Best of ACC.22: Blood Pressure Management in Older People

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DISCLOSURES

- Consulting
  - Genentech
- Medical Advisory Board
  - Clocktree
  - Measure Labs
- Research Funding
  - Amgen
  - Microsoft Research

OUTLINE

- Review recent HTN guideline recommendations and controversies for BP management in old and very old adults

- Learn how to incorporate guidelines in clinical practice
  - Case #1: Old person
  - Case #2: Very old person

- Take home points

HYPERTENSION AND CARDIOVASCULAR DISEASE

- Hypertension is the leading cause of death and disability-adjusted life years worldwide
  - #3 cause of death and disability in India (IHME 2020)

- In the US, accounts for more CV deaths than any other modifiable CVD risk factor, second only to smoking as preventable cause of death from any cause

- >50% of deaths from CHD and stroke occurred among individuals with hypertension (NHANES survey)

US CVD MORTALITY RATE IS RISING

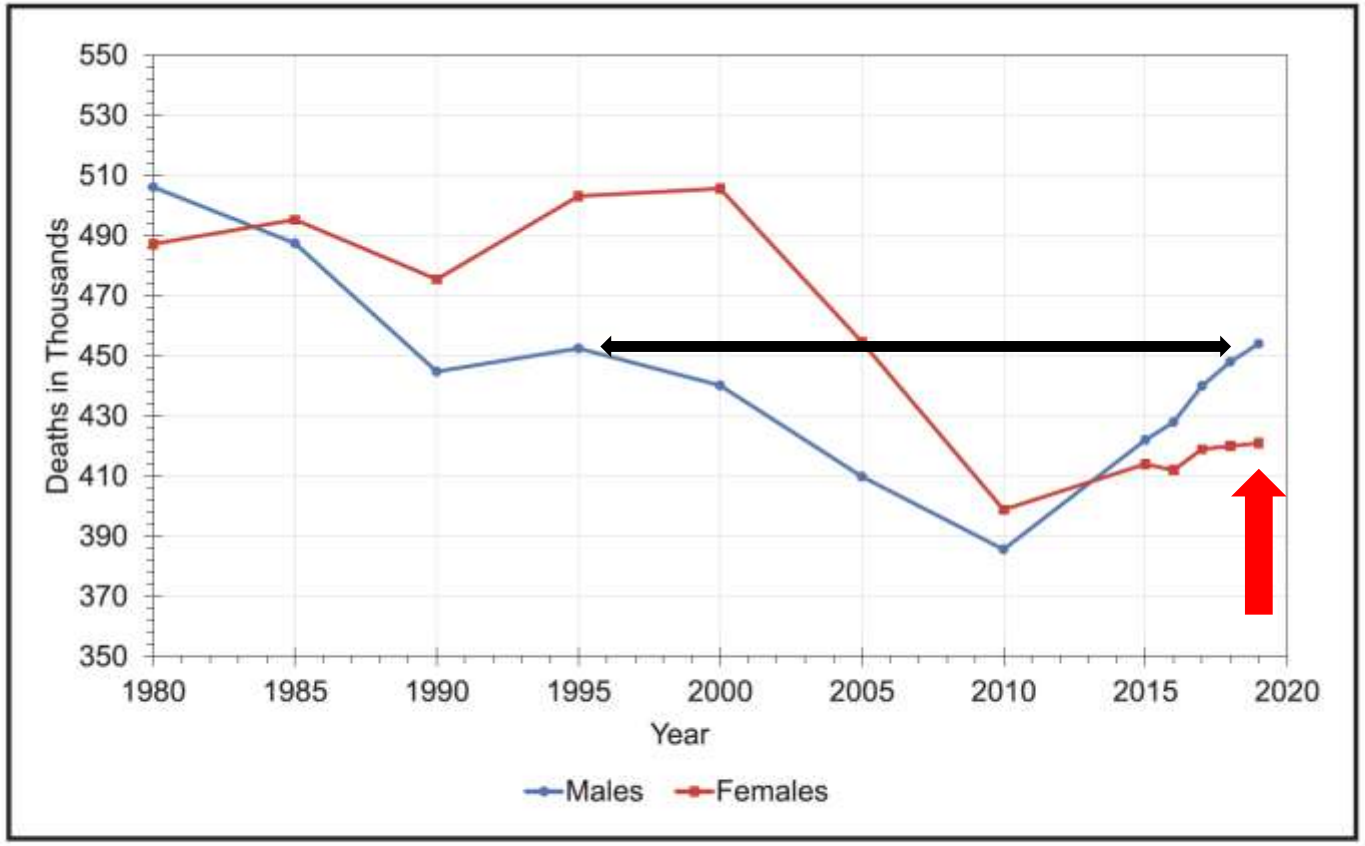
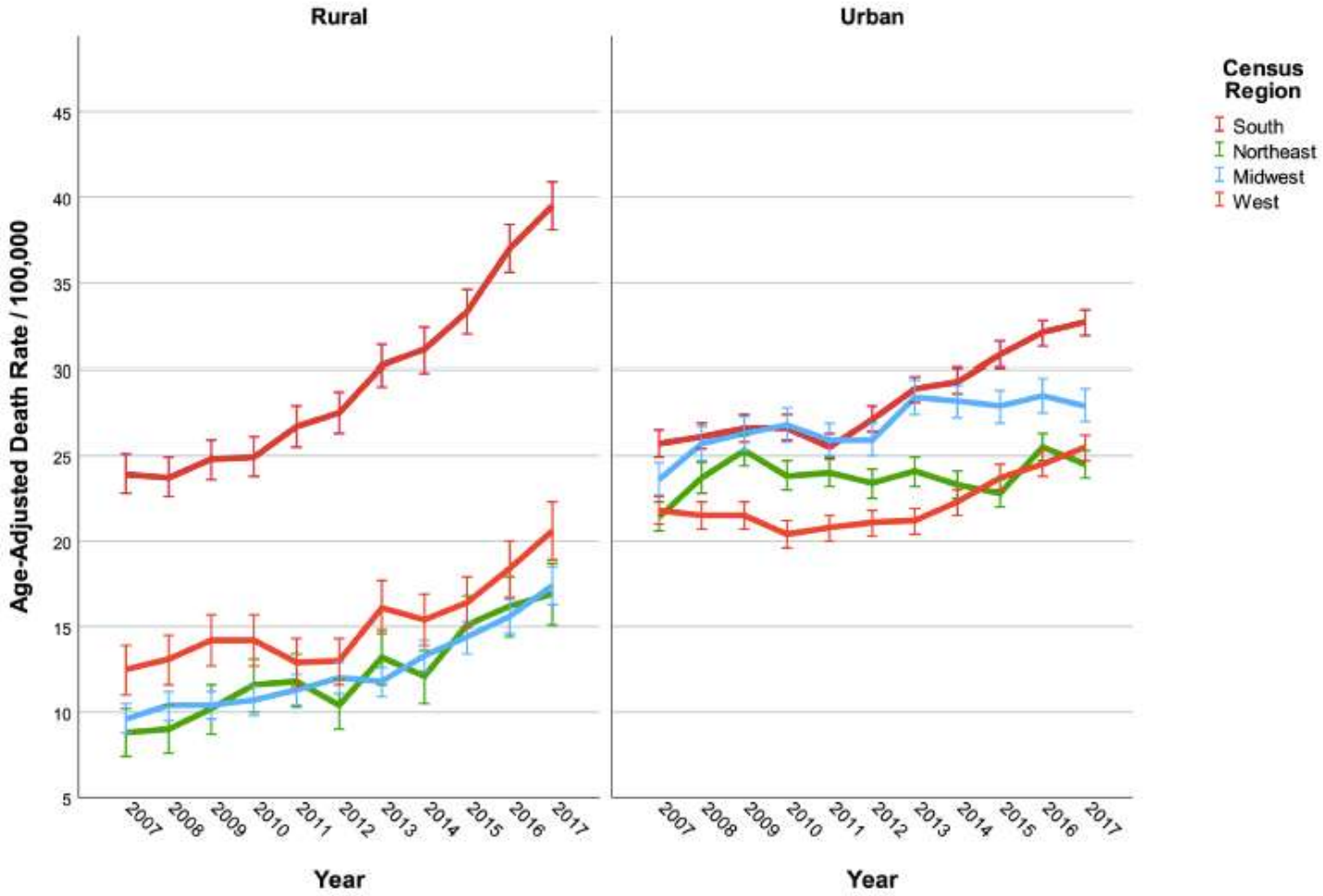


