

Supplemental Online Content

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This supplemental material has been provided by the authors to give readers additional information about their work.

eAppendix 1. Survey Questions

1. Consider Mr. Miller, a 62-year-old man with well-controlled hypertension on aspirin with new atrial fibrillation. He has no particular preference for treatment and wants your advice.

What is Mr. Miller's risk for stroke in the next year with no change in therapy? _____%

What would you tell Mr. Miller is the chance that warfarin will prevent him from having a stroke in the next year? _____%

IN YOUR PRACTICE, in what proportion of patients with atrial fibrillation and similar risk to Mr. Miller do you recommend anticoagulation? _____%

2. Consider Mr. Davis, a 60-year-old man with persistent mild hypertension (SBP 145/92) without preexisting cardiovascular disease. He is adherent to lifestyle interventions and has no particular preference for treatment and wants your advice.

How likely is Mr. Davis to have a cardiovascular event within 5 years with no antihypertensive therapy? _____%

What would you tell Mr. Davis is the chance that antihypertensive therapy will prevent him from having a cardiovascular event within 5 years? _____%

IN YOUR PRACTICE, in what proportion of patients with mild hypertension with similar risk to Mr. Davis do you recommend antihypertensive therapy? _____%

3. Consider Mrs. Wilson, a 60-year-old Caucasian woman with BMI 30 and osteoporosis without fracture. She is active and has adequate dietary calcium and vitamin D. She has no particular preference for treatment and wants your advice.

How likely is Mrs. Wilson to have a hip fracture in the next 5 years with no additional treatment? _____%

What would you tell Mrs. Wilson is the chance that bisphosphonate therapy (e.g. alendronate) will prevent her from having a hip fracture in the next 5 years? _____%

IN YOUR PRACTICE, in what proportion of patients with osteoporosis and similar risk to Mrs. Wilson do you recommend bisphosphonate therapy? _____%

4. Consider Mr. Brown, a healthy 52-year-old man who is found to have a screening LDL of 150 and HDL of 40. He has tried lifestyle interventions, has no particular preference for treatment and wants your advice.

How likely is Mr. Brown to have a cardiovascular event within 5 years with no additional treatment? _____%

What would you tell Mr. Brown is the chance that moderate-intensity statin therapy will prevent him from having a cardiovascular event in the next 5 years? _____%

IN YOUR PRACTICE, in what proportion of patients with hypercholesterolemia and similar risk to Mr. Brown do you recommend statins? _____%

5. Consider a condition in which 3% of patients will develop a bad outcome within 5 years and a treatment has a relative risk reduction of 33%.

If 100 patients with this condition are treated for 5 years, how many patients will have a bad outcome prevented by treatment? _____%

eAppendix 2. Determination of Best Answers for Treatment Questions

To identify the best evidence-based information from the literature regarding probability of a disease outcome and impact of treatment on individual patients¹, we used a hierarchical method.

1. Data was first sought from high-quality recent systematic reviews, meta-analyses, and/or guidelines.
2. If only older systematic reviews, meta-analyses, and/or guidelines were available with newer high-impact studies after publication, we considered data from both (attempting to understand most accurate numbers for current technology/practice)
3. If no systematic reviews, meta-analyses, and/or guidelines were available, we used data from commonly cited studies based on citations in recent guidelines and creating weighted averages by consensus. The expert panel of physicians overseeing the study was presented with best evidence identified and settled on evidence-based answers presented in results.

Of note, we evaluated recommendations in guidelines around treatment for each individual case. These will not be part of the primary analysis but will likely inform our understanding of results. Each question was written to capture an area with some uncertainty in standard practice—when patient shared decision making would be important.

Quotes are often included in this document. They will mostly be removed from the final appendix but are present to make it easier to evaluate evidence.

Question 1

Consider Mr. Miller, a 62-year-old man with well-controlled hypertension on aspirin with new atrial fibrillation. He has no particular preference for treatment and wants your advice.

a. What is Mr. Miller's risk for stroke in the next year with no change in therapy?

To determine the probability of stroke in a patient with atrial fibrillation, we found clinical prediction scores to be the best validated method.

CHA2DS2-VASc is the most accepted score for atrial fibrillation. It gives a point for, hypertension, which would give Mr. Miller a 1.3% risk of stroke in the next year.² The CHA2DS2-VASc score is not completely accurate³, so we gave a range around the estimate of a relative 50% higher or lower to 0.6%-2.0% absolute risk.

There's controversy about if aspirin decreases risk of stroke in Afib. We modified the risk of stroke lower to capture this uncertainty.⁴ So, his risk of stroke could be as low as 0.4%

In summary, risk of stroke in one year for this patient is 0.4% - 2.0%

b. What would you tell Mr. Miller is the chance that warfarin will prevent him from having a stroke in the next year?

