

Charlotte (Charlie) MacLeod

1. Charlie

1.1 Meet Charlie MacLeod

SCFPCLearn

Charlotte (Charlie) MacLeod

You ask Charlie what brings her in today. She smirks and says "You do."

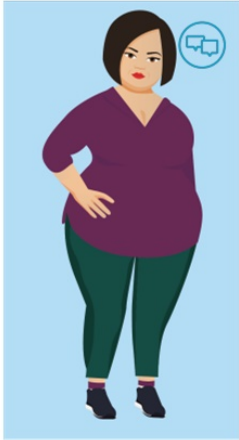
You recalled her based on her labs which were done approximately three months late. She reports feeling fine. You last saw Charlie nine months ago.

Visit Begins

Charlie Responds

Meds & Vitals

More Information



Button 1 (Slide Layer)

SCFPCLearn

Charlotte (Charlie) MacLeod

"Charlie, why have things been delayed and why did you decide to come now?"

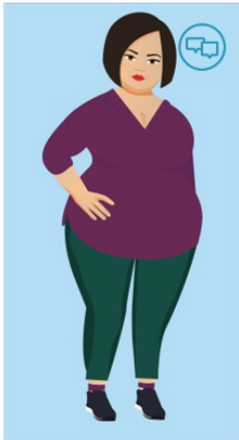
You

Visit Begins

Charlie Responds

Meds & Vitals

More Information



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Button 2 (Slide Layer)

SCFPCLearn

Charlotte (Charlie)
MacLeod

“Well, our friend Susan had a heart attack last month. She is diabetic, too, and only three years older.”

Charlie

Visit Begins

Charlie Responds

Meds & Vitals

More Information

Button 3 (Slide Layer)

SCFPCLearn

Charlotte (Charlie)
MacLeod

Her only medications:
metformin 500mg twice a day

Other notes from today:
BP = 154/94
Weight = 93 kg (BMI = 35kg/m²)

Charlie

Visit Begins

Charlie Responds

Meds & Vitals



More Information


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1.2 Charlie History





SCFPC Learn

Past History





What does Charlie's past history show?



Four Years Ago

Attempts at Changes

Other Information

Medications

Previous Labs



Click on the hints to the left to gain more insight


Move forward

Four Years (Slide Layer)





SCFPC Learn

Past History





What does Charlie's past history show?



Four Years Ago

Attempts at Changes

Other Information

Medications

Previous Labs

Four Years Ago

Asymptomatic Charlie (at age 50) agreed to her first screening. Her A1C was 7.7%, confirmed at 7.5% three months later. Diabetes was diagnosed.



Note: If symptoms of hyperglycemia present, only one test is needed for diagnosis. If screening without symptoms, a positive test should be followed up with same type of test for confirmation.


Move forward

Attempts (Slide Layer)





SCFPCLearn

Past History





What does Charlie's past history show?



Four Years Ago

Attempts at Changes

Other Information

Medications

Previous Labs

Attempts at Changes

For one year, she insisted on trying lifestyle changes. Her A1C was 7.9% after multiple visits and a dietary referral. You convinced her to try metformin, but could only get to 500 mg twice a day due to nausea. Her A1C after metformin was in the low 7s (e.g., 7.3%).



X


Move forward

Other Information (Slide Layer)





SCFPCLearn

Past History





What does Charlie's past history show?



Four Years Ago

Attempts at Changes

Other Information

Medications

Previous Labs

Other Information

It has been 15 years since she stopped smoking.

She has no history of coronary artery disease or renal disease but her last two BP readings were 146/88 and 142/92 with a note to measure next visit.



X

Move forward






Medications (Slide Layer)

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Past History



What does Charlie's past history show?



Four Years Ago

Attempts at Changes

Other Information


Medications

Previous Labs

Medications

Encouraged by her family, Charlie then tried a variety of naturopathic medicines (including apple cider vinegar and bitter melon).

She went for labs every six months, continued metformin, but would not consider other medications.


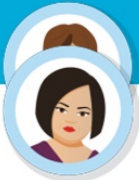


Move forward






Labs (Slide Layer)

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Past History



What does Charlie's past history show?



Four Years Ago

Attempts at Changes

Other Information

Medications


Previous Labs

Labs (3 months ago)

A1C: 8.0%

Creatinine: 95umol/L (eGFR 71), no microalbuminuria

Lipids: Total cholesterol = 5.7; LDL = 4.1; HDL = 0.9; triglycerides = 3.6 (total cholesterol/HDL ratio 6.3)




Move forward

1.3 What patient-oriented outcome is Charlie most at risk for?

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What patient-oriented outcome is Charlie most at risk for?




