

# A patient-centered, population health approach to older adults with CKD

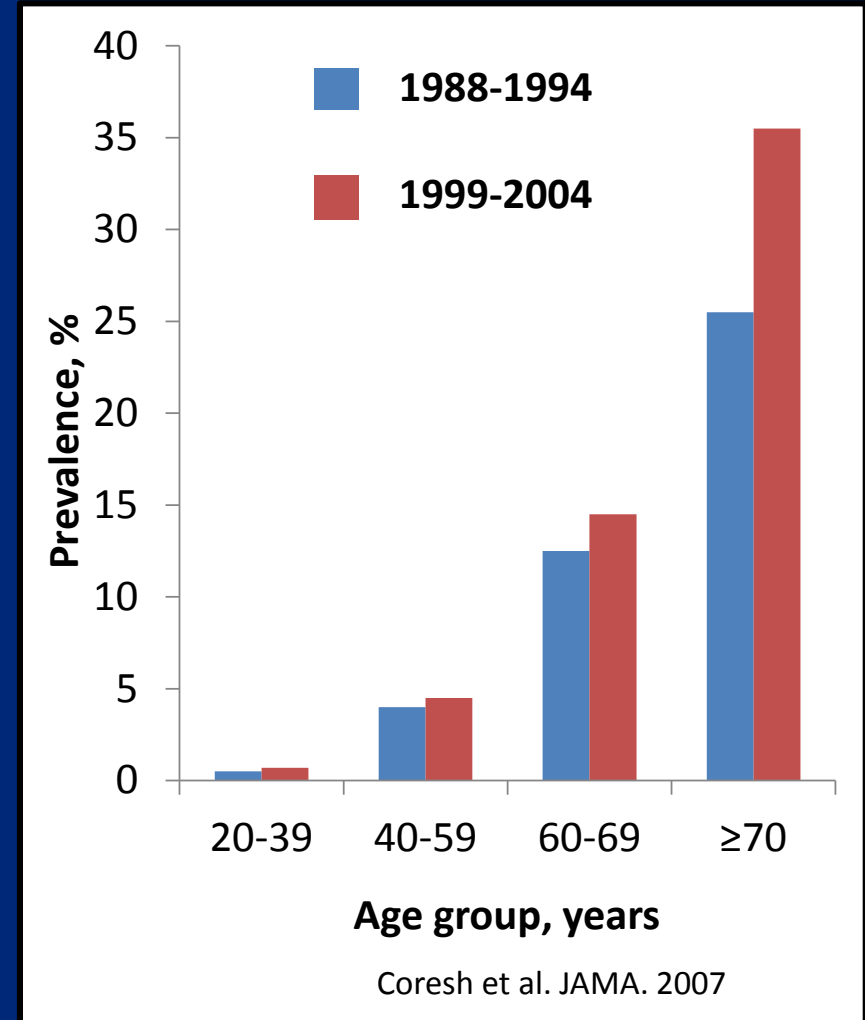
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# Background

- Chronic kidney disease (CKD) is a complex chronic disease
- Prevalence increasing among older adults
- Associated with adverse health outcomes
- A population health management framework for older adults with CKD may be helpful



