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

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

- *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*
- *Untreated/Uncontrolled HTN leads to life threatening events*
- *AA* more likely than others to develop
  - HTN at younger age, have higher BP, 4 x more likely to develop CKD

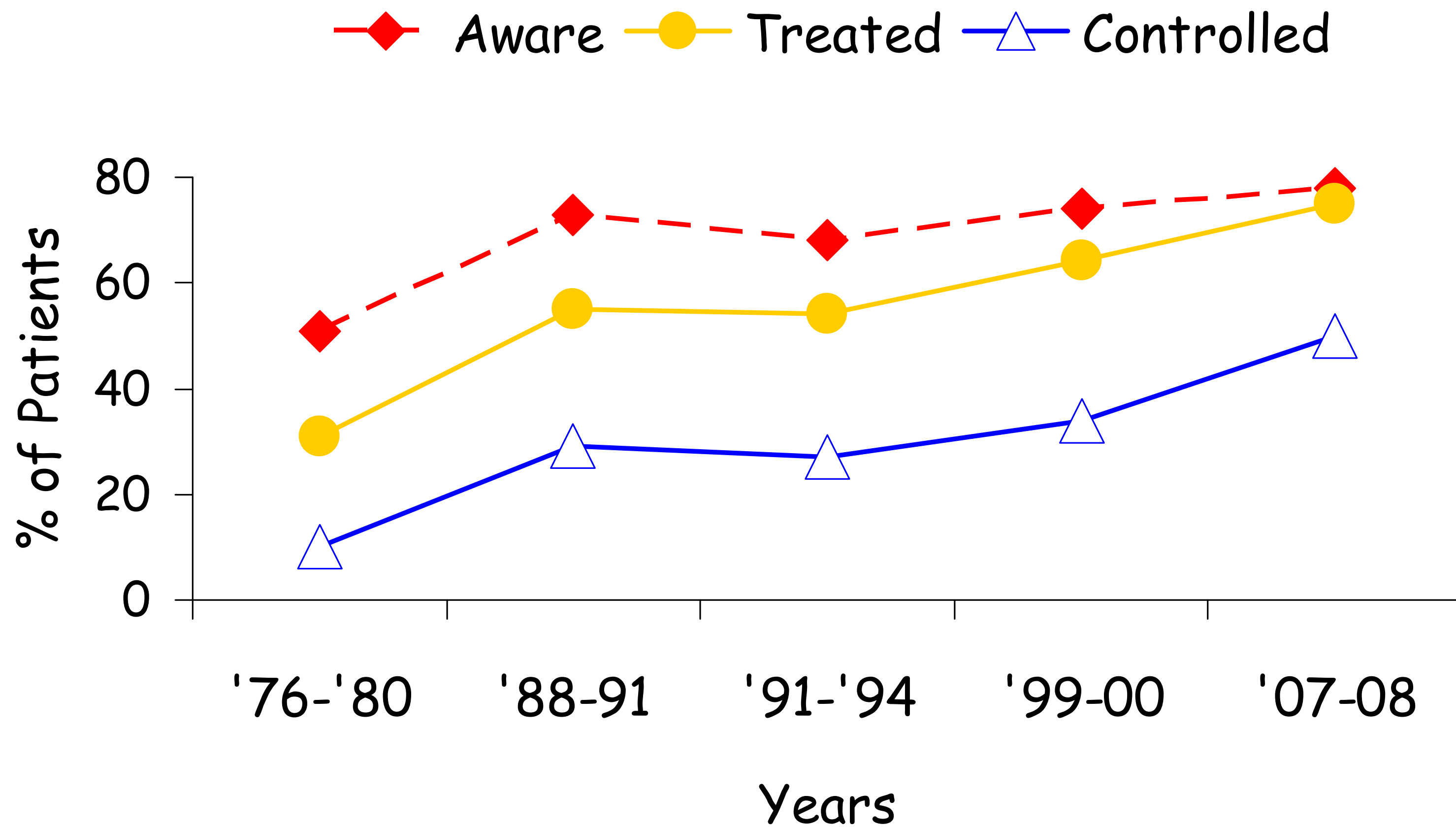
What do we know?

- 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*

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

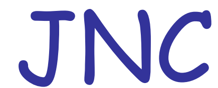
Trends in Treating Hypertension

NEJM 2010; 303: 2043



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



- Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure
  - Standard of care for HTN
  - 35 years from first report
  - Events lower since starting JNC
  - JNC-8 expected in 2012 – delayed

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

Neurology 2011; 77: 1330

- NEW meta-analysis 12 studies (> 0.5 M)
- *RR 1.55 higher with prehypertension*
- *Most of Δ 130-139/85-90 mm Hg range*
- *Evidence to TREAT does not exist*
- *Place for non-drug therapy*

JNC Treatment Goals Hypertension

- Lower BP to < 140/< 90 minimally
- Lower BP to < 130/< 80 for CRI and DM
- 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