☐ Blindness

☐ Renal Failure

☒ Death

☐ Amputation

☐ Severe Hypoglycemia

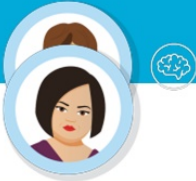



Correct	Choice
	Blindness
	Renal Failure
X	Death
	Amputation
	Severe Hypoglycemia

1.4 Info with Evidence


SCFPC Learn

Review







Answer: Death



While diabetes is a leading cause of blindness or renal failure, these outcomes are less common than death or cardiovascular disease (CVD) in patients with this condition.




Findings like microalbuminuria or retinopathy changes (assessed by ophthalmology) are more common but may not be perceived by patients.



Additional Evidence

Data on Amputation

Bottom Line



Evidence Review

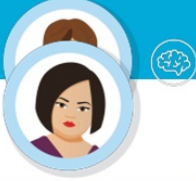
From a seven-year study (mean age 68, diabetes for 10 years, 50% with some albuminuria): risk of renal failure was 0.7% and death was 40% (half due to cardiovascular events).


Moving Forward

Button 2 (Slide Layer)


SCFPC Learn

Review







Answer: Death



While diabetes is a leading cause of blindness or renal failure, these outcomes are less common than death or cardiovascular disease (CVD) in patients with this condition.




Findings like microalbuminuria or retinopathy changes (assessed by ophthalmology) are more common but may not be perceived by patients.



Additional Evidence

Data on Amputation

Bottom Line



Evidence Review: ADVANCE trial

The 10-year results from ADVANCE trial: 0.9% had end-stage renal disease; 6.6% had blindness or photocoagulation; 21.6% died (43% from CVD); 8.3% had severe (third-party rescue) hypoglycemia; 21.3% had any major fatal/non-fatal CVD.

Moving Forward

Button 3 (Slide Layer)

SCFPCLearn

Review

Answer: Death

While diabetes is a leading cause of blindness or renal failure, these outcomes are less common than death or cardiovascular disease (CVD) in patients with this condition.

Findings like microalbuminuria or retinopathy changes (assessed by ophthalmology) are more common but may not be perceived by patients.

Additional Evidence

Data on Amputation

Bottom Line

Evidence Review: Amputation

A study of patients at higher amputation risk found that, at 10 years, 12% had any amputation (toes or greater), compared to 44% with a major CVD event.

X

Moving Forward

Button 4 (Slide Layer)

SCFPCLearn

Review

Answer: Death

While diabetes is a leading cause of blindness or renal failure, these outcomes are less common than death or cardiovascular disease (CVD) in patients with this condition.

Findings like microalbuminuria or retinopathy changes (assessed by ophthalmology) are more common but may not be perceived by patients.

Additional Evidence

Data on Amputation

Bottom Line

Evidence & Bottom Line

Other studies, such as ACCORD and UKPDS, found similar results.

Bottom line:
Death and CVD outcomes are the most likely serious outcome.

X

Moving Forward

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1.5 Charlie MacLeod

SCFPC Learn

Charlotte (Charlie) MacLeod

You explain to Charlie that what happened to her friend is more common among people with diabetes. But the good news is that there is help available.

Diabetes Interventions

Charlie Responds

More Information



Button 1 (Slide Layer)

SCFPC Learn

Charlotte (Charlie) MacLeod

"The three primary interventions to prevent bad outcomes in diabetes are lowering blood sugars, lowering blood pressure, and lowering bad cholesterol via treating cardiovascular risk with statins."

You

Diabetes Interventions

Charlie Responds

More Information



Button 2 (Slide Layer)

SCFPC Learn

Charlotte (Charlie) MacLeod

"My blood pressure and cholesterol are good, I think it's just the diabetes."

Charlie

Diabetes Interventions Charlie Responds More Information

The slide layer features a vertical sidebar on the left with icons for home, search, a list, and a user profile. The main content area has a title, a quote from a character named Charlie, and three buttons: 'Diabetes Interventions', 'Charlie Responds', and 'More Information'. On the right is a full-body illustration of a pregnant woman in a purple shirt and green pants, with a speech bubble icon above her head.

