

Under Pressure:
Interpretation of hypertension guidelines and
data to individualize care for older adults

Oregon Geriatrics Society Meeting 2020

Jessica Weiss, MD MCR

2020

Conflict of Interest Disclosure

Disclosure

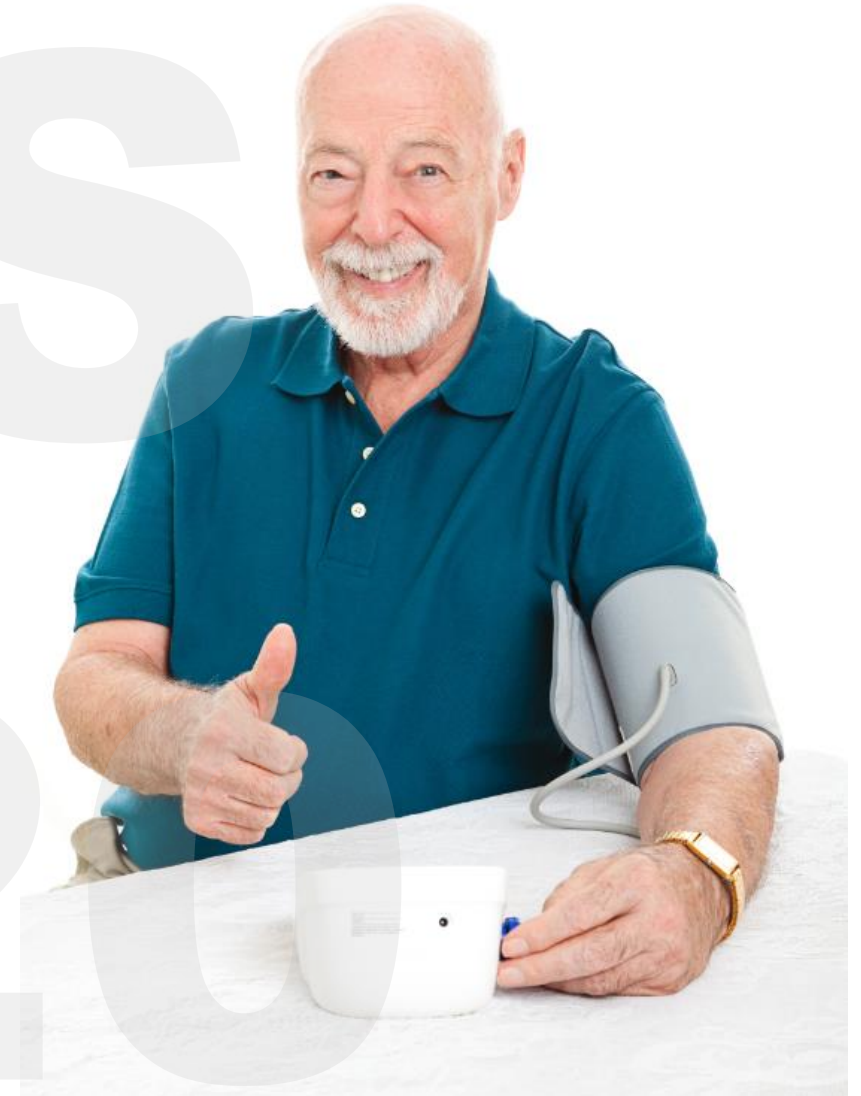
O O G G S

I do not have any relationship(s) to disclose.

2 0 2 0

Objectives

- Review the differences between current hypertension guidelines
- Evaluate the role that chronic kidney disease and complex comorbidity play in defining blood pressure targets
- Assess the role for specific medications to manage hypertension in older adults.



Treatment of hypertension improves cardiovascular outcomes





OGGS

2020

In adults, some blood pressure control is better than none to decrease cardiovascular events & death.

Dr. A

An 83 yo retired PhD, referred by his primary care provider for recommendations on hypertension management.

PMH:

Hypertension

Diet-controlled DM

PUD

Edema (multifactorial)

BPH

Gout

188/66 → 169/59

HR 62

Medications:

Amlodipine 2.5 mg/d

Atenolol 50 mg daily

Lasix 20 mg daily

Tamsulosin 0.4 mg/d

You say my blood pressure should be lower – how much lower? I read the news – no one agrees!



**Recent practice guidelines don't agree
on blood pressure targets for older
adults.**

JNC-8

**ACP/
AAFP**

**ACC/
AHA**

Guideline	BP target recommendation/rationale
JNC-8 2014	<p>-In a population of patients age 60 and older, initiate therapy with SBP >150 or DBP >90 and treat to target <150/90</p>
ACP/AAFP 2016	<p>-In adults over age 60, initiate treatment when SBP is >150 and treat to <150 to reduce the risk of mortality, stroke, and cardiovascular events.</p> <p>-In adults over age 60 with history of stroke, target SBP <140 for secondary stroke prevention</p> <p>-In adults over age 60 with high cardiovascular risk, consider SBP <140</p>
ACC/AHA 2017	<p>-For non-institutionalized ambulatory adults age 65+ with SBP >130, treatment to SBP <130 is recommended.</p> <p>(For adults >65 with high burden of comorbidity, limited life expectancy, clinical judgement, pt preferences, and a team-based approach are recommended.)</p>

JNC-8 Systematic review: Data related to BP targets older adults

SBP target <140

- VALISH
(2004, n= 3,260)
- JATOS
(2008, n= 4,418)
- Cardio-sis
(2008, n= 1,111)

More vs less therapy, resulting in SBP <160

- SHEP
(1991, n= 4,736)
- Syst-Eur
(1997, n= 4,695)
- HYVET
(2008, n= 3,845)

ACP-AAFP Syst Review: Data related to BP targets older adults

Treat to target studies using SBP <140 versus a higher target

	All-cause mortality	CV events	Stroke
ACP-AAFP Systematic review -SBP <140 or DBP <85	0.86 (0.69; 1.06)	0.82 (0.64; 1.00)	0.79 (0.59; 0.99)

Studies included in the analysis were ACCORD, Cardio-SIS, HOT, SPRINT, JATOS, and VALISH

