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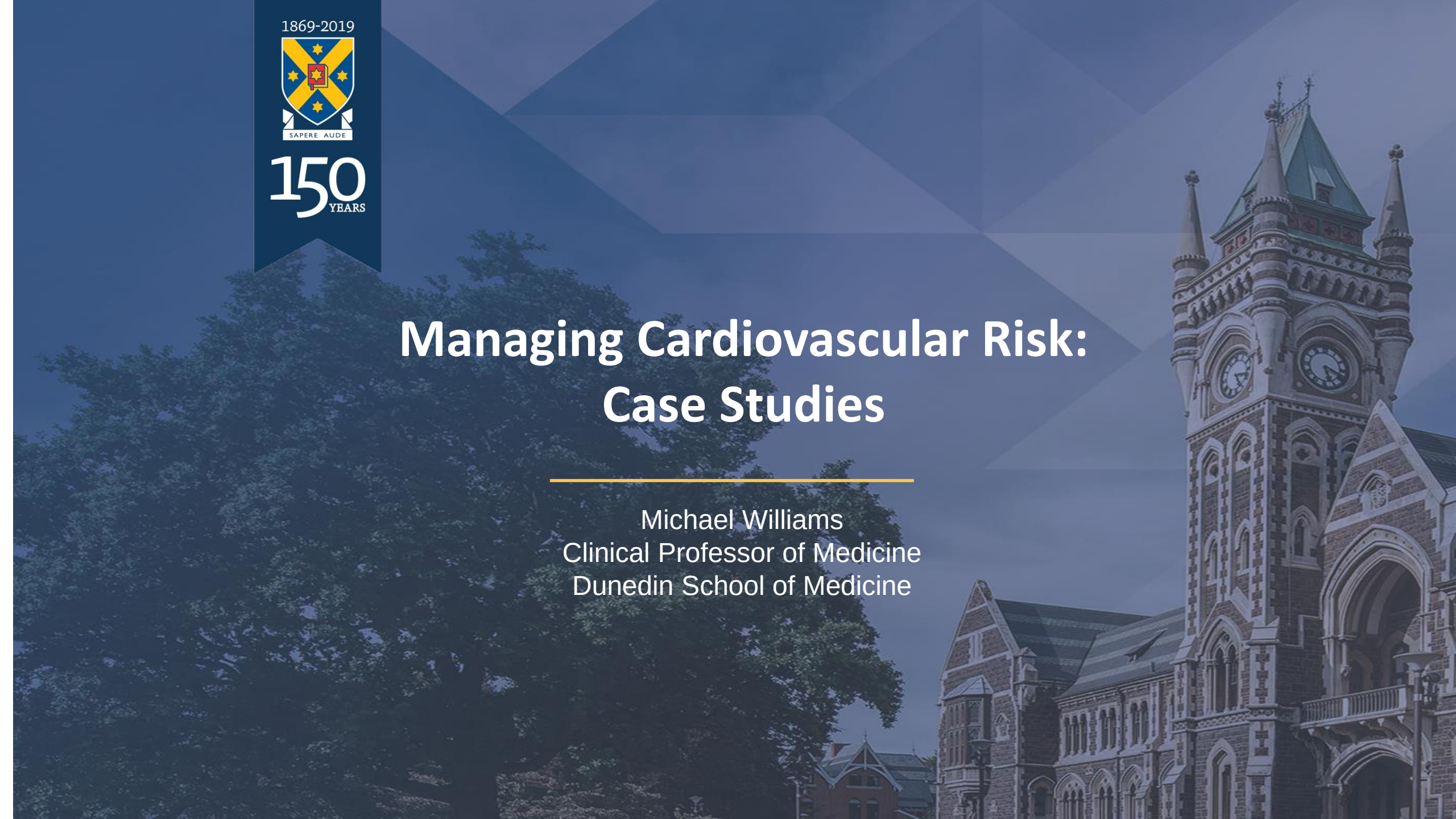
Saturday, August 10, 2019

(Room 10)

11:00 - 11:55 WS #92: Managing Cardiovascular Risk: Case Studies

12:05 - 13:00 WS #102: Managing Cardiovascular Risk: Case Studies (Repeated)



Managing Cardiovascular Risk: Case Studies

Michael Williams
Clinical Professor of Medicine
Dunedin School of Medicine

MINISTRY OF HEALTH
MANATŪ HAUORA

New Zealand Government

Cardiovascular Disease Risk Assessment and Management for Primary Care

Released 2018

health.govt.nz

https://www.health.govt.nz/publication/cardiovascular-disease-risk-assessment-and-management-primary-care

UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND

What's new in 2018 CVD risk assessment and management?

Risk assessment

- Cardiovascular disease (CVD) risk assessment and management for people aged 30 to 74 years without prior CVD is now based on new five-year CVD risk prediction equations from the New Zealand PREDICT study, to be known as the NZ Primary Prevention Equations. There are separate equations for people with and without diabetes.

- The risk equations include NZDep, CVD preventive medications, and a diagnosis of atrial fibrillation as new predictors.

The Absolute CVD Risk/Benefit Calculator

Framingham	QRISK®2-2014	ACC/AHA ASCVD	PREDICT
US Data, 10 Year Risk	UK Data, 10 Year Risk	US Data, 10 Year Risk	New Zealand Data, 5 Year Risk
Heart attacks + angina/coronary insufficiency + heart failure + strokes + intermittent claudication	Heart attacks + strokes	CHD death + nonfatal heart attacks + fatal/nonfatal strokes	Heart attacks + angina + heart failure + strokes/TIAs + peripheral vascular disease

http://chd.bestsciencemedicine.com/calc2.html

Age

64 years

Gender ✔ Male | Female

Ethnicity European

Smoker Non-smoker

Diabetes Yes | ✔ No

Systolic Blood Pressure

138 mmHg

Enter present blood pressure regardless of treatment

120 mmHg is used for baseline risk

On treatment for BP Yes | ✔ No

Click YES if taking blood pressure medication

On lipid-lowering treatment Yes | ✔ No

Click YES if taking lipid-lowering medication

On antithrombotic treatment Yes | ✔ No

Click YES if taking antiplatelet/anticoagulant medication

Total Cholesterol

5.3 mmol/L

Cholesterol should be prior to drug treatment

Relative Benefit: 0%

Benefit often has *nothing* to do with the effect on the surrogate marker. At present, you can only select one intervention at a time.

Physical Activity

Mediterranean Diet vs Low fat

Vitamin/Omega-3 supplements

HDL Cholesterol

1.3 mmol/L

HDL should be prior to drug treatment

1.3 mmol/L is used for baseline risk.

Family History of CVD Yes | ✔ No

Angina or heart attack in a 1st degree relative < 60 yrs

Chronic Kidney Disease Yes | ✔ No

CKD status is not part of the risk algorithm but is used for calculating the benefit of certain therapies

Atrial Fibrillation Yes | ✔ No

Deprivation Quintile

1 - No deprivation characteristics

This socioeconomic deprivation index can be determined by answering eight questions. For detailed information, see page two of the NZDep2013 brief flyer or visit the website.

Risk Time Period

5 years

91.8%	No event
8.2%	Total with an event
0.0%	Number who benefit from treatment
NNT ∞	Number needed to treat
4.9%	Baseline events using baseline factors alone
3.3%	Additional events "caused" by risk factors

As with all risk calculators, calculated risk numbers are +/-

The Absolute CVD Risk/Benefit Calculator

Framingham
US Data, 10 Year Risk
Heart attacks + angina/coronary insufficiency + heart failure + strokes + intermittent claudication

QRISK®2-2014
UK Data, 10 Year Risk
Heart attacks + strokes

ACC/AHA ASCVD
US Data, 10 Year Risk
CHD death + nonfatal heart attacks + fatal/nonfatal strokes

PREDICT
New Zealand Data, 5 Year Risk
Heart attacks + angina + heart failure + strokes/TIAs + peripheral vascular disease

http://chd.bestsciencemedicine.com/calc2.html

Age
64 years

Gender
✔ Male | Female

Ethnicity
European

Smoker
Non-smoker

Diabetes
Yes | ✔ No

Systolic Blood Pressure
138 mmHg
Enter present blood pressure regardless of treatment
120 mmHg is used for baseline risk

On treatment for BP
Yes | ✔ No
Click YES if taking blood pressure medication

On lipid-lowering treatment
Click YES if taking lipid-lowering medication
Yes | ✔ No

On antithrombotic treatment
Click YES if taking antiplatelet/anticoagulant medication
Yes | ✔ No

Total Cholesterol
5.3 mmol/L
Cholesterol should be prior to drug treatment
3 mmol/L is used for baseline risk.

Relative Benefit: 35%

Benefit often has *nothing* to do with the effect on the surrogate marker. At present, you can only select one intervention at a time.

- Physical Activity
- Mediterranean Diet vs Low fat
- Vitamin/Omega-3 supplements
- BP meds (not atenolol/doxazosin)
- Low-mod intensity statins
- **High intensity statins**

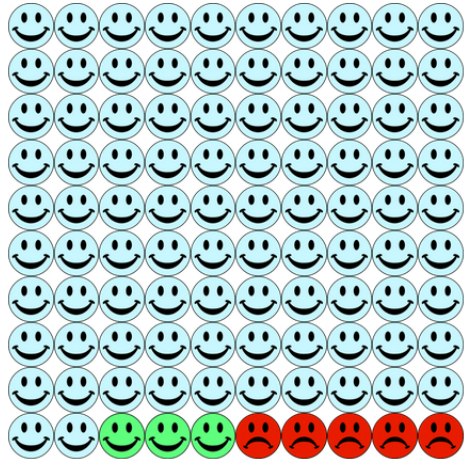
Harm Of Intervention

- Muscle aches and stiffness NNH 10-20 (similar to placebo in most studies)
- Increased liver function tests (3x normal) NNH 150
- Severe muscle/kidney damage NNH 10,000
- Nausea, constipation, diarrhea
- Drug Cost

Fibrates | Niacin | Ezetimibe
Metformin | Sulfonylureas | Insulins
Glitazones | GLPs | DPP-4s
Meglitinides | SGLT2
Smoking Cessation

Risk Time Period

5 years



	91.8%	**No event**
	5.3%	**Total with an event**
	2.9%	**Number who benefit from treatment**
NNT	**35**	**Number needed to treat**
	4.9%	**Baseline events using baseline factors alone**
	0.4%	**Additional events "caused" by risk factors**

As with all risk calculators, calculated risk numbers are +/- 5% at best. More information.