Chart 14-12. CVD mortality trends for US males and females, 1980 to 2019.

Tsao C, et al. Circulation. 2022.

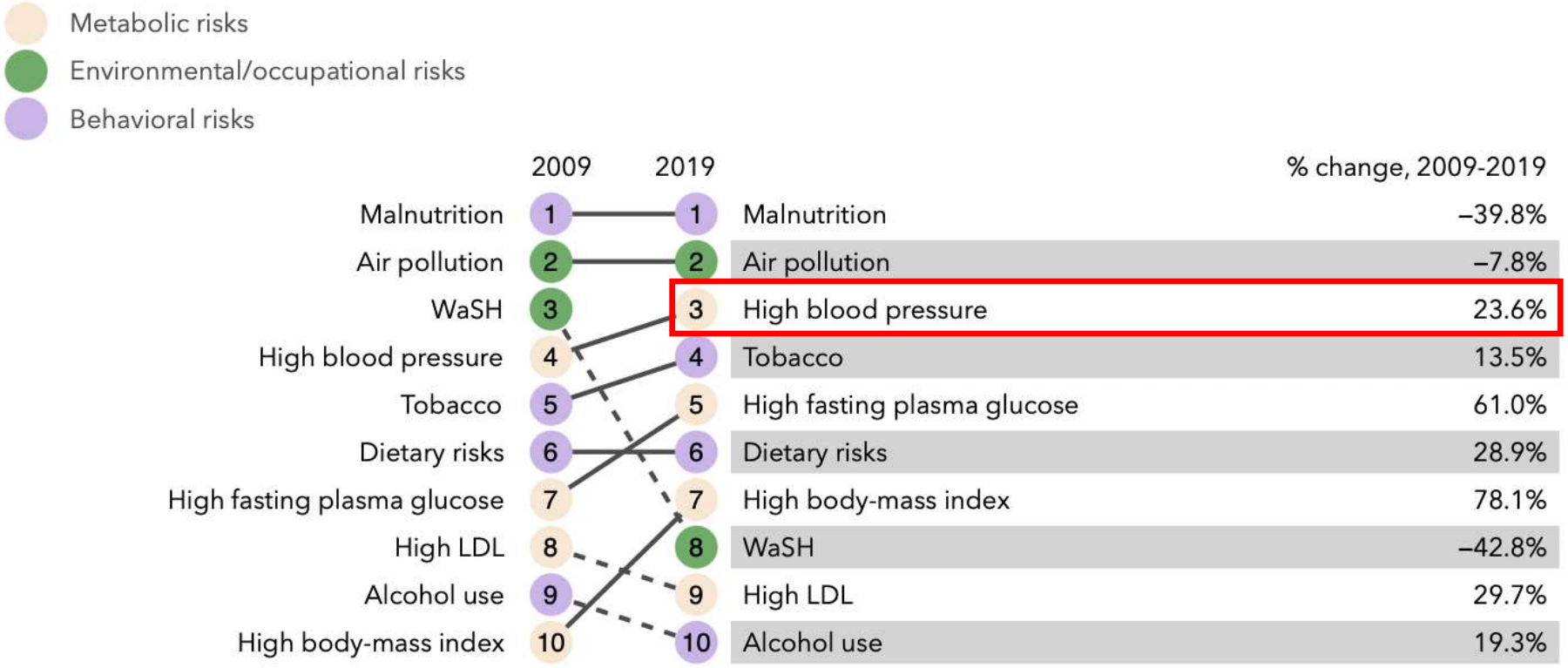
HYPERTENSION RELATED CV MORTALITY INCREASING



Nambiar L, et al. DOI: https://doi.org/10.1016/j.jacc.2020.03.009.

