

Critical Lab Values

Panic / Reportable Thresholds

CSHP · Accreditation Canada

ELECTROLYTES (SI — MMOL/L)

Lab	Crit Low	Crit High
Na+	< 120	> 160 mmol/L
K+	< 2.5	> 6.5 mmol/L
Glucose	< 2.2	> 28 mmol/L
Ca²⁺	< 1.6	> 3.25 mmol/L
Mg²⁺	< 0.4	> 2.5 mmol/L

HEMATOLOGY

Lab	Crit Low	Crit High
Hgb	< 70 g/L	> 200 g/L
Platelets	< 50×10^9	> 1000×10^9
WBC	< 2.0×10^9	> 30×10^9
INR	—	> 5.0
aPTT	—	> 100 s

ABG / METABOLIC

pH	< 7.20 or > 7.60
PaO₂	< 5.3 kPa (< 40 mmHg)
Lactate	> 4.0 mmol/L
Troponin	Any rise above URL -> MD
Creatinine	> 884 μ mol/L or x3 baseline

ACCREDITATION CANADA

Critical values -> provider within 30 min. Document: name, time, read-back.

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Critical Lab Values

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Sepsis-3 Protocol

CCCS 2023 · Ontario Sepsis Protocol

SSC 2021 · CADTH · CCCS

SEPSIS-3 DEFINITIONS

SEPSIS	Life-threatening organ dysfunction from ..
SOFA ≥ 2	Suspected infection + SOFA ≥ 2 = Sep..
SHOCK	Vasopressors MAP ≥ 65 + lactate > 2 ...

QSOFA SCREEN (≥ 2 = HIGH RISK)

RR ≥ 22/min	AMS (GCS < 15)
SBP ≤ 100 mmHg	Lactate > 2 mmol/L

HOURLY BUNDLE (ONTARIO SEPSIS PROTOCOL)

- Lactate STAT** repeat if > 4 mmol/L
- Blood Cx x2** before ABX, < 45 min delay
- Broad ABX** within 1hr, local antibiogram
- 30 mL/kg IV crystalloid** if hypotension or lactate ≥ 4
- Norepinephrine** 1st line, MAP ≥ 65 mmHg

VASOPRESSORS

Agent	Dose	Note
Norepinephrine	0.01-3 mcg/kg/min	1st line
Vasopressin	0.03-0.04 U/min	Add-on
Epinephrine	0.01-0.5 mcg/kg/min	Refract

CADTH — DE-ESCALATE ABX 48-72H

Procalcitonin-guided therapy reduces duration. Every hr delay in ABX ~7% mortality.

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Acute Stroke

Canadian Stroke Best Practices 2022

Heart & Stroke Canada · CSBP 2022

BE-FAST SCREEN (CSBP 2022)

B - Balance	Sudden loss of balance/coordination
E - Eyes	Sudden vision change or loss
F - Face	Droop — ask to smile
A - Arm	Drift/weakness — arms out 10s
S - Speech	Slurred, absent, wrong words
T - Time	Call 911 NOW. Note last known well

TPA ELIGIBILITY — ISCHEMIC (CSBP 2022)

INCLUDE	EXCLUDE
Onset $\leq$ 4.5h	ICH on CT
Age $\geq$ 18	BP $>$ 185/110
NIHSS scored	INR $>$ 1.7 / Plts $<$ 100
CT/MRI done	Gluc $<$ 2.8 or $>$ 22 mmol/L
Dx ischemic	Major surgery $<$ 14d

ALTEPLASE — 0.9 MG/KG IV (MAX 90 MG)

10% bolus 1 min $\rightarrow$ 90% over 60 min. No anticoag or ASA x 24h post-dose.

BP TARGETS (CSBP 2022)

Pre-tPA	$<$ 185/110 mmHg
Post-tPA 24h	$<$ 180/105 mmHg
No tPA (isch)	$<$ 220/120, permissive x72h
Hemorrhagic	SBP $<$ 140 mmHg

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Acute Coronary Syndrome

CCS Guidelines 2022

Canadian Cardiovascular Society 2022

CLASSIFICATION

Type	ECG	Troponin
STEMI	STE or new LBBB	Elevated
NSTEMI	STD / TWI / nl	Elevated
UA	STD / nl	Normal

STEMI — CCS IMMEDIATE ACTIONS

- 12-Lead ECG** within 10 min of first medical contact
- Activate Cath Lab** FMC-to-device < 90 min (CCS)
- ASA 160-325mg PO** non-enteric, chewed (CCS I)
- Ticagrelor 180mg** preferred over Clopidogrel (CCS I)
- UFH 60 U/kg IV** max 4,000 U or Enoxaparin
- O2 if SpO2 < 90%** NTG if SBP > 90, not RV infarct

KILLIP CLASSIFICATION

Cl	Findings	Mortality
I	No HF signs	~6%
II	Rales, S3, JVD	~17%
III	Pulmonary edema	~38%
IV	Cardiogenic shock	> 80%

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Acute Coronary Syndrome

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CCS 2022 · Health Canada · Canadian STEMI Protocol

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Dysrhythmia Reference

CCS / ACLS Canada 2020

CCS Arrhythmia Guidelines · Heart & Stroke

BRADYCARDIA (HR < 50, SYMPTOMATIC)

