The Top Five Internal Medicine Apps

NBIMU April 20, 2018

Joffre Munro MD FRCPC

Conflicts of Interest

- None to disclose.

Objectives

- Embrace medical Apps & tools that may enhance the quality of our patient care.

Diabetes Canada – Clinical Practice Guidelines App

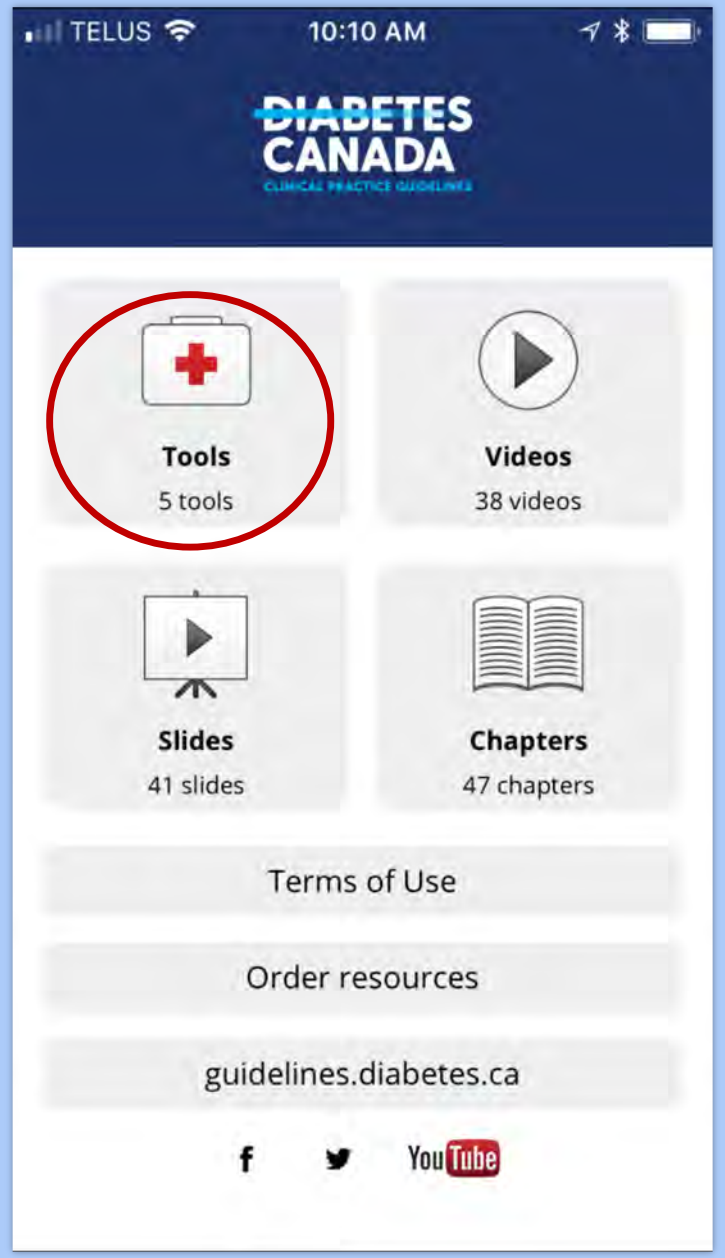
iPhone and Android

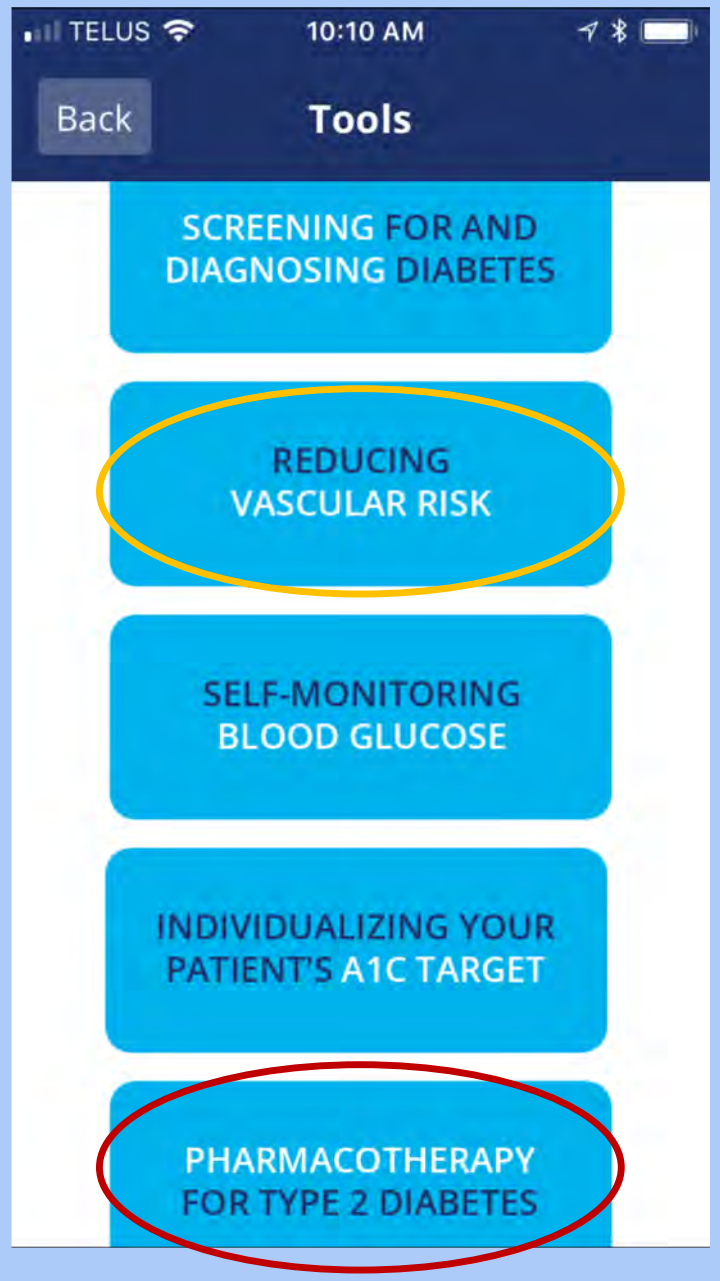
Search "DC CPG"

Guidelines & Tools

Interim Update 2016 included

Coming Soon 2018 guidelines





DIABETES CANADA
CLINICAL PRACTICE GUIDELINES

Diabetes Canada – Clinical Practice Guidelines App

Eg.

65yo male T2DM x 10yrs (A1C 9.2%)

PMHx:

- ischemic CM (EF 35%)
- CKD (eGFR 45)

Meds: metformin 1 g bid, ASA, statin, ACE-I, BB.

Pharmacotherapy for Type 2 Diabetes

Print

By Agent and Patient Characteristics

▼ **STEP 1: Initial Pharmacotherapy**

At diagnosis of type 2 diabetes: Start lifestyle intervention (nutrition therapy and physical activity) +/- Metformin

Which of the following applies to your patient?

- ○ A1C <8.5%
- ● A1C ≥8.5%
- ○ Symptomatic hyperglycemia with metabolic decompensation

Get Recommendation

Recommendations:

Start metformin immediately. Consider initial combination with another antihyperglycemic agent.

If the glycemic target is still not reached, add an agent best suited to the individual. See the following table.

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▼ **STEP 2:** Individualize and Sort Results

Individualize the table based on patient characteristics:

Priority: Does your patient have clinical cardiovascular disease? ◉ Yes ○ No

What is your patient's renal function (eGFR in mL/min/1.73m^2)? 45

Does your patient have Congestive Heart Failure? ◉ Yes ○ No

Does your patient have metabolic bone disease? ○ Yes ◉ No

Does your patient currently have pancreatitis? ○ Yes ◉ No

Does your patient have a prior history of pancreatitis? ○ Yes ◉ No

Individualize

DIABETES CANADA
CLINICAL PRACTICE GUIDELINES

Diabetes Canada – Clinical Practice Guidelines App

Eliminates some Tx options

Highlights dosing adjustments

*If GFR >60 then will prioritize GLP-1s and SGLT-2s if patient has cardiovascular disease.

Class ▲	Relative A1C lowering	Hypoglycemia	Weight	Effect in Cardiovascular Outcome Trial	Other therapeutic considerations	Cost
Alpha-glucosidase inhibitor (acarbose)	↓	Rare	neutral to ↓		Improved postptandial control, GI side-effects	$$
GLP-1R agonists	↓↓ to ↓↓↓	Rare	↓↓	lira: Superiority in T2DM patients with clinical CVD lixi: Neutral	**Caution for albiglutide, dulaglutide, liraglutide. Caution/reduced dose exenatide (daily or weekly), GI side effects**	$$$$
Incretin agent: DPP-4 Inhibitors	↓↓	Rare	neutral to ↓	alo, saxa, sita: Neutral	**Reduced dose for alogliptin, saxagliptin and sitagliptin. No change for linagliptin. Caution with saxagliptin in heart failure**	$$$
Insulin	↓↓↓	Yes	↑↑	glar: Neutral	No dose ceiling, flexible regimens	$-$$$$
Insulin secretagogue: Meglitinide	↓↓	Yes	↑		Less hypoglycemia in context of missed meals but usually requires TID to QID dosing	$$
Insulin secretagogue: Sulfonylurea	↓↓	Yes	↑		**Caution/reduced dose glyburide**	$
SGLT2 inhibitors	↓↓ to ↓↓↓	Rare	↓↓	empa: Superiority in T2DM patients with clinical CVD	**Do not start SGLT2 inhibitor at this eGFR. May continue canagliflozin 100 mg or empagliflozin with close monitoring of renal function. Genital infections, UTI, hypotension, dose-related changes in LDL-C, caution with renal dysfunction and loop diuretics, dapagliflozin not to be used if bladder cancer, rare diabetic ketoacidosis (may occur with no hyperglycemia)**	$$$
Weight loss agent (orlistat)	↓	None	↓		GI side effects	$$$

alo=alogliptin; empa=empagliflozin; glar=glargine; lixi=lixisenatide; saxa=saxagliptin; sita=sitagliptin

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65yo male T2DM x 10yrs (A1C 9.2%)

PMHx:

ischemic CM (EF 35%)

CKD (eGFR 45)

Meds: metformin 1 g bid, ASA, statin, ACE-I, BB.

Caution: reduce dose of metformin.

	CKD 1 & 2 eGFR ≥60 mL/min	CKD 3 eGFR 30-59 mL/min	CKD 4 eGFR 15-29 mL/min	CKD 5 eGFR <15 mL/min or dialysis	Comments
Metformin	No dose adjustment	Reduce dose	Use alternative agent		See "Sick Day Medication List" (Appendix 7). Risk of drug accumulation with declining renal function, especially if acute.

Caution: Metformin eliminated from treatment plan because of renal failure.

Caution: Thiazoledinediones eliminated from treatment plan because of Congestive Heart Failure or metabolic bone disease.

