

Metabolic Monitoring (Mental Health, Acute Care)

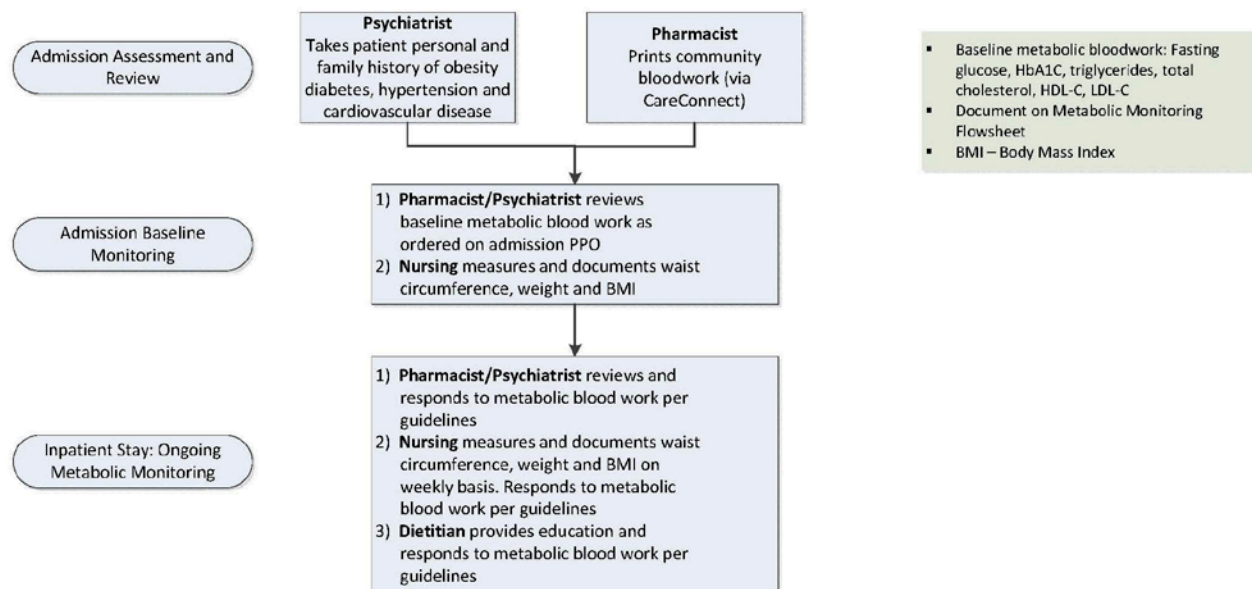
Site Applicability:

St. Paul's Hospital, Mental Health Inpatient Units: 2N, 8C, 9A

Practice Level:

Basic - RN/RPN, RD, Pharmacist, Physician

Need to Know



Metabolic syndrome (MetS) is a term used to describe a cluster of cardiometabolic risk factors including: abdominal obesity, hypertension, hyperglycemia, and dyslipidemia. Individuals with these risk factors are at higher risk of developing cardiovascular disease, cerebrovascular disease, and type 2 diabetes mellitus.

Epidemiologic data suggest that individuals with mental illness have an increased prevalence of some or all of these risk factors. Hypothesized contributing factors include underlying shared pathophysiology of disease, poor nutrition, smoking, poverty, urbanization, and sedentary lifestyle, as well as adverse effects associated with psychotropic medications.

Goals of metabolic monitoring in acute inpatient psychiatry include:

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- 1) Identifying treatable pathology in a high-risk population (i.e., screening for diabetes, dyslipidemia, and hypertension)
- 2) Identifying risk factors and disease markers to facilitate preventative strategies and early diagnosis
- 3) Tracking and linking metabolic disturbances in relation to treatment with psychotropic medications

Monitoring

The Psychiatry Admission Orders (PH079, [Appendix C](#)) outlines baseline and ongoing metabolic laboratory testing, consistent with the parameters outlined in Table 1.