Risk assessment

- Family history of premature CVD is now defined as having a first-degree relative hospitalised or having died due to a heart attack or stroke before age 50 years.

- A history of heart failure is now included as part of a history of established CVD. Therefore these patients do not require risk assessment with the primary prevention equations.

- A measurement of serum creatinine (to calculate eGFR) is now recommended to identify people with chronic kidney disease. Patients with an eGFR less than 30 ml/min/m2 have a CVD risk equivalent to those with established CVD. Therefore these patients do not require risk assessment with the primary prevention equations.

- Begin CVD risk assessments in men aged 45 years and women aged 55 years.
- For Māori, Pacific and South Asian populations, and people with known significant CVD risk factors, risk assessment is now recommended to begin in men aged 30 years and in women aged 40 years, 15 years earlier than other population groups.

- For people with severe mental illness (schizophrenia, major depressive disorder, bipolar disorder, schizoaffective disorder), CVD risk assessment is recommended from age 25 years. Repeat assessments should follow every two years, unless the risk is 15 percent or more, when it should be repeated every year.

Risk assessment

- **Repeat CVD risk assessments** are recommended at the following intervals:

Five-year risk level	Repeat CVD risk assessment
< 3 percent	10 years
3–9 percent	5 years
10–14 percent	2 years
15+ percent	1 year, as part of annual management review

Risk assessment – diabetes

- CVD risk assessment and management is a recommended component of the annual diabetes review, in people with type 2 diabetes.
- The new risk prediction equations for people with type 2 diabetes include: duration of diabetes, BMI, eGFR, ACR, HbA_{1c} and hypoglycaemic medications; in addition to the risk factors in equations for people without diabetes.
- No specific risk equations are available for people with type 1 diabetes, although the same main disease variables (diabetes duration, renal disease, glycaemic control) apply as for type 2 diabetes. CVD risks for this group are substantially higher than for people with type 2 diabetes (50% higher in men and up to 90% higher in women).

Blood pressure management

- Out-of-office blood pressure (BP) measurement, assessed by ambulatory or home BP monitoring, is an important adjunct to office BP measurement and should be considered if 'white-coat' hypertension, resistant hypertension or drug-induced hypotension suspected.
- The ideal blood pressure for most individuals is likely to be below 120 mmHg systolic and 75 mmHg diastolic.
- For each 10 mmHg reduction in systolic blood pressure, RCTs demonstrate that patients will achieve an approximate 20 percent relative risk reduction in CVD events over five years.
- Reducing salt and alcohol intake, losing weight and increasing physical activity are effective ways to reduce BP and should be encouraged in all patients with office BP of 130 mmHg systolic or 80 mmHg diastolic or greater.
- For individuals with persistent office BP of 160 mmHg systolic (150 mmHg on ambulatory and home monitoring) and/or 100 mmHg diastolic (95 mmHg on ambulatory and home monitoring) or more, after lifestyle modifications, drug treatment is recommended regardless of predicted CVD risk.
- For individuals with a five-year CVD risk of 15 percent or more, with persistent office BP of 130 mmHg systolic and/or 80 mmHg diastolic or greater or an equivalent level from ambulatory or home blood pressure monitoring, drug treatment in addition to lifestyle changes, is strongly recommended.

History

48 year old woman with Hypertension. Normal exercise tolerance. Returns for 3rd assessment of blood pressure after 6 months lifestyle and dietary intervention

Past Medical History:

* Hysterectomy

Social History:

* No alcohol
* Non smoker

Family History:

* Mother died after stroke at 64yrs

Examination/Results:

* BP 150/95mmHg.
* ECG shows left ventricular hypertrophy

CV risk:

* 6% in 5 years

Recommended treatment for hypertension

A. Cilazapril

B. Metoprolol

C. Amlodipine

D. Chlorthalidone

E. Doxazosin

Discussion

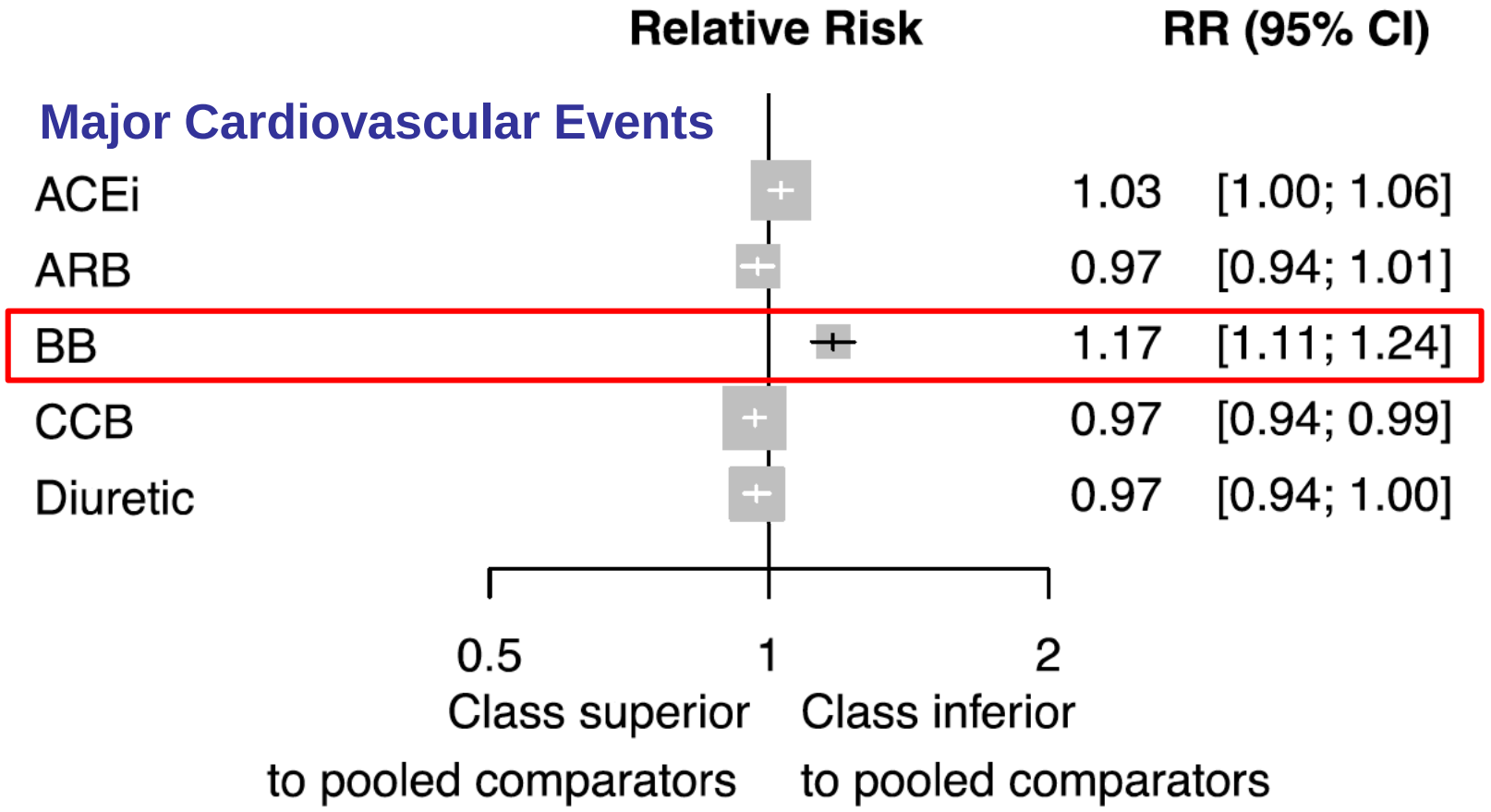
A is an appropriate therapeutic measure

In hypertensive patients younger than 55, the first choice for initial therapy could be an angiotensin-converting enzyme (ACE) inhibitor (or an angiotensin-II receptor antagonist if an ACE inhibitor is not tolerated). (NICE guidelines)

This recommendation is based on superior BP reduction in this age group compared to Ca antagonists and thiazide diuretics. No endpoint data available to suggest superior outcome.

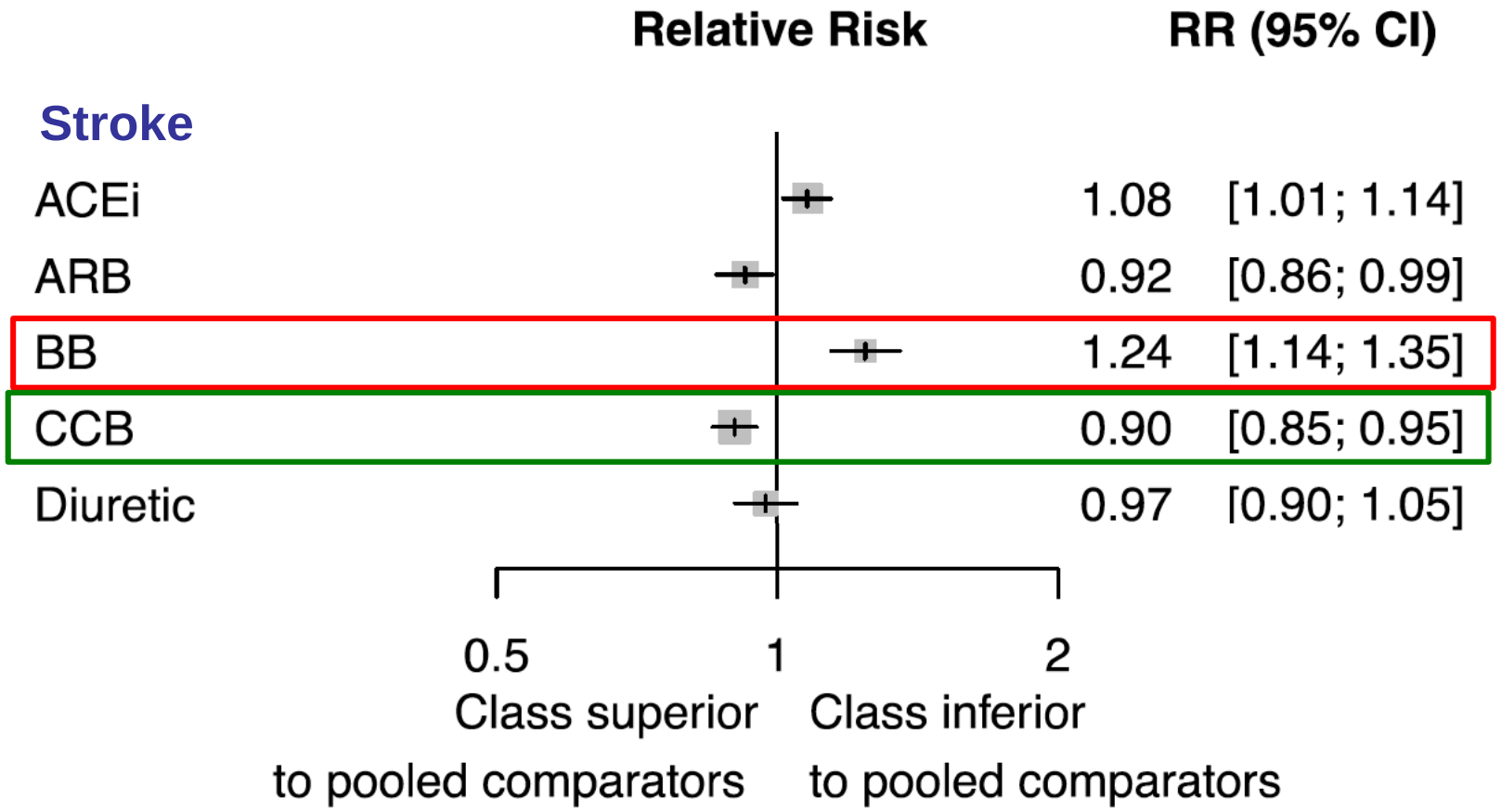
B Betablockers are not regarded as first line therapy for hypertension. They may be considered for particular indications in younger patients, eg. pregnancy