1.6 Order the interventions below based on their effectiveness in reducing cardiovascular disease

Arrange the interventions

Order the interventions below based on their effectiveness in reducing cardiovascular disease

Lowering blood pressure Most Effective

Lowering lipid levels (statins)

Lowering blood sugars Least Effective

Submit



The slide has a blue header with the title 'Arrange the interventions' and a gear icon. Below the header, there's a circular portrait of a woman. The main text asks the user to order interventions by effectiveness. Three interventions are listed in dropdown menus: 'Lowering blood pressure' (positioned as 'Most Effective'), 'Lowering lipid levels (statins)', and 'Lowering blood sugars' (positioned as 'Least Effective'). A 'Submit' button is at the bottom right. The left sidebar contains icons for home, search, a list, and a user profile.


Correct Order
Lowering blood pressure
Lowering lipid levels (statins)
Lowering blood sugars

1.7 History


SCFPCLearn


Review







Answer:
1. Lowering Blood Pressure
2. Lowering lipid levels (statins)
3. Lowering blood sugars







Explanation

Comparison

More Info



Click on the buttons for more information





Moving Forward

Button 1 (Slide Layer)

SCFPCLearn

Review





Answer:

1. Lowering Blood Pressure
2. Lowering lipid levels (statins)
3. Lowering blood sugars

Explanation

Comparison

More Info

Explanation

While a diagnosis of diabetes is all about sugar, interventions are not all about sugar.

Using medications with proven benefit is more important than surrogate marker targets. That's our focus (A1C, hypertension, and lipid targets are discussed in other cases).


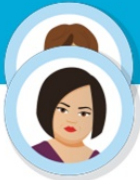
X





Moving Forward

Button 2 (Slide Layer)

SCFPCLearn

Review





Answer:

1. Lowering Blood Pressure
2. Lowering lipid levels (statins)
3. Lowering blood sugars

Explanation

Comparison

More Info

Comparison of Risk Reduction

Approximate relative risk reduction in cardiovascular disease for patients with diabetes:

- Lowering BP = 25% to 50%
- Lowering lipid levels (statin) 25%
- Lowering blood sugars = 15%
- Acetylsalicylic acid = 0%

X



Moving Forward





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Button 4 (Slide Layer)

SCFPCLearn

Review





Answer:

1. Lowering Blood Pressure
2. Lowering lipid levels (statins)
3. Lowering blood sugars

Explanation

Comparison

More Info

More Information X

In studies, statins were prescribed based on having diabetes, not lipid levels, and lipid levels were not targeted. Evidence for other lipid lowering agents is very limited.





For lowering blood sugars (hypoglycemic agents) the benefit varies by drug class (see next slides). Acetylsalicylic acid (ASA) has no or very minimal benefit in patients with diabetes without cardiovascular disease, while consistently causing increased major bleeds.

Moving Forward

1.8 Meet Charlie MacLeod

SCFPCLearn

Charlotte (Charlie) MacLeod




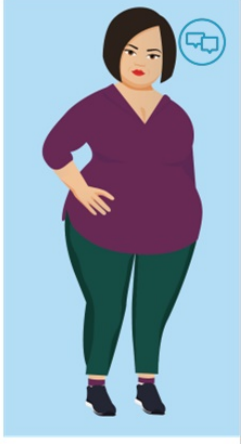
She is not convinced that she has elevated blood pressure ("I feel fine") or needs to use statins ("One of my friends said they made her feel terrible").

Cardiovascular Risk

Reducing risk with Treatment

Charlie's feedback

Medication Options



Button 1 (Slide Layer)

SCFPCLearn

Charlotte (Charlie)
MacLeod

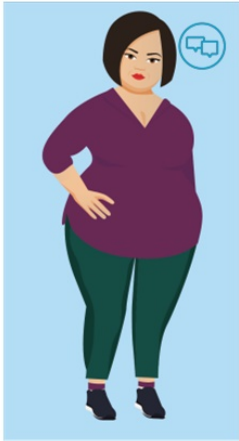
Using her systolic blood pressure today (154 mmHg), age (54), total cholesterol (5.7), and HDL (0.9), in the [Best Science Medicine CVD Risk Calculator](#), her estimated CVD risk is approximately 25% over 10 years.

Cardiovascular Risk

Reducing risk with Treatment

Charlie's feedback

Medication Options



Button 2 (Slide Layer)

SCFPCLearn

Charlotte (Charlie)
MacLeod

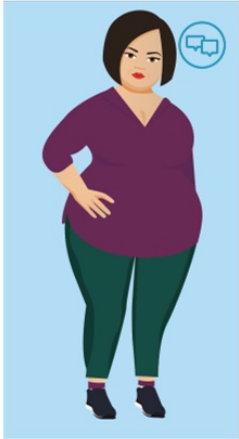
Treating blood pressure alone would reduce the 25% risk to between 18% and 13%. A moderate potency statin alone would reduce this to approximately 18%.