# Population health

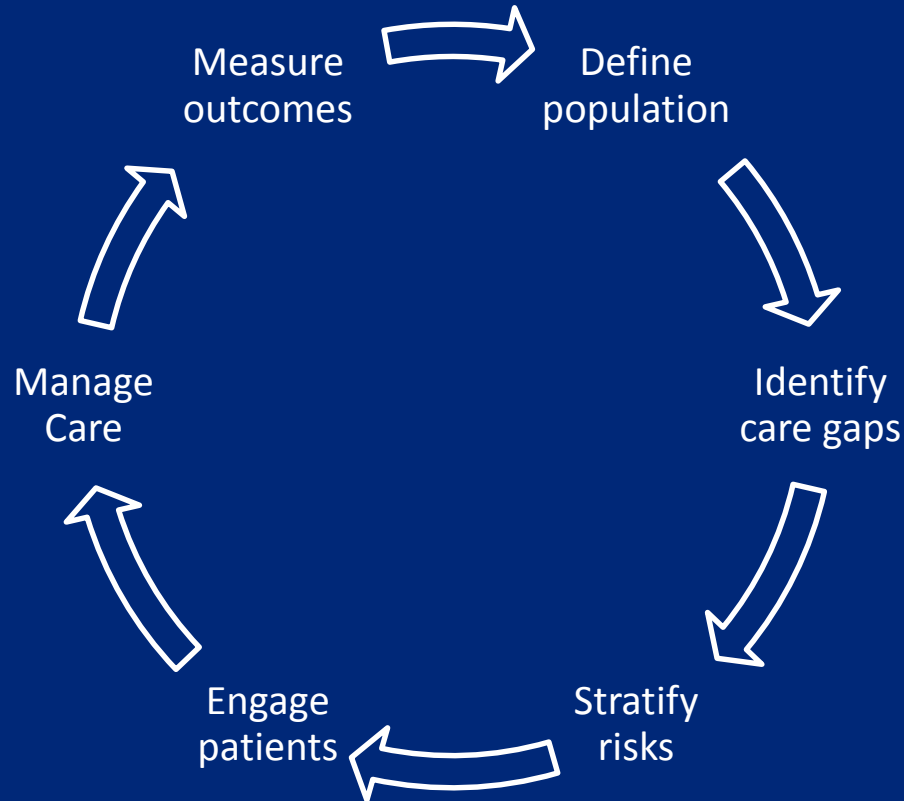
- Population health - the health outcomes of a group of individuals, including the distribution of such outcomes within the group<sup>1</sup>
- Population health management – An approach to improving the health outcomes of a group of individuals
  - Information (data) on group used to improve outcomes of patients within that group<sup>2</sup>
  - Prospective or anticipatory care<sup>3</sup>
  - Patient centered – focus on outcomes that are important to patient and their families

1. Kindig D. Am J Public Health 2003.

2. Margolius. Health Affaris. 2011

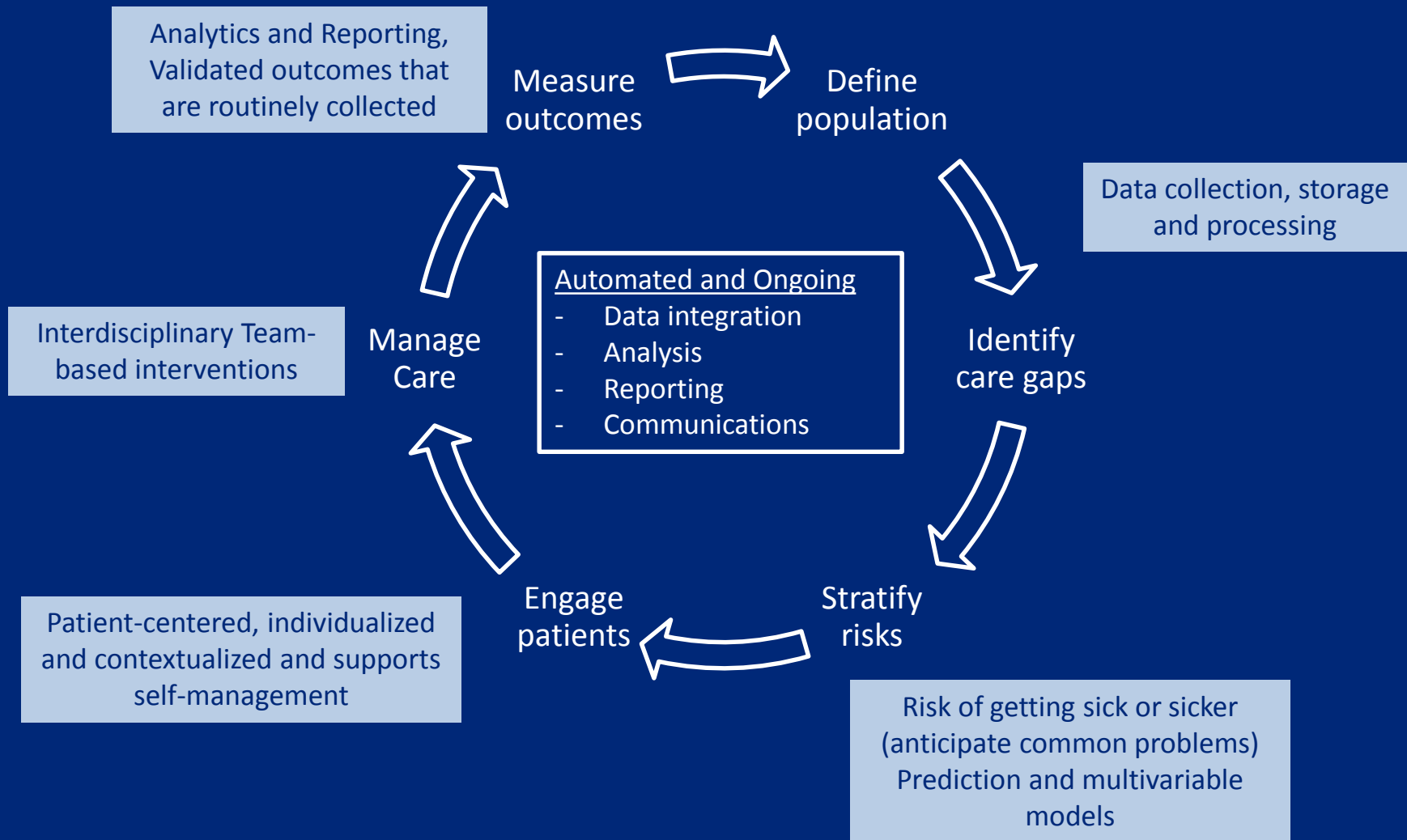
3. Cassel. Medicare Matters. Univ Cal Press. 2007

