

The Pharmacist Role in Managing Chronic Kidney Disease

Intervening today can improve outcomes in your
patients

Presenter Disclosure

- Presenter's Name: Michael Boivin, RPh
- I have the Relationships with commercial interests:
 - Advisory Board/Speakers Bureau – SDM, Abbvie, Novo-Nordisk, Emergent BioSolutions, Astra Zeneca
 - Funding (Grants/Honoraria) : Merck, Teva, Pfizer, Abbott Diabetes, Valneva, Novo Nordisk, Khiron, Tilray, Canopy, mdBriefcase
 - Speaker/Consulting Fees: J & J, Sanofi-Pasteur, Abbvie, Ascensia, Pfizer, Astra Zeneca
- Speaking Fees for current program:
 - I have received a speaker's fee from Astra Zeneca Inc. for this learning activity

Commercial Support Disclosure

- This learning activity has received financial support from Astra Zeneca Inc. in the form of unrestricted educational grant

Disclosure

- For more information on products and treatment options for diabetes, refer to CPS for product monographs and evidence-based guidance

Learning Objectives

Upon completion of this presentation, you will be better able to:

1. Review the impact of chronic kidney disease on Canadians
2. Determine the categorization of CKD based on a patient's laboratory assessment
3. Discuss the role of SGLT2 inhibitors in managing patients with chronic kidney disease
4. Review the Diabetes Canada guideline recommendations for the management of diabetes in people with type 2 diabetes and chronic kidney disease

Meet Daniel

- Background
 - 52 years old
 - Presenting today with a prescription for ramipril 2.5 mg and dapagliflozin 10 mg today
 - He does not have diabetes
- Medications
 - None, except what was prescribed today
- Discussion
 - Some lab work a few months showed some signs of kidney problem
 - After more testing was diagnosed with kidney disease today (eGFR = 52 mL/min)
 - He is shocked because he feels fine and has no symptoms



Interactive Question

If Daniel presented in your practice, what is appropriate to recommend (check all that apply)

- a) Limit his sodium intake to < 800 mg/day
- b) Use salt substitute instead of salt
- c) 30 minutes of activity per day
- d) Set blood pressure target of < 140/90 mmHg
- e) Add statin
- f) Call physician as SGLT2i is not indicated

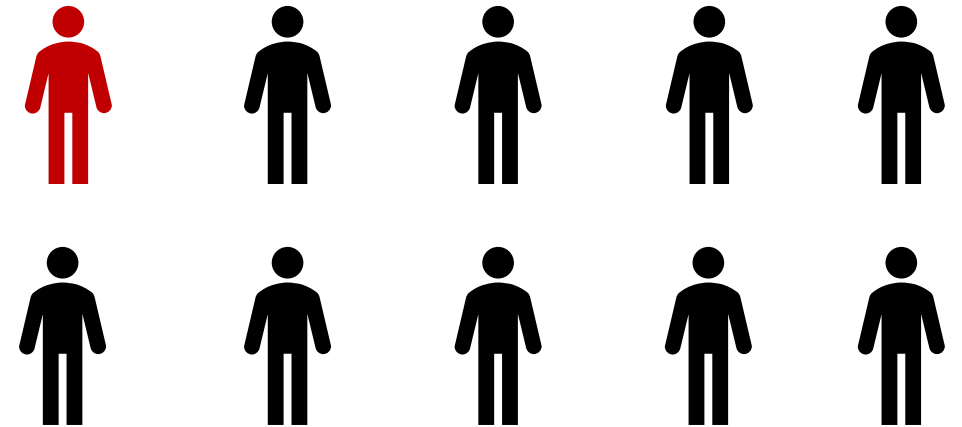


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Chronic Kidney Disease

- 4 million Canadians
- Diabetes is the leading cause of CKD (38%)
- End-stage kidney disease has ↑ 35% since 2009
- In 2018, was the 10th leading cause of death
- Hemodialysis is one of the most expensive treatments in health care
 - \$40 billion to treat CKD per year

1 in 10 Canadians Live with CKD



Chronic Kidney Disease

- CKD is an abnormalities of kidney structure or function, present for > 3 months, with implications for health

Criteria for CKD (either of the following present for > 3 months)

Markers of kidney damage (≥ 1)

- Albuminuria (urinary albumin excretion rate ≥ 30 mg/24 hours; ACR ≥ 3 mg/mmol)
- Urine sediment abnormalities
- Electrolyte and other abnormalities due to tubular disorders
- Abnormalities detected by histology
- Structural abnormalities detected by imaging
- History of kidney transplantation

Decreased glomerular filtration rate (GFR)

- GFR < 60 mL/min

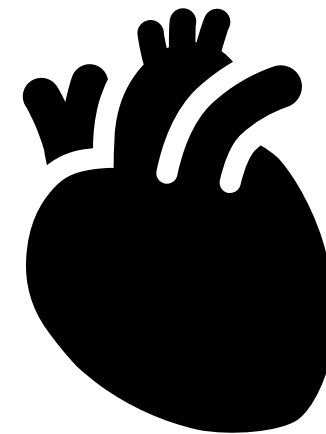
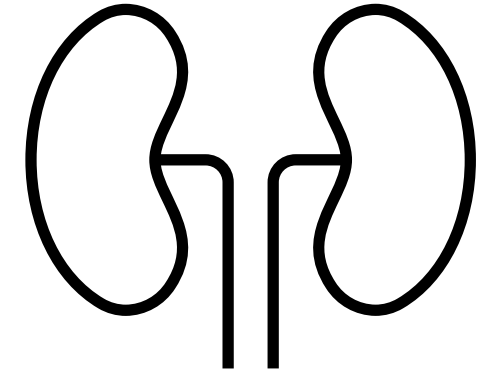
Symptoms of CKD

- Low energy, fatigue, confusion
- Urinating more often
- Foaming, tea-coloured, blood or cloudy urine
- Edema
- Shortness of breath
- Pruritus
- Nausea and/or vomiting
- Difficulty sleeping

Many patients are asymptomatic and will not develop symptoms until CKD is severe or acute kidney injury develops

Who's at Risk and Should be Screened for CKD?

- Diabetes
- Hypertension
- Cardiovascular disease (CAD, HF, stroke, PVD)
- Family history of severe CKD or hereditary kidney disease, polycystic kidney disease, hereditary nephritis
- First Nation people
- Patients with multisystem disease with renal involvement (e.g. systemic lupus erythematosus)
- History of acute kidney injury (AKI)



Screening for CKD

Glomerular Filtration Rate (GFR)

- GFR < 60 mL/min for > 3 months is considered for CKD
- Can be detected by routine lab testing
- Estimated by serum creatinine using recommended CKD-EPI formula
- Limitations
 - Assumes steady state of creatinine generation
 - Unreliable in people with extreme muscle mass or very high protein diet

Proteinuria

- Albuminuria is the loss of albumin in the urine
- Urine ACR (uACR) is the preferred method to screen for protein in the urine
 - Measures amount of albumin to creatinine
- uACR elevation (>3.0 mg/mmol) on serial testing is abnormal
 - Two abnormal ACR over 3 months is diagnostic of CKD
- uACR may be unreliable in some patients due to acute illness, vigorous exercise, poorly controlled hypertension or poorly controlled blood glucose
- 24-hour urine collections are not necessary in most cases

KDIGO Staging and Prognosis of CKD

Prognosis of CKD by GFR and albuminuria categories: KDIGO 2012

				Persistent albuminuria categories		
				Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				< 30 mg/g < 3 mg/mmol	30–300 mg/g 3–30 mg/mmol	> 300 mg/g > 30 mg/mmol
GFR categories (ml/min/1.73 m ²)	Description and range					
	G1	Normal or high	≥ 90			
	G2	Mildly decreased	60–89			
	G3a	Mildly to moderately decreased	45–59			
	G3b	Moderately to severely decreased	30–44			
	G4	Severely decreased	15–29			
G5	Kidney failure	< 15				

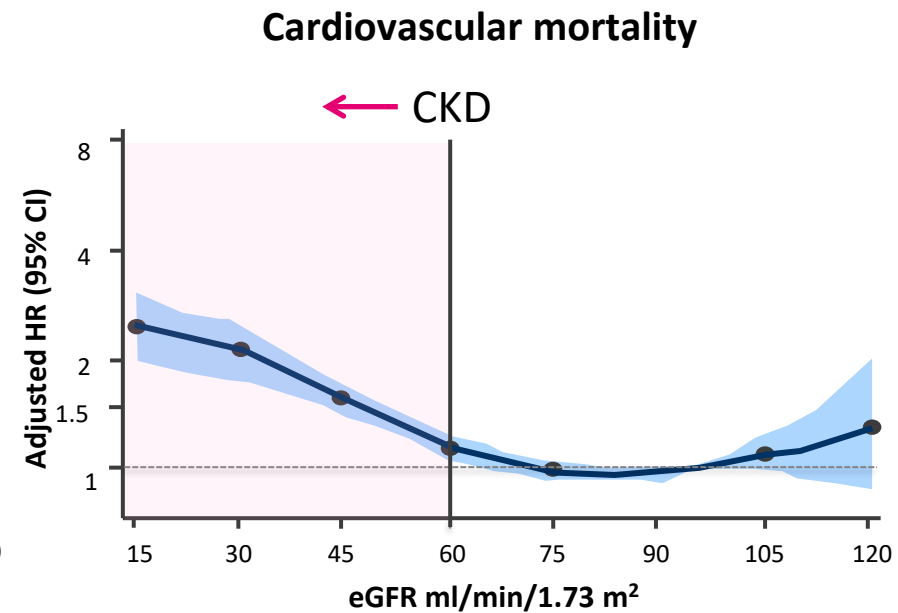
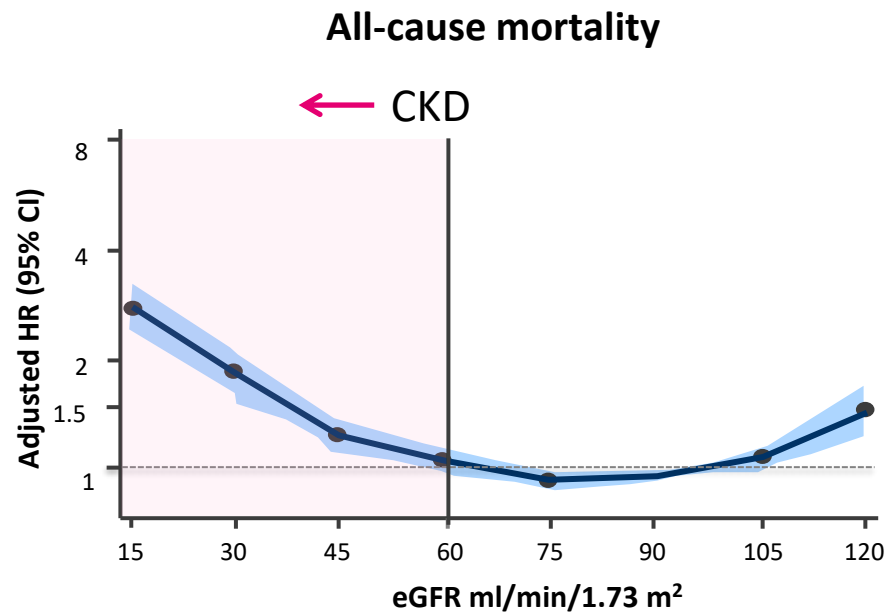
Relative risk of adverse outcomes