Cardiovascular Risk

Reducing risk with Treatment

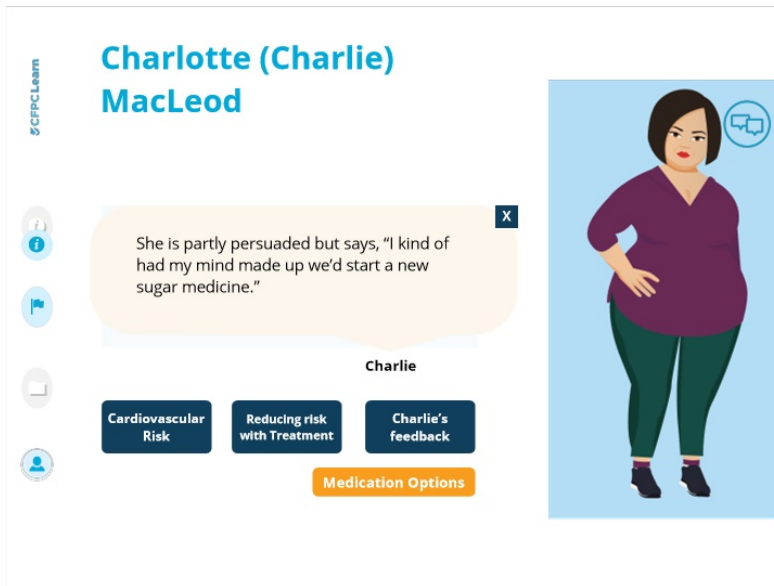
Charlie's feedback

Medication Options



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Button 3 (Slide Layer)



1.9 Select all the hypoglycemic medications/drug classes that have evidence of patient-oriented benefits

The screenshot shows a medication selection form. At the top, a blue header bar contains the instruction 'Select all the hypoglycemic medications/drug classes that have evidence of patient-oriented benefits' and a circular icon with a brain symbol. Below the header is a list of medication classes, each with a checkbox and a name. To the right of the list is a circular profile picture of a woman. At the bottom right is an orange 'Submit' button.



Medication Class	Selected
Metformin	<input checked="" type="checkbox"/>
Sulphonylureas (e.g., gliclazide)	<input type="checkbox"/>
Thiazolidinediones (TZDs) (e.g., pioglitazone)	<input type="checkbox"/>
SGLT-2 inhibitors (e.g., empagliflozin)	<input checked="" type="checkbox"/>
DPP-4 inhibitors (e.g., sitagliptin)	<input type="checkbox"/>
Incretin Mimetics (GLP-1 agonists) (e.g., liraglutide)	<input checked="" type="checkbox"/>
Insulin	<input type="checkbox"/>

Correct	Choice
X	Metformin
	Sulphonylureas (e.g., gliclazide)
	Thiazolidinediones (TZDs) (e.g., pioglitazone)
X	SGLT-2 inhibitors (e.g., empagliflozin)
	DPP-4 inhibitors (e.g., sitagliptin)
X	Incretin Mimetics (GLP-1 agonists) (e.g., liraglutide)
	Insulin

1.10 Answer Slide 5 buttons

SCFPCLearn

Review





Answer:

- SGLT-2 Inhibitors (e.g., empagliflozin)
- Metformin
- Incretin Mimetics (GLP-1 agonists) (e.g., liraglutide)

Cardiovascular Benefits

Microvascular Benefits


Approval Process for Diabetes Medications



Diabetes medicines had come to market based on evidence of reduced blood sugar. Rosiglitazone (TZD) changed that when evidence suggested it may worsen some cardiovascular outcomes. Manufacturers now need to prove cardiovascular safety (but not necessarily benefit).





Let's Make a Plan

Cardiovascular (Slide Layer)

SCFPCLearn

Review






Answer:

- SGLT-2 Inhibitors (e.g., empagliflozin)
- Metformin
- Incretin Mimetics (GLP-1 agonists) (e.g., liraglutide)

Cardiovascular Benefits

Microvascular Benefits

**Evidence Review: Cardiovascular Benefits**


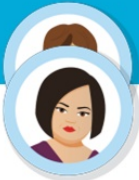
Relative risk reduction in cardiovascular disease for SGLT-2 inhibitors, GLP-1 agonists, and metformin are likely around 15% (metformin is less consistent). Pioglitazone has some inconsistent positive results but, like other TZDs, has multiple harms (e.g., heart failure, fractures).