If not at glycemic targets

• Add another agent from a different class • Add/Intensify insulin regimen

Make timely adjustments to attain target A1C within 3-6 months

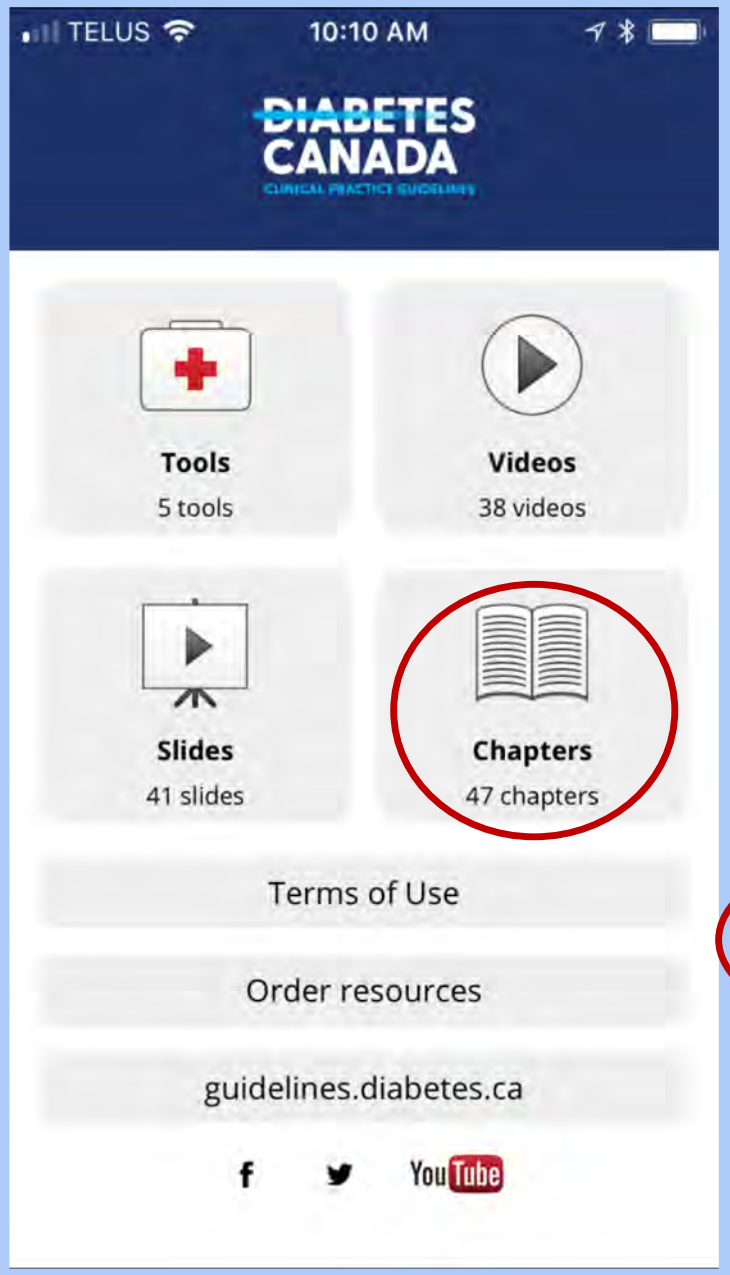
DIABETES CANADA
CLINICAL PRACTICE GUIDELINES

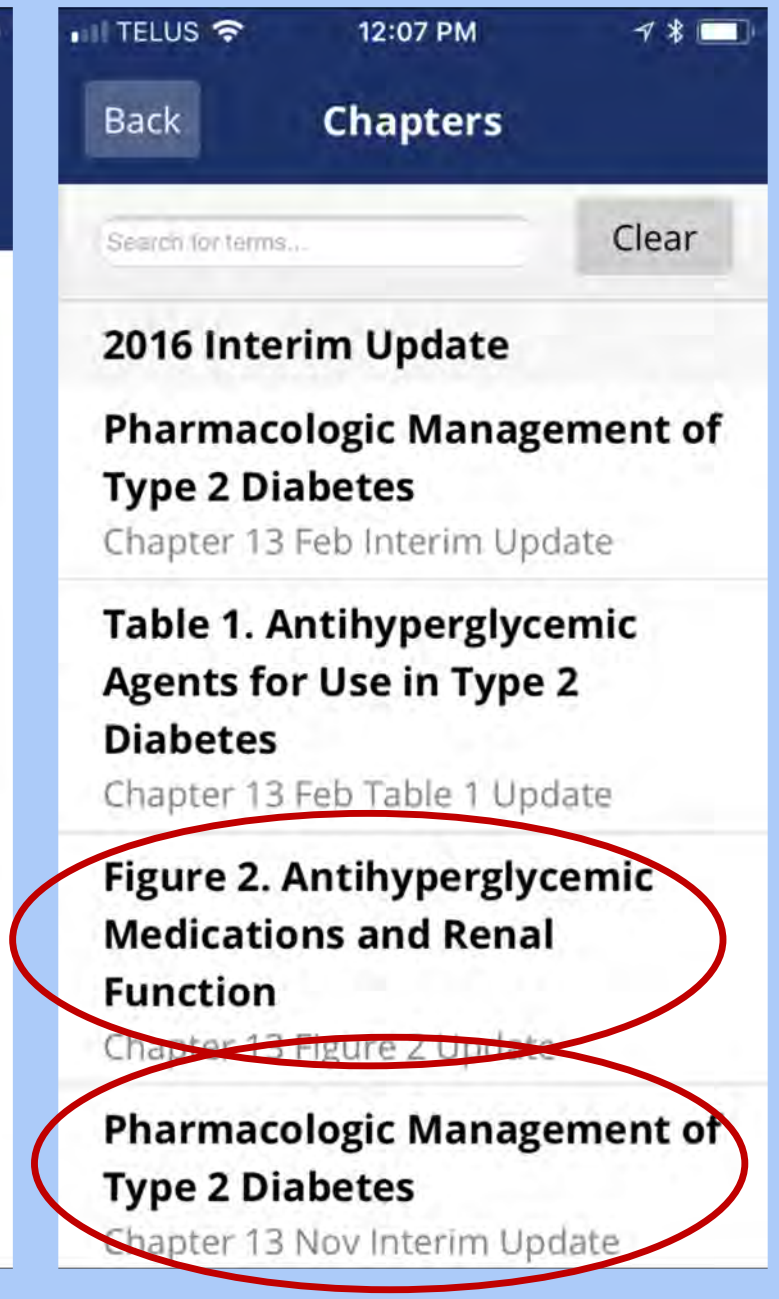
Diabetes Canada – Clinical Practice Guidelines App

Considerations not always apparent include:

Renal function dosing

Cardiovascular superiority





DIABETES CANADA
CLINICAL PRACTICE GUIDELINES

Diabetes Canada – Clinical Practice Guidelines App

Considerations not always apparent include:

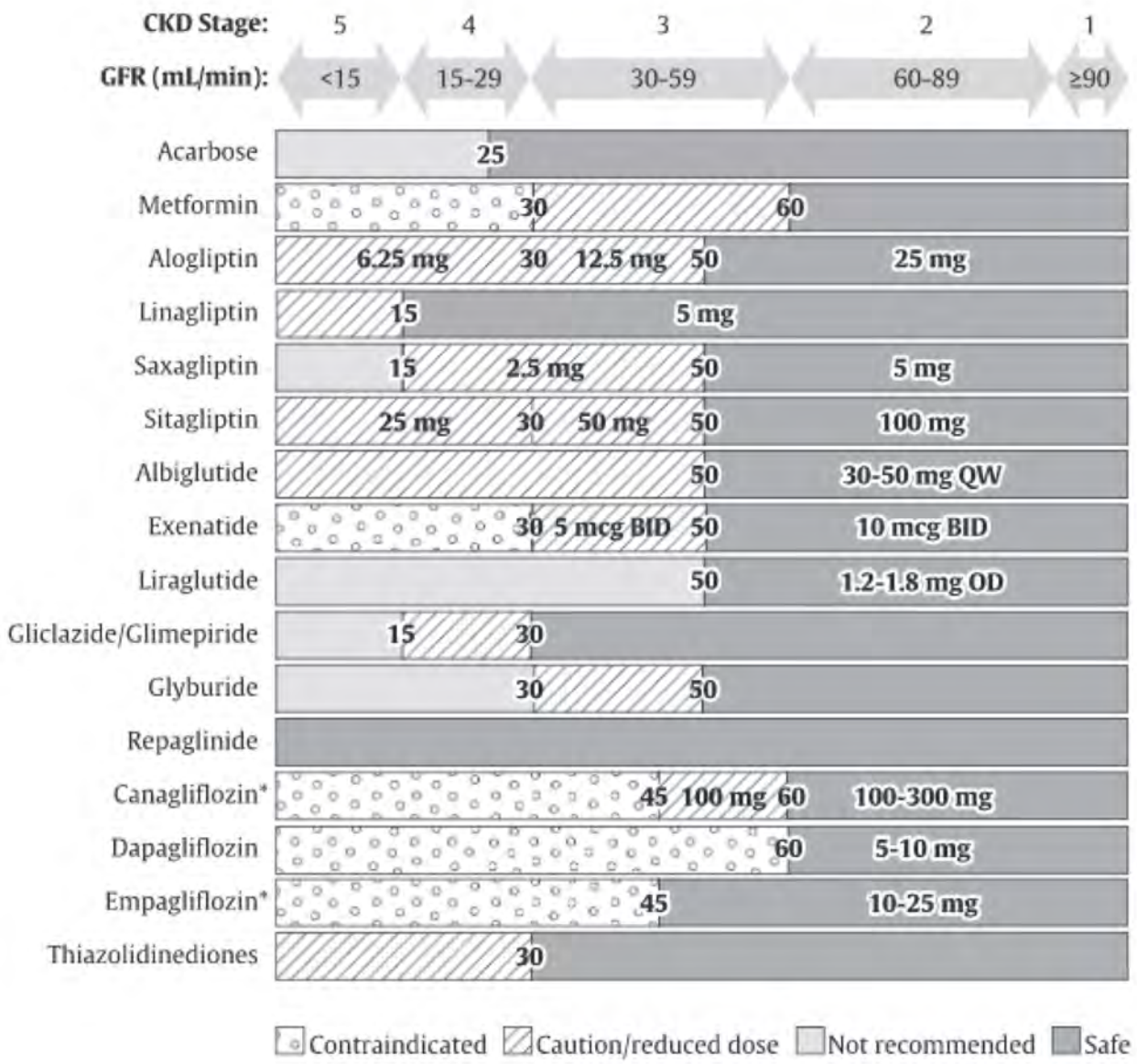
Renal function dosing

Cardiovascular superiority

Add another agent best suited to the individual by prioritizing patient characteristics:

PATIENT CHARACTERISTIC		CHOICE OF AGENT
Priority: Clinical cardiovascular disease	→	Antihyperglycemic agent with demonstrated CV outcome benefit (empagliflozin, liraglutide)
• Degree of hyperglycemia • Risk of hypoglycemia • Overweight or obesity • Cardiovascular disease or multiple risk factors • Comorbidities (renal, CHF, hepatic) • Preferences & access to treatment		• Consider relative A1C lowering • Rare hypoglycemia • Weight loss or weight neutral • Effect on cardiovascular outcome • See therapeutic considerations, consider eGFR • See cost column; consider access

Antihyperglycemic Medications and Renal Function



*Do not initiate if eGFR <60 mL/min/1.73 m².
The drug may be continued if the eGFR falls to 45-59 mL/min/1.73m².