- Low risk
- Moderately increased risk
- High risk
- Very high risk

↓ eGFR is a Risk Factor for CV Death and All-Cause Mortality

347,256 hypertensive individuals
2,970,318 patient-years

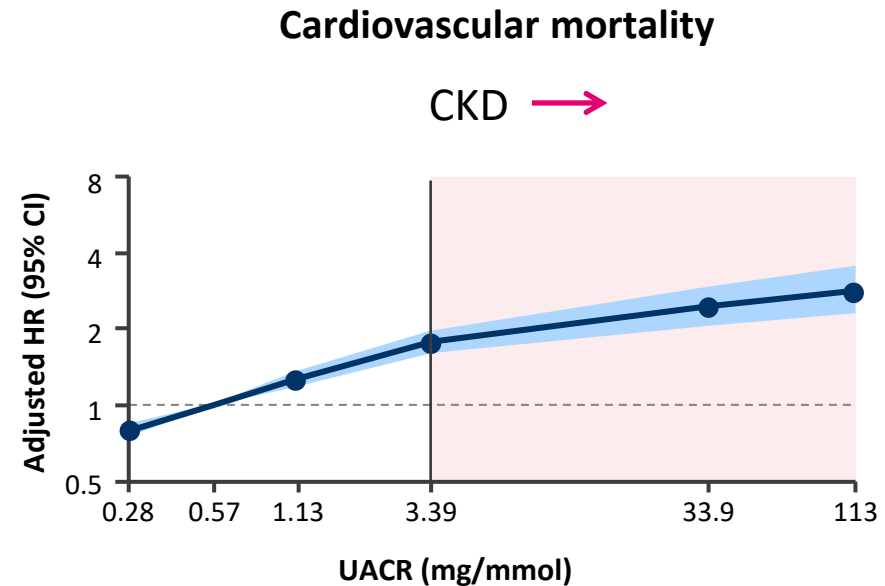
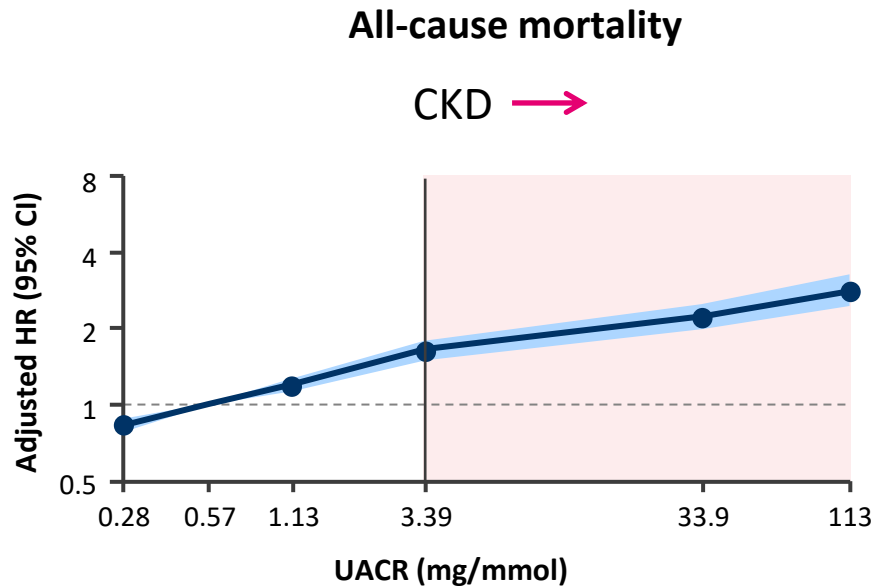
CV death/
all-cause
mortality



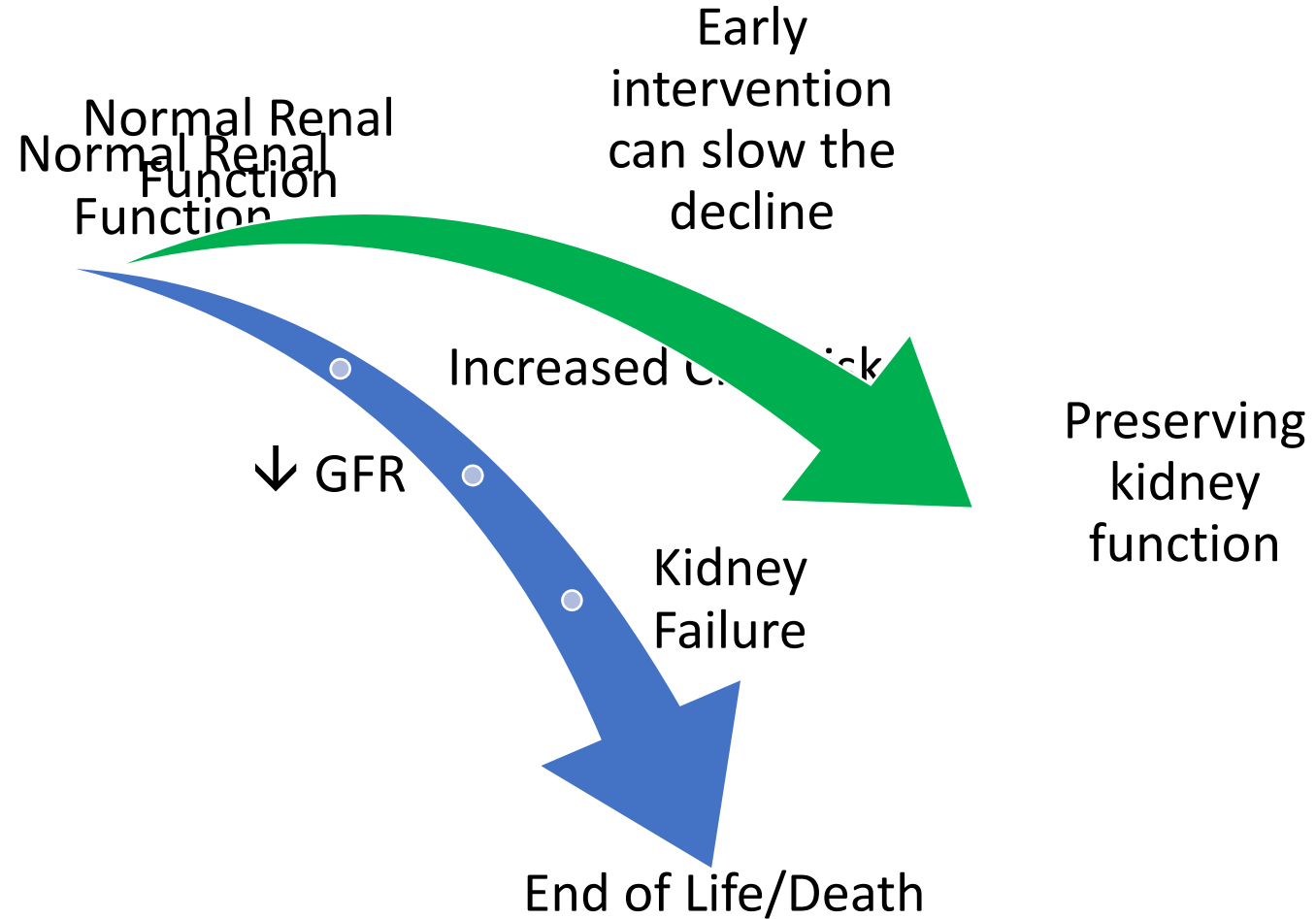
↑ ACR is a Risk Factor for CV Death and All-Cause Mortality

347,256 hypertensive individuals
2,970,318 patient-years

CV death/
all-cause
mortality



CKD is Commonly a Progressive and Spirally Condition



Complications of CKD

- Anemia
- Mineral abnormalities
 - Imbalances in calcium, vitamin D and phosphorus – increasing risk of bone disease
- Cardiovascular disease – Risk increases with ↓ GFR and ↑ ACR
- Dyslipidemia
- Hypertension
- Electrolyte disturbances (e.g. hyperkalemia)
- Uremia

KDIGO has
guidelines for most
of these
complications at:
<https://kdigo.org/guidelines/>

Calculating Risk of Kidney Failure Requiring Dialysis or Transplant

STAGES CAUSES STATS THE EQUATION CKD HANDBOOK RISK CALCULATOR VIDEO

THE KIDNEY FAILURE RISK EQUATION

Find out your real risk of kidney failure

WATCH

KIDNEY FAILURE RISK CALCULATOR

LEARN MORE ABOUT YOUR KIDNEYS

<https://kidneyfailurerisk.com/>

YOUR RESULTS

5.2 mg/mmol URINE ALBUMIN M SEX 52 AGE 52.0 mL/min/1.73 m² GFR

ASSESSMENT

STAGE 3

MODERATE DECREASE IN FUNCTION

CKD STAGES	GLOMERULAR FILTRATION RATE	Patient risk of progression to kidney failure requiring dialysis or transplant:
1	> 90	
2	90-60	
3	59-30	AT 2 YEARS: 0.39 % AT 5 YEARS: 1.23 %
4	29-15	
5	< 15	

Risk thresholds used in health systems include:

- 3-5 % over 5 years for referral to a kidney doctor
- 10 % over 2 years for team based care (Kidney Doctor, Nurse, Dietician, Pharmacist)
- 20-40 % over 2 years for planning a transplant or fistula

Managing CKD in Practice



Lifestyle Modification - Physical Activity

- ↓ physical function associated with ↑ mortality and ↓ QoL
- Recommendations are consistent with standard recommendations
- Recommend
 - 30 minutes of moderate aerobic activity, 5 times per week

PHYSICAL ACTIVITY

Performing a variety of types and intensities of physical activity, which includes:



- **Moderate to vigorous aerobic physical activities** such that there is an accumulation of at least 150 minutes per week
- Muscle strengthening activities using major muscle groups at least twice a week



- Several hours of **light physical activities**, including standing

SLEEP



Getting 7 to 9 hours of good-quality sleep on a regular basis, with consistent bed and wake-up times

SEDENTARY BEHAVIOUR



Limiting sedentary time to 8 hours or less, which includes:

- No more than 3 hours of recreational screen time
- Breaking up long periods of sitting as often as possible



<https://csepguidelines.ca/adults-18-64/>

Other Lifestyle Recommendations

- Achieve a healthy BMI (18.5-25 kg/m²)
- Smoking cessation
- Adequate fluid intake: Fluid restriction is not necessary for most patients
- Healthy diet: low sodium diet (<2000 mg/day)
- Protein – 0.8 g/kg/day in patients with GFR <30 mL/min

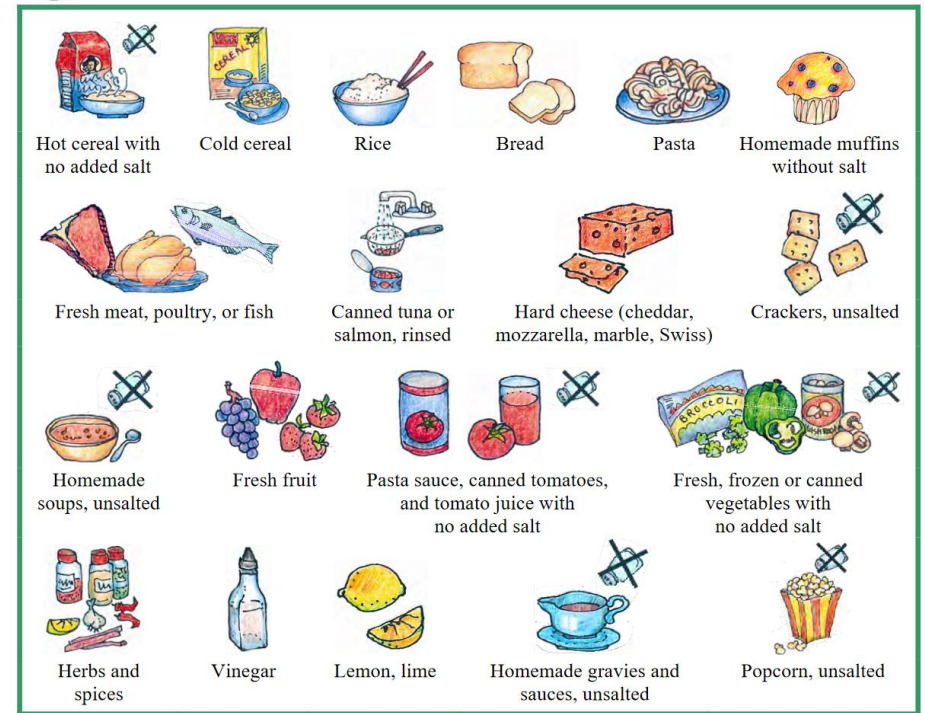
Sodium Foods

Many foods contain sodium (salt). Ask your dietitian how you can limit foods high in sodium.