HIGH BLOOD PRESSURE IS A LEADING CAUSE OF DEATH AND DISABILITY IN INDIA

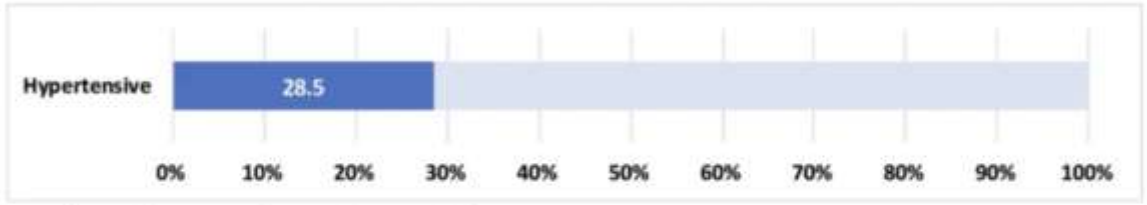
What risk factors drive the most death and disability combined?



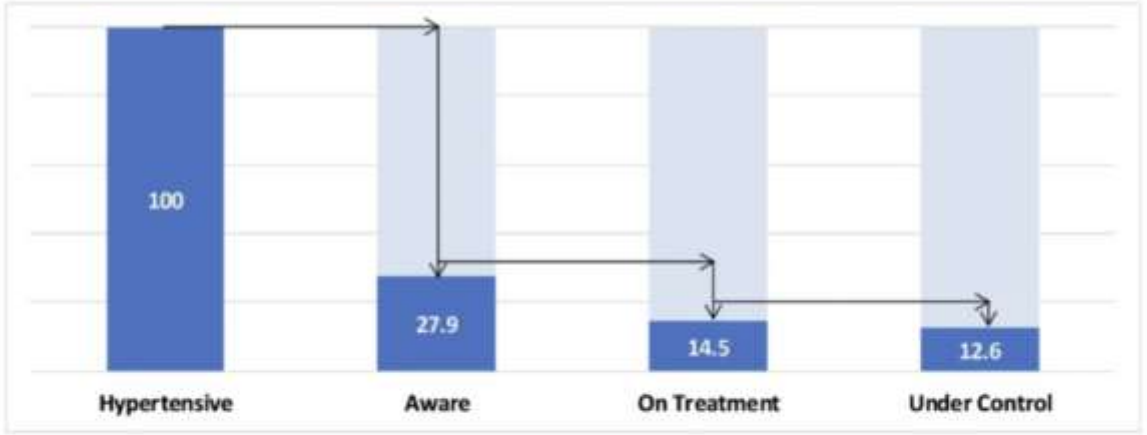
Lancet 2020;396:1204–22.

HYPERTENSION RATES IN INDIA

Fig. 1



Prevalence of hypertension at Indian population



Awareness, treatment and control status among hypertensive population

Hypertension control cascade: gap in prevalence, awareness, treatment and control of hypertension. Panel 1: Prevalence of hypertension at Indian population. Panel 2: Awareness, treatment and control status among hypertensive population.

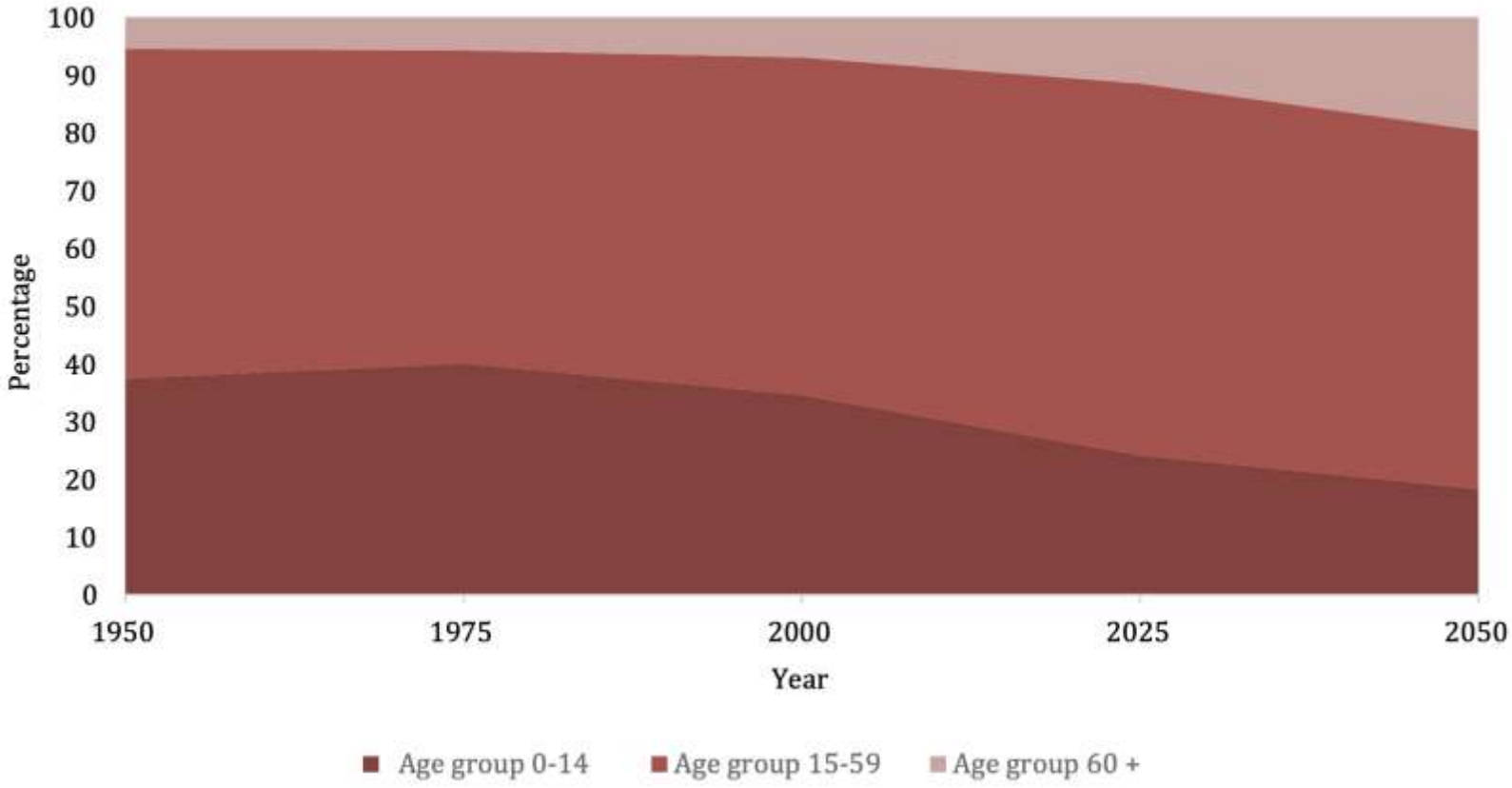
J Hum Hypertens (2022). https://doi.org/10.1038/s41371-022-00692-y