ACP-AAFP and ACC Reviews: Data related to BP targets older adults

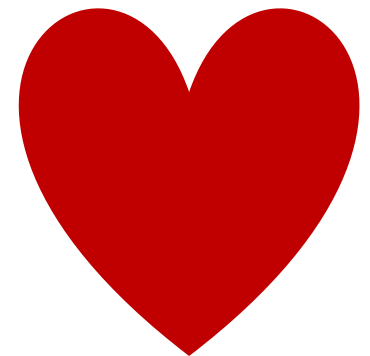
	All-cause mortality	CV events	Stroke
ACP-AAFP Systematic review -SBP <140 or DBP <85	0.86 (0.69; 1.06)	0.82 (0.64; 1.00)	0.79 (0.59; 0.99)
ACC-AHA Systematic review -intensive vs higher target	0.92 (0.76; 1.11)	0.77 (0.64; 0.93)	0.78 (0.64; 0.94)

Studies used ACP-AAFP:

ACCORD
 Cardio-Sis
 HOT
 SPRINT
 JATOS
 VALISH

Studies used AHA:

ACCORD
 Cardio-Sis
 HOT
 SPRINT
 JATOS
 VALISH
 Wei et al



OOGS

2020

In older adults with high risk of cardiovascular disease, SBP <140 may reduce risk of CV events and mortality

In older adults in general, SBP <150 can reduce the risk of stroke, can potentially reduce the risk of cardiovascular outcomes and *probably* mortality

In adults, some blood pressure control is better than none to decrease cardiovascular events & death.

188/66 →
169/59 mm Hg



1. Increase amlodipine to 5 mg daily

2. Check blood pressure 2-3 times a week. Call if upper number is above 145 or below 115, or if the lower number is below 55

Dear Dr. Weiss,

I had labs done last week, and I learned that I have chronic kidney disease. Does this affect what my blood pressure should be?

Thank you,
Dr. A

*What is the
“right” blood
pressure for older
adults with kidney
disease?*



Recommendations from JNC-8 for patients with CKD:

“In the population aged 18 or older with CKD, initiate pharmacologic treatment to lower BP at SBP of 140 mmHg or higher or DBP of 90 mmHg or higher and treat to goal SBP of lower than 140 mmHg and goal DBP lower than 90 mmHg.”

Expert opinion – grade E

Caveat for age:

“...when weighing the risks and benefits of a lower BP goal for people aged 70 and older with estimated GFR less than 60 ml/min/1.73m², antihypertensive treatment should be individualized, taking into consideration factors such as frailty, comorbidities, and albuminuria.”

JNC-8 goal for CKD: <140/90

Lower BP target <140

- ~~VALISH~~
(2004, n= 3,260)
- ~~JATOS~~
(2008, n= 4,418)
- ~~Cardio-sis~~
(2008, n= 1,111)

Lower BP target <150

- ~~SHEP~~
(1991, n= 4,736)
- ~~Syst-Eur~~
(1997, n= 4,695)
- ~~HYVET~~
(2008, n= 3,845)

<u>Trial</u>	<u>Mean age</u>	<u>BP goals/tx groups</u>	<u>Achieved BP</u>	<u>Outcomes</u>
Non-CKD population				
Shulman 1989 N=10,940	50.8	DBP <90 vs usual	NR	--Faster rate in creatinine rise reported in those with higher BPs.
Walker 1992 (MRFIT) N=5,524	46.5	DBP <95 vs usual	<140 vs 150-159	--Rate in renal function decline was faster for those with higher vs lower BPs.
Non-DM CKD population				
<u>Klahr 1994</u> (MDRD) N=840	52	<125/75 vs <140/90	MAP 92 vs ~98	--Lower BP significantly slowed GFR decline ONLY in those with proteinuria >1 gm/d
Wright 2002 (AASK) N=1,094	54	MAP ≤92 vs MAP 102-107	BP 128/78 vs 141/85	--NSD in GFR slope or composite of GFR decline/ESRD/death based on BP alone.
<u>Ruggenenti 2005</u> (REIN-2) N=338	53-54	<130/80 vs DBP <90	130/80 vs 134/82	-NSD ESRD, change in <u>eGFR</u> (stopped due to futility)

Recommendations from AHA for patients with CKD:

“Adults with hypertension and CKD should be treated to a BP goal of less than 130/80 mmHg.”

AHA goal for CKD: <130/80

<u>Trial</u>	<u>Mean age</u>	<u>BP goals/tx groups</u>	<u>Achieved BP</u>	<u>Outcomes</u>
Non-CKD population				
Shulman 1989 N=10,940	50.8	DBP <90 vs usual	NR	--Faster rate in creatinine rise reported in those with higher BPs.
Walker 1992 (MRFIT) N=5,524	46.5	DBP <95 vs usual	<140 vs 150-159	--Rate in renal function decline was faster for those with higher vs lower BPs.
Non-DM CKD population				
<u>Klahr 1994</u> (MDRD) N=840	52	<125/75 vs <140/90	MAP 92 vs ~98	--Lower BP significantly slowed GFR decline ONLY in those with proteinuria >1 gm/d
Wright 2002 (AASK) N=1,094	54	MAP ≤92 vs MAP 102-107	BP 128/78 vs 141/85	--NSD in GFR slope or composite of GFR decline/ESRD/death based on BP alone.
<u>Ruggenenti 2005</u> (REIN-2) N=338	53-54	<130/80 vs DBP <90	130/80 vs 134/82	-NSD ESRD, change in <u>eGFR</u> (stopped due to futility)

AHA-ACC Systematic Review analysis for CKD populations

	RR (95% CI)
All-Cause mortality	0.96 (0.66; 1.4)
Renal events	1.03 (0.89; 1.19)