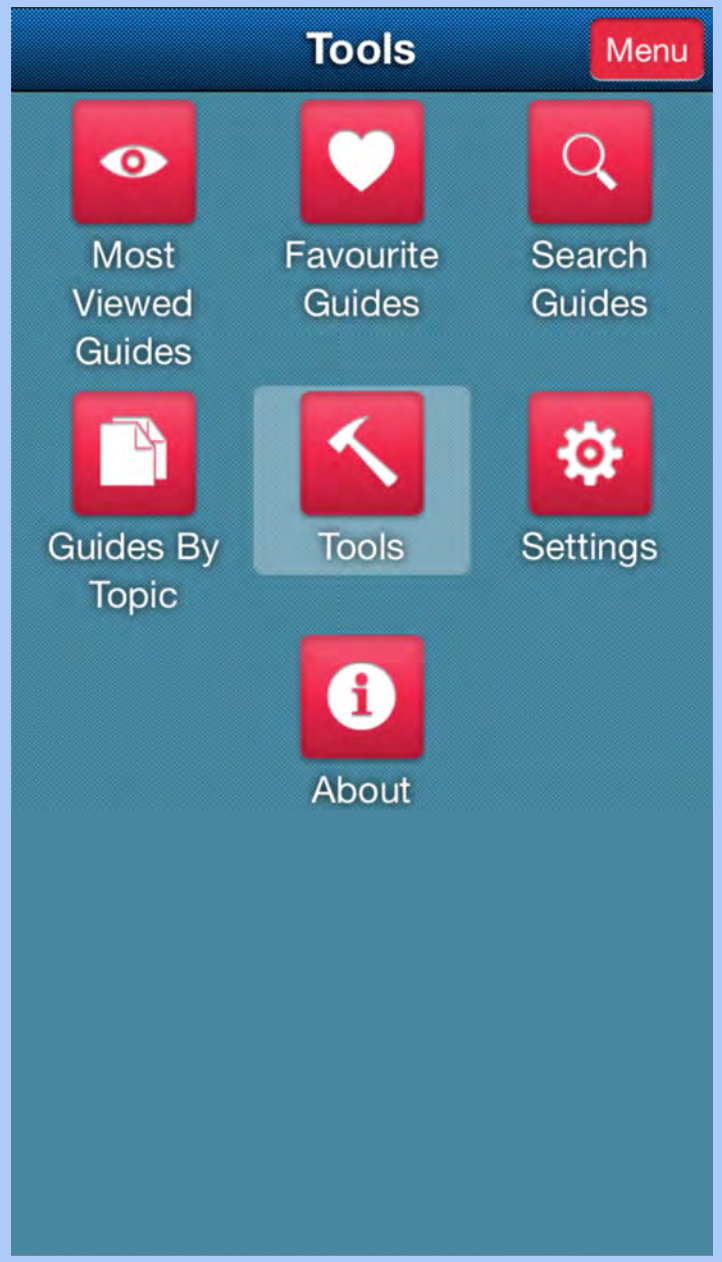
Thrombosis Canada App

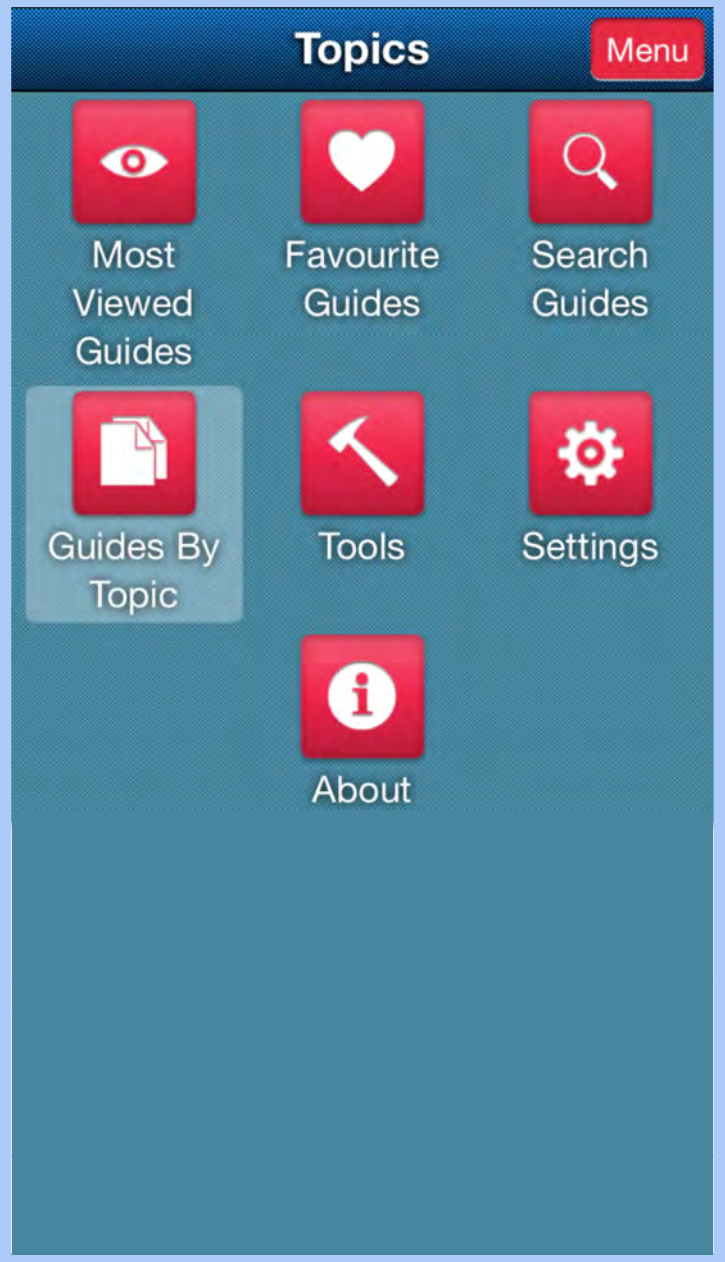
iPhone and Android

Guidelines & Tools

Anticoagulation Tools:

- A Fib risk scores
- Periop management





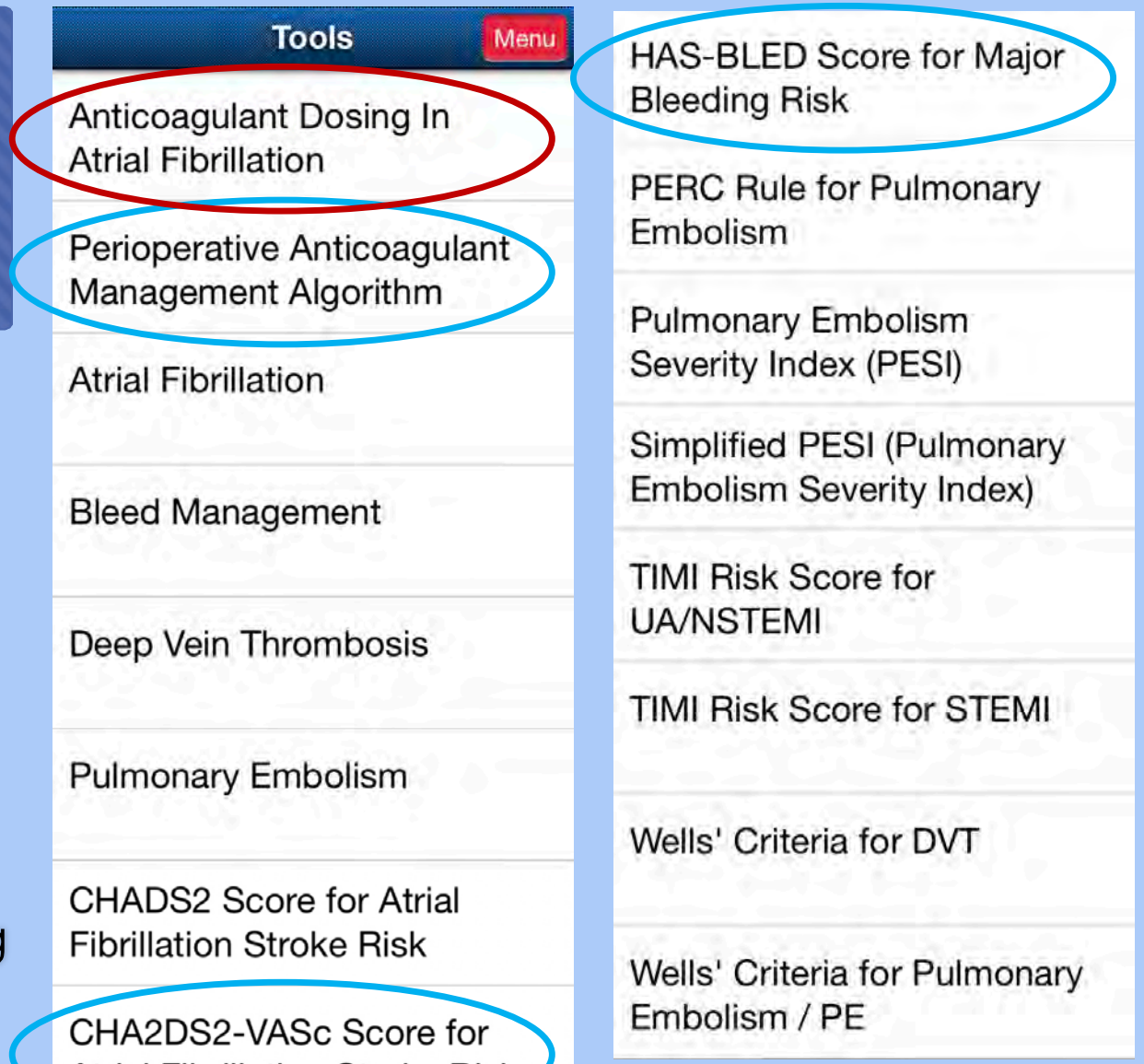
Thrombosis Canada
Thrombose Canada

Thrombosis Canada App

Anticoagulation Dosing in Atrial Fibrillation:

(Uses 2016 updated CCS guidelines)

- Anticoagulant & Dosing
- CHADS score
- renal function monitoring



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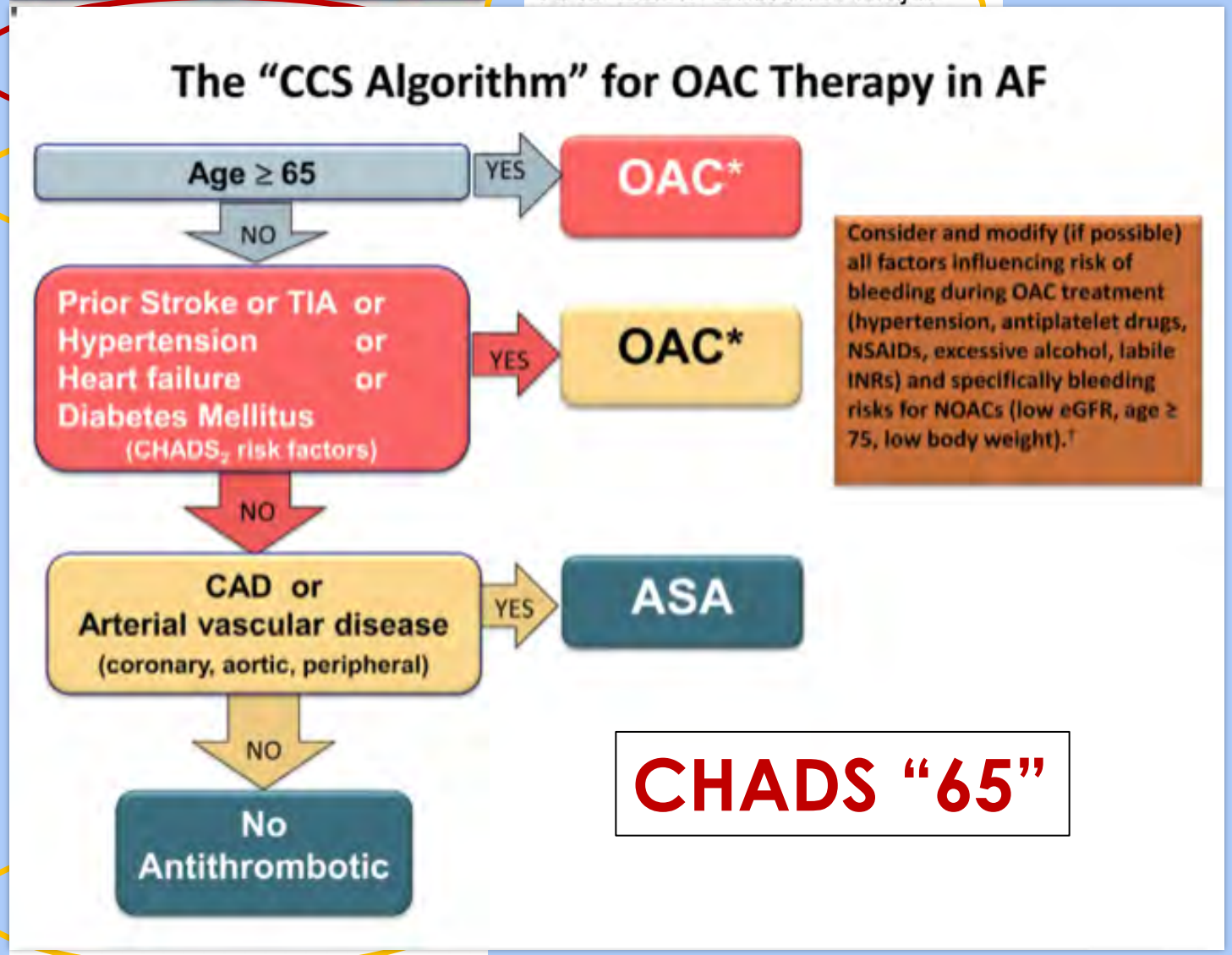
Tools Menu

HAS-BLED Score for Major



CHADS "65"

Creatinine Clearance (Cockcroft-Gault Equation)

Thrombosis Canada
Thrombose Canada

Thrombosis Canada App

Eg.