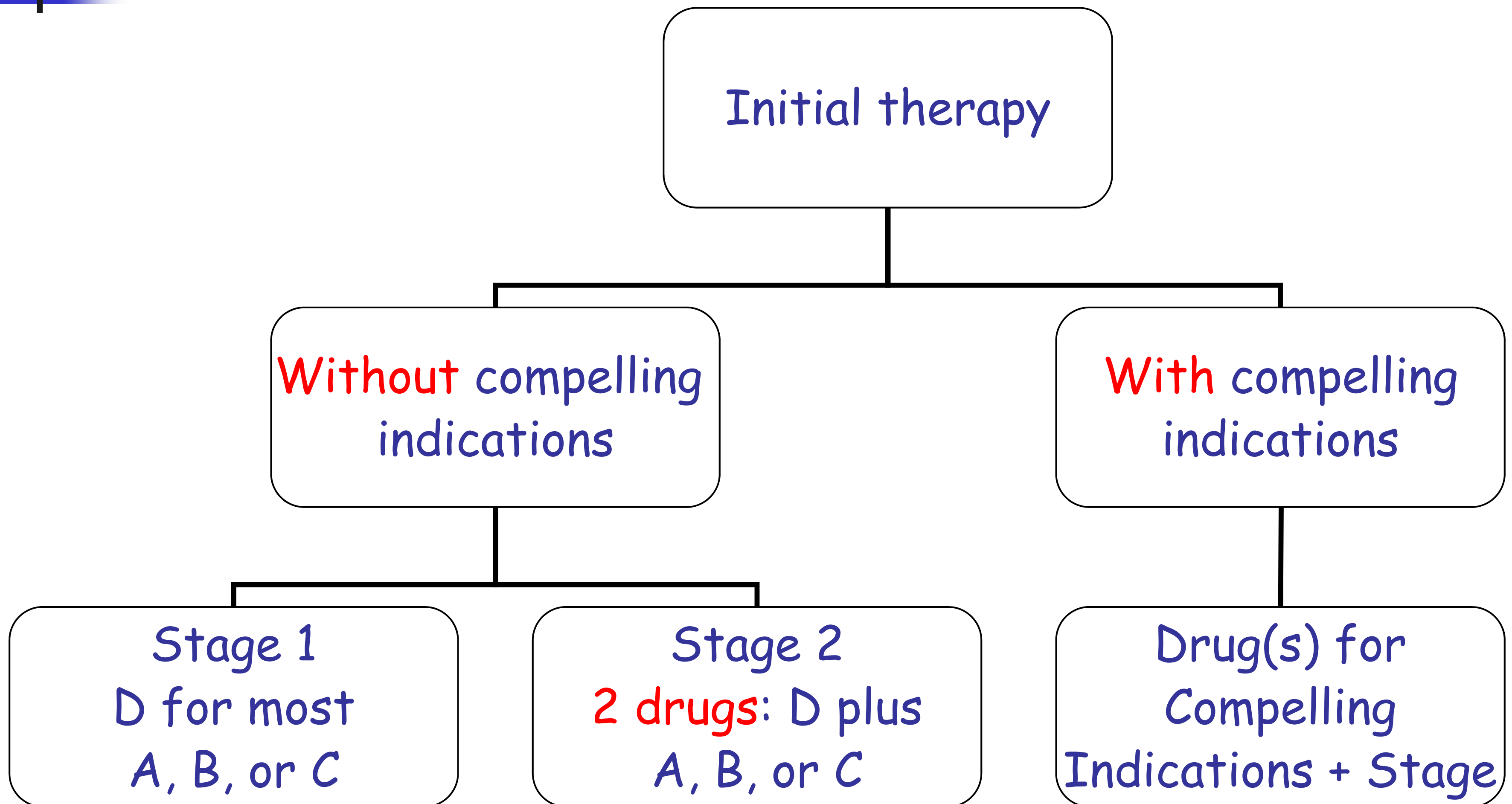
Initial drug choice

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

JNC-7 Algorithm

Know your ABCDs

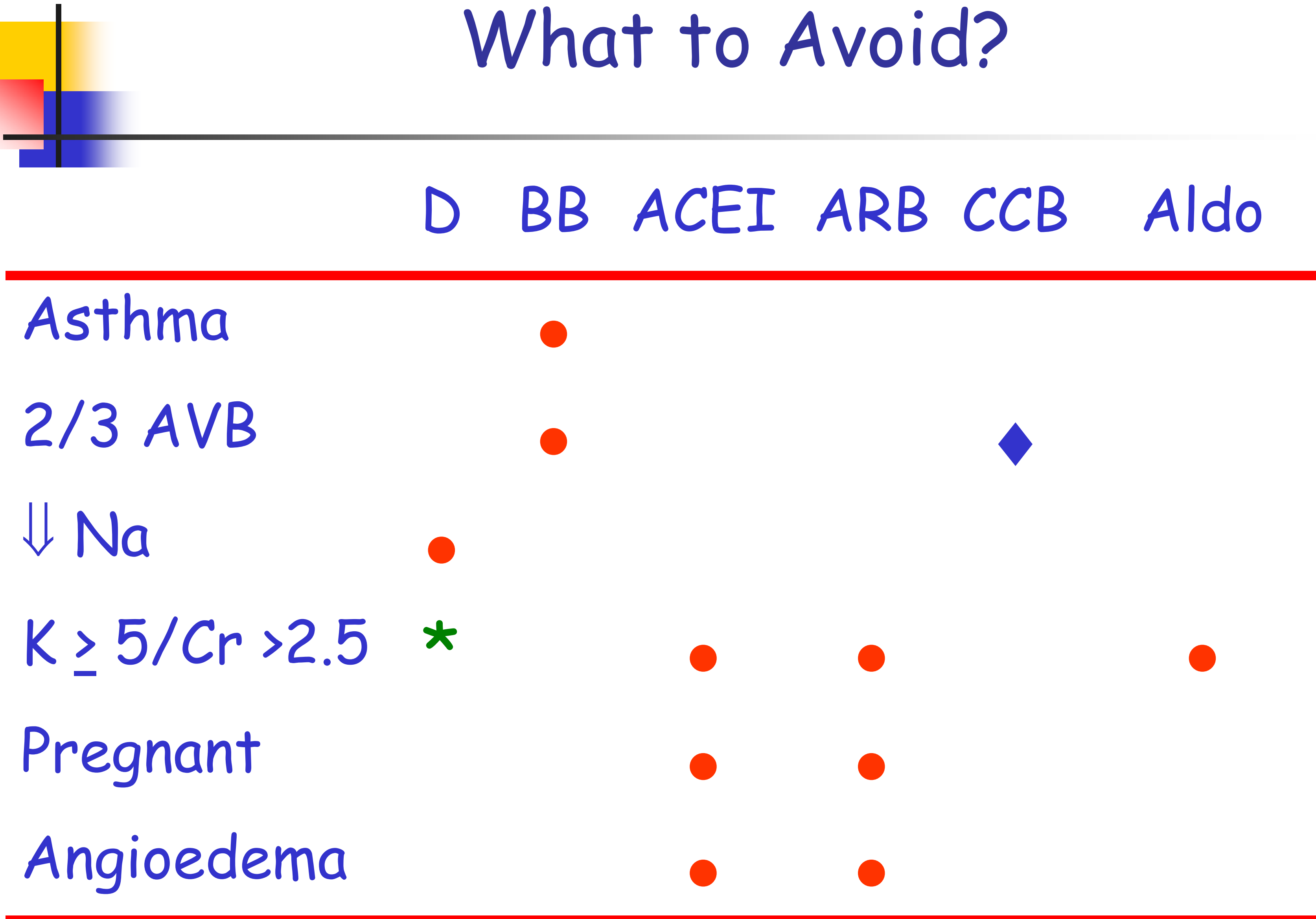
After ALL lifestyle changes attempted



What are Compelling Indications?

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

What to Avoid?

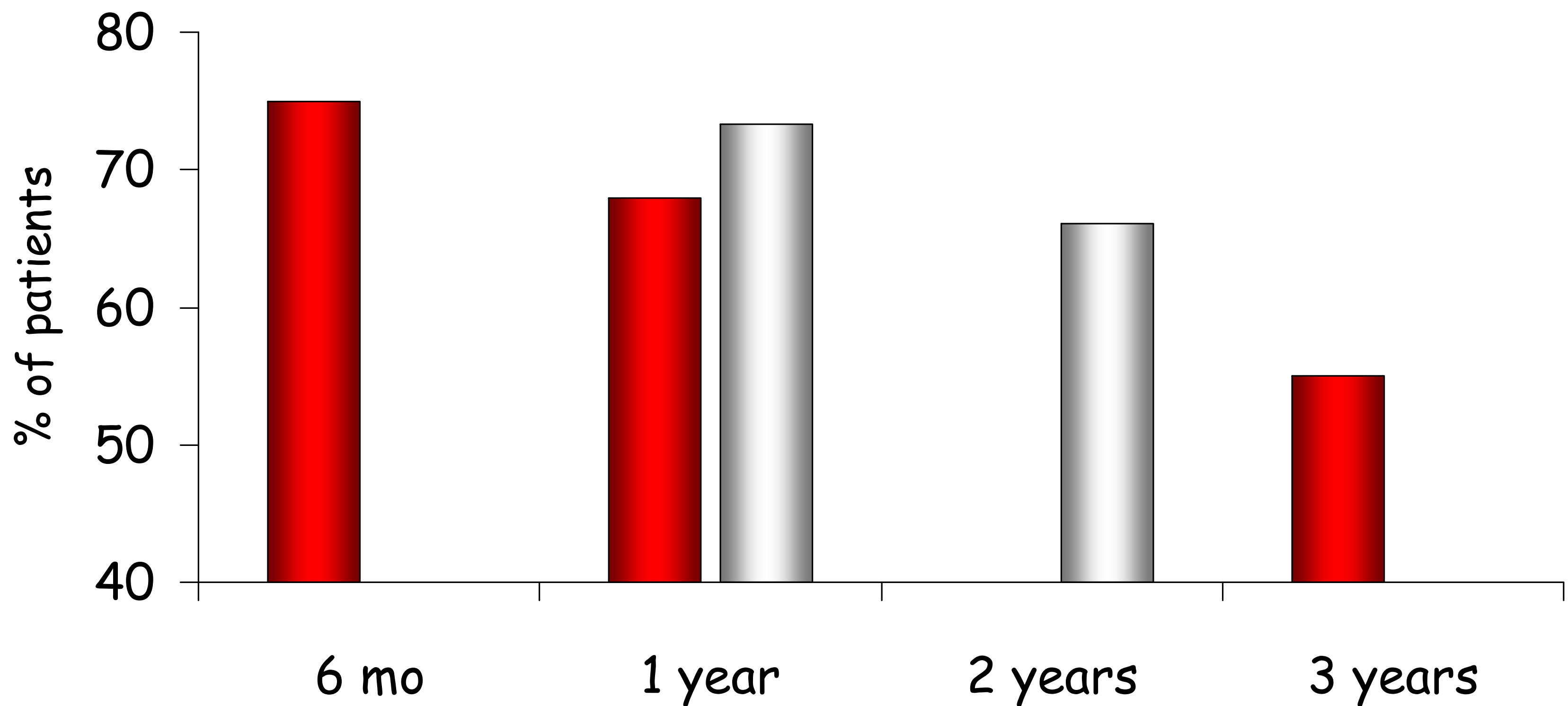


	D	BB	ACEI	ARB	CCB	Aldo
Asthma		●				
2/3 AVB		●			♦	
⇓ Na	●					
K $\geq$ 5/Cr >2.5	*		●	●		●
Pregnant			●	●		
Angioedema			●	●		

