across the lifespan in research and evaluate the applicability of available evidence for this population.

Why applicability? SR of exclusion from trials

- Systematic review of 50 studies and 305 trials
- % excluded by trials
- Age, comorbidity, co-prescribing
- Other implicit criteria



He J et al. Trials 2020;21:228 https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-020-4139-0

Revision: NIH Policy and Guidelines on the Inclusion of Individuals Across the Lifespan as Participants in Research Involving Human Subjects

Notice Number: NOT-OD-18-116

Key Dates

Viewpoint

September 21, 2018

Inclusion Across the Lifespan
NIH Policy for Clinical Research

Marie A. Bernard, MD[1]; Janine A. Clayton, MD[2]; Michael S. Lauer, MD[3]

» Author Affiliations | Article Information

JAMA. Published online September 21, 2018. doi:10.1001/jama.2018.12368

'Enrolling older patients in clinical trials invariably means patients with more comorbidities will be included in studies, meaning that the data will be "noisier."

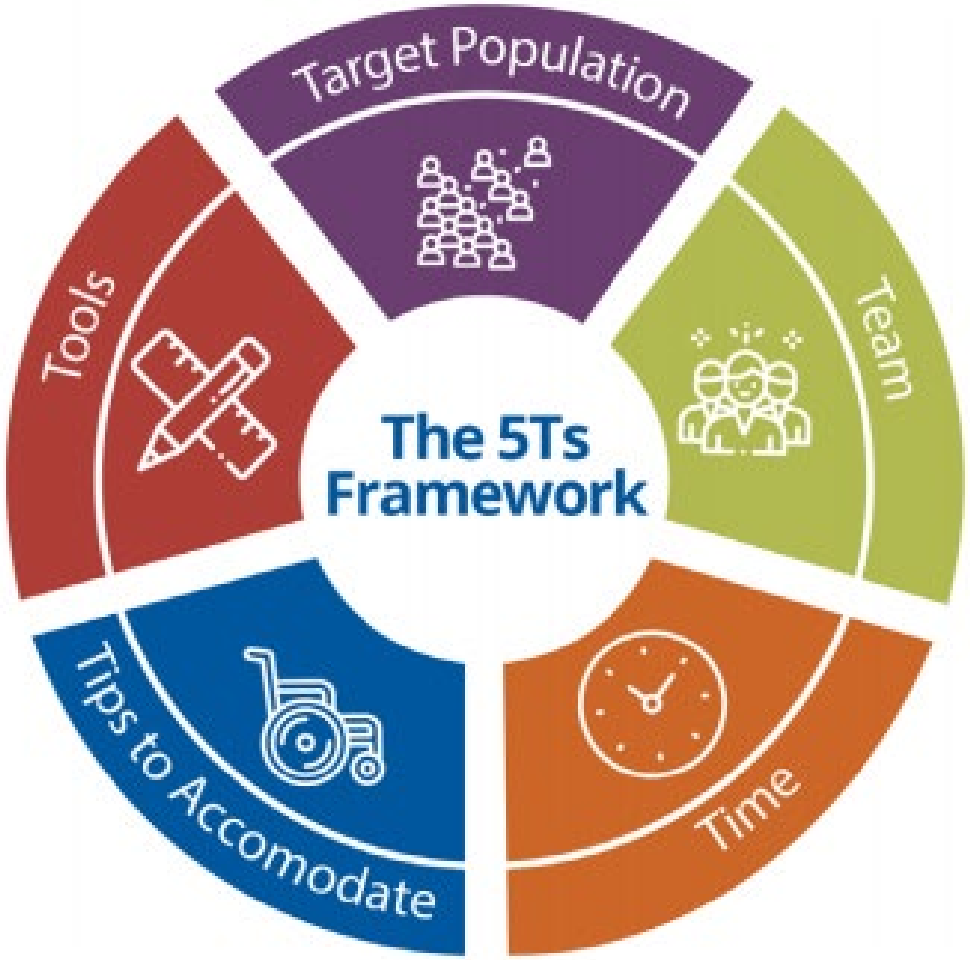
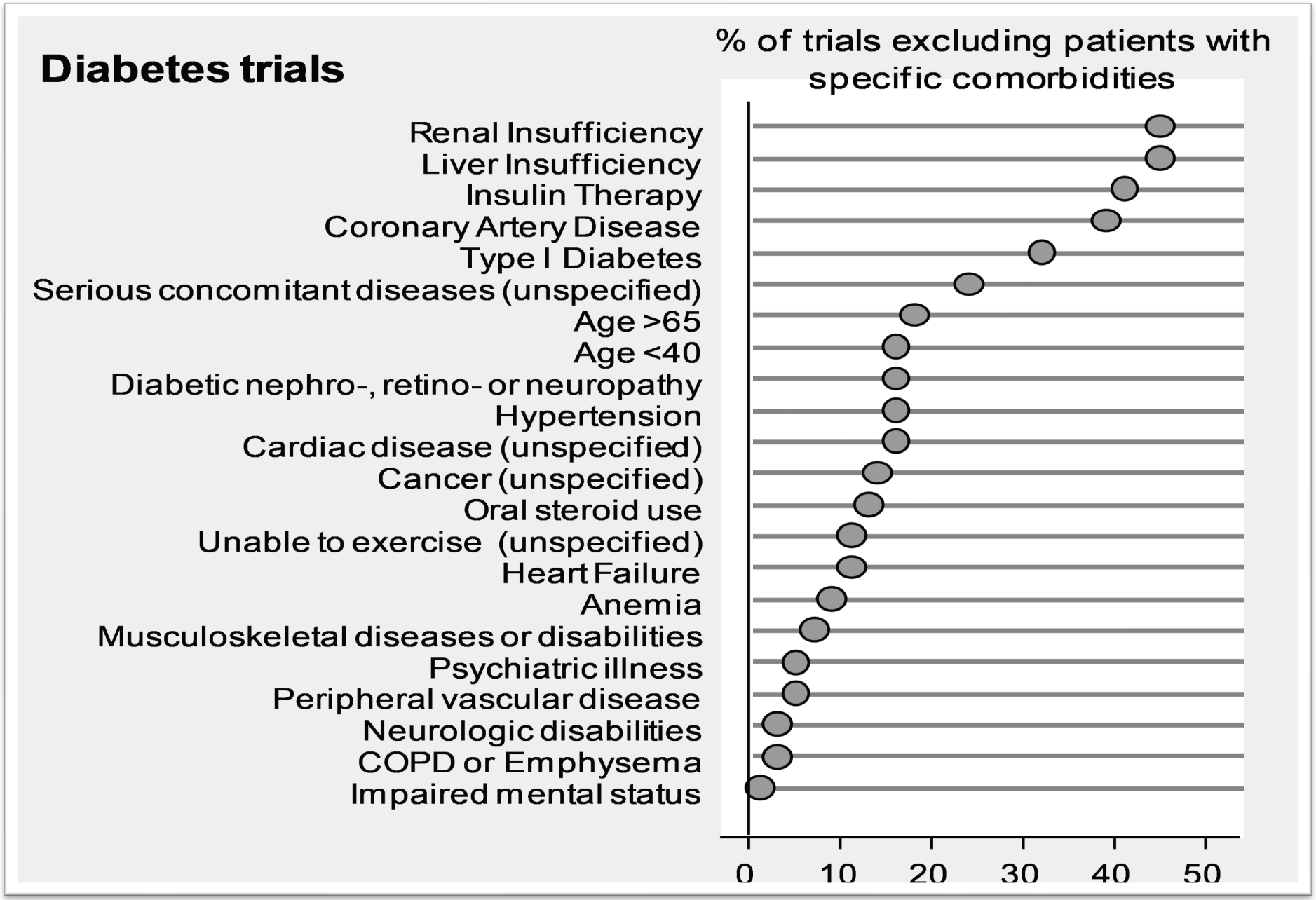


Figure 1. The *5Ts* (*Target Population*, *Team*, *Tools*, *Time*, and *Tips to Accommodate*) is a framework for communicating with non–geriatrics-trained researchers to increase inclusion of older adults in clinical research.