2020

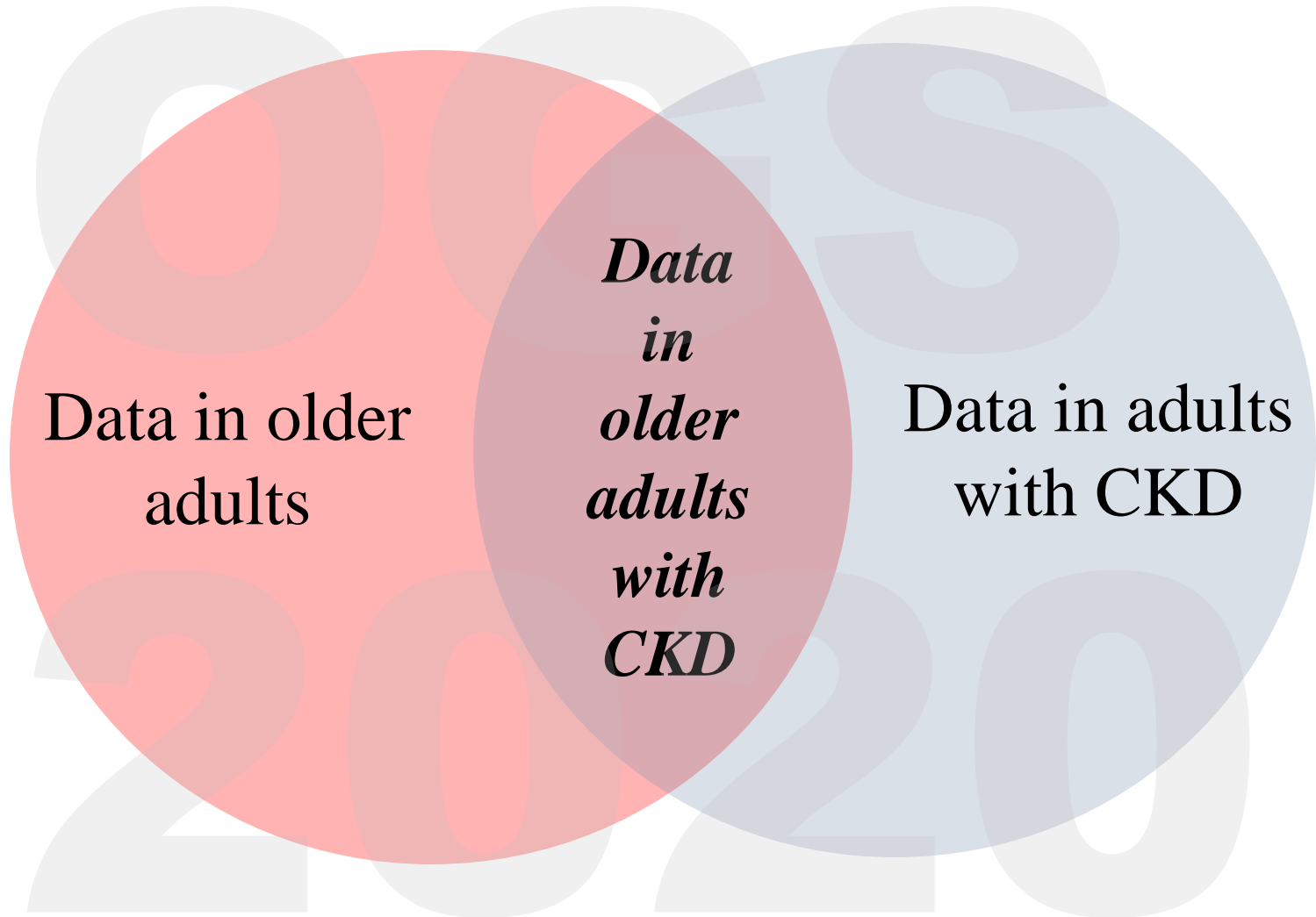
Data suggests that a lower blood pressure (<130/80) may more effectively slow CKD progression in patients with proteinuria (>1 gm/d)

In adults ages ≤ 70 , some BP control is better than none to slow CKD progression.

In older adults with high risk of cardiovascular disease, SBP <140 may reduce risk of CV events and mortality

In older adults in general, SBP <150 can reduce the risk of stroke, can potentially reduce the risk of cardiovascular outcomes and *probably* mortality

In adults, some blood pressure control is better than none to decrease cardiovascular events & death.



Data in older
adults

*Data
in
older
adults
with
CKD*

Data in adults
with CKD

Trials of blood pressure control in adults with mean age >60 in trial population

**EXCLUSION
CRITERIA**

Creatinine ≥ 3 RENAAL (eGFR 21 men, 16 women)
SPRINT men (eGFR <20 men)

Creatinine >2.5-2.9 EWPHE (2.5; eGFR 25 men, 19 women)
SPRINT women (eGFR <20 women)

Creatinine >2-2.4 SCOPE men (2; eGFR 32)
Cardio-Sis (2; eGFR 33 men, 24 women)
FEVER (2; eGFR 32 men, 24 women)
SYST-EUR (2; eGFR 33 men, 24 women)
VALISH (2; eGFR 32 men, 24 women)

Creatinine >1.5-1.9 **ACCORD** (1.5; eGFR 39 men, 29 women)
BENEDICT (1.5; eGFR 46 men, 34 women)
HYVET (1.7; eGFR 39 men, 29 women)
JATOS (1.5; eGFR 44 men, 33 women)
SCOPE women (1.6; eGFR 30)

Less specific renal function exclusion SHEP, STONE, TRANSCEND



Image from shutterstock

Observational studies have suggested a J-curve effect between SBP and mortality – with older adults having increased risk of death at both high and low extremes of blood pressure.

The SBP threshold at which risk of death increases may increase with advancing age.

SPRINT



Image from shutterstock

SPRINT study group, NEJM,
November 2015

SPRINT Hazard Ratio (95% CI) for primary outcome
(MI, ACS without MI, CVA, decompensated HF, death from CV cause)

Overall population	HR 0.75 (0.64-0.89)
Previous CKD	HR 0.82 (0.63-1.07)
Age ≥ 75	HR 0.67 (0.51-0.86)

2020

		Hazard ratio for more intensive BP control	P value
Serious adverse events (total)		1.04	0.25
Serious adverse events individual conditions			
	Hypotension	1.67	0.001
	Syncope	1.33	0.05
	Injurious fall	0.95	0.71
	Electrolyte abnormality	1.35	0.02
	AKI	1.66	<0.001
ER visit or serious adverse event			
	Hypotension	1.7	<0.001
	Syncope	1.44	0.003
	Injurious fall	1	0.97
	Electrolyte abnormality	1.38	0.006
	AKI	1.71	<0.001

For older adults with CKD/CV risk factors, SBP ~120 may decrease r/o death and CV events.