THE GLOBAL AGING POPULATION

- Life expectancy for those >80 years old is now ~9 years (was 6 years in the 1970s)
- In the EU, 5.4% of the population was ≥80 years old in 2016 (27.3 million)
- In India, the number of people aged 75 years and above is expected to increase by 340% between 2011 and 2050
  - In the next few years, India is expected to be the most populous country in the world (1.39 billion in 2019)
- In the US, 7.4% of the population is projected to be ≥80 years old by 2050

POPULATION TRENDS IN INDIA

Figure 1.1: Population by broad age group, India, 1950-2050



Source: United Nation (2019), World Population Prospects, The 2019 Revision, United Nations, New York

Table 1.1

	2011
Population	1210
Decadal gro	17.7
Elderly pop	103
Infant mort	47*
Crude birth	22.1*
Crude deat	7.2*

*refers to th
Source: Offic
(2009, 2011,

tion System

GUIDELINE CONTROVERSIES–NO CONSENSUS!

- Major differences among guidelines:
  - Definition of hypertension stages
  - Threshold for treatment in specific populations
    - Older persons
    - Diabetes
    - Chronic kidney disease

BP CATEGORIES AND TREATMENT THRESHOLDS

- 2017 ACC/AHA BP Guideline lowered threshold for stage I HTN to ≥130/80 mm Hg
- 2018 ESC/ESH BP Guideline maintained treatment threshold at ≥140/90 mm Hg for stage I HTN
- 2019 Indian Guidelines on Hypertension defines treatment threshold for stage I HTN at ≥140/90 mm Hg

DEFINITIONS OF OLD AND VERY OLD PEOPLE

- No consensus among international medical societies

- Old: 65-79 years old (ESC/ESH)
  - UN/WHO (≥60 years old, LMIC, ≥65 years old, HIC)
  - ACC/AHA (≥65 years old, elderly)
  - Indian hypertension guideline (≥60 years old)

- Very old/oldest old: ≥80 years old

CASE #1: OLD PATIENT

- 66 year old man with history of hyperlipidemia and BPH presents to your clinic for BP management. Office readings are in the 130s/80s. Home readings are similar. Does not smoke. Exercises 3x a week (treadmill x 30 minutes).

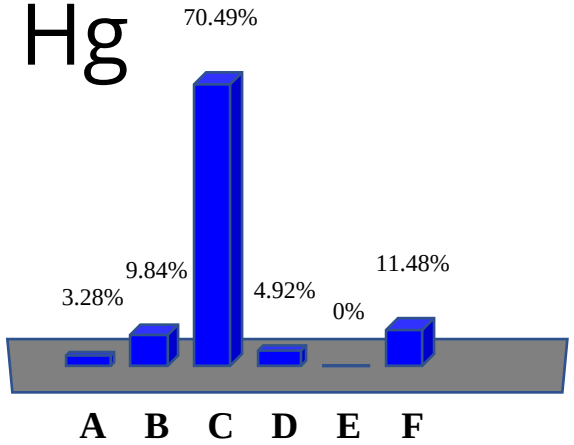
- Medications:
  - Atorvastatin 10 mg
  - Tamsulosin 0.4 mg

- Exam: Well-appearing man in no distress
  - BP 138/76 mm Hg, repeat 134/82 mm Hg, P 65, BMI 29.7
  - No S3 or S4

- Labs:
  - TC 166, HDL 42, HDL 105
  - Hba1c 5.5%

SBP AND DBP THRESHOLD FOR TREATMENT IS:

A. SBP ≥120 mm Hg
B. SBP ≥130 mm Hg
C. SBP ≥140 or DBP ≥90 mm Hg
D. SBP ≥150 mm Hg
E. SBP ≥160 or DBP ≥90 mm Hg
F. Individualize



SBP AND DBP THRESHOLD FOR TREATMENT IS:

A. SBP ≥120 mm Hg
B. SBP ≥130 mm Hg (ACC/AHA)
C. SBP ≥140 or DBP ≥90 mm Hg (ESC/ESH, Brazil HG)
D. SBP ≥150 mm Hg
E. SBP ≥160 or DBP ≥90 mm Hg
F. Individualize (Indian HG)