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

Persistence newly treated

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



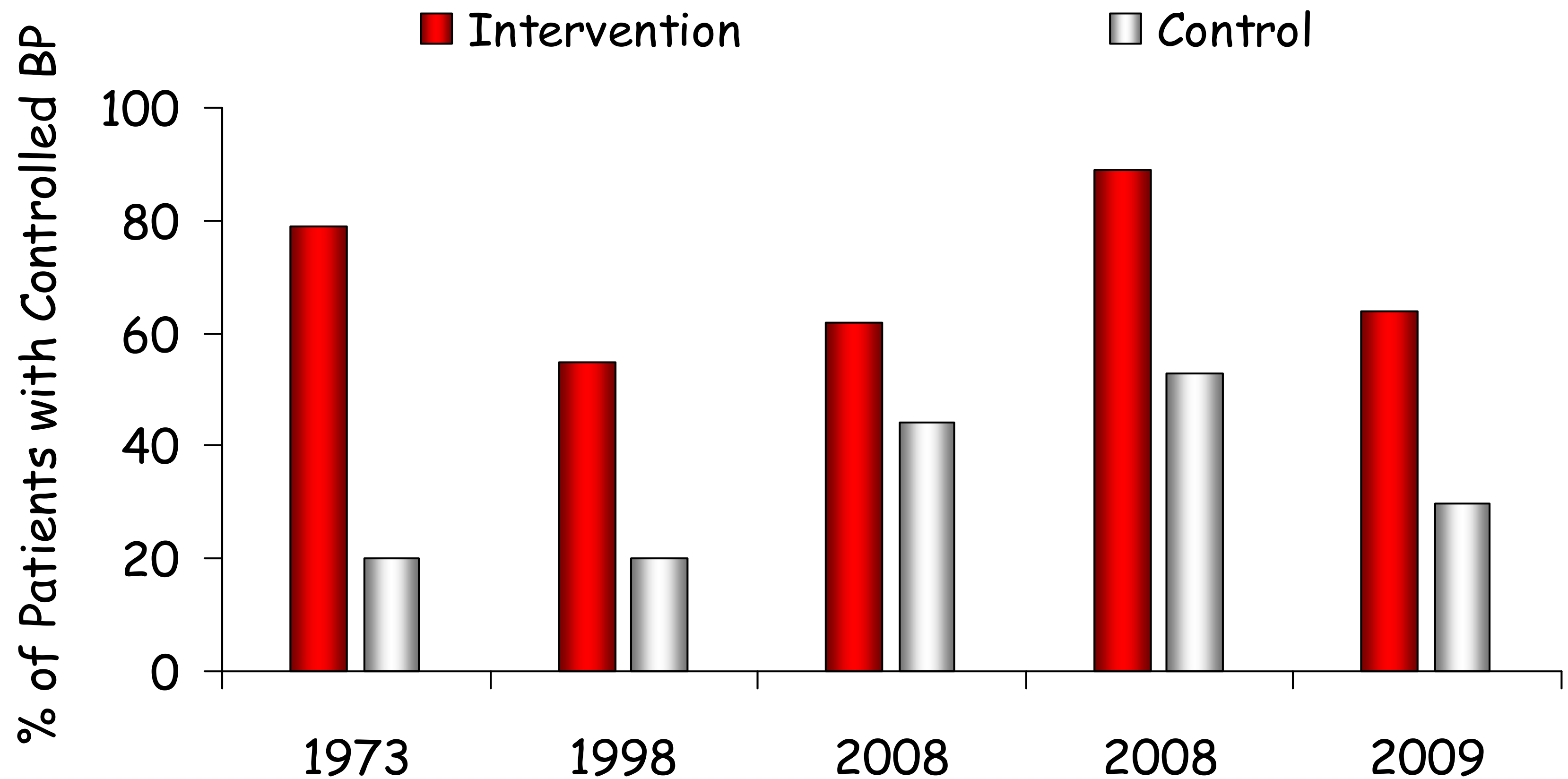
	Literacy level (%)	
Variable	Marginal-Adequate	Low
BP < 140/90	70.7	54.1
≥ 2 meds in chart	53.6	81.1
% report taking	48.8	58.4

J Gen Intern Med 2009; 24: 57

Directions	Literacy level (% correct)		
Literacy Level (% of patients)	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

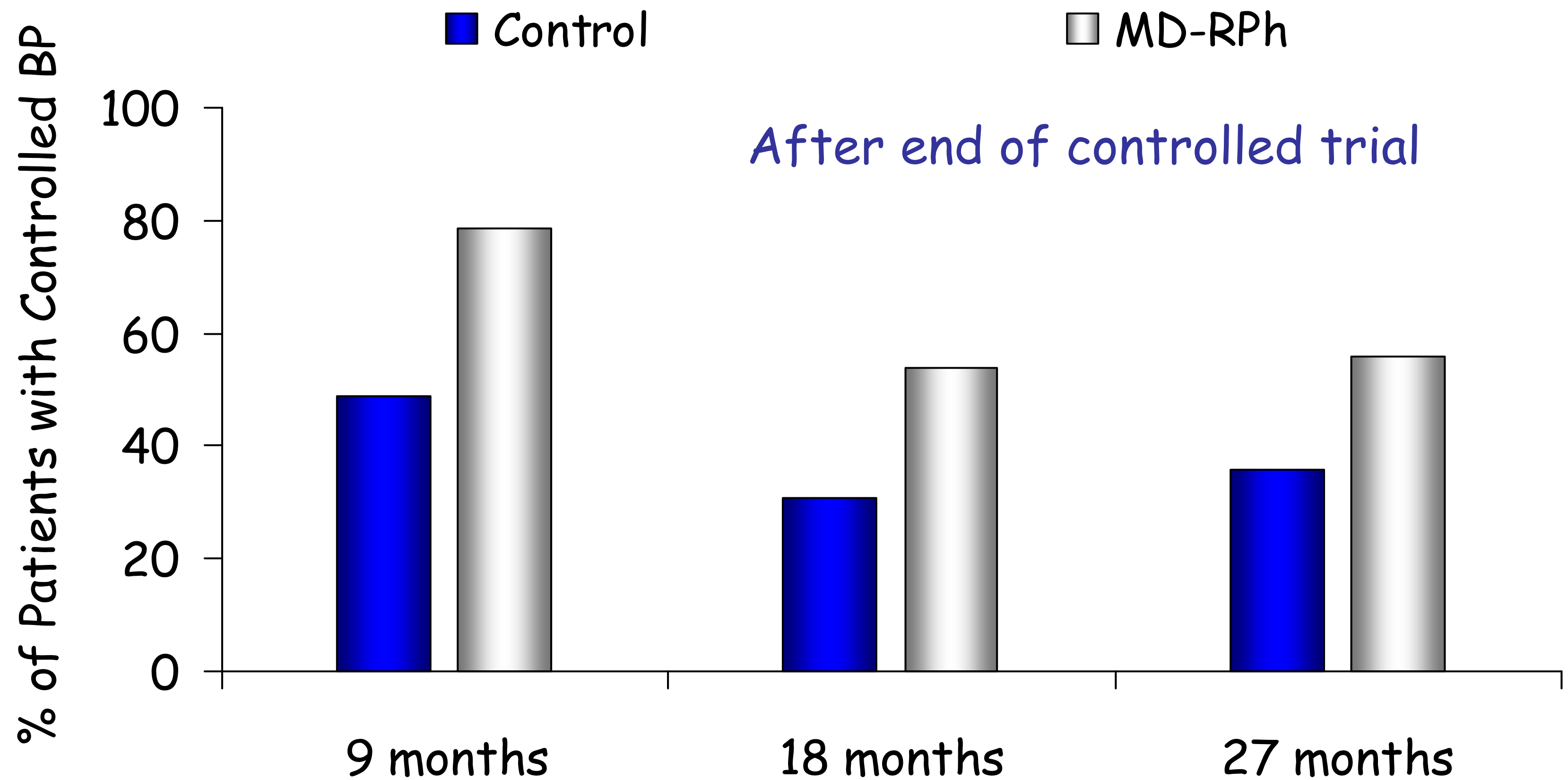
Pharmacist as Part of Team

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



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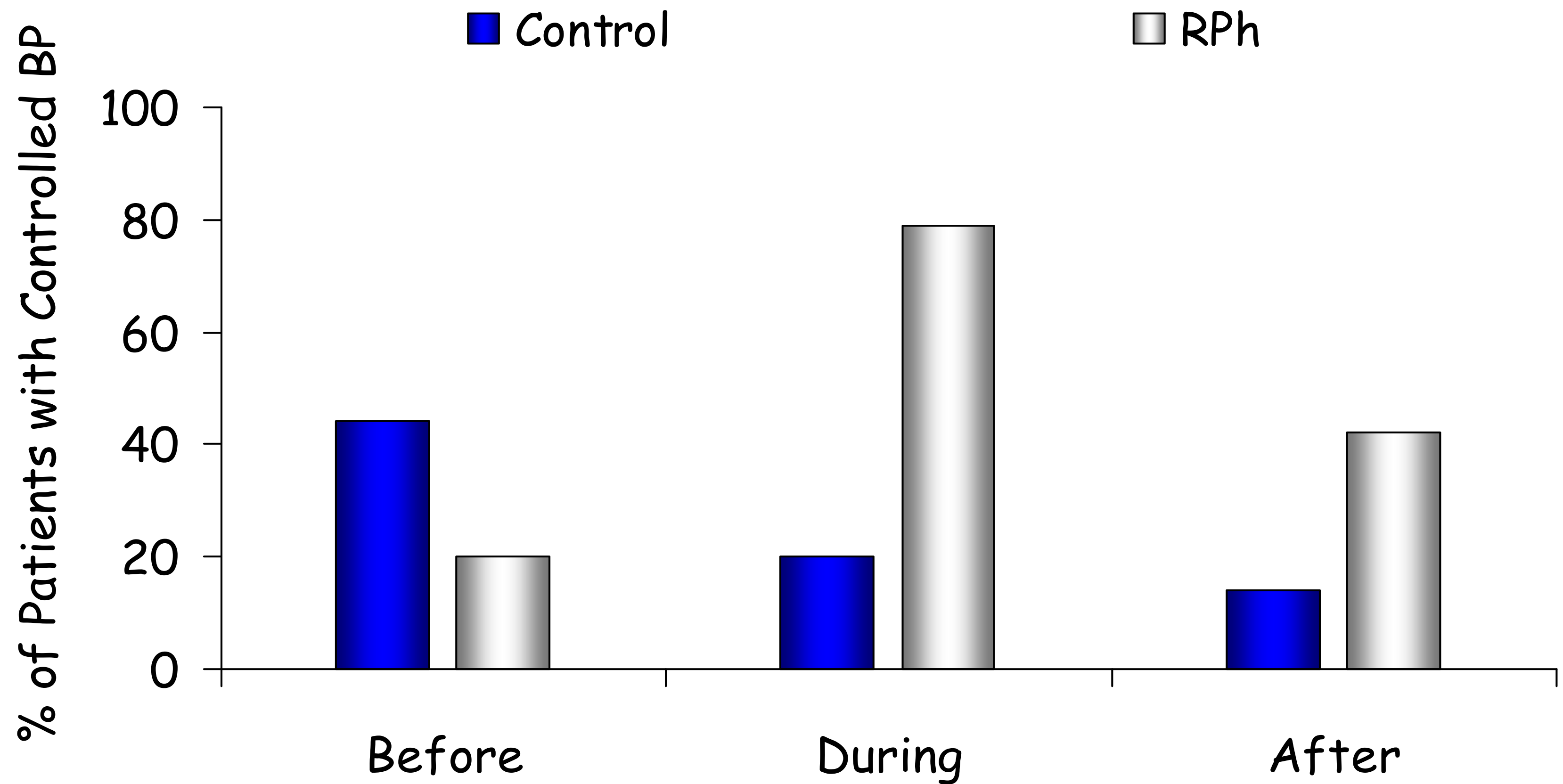