Observational data suggest a u-shaped relationship between SBP & death in older adults with CKD.

Data suggests that a lower blood pressure (<130/80) may more effectively slow CKD progression in patients with proteinuria (>1 gm/d)

In adults ages ≤ 70 , some BP control is better than none to slow CKD progression.

In older adults with high risk of cardiovascular disease, SBP <140 may reduce risk of CV events and mortality

In older adults in general, SBP <150 can reduce the risk of stroke, can potentially reduce the risk of cardiovascular outcomes and *probably* mortality

In adults, some blood pressure control is better than none to decrease cardiovascular events & death.

Creatinine: 1.5 mg/dL

eGFR: 45 ml/min/1.73m²

Urine prot/creat ratio:
0.15 mg/mg



1. No change to your medications for now

2. Check blood pressure 2-3 times a week. Call if upper number is above 150 or below 110

3. Call if feeling excessively fatigued, dizzy, or light-headed.



Dr. A. called,

He got gastroenteritis from his grankids.

He stopped having vomiting and diarrhea 2 days ago, but is still really weak and tired.

His blood pressure this morning was 112/50.

He also wants to update you that he was in an outside hospital a month ago with chest pain (ended up being heartburn), but they added Lisinopril 10 mg daily to his regimen. They told him he needs it because of his kidneys. **He would appreciate a call back.**

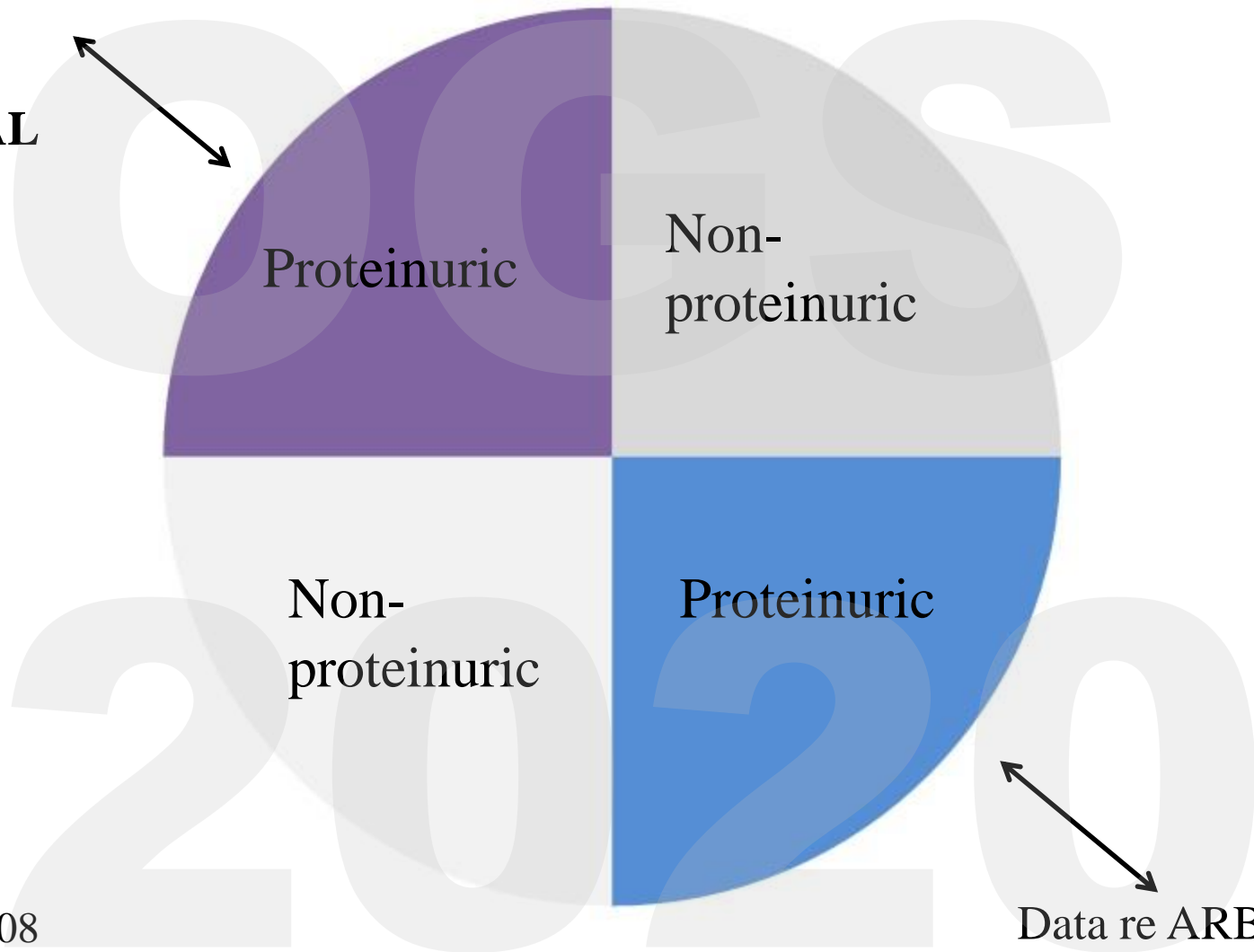
Are some blood pressure medications better than others for older adults with chronic kidney disease?

Both JNC-8 and ACC-AHA suggest ace-inhibitors or angiotensin receptor blockers as preferred therapy in CKD.

Data re Ace-inhibition
for CKD patients:

AASK
AVER
ESPIRAL

Mean age 45
Mean age 58
Mean age 54



Marin et al, J HTN, 2001
Esnault et al, Clin Ther, 2008
Berl et al, JASN, 2005
Wright et al, JAMA, 2002

Data re ARB for CKD
patients:
IDNT **Mean age 59**

RAAS blockade is beneficial for adults w proteinuria; benefit in the absence of proteinuria is unclear.