Choose

These foods are low in sodium.



Limit

These foods have some sodium. Limit them to the amounts listed below.



Developed by Registered Dietitians
Nutrition Services
607808-NFS



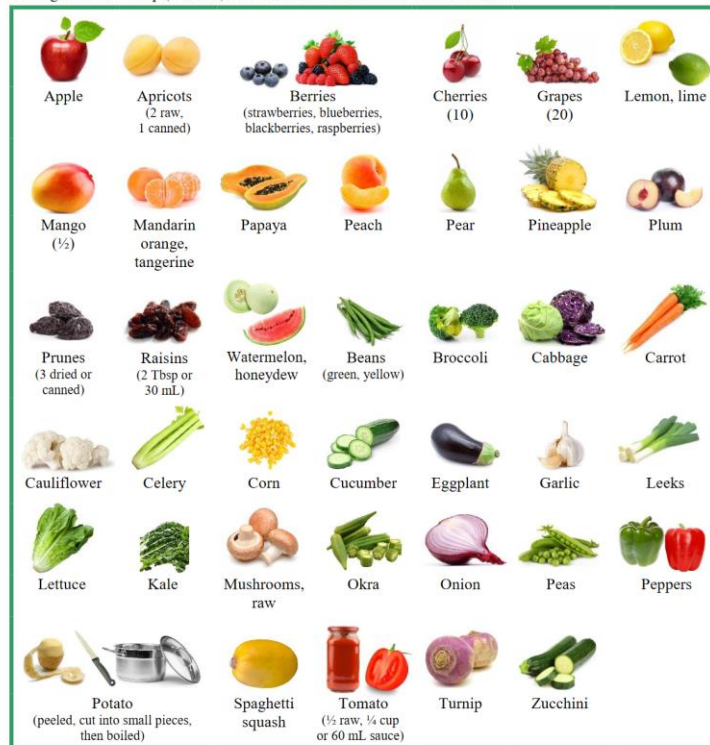
Some Patients Require Adjustment in Potassium and Phosphorus in their Diet

Potassium Foods

Ask your dietitian how many servings of potassium foods you should have from each group. Some packaged foods have potassium additives. Every time you shop, look for the word *potassium* in the ingredient list on food packages.

Low potassium foods

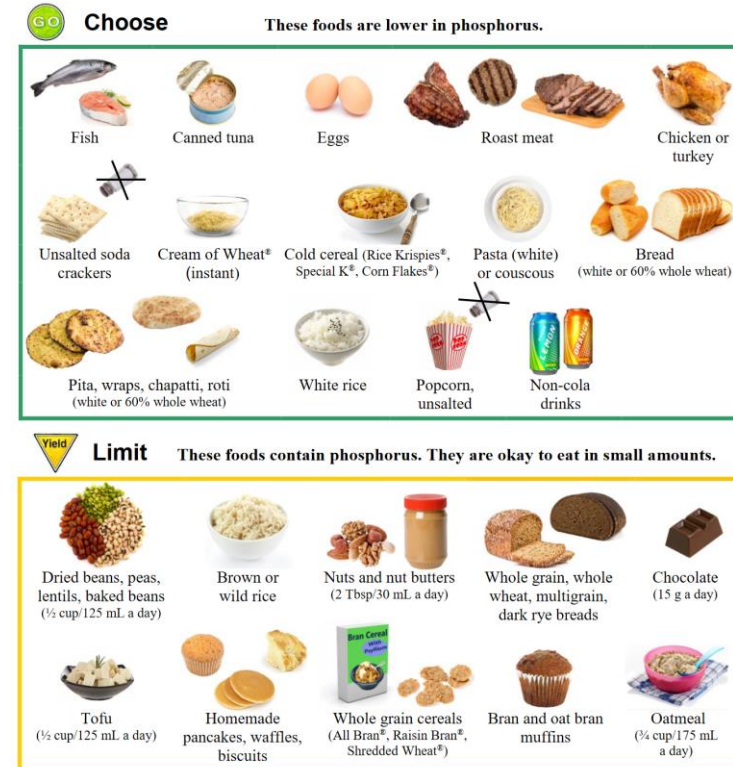
Serving sizes are ½ cup (125 mL) or 1 medium unless another amount is listed.



Phosphorus Foods

Talk to your dietitian about how much phosphorus (phosphate) is right for you every day. This handout can help you choose foods lower in phosphorus.

Limit or avoid packaged foods that have phosphate additives. Your body absorbs phosphorus from additives more easily than phosphorus that is naturally in foods. Every time you shop, look for the words *phosphorus* or *phosphoric* on ingredient lists.



Hypertension Management

- Individualize BP targets
 - Non-diabetic CKD and ≥ 50 years
 - Systolic BP target < 120 mmHg
 - Diabetes and CKD
 - Target $< 130/80$ mmHg
 - CKD not in the preceding two categories
 - Target $< 140/90$ mmHg
- ACEi or ARB (if there is proteinuria)
 - Diuretic as add-on, if required

2020 - 2022 HYPERTENSION HIGHLIGHTS

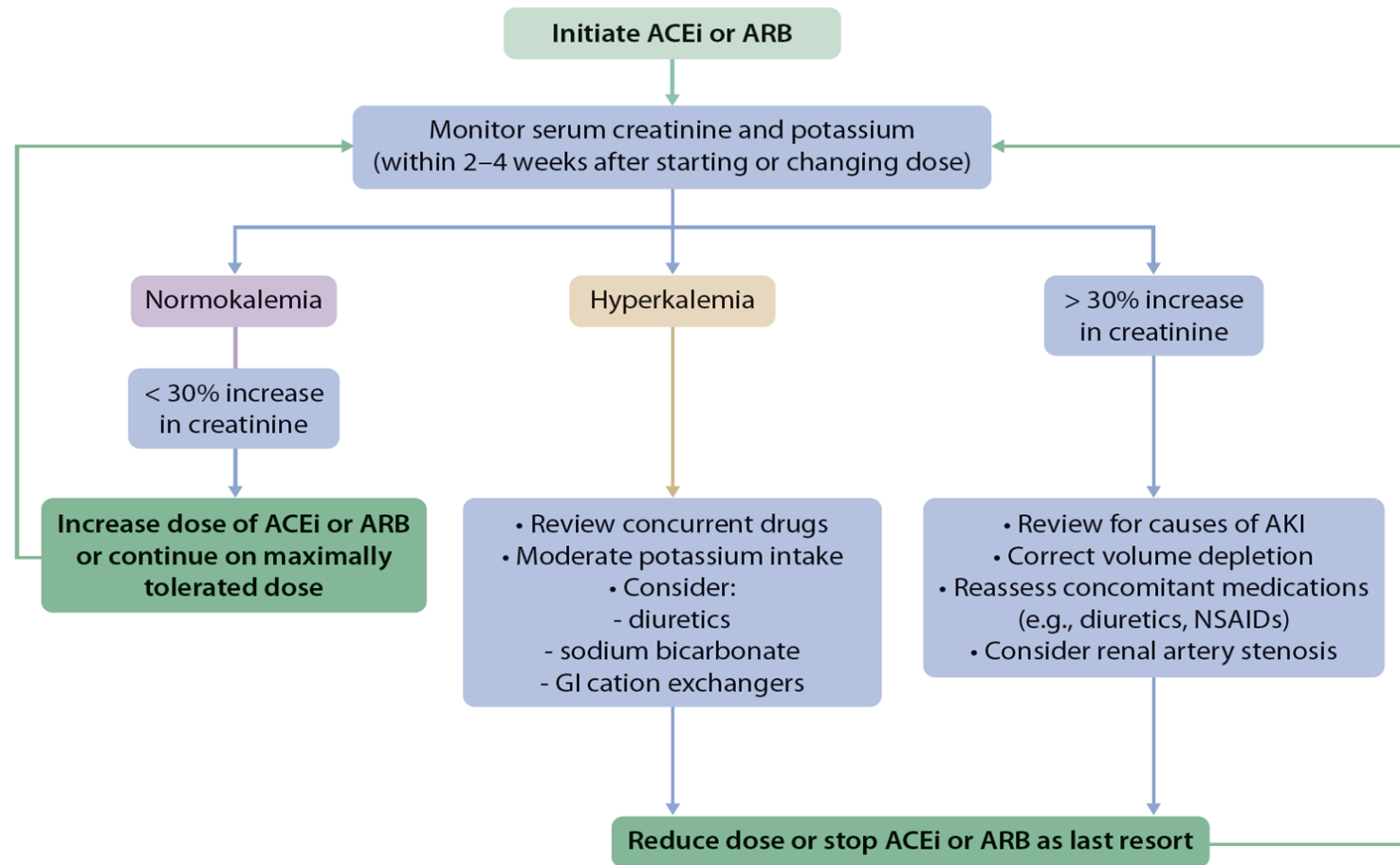


A Practical Guide informed
by the Hypertension Canada
Guidelines for the Prevention,
Diagnosis, Risk Assessment,
and Treatment of Hypertension