Hypertension: effects of drug classes



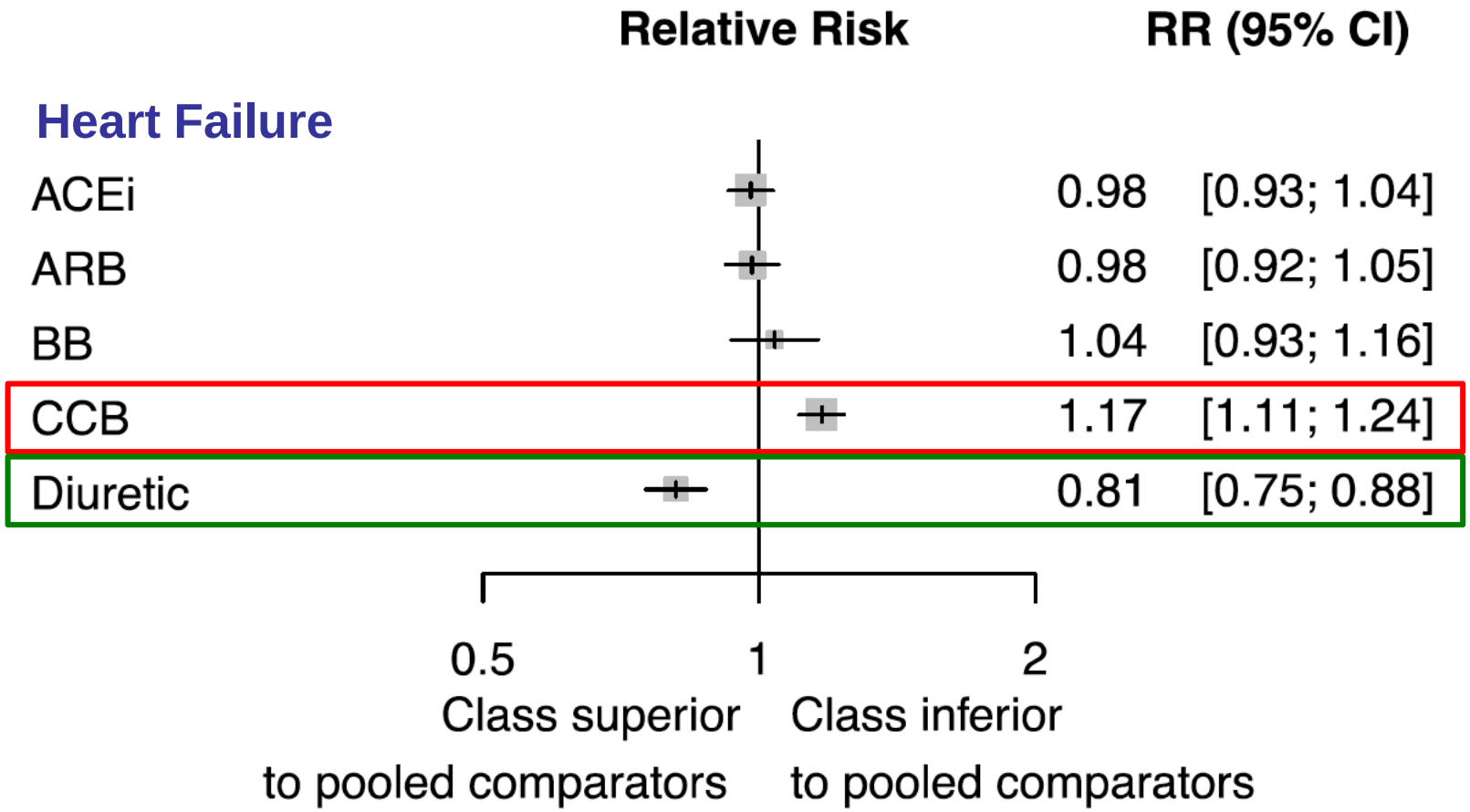
Lancet 2016;387:957-967

Hypertension: effects of drug classes



Lancet 2016;387:957-967

Hypertension: effects of drug classes



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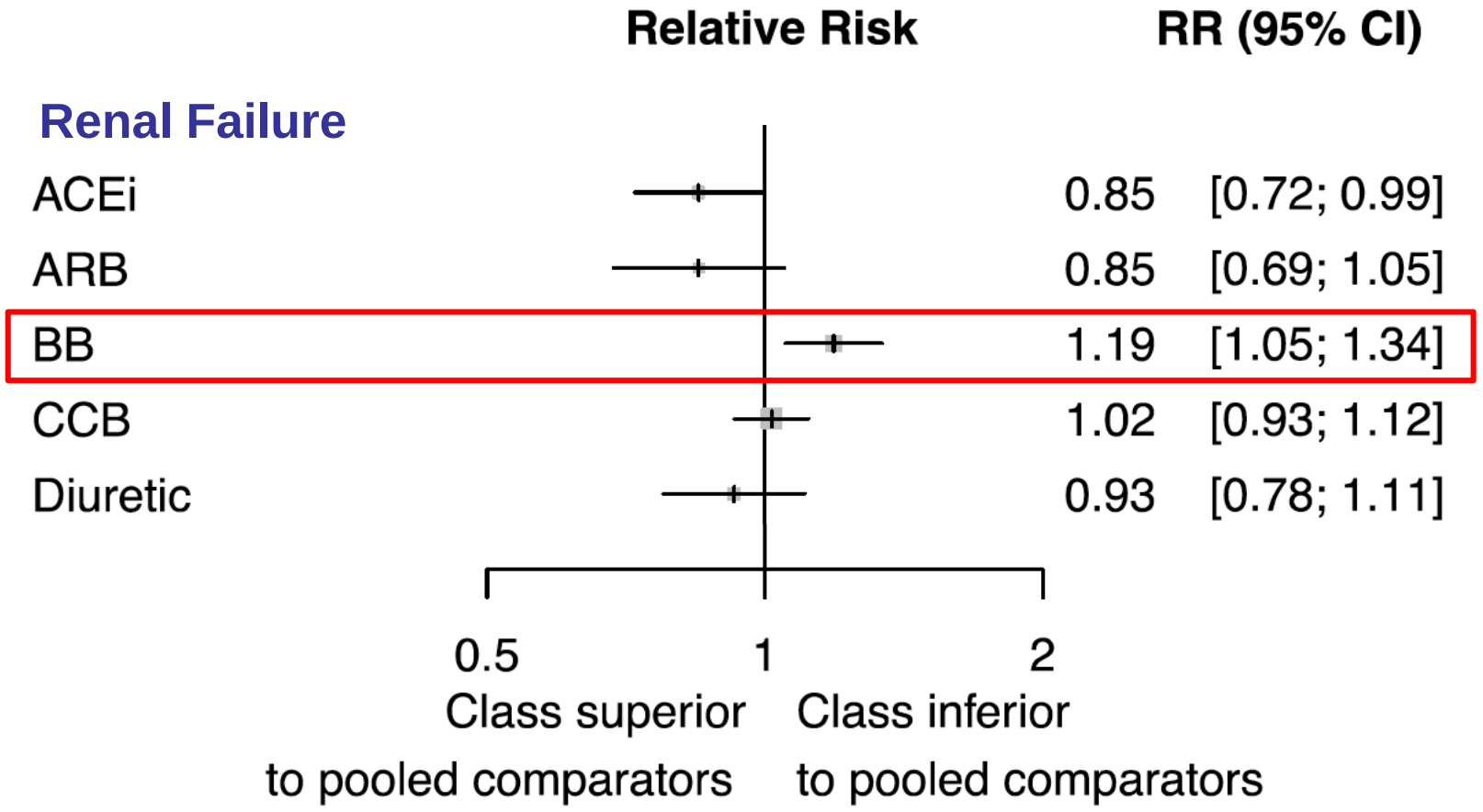
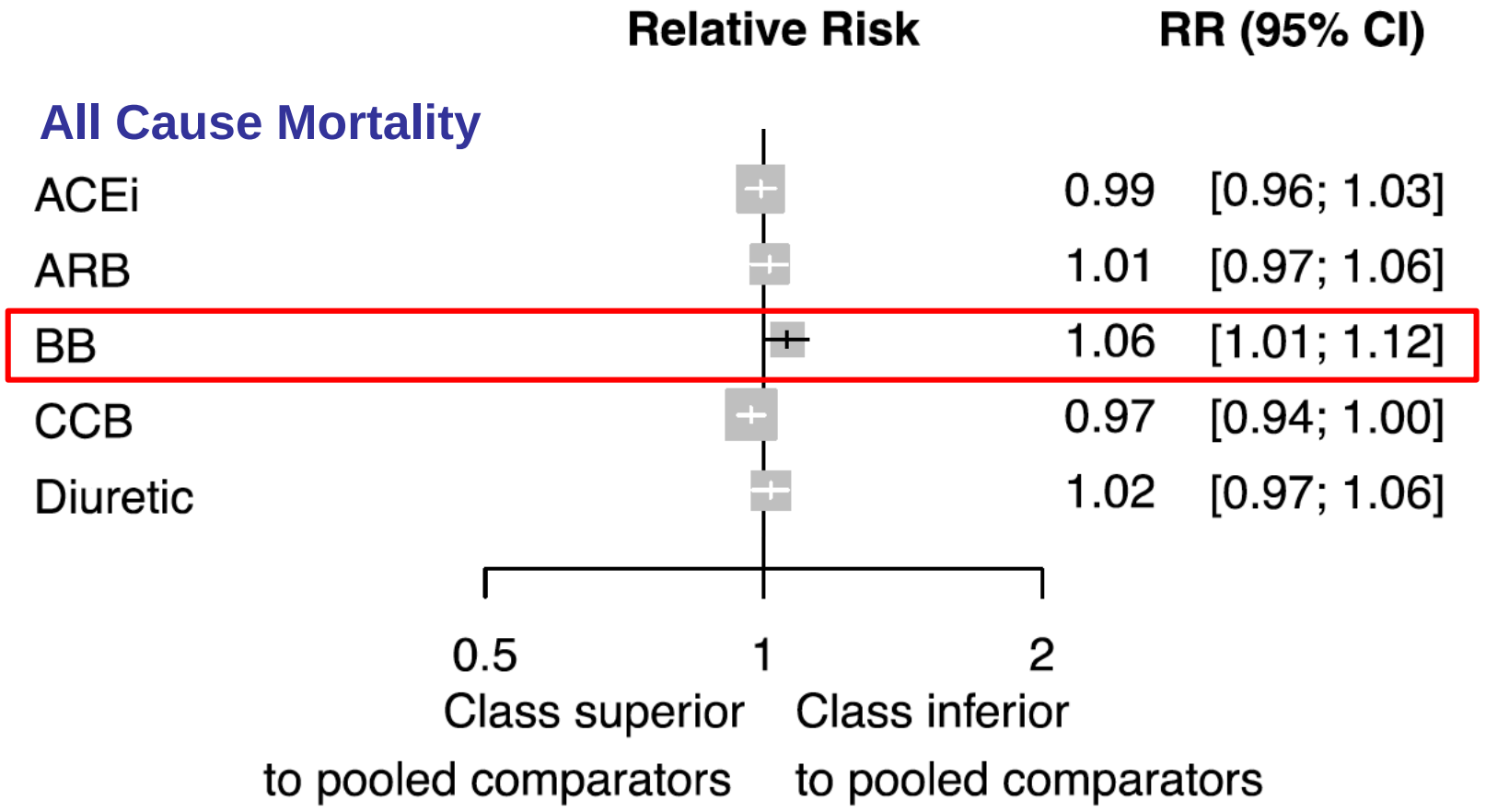
Hypertension: effects of drug classes