The benefits of treating atrial fibrillation with anticoagulation to prevent stroke has been reviewed. The most recent review was Steinberg BA, Piccini JP.⁵ Which referred back to a systematic review by Hart et al.⁶

This review identified a 39% RRR compared to aspirin, and others have referenced a 50% reduction in comparison to placebo, so the treatment benefit would be 39%-50% relative risk reduction which would translate to a 0.16%-1.0% benefit to Mr. Miller directly.

c. Do Guidelines recommend treatment?

Mr. Miller has a CHA2DS2-VASc score of 1. Guidelines from AHA/ACC do NOT recommend anticoagulation for a patient like Mr. Miller.⁷

"For patients with AF and an elevated CHA2DS2-VASc score of 2 or greater in men or 3 or greater in women, oral anticoagulants are recommended."

Question 1 References²⁻⁷

Question 2

Consider Mr. Davis, a 60-year-old man with persistent mild hypertension (SBP 145/92) without preexisting cardiovascular disease. He is adherent to lifestyle interventions and has no particular preference for treatment and wants your advice.

a. How likely is Mr. Davis to have a cardiovascular event within 5 years with no antihypertensive therapy?

To determine the probability of cardiovascular events in a patient with mild⁸ hypertension, we found clinical prediction scores to be the best validated method. Cardiovascular risk scores included The ASCVD risk⁸ estimator

For risk calculators, cholesterol is a key component. As we didn't discuss cholesterol, we are considering a broad range to include very low cholesterol and very high cholesterol.

Assuming low cholesterol (TC 160, HDL 60, LDL 100) 10-year 7.6% risk

Assuming high cholesterol (TC 300, HDL 40, LDL 180) 10-year risk 17.7%

The proportion of that 10-year risk that is in the first 5 years is likely 1/3-2/3 of the 10-year risk.

So, 1/3 of the lower bound of 10-year risk is $7.6\% = 2.53\%$

And 2/3 of the upper bound of 10-year risk $17.7\% = 11.8\%$

In summary, risk of a cardiovascular event over 5 years for this patient is 2.5-11.8%

b. What would you tell Mr. Davis is the chance that antihypertensive therapy will prevent him from having a cardiovascular event within 5 years?

The effect of treatment of his hypertension was identified through a recent systematic review.⁹

These effects are consistent with those identified when this patient is considered using AHA/ACC risk score. ASCVD calculator provides HTN relative risk reduction ~25-26%

Treatment benefit per systematic review: OR 0.72⁹ or 28% relative reduction, so absolute benefit would be 28% of 2.53%-(28% of 11.8%). However, this systematic review combined stroke and cardiovascular events, and the effect was non-significant for cardiovascular events alone, so estimates of benefit include 0%. The relative risk reduction was 0-28% and the absolute benefits to Mr. Davis are 0%-3.3%

Do Guidelines recommend treatment?

Guidelines are variable. Cardiology guidelines recommend treatment of patients "Use of BP-lowering medication is recommended for primary prevention of CVD in adults with no history of CVD and with an estimated 10-year ASCVD risk <10% and an SBP of 140 mm Hg or higher or a DBP of 90 mm Hg or higher", whereas primary care guidelines (ACP/AAFP) do not recommend treatment with systolic blood

pressure below 150 without increased cardiovascular risk.^{10,11}

ACP/AAFP:

“ACP and AAFP recommend that physicians initiate treatment in adults aged 60 years old and older with persistent systolic blood pressure at or above 150 millimeters of mercury (mm Hg) to achieve a target systolic blood pressure of less than 150 mm Hg to reduce the risk of mortality, stroke, and cardiac events.”

“ACP and AAFP recommend that physicians consider initiating or intensifying pharmacological treatment in some adults aged 60 years old and older at high cardiovascular risk, based on individualized assessment, to achieve a target systolic blood pressure of less than 140 mm Hg to reduce the risk of stroke or cardiac events.

Increased cardiovascular risk includes all people with known vascular disease and among others, is defined as most patients with diabetes, individuals with chronic kidney disease with estimated glomerular filtration rate (eGFR) <45 mL/min/per 1.73 m², metabolic syndrome (abdominal obesity, hypertension, diabetes, and dyslipidemia), and older age.”¹²

Question 2 References⁹⁻¹²

Question 3

Consider Mrs. Wilson, a 60-year-old Caucasian woman with BMI 30 and osteoporosis without fracture. She is active and has adequate dietary calcium and vitamin D. She has no particular preference for treatment and wants your advice.

a. How likely is Mrs. Wilson to have a hip fracture in the next 5 years with no additional treatment?

Chance of hip fracture is less than 1%.

The FRAX prediction model appears to be the best accepted model and estimates a 10-year risk of hip fracture for Mrs. Wilson to be 0.5%, (although 6.5% “major osteoporotic fracture”)¹³

When one adjusts weight parameters in the FRAX model, the patient could have up to a 2% 10-year risk of hip fracture. To convert from a 10 year risk, we assumed 1/3 to 2/3 of risk would be in the first 5 years.