2017 ACC/AHA BLOOD PRESSURE CATEGORIES

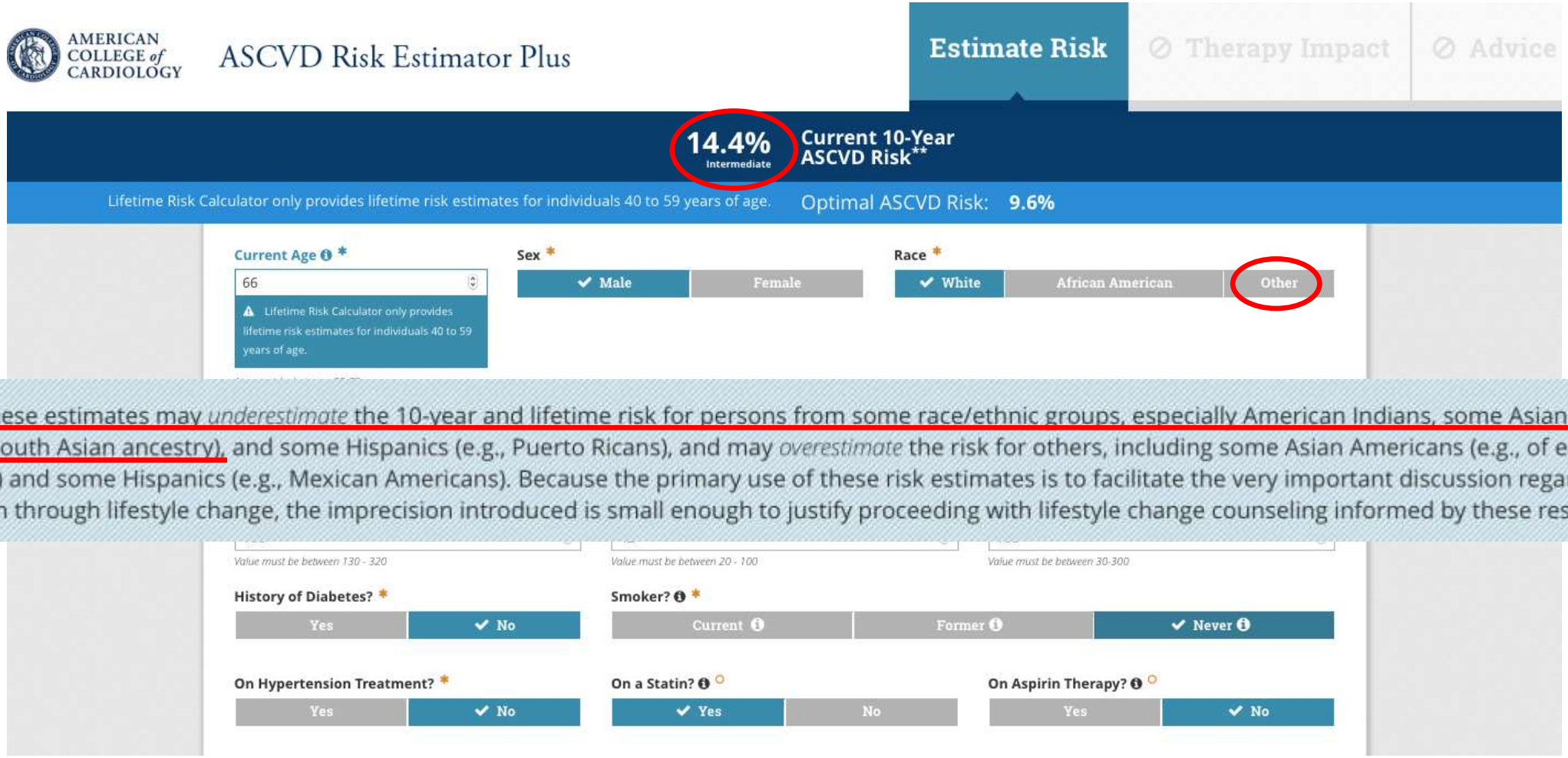
Table 6. Categories of BP in Adults*

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	or	80–89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

*Individuals with SBP and DBP in 2 categories should be designated to the higher BP category.
BP indicates blood pressure (based on an average of ≥2 careful readings obtained on ≥2 occasions, as detailed in Section 4); DBP, diastolic blood pressure; and SBP systolic blood pressure.

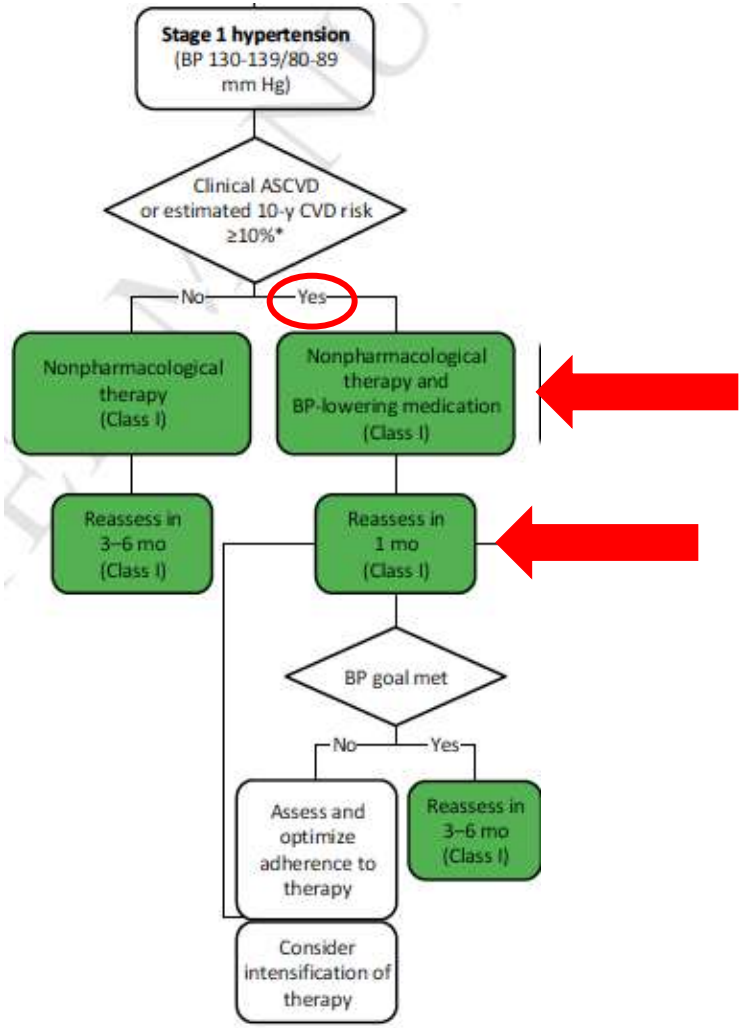
Whelton PK, et al. J Am Coll Cardiol. 2017.