# Population Health Management Framework



Adapted from "Population health management: A roadmap for provider-based automation in a new era of health care." Institute for Health Technology Transformation.

# Population Health Management Framework



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# What does this have to do with geriatrics?

Analytics and Reporting,  
Validated outcomes that are routinely  
collected

Measure  
outcomes



Define  
population

Geriatrics focuses on  
multiple chronic conditions,  
frailty and geriatric  
syndromes

Data collection, storage and  
processing

Geriatrics emphasizes  
outcomes that are important  
to patients and their families

Interdisciplinary Team-based  
interventions

Manage  
Care

Automated and Ongoing

- Data integration
- Analysis
- Reporting
- Communications

Identify  
care gaps

Geriatrics can identify gaps  
related to poor care  
coordination, complex  
transitions,  
rehospitalizations

Geriatrics is interdisciplinary  
and has developed many  
models of care (ACE units,  
GRACE, PACE, Care Transition  
Intervention, HBPC, HELP)

Patient-centered, individualized and  
contextualized and supports self-  
management

Engage  
patients

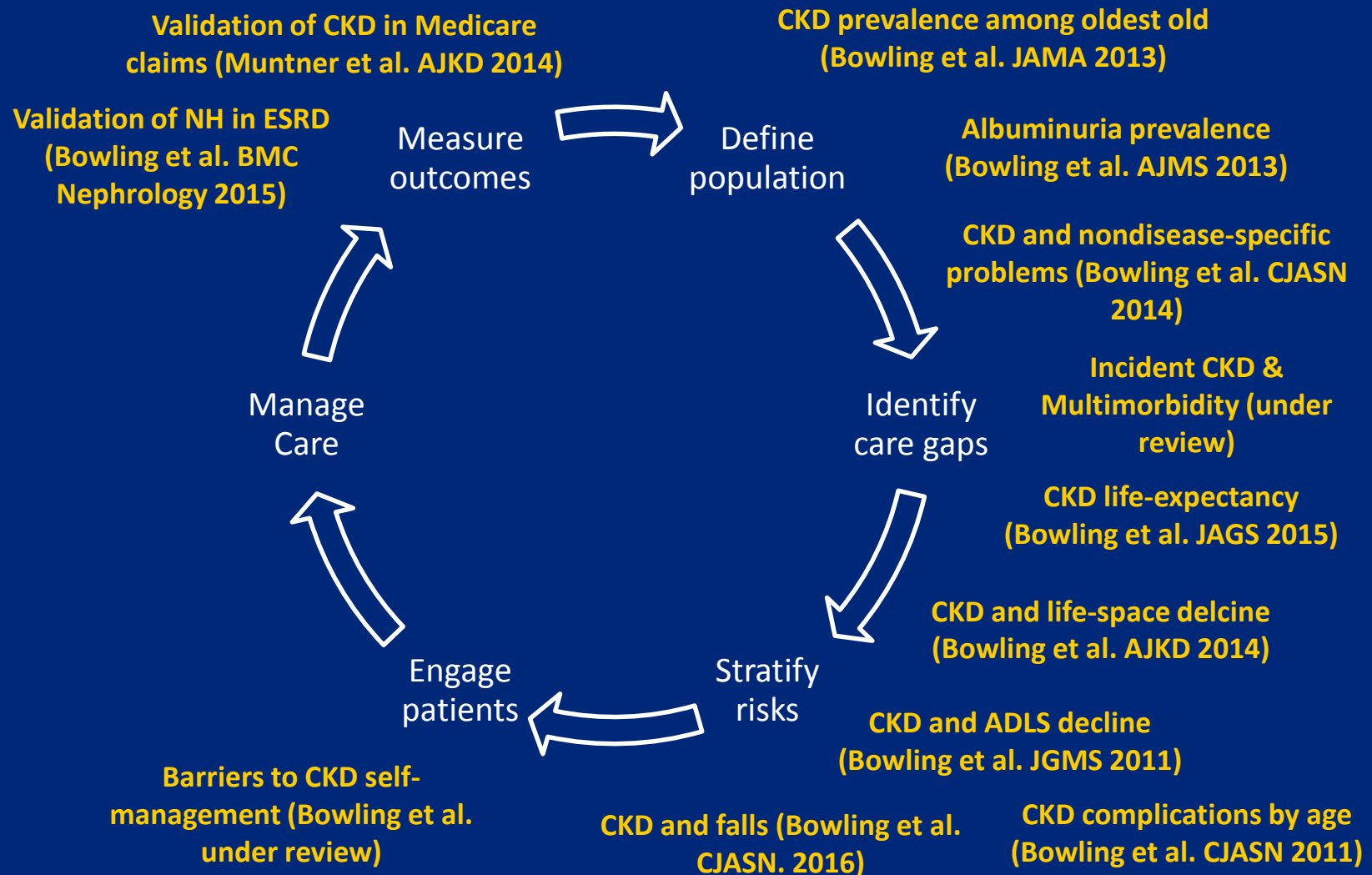
Stratify  
risks

Geriatric assessments  
improve risk stratification  
(gait speed, frailty, cognition,  
function)

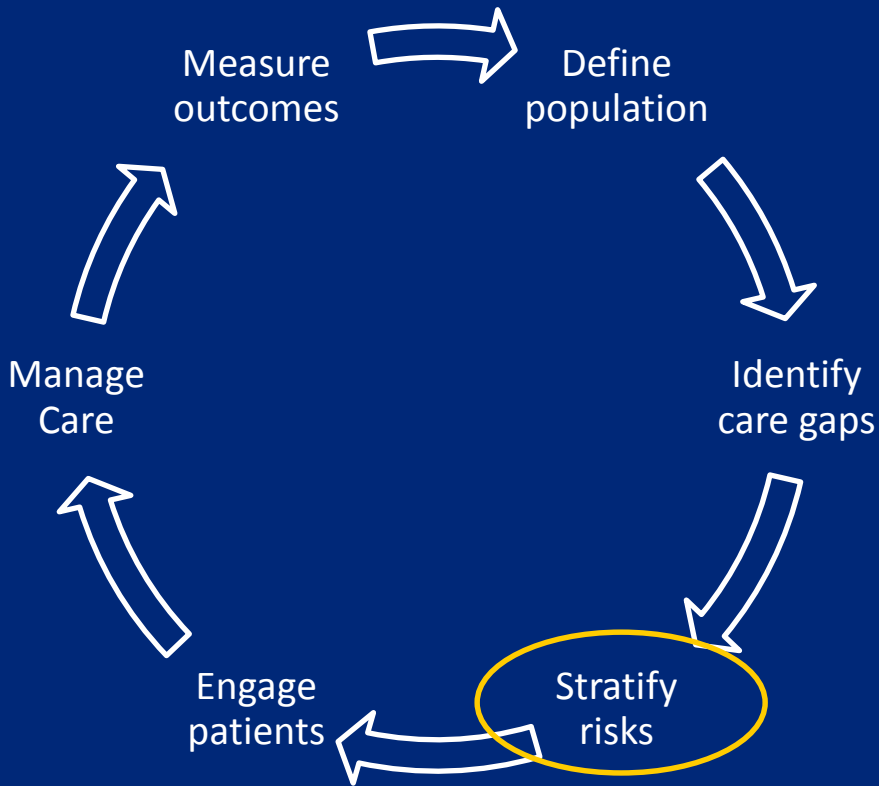
Risk of getting sick or sicker  
(anticipate common problems)  
Prediction and multivariable models