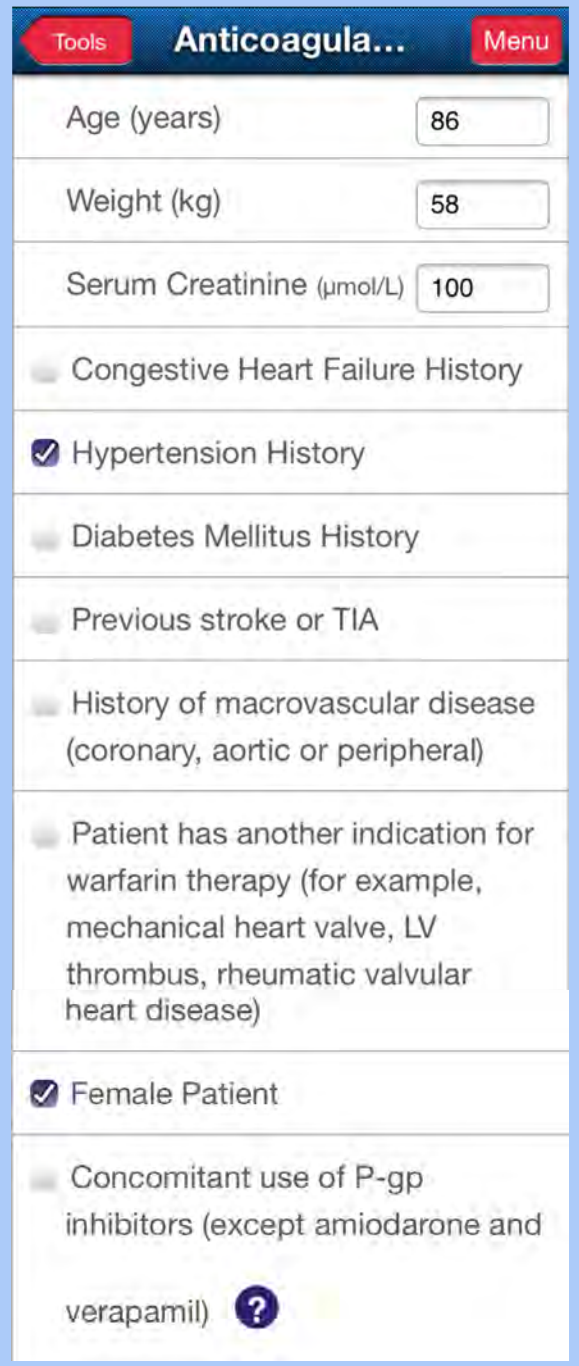
86yo female with new paroxysmal A Fib

PMHx:

- HTN
- CKD (CrCl 32)

Meds: ramipril, amlodipine, metoprolol (new).

Weight: 58kg



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86yo female with new paroxysmal A Fib

PMHx:

HTN

CKD (CrCl 32)

Meds: ramipril, amlodipine, metoprolol (new).

Weight: 58kg

Tools | Anticoagula... | Menu

Age (years)	86
Weight (kg)	58
Serum Creatinine (μmol/L)	100
☐ Congestive Heart Failure History	
☑ Hypertension History	
☐ Diabetes Mellitus History	
☐ Previous stroke or TIA	
☐ History of macrovascular disease (coronary, aortic or peripheral)	
☐ Patient has another indication for warfarin therapy (for example, mechanical heart valve, LV thrombus, rheumatic valvular heart disease)	
☑ Female Patient	
☐ Concomitant use of P-gp inhibitors (except amiodarone and verapamil) ?	

Tools | Anticoagula... | Menu

Recommendations

- Dabigatran 110 mg twice daily, or
- Rivaroxaban 15 mg once daily, or
- Apixaban 2.5 mg twice daily, or
- Edoxaban 30 mg once daily, or
- Warfarin to achieve INR between 2-3

*(CCS: NOAC over warfarin)

CHADS Score: **2**
Creatinine Clearance: **32.7 mL/min**

Creatinine clearance should be checked yearly if creatinine clearance is ≥ 50 mL/min and every 6 months if <50 and drug selection and dose should be reassessed accordingly.

Thrombosis Canada
Thrombose Canada

Thrombosis Canada App

Eg.

86yo female with new paroxysmal A Fib

"I am not so sure I want to start a blood thinner; what are the risks?"

Tools | Menu

- Anticoagulant Dosing In Atrial Fibrillation
- Perioperative Anticoagulant Management Algorithm
- Atrial Fibrillation
- Bleed Management
- Deep Vein Thrombosis
- Pulmonary Embolism
- CHADS2 Score for Atrial Fibrillation Stroke Risk
- CHA2DS2-VASc Score for Atrial Fibrillation Stroke Risk
- Creatinine Clearance (Cockcroft-Gault Equation)

- HAS-BLED Score for Major Bleeding Risk
- PERC Rule for Pulmonary Embolism
- Pulmonary Embolism Severity Index (PESI)
- Simplified PESI (Pulmonary Embolism Severity Index)
- TIMI Risk Score for UA/NSTEMI
- TIMI Risk Score for STEMI
- Wells' Criteria for DVT
- Wells' Criteria for Pulmonary Embolism / PE

Thrombosis Canada
Thrombose Canada

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Eg.

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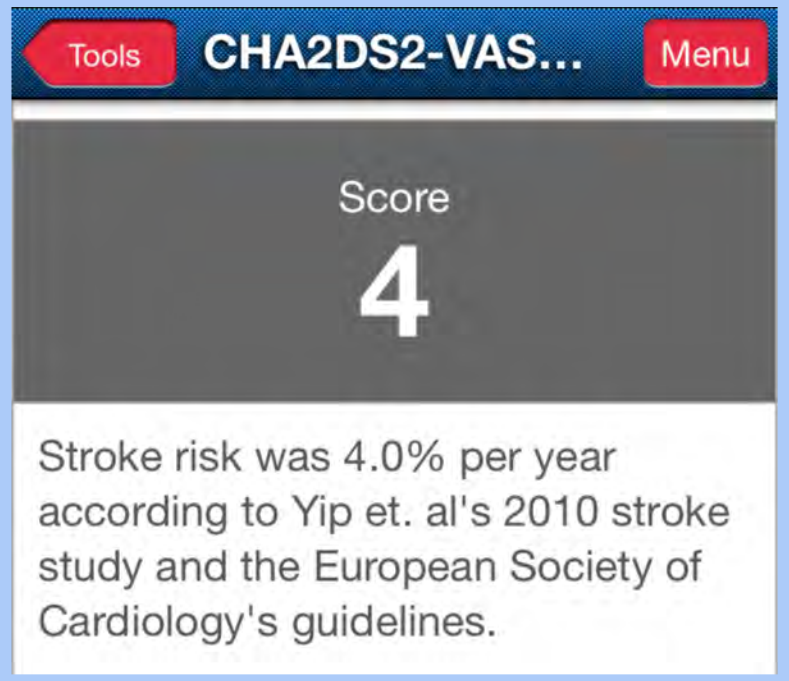
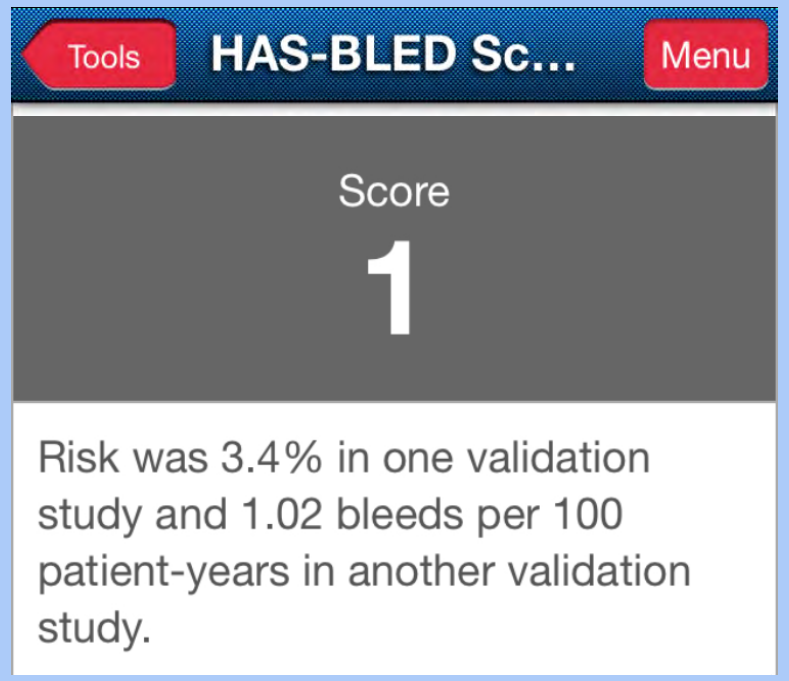




Thrombosis Canada
Thrombose Canada

FRAX – Fracture Risk Assessment Tool

Endorsed by Osteoporosis Canada

www.osteoporosis.ca - link to

(www.sheffield.ac.uk/FRAX)

or

"Calculate by QxMD" App

FRAX® Fracture Risk Assessment Tool

Home | Calculation Tool | Paper Charts | FAQ

Weight Conversion
Pounds → kg
Convert

Height Conversion
Inches → cm
Convert

Calculation Tool

Please answer the questions below to calculate the ten year probability of fracture with BMD.

Country: Canada Name/ID: About the risk factors

Questionnaire:

1. Age (between 40 and 90 years) or Date of Birth
   Age: 65 Date of Birth: Y: M: D:
2. Sex — Male / Female
3. Weight (kg) — 68
4. Height (cm) — 162
5. Previous Fracture — No / Yes
6. Parent Fractured Hip — No / Yes
7. Current Smoking — No / Yes
8. Glucocorticoids — No / Yes
9. Rheumatoid arthritis — No / Yes
10. Secondary osteoporosis — No / Yes
11. Alcohol 3 or more units/day — No / Yes
12. Femoral neck BMD (g/cm^2)
    GE-Lunar | 0.876 | T-score: -1.2

Clear | Calculate

BMI: 25.9
The ten year probability of fracture (%)
with BMD

Major osteoporotic	7.2
Hip Fracture	0.6

If you have a TBS value, click here: Adjust with TBS

Print tool and information

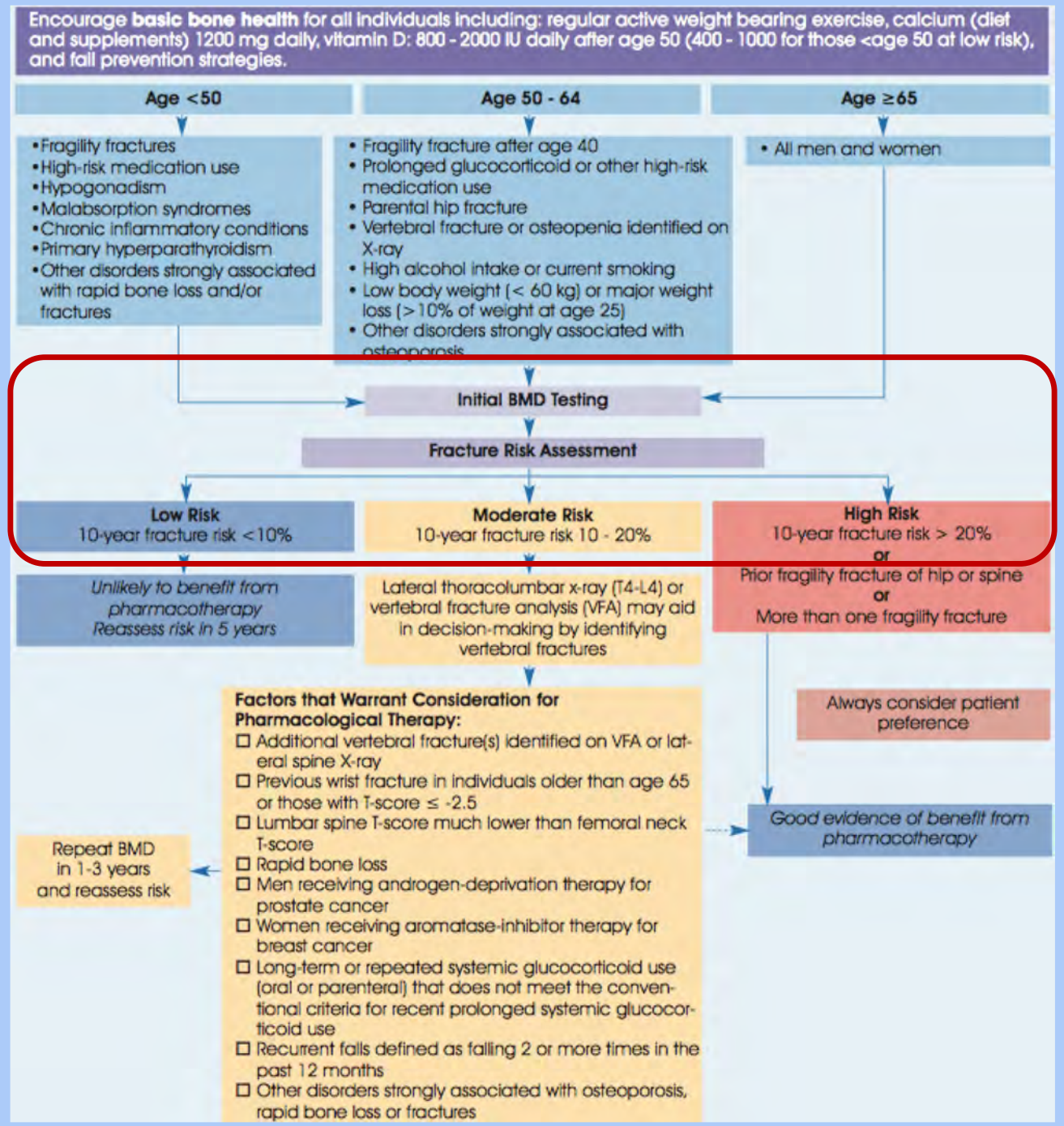
OSTEOPOROSIS CANADA

FRAX – Fracture Risk Assessment Tool

10-year Fracture Risk Assessment

CAROC vs FRAX

(both approved by Osteoporosis Canada)