ACC/AHA POOLED COHORT EQUATION



Note: These estimates may *underestimate* the 10-year and lifetime risk for persons from some race/ethnic groups, especially American Indians, some Asian Americans (e.g., of south Asian ancestry), and some Hispanics (e.g., Puerto Ricans), and may *overestimate* the risk for others, including some Asian Americans (e.g., of east Asian ancestry) and some Hispanics (e.g., Mexican Americans). Because the primary use of these risk estimates is to facilitate the very important discussion regarding risk reduction through lifestyle change, the imprecision introduced is small enough to justify proceeding with lifestyle change counseling informed by these results.

ACC/AHA STAGE 1 HYPERTENSION MANAGEMENT



Whelton PK, et al. J Am Coll Cardiol. 2017.

2019 INDIAN HYPERTENSION GUIDELINE

Table 2 Classification of blood pressure for adults age 18 and older.

Category	Systolic (mmHg)		Diastolic (mmHg)
Optimal	<120	and	<80
Normal	<130	and	<85
Stage 3	≥180	or	>110
Isolated systolic hypertension			
Grade 1	140–159	and	<90
Grade 2	>160	and	<90

The target blood pressure should be <130/80 mmHg in those under the age of 60 years. The target should be individualized in the elderly.

Journal of Human Hypertension (2020) 34:745–758.

CASE #2: VERY OLD PATIENT

CASE #2: VERY OLD PATIENT

- 83 year old woman with history of hyperlipidemia and asthma. Her blood pressures during her last 3 office visits have been 162/65 mm Hg, 155/68 mm Hg, and 161/72 mm Hg. Not taking any medications.

- She is active and walks 45 minutes 5x a week

- Exam: Unremarkable, healthy appearing (BMI 23.5)

- Labs: Creatinine 0.8, K+ 4.5. U/A normal

SBP AND DBP THRESHOLD FOR TREATMENT IS:

A. SBP ≥120 mm Hg
B. SBP ≥130 mm Hg
C. SBP ≥140 or DBP ≥90 mm Hg
D. SBP ≥150 mm Hg
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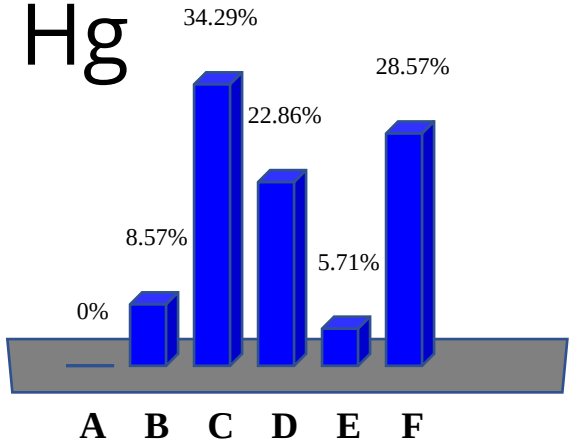

SBP AND DBP THRESHOLD FOR TREATMENT IS:

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B. SBP ≥130 mm Hg (ACC/AHA)
C. SBP ≥140 or DBP ≥90 mm Hg
D. SBP ≥150 mm Hg
E. SBP ≥160 or DBP ≥90 mm Hg (ESC/ESH)
F. Individualize (Indian HG)

COMPARISON OF BP THRESHOLD AND TREATMENT TARGETS

Table 1: A Comparison of Blood Pressure Thresholds and Targets between ACC/AHA, ACP/AAFP, and ESC/ESH Guidelines

	ACC/AHA 2017	ACP/AAFP 2017	ESC/ESH 2018
Definition of Older Patients	≥65 years	≥60 years	Elderly 65-79 years Very Old ≥80 years
BP Threshold for Initiation of Pharmacotherapy	≥130/80 mmHg	SBP ≥150 mmHg	Elderly ≥140/90 mmHg Very Old ≥160/90 mmHg
Blood Pressure Target	<130/80 mmHg	SBP <150 mmHg	SBP 130-139 mmHg DBP 70-79mmHg

Agarwala A, et al. http://www.acc.org. Feb 26, 2020. Accessed Mar 8, 2020.

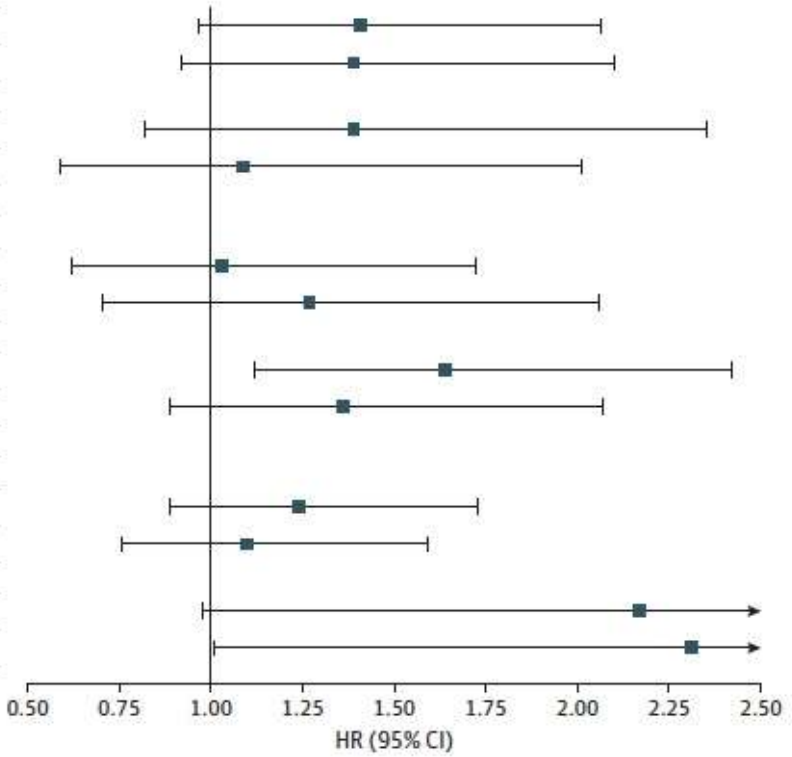
VERY OLD PATIENT– FACTORS TO CONSIDER

- Quality of life and life expectancy (e.g., history of dementia, cancer)
- Prior fall history/frailty
- Goals of treatment