Lancet 2016;387:957-967

Hypertension: effects of drug classes



Lancet 2016;387:957-967

Summary: β blockers vs other antihypertensive drugs

Lancet 2016;387:957-967

- Relative risk of major cardiovascular events 1.17 higher for β-blockers (95% CI, 1.11 – 1.24) compared to others
- Relative risk of stroke 1.24 higher for β-blockers (95% CI, 1.14 – 1.35) compared to others
- Relative risk of renal failure 1.19 higher for β-blockers (95% CI, 1.05 – 1.34) compared to others
- No difference for coronary heart disease rate
- No difference for all cause mortality rate, trend to inferior efficacy, relative risk 1.06 (95% CI, 1.01 – 1.12)
- **β blockers should not be used as first line therapy in uncomplicated Hypertension**

Summary: calcium channel blockers vs other antihypertensive drugs

Lancet 2016;387:957-967

- Superior for stroke, relative risk of stroke 0.90 (95% CI, 0.85 – 0.95) compared to others
- Inferior for heart failure prevention, relative risk of heart failure 1.17 (95% CI, 1.11 – 1.24) compared to others
- No difference for major cardiovascular events, coronary heart disease rates and renal failure compared to others
- No difference for all cause mortality

Summary: diuretics vs other antihypertensive drugs

Lancet 2016;387:957-967

- Superior for heart failure prevention, relative risk of heart failure 0.81 (95% CI, 0.75 – 0.88) compared to others
- No difference for major cardiovascular events, coronary heart disease rates, stroke and renal failure compared to others
- No difference for all cause mortality compared to others
- Chlorthalidone (Hygroton) 12.5 – 25 mg daily or Indapamide (DAPA-TABS) 1.25 – 2.5 mg daily preferred to Bendroflumethiazide (Bendrofluazide) or Hydrochlorothiazide

Discussion

C and D Calcium antagonists and thiazide/thiazide like diuretics are the most likely drugs to confer benefit as first-line treatment for most patients aged 55 or older. (NICE guidelines)

E Alpha blockers are generally regarded as fourth line drugs for uncomplicated hypertension. They have an increased risk of heart failure compared to thiazide/thiazide like diuretics in the elderly

Progress

3 month follow up review, on Cilazapril 5mg daily.

Home blood pressure monitor records average of 135/85mmHg. Recommendation to patient

A. Continue Cilazapril 5mg daily and review

B. Increase Cilazapril to 7.5mg daily

C. Add Amlodipine 2.5 mg daily

D. Add Chlorthalidone 12.5mg daily

E. Change to Cilazapril 5mg/Hydrochlorothiazide 12.5mg

Guidance for home blood pressure measurement

- Use a validated device calibrated with office BP assessment.
- Take morning measurements before breakfast, before morning medications and after five minutes in a sitting position.
- Take evening measurements before going to bed, after medication and after five minutes in a sitting position.
- For each measurement, take two consecutive measures, one minute apart.
- Record all values with notes to explain obvious variations (eg, drinking coffee before measurement).
- Use the average of all readings (Table).

Measurement method			
Clinic BP	130/80	140/90	160/100 mmHg
Ambulatory or 24-hour BP (daytime average)	125/75	135/85	150/95 mmHg
Home BP	125/75	135/85	150/95mm Hg

Blood pressure management

- For individuals with five-year CVD risk between 5 and 15 percent with persistent office BP of 140 mmHg systolic and/or 90 mmHg diastolic or greater, or an equivalent level from ambulatory or home BP monitoring, the benefits and harms of BP-lowering drugs should be presented and discussed to allow an individualised informed decision about whether to start treatment.

- If drug treatment is commenced, a target office BP less than 130 mmHg systolic and less than 80 mmHg diastolic is recommended.

- Caution is recommended in lowering BP in older people who may be at particular risk of treatment-related harms.

- Angiotensin converting enzyme (ACE) inhibitors or angiotensin II receptor blockers (ARBs), calcium channel blockers and thiazide diuretics are all suitable first-line drugs, either as monotherapy or in some combinations unless contraindicated.

- Once target BP is reached, an annual review is recommended. For stable individuals, home BP monitoring and electronic communication with the physician may provide an acceptable alternative to office monitoring.

History

* 82 year old man with asymptomatic hypertension.
  Presents for review of painful knee.

Past Medical History and Medications:

* Cholecystectomy years ago.
* Prostatic symptoms with urinary frequency
* No medications. Philosophically opposed to “pills”

Social History:

Lives alone, independent. Does his own garden and lawns.

Examination:

* BP 168/84 mmHg on repeated measurements. Last year BP 172/86mmHg. ECG normal and no evidence of LVH.