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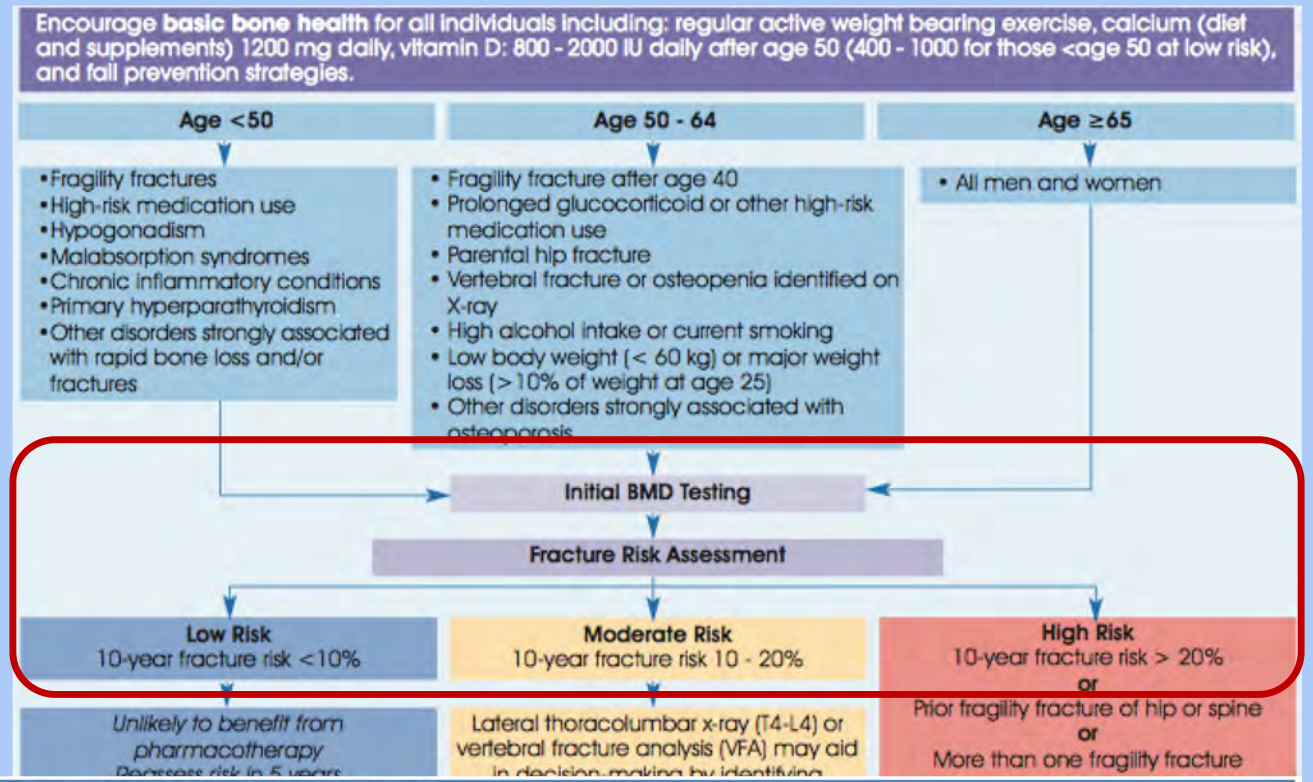

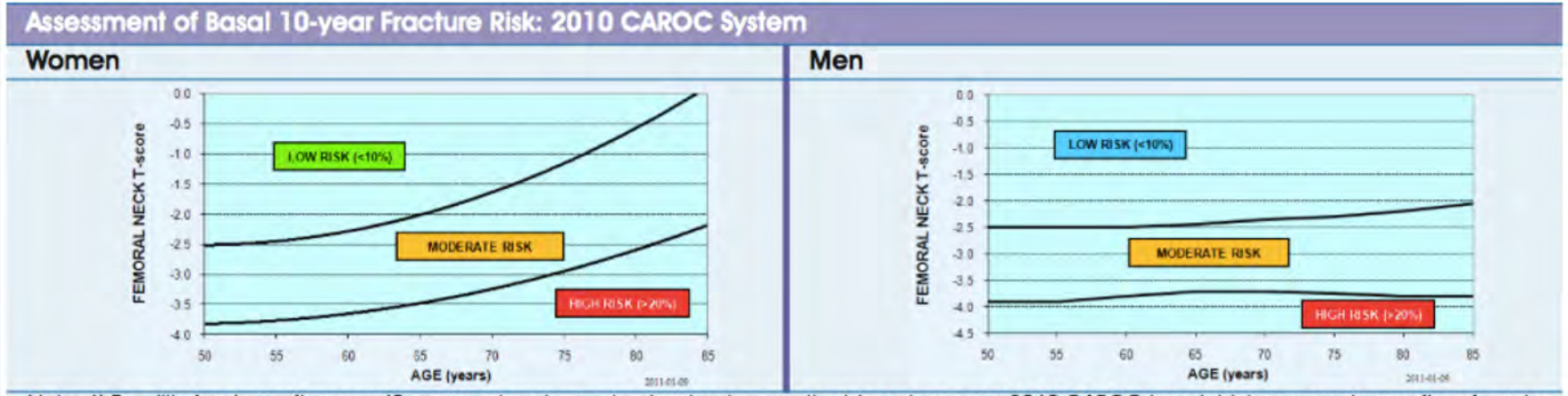

Note: 1) Fragility fracture after age 40 or recent prolonged systemic glucocorticoid use increases 2010 CAROC basal risk by one category (i.e., from low to moderate or moderate to high).
2) Using this model in a patient on therapy only reflects the theoretical risk of a hypothetical patient who is treatment naïve and does not reflect the risk reduction associated with therapy.
3) Femoral neck T-score should be derived from NHANES III Caucasian women reference database.
4) Individuals with a fragility fracture of the vertebra or hip, or with more than one fragility fracture are at high fracture risk.

OSTEOPOROSIS CANADA

FRAX – Fracture Risk Assessment Tool

WHO-FRAX

- more criteria/complete
- can be used without BMD
- more accurate if risk factors are present

FRAX® Fracture Risk Assessment Tool

Home | Calculation Tool | Paper Charts | FAQ

Weight Conversion
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Print tool and information