C. Barrett Bowling et al. JAGS 2019 Feb;67(2):342-346.



Boyd, Vollenweider, Puhan PLOS One 2012

What do we know about how to provide care? Can we improve outcomes that matter to older adults with multiple chronic conditions?

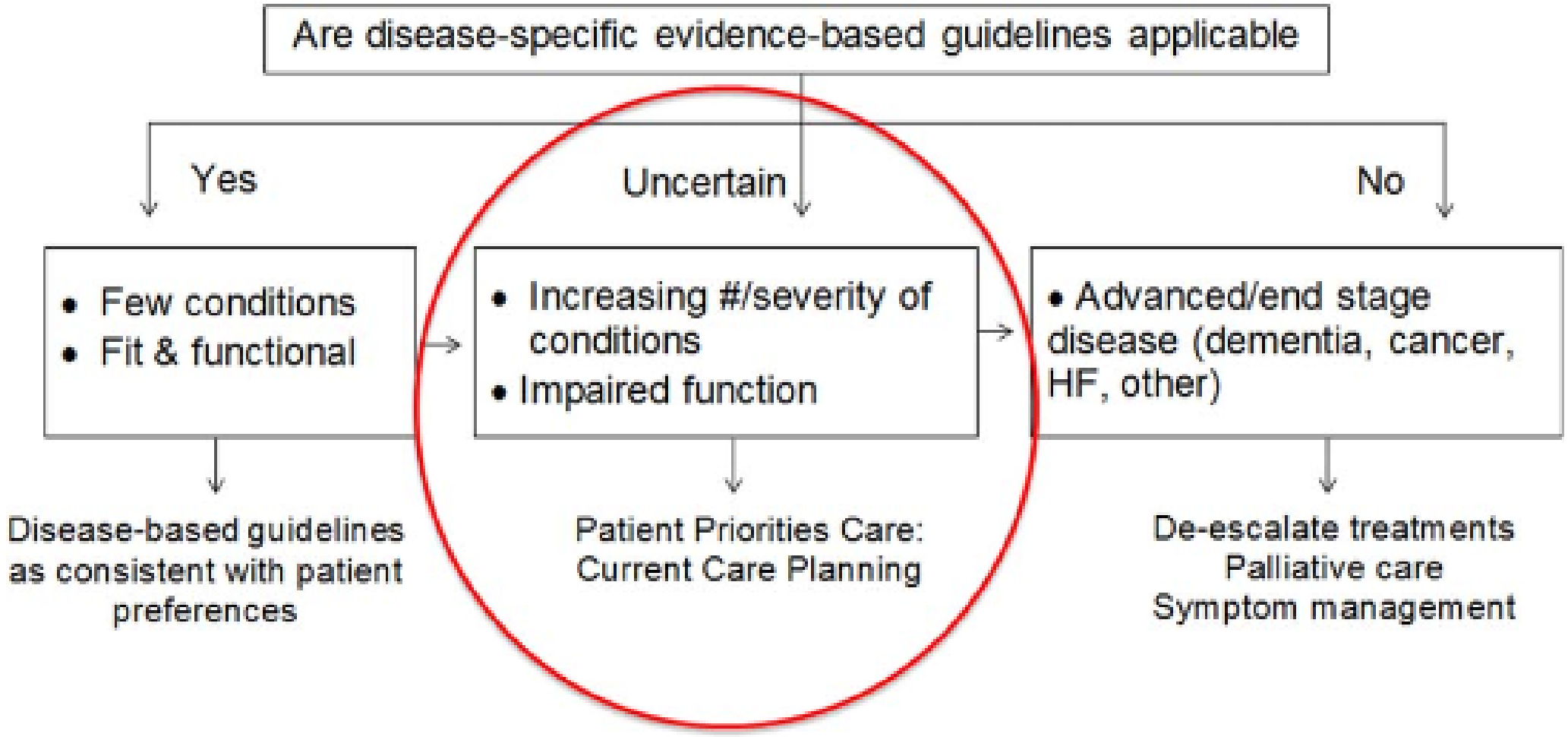
What do we still need to know?