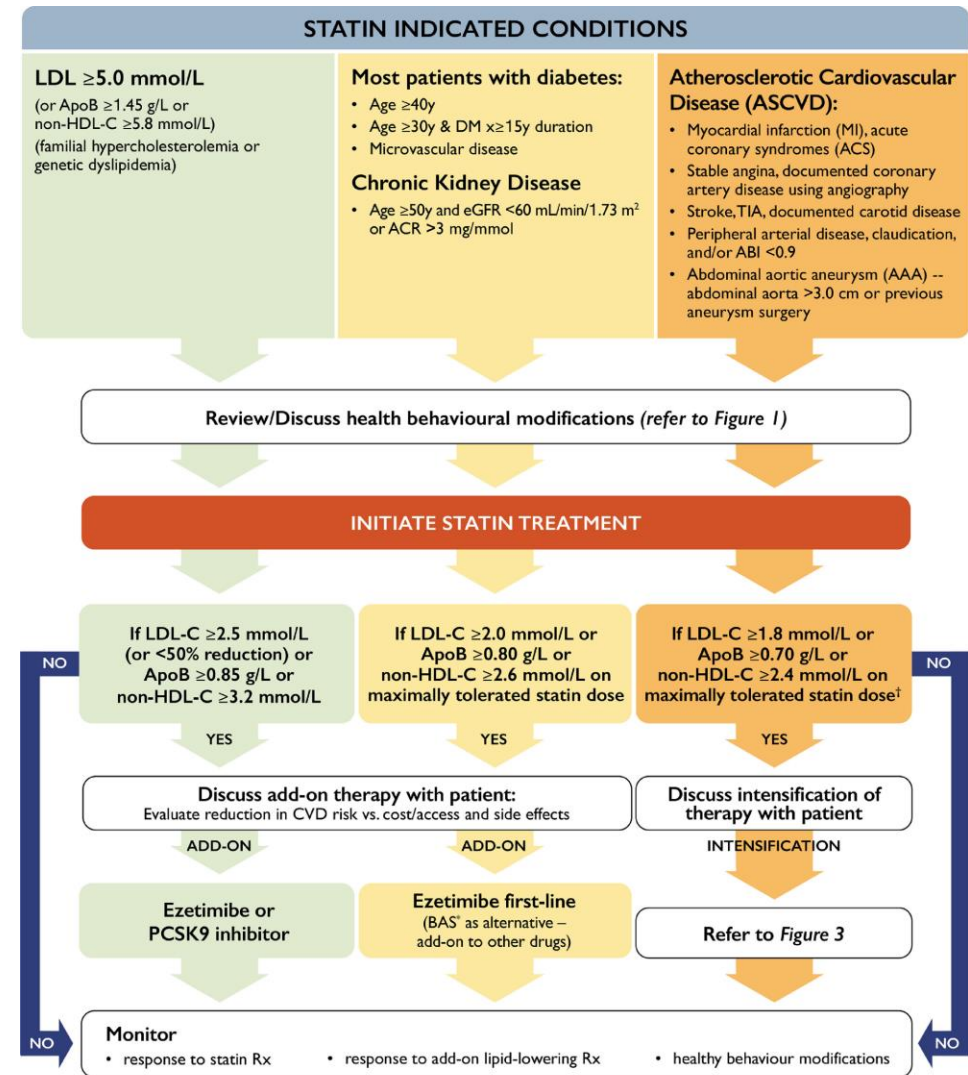
<https://hypertension.ca/>

Initiating ACEi or ARB in CKD



Dyslipidemia Management

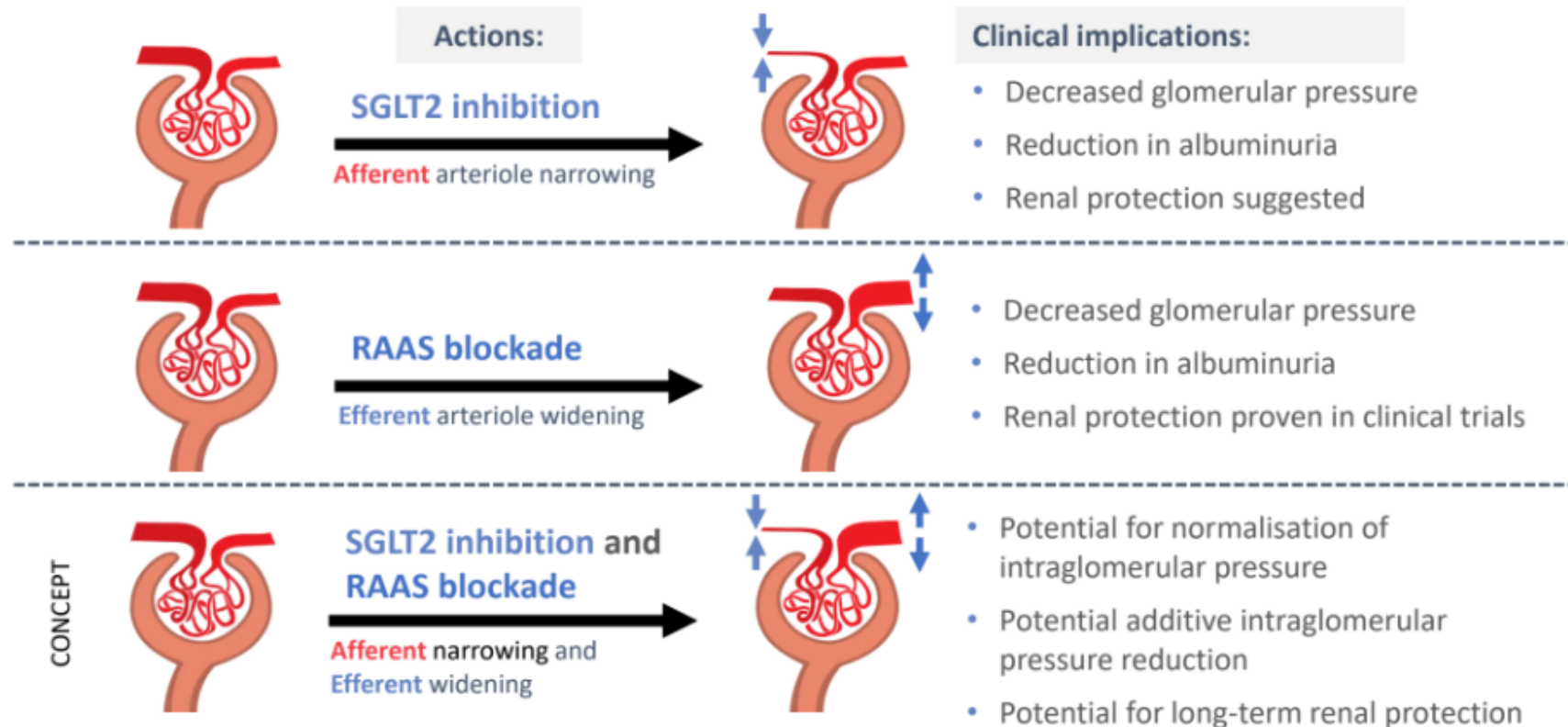
- Statin therapy is indicated for many people with CKD, regardless of LDL-C level
- Recommended for patients with CKD who are ≥ 50 years with
 - eGFR < 60 mL/min OR
 - ACR > 3 mg/mmol
- Any person with underlying ASCVD or 10-year CVD risk $> 10\%$
- Targets:
 - LDL-C < 2.0 mmol/L
 - ApoB < 0.8 g/L
 - Non-HDL-C < 2.6 mmol/L



Antiplatelet Therapy

- Low dose ASA (81 mg) may be used in secondary prevention
- Includes patients with history of:
 - Acute coronary syndrome
 - Prior myocardial infarction or coronary revascularization
 - Prior stroke or TIA
 - Peripheral vascular disease
- Low dose ASA should **NOT** be used in primary prevention or in those with history of ASA-induced GI bleed

Does Adding SGLT2i to ACEi or ARB Improve CKD Outcomes?



Empagliflozin is not indicated for CV risk reduction or kidney disease

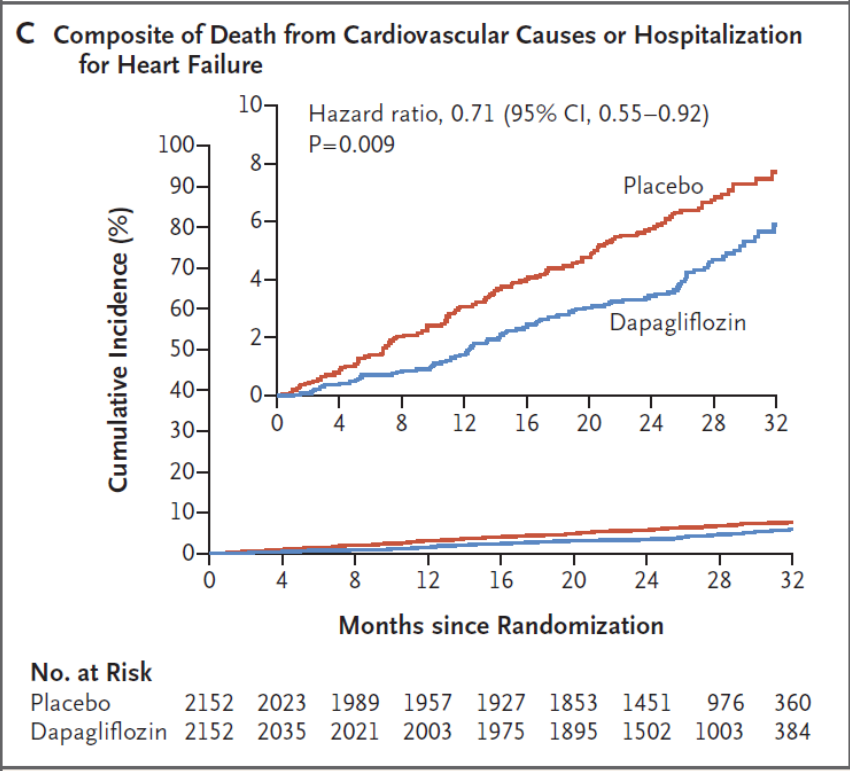
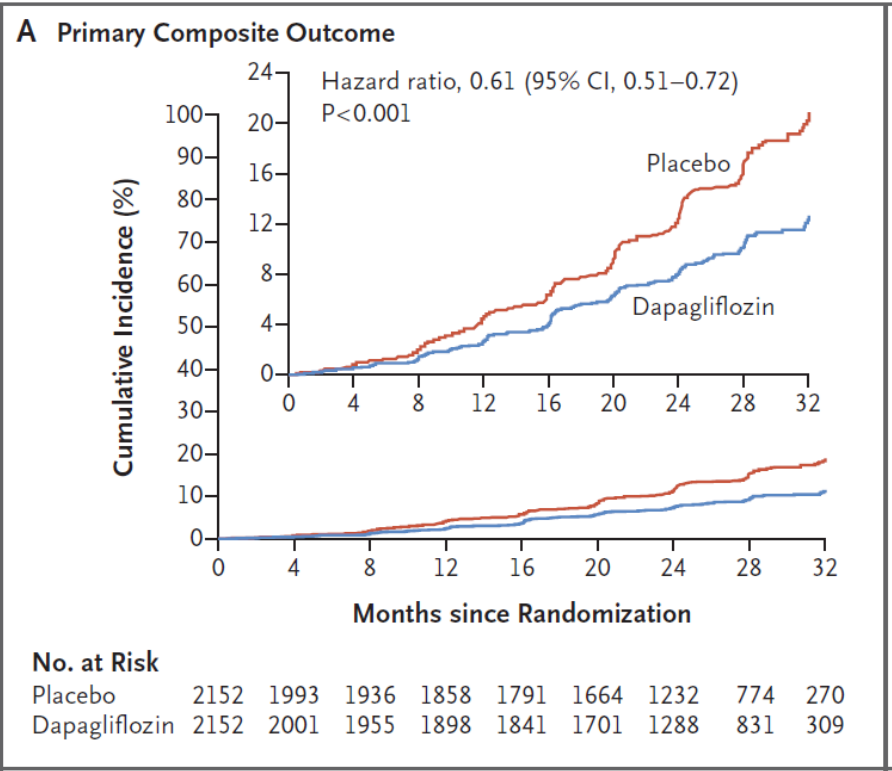
Adapted from: Cherney D et al. *Circulation* 2014;129:587; Lewis et al. *N Engl J Med* 2001;345:851; Kon V et al. *Kidney Int* 1993;44:545

DAPA-CKD Primary Endpoint & CV Death/HHF

Primary Composite Outcome: Sustained $\geq 50\%$ eGFR Decline, ESKD, Renal or CV Death

Secondary Composite Outcome: CV Death or Hospitalization for Heart Failure

NNT=19



Key Learning Point:

Pharmacists will start to see prescriptions for SGLT2i in people with CKD without diabetes. This is to improve renal and CV outcomes.

Patient Education – Lots of Great Tools

UNDERSTANDING YOUR DIAGNOSIS

Your Kidneys, Your Health



A GUIDEBOOK DESIGNED FOR INDIVIDUALS
DIAGNOSED WITH LATE STAGE
CHRONIC KIDNEY DISEASE

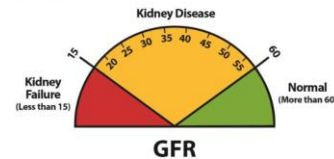
[https://kidneyfailurerisk.com/CKD_ha
ndbook_Jan_31st_2019.pdf](https://kidneyfailurerisk.com/CKD_ha
ndbook_Jan_31st_2019.pdf)

Living with Kidney Disease: What You Can Do to Manage Your Condition

Your GFR result on _____ was _____
Date

- A GFR of 60 or higher is in the normal range.
- A GFR below 60 may mean kidney disease.
- A GFR of 15 or lower may mean kidney failure.

GFR is glomerular filtration rate – a measure of how well your kidneys are working.

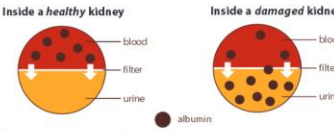


National Kidney Disease Education Program, National Institutes of Health

Your urine albumin result on _____ was _____
Date

- A urine albumin result below 3mg/mmol is normal
- A urine albumin result above 3mg/mmol may mean kidney disease

Albumin is a protein found in the blood. Damaged kidneys let some albumin pass into the urine. The less albumin in your urine, the better.



National Kidney Disease Education Program, National Institutes of Health

Your blood pressure result on _____ was _____
Date

You can protect your kidneys by controlling your blood pressure to **less than 140/90** (if you have diabetes this should be less than 130/80).

