

Hypertension

William N. Jones, M.S., R.Ph.
wnjones49@cox.net

*The views expressed are my own and may not
reflect the views of anyone else.*

An update and looking into my
crystal ball of what will be in JNC 8
*If you torture the data enough
it will confess to anything!*

I know you are excited to be here!





What will be presented?

- *Quick review of what is know and something new*
- *What JNC 8 might look like and why*



What should be done?

What is the BP goal?

- *You are seeing a new patient in clinic who is a 62 old man with type 2 diabetes for 10 years. He has a BP of 139/76. He quit smoking 25 years ago. His labs are as follows:*
- *HbA1c 8.3% Electrolytes are normal Creatinine 0.9 mg/dl LDL 110 mg/dl HDL 42 mg/dl TG 147 mg/dl Urine alb/Cr ratio 14*



What do we know?

- ❖ *About 70 million adults in US have HTN*
- ❖ About 90% lifetime chance of HTN
- ❖ AA more likely than others to develop
 - ❖ HTN at younger age
 - ❖ Have higher BP
 - ❖ 4 x more likely to develop CKD



What do we know?

- ❖ *Untreated/Uncontrolled HTN leads to life threatening events*
 - ❖ ~67% of MI
 - ❖ ~75% of strokes
 - ❖ ~70% of CHF
 - ❖ ~17% of deaths
- ❖ Cost is > \$70 Billion/year



What do we know?

- ❖ No dichotomous BP point for CV events
 - ❖ *No one BP where risk changes (life insurance)*
- ❖ SBP and DBP associated with CV events
 - ❖ *SBP independent of DBP*
- ❖ Multifactorial for CV events
 - ❖ *BP, hyperglycemia, age, smoking, lipids, LVH*

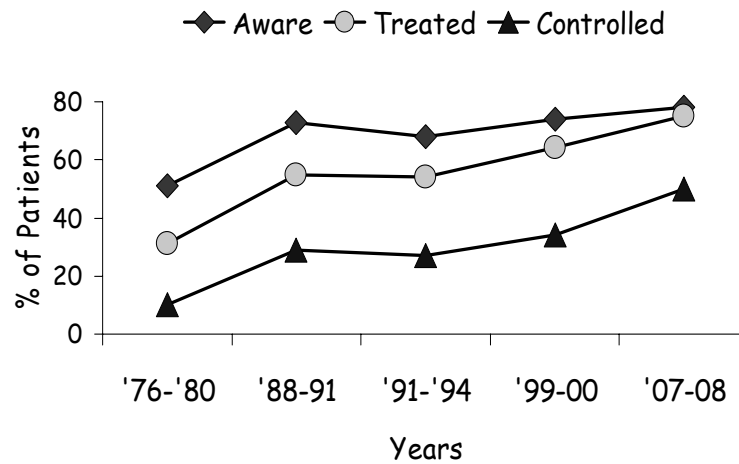


What do we know?

- ❖ Treatment and control lowers all events
 - ❖ *This is NOT NEW information*
- ❖ Many untreated or treated & uncontrolled
 - ❖ *Good news/Bad news*

Trends in Treating Hypertension

NEJM 2010; 303: 2043



Recent Clinical Trials

NEJM 2009;361:878

Trial Acronym	Treatments	Primary outcome
STOP-2	D or B vs A or C	SAME
ALLHAT	D vs A vs C	SAME
INVEST	D+B vs A+C	SAME
ASCOT	D+B vs A+C	SAME
LIFE	ARB vs B	ARB > B
ANBP-2	D vs A	A > D (men)
ACCOMPLISH	A+D vs A+C	A+C > A+D

JNC

- Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure
 - Standard of care for HTN
 - 38 years from first report
 - Events lower since starting JNC
 - JNC-8 expected in Fall 2011

JNC-7 BP Classification

Classification	SBP (mm Hg)		DBP (mm Hg)
Normal	< 120	AND	< 80
Pre-hypertension	120-139	OR	80-89
Stage 1	140-159	OR	90-99
Stage 2	≥ 160	OR	≥ 100