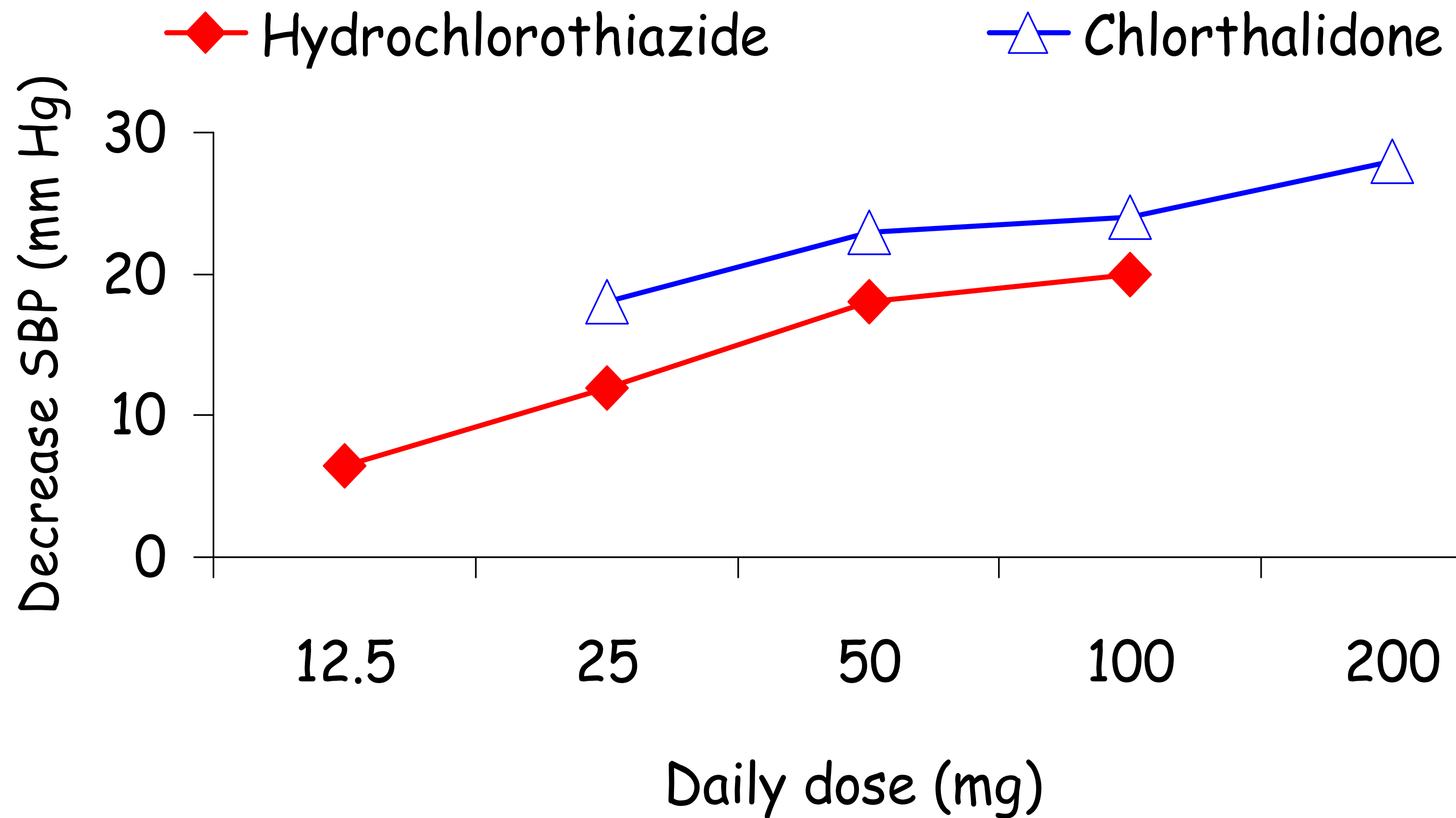
My crystal ball

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

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

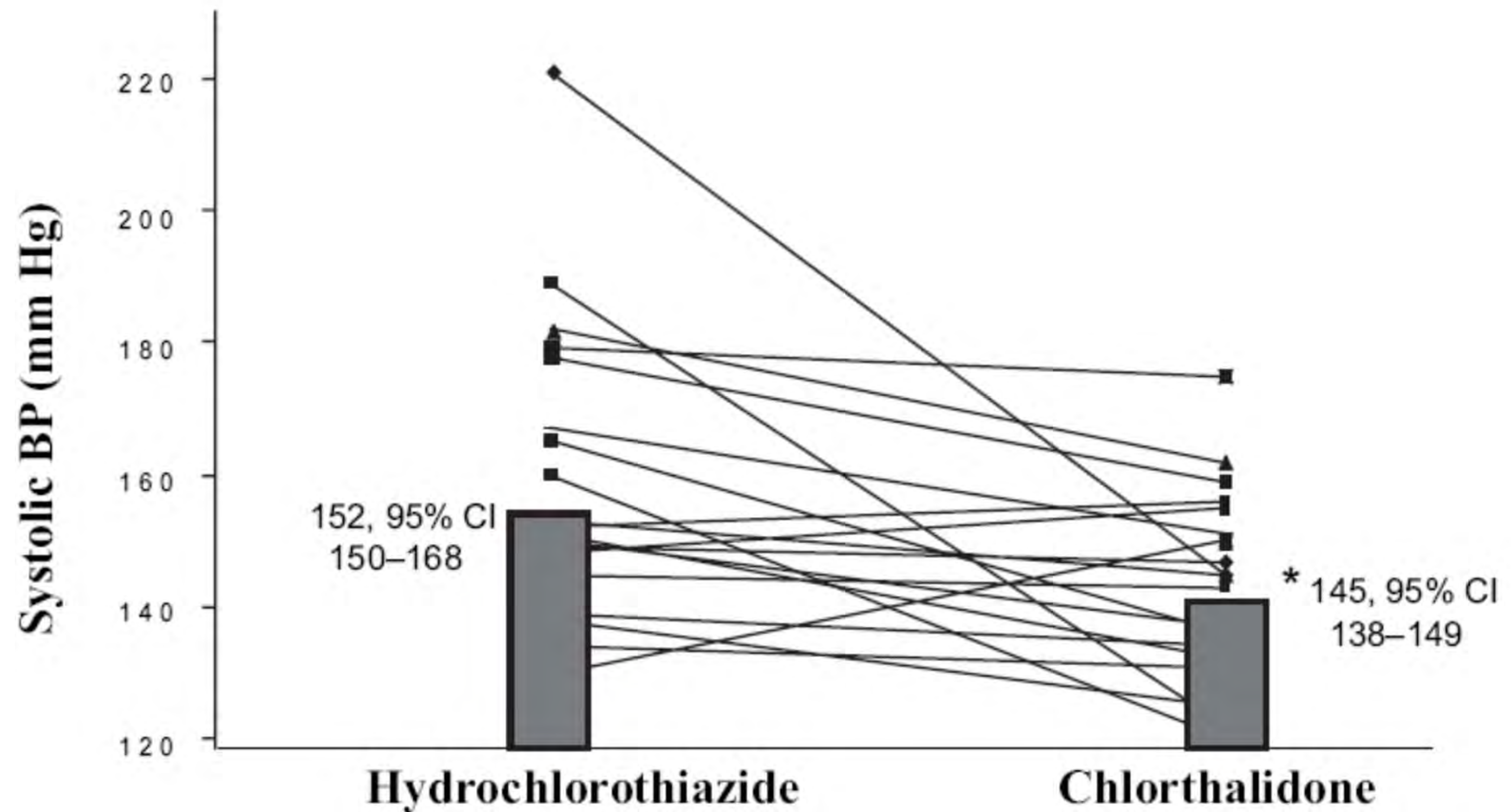
Are diuretics the same?