- Check your blood pressure as prescribed
- Take your medication as prescribed at the same time each day
- Do not skip doses or stop taking medication without checking with your doctor

Sept 15/2014

<http://www.ckdpathway.ca/Content/pdfs/LivingwithKidneyDisease.pdf>

Tips for Managing your Kidney Disease

- 1. Choose and prepare foods with less salt**
To help control your blood pressure – aim for less than 2,000mg of sodium/day (equals 1 level teaspoon of salt)
 - Buy fresh, unprocessed food.
 - Do not add salt to your food at the table.
 - Do not use salt substitutes when cooking.
 - Use spices and herbs in place of salt.
 - Choose fresh and frozen food over canned food.
 - Rinse canned foods before eating them.
- 2. Choose foods that are healthy for your heart**
To help keep fat from building up in your blood vessels.
 - Grill, broil, bake, roast or stir-fry foods instead of frying.
 - Trim fat from meat and remove skin from poultry before eating.
- 3. Be physically active**
To improve blood pressure, blood sugar and blood cholesterol.
 - Make exercise a regular part of your life
 - Aim for 30 minutes of activity 5 times per week.
- 4. Maintain a healthy weight**
To protect your kidneys.
 - Being overweight makes your kidneys work harder. Losing weight helps kidneys last longer.
 - Maintain a healthy weight (Body Mass Index (BMI) between 18.5 to 25).
- 5. Quit smoking** – cigarette smoking can make kidney damage worse.
- 6. If you have diabetes, control your blood glucose levels (A1C below 7%).** Good blood glucose control may help prevent or delay diabetes complications and kidney disease.

For more information, visit the Kidney Foundation of Canada website: www.kidney.ca

Your Next Appointment is:

Date: _____
 Time: _____
 Location: _____
 Other Notes/Goals: _____



Managing Daniel



Key points

- Candidate for statin
- Monitor for eGFR/K+ in 2 weeks
- Lifestyle is important to improve outcomes

Pharmacist course of action:

- Educate patient on CKD and its link to complications and lifestyle changes
- Contacts physician to recommend she consider statin
- Recommends home BP monitor, goal is systolic < 120 mmHg

• Background

- 52 years old
- Presenting today with a prescription for ramipril 2.5 mg and dapagliflozin 10 mg today
- He does not have diabetes

• Medications

- None expect what was prescribed today

• Discussion

- Some lab work a few months showed some signs of kidney problem
- After more testing was diagnosed with kidney disease today (eGFR = 52 mL/min)
- He is shocked because he feels fine and has no symptoms

Meet Rebecca

- Background
 - 59 years
 - Type 2 diabetes X 5 years
 - Dyslipidemia, hypertension X 15 years
- Medications
 - Metformin 1000 mg BID
 - Perindopril 4 mg daily
 - Atorvastatin 20 mg daily
- Assessment and Labs
 - BMI = 28 kg/m²
 - BP = 134/78 mmHg
 - A1C = 6.8%
 - LDL-C = 1.7 mmol/L
 - eGFR = 51 mL/min
 - ACR = 4.2 mg/mmol
- Discussion
 - Patient is in for refills
 - Says she is feeling well and NP is very happy with how well her diabetes is managed



Interactive Question


If Rebecca was your patient, what would be your course of action? (please check all that apply)

- a) Nothing at this point
- b) Add another BP medication to get systolic BP < 120 mmHg
- c) Adjust perindopril
- d) Add SGLT2 inhibitor
- e) Add GLP-1 RA
- f) Cut dose of metformin to 500 mg BID




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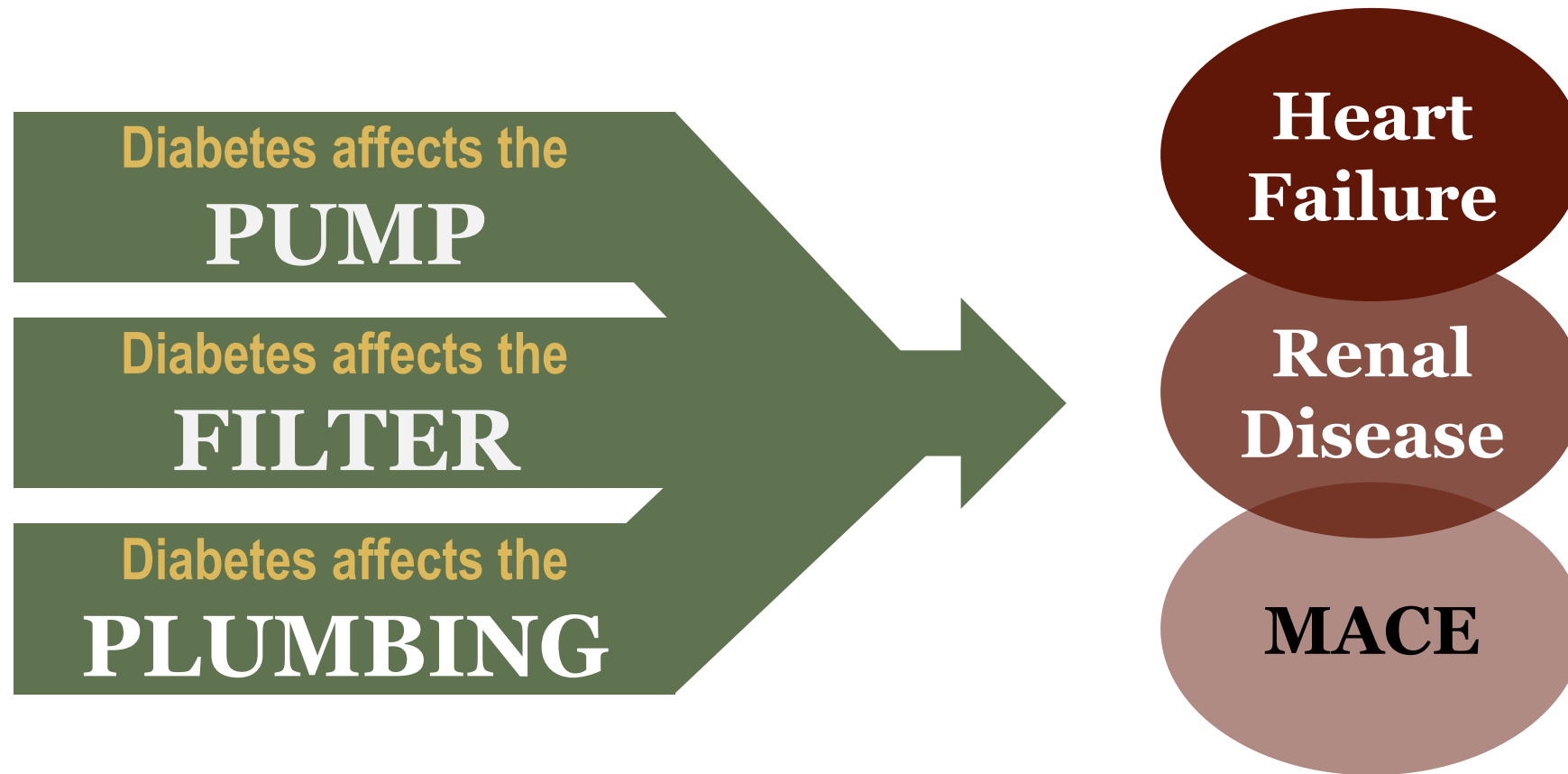
Key Considerations for Diabetes with CKD

- 
- Setting glycemic targets
 - Beyond glycemic control
 - Holistic Approach – KDIGO
 - ABCDESSS from Diabetes Canada
 - Adjustment in antihyperglycemic agents
 - Medication dose adjustment
 - Practical SGLT2i initiation

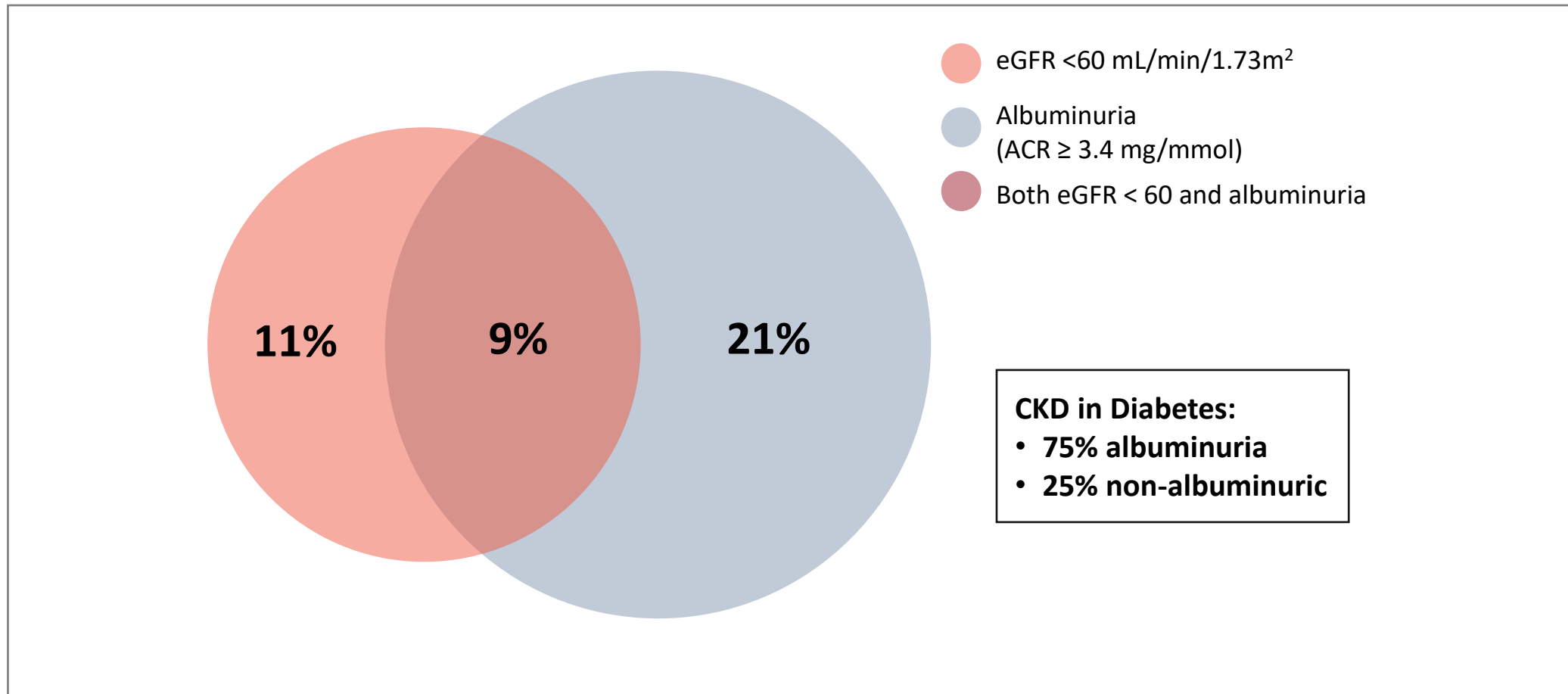
1. Setting Glycemic Targets

≤6.5	Adults with type 2 diabetes to reduce the risk of CKD and retinopathy if at low risk of hypoglycemia
≤7.0	MOST ADULTS WITH TYPE 1 OR TYPE 2 DIABETES
7.1  8.5	7.1-8.0%: Functionally dependent* 7.1-8.5%: <ul style="list-style-type: none"> • Recurrent severe hypoglycemia and/or hypoglycemia unawareness • Limited life expectancy • Frail elderly and/or with dementia**
Avoid higher A1C to minimize risk of symptomatic hyperglycemia and acute and chronic complications	
End of life	A1C measurement not recommended. Avoid symptomatic hyperglycemia and any hypoglycemia