Managing patients with multimorbidity: systematic review of interventions in primary care and community settings


OPEN ACCESS

Susan M Smith *associate professor of general practice*[1], Hassan Soubhi *adjunct professor of family medicine*[2], Martin Fortin *professor of family medicine*[2], Catherine Hudon *associate professor of family medicine*[2], Tom O'Dowd *professor of general practice*[3]

[1]Department of General Practice, Royal College of Surgeons, Dublin 2, Ireland; [2]Department of Family Medicine, University of Sherbrooke, Chicoutimi, QC, Canada; [3]Department of Public Health and Primary Care, Trinity College Centre for Health Sciences, Dublin 24, Ireland



Blaum C et al. *JAGS* 66:2009–2016,2018

Approach to the Evaluation and Management of Older Adults with Multimorbidity: Guiding Principles

- Patient Preferences
- Interpreting the Evidence
- Prognosis
- Treatment Complexity and Feasibility
- Optimizing Therapies and Care Plans

http://www.americangeriatrics.org/health_care_professionals/clinical_practice/multimorbidity

American Geriatrics Society's Guiding Principles for the Care of Older Adults with Multimorbidity

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 (e.g., remaining life expectancy, functional status, quality of life) for older adults with multimorbidity.

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.

http://www.americangeriatrics.org/files/documents/MCC.principles.pdf

Journal of the
American Geriatrics Society

Decision Making for Older Adults With Multiple Chronic Conditions: Executive Summary for the American Geriatrics Society Guiding Principles on the Care of Older Adults With Multimorbidity

Cynthia Boyd, MD, MPH, Cynthia Daisy Smith, MD,† Frederick A. Masoudi, MD, MSPH,‡ Caroline S. Blaum, MD, MS,§ John A. Dodson, MD, MPH,§ Ariel R. Green, MD, MPH,* Amy Kelley, MD, MSHS,¶ Daniel Matlock, MD, MPH,‖ Jennifer Ouellet, MD,** Michael W. Rich, MD,†† Nancy L. Schoenborn, MD,* and Mary E. Tinetti, MD***