JNC Treatment Goals Hypertension

- Lower BP to < 140/< 90 minimally
- Lower BP to < 130/< 80 for CRI and DM
- Lower BP to normal, if possible
- Control other risk factors, if possible
- *Avoid adverse side effects*

Lifestyle Modifications

Lifestyle modification	↓ DBP (mm Hg)
↓ Weight	2 - 5
Regular physical activity	5
↓ Salt intake	5
↓ Weight & salt	7 - 10

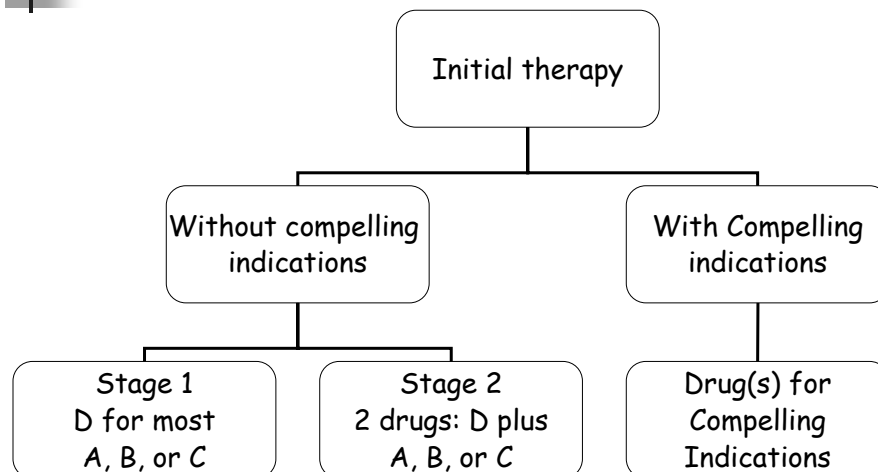
JNC-7 Algorithm

Initial drug choice

- Without *Compelling* Indication
- With *Compelling* Indication
 - All drugs lower BP ~ 10 mm Hg, so something else needs consideration

JNC-7 Algorithm

After ALL lifestyle changes



What are Compelling Indications?

	D	BB	ACEI	ARB	CCB	Aldo
CHF	•	•	•	•		•
MI		•	•			•
CHD	•	•	•		•	
DM	•	•	•	•	•	
CRF			•	•		
Stroke	•		•			

What to Avoid?

	D	BB	ACEI	ARB	CCB	Aldo
Asthma		•				
2/3 AVB		•			•	
↓ Na	•					
K \geq 5/Cr $>$ 2.5	*		•	•		•
Pregnant			•	•		
Angioedema			•	•		



JNC-7: Improving BP Control

- ❖ Improve persistence and adherence
- ❖ Work with all team members
- ❖ Titrate or combine drugs
- ❖ Consider complexity of care
- ❖ Consider cost of care



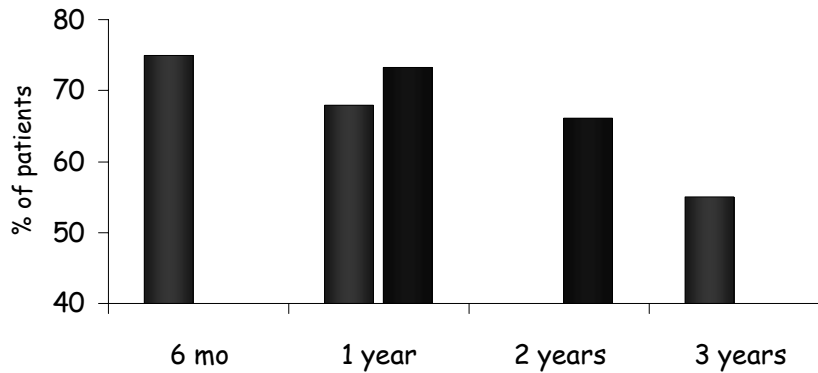
If not at goal BP?