Table 1: Baseline and Ongoing Monitoring Frequency

	Baseline	Weekly	3 Months	Annually
Medical History*	X			X
Weight/BMI	X	X		X
Waist Circumference	X	X		X
Pulse and Blood Pressure	X	X		X
Fasting Glucose	X		X	X
HgbA1C	X		X	X
Fasting Lipid Profile**	X		X	X

* Personal and family history of obesity, diabetes, hypertension, and cardiovascular disease

**Fasting lipid profile include triglycerides, total cholesterol, HDL-C, and LDL-C

(Canadian Diabetes Association, 2013; American Psychiatric Association [APA], 2004; APA, 2010)

Table 2: Roles and Responsibilities

Discipline	Responsibilities
Pharmacist	<ul style="list-style-type: none"> Reviews metabolic blood work completed in the community (via care connect), on admission and throughout inpatient stay Calculates Framingham Risk Score for patients with abnormal metabolic parameters
Psychiatrist	<ul style="list-style-type: none"> Conducts a personal and family history of obesity, diabetes, hypertension, and cardiovascular disease upon admission Reviews metabolic measures from the community, on admission, and throughout inpatient stay Reviews Framingham Risk Score and makes follow-up referrals where appropriate
Nurse	<ul style="list-style-type: none"> Measures and documents waist circumference, weight and BMI on admission and weekly thereafter

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	<ul style="list-style-type: none"> Reviews and documents metabolic measures on admission and throughout inpatient stay Provides patient and family education as needed
Dietitian	<ul style="list-style-type: none"> Reviews metabolic measures and provides dietary support/education as needed
Unit Coordinator	<ul style="list-style-type: none"> Upon discharge, sends <i>Metabolic Monitoring Flowsheet (Form PS150)</i> to patient's community mental health team and primary care provider (as applicable)

Interventions

Concern	Interventions
Preventing weight gain	<ul style="list-style-type: none"> Education: educate the patient and family/support person(s) on the importance of lifestyle habits including nutrition, smoking cessation, and physical activity. Psychotropic selection: risk of metabolic repercussions should be carefully considered, especially in patients with a family history of or already established metabolic disturbances or cardiovascular disease. Medication: where weight gain is a substantial concern and psychotropic medication with low risk of weight gain is not an option, addition of medication to minimize weight gain (e.g. metformin), in addition to lifestyle modification, may be considered
When weight gain has occurred	<ul style="list-style-type: none"> Education: intensify educative efforts regarding lifestyle changes Psychotropic selection: consider switching to another medication with less metabolic effects Consultation: consider consulting with family practice (see criteria for family practice referral) to discuss medication against weight gain.
Elevated blood lipids Triglycerides more than 1.7 mmol/L ❖ HDL less than 1.0 mmol/L (male); less than 1.3 mmol/L (female) ❖ LDL more than 3.4 mmol/L	<ul style="list-style-type: none"> Education: intensify educative efforts regarding lifestyle changes Psychotropic selection: consider switching to another psychopharmacological medication with less metabolic effects Consultation: consider consulting with family practice (see criteria for family practice referral) to discuss medication against elevated blood lipids. Family practice may consider increasing frequency of blood work.

<p>Elevated blood sugars</p> <ul style="list-style-type: none"> ❖ IFG: 5.6 to 7 mmol/L ❖ Diabetes: <ul style="list-style-type: none"> FPG 7mmol/L or more; or A1C 6.5% or more; or OGTT 11.1 mmol/L or more Random glucose 11.1 mmol/L or more 	<p><u>If impaired fasting glucose (IFG):</u></p> <ul style="list-style-type: none"> • consider consulting with family practice (see criteria for family practice referral) who may consider repeating blood work (e.g., re-checking A1C) • intensify educative efforts regarding lifestyle changes • consider switching to another psychopharmacological medication with less metabolic effects <p><u>If diabetes:</u></p> <ul style="list-style-type: none"> • consult with family practice (see criteria for family practice referral) regarding pharmacological interventions • ensure diabetes follow-up on discharge • intensify educative efforts regarding lifestyle change and weight reduction • consider switching to another psychopharmacological medication with less metabolic effects
<p>Hypertension</p> <ul style="list-style-type: none"> ❖ Average blood pressure is 140 mmHg or less systolic, 90 mmHg or less diastolic ❖ Any blood pressure measurement of 180 mmHg systolic or more and/or 110 mmHg or more diastolic 	<ul style="list-style-type: none"> • Consultation consider consulting with family practice for any new diagnosis of hypertension • Education: intensify educative efforts regarding lifestyle changes

Family Practice Referrals Criteria

A referral to family practice can be made physician to physician, with consideration given to the following:

- Intermediate or high [Framingham Risk Score](#)
- Any of the following comorbidities:
 - Clinical atherosclerosis
 - Abdominal aortic aneurysm
 - Diabetes and age 40 or more, or 15 year duration (type 1) for age 30 or more; or presence of microvascular disease
 - Chronic kidney disease (50 years or over)
 - LDL 5.0 mmol/L or more
 - New diagnosis of hypertension or diabetes

Documentation

Metabolic Monitoring Flowsheet (Form PS150) – see [Appendix D](#)

- Pharmacist/MRP: to document risk factors, ECG, and QTc Interval
- Nurse: to document weekly waist circumference, weight and BMI, in addition to admission and ongoing metabolic blood work
- All: to document interventions as completed

Patient Education and Resources

Using the *Metabolic Monitoring Patient Brochure* ([Appendix E](#)), educate the patient and family/support person(s) about:

- expected benefits of treatment
- possible side effects of prescribed medication
- signs and symptoms of diabetes and diabetic ketoacidosis
- concrete interventions to modify identified cardio-metabolic risk factors:
 - safe weight reduction for overweight individuals
 - smoking reduction or cessation for tobacco users
 - safe increases in physical activity levels in sedentary individuals
 - increased consumption of a healthy-heart diet

Discharge Planning

Upon discharge, the unit coordinator will send a copy of the *Metabolic Monitoring Flowsheet* (Form PS150) to the patient's primary care and community mental health providers (as applicable).

Related Standards and Resources:

[BD-00-13-40100](#) - Clozapine: Care of Patients Receiving

References

1. American Diabetes Association; American Psychiatric Association; American Association of Clinical Endocrinologists; North American Association for the Study of Obesity. (2004). Consensus development conference on anti-psychotic drugs and obesity and diabetes. *Diabetes Care*, 27 (2), 596–601.
2. American Psychiatric Association (2010). Practice Guideline for the Treatment of Patients with Bipolar Disorder, Second Edition.
3. American Psychiatric Association (2010). Practice Guideline for the Treatment of Patients with Schizophrenia, Second Edition.

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4. American Psychiatric Association (2010). Practice Guideline for the Treatment of Patients with Major Depressive Disorder, Second Edition.
5. Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. Canadian Diabetes Association 2013 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada. (2013). *Canadian Journal of Diabetes* 37(suppl 1):S1-S212
6. Canadian Psychiatric Association. (2005). Clinical practice guidelines: treatment of schizophrenia. *Canadian Journal of Psychiatry*, 50(13), 7S.
7. Cohn, T. A., & Sernyak, M. J. (2006). Metabolic monitoring for patients treated with antipsychotic medications. *The Canadian Journal of Psychiatry*, 51(8), 492-501.
8. De Hert, M., Vancampfort, D., Correll, C. U., Mercken, V., Peuskens, J., Sweers, K., et al. (2011). Guidelines for screening and monitoring of cardiometabolic risk in schizophrenia: Systematic evaluation. *The British Journal of Psychiatry*, 199(2), 99-105.
9. Gothefors, D., Adolfsson, R., Attvall, S., Erlinge, D., Jarbin, H., Lindström, K., et al. (2010). Swedish clinical guidelines—prevention and management of metabolic risk in patients with severe psychiatric disorders. *Nordic Journal of Psychiatry*, 64(5), 294-302.
10. Mackin, P., Bishop, D. R., & Watkinson, H. M. (2007). A prospective study of monitoring practices for metabolic disease in antipsychotic-treated community psychiatric patients. *BMC Psychiatry*, 7(1), 28-34.
11. Mitchell, A. J., Delaffon, V., Vancampfort, D., Correll, C. U., & De Hert, M. (2012). Guideline concordant monitoring of metabolic risk in people treated with antipsychotic medication: systematic review and meta-analysis of screening practices. *Psychological Medicine*, 42(1), 125-147.
12. Mitchell, A. J., Vancampfort, D., Sweers, K., van Winkel, R., Yu, W., & De Hert, M. (2011). Prevalence of metabolic syndrome and metabolic abnormalities in schizophrenia and related disorders—a systematic review and meta-analysis. *Schizophrenia Bulletin*, 39(2), 306-318.
13. NICE. (2014). Schizophrenia. Core interventions in the treatment and management of schizophrenia. London: National Institute for Clinical Excellence.
14. Waterreus, A. J., & Laugharne, J. D. (2009). Screening for the metabolic syndrome in patients receiving antipsychotic treatment: a proposed algorithm. *The Medical Journal of Australia*, 190(4), 185-189.