OSTEOPOROSIS CANADA

GOLD 2017 Pocket Guide App

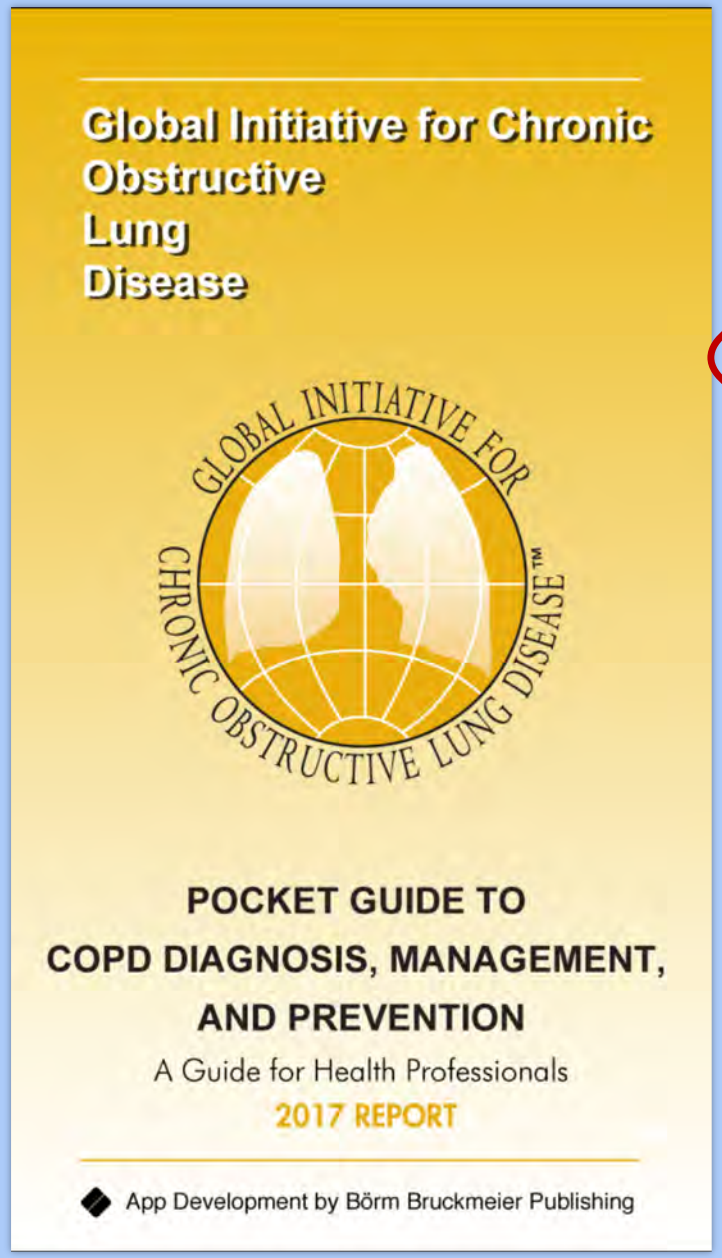
iPhone and Android - $4

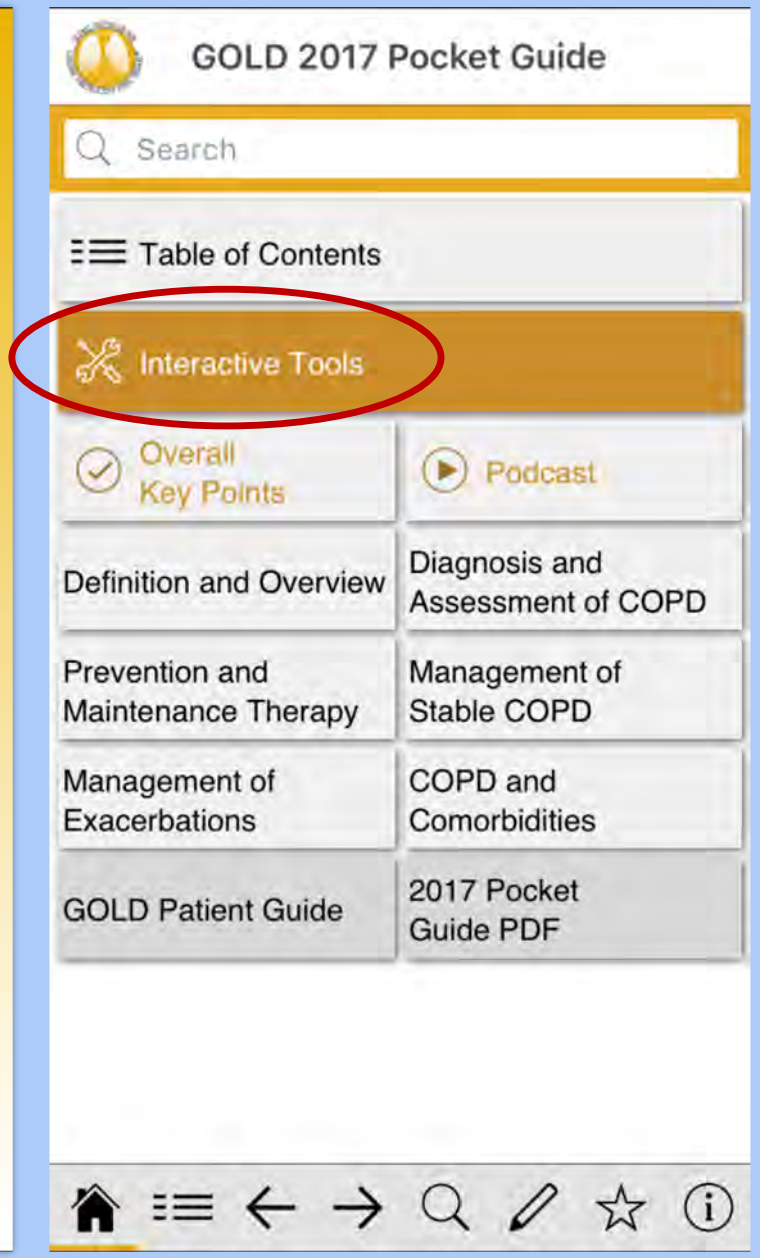
Guidelines & Tools

2018 Update not included

ABCD Assessment Tool

Treatment Algorithms





2017 GOLD

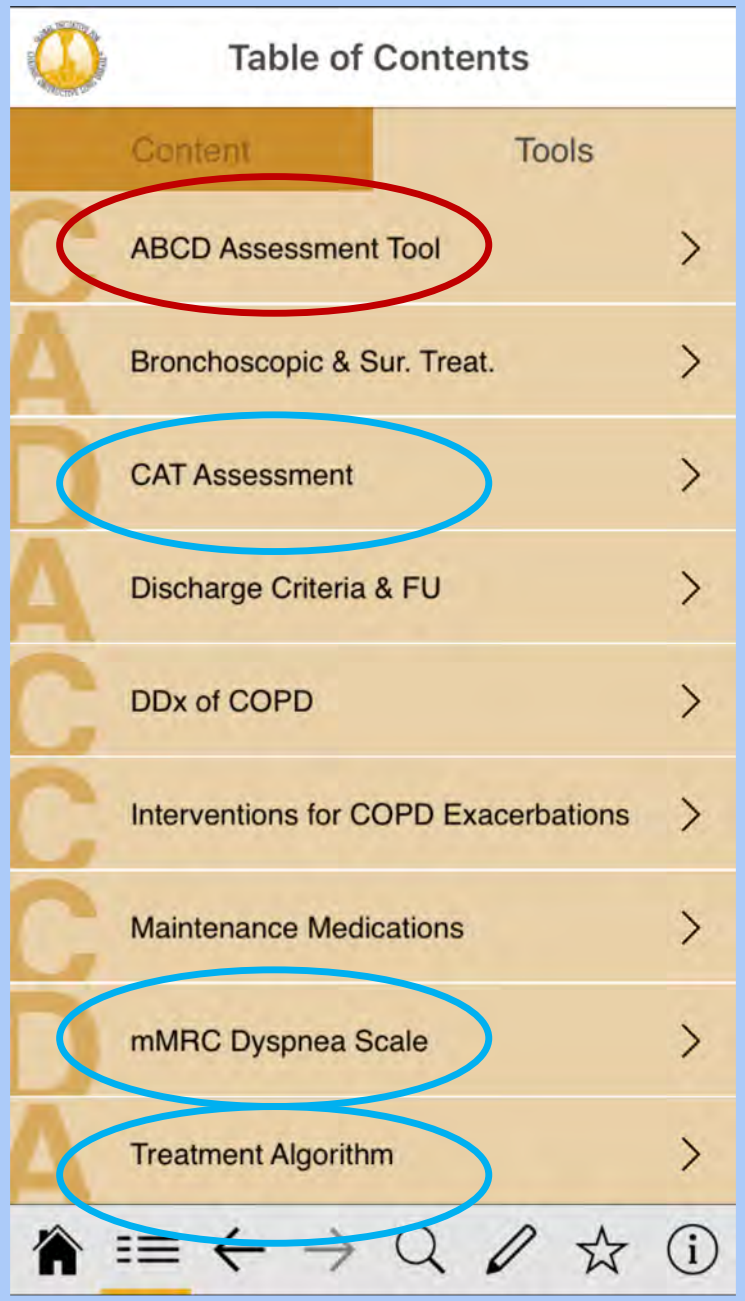
GOLD 2017 Pocket Guide App

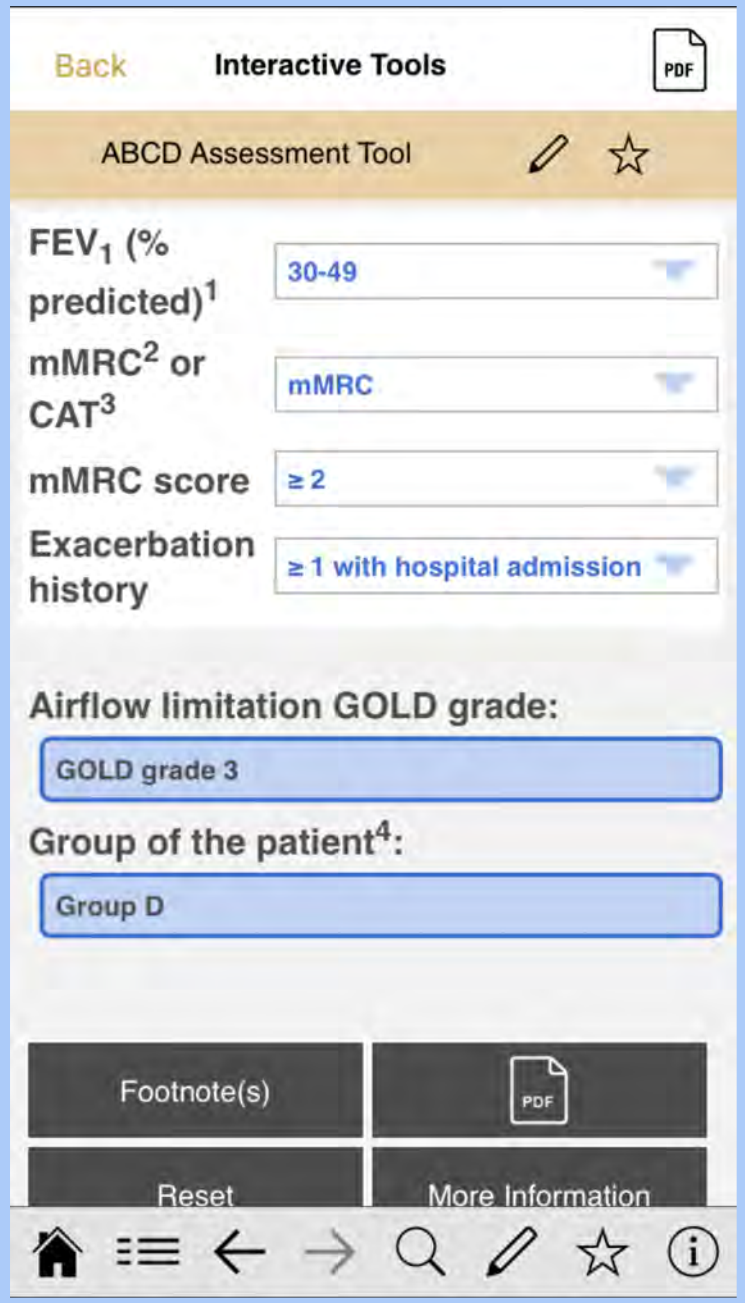
ABCD Assessment Tool:

Eg. 60yo M with COPD

FEV1 38%

- dyspnea walking on the level
- 1 COPDE admission last year





2017 GOLD

GOLD 2017 Pocket Guide App

ABCD Assessment Tool:

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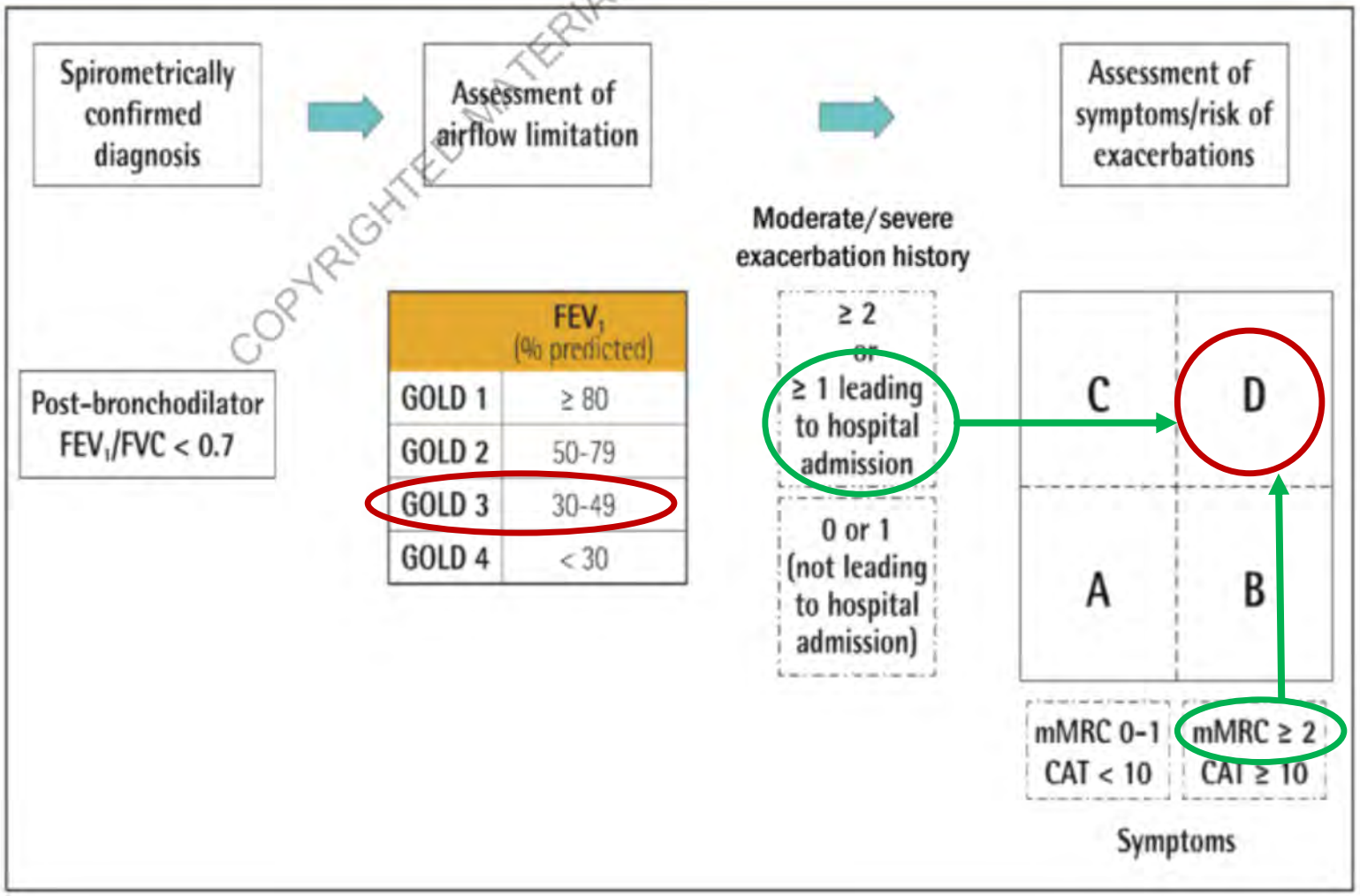
Figure 2.4. The refined ABCD assessment tool