Let's Make a Plan

Microvascular (Slide Layer)

SCFPCLearn

Review






Answer:

- SGLT-2 Inhibitors (e.g., empagliflozin)
- Metformin
- Incretin Mimetics (GLP-1 agonists) (e.g., liraglutide)

Cardiovascular Benefits

Microvascular Benefits

**Evidence Review: Microvascular Benefits**



For microvascular outcomes, the only consistent proven patient-oriented (hard) outcome is for SGLT-2 inhibitors which reduce the risk of chronic kidney disease.

Let's Make a Plan






1.11 Create a Plan

SCFPC Learn

Let's Make a Plan



Using what you have learned write a plan for Charlotte. It can include any/all of the following: lifestyle intervention(s), prescription intervention(s), lab(s)/test(s) required, follow up appointment time frame, and referral required.





Fill in your plan for the patient here

See how your plan compares

1.12 Plan Answers

SCFPC Learn

Charlotte (Charlie) MacLeod




Below is the proposed plan for **medications**. How does your plan compare?

Selecting a medication

Benefit of medications

Prescribing

 Clinical Pearl



Click on the categories to the left to see possible answers


Next

Pearl (Slide Layer)


SCFPCLearn

Charlotte (Charlie) MacLeod







Below is the proposed plan for **medications**. How does your plan compare?




Selecting a medication




Benefit of medications




Prescribing




Clinical Pearl



**Clinical Pearl**

Cutting a 25mg tablet of empagliflozin in half could cut the cost by approximately 50%.



Next

Select (Slide Layer)

SCFPCLearn

Charlotte (Charlie) MacLeod





Below is the proposed plan for **medications**. How does your plan compare?




Selecting a medication




Benefit of medications



Prescribing



Clinical Pearl



**Medications**

The best choice blood sugar medications for Charlie, while maintaining metformin 500 mg twice a day, is either an **SGLT-2 inhibitors** or a **GLP-1 agonists**. They can be more expensive compared to older hypoglycemic agents. Confirm whether the patient has drug coverage.






Next

Benefit (Slide Layer)

SCFPCLearn

Charlotte (Charlie) MacLeod







Below is the proposed plan for **medications**. How does your plan compare?

Selecting a medication


Benefit of medications

Prescribing

 Clinical Pearl

 **Medications Additional**

Either of these medications will reduce her risk of cardiovascular disease from approximately 25% to approximately 21% in addition to lowering A1c. SGLT-2 inhibitors are generally less expensive and all are oral.






Next

Prescribe (Slide Layer)

SCFPCLearn

Charlotte (Charlie) MacLeod







Below is the proposed plan for **medications**. How does your plan compare?

Selecting a medication

Benefit of medications


Prescribing

 Clinical Pearl

 **Prescribing Suggestion**

Prescribe empagliflozin 10 mg once a day for 30 days: You advise her of a 5% to 10% risk of genital (e.g., yeast) infection over one year.

Notes: 10 mg appears as effective as 25 mg; can prescribe one-month to confirm tolerability.





Next

1.13 Plan Answers

SCFPC Learn

Charlotte (Charlie) MacLeod



Additional plans for the patient, how does your plan compare?

Tests

Next Appointment

Click on the categories to the left to see possible answers



What's in a name?

Back to Day Sheet

Next Appointment (Slide Layer)

SCFPC Learn

Charlotte (Charlie) MacLeod



Additional plans for the patient, how does your plan compare?

Tests

Next Appointment

Next Appointment

You ask Charlie to come back in four to six weeks to check how the empagliflozin is working and review her blood pressure. Can set up her next lab tests then and likely start hypertension treatment. Hopefully, you will initiate a statin within the year.


What's in a name?


Back to Day Sheet

Tests (Slide Layer)

SCFPCLearn

Charlotte (Charlie) MacLeod





Additional plans for the patient, how does your plan compare?

Tests

Next Appointment

What's in a name?

Back to Day Sheet

Tests


You can discuss a home blood pressure monitor with Charlie.


If using a home monitor, Hypertension Canada recommends two readings taken each morning and evening for 7 days (28 total). Discard first day readings and average the last 6 days.

Name (Slide Layer)

SCFPCLearn

Charlotte (Charlie) MacLeod





Additional plans for the patient, how does your plan compare?

Tests

Next Appointment

What's in a name?

Back to Day Sheet

Meaning Behind the Name: Charlotte (Charlie) MacLeod

Fredrick Banting and the discovery of insulin are synonymous. However, two others were involved: Charles Best ("Charlie") and JJR MacLeod.