Recommended treatment for hypertension

A. Cilazapril

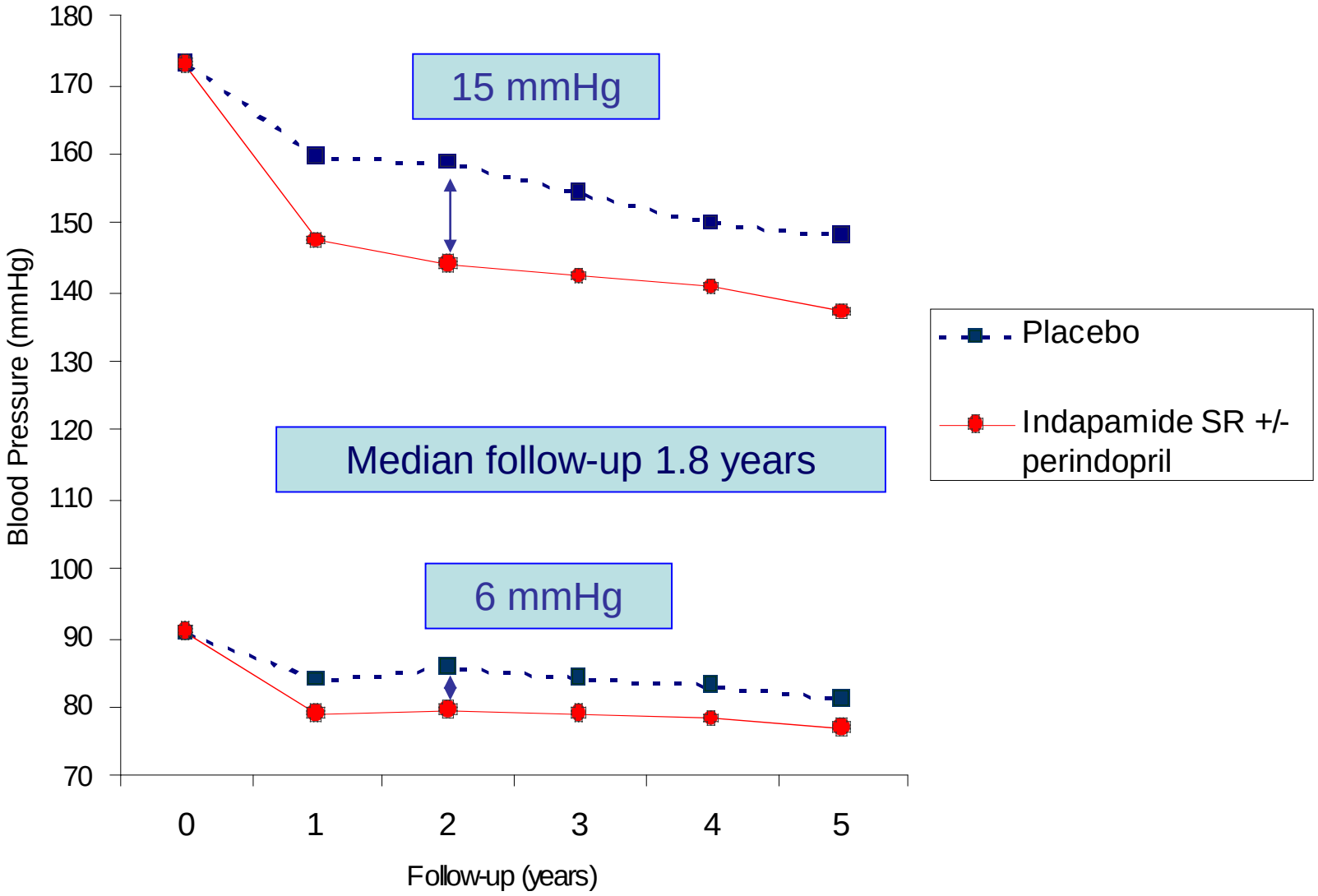
B. Chlorthalidone

C. Bendrofluazide

D. Amlodipine

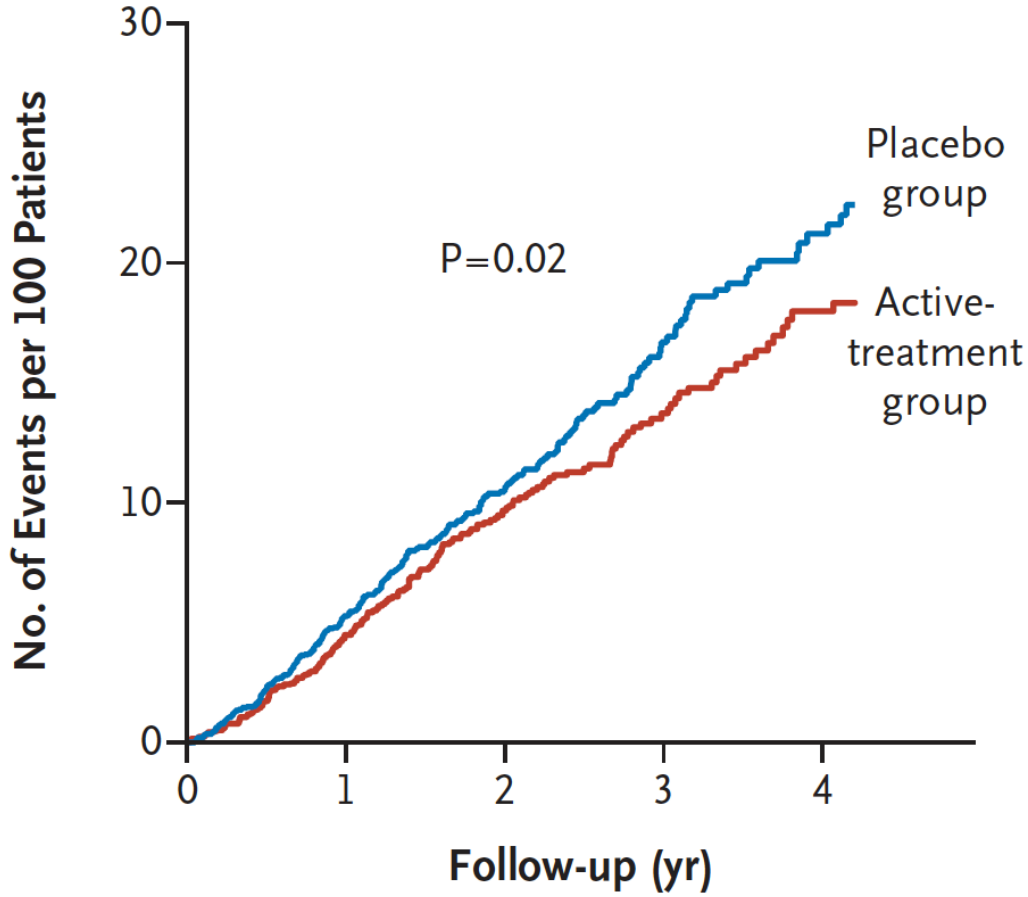
E. Doxazosin

Blood pressure separation



NEJM 2008:358:1887-98

Total Mortality (21% reduction)



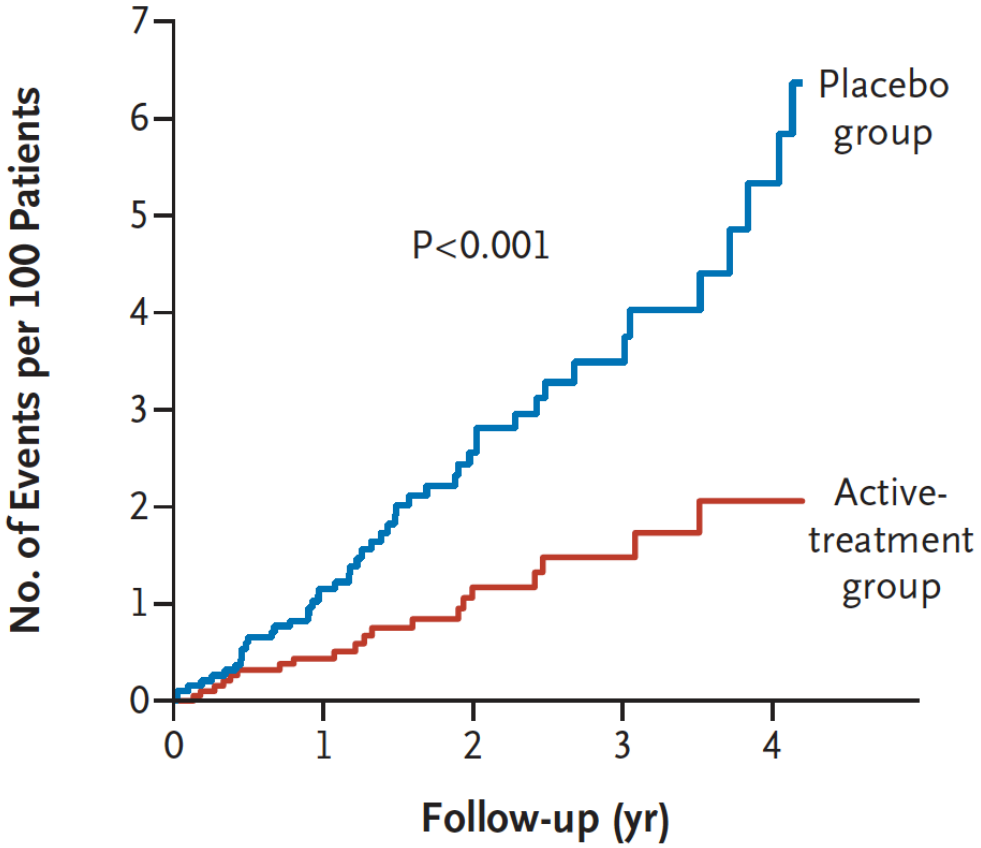
No. at Risk

Placebo group	1912	1492	814	379	202
Active-treatment group	1933	1565	877	420	231

NEJM 2008:358:1887-98

NNT = 40/2yrs, 16/5yrs

Chronic heart failure (64% reduction)



No. at Risk

Placebo group	1912	1480	794	367	188
Active-treatment group	1933	1559	872	416	228

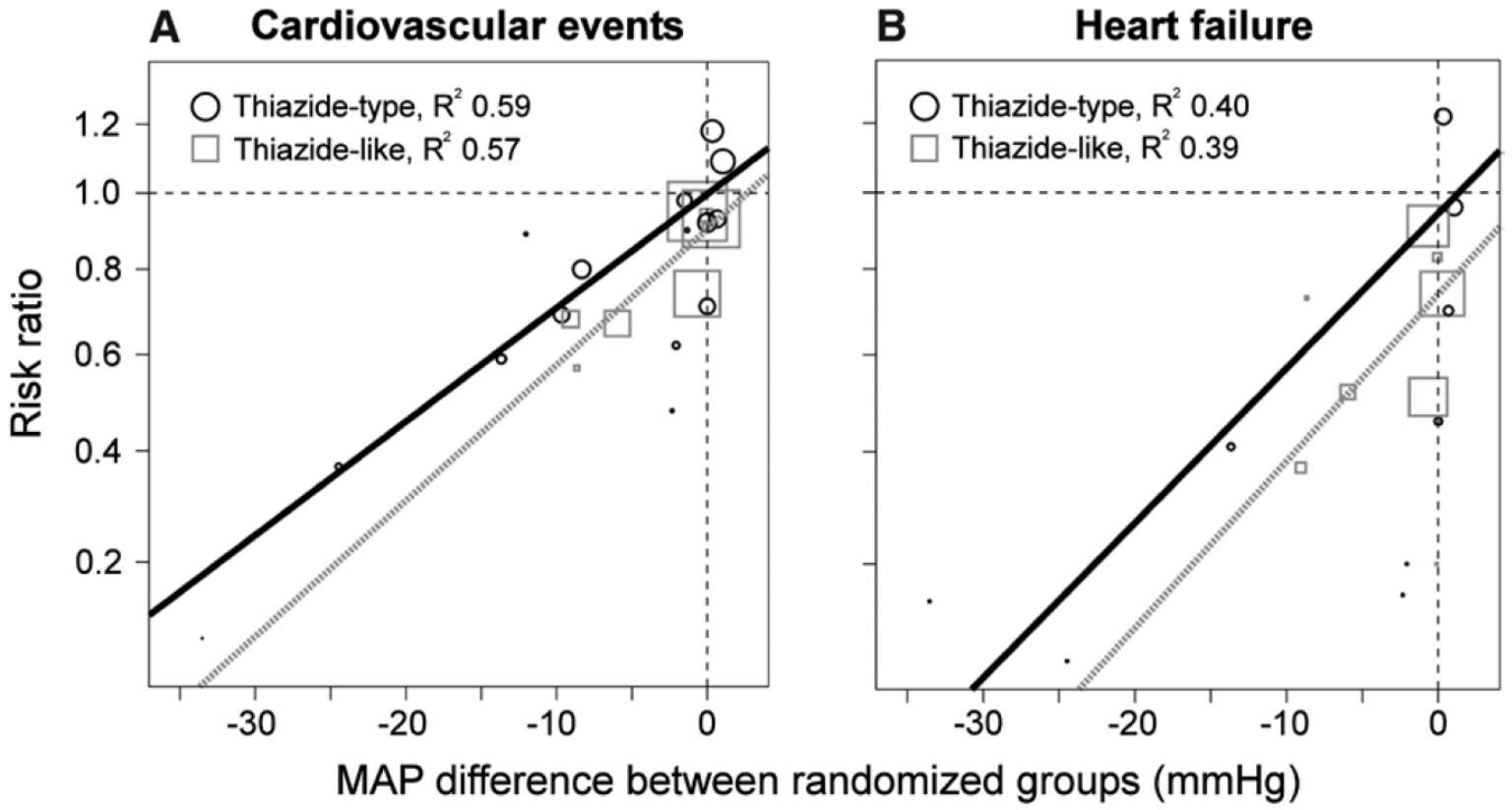
NEJM 2008:358:1887-98

NNT = 53/2yrs, 21/5yrs

Key points in Hypertension

- Persons > 50yrs, systolic blood pressure >140mmHg is a more important CV risk factor than diastolic BP
- Thiazide/thiazide like diuretics or calcium antagonists should be used for most patients > 55yrs with uncomplicated hypertension. (NICE guidelines)
- Certain high-risk conditions are compelling indications for ACE, ARB, β blockers or calcium channel blockers
- Most patients will require two or more anti-hypertensive agents to achieve target BP