2. Thinking Beyond Glycemic Control

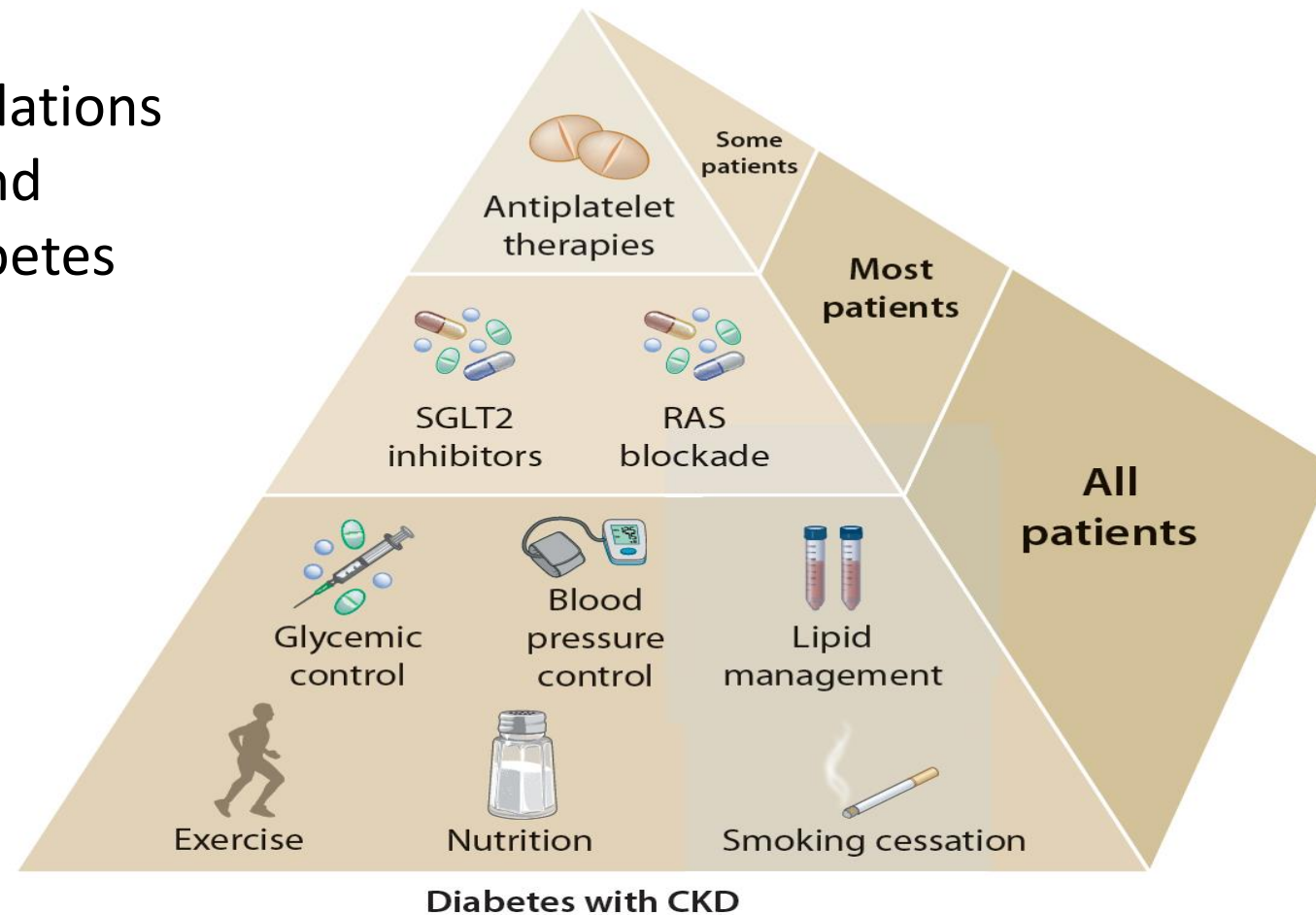


40% of Patients with Type 2 Diabetes Have Chronic Kidney Disease (CKD)



3. KDIGO Recommendations for Diabetes with CKD

Similar recommendations for patients with and without type 2 diabetes



4. Cardiovascular Protection – Know your ABCDES³

A	A1C targets	A1C ≤ 7%
B	BP targets	BP < 130/80 mmHg
C	Cholesterol targets	LDL-C < 2.0 mmol/L
D	Drugs for CV and/or cardiorenal protection	ACEi/ARB (if CVD, age ≥ 55 with risk factors, OR diabetes complications) Statin (if CVD, age ≥ 40 for Type 2, OR diabetes complications) ASA (if CVD) SLGT2i/GLP1-RA with demonstrated cardiorenal benefits in high-risk type 2 diabetes with ASCVD, CHF, CKD or ≥ 60 years with ≥ 2 CV risk factors
E	Exercise goals and healthy Eating	150 minutes of moderate to vigorous aerobic activity/ week and resistance exercises 2-3 times/week Follow healthy dietary pattern (i.e. Mediterranean diet, low glycemic index)
S	Screening for complications	Cardiac: ECG every 3-5 years if age > 40 OR diabetes complications Foot: Monofilament/Vibration yearly or more if abnormal Kidney: Test eGFR and ACR yearly, or more if abnormal Retinopathy: yearly dilated retinal exam
S	Smoking cessation	If smoker: Ask permission to give advice, arrange therapy and provide support
S	Self-management , stress, other barriers	Set personalized goals Assess for stress, mental health, and financial or other concerns that might be barriers to achieving goals

ACEi/ARB and Statin

ACEi/ARB

- Clinical CVD
- Age >55 years & CV risk factor or end organ damage (albuminuria, retinopathy, left ventricular hypertrophy)
- Microvascular complications
- Doses for vascular protection
 - Perindopril 8 mg daily
 - Ramipril 10 mg daily
 - Telmisartan 80 mg daily
- **Regardless of baseline BP**

Statin in Diabetes

- Cardiovascular disease or
- Age ≥ 40 yrs or
- Microvascular complications or
- DM >15 yrs duration and age >30 yr or
- Warrants therapy based on other guidelines
- **Regardless of baseline LDL-C**

5. Adjustment in Antihyperglycemic Agents

Regular review

- Assess glycemic control, CV and renal status
- Screen for complications (eyes, feet, kidneys)
- Review efficacy, side effects, safety and ability to take current medications
- Reinforce and support healthy behaviour interventions

If A1C NOT at target and/or change in clinical status

Adjust or advance therapy*

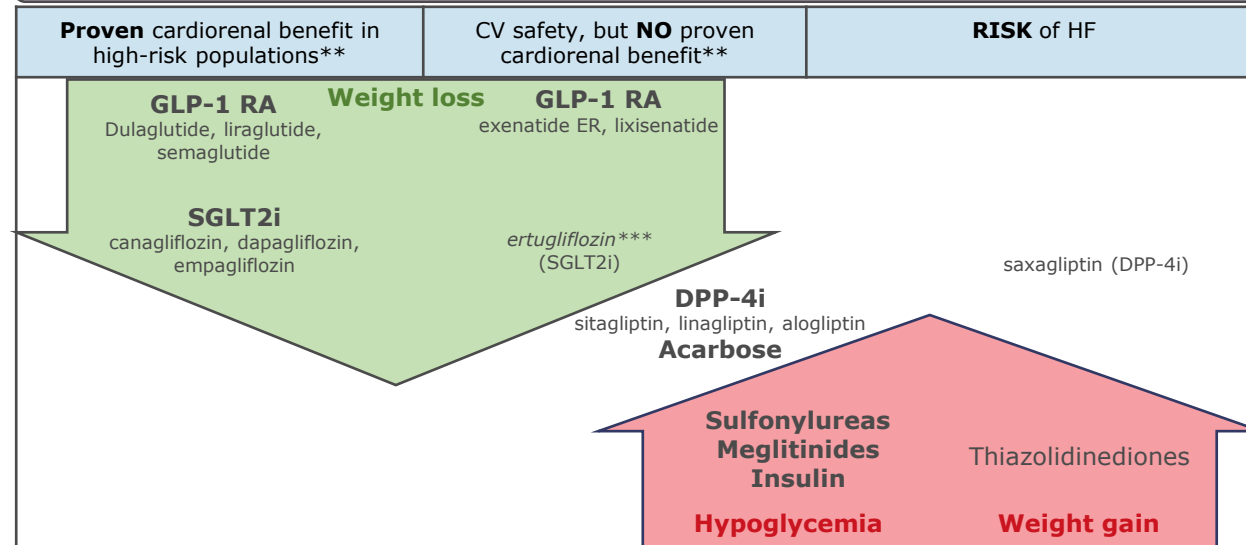
ASCVD, CKD or HF or age>60 with 2 CV risk factors[†]

ADD or SUBSTITUTE AHA with demonstrated cardiorenal benefits

		Established CV or renal disease			Risk factors
		ASCVD	CKD	HF	>60 years with CV risk factors
Lower risks observed in outcome trials	MACE	GLP-1 RA or SGLT2i*	SGLT2i* or GLP-1 RA		GLP-1 RA
	HHF	SGLT2i*	SGLT2i*	SGLT2i* (and lower CV mortality)	SGLT2i*
	Progression of nephropathy	SGLT2i*	SGLT2i*		SGLT2i*
		Grade A evidence	Grade B evidence	Grade C or D evidence	*only if eGFR>30ml/min/1.73m ²

A1C above target and glucose lowering required

ADD or SUBSTITUTE AHA^{††} according to clinical priorities^{†††}
start insulin for symptomatic hyperglycemia and/or metabolic decompensation



Fixed-dose combinations may be considered to reduce burden

*Changes in clinical status may necessitate adjustment of glycemic targets and/or deprescribing. [†]Tobacco use dyslipidemia or hypertension. ^{††}All AHAs have Grade A evidence for effectiveness to reduce blood glucose levels. ^{†††}Consider degree of hyperglycemia, costs and coverage, renal function, comorbidity, side effect profile and potential for pregnancy. ^{**}In CV outcome trials performed in people with ASCVD, CKD, HF or at high CV risk. ^{***}VERTIS presented at ADA June 2020 showed noninferiority for MACE.

AHA, antihyperglycemic agent; ASCVD, atherosclerotic cardiovascular diseases; CKD, chronic kidney disease; CV, cardiovascular disease; DPP-4i, dipeptidyl peptidase-4 inhibitor; GLP-1 RA, glucagon-like peptide 1 receptor agonist; HF, heart failure; HHF, hospitalization for heart failure; MACE, major adverse cardiovascular events; SGLT2i, sodium glucose co-transporter 2 inhibitor

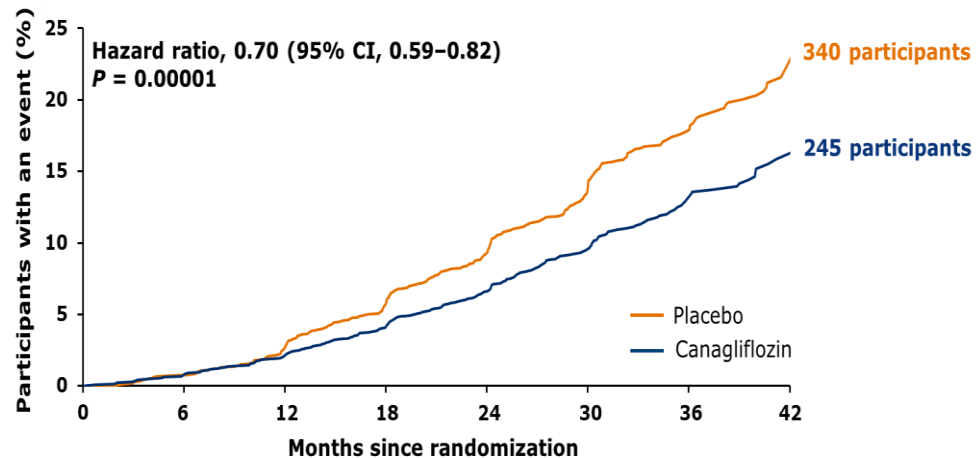
Lipscombe, Lorraine, Sonia Butalia, Kaberi Dasgupta, Dean T. Eurich, Lori MacCallum, Baiju R. Shah, Scot Simpson, and Peter A. Senior. "Pharmacologic Glycemic Management of Type 2 Diabetes in Adults: 2020 Update." Canadian Journal of Diabetes 44, no. 7 (October 1, 2020): 575–91.