Am J Hyperten 2005; 18: 619

- ♦ Non-adherent (16% of all)
 - ♦ This is LOW compared to other studies
 - ♦ Health literacy is part of this issue

Persistence newly treated

Ann Pharmacother 2005; 39: 1401 & Am J Med 2010; 123: 173



Health literacy and BP control

J Gen Intern Med 2007; 22: 1523

Variable	Literacy level (%)	
	Marginal-Adequate	Low
BP < 140/90	70.7	54.1
≥ 2 meds in chart	53.6	81.1
% report taking	48.8	58.4

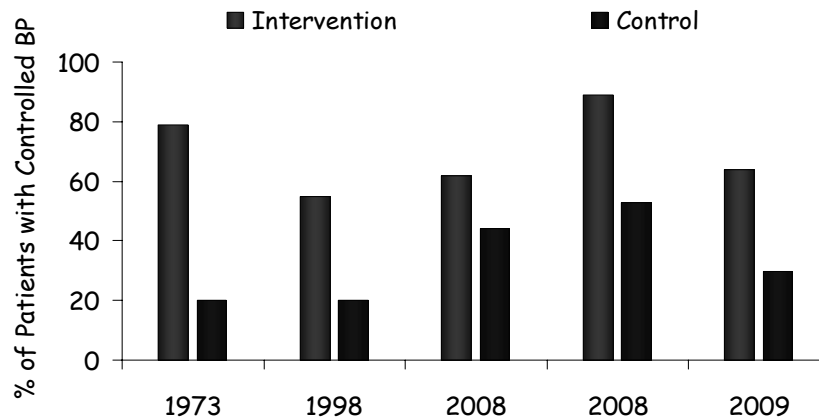
Understanding label directions

J Gen Intern Med 2009; 24: 57

Directions Literacy Level (% of patients)	Literacy level (% correct)		
	Adequate (55%)	Marginal (30%)	Low (15%)
Once daily	84	78	74
Every day, in morning	91	92	72
Every day, at 8 a.m.	86	83	76
Every 12 h	61	51	30

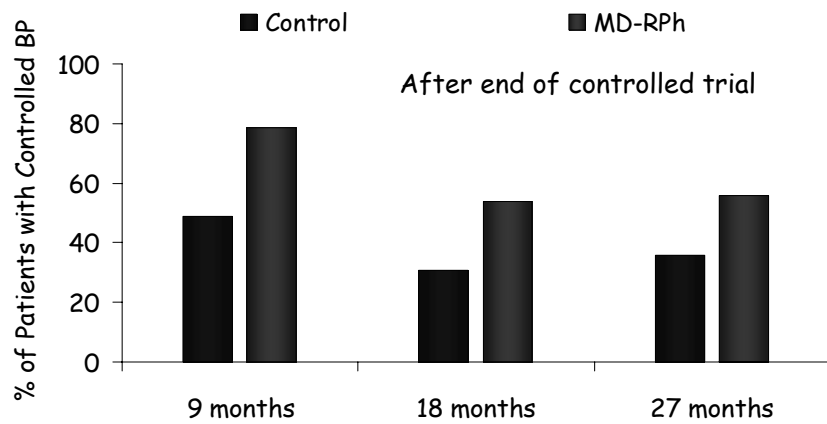
Pharmacist as Part of Team

Circ 1973; 48; 1104; *JGIM* 1998; 13: 740
JGIM 2008; 23: 1966; *J Clin Hyperten* 2008; 10: 260;
Arch Intern Med 2009; 169: 1996