Hypertension 2004; 43: 4



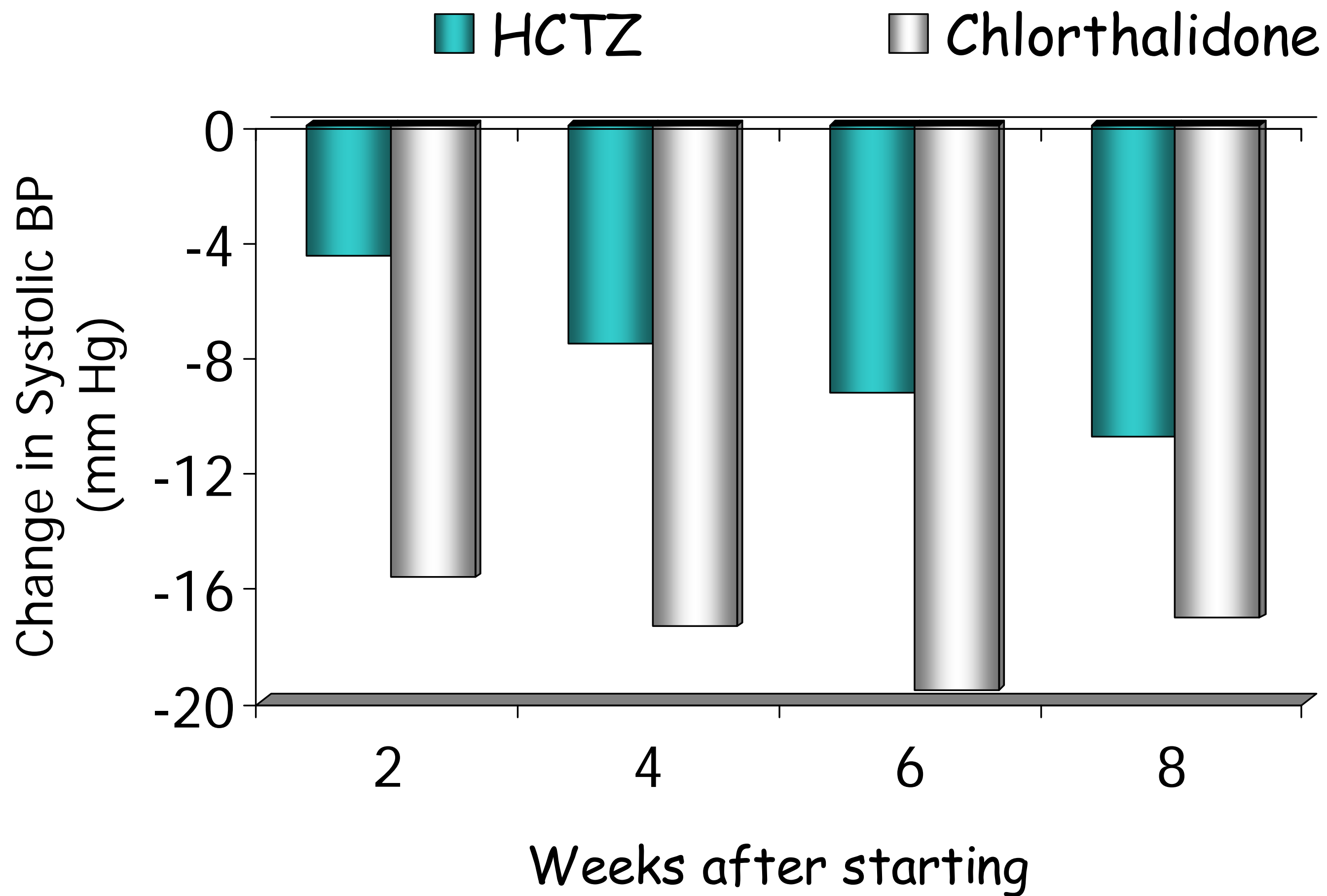
Are diuretics the same?

J Clin Hyperten 2005; 7: 345



Are diuretics the same?

Hypertension 2006; 47: 352



- Which diuretic?
  - At least even money JNC-8 will support chlorthalidone as preferred diuretic
  - MORE combinations with HCTZ
  - None of the studies show clinical outcome differences.
    - Should that be known since HCTZ costs less?

Should Beta-Blockers remain first line?

Relative Risk

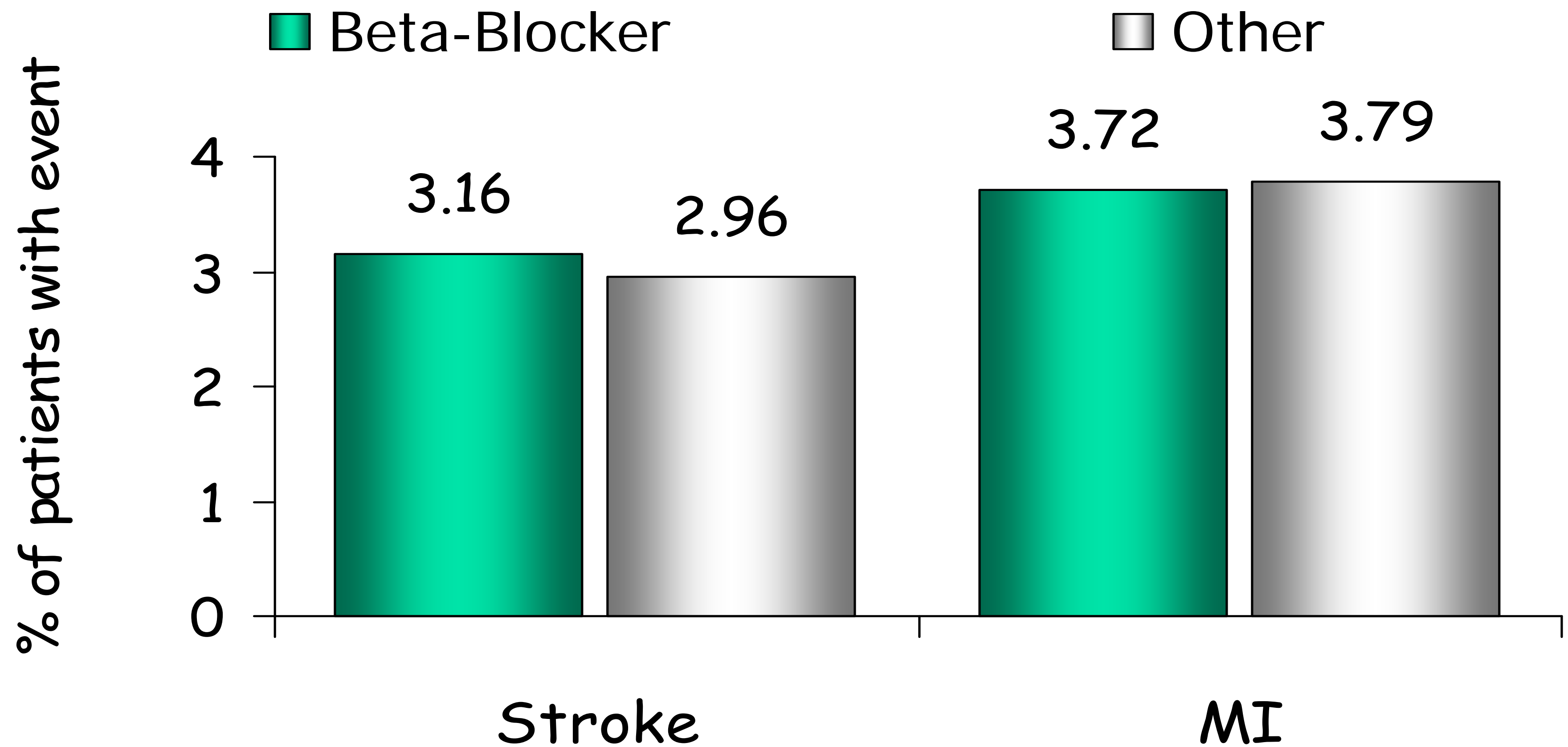
Lancet 2005; 366: 1545 (***meta analysis***)