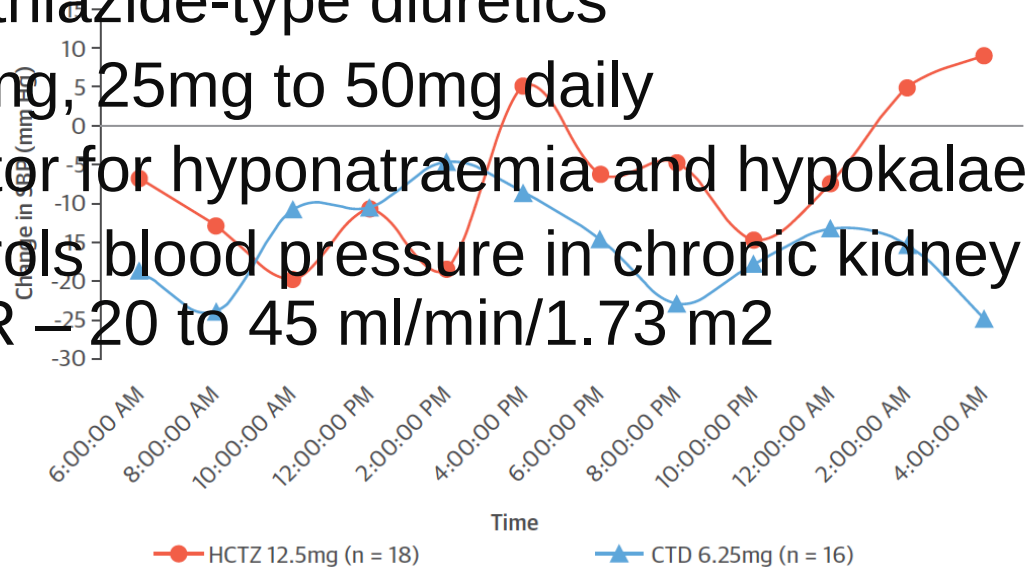
Thiazide-like – Chorthalidone, Indapamide
v
Thiazide-type – Bendroflumethiazide, Chlorothiazide, Hydrochlorothiazide



Hypertension 2015;65:1033-1040

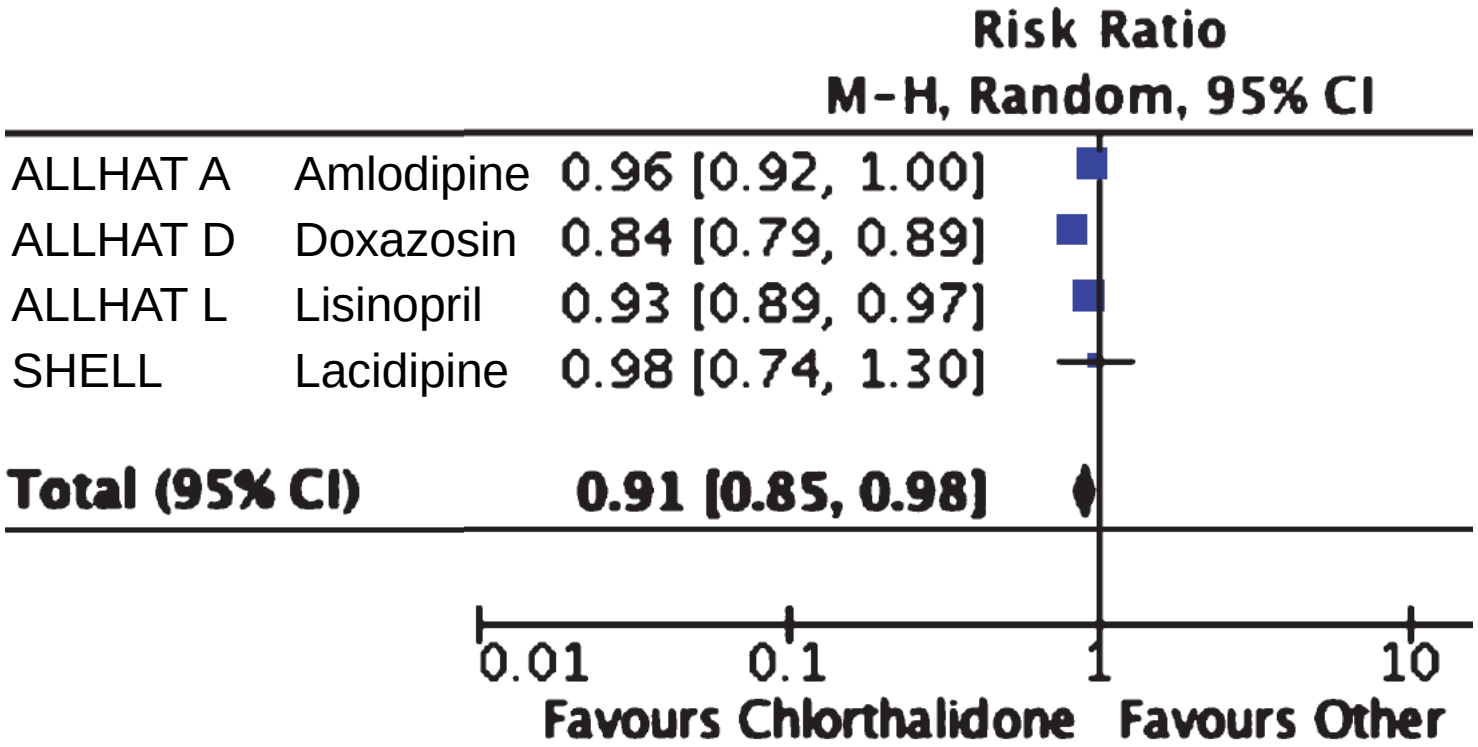
Chlorthalidone therapy

- Long half life, average of about 50 hours
- Lowers night time blood pressure and 24 hour ambulatory blood pressure more effectively than short acting thiazide diuretics (masked hypertension).
- Reduces cardiovascular events and heart failure more than thiazide-type diuretics
- 12.5mg, 25mg to 50mg daily
- Monitor for hyponatraemia and hypokalaemia
- Controls blood pressure in chronic kidney disease, eGFR – 20 to 45 ml/min/1.73 m2



Chlorthalidone vs other antihypertensives

Cardiovascular disease outcomes



J Prim Health Care 2017;9(2):105–113

Diabetes with multiple risk factors

* 62 year old man with recent diagnosis of Type II diabetes. No symptoms of ischaemic heart disease.

Past Medical History:

* Cholecystectomy

Social History:

* He drinks two stubbies of beer/day
* Smokes 10 cigarettes/day

Examination:

* BMI is 30 kg/M^2. BP 140/88 mmHg on several office visits

Results:

Total cholesterol	6.1 mmol/l
LDL cholesterol	3.2 mmol/l
HDL cholesterol	1.5 mmol/l
Triglycerides	5.0 mmol/l

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QRISK®2-2014
UK Data, 10 Year Risk
Heart attacks + strokes

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PREDICT
New Zealand Data, 5 Year Risk
Heart attacks + angina + heart failure + strokes/TIAs + peripheral vascular disease

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Age
62 years

Gender
✔ Male | Female

Ethnicity
European

Smoker
Current smoker

Diabetes
✔ Yes | No

Systolic Blood Pressure
140 mmHg
Enter present blood pressure regardless of treatment
120 mmHg is used for baseline risk

On treatment for BP
Yes | ✔ No
Click YES if taking blood pressure medication

On lipid-lowering treatment
Click YES if taking lipid-lowering medication
Yes | ✔ No

On antithrombotic treatment
Click YES if taking antiplatelet/anticoagulant medication
Yes | ✔ No

Total Cholesterol
6.1 mmol/L
Cholesterol should be prior to drug treatment
3 mmol/L is used for baseline risk.

Relative Benefit: 0%

Benefit often has *nothing* to do with the effect on the surrogate marker. At present, you can only select one intervention at a time.

- Physical Activity
- Mediterranean Diet vs Low fat
- Vitamin/Omega-3 supplements
- BP meds (not atenolol/doxazosin)
- Low-mod intensity statins
- High intensity statins
- Fibrates
- Niacin
- Ezetimibe
- Metformin
- Sulfonylureas
- Insulins
- Glitazones
- GLPs
- DPP-4s
- Meglitinides
- SGLT2
- Smoking Cessation
- ASA

Benefit Estimate Details

Risk Time Period

5 years

88.0%	No event
12.0%	Total with an event
0.0%	Number who benefit from treatment
NNT ∞	Number needed to treat
3.6%	Baseline events using baseline factors alone
8.4%	Additional events “caused” by risk factors

As with all risk calculators, calculated risk numbers are +/- 5% at best. More information.

Appropriate treatment may include:

A. Aspirin.

B. Quinapril.

C. Atorvastatin.

D. Bezafibrate.

E. Metoprolol.

Commentary

A - Aspirin

Aspirin therapy (75 to 150 mg/d) has been recommended as a primary prevention strategy in those with diabetes at increased cardiovascular risk, There is no randomised evidence to support this. The recent ASCEND primary prevention trial in diabetes showed less serious vascular events (8.5% vs. 9.6%; rate ratio, 0.88; 95% CI, 0.79 to 0.97; P=0.01) balanced by increased serious bleeding (4.1% vs. 3.2%; RR 1.29; 95% CI, 1.09 to 1.52; P=0.003).

Therefore no net benefit for Aspirin in primary prevention in diabetes.

N Engl J Med 2018; 379:1529-1539

B - Quinapril, preferred over E - Metoprolol

All patients with diabetes and hypertension should be treated with a regimen that includes either an ACE inhibitor or an ARB. If one class is not tolerated, the other should besubstituted. Other drug classes demonstrated to reduce CVD events in patients with diabetes (β-blockers, thiazide diuretics, and calcium channel blockers) should be added as needed to achieve blood pressure targets.