<https://doi.org/10.1016/j.cjcd.2020.08.001>

CREDESCENCE Primary Endpoint & HF Endpoint

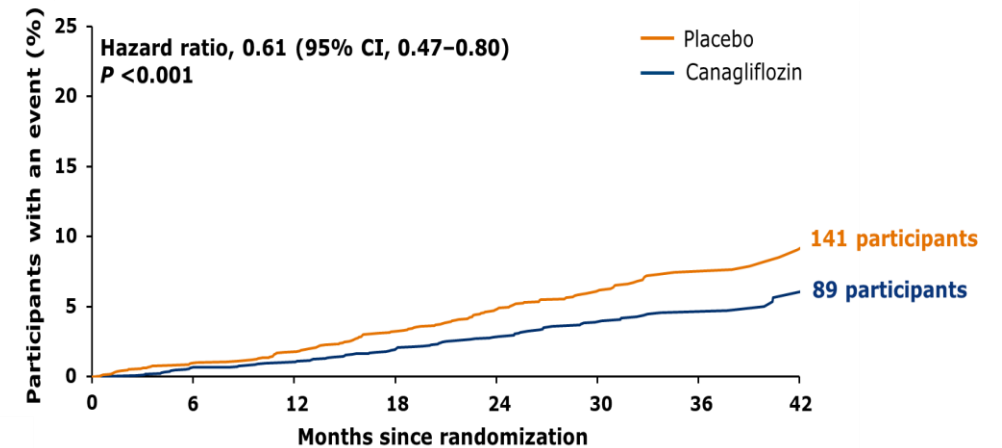
Primary Outcome: ESKD, Doubling of Serum Creatinine, or Renal or CV Death

NNT = 23



No. at risk	0	6	12	18	24	30	36	42
Placebo	2199	2178	2132	2047	1725	1129	621	170
Canagliflozin	2202	2181	2145	2081	1786	1211	646	196

Hospitalization for Heart Failure



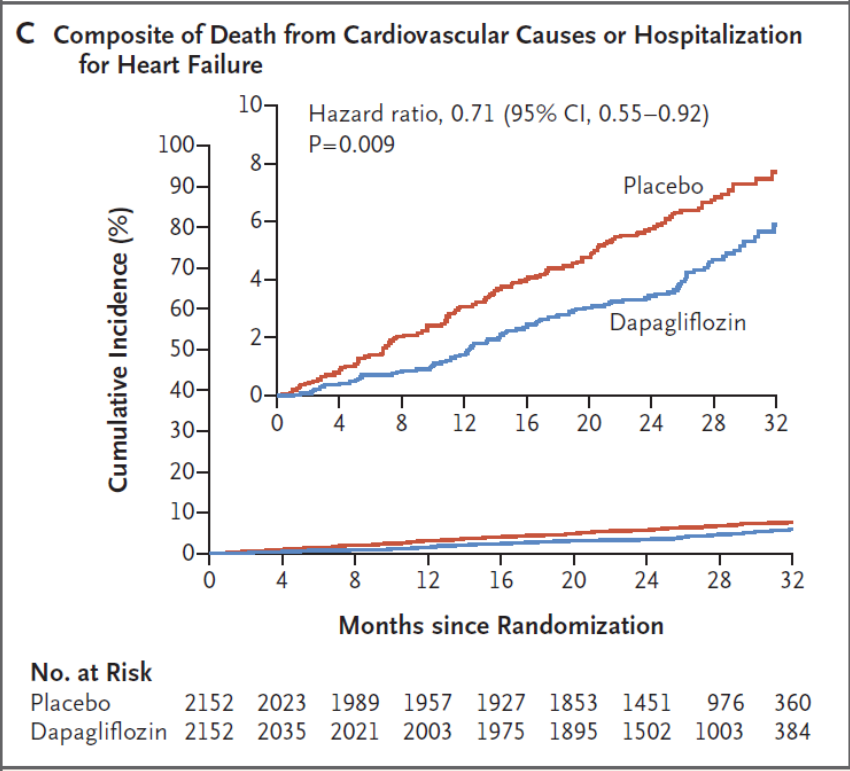
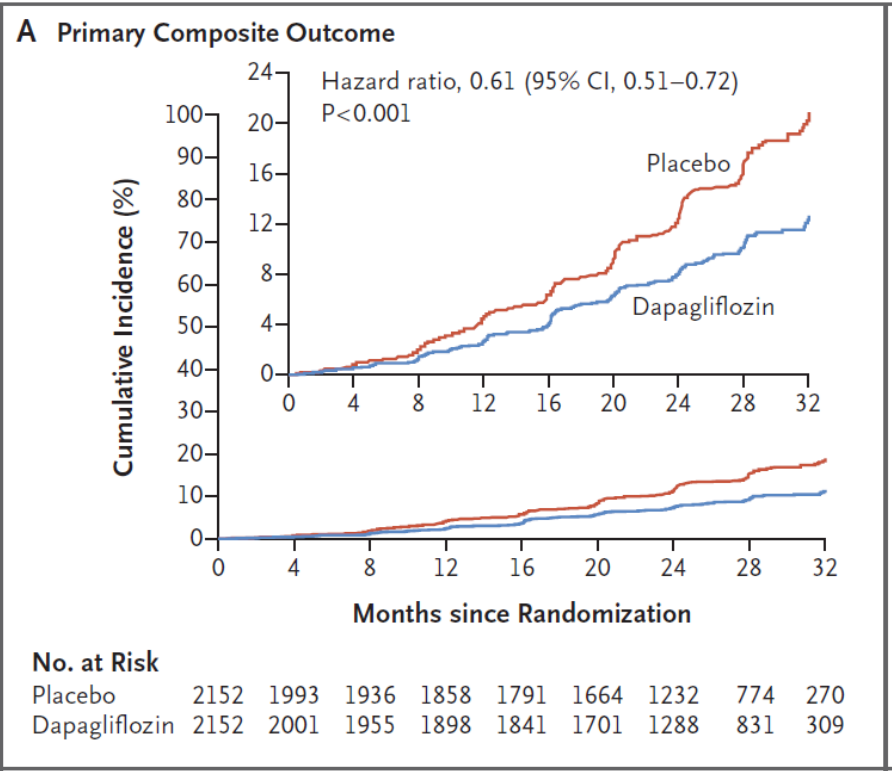
No. at risk	0	6	12	18	24	30	36	42
Placebo	2199	2165	2122	2043	1735	1147	638	170
Canagliflozin	2202	2171	2131	2076	1789	1226	668	199

DAPA-CKD Primary Endpoint & CV Death/HHF

Primary Composite Outcome: Sustained $\geq 50\%$ eGFR Decline, ESKD, Renal or CV Death

Secondary Composite Outcome: CV Death or Hospitalization for Heart Failure

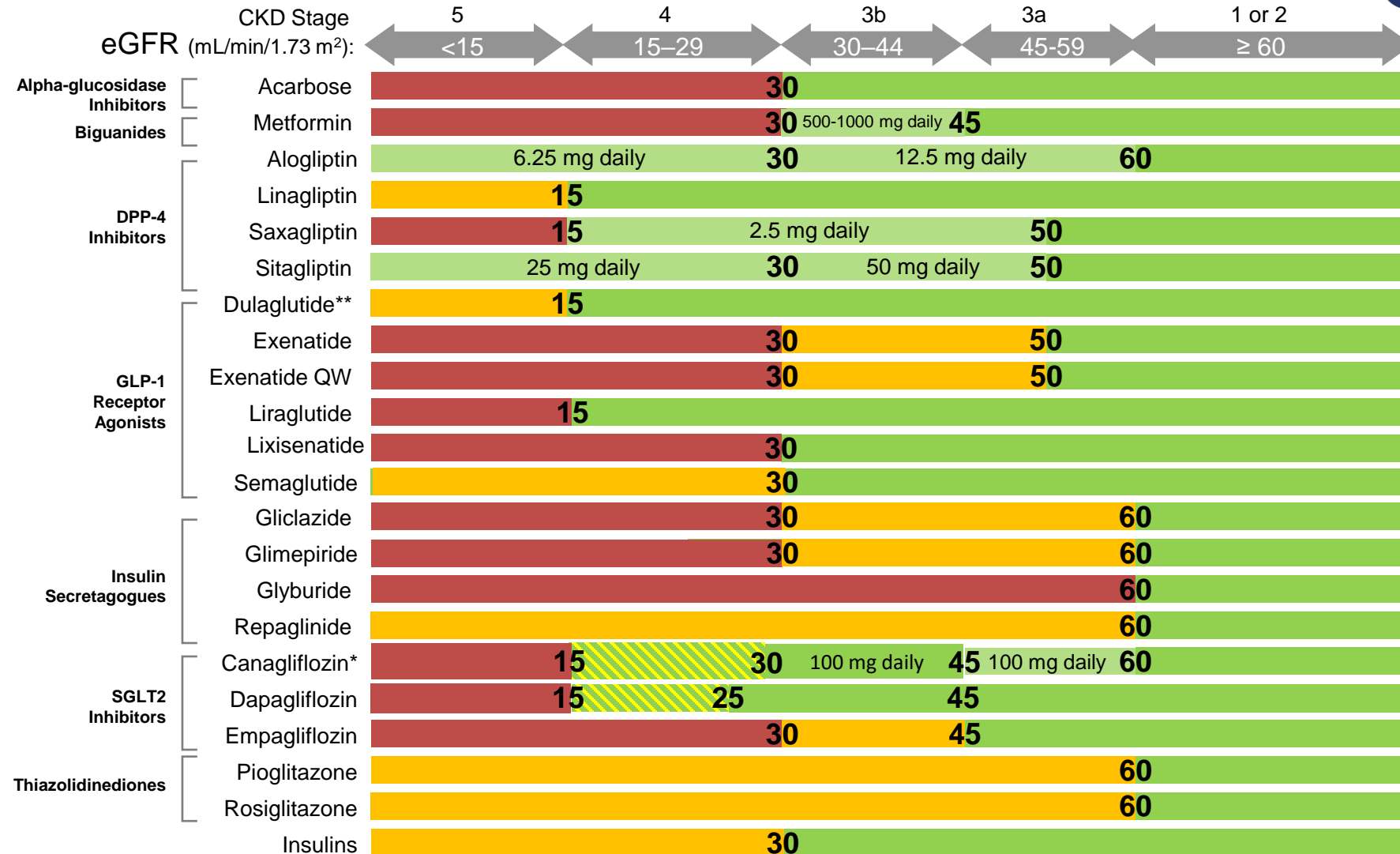
NNT=19



Key Learning Point:

Diabetes guidelines recommend SGLT2i to improve renal outcomes, regardless of the patient's A1C level.