For older adults with CKD/CV risk factors, SBP ~120 may decrease r/o death and CV events.

Observational data show a u-shaped relationship between SBP & death in older adults with CKD.

Data suggests that a lower blood pressure (<130/80) may more effectively slow CKD progression in patients with proteinuria (>1 gm/d)

In adults ages ≤ 70 , some BP control is better than none to slow CKD progression.

In older adults with high risk of cardiovascular disease, SBP <140 may reduce risk of CV events and mortality

In older adults in general, SBP <150 can reduce the risk of stroke, can potentially reduce the risk of cardiovascular outcomes and *probably* mortality

In adults, some blood pressure control is better than none to decrease cardiovascular events & death.

eGFR: 45 ml/min/1.73m²

Urine prot/creat ratio: 0.15 mg/mg

Now in clinic, BP 106/49, HR 67

Creatinine 3.2 (eGFR 19 ml/min/1.73m²)

BUN 58

Potassium 5.7

CO₂ 21

Na 135

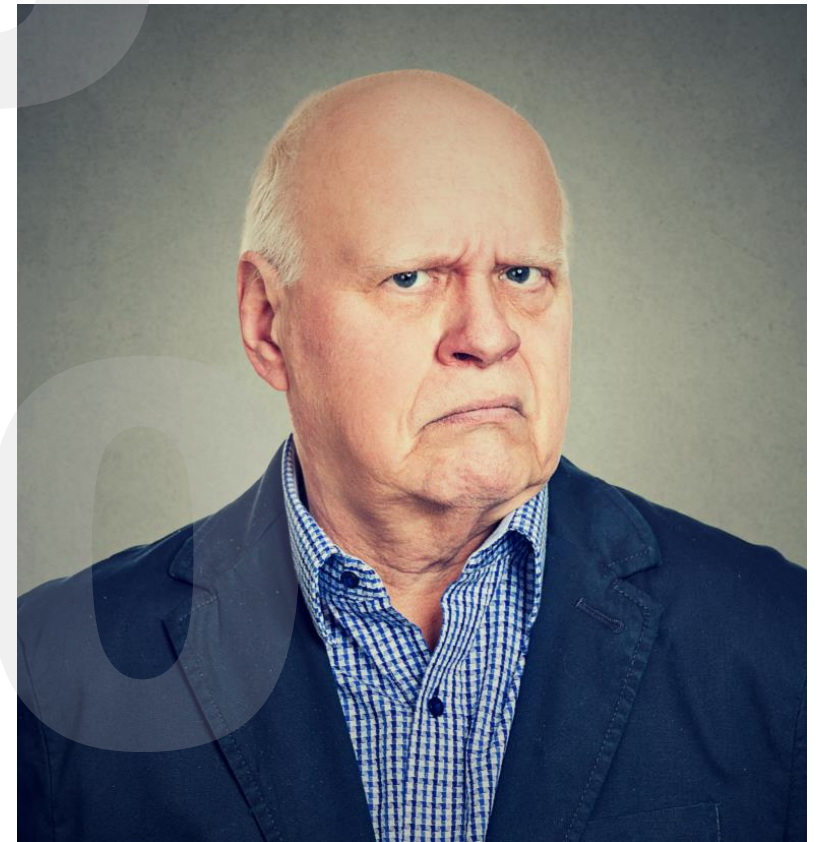
Medications:

Metoprolol 25 mg bid

Lasix 20 mg/d

~~**Lisinopril 10 mg/d**~~

Amlodipine 7.5mg/d



Mr. B is a 85 year old friend of Dr. A's. He has DM (last HgA1c 7.5), CAD, HFrEF, HTN, osteoarthritis, CKD III, and Gout. He has intermittent angina, exertional.

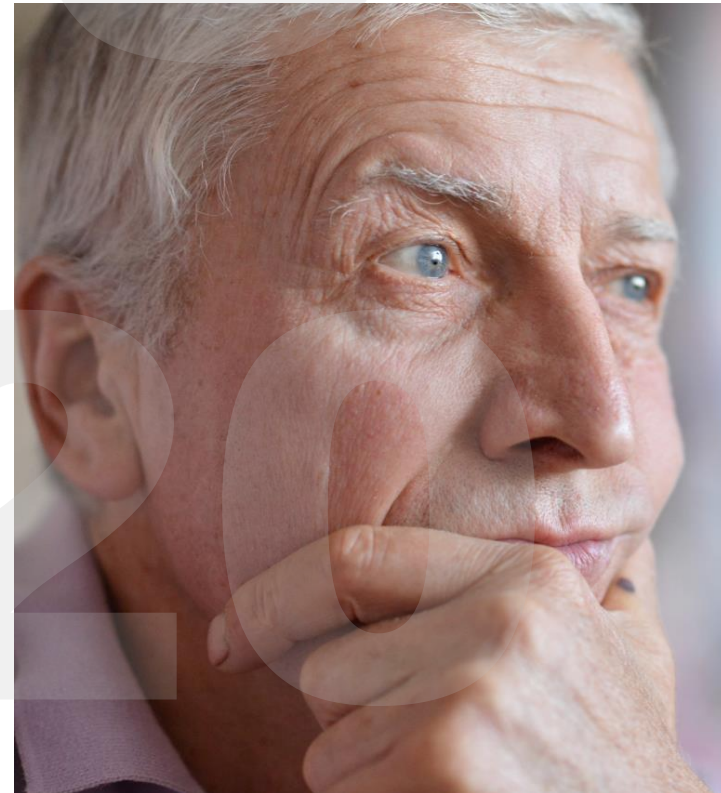
VS: 112/70 HR 65

Medications:

Lisinopril 30 mg daily
Carvedilol 12.5 mg bid
Lasix 40 mg daily
Nitroglycerin prn

Creatinine 1.5 (eGFR 45 ml/min/1.73m²)

“Dr. A says my blood pressure is too low!”