Mrs. Wilson therefore has a **0.17%-1% risk of hip fracture in next 5 years**

b. What would you tell Mrs. Wilson is the chance that bisphosphonate therapy (e.g. alendronate) will prevent her from having a hip fracture in the next 5 years?

The Crandall & Shekelle systematic review provides a RR 0.6-0.8 for hip fracture if taking bisphosphonates. In other words, relative risk reduction was 20-40%. Given a 0.17%-1.0% risk of hip fracture over 5 years; the benefit would then be 0.1-0.4%¹⁴

For comparison, the 2014 AIM Crandall & Shekelle article NNT ~80 over 1-3 years for alendronate for vertebral or non-vertebral fractures but provided no NNT for hip fracture alone.¹⁴ Some have discussed there is no definite effect on hip fracture prevention.¹⁵

Therefore, we conclude that Mrs. Wilson has a 0.17-1% risk of hip fracture in 5 years that will be decreased by 0-0.4% if she takes bisphosphonate therapy.

Do Guidelines recommend treatment?

USPSTF would not recommend screening this patient with DEXA

“The U.S. Preventive Services Task Force (USPSTF) recommends screening for osteoporosis in women age 65 years and older, and in women younger than age 65 years who have been through menopause and are at increased risk for osteoporosis.”¹⁶

For a patient diagnosed with osteoporosis, based on a T-score < -2.5 she would be recommended pharmacologic treatment per Endocrine Society guidelines.¹⁷

“In the United States, pharmacological therapy is recommended for postmenopausal women with hip or vertebral fractures; those with T-scores of -2.5 or less in the femoral neck, total hip, or lumbar spine”

Question 3 References¹³⁻¹⁷

Question 4

Consider Mr. Brown, a healthy 52-year-old man who is found to have a screening LDL of 150 and HDL of 40. He has tried lifestyle interventions, has no particular preference for treatment and wants your advice.

This is a case of primary prevention for mild hyperlipidemia.

To determine the probability of cardiovascular events in a patient with hyperlipidemia, we found clinical prediction scores to be the best validated method. Similar to question 1, experts noted the ASCVD risk calculator may overestimate risk, so we included a range of risk.

ACC ASCVD Risk Estimator plus⁸

His 10-year risk varies by total cholesterol which is dependent on triglyceride level, which we did not provide. We are therefore providing a range of correct answers:

If total cholesterol = 190, then 10-year risk 4.4% (TGL 0)

If total cholesterol = 300, then 10-year risk 7.9% (TGL 550)

Assuming 1/3 to 2/3 of that risk is in the first 5 years 1.5% to 5.3%

This risk estimate is similar to ACC/AHA guidelines.^{18,19}

**a. How likely is Mr. Brown to have a cardiovascular event within 5 years with no additional treatment?
1.5%-5.3%**

c. What would you tell Mr. Brown is the chance that moderate-intensity statin therapy will prevent him from having a cardiovascular event in the next 5 years?

Relative benefit of statins based on the American Heart Journal: all major CV events RR: 0.74, 95%CI: 0.67-0.81 (19%-33% relative risk reduction)²⁰ Similarly, the ASCVD Risk estimator uses 25.2% relative risk for all ranges of recommended treatment.

So, absolute benefit would be 0.3%-1.7%

Do Guidelines recommend treatment?

Guidelines generally don't recommend therapy for this range of risk, but they may if this individual was at the higher end of risk with a high total cholesterol.

ASCVD Risk estimator: Guidelines do not recommend statin therapy for patients with 10-year risk < 5%. However, if risk > 5% it should be considered.

Question 4 References^{8,18-20}

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eTable. Comparison of Resident Physicians vs Primary Care Clinicians for Estimates of Probability of Disease and Individual Benefit With Treatment

Clinical scenario	Total population	Resident estimate (n=282), % (median, IQR)	Primary care clinician estimate (n=260), % (median, IQR)	Scientific Evidence, ARR %
Atrial Fibrillation				
Probability of stroke	5% (2-15)	5% (1.3-10)	5% (2-20)	0.4-2%
Estimate of individual benefit with warfarin	50% (5-80)	50% (5-80)	50% (5-80)	0.2-1%
Hypertension				
Probability of cardiovascular event	10% (6-20)	10% (5-25)	10% (7-20)	3-12%
Estimate of individual benefit with antihypertensive	30% (10-70)	40% (10-60)	30% (10-70)	0-3%
Osteoporosis				
Probability of hip fracture	10% (5-25)	11% (5-30)	10% (5-20)	0.3-1%
Estimate of individual benefit with bisphosphonate therapy	40% (10-60)	40% (15-60)	30% (10-55)	0.1-0.4%
Hypercholesteremia				
Probability of cardiovascular event	10% (5-15)	10% (5-15)	8% (5-10)	2-3%
Estimate of individual benefit with statin therapy	20% (5-50)	25% (10-50)	20% (5-50)	0.3-2%