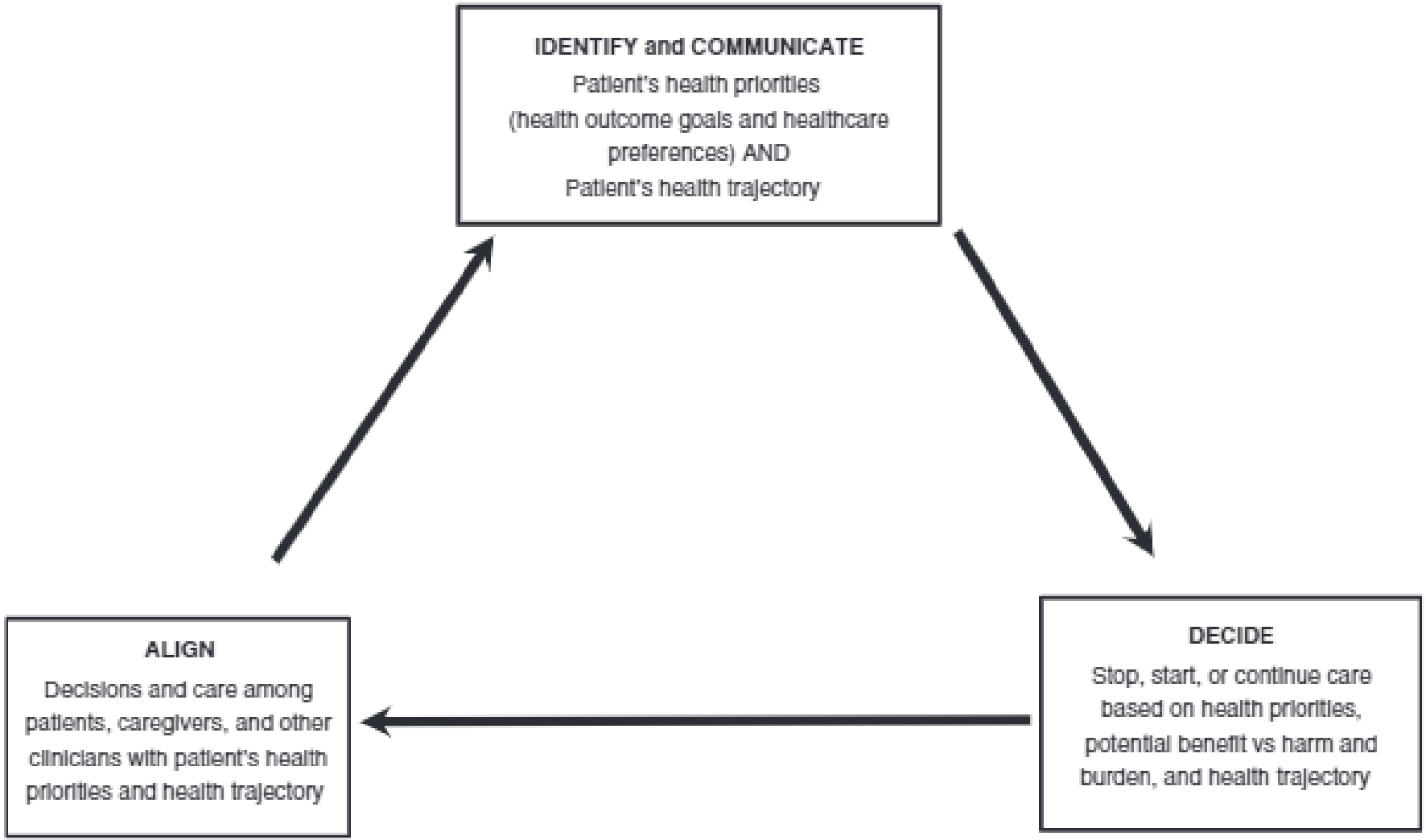


Figure 1. Patient priorities-aligned decision making for older adults with multiple chronic conditions.

Boyd et al. JAGS 67:665 –673, 2019

Research

JAMA Internal Medicine | Original Investigation

Association of Patient Priorities–Aligned Decision-Making With Patient Outcomes and Ambulatory Health Care Burden Among Older Adults With Multiple Chronic Conditions

A Nonrandomized Clinical Trial

Mary E. Tinetti, MD; Aanand D. Naik, MD; Lilian Dindo, PhD; Darce M. Costello, EdD, MPH, MBA; Jessica Esterson, MPH; Mary Geda, BN, MSN, RN; Jonathan Rosen, MD; Kizzy Hernandez-Bigos, BA; Cynthia Daisy Smith, MD; Gregory M. Ouellet, MD; Gina Kang, MD; Yungah Lee, MD; Caroline Blaum, MD

IMPORTANCE Health care may be burdensome and of uncertain benefit for older adults with multiple chronic conditions (MCCs). Aligning health care with an individual's health priorities may improve outcomes and reduce burden.

OBJECTIVE To evaluate whether patient priorities care (PPC) is associated with a perception of more goal-directed and less burdensome care compared with usual care (UC).

+ Invited Commentary
+ Supplemental content

Tinetti et al. JAMA Intern Med. doi:10.1001/jamainternmed.2019.4235

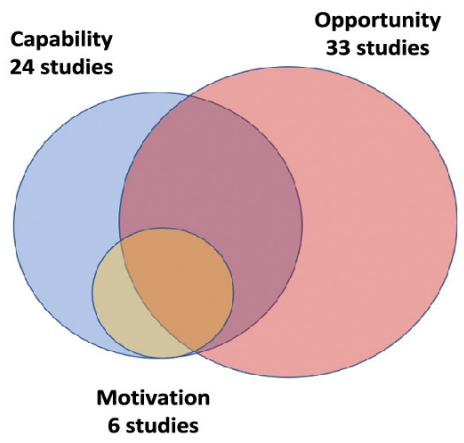
Deprescribing:
Reducing or stopping medications for which potential harms outweigh potential benefits