Geriatrics is patient- and family-centered  
(identifying patient preferences, health goals,  
geriatric assessment provides context, assess  
life-expectancy, address need for palliative care)

# Our research program in CKD and population health management



# Can geriatric conditions be used to better stratify risks?



- Biomarkers used to stratify risk in CKD
- Geriatric conditions (falls, mobility impairment, cognitive impairment) are strong predictors of adverse health outcomes
- **QUESTION: For VA patients 70 years and older with CKD, can geriatric conditions be used to predict risk for hospitalization and ED visits?**



# Data access

- VA has a large corporate data warehouse (CDW)
  - 1.5 petabytes of storage
  - 20 million unique patients
  - 1,000 separate data tables
  - 20,000 columns
  - 80 billion rows
- VA Informatics and Computing Infrastructure (VINCI)
- **PROBLEM:** Geriatric conditions not routinely captured in these data or only in text fields



# Clinical reminder in the VA Renal Clinic

- Unstructured data in clinical notes → structured data variables in CDW

Reminder Resolution: Renal Clinic Geriatrics Need Screen

GERIATRIC TOOLKIT - NURSING SCREEN

FALLS ASSESSMENT

Have you fall

Yes

No

MOBILITY ASSESSME

1. Do you hav

2. Do you req  
neighbo

Reminder Resolution: Renal Clinic Geriatrics Need Screen

COGNITIVE ASSESSMENT

Does patient have a history of dementia?

Yes

No

- Please choose from the following:

Perform Mini-Cog:

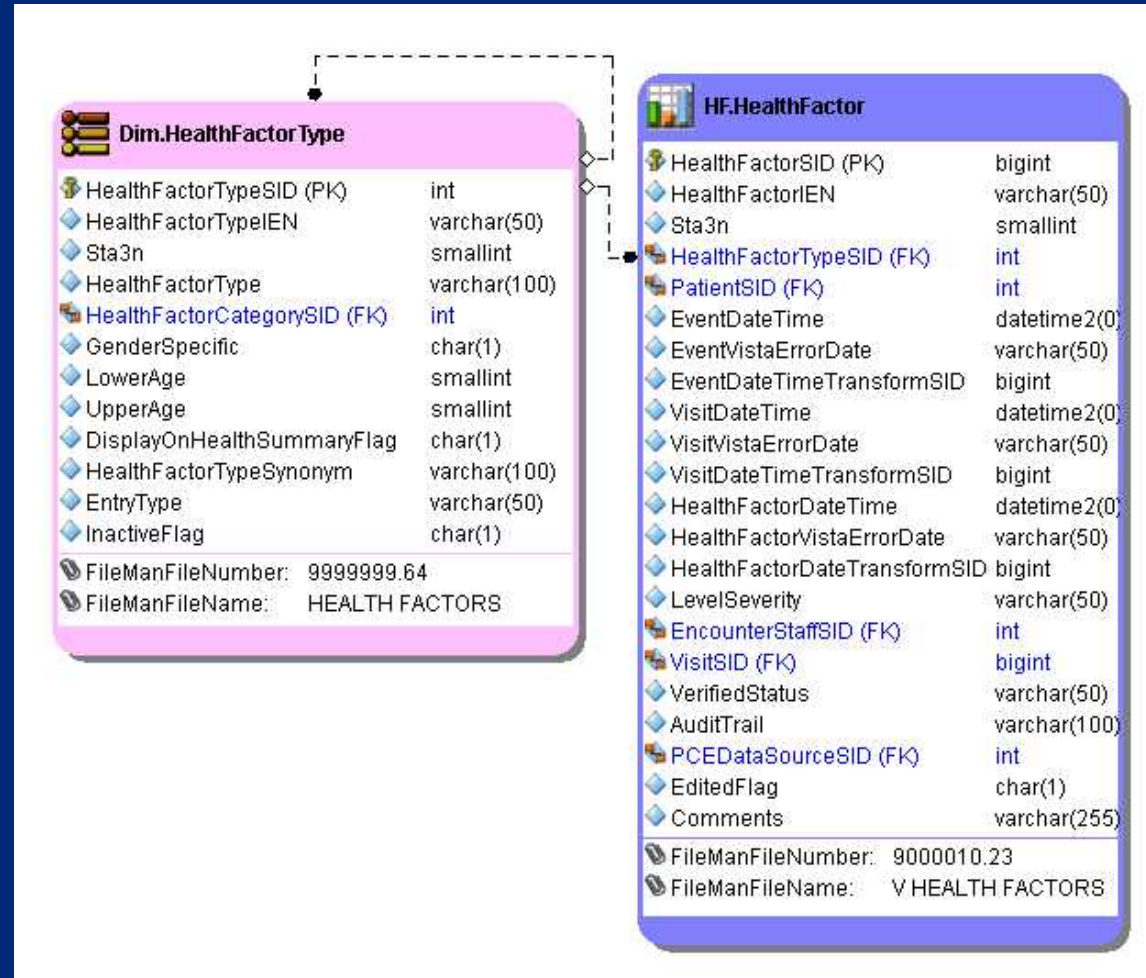
- Ask patient to please repeat the following words:  
banana, sunrise, chair