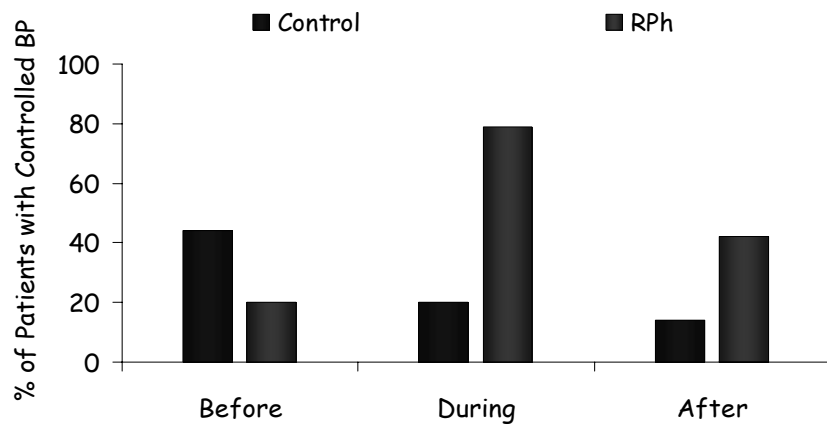
What happens if stop?

Pharmacother 2009; 30; 228



What happens if stop?

Circ 1973; 48; 1104





My crystal ball

- ❖ Increased focus on teams to improve BP control
 - ❖ Pharmacists important to controlling BP
 - ❖ Can't intervene and stop

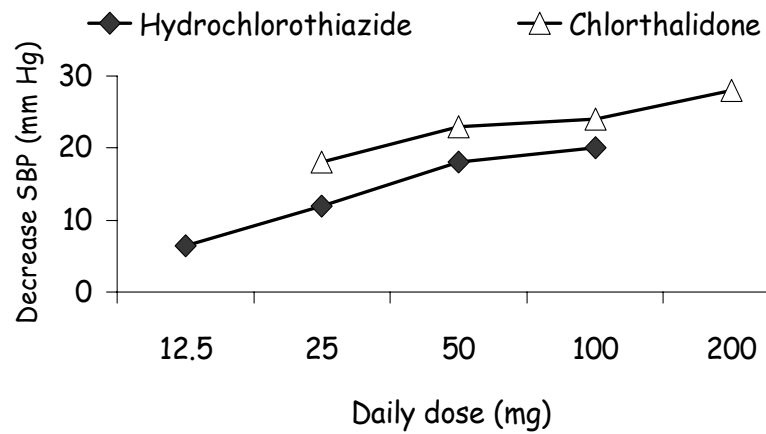


What else is newer?

- ❖ Which diuretic?
- ❖ What is role of beta-blockers?
- ❖ How low should BP be?

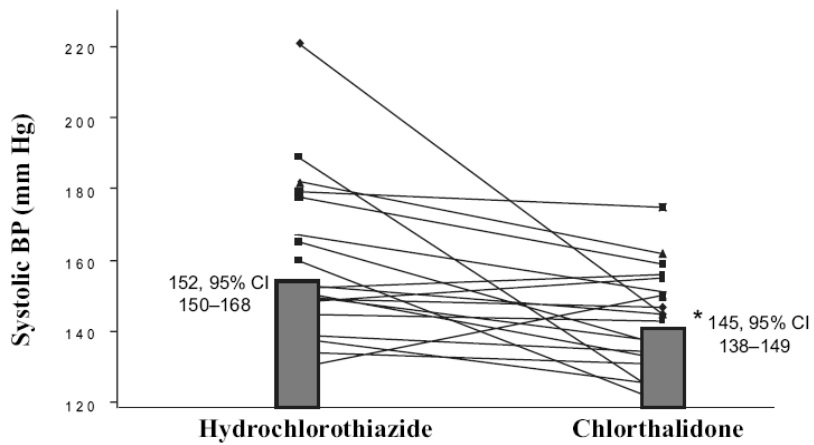
Are diuretics the same?