Deprescribing and deimplementation: Time for transformative change

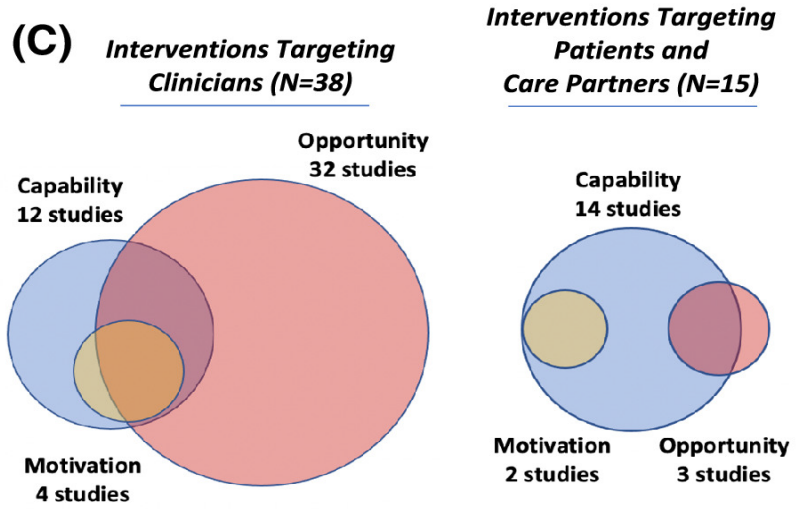
(A)

Intervention type	# of studies (N=43)	Behavior change modalities used (Capability, Opportunity, Motivation)
Interventions targeting clinicians (38 studies)		
Expert team reviews case, makes recommendations to primary clinician(s)	22	
Education provided to clinicians	7	
Decision support (e.g., point-of-care alerts), audit and feedback, other	5	
More than 1 intervention type	4	
Interventions targeting patients and/or care partners (15 studies)		
Expert team reviews case, recommendations given to patient and/or care partner	7	
Education provided to patients and/or care partner	4	
More than 1 intervention type	4	

(B)

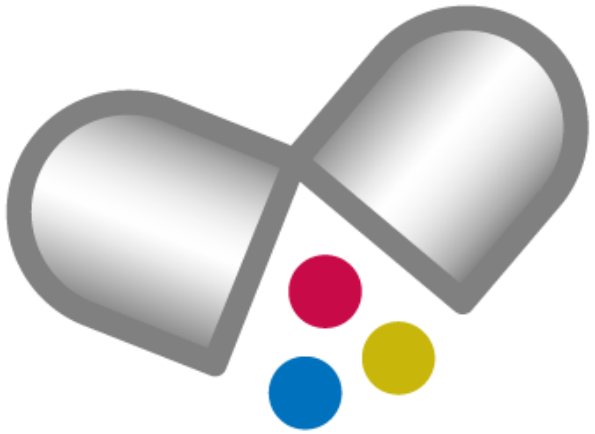


(C)



Journal of the American Geriatrics Society, First published: 09 September 2021, DOI: (10.1111/jgs.17441)

US Deprescribing Research Network



<u>Our goals:</u>

- Develop a national community for mutual learning and collaborations
- Provide resources and supports
  - Junior investigator Intensive
  - Pilot and Grant Planning Awards
- Develop infrastructure
- Engage stakeholders
- Disseminate

www.deprescribingresearch.org

NIA R24 AG064025-1 (Boyd and Steinman, MPIs)

Multiple Chronic Conditions in Context

Moving from "What is the matter?" to ***"What Matters to You?"***

Key contextual factors: public policy, community, health care systems, family, and person, to sub-personal cellular and molecular levels (where most medical knowledge currently is generated)

New knowledge needed involves moving from a predominant disease focus toward a person-driven, goal-directed research agenda

NIH/PCORI Meeting on Multiple Chronic Conditions in Context, Feb. 2013

Mrs. M

Consequences of Conditions and our Treatments:

- Orthostatic
- Stays home because she is fearful of incontinence episodes (on diuretics)
- Reluctant to take warfarin due to monthly visits (before alternatives)
- Sometimes feels shaky in the morning before she eats breakfast
- "It's too many pills."

Her goals: Wants to avoid a stroke as she is caregiver for husband and worries about who would take care of him, but would like to feel better every day and get out of her house more.