6. Medication Dose Adjustment



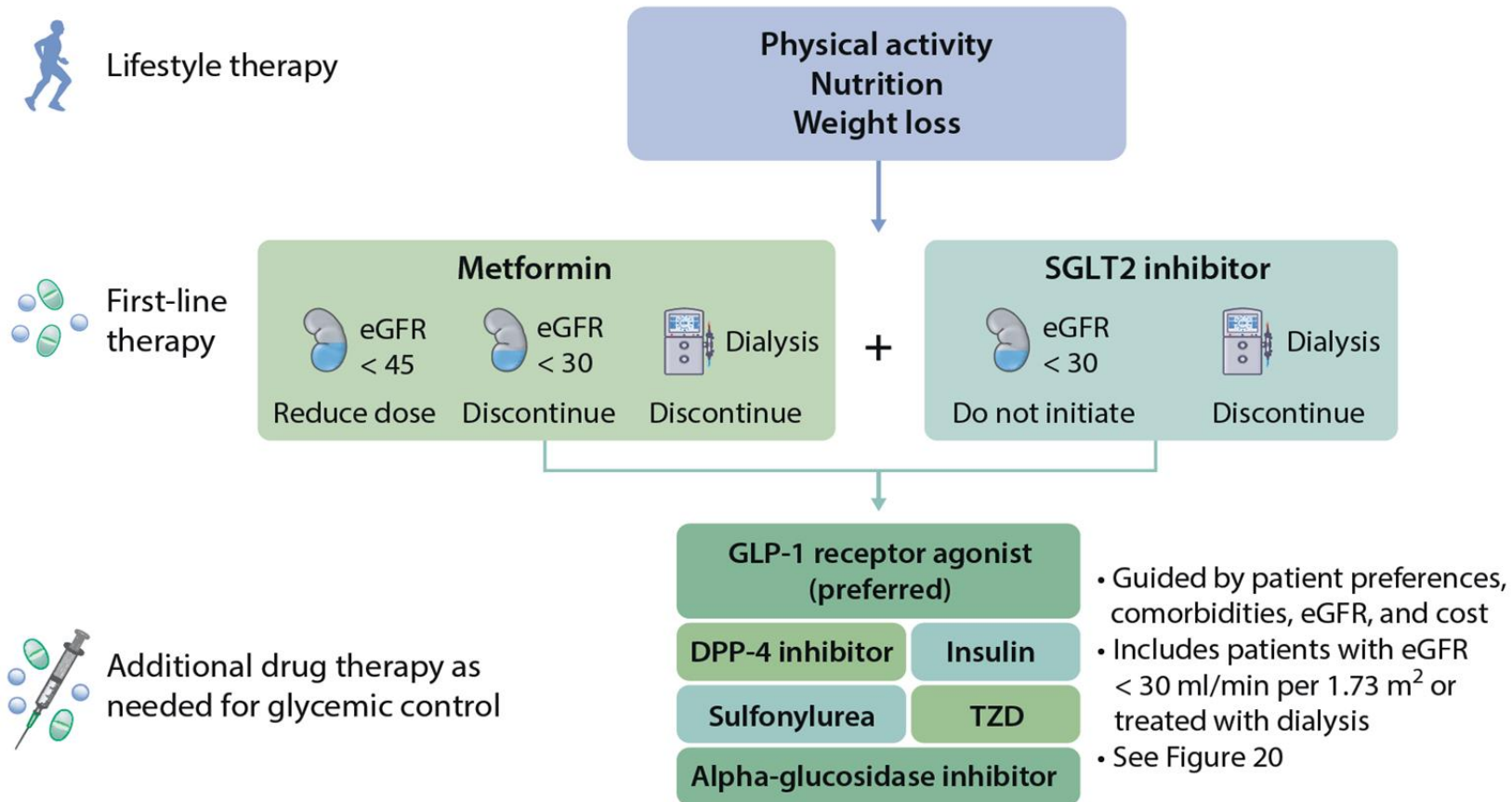
■ Use alternative agent
 ■ Dose adjustment required
 ■ Caution
 Do not initiate
 ■ Dose adjustment not required

* May be used for cardiorenal benefits in those with clinical CVD, A1C above target and eGFR >30 mL/min/1.73m²

**Based on the dulaglutide Product Monograph, it should be used with caution in patients with an eGFR of <30 mL/min/1.73m². The renal recommendations for dulaglutide from Diabetes Canada are based on data from AWARD-7, which demonstrated safety of dulaglutide in patients with moderate-to-severe CKD

Adapted from Lipscombe L et al. Can J Diabetes 2018;42(Suppl 1):S88-S103. ; Jardiance Product Monograph. Boehringer Ingelheim (Canada) Ltd. April 16, 2018. ; and Ozempic Product Monograph. Novo Nordisk Canada Inc. January 4, 2018.

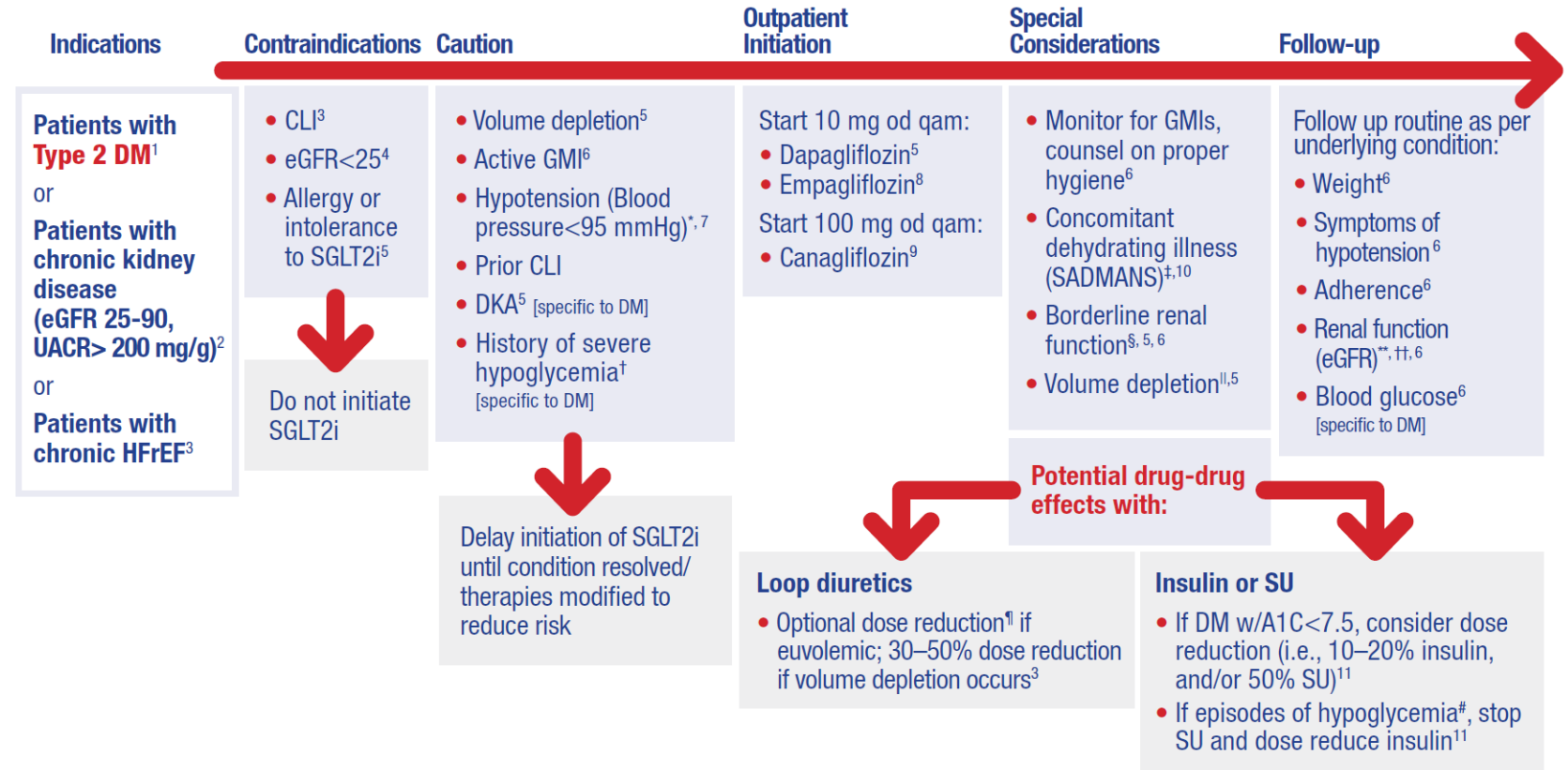
Metformin and SGLT2i Based on eGFR



7. Practical SGLT2i Initiation

Resource on SGLT2i initiation from Canadian Heart Failure Society

https://heartfailure.ca/sites/default/files/chfs_practical_approach_algorithm_sgl2i_0.pdf



Abbreviations:

CLI: critical limb ischemia; **DKA:** diabetic ketoacidosis; **DM:** diabetes mellitus; **eGFR:** estimated glomerular filtration rate; **GMI:** genital mycotic infections; **HFrEF:** heart failure with reduced ejection fraction; **SGLT2i:** SGLT2 inhibitors; **SU:** sulfonylurea; **UACR:** urine albumin to creatinine ratio

This document has been exclusively developed and approved by the CHFS. CHFS has received unrestricted financial support from AstraZeneca and the Boehringer-Ingelheim - Lilly Alliance.

SADMANS in Patients with CKD

- When patient is ill and can't maintain fluid intake or have an acute decline in renal function
- Normally stop therapy and restart when patient is hydrated

S	Sulfonylureas
A	ACE inhibitors
D	Diuretics, direct renin inhibitors
M	Metformin
A	Angiotensin receptor blockers
N	Nonsteroidal anti-inflammatory
S	SGLT2 inhibitors

Instructions for Health-Care Professionals:

If people with diabetes become ill and are unable to maintain adequate fluid intake, or have an acute decline in renal function (e.g. due to gastrointestinal upset or dehydration), they should be instructed to hold medications which will:

A) Increase risk for a decline in kidney function:

- Angiotensin-converting enzyme inhibitors
- Angiotensin receptor blockers
- Direct renin inhibitors
- Nonsteroidal anti-inflammatory drugs
- Diuretics
- SGLT2 inhibitors

B) Have reduced clearance and increase risk for adverse effects:

- Metformin
- Sulfonylureas (gliclazide, glimepiride, glyburide)

S sulfonylureas
A ACE inhibitors
D diuretics, direct renin inhibitors

M metformin
A angiotensin receptor blockers
N nonsteroidal anti-inflammatory
S SGLT2 inhibitors

Please complete the following card and give it to your patient.

People with diabetes should be instructed that increased frequency of self blood glucose monitoring will be required, and adjustments to their doses of insulin or noninsulin antihyperglycemic agents may be necessary.

Instructions for People with Diabetes

When you are ill, particularly if you become dehydrated (e.g. vomiting or diarrhea), some medicines could cause your kidney function to worsen or result in side effects.

If you become sick and are unable to drink enough fluid to keep hydrated, you should **STOP** the following medications:

- Blood pressure pills
- Water pills
- Metformin
- Diabetes pills
- Pain medications
- Nonsteroidal anti-inflammatory drugs (see below)

Please be careful not to take nonsteroidal anti-inflammatory drugs (which are commonly found in pain medications [e.g. Advil] and cold remedies).

Please check with your pharmacist before using over-the-counter medications and discuss all changes in medication with your health-care professional.

Please increase the number of times you check your blood glucose levels. If they run too high or too low, contact your health-care professional.

If you have any problems, you can call:

Managing Rebecca



Key Considerations

- BP not at target
- Perindopril at lower than recommended dose for CV protection
- A1C could be lowered to < 6.5%

Pharmacist course of action

- Educates Rebecca on CKD risk and diabetes
- Contacts NP to discuss addition of SGLT2i and increase in dose of perindopril
- Importance of checking GFR and potassium 2 weeks after changes
- Recommends home BP monitoring to get the patient to target

• Background

- 59 years
- Type 2 diabetes X 5 years
- Dyslipidemia, hypertension X 15 years

• Medications

- Metformin 1000 mg BID
- Perindopril 4 mg daily
- Atorvastatin 20 mg daily

• Assessment and Labs

- BMI = 28 kg/m²
- BP = 134/78 mmHg
- A1C = 6.8%
- LDL-C = 1.7 mmol/L
- eGFR = 51 mL/min
- ACR = 4.2 mg/mmol

• Discussion

- Patient is in for refills
- Says she is feeling well and NP is very happy with how well her diabetes is managed

Key Learning Points

1. CKD is common in Canada and can lead to poor outcomes in people with and without diabetes
2. CKD is associated with an increase in mortality and CV death
3. Guidelines recommend lifestyle changes, BP and dyslipidemia management
4. SGLT2i's are approved to be used in people with CKD with and without type 2 diabetes to improve renal and cardiovascular outcomes
5. Pharmacists can intervene, educate and work with patients and physicians to lower the impact of CKD