Hypertension 2004; 43: 4



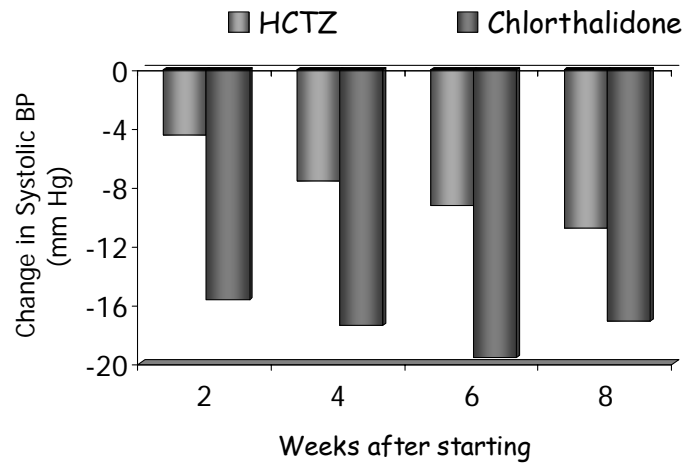
Are diuretics the same?

J Clin Hyperten 2005; 7: 345



Are diuretics the same?

Hypertension 2006; 47: 352



My crystal ball

- ❖ Which diuretic?
 - ❖ At least even money JNC-8 will support chlorthalidone as preferred diuretic
 - ❖ None of the studies show clinical outcome differences. Should that be known since chlorthalidone is several times more costly?

Should Beta-Blockers remain first line?

Relative Risk

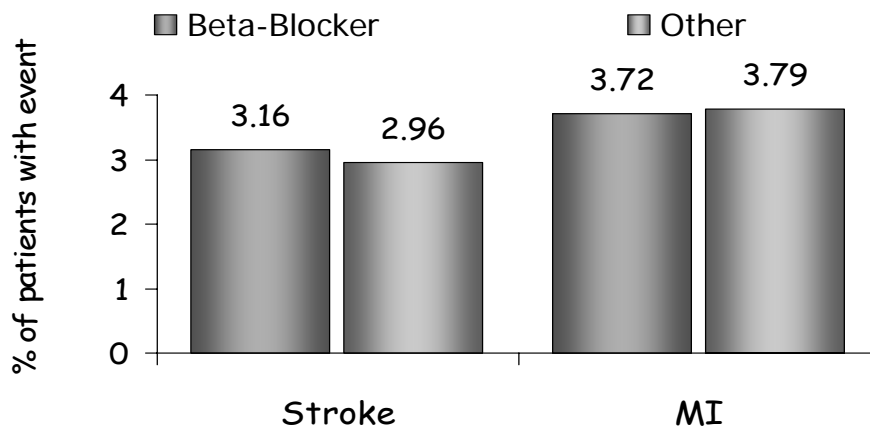
Lancet 2005; 366: 1545 (*meta analysis*)

- "The relative risk of stroke was 16% higher for beta-blockers (95% CI 4 - 30%) than for other drugs. There was no difference for myocardial infarction."
 - MI was 2% lower in these studies

Should Beta-Blockers remain first line?

Absolute rates

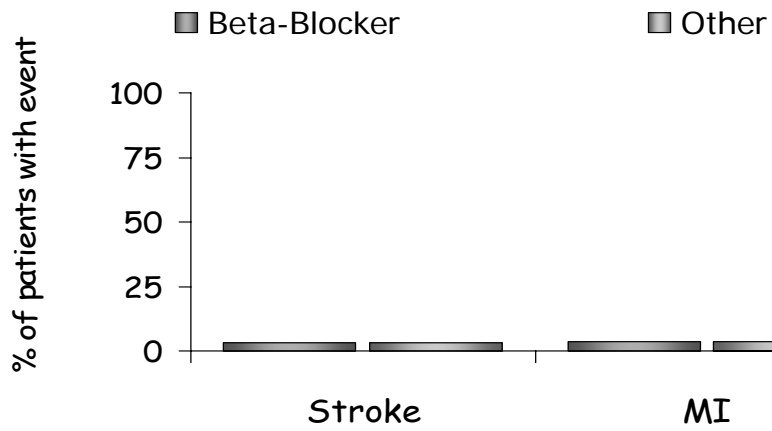
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Should Beta-Blockers remain first line?