The Absolute CVD Risk/Benefit Calculator

Framingham
US Data, 10 Year Risk
Heart attacks + angina/coronary insufficiency + heart failure + strokes + intermittent claudication

QRISK®2-2014
UK Data, 10 Year Risk
Heart attacks + strokes

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PREDICT
New Zealand Data, 5 Year Risk
Heart attacks + angina + heart failure + strokes/TIAs + peripheral vascular disease

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Age
62 years

Gender
✔ Male | Female

Ethnicity
European

Smoker
Current smoker

Diabetes
✔ Yes | No

Systolic Blood Pressure
140 mmHg
Enter present blood pressure regardless of treatment
120 mmHg is used for baseline risk

On treatment for BP
Yes | ✔ No
Click YES if taking blood pressure medication

On lipid-lowering treatment
Click YES if taking lipid-lowering medication
Yes | ✔ No

On antithrombotic treatment
Click YES if taking antiplatelet/anticoagulant medication
Yes | ✔ No

Total Cholesterol
6.1 mmol/L
Cholesterol should be prior to drug treatment
3 mmol/L is used for baseline risk.

Relative Benefit: 50%

Benefit often has *nothing* to do with the effect on the surrogate marker. At present, you can only select one intervention at a time.

- Physical Activity
- Mediterranean Diet vs Low fat
- Vitamin/Omega-3 supplements
- **BP meds (not atenolol/doxazosin)**

Harm Of Intervention

- Types of side effects vary between drugs
- Having to stop drug due to intolerability NNH 10
- Inconvenience of surrogate remeasurements
- Drug Cost

- Low-mod intensity statins
- High intensity statins
- Fibrates
- Niacin
- Ezetimibe
- Metformin
- Sulfonylureas
- Insulins
- Glitazones
- GLPs
- DPP-4s
- Meglitinides
- SGLT2
- Smoking Cessation
- ASA

Benefit Estimate Details

Risk Time Period

5 years

	88.0%	**No event**
	6.0%	**Total with an event**
	6.0%	**Number who benefit from treatment**
NNT	**17**	**Number needed to treat**
	3.6%	**Baseline events using baseline factors alone**
	2.4%	**Additional events "caused" by risk factors**

As with all risk calculators, calculated risk numbers are +/- 5% at best. More information.

C. Statin

Collaborative Atorvastatin Diabetes Study (CARDS):

Primary prevention of cardiovascular disease with atorvastatin in type 2 diabetes
Primary end point by treatment at 3.9 yrs F-up in 2,838 patients

End point	Placebo	Atorvastatin 10mg	Risk reduction (%)(95% CI)
Primary end point, n (%)	127 (9.0)	83 (5.8)	37 (17-52)*
Acute coronary events, n (%)	77 (5.5)	51 (3.6)	36 (9-55)*
Coronary revascularization, n (%)	34 (2.4)	24 (1.7)	31 (-16-59)
Stroke, n (%)	39 (2.8)	21 (1.5)	48 (11-69)*

***p=0.001**

Calhoun HM et al. *Lancet* 2004; 364: 685-696.

The Absolute CVD Risk/Benefit Calculator

Framingham
US Data, 10 Year Risk
Heart attacks + angina/coronary insufficiency + heart failure + strokes + intermittent claudication

QRISK®2-2014
UK Data, 10 Year Risk
Heart attacks + strokes

ACC/AHA ASCVD
US Data, 10 Year Risk
CHD death + nonfatal heart attacks + fatal/nonfatal strokes

PREDICT
New Zealand Data, 5 Year Risk
Heart attacks + angina + heart failure + strokes/TIAs + peripheral vascular disease

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Age
62 years

Gender
✔ Male | Female

Ethnicity
European

Smoker
Current smoker

Diabetes
✔ Yes | No

Systolic Blood Pressure
140 mmHg
Enter present blood pressure regardless of treatment
120 mmHg is used for baseline risk

On treatment for BP
Yes | ✔ No
Click YES if taking blood pressure medication

On lipid-lowering treatment
Yes | ✔ No
Click YES if taking lipid-lowering medication

On antithrombotic treatment
Yes | ✔ No
Click YES if taking antiplatelet/anticoagulant medication

Total Cholesterol
6.1 mmol/L
Cholesterol should be prior to drug treatment
3 mmol/L is used for baseline risk.

Relative Benefit: 35%

Benefit often has *nothing* to do with the effect on the surrogate marker. At present, you can only select one intervention at a time.

- Physical Activity
- Mediterranean Diet vs Low fat
- Vitamin/Omega-3 supplements
- BP meds (not atenolol/doxazosin)
- Low-mod intensity statins
- **High intensity statins**

Harm Of Intervention

- Muscle aches and stiffness NNH 10-20 (similar to placebo in most studies)
- Increased liver function tests (3x normal) NNH 150
- Severe muscle/kidney damage NNH 10,000
- Nausea, constipation, diarrhea
- Drug Cost

Fibrates | Niacin | Ezetimibe
Metformin | Sulfonylureas | Insulins
Glitazones | GLPs | DPP-4s
Meglitinides | SGLT2
Smoking Cessation

Risk Time Period

5 years

88.0%	No event
7.8%	Total with an event
4.2%	Number who benefit from treatment
NNT 24	Number needed to treat
3.6%	Baseline events using baseline factors alone
4.2%	Additional events “caused” by risk factors

As with all risk calculators, calculated risk numbers are +/- 5% at best. More information.

Treating hypertriglyceridaemia in diabetes

- The Fenofibrate Intervention and Event Lowering in Diabetes (FIELD) trial randomized 9,795 people with type 2 diabetes with average total cholesterol levels (3.0-6.6 mmol/l) and an elevated total-to-HDL cholesterol ratio (>4) or triglycerides (1.0-5.0mmol/l) to fenofibrate or placebo. In the overall population, fenofibrate treatment did not reduce the primary end point of first MI or CHD death over 5yrs.

- Combination therapy of LDL-lowering drugs (eg, statins) and fibrates or niacin may be necessary to achieve lipid targets, but this has not been evaluated in outcomes studies for either CVD event reduction or safety.

Diabetes management

- Healthy lifestyle measures (smoking cessation, healthy diet, regular physical activity, optimal weight) should be strongly encouraged for people with diabetes.

- All people with diabetes, especially the newly diagnosed, should be offered training in self-management.

- Optimise glycaemic control to an appropriate level in consultation with the individual patient. The target range agreed will generally be more stringent in younger and fitter patients (eg, 50–55 mmol/mol or lower) than older, co-morbid or frail patients and those prone to hypoglycaemia (eg, 55–64 mmol/mol or higher).

- Remember the risk of hypoglycaemia from sulphonylureas and insulin (including combination therapy), especially in older people.

The Absolute CVD Risk/Benefit Calculator

Framingham
US Data, 10 Year Risk
Heart attacks + angina/coronary insufficiency + heart failure + strokes + intermittent claudication

QRISK®2-2014
UK Data, 10 Year Risk
Heart attacks + strokes

ACC/AHA ASCVD
US Data, 10 Year Risk
CHD death + nonfatal heart attacks + fatal/nonfatal strokes

PREDICT
New Zealand Data, 5 Year Risk
Heart attacks + angina + heart failure + strokes/TIAs + peripheral vascular disease

---

Age
62 years

Gender
✔ Male | Female

Ethnicity
European

Smoker
Current smoker

Diabetes
✔ Yes | No

Systolic Blood Pressure
140 mmHg
Enter present blood pressure regardless of treatment
120 mmHg is used for baseline risk

On treatment for BP
Yes | ✔ No
Click YES if taking blood pressure medication

On lipid-lowering treatment
Yes | ✔ No
Click YES if taking lipid-lowering medication

On antithrombotic treatment
Yes | ✔ No
Click YES if taking antiplatelet/anticoagulant medication

Total Cholesterol
6.1 mmol/L
Cholesterol should be prior to drug treatment
3 mmol/L is used for baseline risk.

Relative Benefit: 35%

Benefit often has *nothing* to do with the effect on the surrogate marker. At present, you can only select one intervention at a time.

- Physical Activity
- Mediterranean Diet vs Low fat
- Vitamin/Omega-3 supplements
- BP meds (not atenolol/doxazosin)
- Low-mod intensity statins
- High intensity statins
- Fibrates
- Niacin
- Ezetimibe
- **Metformin**

Harm Of Intervention

- Indigestion, nausea, diarrhea
- Lactic acidosis - inconclusive evidence
- Inconvenience of surrogate remeasurements
- Drug Cost

- Sulfonylureas
- Insulins
- Glitazones
- GLPs
- DPP-4s
- Meglitinides
- SGLT2
- Smoking Cessation
- ASA

Benefit Estimate Details

Risk Time Period

5 years

88.0%	No event
7.8%	Total with an event
4.2%	Number who benefit from treatment
NNT 24	Number needed to treat
3.6%	Baseline events using baseline factors alone
4.2%	Additional events “caused” by risk factors

As with all risk calculators, calculated risk numbers are +/- 5% at best. More information.

History

58 year old male lawyer seeks advice about cardiovascular risk management.

Past Medical History:

* Left rotator cuff repair

Social History:

* One 330ml beer/day, attends gymn 5/week
* Non smoker

Family History:

* Father suffered myocardial infarction age 48 years.

Examination/Results:

* BP 132/82mmHg, normal

Lipids:

* Total cholesterol	5.4 mmol/l
LDL cholesterol	3.5 mmol/l
HDL cholesterol	1.1 mmol/l
Triglycerides	1.8 mmol/l

The Absolute CVD Risk/Benefit Calculator

Framingham
US Data, 10 Year Risk
Heart attacks + angina/coronary insufficiency + heart failure + strokes + intermittent claudication

QRISK®2-2014
UK Data, 10 Year Risk
Heart attacks + strokes

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US Data, 10 Year Risk
CHD death + nonfatal heart attacks + fatal/nonfatal strokes

PREDICT
New Zealand Data, 5 Year Risk
Heart attacks + angina + heart failure + strokes/TIAs + peripheral vascular disease

---

Age
58 years

Gender
✔ Male | Female

Ethnicity
European

Smoker
Non-smoker

Diabetes
Yes | ✔ No

Systolic Blood Pressure
132 mmHg
Enter present blood pressure regardless of treatment
120 mmHg is used for baseline risk

On treatment for BP
Yes | ✔ No
Click YES if taking blood pressure medication

On lipid-lowering treatment
Click YES if taking lipid-lowering medication
Yes | ✔ No

On antithrombotic treatment
Click YES if taking antiplatelet/anticoagulant medication
Yes | ✔ No

Total Cholesterol
5.4 mmol/L
Cholesterol should be prior to drug treatment
3 mmol/L is used for baseline risk.