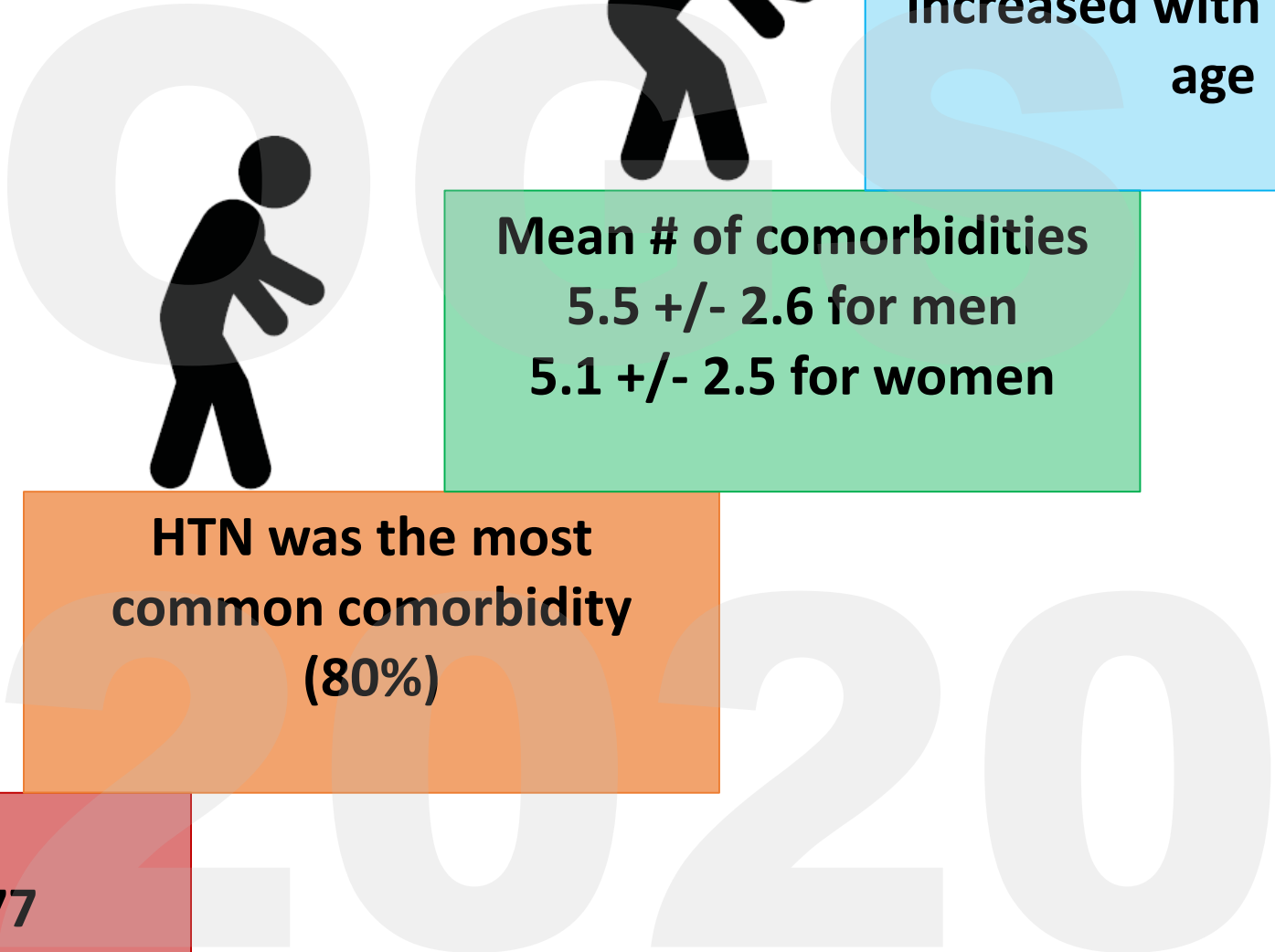


Number of comorbidities increased with advancing age

**Mean # of comorbidities
5.5 +/- 2.6 for men
5.1 +/- 2.5 for women**

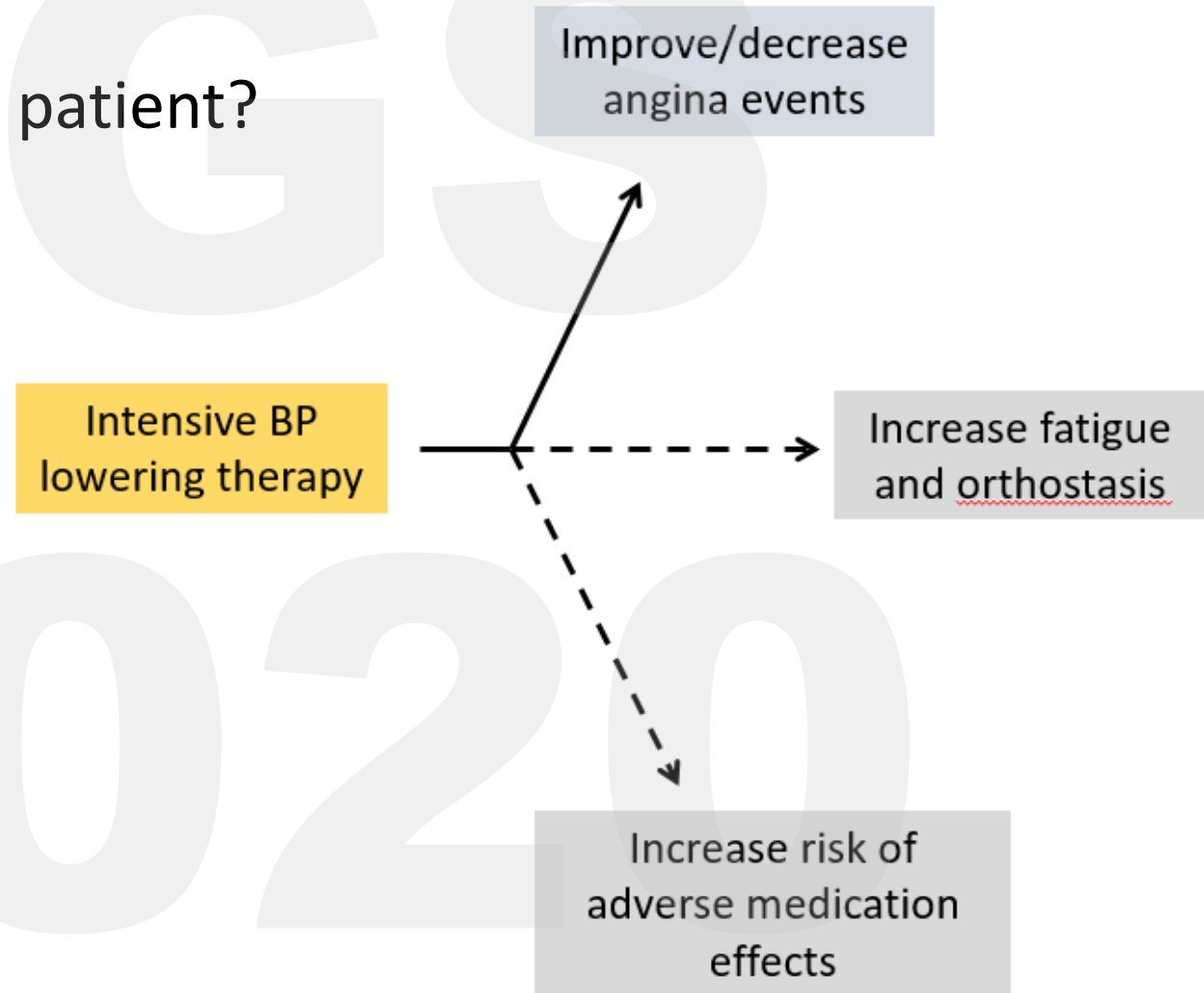
HTN was the most common comorbidity (80%)