FALL RISK IN OLDER ADULTS WITH HYPERTENSION

Figure. Serious Fall Injury Events Among Relevant Subgroups According to Antihypertensive Intensity in Older Adults With Hypertension

Character	HR (95% CI)
Age	
<85 y (n = 3918)	
Moderate intensity	1.41 (0.97-2.06)
High intensity	1.39 (0.92-2.10)
≥85 y (n = 1206)	
Moderate intensity	1.39 (0.82-2.35)
High intensity	1.09 (0.59-2.01)
Sex	
Women (n = 3156)	
Moderate intensity	1.03 (0.62-1.72)
High intensity	1.27 (0.71-2.06)
Men (n = 1968)	
Moderate intensity	1.64 (1.12-2.42)
High intensity	1.36 (0.89-2.07)
Fall in past year	
No (n = 4621)	
Moderate intensity	1.24 (0.89-1.73)
High intensity	1.10 (0.76-1.59)
Yes (n = 503)	
Moderate intensity	2.17 (0.98-4.80)
High intensity	2.31 (1.01-5.29)



JAMA Intern Med. 2014;174:588-595.

SPRINT ELDERLY PATIENTS– BETTER CV OUTCOMES

Subgroup	Intensive Treatment	Standard Treatment	Hazard Ratio (95% CI)	P Value for Interaction
	no. of patients with primary outcome/total no. (%)			
Overall	243/4678 (5.2)	319/4683 (6.8)	0.75 (0.64–0.89)	
Previous CKD				0.36
No	135/3348 (4.0)	193/3367 (5.7)	0.70 (0.56–0.87)	
Yes	108/1330 (8.1)	126/1316 (9.6)	0.82 (0.63–1.07)	
Age				0.32
<75 yr	142/3361 (4.2)	175/3364 (5.2)	0.80 (0.64–1.00)	
≥75 yr	101/1317 (7.7)	144/1319 (10.9)	0.67 (0.51–0.86)	
Sex				0.45
Female	77/1684 (4.6)	89/1648 (5.4)	0.84 (0.62–1.14)	
Male	166/2994 (5.5)	230/3035 (7.6)	0.72 (0.59–0.88)	
Race				0.83
Black	62/1454 (4.3)	85/1493 (5.7)	0.77 (0.55–1.06)	
Nonblack	181/3224 (5.6)	234/3190 (7.3)	0.74 (0.61–0.90)	
Previous cardiovascular disease				0.39
No	149/3738 (4.0)	208/3746 (5.6)	0.71 (0.57–0.88)	
Yes	94/940 (10.0)	111/937 (11.8)	0.83 (0.62–1.09)	
Systolic blood pressure				0.77
≤132 mm Hg	71/1583 (4.5)	98/1553 (6.3)	0.70 (0.51–0.95)	
>132 to <145 mm Hg	77/1489 (5.2)	106/1549 (6.8)	0.77 (0.57–1.03)	
≥145 mm Hg	95/1606 (5.9)	115/1581 (7.3)	0.83 (0.63–1.09)	

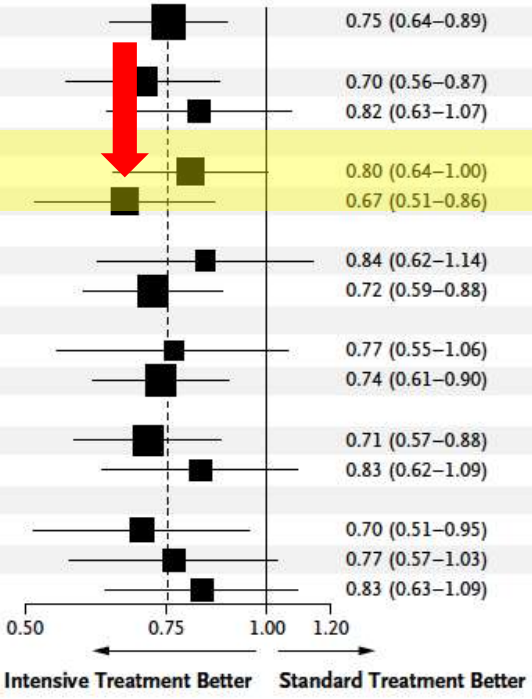


Figure 4. Forest Plot of Primary Outcome According to Subgroups.

The dashed vertical line represents the hazard ratio for the overall study population. The box sizes are proportional to the precision of the estimates (with larger boxes indicating a greater degree of precision). The subgroup of no previous chronic kidney disease (CKD) includes some participants with unknown CKD status at baseline. Black race includes Hispanic black and black as part of a multiracial identification.

JAMA. 2016;315:2673-2682.

SPRINT: SERIOUS ADVERSE EVENTS

- Serious adverse events in intensive treatment arm included hypotension, syncope, acute kidney injury
    - Injurious fall rates similar, but SAEs related to intervention higher in intense treatment group (HR 2.22, p=0.05)
    - New analysis *did not* assess SAEs in older patients based on classification (possibly or directly related to intervention)

JAMA. 2016;315:2673-2682.

DO SPRINT RESULTS APPLY TO ASIANS?

Table 1. Baseline Characteristics of the Study Participants.*

Characteristic	Intensive Treatment (N=4678)	Standard Treatment (N=4683)
Criterion for increased cardiovascular risk — no. (%)†		
Age ≥75 yr	1317 (28.2)	1319 (28.2)
Chronic kidney disease‡	1330 (28.4)	1316 (28.1)
Cardiovascular disease	940 (20.1)	937 (20.0)
Clinical	779 (16.7)	783 (16.7)
Subclinical	247 (5.3)	246 (5.3)
Framingham 10-yr cardiovascular disease risk score ≥15%	3556 (76.0)	3547 (75.7)
Female sex — no. (%)	1684 (36.0)	1648 (35.2)
Age — yr		
Overall	67.9±9.4	67.9±9.5
Among those ≥75 yr of age	79.8±3.9	79.9±4.1
Race or ethnic group — no. (%)§		
Non-Hispanic black	1379 (29.5)	1423 (30.4)
Hispanic	503 (10.8)	481 (10.3)
Non-Hispanic white	2698 (57.7)	2701 (57.7)
Other	98 (2.1)	78 (1.7)
Black race§¶	1454 (31.1)	1493 (31.9)

N Engl J Med 2015;373:2103-16.