- Ask patient to please remember those words

- Ask patient to please draw a clock face, put all of the numbers,  
make the clock show 10 minutes past 11 o'clock.

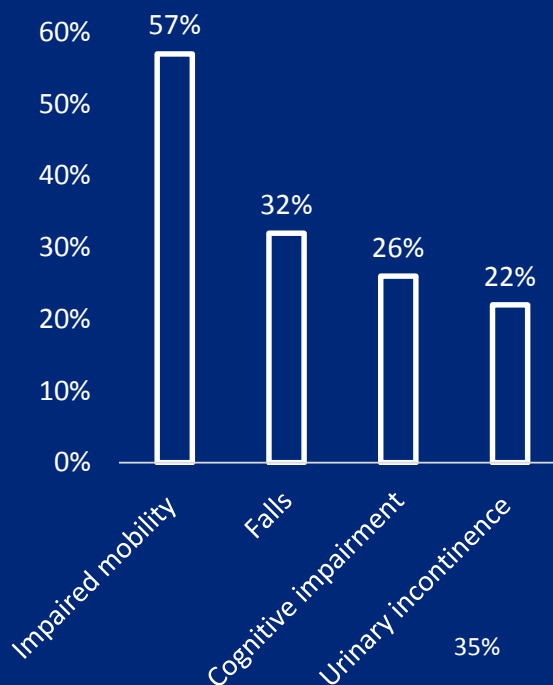
# Data processing

- Microsoft SQL Server Management Studio 2014
- SAS Enterprise Guide 6.1
- R x64 3.1.2



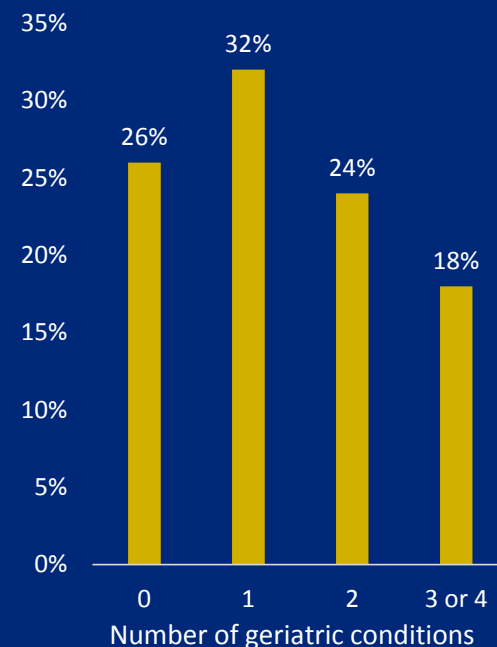
# VA Renal Clinic patients $\geq 70$ years old (n= 201)

Characteristics	% or median (range)
Age	76 (70 – 95)
Male	99%
African American	46%
Hypertension	98%
Diabetes	64%
Heart failure	30%
eGFR (ml/min/1.73 m <sup>2</sup> )	
$\geq 60$	3%
45 – 59	24%
30 – 44	41%
$< 30$	32%
ACR, mg/g	
$< 30$	40%
30 – 299	38%
$\geq 300$	22%