Absolute rates

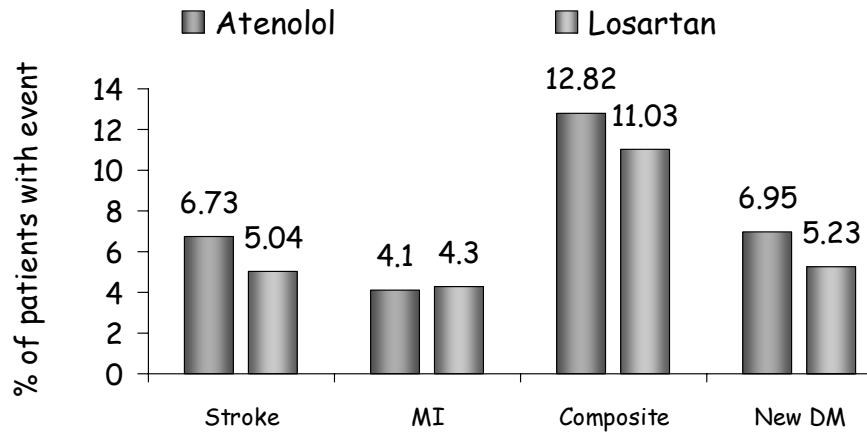
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Should Beta-Blockers remain first line?

Absolute rates

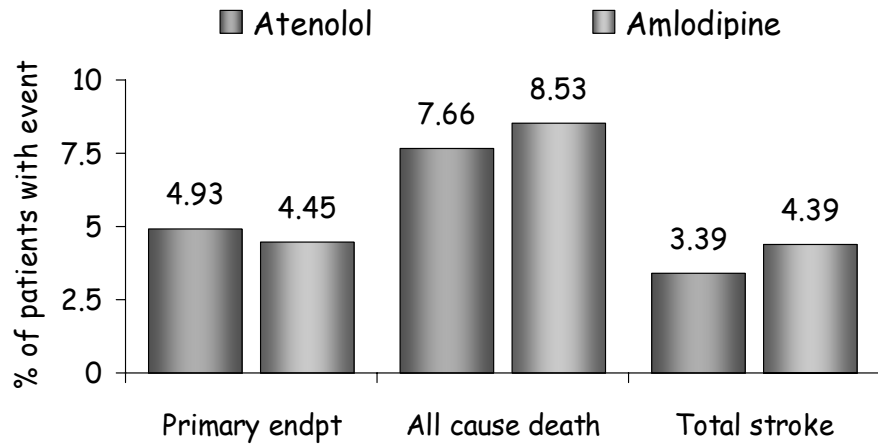
Lancet 2002; 359; 995 (**LIFE**)



BB + diuretic and CCB + ACEI

Absolute rates

Lancet 2005; 366: 895 (ASCOT)



My crystal ball

- ❖ What is role of beta-blockers?
 - ❖ European and British Societies of Hypertension have moved BB to non-first line status already
 - ❖ Take it to the bank that JNC-8 will follow suit
 - ❖ This does not impact CAD and CHF indications, but I suspect it will lower rate of prescribing



My crystal ball

❖ How low should you go?



Organizations recommending lower BP for specific indications

Organization	Indications for lower BP
JNC-7	DM, CKD
K/DOQI	Prevent CKD
BSH	DM
ESH/ESC	DM and high risk
AHA	CHD, risk equivalent, >10%
ASH	DM
ADA	DM