- Decreased her BP meds (higher goal), strategies for orthostasis
- Gave permission to skip or take diuretics later on days she wants to do things
- Home PT as right now she is only getting out to health care
- Mobility application – filled out her part for her
- Agreement with warfarin clinic that her INR can be drawn sometimes when she sees other providers (like me)
- Eliminated glyburide

Thanks to Funders

- Paul Beeson Career Development Award Program (National Institute on Aging 1K23AG032910, AFAR, The John A. Hartford Foundation, The Atlantic Philanthropies, The Starr Foundation and an anonymous donor)
- AHRQ R21 “Improving Clinical Practice Guidelines for Complex Patients” HS018597-01
- Patient-Centered Outcomes Research Institute (PCORI) Award (ME-1310-07619).
- K24AG056578 Patient-Centered Care for Older Adults with Multiple Chronic Conditions: Research and Mentoring Program
- NIA R21AG057289 / R33 Optimal Medication Management for Older Adults with ADRD
- NIA R24 U.S. Deprescribing Research Network (USDeN) NIA R24 AG064025-1

cyboyd@jhmi.edu

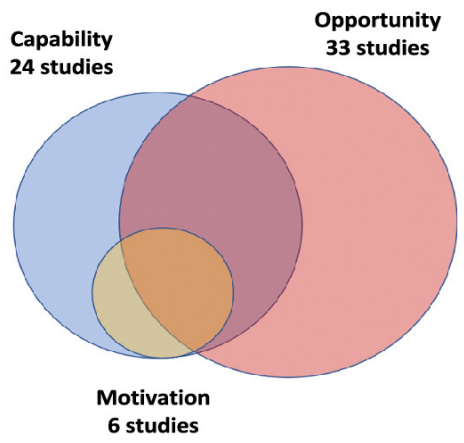
Deprescribing:
Reducing or stopping medications for which potential harms outweigh potential benefits

Deprescribing and deimplementation: Time for transformative change

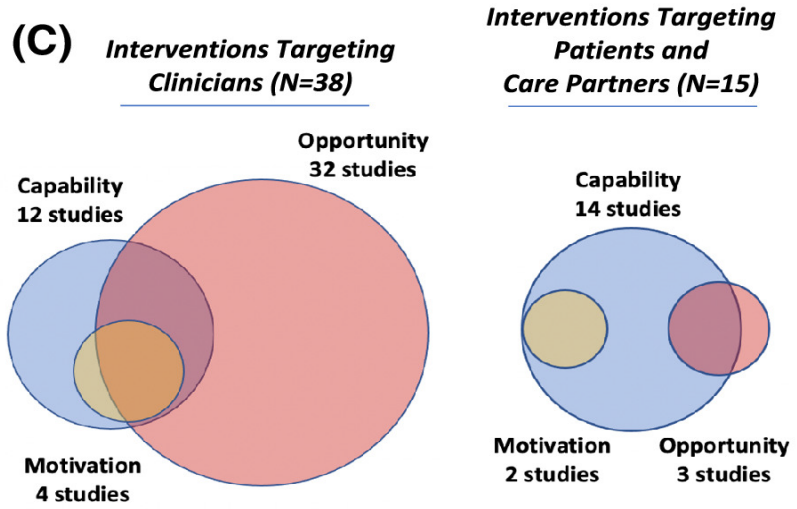
(A)

Intervention type	# of studies (N=43)	Behavior change modalities used (Capability, Opportunity, Motivation)
Interventions targeting clinicians (38 studies)		
Expert team reviews case, makes recommendations to primary clinician(s)	22	
Education provided to clinicians	7	
Decision support (e.g., point-of-care alerts), audit and feedback, other	5	
More than 1 intervention type	4	
Interventions targeting patients and/or care partners (15 studies)		
Expert team reviews case, recommendations given to patient and/or care partner	7	
Education provided to patients and/or care partner	4	
More than 1 intervention type	4	

(B)



(C)



Journal of the American Geriatrics Society, First published: 09 September 2021, DOI: (10.1111/jgs.17441)