**Ages 65+
Mean age 76-77
Screened for 23 possible comorbidities**



Practical considerations

- Get all the information!
- What matters most to the patient?



Mrs. A

83 yo woman, wife of Dr. A, recently broke her hip in a ground level fall and is in a SNF for rehabilitation.

PMH:

Moderate dementia

Heart failure

CKD IIIa

Hypertension

Osteoarthritis

178/63, HR 67

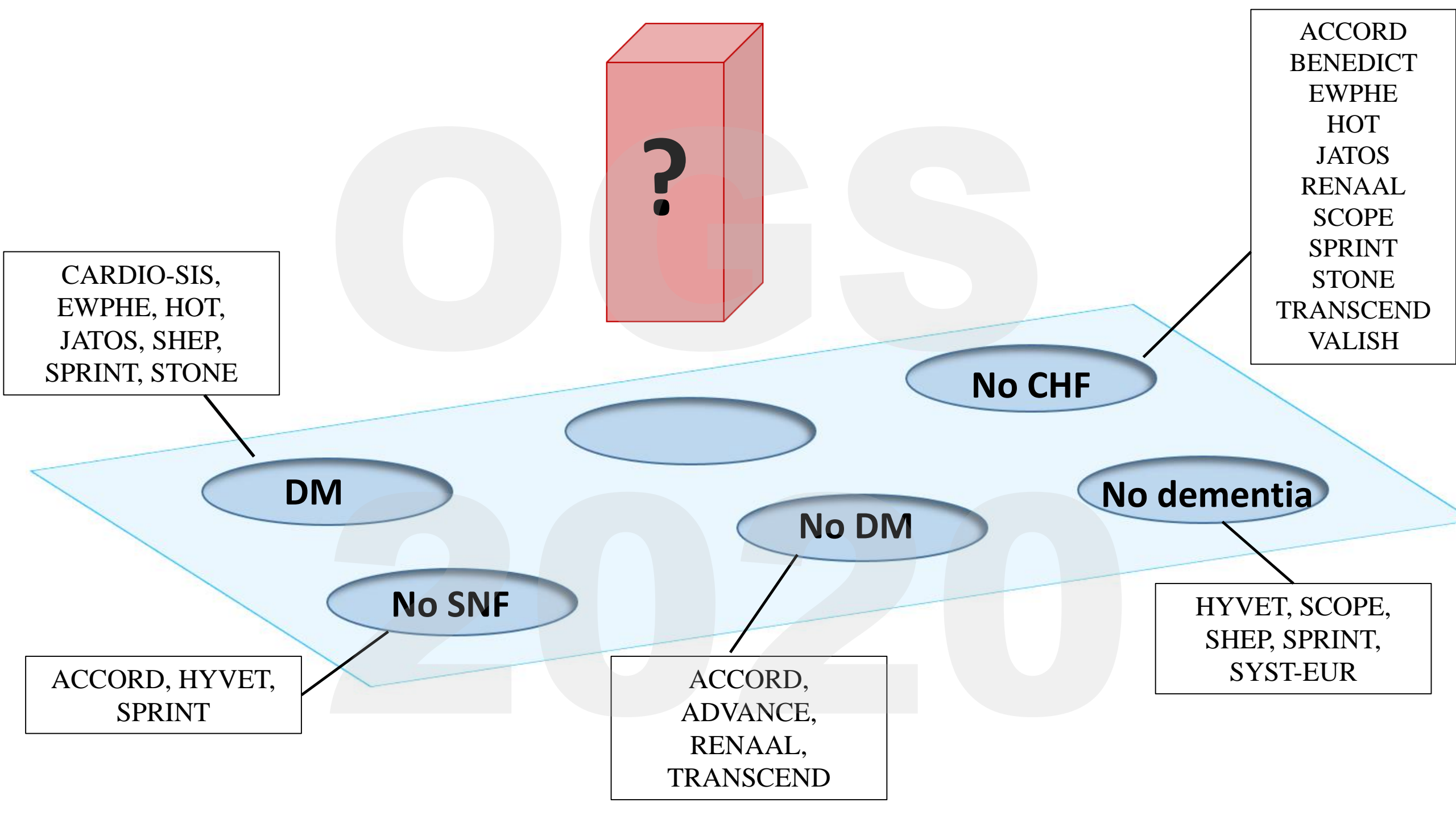
What should her blood pressure be?