Persons/Groups Consulted

Psychiatry Department Head, SPH

Inpatient Physician Leads

Inpatient Clinical Nurse Leaders

Clinical Nurse Specialist, Tertiary & Older Adult Psychiatry

Family Practice Lead, SPH

Family Practice Physician, SPH

Inpatient Mental Health Nursing Consortium Members

Nurse Educator, Psychiatry

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Nurse Practitioner, Inner City Youth
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Developed By

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Clinical Pharmacy Specialist, Psychiatry
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Effective Date:	23-JAN-2019
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Last Revised:	
Approved By:	PHC
	Mental Health Quality & Performance Improvement Committee (QPIC) Professional Practice Standards Committee
Owners:	PHC Mental Health Program

Appendix A: Metabolic syndrome diagnosis criteria and risk factors

Metabolic syndrome diagnosis = three (3) or more criteria met

	Criteria	Related medical condition
Elevated waist circumference ^a	Men: greater than 40 inches Women: greater than 35 inches	Abdominal obesity
Elevated blood pressure	If no co-morbid conditions: greater than 140/90 If patient has diabetes, renal disease or other organ damage ^b : greater than 130/80	Hypertension
Elevated triglycerides	Greater than 1.7 mmol/L or drug treatment for elevated triglycerides ^c	Dyslipidemia
Reduced high-density lipoprotein cholesterol (HDL-C)	Men: less than 1.0 mmol/L Women: less than 1.3 mmol/L or drug treatment for reduced HDL-C ^c	Dyslipidemia
Elevated fasting glucose	Greater than 5.6 mmol/L (fasting) Greater than 11.1 mmol/L (random) or drug treatment for elevated glucose	Diabetes

^a If waist circumference is difficult to obtain and BMI is greater 30 kg/m², it can be initially assumed.

^b Target organ damage includes: cerebrovascular disease, coronary heart disease (CHD), left ventricular hypertrophy (LVH), chronic kidney disease (CKD), peripheral vascular disease and hypertensive retinopathy.

^c The most commonly used drugs for elevated triglycerides and reduced HDL-C are fibrates and nicotinic acid.

Metabolic syndrome risk factors

Risk Factor	Considerations
Personal or family history of any of:	• Diabetes • High cholesterol • Hypertension • Heart Disease
High-risk ethnicity ^a	• Aboriginal • African • Asian • Hispanic • South Asian
Tobacco use	• Quit less than 7 days ago • Current user
Sedentary/inactive lifestyle	Less than 30 minutes per day or 150 minutes per week of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more, or no appreciable exercise
Poor diet quality / dietary habits	• Diets high in fat and low in fibre
Increasing weight	Greater than 5% increase from baseline


^a Ethnicity (origin/descent) should be basis for classification, not country of residence.

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Appendix B: Psychotropic Medications and Metabolic Abnormalities

Medication	Weight Gain	Dyslipidemia	Diabetes
Antipsychotics			
Low Potency First-Generation Antipsychotics	++	++	++
Medium Potency First-Generation Antipsychotics	+	+	+
High Potency First-Generation Antipsychotics	-	-	-
Clozapine	+++	+++	+++
Olanzapine	+++	+++	+++
Quetiapine	++	++	++
Risperidone/Paliperidone	++	+	+
Aripiprazole	+	-	-
Asenapine	+	-	-
Lurasidone	+	-	-
Ziprasidone	-	-	-
Mood Stabilizers			
Divalproex	++	+	+
Lithium	++	-	-
Lamotrigine	-	-	-
Carbamazepine	+	-	-
Antidepressants			
SSRIs (other than paroxetine)	+	-	-
Paroxetine	++	-	-
SNRIs	-	-	-
Bupropion	-	-	-
Mirtazapine	++	-	-
Trazodone	++	-	-
TCAs	++	-	-
MAOIs	++	-	-
<p>1) This is a general overview of metabolic changes caused by select psychotropic medications, for more specific information, refer to each individual product monograph.</p> <p>2) Some medications have been associated with cholesterol changes as a result of weight gain, and not an independent effect of the drug (e.g. Mirtazapine). These have still been marked as “-” for cholesterol changes.</p>			