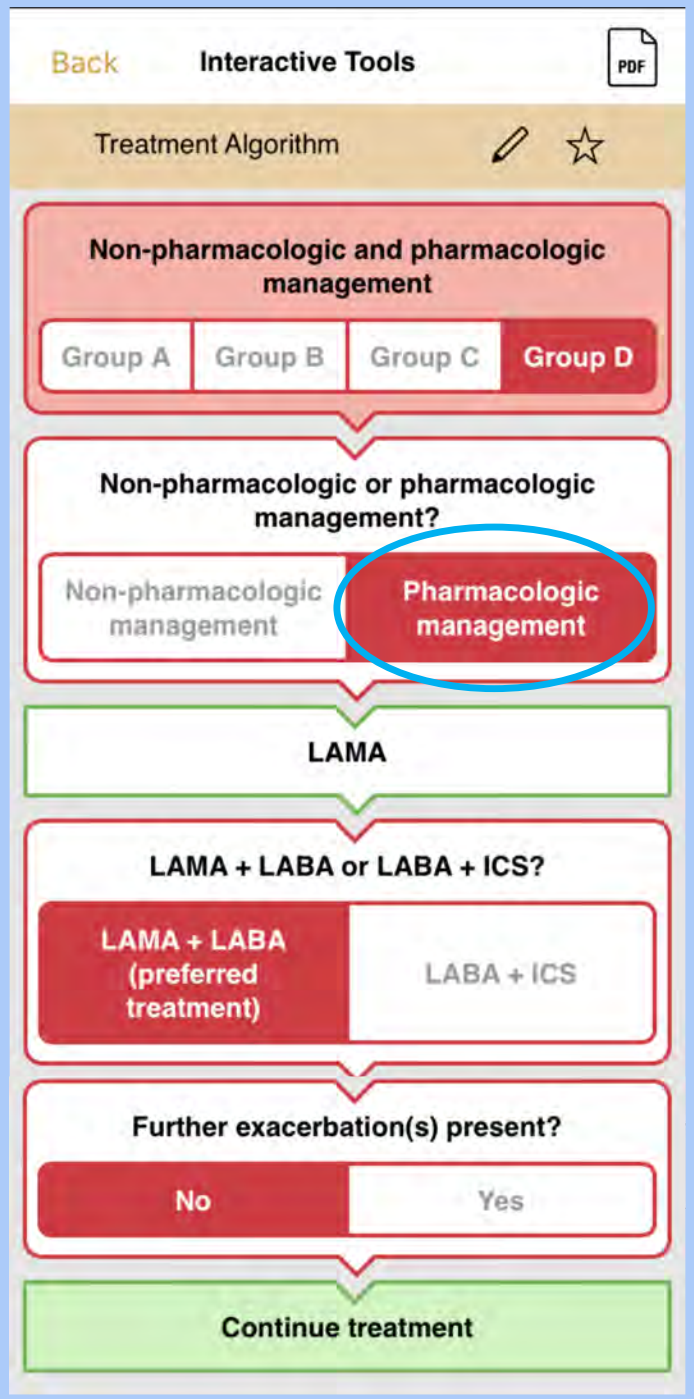
2017 GOLD

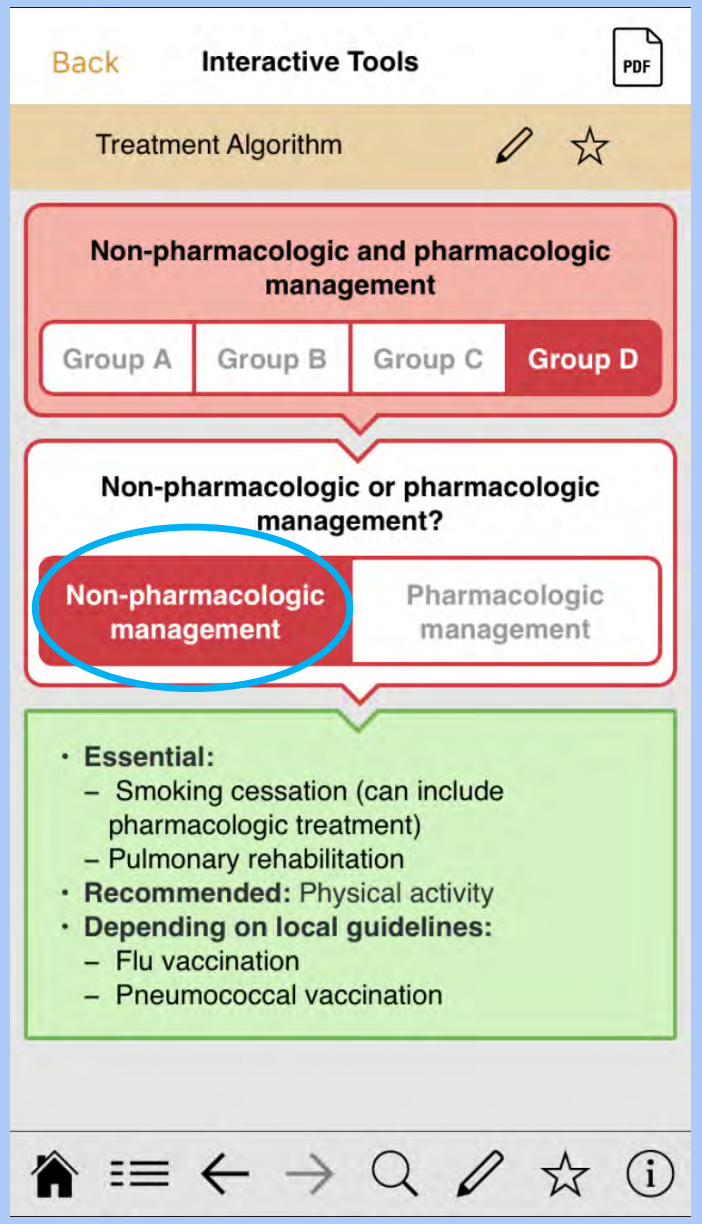
GOLD 2017 Pocket Guide App

Treatment Algorithm:

Eg. 60yo M with COPD

GOLD Grade 3 Group D





2017 GOLD

GOLD 2017 Pocket Guide App

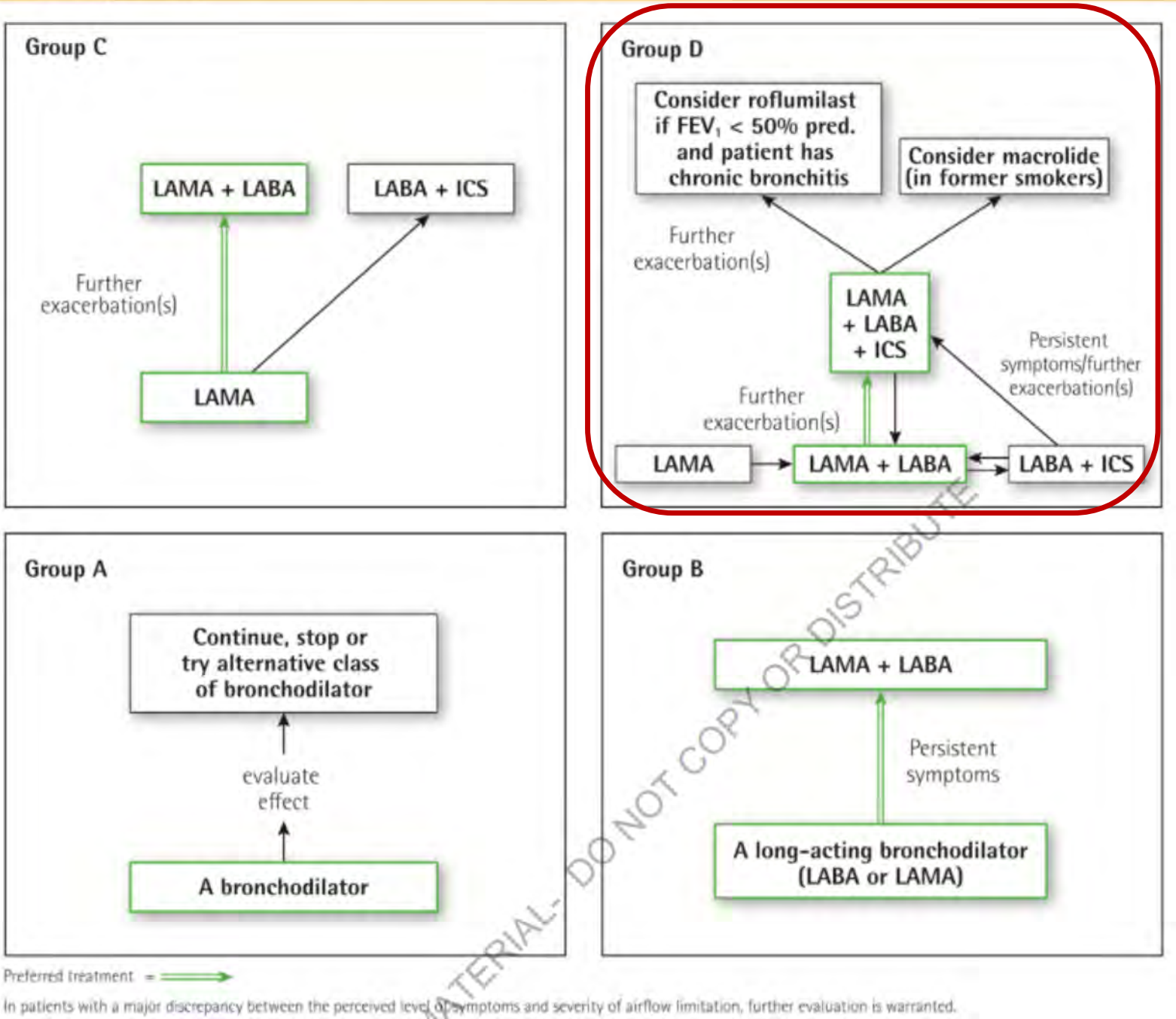
Treatment Algorithm:

Eg. 60yo M with COPD

GOLD Grade 3 Group D

2017 GOLD

Figure 4.1. Pharmacologic treatment algorithms by GOLD Grade [highlighted boxes and arrows indicate preferred treatment pathways]