- "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

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



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Absolute rates

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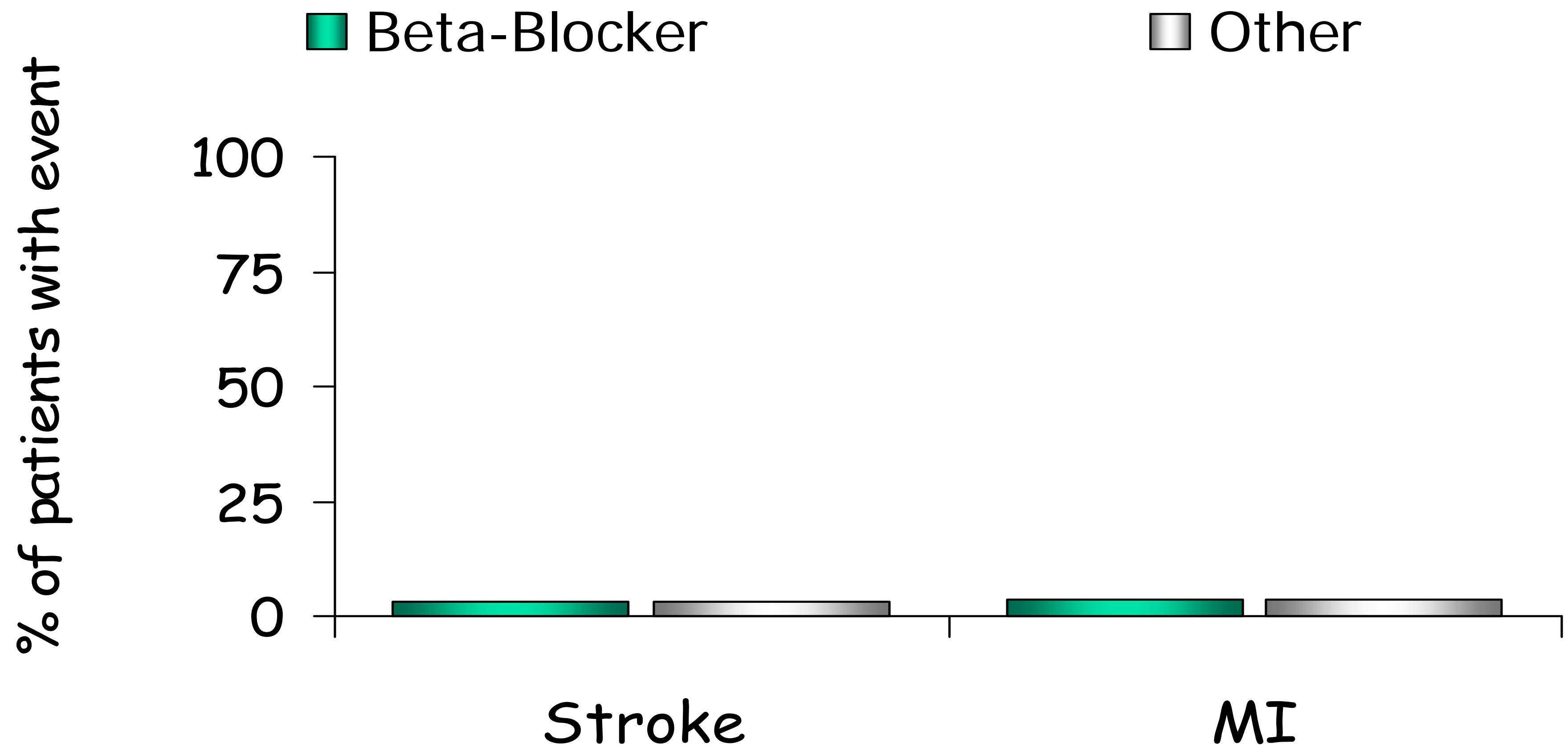
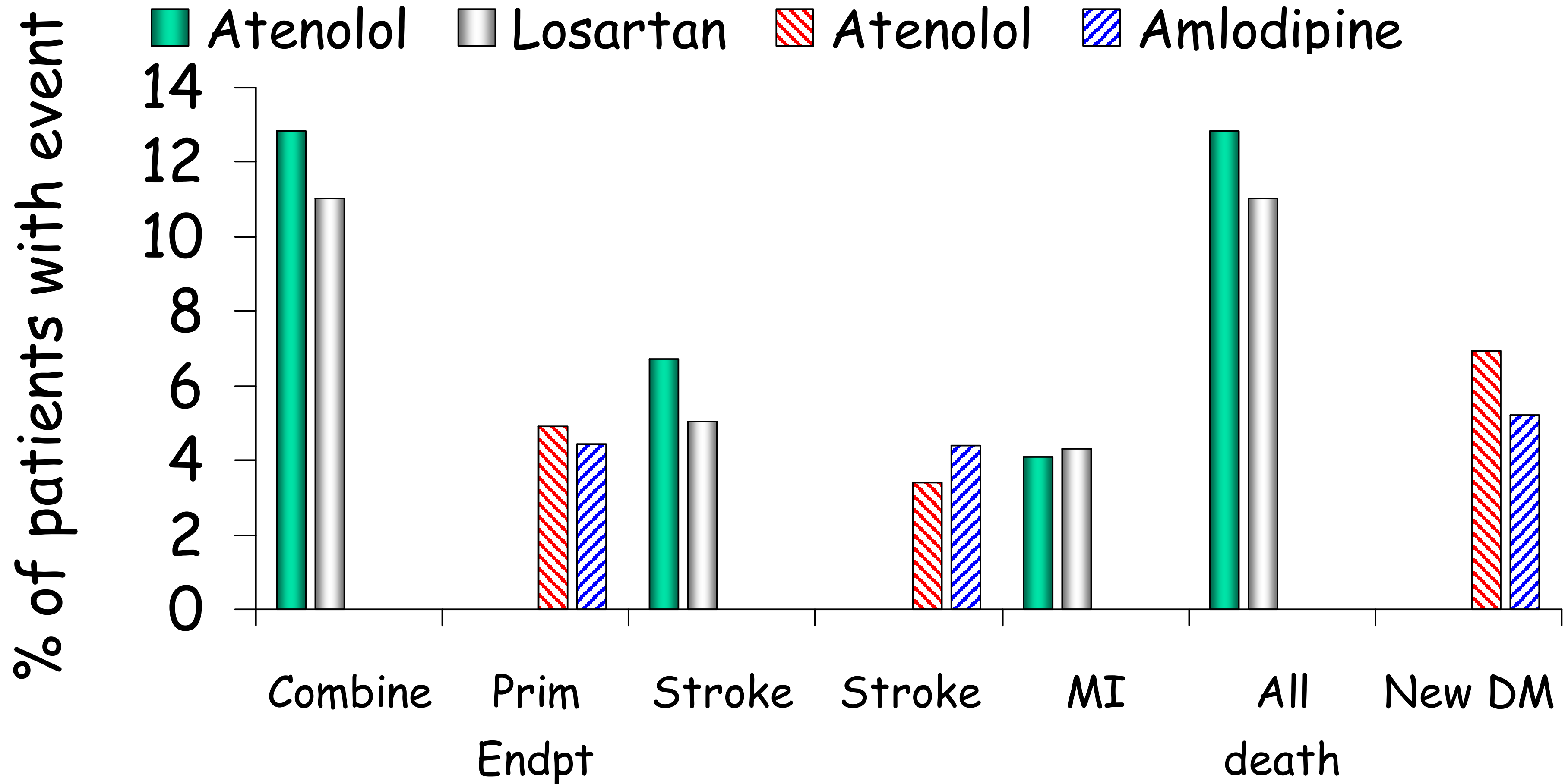


Should Beta-Blockers remain first line?

Absolute rates

Lancet 2002; 359; 995 (**LIFE**) Lancet 2005; 366: 895 (**ASCOT**)



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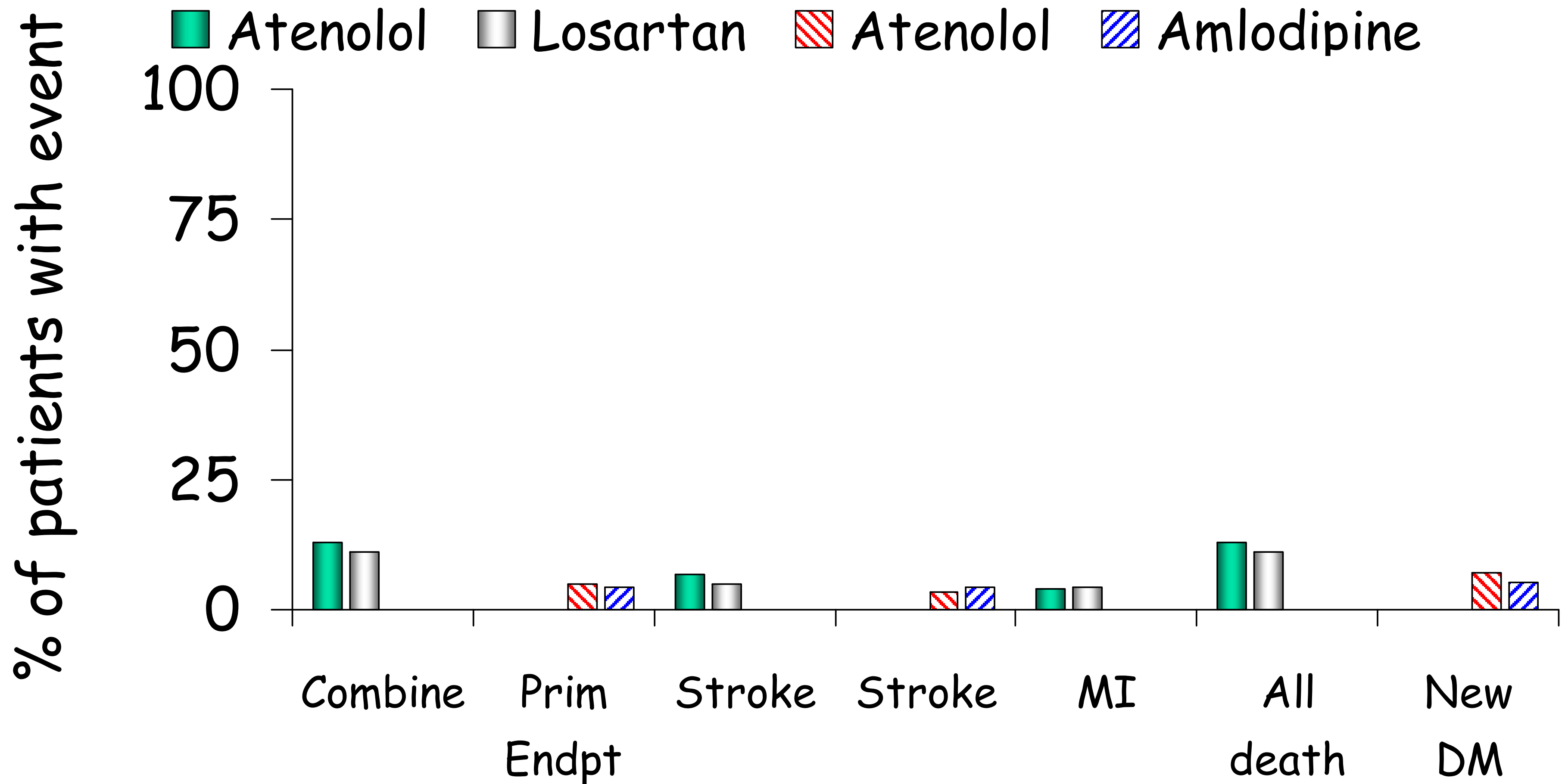
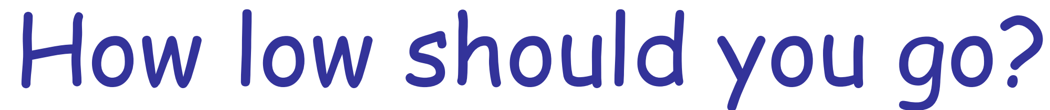