**Unrecognized geriatric conditions are common**

**42% of patients have 2 or more geriatric conditions**

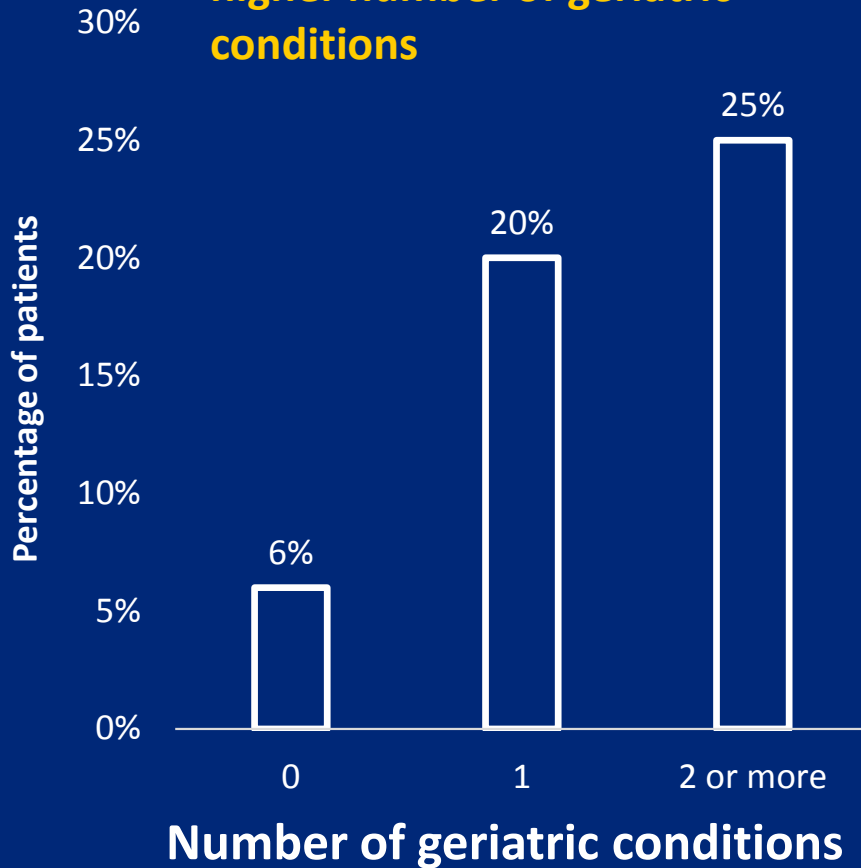


eGFR = estimated glomerular filtration rate, ACR = albumin-to-creatinine ratio

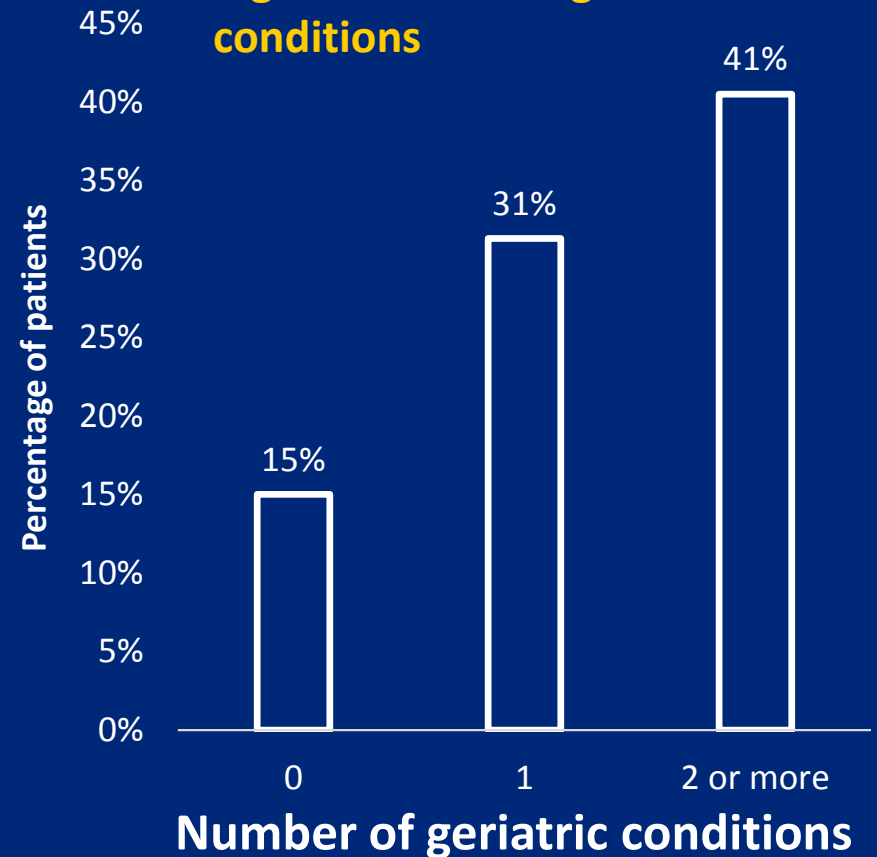


# Stratify risks

## Higher hospitalization at higher number of geriatric conditions

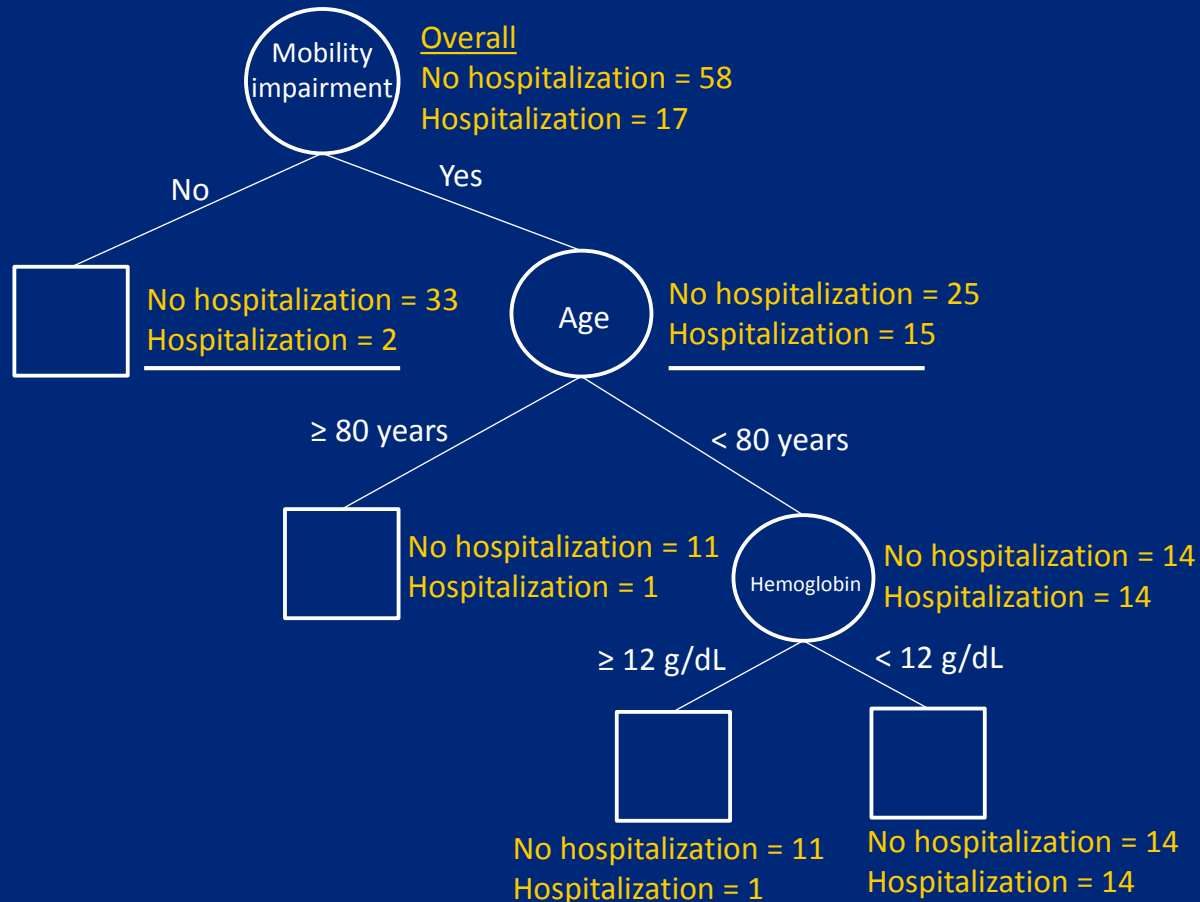


## Higher ED utilization at higher number of geriatric conditions



# Stratify risks

Classification and regression tree (CART) approach



- Split sample approach
- Training sample – 17 hospitalizations
- **Mobility impairment most important** characteristic for stratifying risk for hospitalization
- Validation sample low misclassification rate = 0.16

# Conclusions

- Population health framework helpful for **conceptualizing research and clinical programs** for older adults with CKD
- Access to geriatric assessments may **improve risk stratification** in this population
- Next steps include engaging patients and managing care