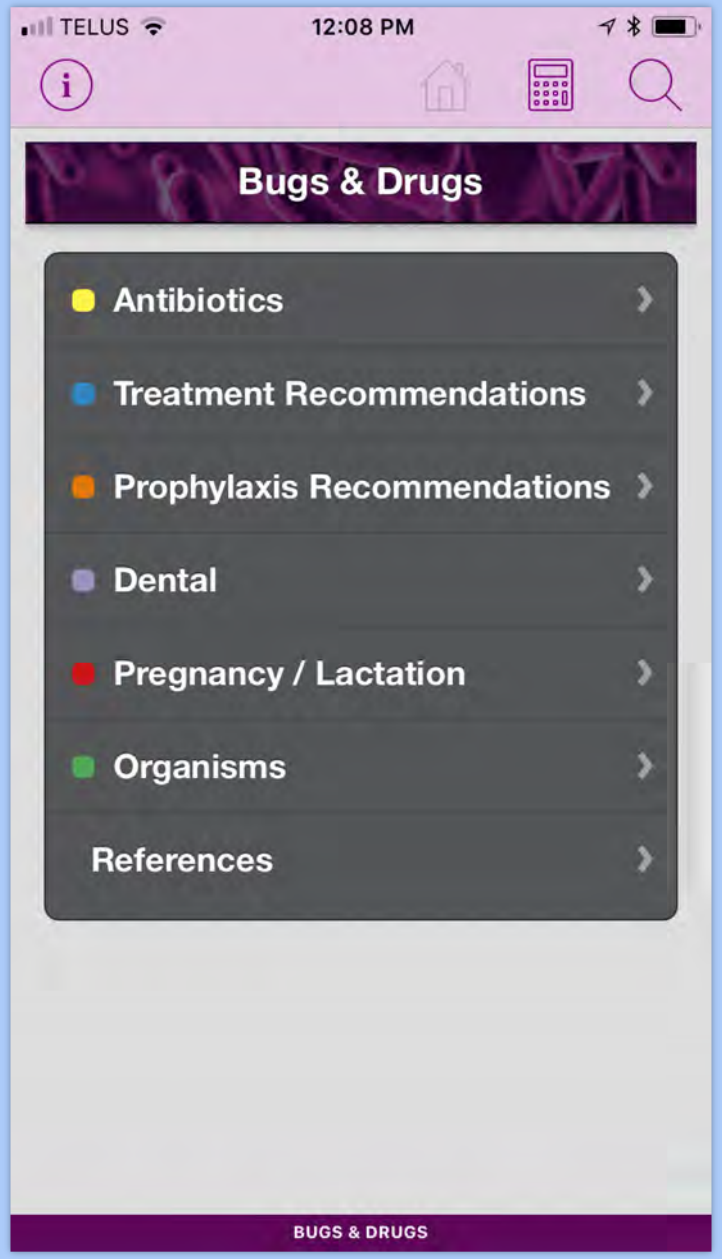


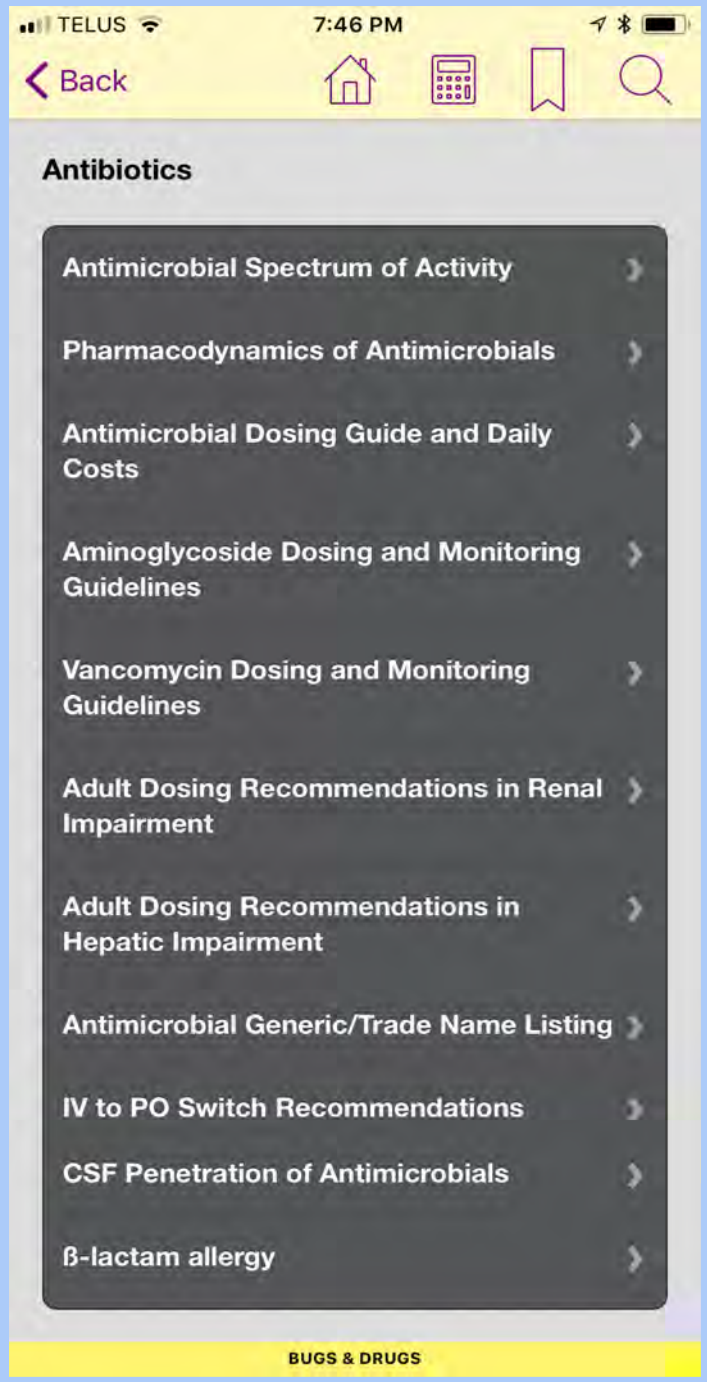
Bugs and Drugs App

iPhone and Android - $15

Antibiotic Therapy Guide:

- Antibiotics: spectrum of activity, dosing, monitoring
- Source directed empiric Tx
- Organism directed Tx





Bugs and Drugs App

- Antibiotics: spectrum of activity, dosing, monitoring

TELUS 8:04 PM

Back

Cefazolin

Predictable Activity

ß-haemolytic Streptococci (Groups A,B,C,G)
Citrobacter koseri
Klebsiella pneumoniae
Raoultella spp
Staphylococcus aureus (MSSA)
Staphylococcus lugdunensis
Streptococcus anginosus group
Streptococcus pneumoniae (Pen-S)

Unpredictable Activity

Actinomyces spp
Anaerobic Gram positive bacteria
Clostridium spp
Escherichia coli
Klebsiella oxytoca
Moraxella catarrhalis
Propionibacterium spp
Proteus mirabilis
Streptococcus pneumoniae (Pen-I)
Viridans group Streptococci (other than S. anginosus group)

No/Insufficient Activity

Aerobic Gram negative bacilli – nonfermenters
Anaerobic Gram negative bacilli
Bacillus spp

BUGS & DRUGS

TELUS 8:03 PM

Back

Penicillins

Antimicrobial	Normal Adult Dose	Cost ($)/Day
amoxicillin	500mg PO tid	1.03
amoxicillin-clavulanate	875mg PO bid or	1.11
	500mg PO tid	2.00
ampicillin	1-2g IV/IM q6h	21.29 - 42.58
penicillin VK	300mg PO qid	0.75
penicillin G Na	3-4MU IV/IM q4-6h	12.24 - 24.48
cloxacillin	500mg PO qid	2.93
	1-2g IV/IM q4-6h	22.40 - 43.86
piperacillin	4g IV/IM q6h	121.71
piperacillin-tazobactam	3.375g IV q6h	25.04
	HAP/VAP: 4.5g IV q6h	33.38
	IAI: 4.5g IV q8h	25.04

HAP = hospital-acquired pneumonia

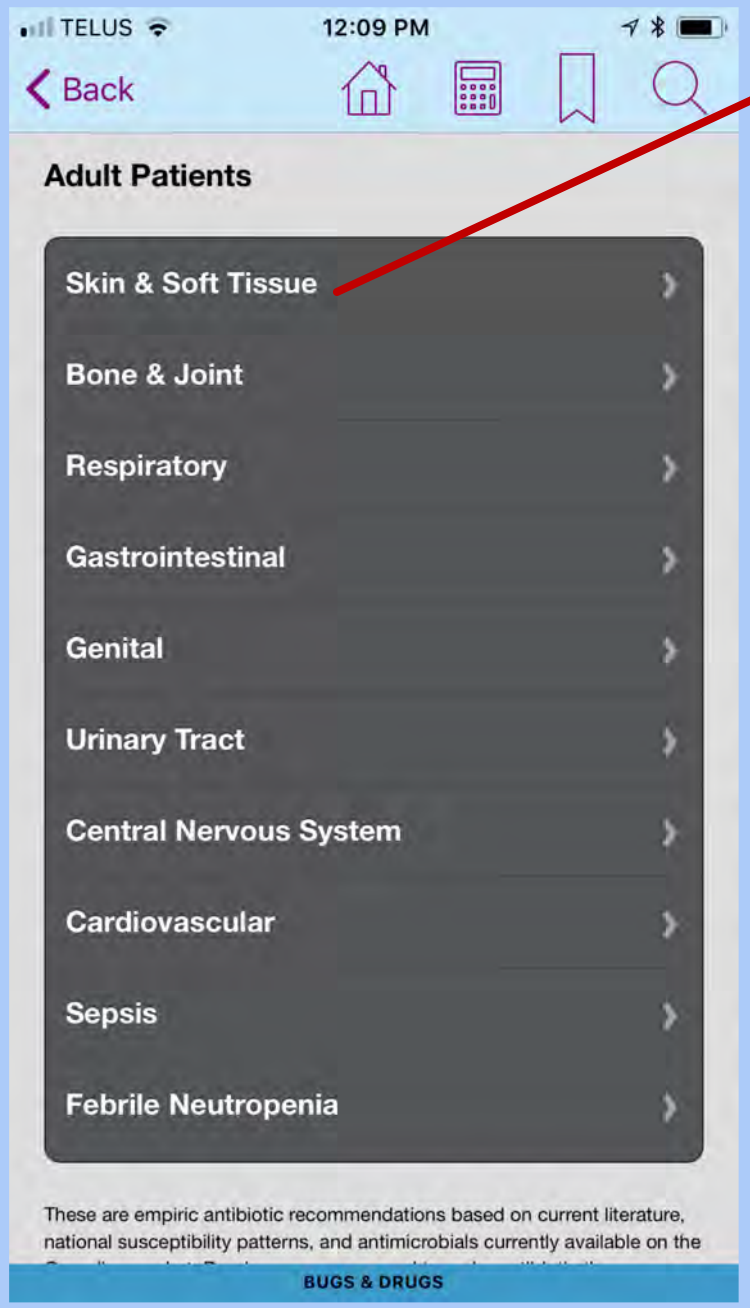
IAI = intra-abdominal infection

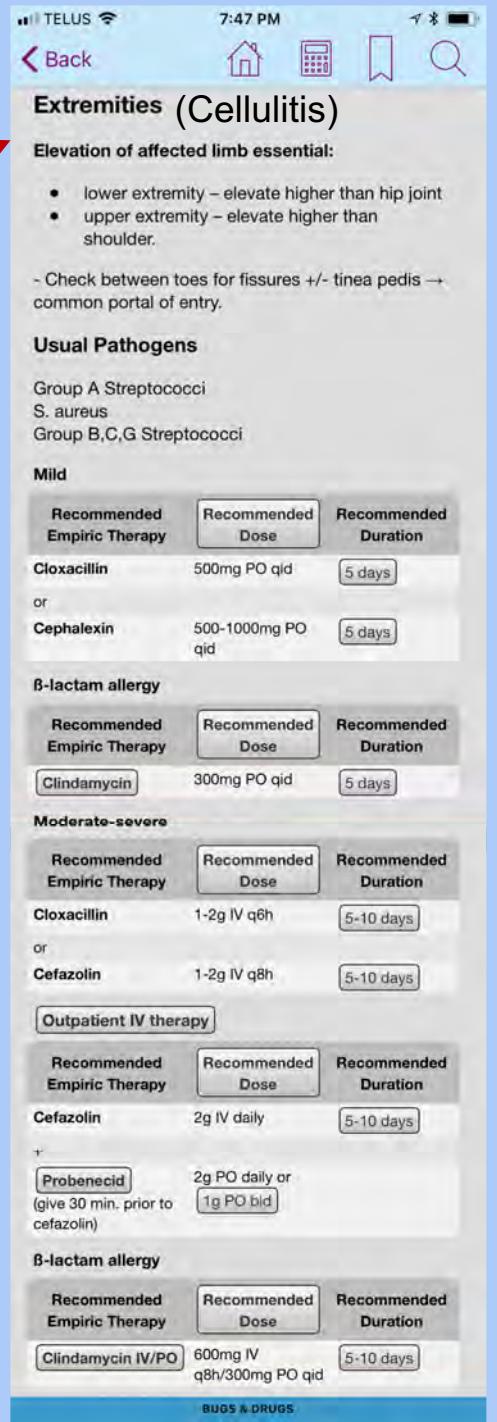
VAP = ventilator-associated pneumonia

BUGS & DRUGS

Bugs and Drugs App

- Source directed empiric Tx





Bugs and Drugs App

- Organism directed Tx

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Empiric Therapy of Specific Organisms

The clinical significance, infectious conditions and usual susceptibility patterns associated with each organism are based on published reports and experience of the authors. Empiric therapy recommendations for specific organisms are based on published microbiological and clinical data, are not all inclusive and may need to be modified based on specific clinical syndromes. Where appropriate, recommend de-escalation to narrower spectrum antibiotic(s) according to susceptibility results.

A B C D E F G H
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BUGS & DRUGS

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Escherichia coli

Gram Stain

- Gram negative bacilli-fermenter

Clinical Significance

E. coli colonizes the large intestine of humans.

It is the most common pathogen in urinary tract infections and is associated with pneumonia, bacteremia (typically secondary to urinary tract infections), endocarditis, meningitis (typically in neonates), hepatic abscesses, peritonitis, endophthalmitis, sinusitis, brain abscesses, skin and soft tissue, and bone and joint infections.

Certain strains of E. coli (enterotoxigenic, enteropathogenic, enteroinvasive, enterohemorrhagic) cause diarrhea.

Usual Susceptibility Pattern

E. coli has variable susceptibility to ampicillin, cephalothin, cephalexin, TMP/SMX and quinolones.

Note: Cefazolin susceptibility may not predict cephalexin susceptibility. Check cephalexin susceptibility before switching from IV to oral therapy.

The number of strains producing extended spectrum beta-lactamases (ESBL) or AmpC cephalosporinases is increasing resulting in resistance to penicillins, cephalosporins, and beta-lactam/beta-lactamase inhibitor combinations.

Empiric Therapy
Urinary Tract Infection
Nitrofurantoin
or
Fosfomycin
or
Cefixime
Bacteremia/Severe Infection
Ceftriaxone
or
Gentamicin
Previous ESBL/AmpC
Imipenem
or
Meropenem

BUGS & DRUGS

Take Home Apps

Thank You -

Questions?