- What is role of beta-blockers?
  - European and British Societies of Hypertension have moved BB to non-first line status already
  - Canadian view is BB for young and not old
  - Take it to the bank that JNC-8 will follow suit
  - This does not impact CAD and CHF indications, but I suspect it will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



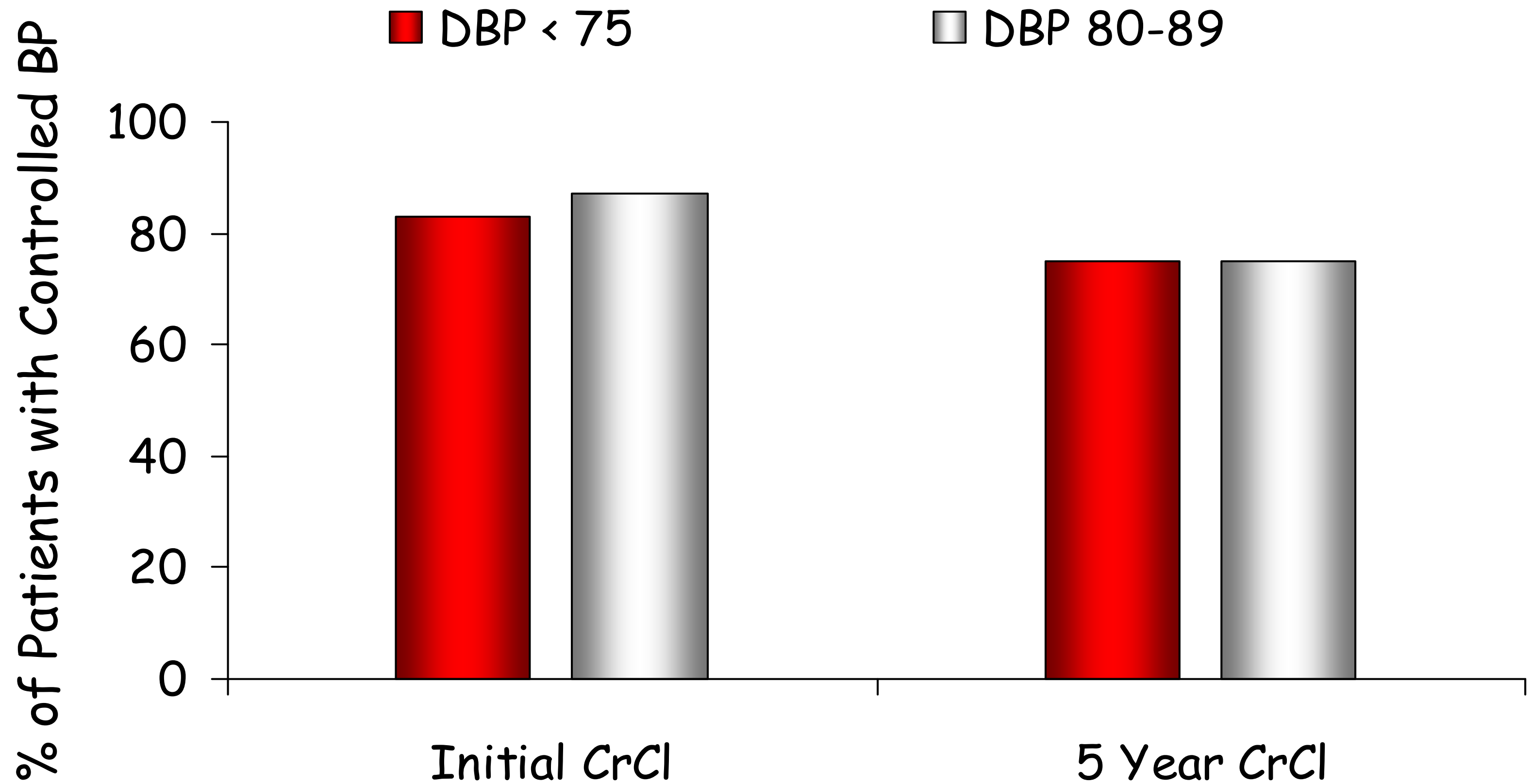
Organization	Indications for lower BP
JNC-7	DM, CKD
K/DOQI	Prevent CKD
BSH	DM
ESH/ESC	DM and high risk
AHA	CHD, risk equivalent, >10%
ASH	DM
ADA	DM

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
  - $\leq$ 85 versus $\leq$ 90-100
  - $\leq$ 80 versus $\leq$ 90-100

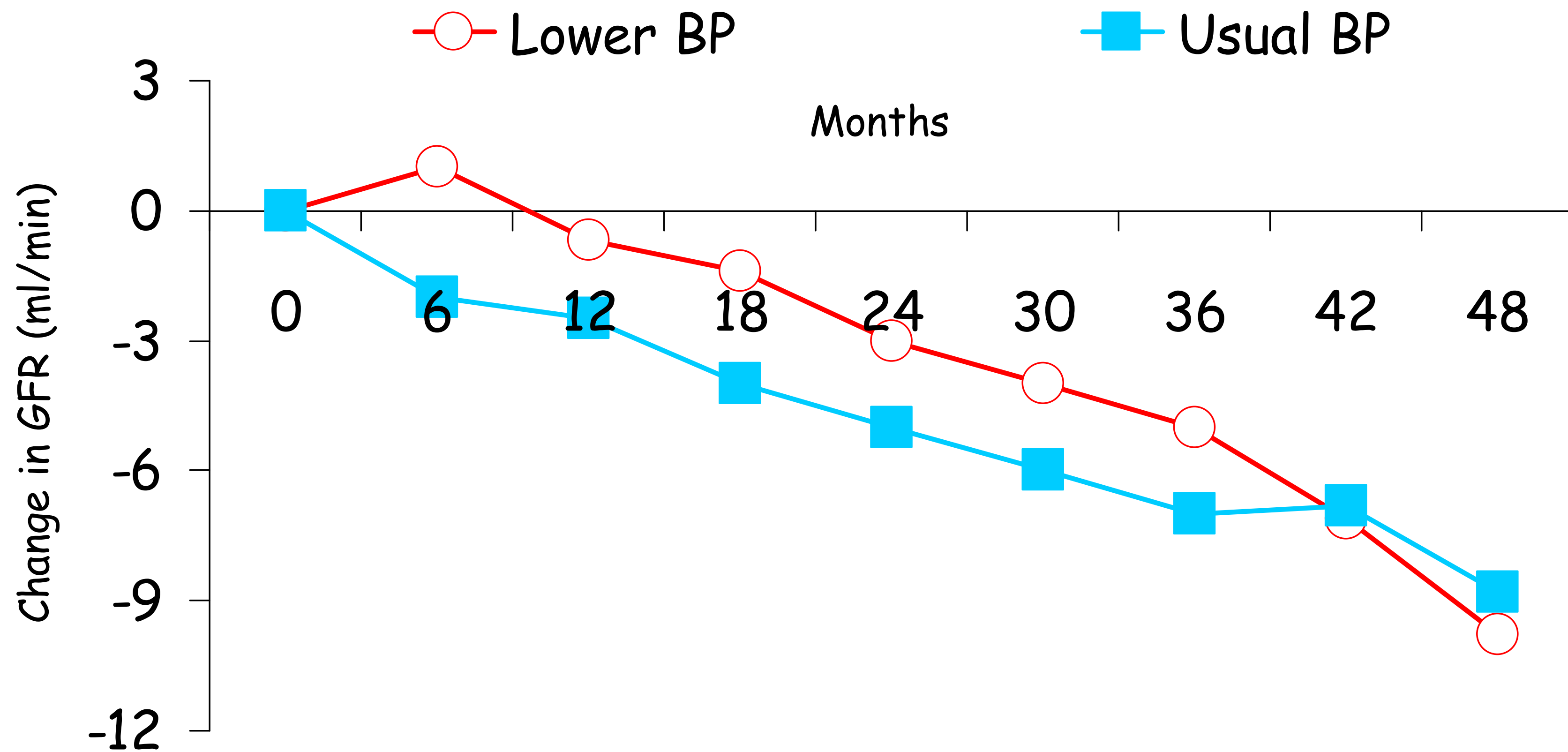
Lower Better?