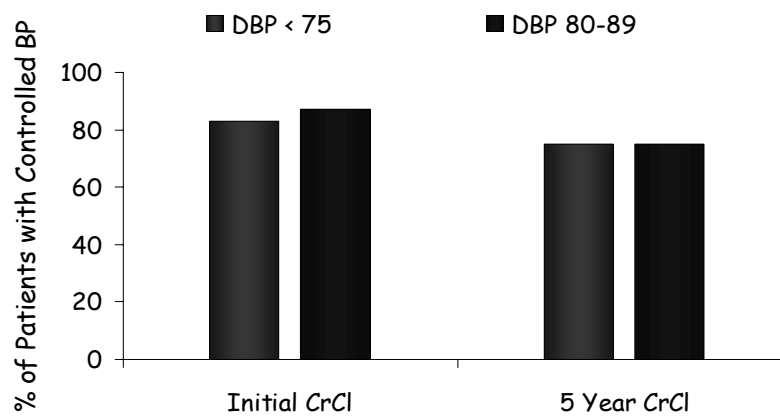
Cochrane Collaboration

Arguedas, Perez, Wright. June 2009

- RCT to lower SBP was 3.9 mm Hg lower
- Lower BP not ~ lower death, CV death, non-CV death, MI, Stroke, ESRD
 - ≤ 85 versus $\leq 90-100$
 - ≤ 80 versus $\leq 90-100$

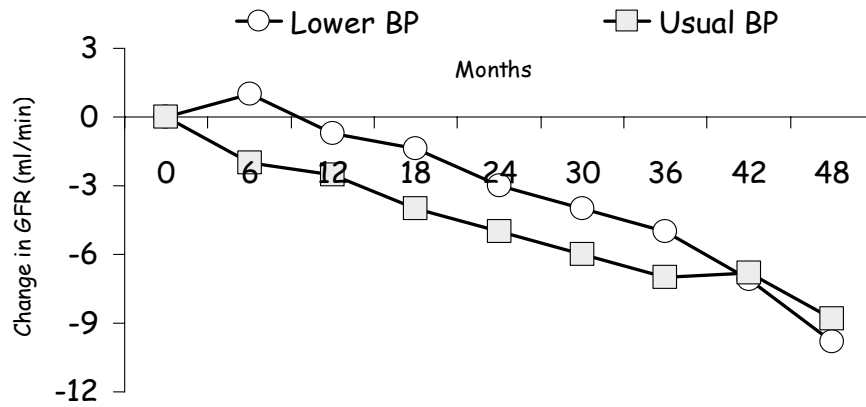
Lower Better?

ABCD study Diab Care 2000 (Suppl 2); B54



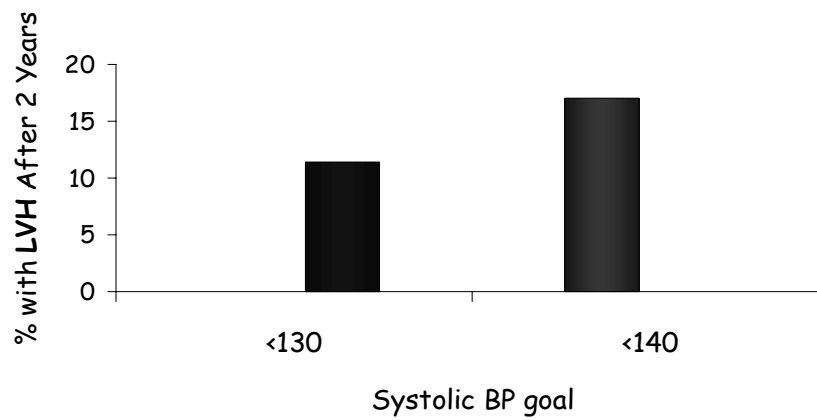
Is a lower BP better?

JAMA 2002; 288: 2421 (AASK)



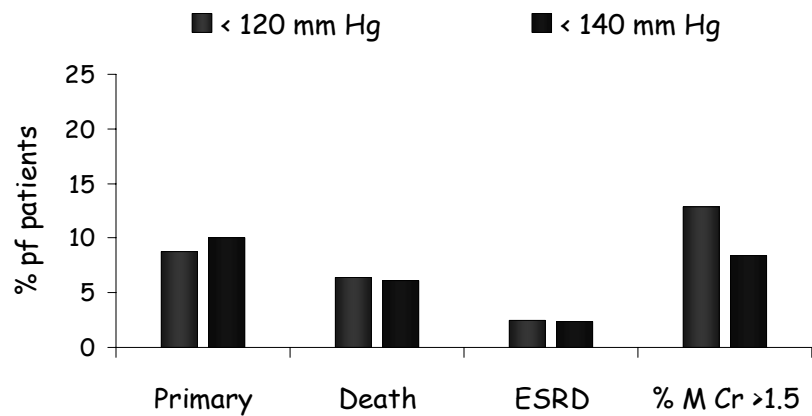
Lower Better? (non-DM)