- 1 **Atropine 0.5mg IV** q3-5min, max 3mg total
- 2 **TCP or Dopa/Epi drip** if atropine fails
- 3 **Transvenous pacing** Cardiology, if unstable

CARDIOVERSION — BIPHASIC ENERGY

Rhythm	Energy
Atrial Fibrillation	120-200 J
AFI / SVT	50-100 J
Monomorphic VT	100 J synchronized
pVT / VF	200 J UNSYNC

STABLE SVT — VAGAL THEN ADENOSINE

- 1 **Valsalva** carotid massage if no bruit
- 2 **Adenosine 6mg** rapid IV + 20mL flush. Repeat 12mg x2
- 3 **Diltiazem 0.25mg/kg IV** or Metoprolol 5mg IV x3

AFIB RATE CONTROL (CCS 2020)

Drug	Dose	Avoid if
Metoprolol	5mg IV q5min x3	Bronchospasm
Diltiazem	0.25mg/kg IV	HFrEF/WPW
Amiodarone	150mg/10min IV	Thyroid dz

CCS 2020 — LENIENT RATE ACCEPTABLE

Resting HR < 100 bpm acceptable in stable AFib

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Dysrhythmia Reference

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CCS Arrhythmia 2020 · ACLS Canada · Heart & Stroke

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Heart Failure

CCS HF Guidelines 2021

CCS 2021 · ODB Formulary · RxFiles

NYHA CLASSIFICATION

I	No symptoms with ordinary activity
II	Mild limitation — comfortable at rest
III	Marked limit — comfortable only at rest
IV	Symptoms at rest — unable to carry on

ACUTE DECOMPENSATION — LMNOP

L	Furosemide 40mg IV or 2.5x home dose IV
M	Morphine CCS: limited evidence, caution
N	Nitrates SL NTG if SBP > 100; IV if pulm edema
O	O2 SpO2 >= 95%. CPAP/BiPAP if pulm edema
P	Position upright, legs dependent

GDMT — HFREF (EF < 40%) CCS 2021

Class	Agent (ODB)	Level
ACEi/ARNI	Ramipril/Sacubitril	CCS I-A
Beta-blk	Carvedilol/Bisoprolol	CCS I-A
MRA	Spironolactone	CCS I-A
SGLT2i	Dapagliflozin/Empag	CCS I-A

BNP / NT-PROBNP (SI UNITS)

< 100 ng/L: HF unlikely. > 400: likely. On ARNI? Use NT-proBNP. All 4 GDMT classes on ODB.

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Heart Failure

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CCS HF 2021 · ODB Formulary · RxFiles

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Post-Op Complications

ERAS Canada · CAGS Protocols

ERAS Canada · CAGS · CADTH · Health Canada

5 W'S OF POST-OP FEVER

POD	Cause	Action
1-2	Wind (atelectasis)	IS, early ambulation
3-5	Water (UTI)	UA / Urine Cx
5-7	Wound (SSI)	Inspect, wound Cx
5-7	Walking (DVT/PE)	Doppler, CTA-PE
Any	Wonder drugs	Drug fever R/O

POST-OP RESPIRATORY FAILURE

- 1 SpO₂, RR, ETCO₂** assess breath sounds immediately
- 2 DDX:** atelectasis, PNA, PE, pulm edema, bronchospasm
- 3 CXR + ABG** trial CPAP/BiPAP before intubation (ERAS)
- 4 Naloxone 0.04-0.4mg IV** if opioid-induced, titrate slowly

VTE PROPHYLAXIS (CADTH / CAGS)

Risk	Prophylaxis	Duration
Low	Early ambulation	In-hospital only
Mod	SCD + LMWH/U...	In-hospital
High	LMWH + SCD	28-35 days post-op

POST-OP HYPOTENSION DDX

Hemorrhage · Sepsis · PE · Cardiac · Neurogenic ·
Adrenal crisis · Drug effect

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DKA / HHS

Diabetes Canada CPG 2023

Diabetes Canada 2023 · CADTH · Health Canada

DIAGNOSTIC CRITERIA (CANADIAN SI)

	DKA	HHS
Glucose	> 14 mmol/L	> 33 mmol/L
pH	< 7.30	> 7.30
Bicarb	< 15 mmol/L	> 15 mmol/L
Anion Gap	> 12 mmol/L	Normal
Osmolality	Variable	> 320 mmol/kg
Ketones	++++ (urine/seru...	Trace/none

DKA MANAGEMENT (DIABETES CANADA 2023)

- 1** 0.9% NaCl 500-1000 mL/hr x2h -> reassess
- 2** Insulin 0.1 U/kg/hr no bolus (DC 2023 recommendation)
- 3** K+ < 3.5 mmol/L hold insulin, replace K+ first
- 4** Add D5W/D10W when glucose < 11 mmol/L
- 5** Transition SubQ AG resolved + pH > 7.3 + PO ok

CORRECTED NA+ (DIABETES CANADA)

$$\text{Na(corr)} = \text{Na(meas)} + 0.4 \times (\text{Glucose} - 5.5)$$

EUDKA — SGLT2 INHIBITORS

Glucose may be near-normal on Dapagliflozin/Empagliflozin. Check ketones regardless. Health Canada advisory 2015.

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