ABCD study Diab Care 2000 (Suppl 2); B54



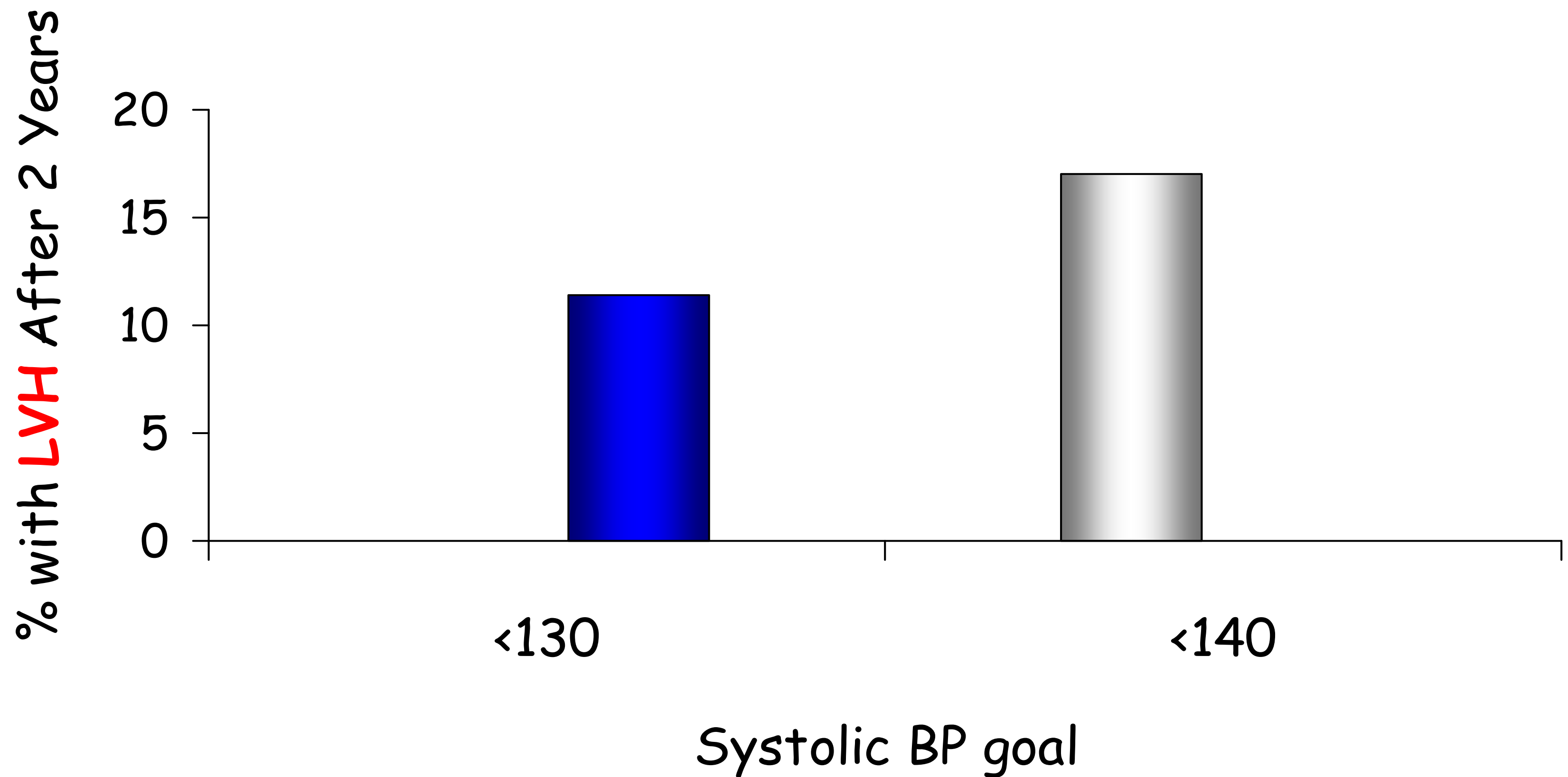
Is a lower BP better?

JAMA 2002; 288: 2421 (**AASK**)



Lower Better? (non-DM)

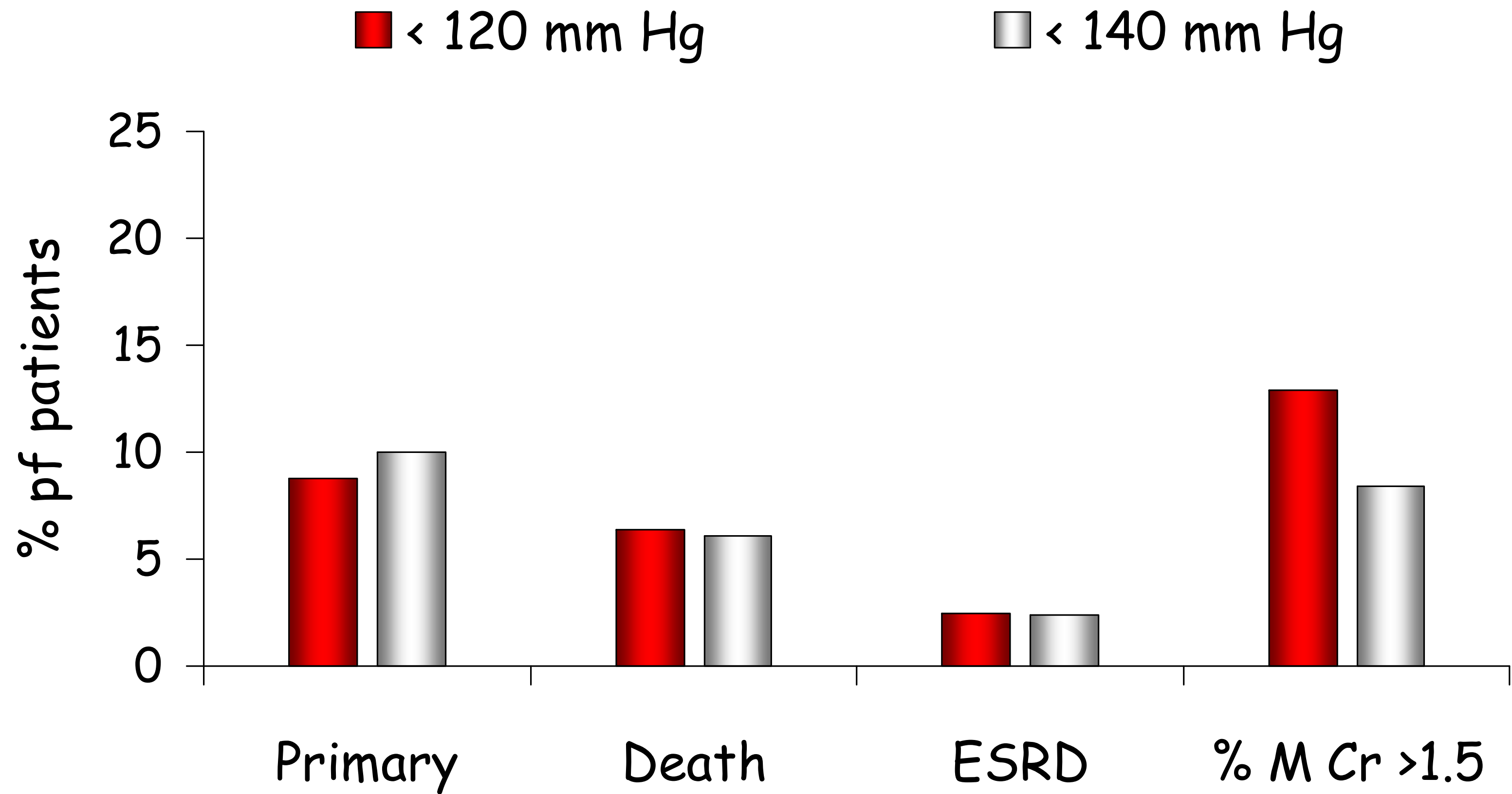
Cardio-Sis Lancet 2009; 374: 525



Lower Better? (DM)

NEJM 2010; 362: 1628

ACCORD study



- 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

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

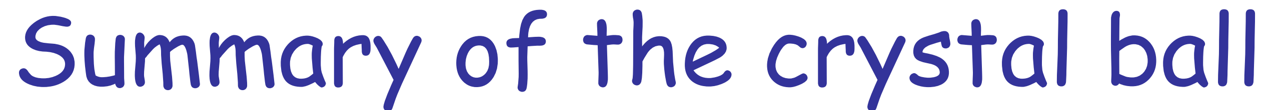
Two drug regimen

ACEI ARB CCB Diuretic

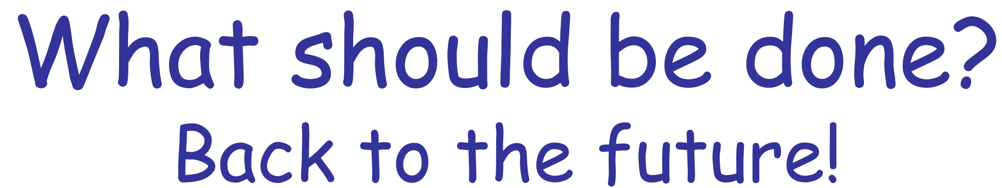
Add 3rd drug
Different from same list

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

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



- Beta-blockers will lose in JNC-8
- Chlorthalidone will win in JNC-8
- Lower BP could go either way
  - Cynicism tells me it will remain lower



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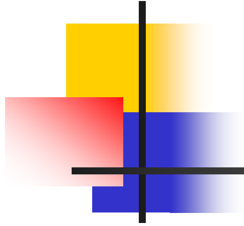

Comments?

Questions?

REMEMBER

If you torture the data long enough it will confess to anything