Cardio-Sis Lancet 2009; 374: 525



Lower Better? (DM)

NEJM 2010; online
ACCORD study



My crystal ball

- ❖ JNC-8 has been pushed back. WHY?
- ❖ Is there more to be discussed?
- ❖ NOT SURE what they will conclude.
 - ❖ Paradigm says lower is better
 - ❖ Many organizations have this position
 - ❖ Down play clinical trials?
 - ❖ Down play adverse effects
 - ❖ Down play added costs



We can do better

- A large % with HTN still uncontrolled
- Plenty of drugs
 - Most important to make sure they are taken
- Should have teams manage BP
- Should use IT to routinely find
 - Patients with BP > 140/>90
 - Patients not persistent



Summary of the crystal ball

- Beta-blockers will lose in JNC-8
- Chlorthalidone will win in JNC-8
- Lower BP could go either way

Predicted JNC-8 Algorithm

After ALL lifestyle changes for Stage 1

Single agent

ACEI

ARB

CCB

Diuretic

Add 2nd drug

Different from same list

Add 3rd different drug

Assess adherence/optimize dose

Predicted JNC-8 Algorithm

After ALL lifestyle changes for Stage 2

Two drug regimen

ACEI

ARB

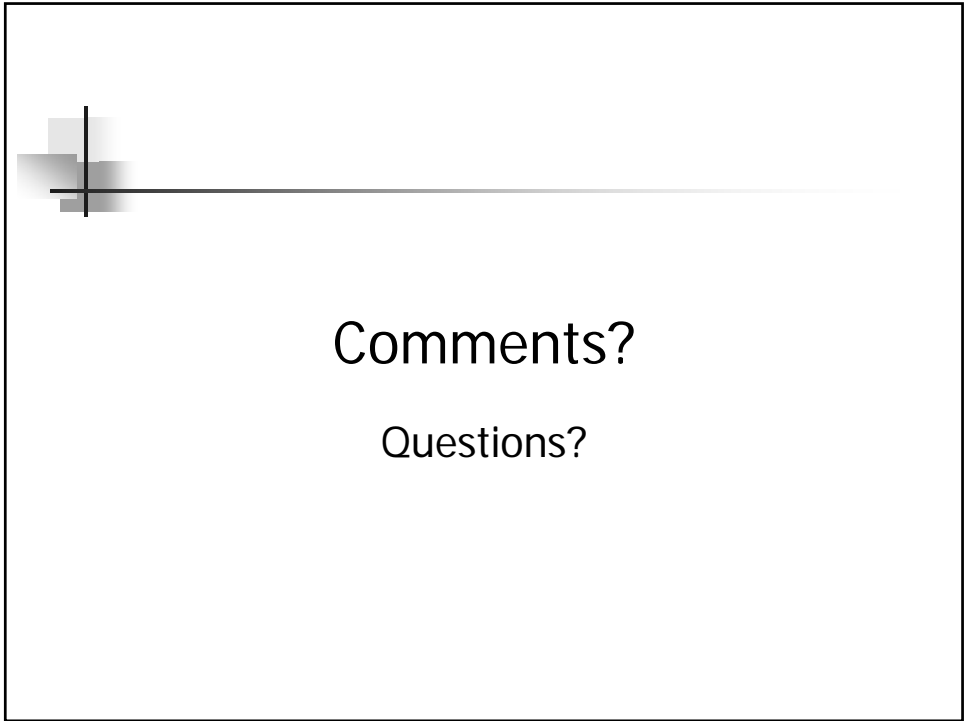
CCB

Diuretic

Add 3rd drug

Different from same list

Add 4th different drug/Assess adherence/
Optimize dose/2nd HTN



Comments?

Questions?