Relative Benefit: 0%

Benefit often has *nothing* to do with the effect on the surrogate marker. At present, you can only select one intervention at a time.

- Physical Activity
- Mediterranean Diet vs Low fat
- Vitamin/Omega-3 supplements
- BP meds (not atenolol/doxazosin)
- Low-mod intensity statins
- High intensity statins
- Fibrates
- Niacin
- Ezetimibe
- Metformin
- Sulfonylureas
- Insulins
- Glitazones
- GLPs
- DPP-4s
- Meglitinides
- SGLT2
- Smoking Cessation
- ASA

Benefit Estimate Details

Risk Time Period

5 years

95.9%	No event
4.1%	Total with an event
0.0%	Number who benefit from treatment
NNT ∞	Number needed to treat
3.5%	Baseline events using baseline factors alone
0.6%	Additional events “caused” by risk factors

As with all risk calculators, calculated risk numbers are +/- 5% at best. More information.

You recommend:

A. Substituting dietary saturated fats with mono and polyunsaturated fats

B. Substitute red wine for beer

C. Atorvastatin, target LDL 2.1 mmol/l

D. Increasing intake of fruit and vegetables

E. Further investigations

Discussion

A is an appropriate dietary intervention which reduces CHD events by up to 21% (Nutr Metab Cardiovasc Dis 2017;27:1060e1080)

B No evidence to suggest red wine better than beer

C Atorvastatin reducing LDL by 40% will reduce the absolute risk of an event from 4.1% to 2.7%, an absolute reduction of 1.4% over 5 years

D Fruit and vegetable intake is associated with reduced total mortality. Variable findings on the effect on CV mortality

Discussion

E Coronary artery calcium score performed with calcium score of 524. This score is at the 94th centile for a man of this age.

Estimated 5 year risk increases from 4% to 9%. Atorvastatin reducing LDL to 2.1 mmol/l reduces risk from 9% to 5.8%, an absolute reduction of 3.2%

https://www.mesa-nhlbi.org/MESACHDRisk/MesaRiskScore/RiskScore.aspx

Risk management

- Encourage a healthy lifestyle (smoking cessation, healthy diet, regular physical activity, optimal weight) in everyone.
- Assessing five-year CVD risk is pivotal to guide decision-making for primary prevention. Individuals with the highest risk have the most to gain.
- Risk communication is critical to making shared decisions about risk management. Communicate the results of risk assessment to all patients.
- An estimated five-year CVD risk of 15 percent or more is considered to be equivalent to the risk for people with prior CVD. Lipid-lowering and blood pressure-lowering drug treatment is strongly recommended and aspirin should be considered in some groups.
- A diagnosis of asymptomatic carotid disease (including plaque identified on carotid ultrasound) or asymptomatic coronary disease (including coronary artery calcium score > 400) or plaque identified on CT angiography is associated with increased CVD risk. These patients should be considered to have an estimated five year risk of 15 percent or more. Lipid-lowering and blood pressure-lowering drug treatment is strongly recommended and aspirin should be considered in some groups
- During shared decision-making, it is reasonable to consider pharmacological treatment of modifiable risk factors for patients with estimated five-year CVD risk of 5–15 percent. For patients in this risk group, the benefits and harms of lipid-lowering and blood pressure lowering drugs should be presented and discussed to allow an individualised informed decision about whether to start treatment.

Lipid management

- Substituting dietary saturated fat with mono and polyunsaturated fats is the most effective dietary approach to reducing low-density lipoprotein cholesterol (LDL-C) while maintaining or increasing high-density lipoprotein cholesterol (HDL-C).
- Statins are the preferred choice of lipid-lowering drugs with each 1.0 mmol/L reduction in LDL-C associated with a 25 percent relative risk reduction events over five years
- For individuals with a total cholesterol to HDL-cholesterol (TC/HDL-C) ratio of eight or more, after lifestyle modifications, drug treatment is recommended regardless of predicted CVD risk.
- For individuals with a five-year CVD risk of 15 percent or more, lipid-lowering drug treatment, in addition to dietary changes, is strongly recommended, with an LDL-C treatment target below 1.8 mmol/L.
- For individuals with a predicted five-year risk between 5 and 15 percent the benefits and harms of lipid-lowering drugs should be presented and discussed to allow an individualised informed decision about whether to start treatment. A target LDL-C reduction of 40 percent or greater is recommended if drug treatment commenced.
- Once target LDL-C is considered satisfactory, an annual review is recommended.

History

63 year old female Samoan nurse is seen for an annual review

Past Medical History:

* Gout

Social History:

* Working shifts acute medical ward
* Smoker 20/day

Family History:

* mother suffered myocardial infarction age 58 years.

Examination/Results:

* BP 154/84mmHg, BMI 31, HbA1c = 36mmol/l

Lipids:

* Total cholesterol	7.6 mmol/l
LDL cholesterol	5.5 mmol/l
HDL cholesterol	1.1 mmol/l
Triglycerides	2.2 mmol/l

The Absolute CVD Risk/Benefit Calculator

Framingham
US Data, 10 Year Risk
Heart attacks + angina/coronary insufficiency + heart failure + strokes + intermittent claudication

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UK Data, 10 Year Risk
Heart attacks + strokes

ACC/AHA ASCVD
US Data, 10 Year Risk
CHD death + nonfatal heart attacks + fatal/nonfatal strokes

PREDICT
New Zealand Data, 5 Year Risk
Heart attacks + angina + heart failure + strokes/TIAs + peripheral vascular disease

---

Age
63 years

Gender
Male | ✔ Female

Ethnicity
Pacific

Smoker
Current smoker

Diabetes
Yes | ✔ No

Systolic Blood Pressure
154 mmHg
Enter present blood pressure regardless of treatment
120 mmHg is used for baseline risk

On treatment for BP
Yes | ✔ No
Click YES if taking blood pressure medication

On lipid-lowering treatment
Click YES if taking lipid-lowering medication
Yes | ✔ No

On antithrombotic treatment
Click YES if taking antiplatelet/anticoagulant medication
Yes | ✔ No

Total Cholesterol
7.6 mmol/L
Cholesterol should be prior to drug treatment
3 mmol/L is used for baseline risk.

Relative Benefit: 0%

Benefit often has *nothing* to do with the effect on the surrogate marker. At present, you can only select one intervention at a time.

- Physical Activity
- Mediterranean Diet vs Low fat
- Vitamin/Omega-3 supplements
- BP meds (not atenolol/doxazosin)
- Low-mod intensity statins
- High intensity statins
- Fibrates
- Niacin
- Ezetimibe
- Metformin
- Sulfonylureas
- Insulins
- Glitazones
- GLPs
- DPP-4s
- Meglitinides
- SGLT2
- Smoking Cessation
- ASA

Benefit Estimate Details

Risk Time Period

5 years

	90.0%	**No event**
	10.0%	**Total with an event**
	0.0%	**Number who benefit from treatment**
NNT	**∞**	**Number needed to treat**
	3.9%	**Baseline events using baseline factors alone**
	6.1%	**Additional events "caused" by risk factors**

As with all risk calculators, calculated risk numbers are +/- 5% at best. More information.

Appropriate treatment may include:

A. Aspirin

B. Quinapril

C. Atorvastatin

D. Varenicline (Champix)

E. Felodipine

Aspirin

- In patients under 70 years with a five-year CVD risk of 15 percent or greater the benefits of aspirin may outweigh the bleeding risk and should be considered. Potential benefit (reduction in non-fatal MI and possible small net years gained) and bleeding risk must be carefully assessed and discussed during shared decision-making.

- In patients with a five-year CVD risk of less than 15 percent, aspirin for primary prevention of CVD alone is not recommended.

Primary prevention

Aspirin Lancet 2009;373;1849-60

5 yr CVD risk	Aspirin		Placebo	Bleeding	**NNT**
<5%	1.8%	vs	2.0%,	- 0.1%	1000
5-10%	9.5%	vs	10.9%,	- 0.4%	100
>10%	14.0%	vs	16.0%,	-1.0%	100

Aspirin

- In patients under 70 years with a five-year CVD risk of 15 percent or greater the benefits of aspirin may outweigh the bleeding risk and should be considered. Potential benefit (reduction in non-fatal MI and possible small net years gained) and bleeding risk must be carefully assessed and discussed during shared decision-making.

- In patients with a five-year CVD risk of less than 15 percent, aspirin for primary prevention of CVD alone is not recommended.

- In patients aged over 70 years with a five-year CVD risk of 15 percent or more the balance of benefits and harms cannot be determined with aspirin and use is not recommended for primary CVD prevention.

Discussion

B – Quinapril or E Felodipine.

Calcium antagonists or diuretics are recommended as first line therapy in patients older than 55 years. Quinapril is a reasonable antihypertensive choice. Effective blood pressure treatment will reduce her 5 year event rate from 10% to 7.0% an absolute reduction of 3.0%.

C – Atorvastatin

High intensity statin treatment will reduce her 5 year event rate from 10% to 6.5% an absolute reduction of 3.5%.

D. Varenicline (Champix)

37.8% of the varenicline group quit smoking and 12.5% of the placebo group quit smoking (NNT: 4) JAMA 2015;313:687-694.

Smoking cessation will reduce her 5 year event rate from 10% to 5.5% an absolute reduction of 4.5%.

History

* 68 year old man with Hypertension. No symptoms of angina.

Past Medical History and Medications:

* Coronary artery bypass surgery 7 years ago.
* Aspirin (150mg daily) as recommended.
  1,500mg of Vitamin C because rarely eats fruit.
* He takes 1,200 IU/day of Vitamin E because he rarely eats vegetables.

Social History:

* He drinks two glasses of wine per day.
* He exercises "occasionally" (about 30 minutes of aerobic exercise one or two times per week).

Examination:

* BMI is 28 kg/M^2. BP 142/94 repeated measurement

Recommended treatment for hypertension

A. Add beta carotene vitamin supplements.

B. Increase his wine intake to 3 glasses per day.

C. Have a 20-minute period of relaxation every day.

D. Increase fruit and vegetable intake in his diet to 8-10 servings per day.

E. Take garlic tablets

Discussion

D is an appropriate therapeutic measure

Increased dietary intake of fruits and vegetables has been shown to be highly effective for blood pressure lowering in a recent randomised trial (the DASH diet). The DASH diet included 4-5 daily servings of fruits and 4-5 daily servings of vegetables (goal 10 combined servings of fruits and vegetables daily).

Garlic tablets (answer E), vitamins C or E, or beta carotene supplements (answer A), are not effective antihypertensive treatments. Formalized relaxation training (answer C) has also not been shown to reduce hypertension in clinical trials.