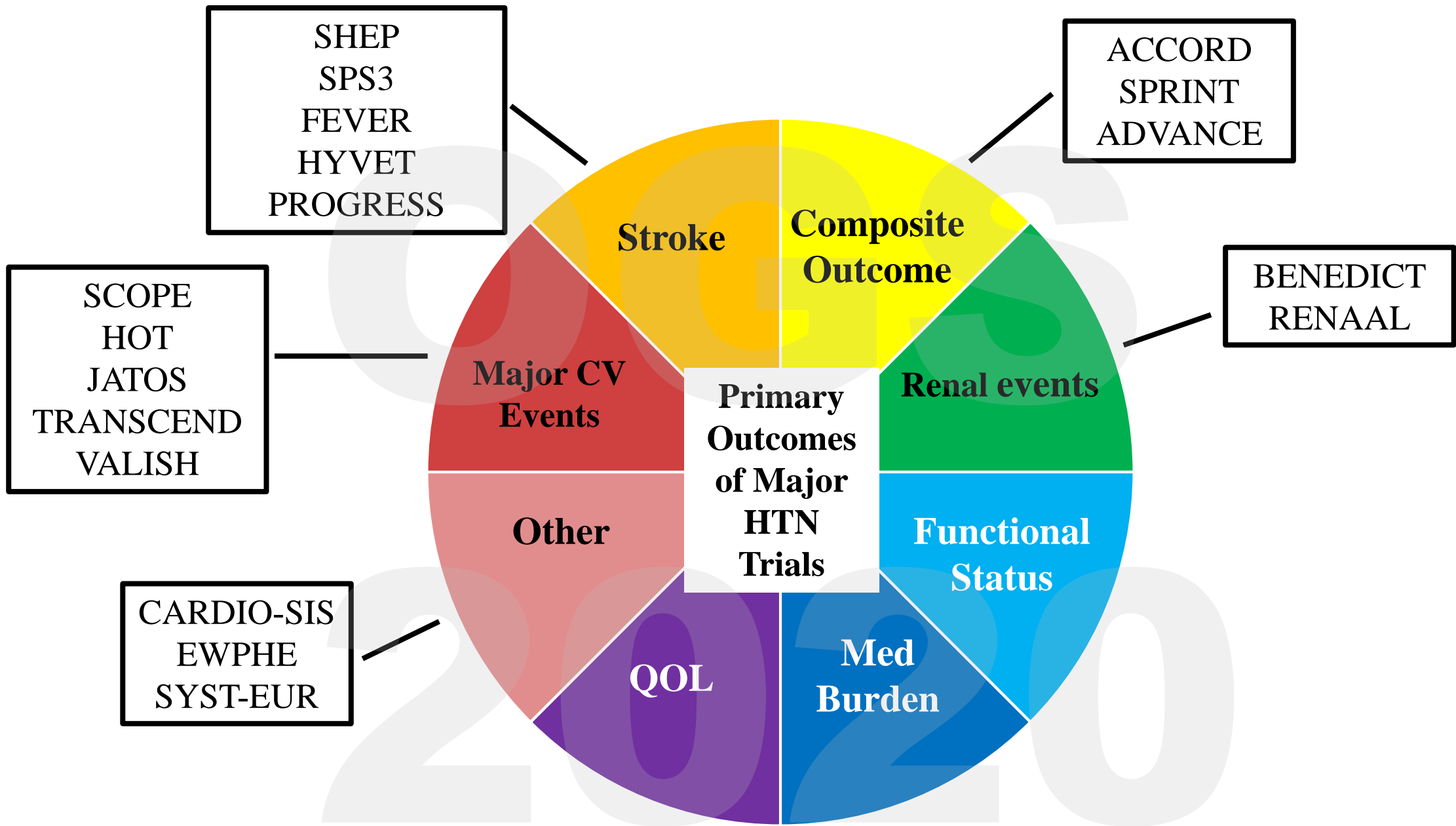
Medications:

Nifedipine ER 60 mg qam

Toprol XL 25 mg daily







What is the patient's ***primary concern***?

Conduct a complete review or focus on a specific aspect of care

What are current medical conditions and interventions, and *is the patient comfortable with/adherent to the plan?*

What are the ***patient's preferences***?

Consider the patient's ***prognosis***

Consider interactions *within and among* treatments and conditions

Weigh the ***benefits and harms*** of the plan

Communicate and decide for or against the current or suggested intervention/plan.

Reassess at intervals for benefit, feasibility, adherence, alignment, with preferences.

Hydrochlorothiazide

Hyponatremia

Furosemide

Dehydration

Clonidine

**Profound BP drop with
low dose**

Doxazosin

Worsening orthostasis

Mrs. A

83 yo woman, wife of Dr. A, who is in a SNF due to frequent falls at home, need for more intensive rehabilitation and support.

PMH:

Moderate dementia
Heart failure
CKD IIIa
Hypertension
Osteoarthritis

Medications:

Toprol XL 25 mg daily
Nifedipine ER 60 mg qam

MORE INFORMATION

Sat	AM: 178/63, HR 65	PM:129/49, HR 60
Sun	AM: 180/72, HR 62	PM:127/50, HR 53
Mon	AM: 176/66, HR 70	PM:131/53, HR 61
Tues	AM: 165/60, HR 70	PM:125/46, HR 75
Wed	AM: 170/73, HR 68	PM:133/51, HR 55





Individualize

RAAS blockade is beneficial for adults w proteinuria; benefit in the absence of proteinuria is unclear.

For older adults with CKD/CV risk factors, SBP ~120 may decrease r/o death and CV events.

Observational data show a u-shaped relationship between SBP & death in older adults with CKD.

Data suggests that a lower blood pressure (<130/80) may more effectively slow CKD progression in patients with proteinuria (>1 gm/d)

In adults ages ≤ 70 , some BP control is better than none to slow CKD progression.

In older adults with high risk of cardiovascular disease, SBP <140 may reduce risk of CV events and mortality

In older adults in general, SBP <150 can reduce the risk of stroke, can potentially reduce the risk of cardiovascular outcomes and *probably* mortality

In adults, some blood pressure control is better than none to decrease cardiovascular events & death.

**Hypertension
management is a team
sport**

2020

THOOGS

Thank you!

2020