TIME FOR A CHANGE?

BIOLOGICAL VERSUS CHRONOLOGICAL AGE

FRAILTY ASSESSMENT

Clinical Frailty Scale*

1 **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2 **Well** – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.

3 **Managing Well** – People whose **medical problems are well controlled,** but are **not regularly active** beyond routine walking.

4 **Vulnerable** – While **not dependent** on others for daily help, often **symptoms limit activities.** A common complaint is being "slowed up", and/or being tired during the day.

5 **Mildly Frail** – These people often have **more evident slowing,** and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6 **Moderately Frail** – People need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.

7 **Severely Frail** – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8 **Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. **Terminally Ill** - Approaching the end of life. This category applies to people with **a life expectancy <6 months**, who are **not otherwise evidently frail.**

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging, Revised 2008.
2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

Benetos et al. Circ Res. 2019;124:1045-1060.

HYPERTENSION MANAGEMENT IN THE VERY OLD

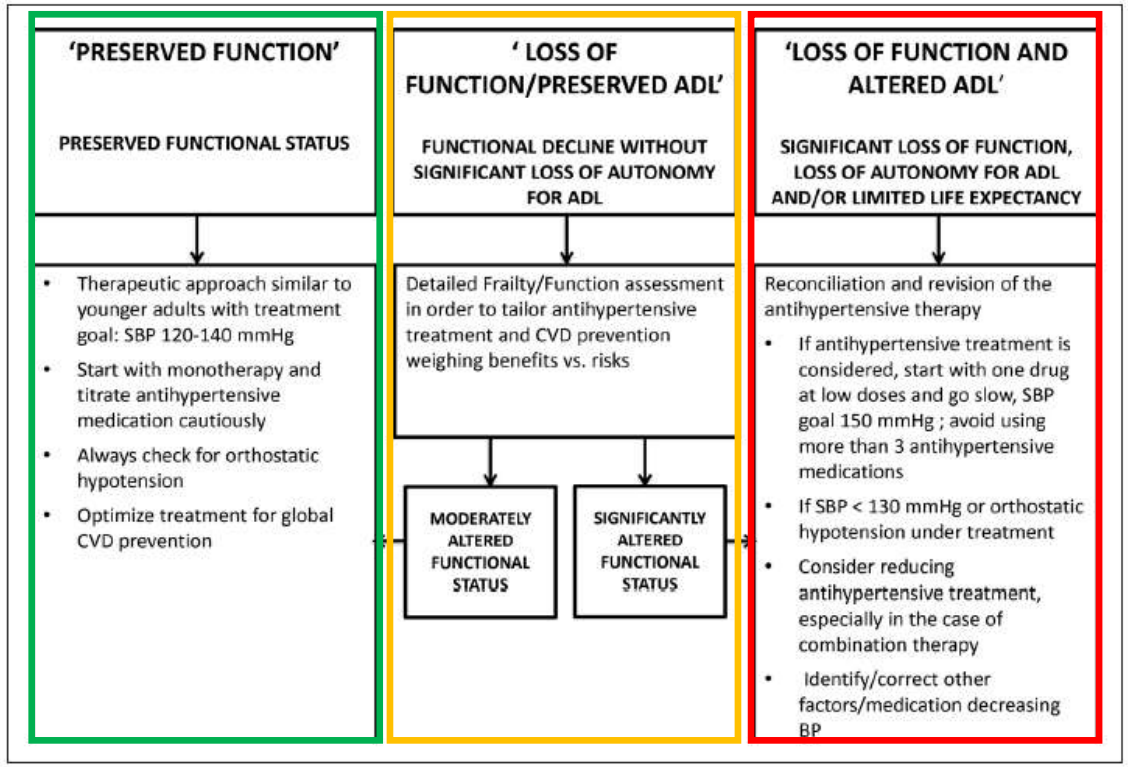


Figure 2. Decisional algorithm for the management of hypertension in subjects aged 80+ years. This algorithm proposes adapted therapeutic strategies according to the classification proposed above (Figure 1). In the preserved function profile, antihypertensive strategies should be those proposed for younger subjects (between 65 and 75 y). For the loss of function and altered activities of daily living (ADL) profile, the antihypertensive therapeutic strategy should be different comparatively to robust patients. The decision for antihypertensive treatment in patients with a loss of function/ preserved ADL profile should be individualized according to the results of the comprehensive geriatric assessment. CVD indicates cardiovascular diseases; and SBP, systolic blood pressure.

Benetos et al. Circ Res. 2019;124:1045-1060.

CASE #2: VERY OLD PATIENT

- 83 year old woman with history of hyperlipidemia and asthma. Her blood pressures during her last 3 office visits have been 162/65 mm Hg, 155/68 mm Hg, and 161/72 mm Hg. Not taking any medications.

- She is active and walks 45 minutes 5x a week

- Exam: Unremarkable, healthy appearing (BMI 23.5)

- Labs: Creatinine 0.8, K+ 4.5. U/A normal

CASE #2: TREATMENT PLAN

- Discuss treatment options with patient
  - Monitor BP at home and optimize diet/sodium intake
  - Do above and start BP medication

- Patient has preserved function (very fit)
  - Target BP <130/80 mm Hg (120-140 mm Hg) is reasonable given excellent functional status
  - Start with monotherapy to assess for side effects and response

TAKE HOME POINTS

- Hypertension is a primary risk factor for cardiovascular disease
- Hypertension-related mortality rates are increasing in India and US
- Lack of consensus on definition of old/very old, BP thresholds

TAKE HOME POINTS

- Use biological age instead of chronological age to guide treatment decisions

- Treatment of hypertension in older persons should be based on patient comorbidities/risk factors, frailty, quality of life, individual preferences
  - Shared decision making with patient about goals of treatment, risks/benefits

THANKS!

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