Appendix C: Psychiatry Admission Orders

IF YOU RECEIVED THIS FAX IN ERROR, PLEASE CALL 604-806-8886 IMMEDIATELY									
 PREScriBER'S ORDERS									
NO DRUG WILL BE DISPENSED OR ADMINISTERED WITHOUT A COMPLETED CAUTION SHEET ALLERGY/INTOLERANCE STATUS FORM (PHC-PH047)									
DATE AND TIME	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center; padding: 5px;"> PSYCHIATRY EMERGENCY ADMISSION ORDERS <small>(Items with check boxes must be selected to be ordered)</small> </th> </tr> <tr> <td colspan="2" style="text-align: right; padding: 5px;"> Page 1 of 2 </td> </tr> <tr> <td colspan="2" style="padding: 10px;"> <p>ADMISSION: <input type="checkbox"/> Involuntary - Certified x _____ <input type="checkbox"/> Voluntary</p> <p>DIAGNOSIS: _____ <input type="checkbox"/> Early Psychosis Pathway (Patients 25 and under, having psychotic symptoms for less than 5 years)</p> <p>CODE STATUS: Full code or <input type="checkbox"/> refer to completed Options for Care and Resuscitation / DNAR Orders (PHC-PH254)</p> <p>DIET: <input type="checkbox"/> Diet as tolerated <input type="checkbox"/> Other: _____</p> <p>ACTIVITY: <input type="checkbox"/> Activity as tolerated <input type="checkbox"/> Other: _____</p> <p>OBSERVATIONAL MONITORING: <input type="checkbox"/> Close observation (Q15 min checks) x 24 hours, then reassessment Reason: _____ <input type="checkbox"/> Constant observation (1:1) x 24 hours, then reassessment Reason: _____ <input type="checkbox"/> Seclusion x 24 hours then reassessment Reason: _____ <input type="checkbox"/> Other: _____</p> <p>VITAL SIGN MONITORING: <input type="checkbox"/> Vitals routine <input type="checkbox"/> Vitals Q _____ H</p> <p>METABOLIC MONITORING: Baseline: height and weight Weekly: weight, BMI, and abdominal circumference <i>once admitted to INPATIENT UNIT (2N, 8C, or 9A)</i></p> <p>LABORATORY: Note: Please consider when/if labs have been previously taken (prior admission, community) <input type="checkbox"/> CBC Diff, electrolytes <input type="checkbox"/> Urea, creatinine, eGFR <input type="checkbox"/> TSH <input type="checkbox"/> Serum B-HCG or <input type="checkbox"/> Urine B-HCG (ED only) <input type="checkbox"/> AST, ALT, GGT <input type="checkbox"/> Urine drug screen (including amphetamines)</p> <p>HIV testing: <input type="checkbox"/> Yes Order HIV antibody test with next bloodwork <input type="checkbox"/> No Reason: <input type="checkbox"/> Recent test <input type="checkbox"/> Known positive <input type="checkbox"/> Refused</p> <p>STI testing: <input type="checkbox"/> Chlamydia <input type="checkbox"/> Gonorrhea <input type="checkbox"/> Syphilis</p> <p>Metabolic tests on admission and at 3-months <input type="checkbox"/> Fasting glucose <input type="checkbox"/> Fasting lipid profile (cholesterol, TG, HDL, calculated LDL) <input type="checkbox"/> HgbA1C Other: _____</p> <p>DIAGNOSTICS: <input type="checkbox"/> ECG <input type="checkbox"/> CT Head (complete requisition PHC-RA090) Date: _____ Other: _____</p> </td> </tr> <tr> <td colspan="2" style="padding: 5px;"> <div style="display: flex; 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Form No. PH079 (R. Jan 15-19)

ALL NEW ORDERS MUST BE FLAGGED
FAX COMPLETED ORDERS TO PHARMACY PLACE ORIGINAL IN PATIENT'S CHART

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PREScriBER'S ORDERS

NO DRUG WILL BE DISPENSED OR
ADMINISTERED WITHOUT A COMPLETED
CAUTION SHEET
ALLERGY/INTOLERANCE STATUS FORM (PHC-PH047)

DATE AND TIME	PSYCHIATRY EMERGENCY ADMISSION ORDERS (Items with check boxes must be selected to be ordered)
	<p>NURSING ASSESSMENTS:</p> <p><input type="checkbox"/> Montreal Cognitive Assessment (MoCA), once stable or 3 to 5 days prior to planned discharge (use for Early Psychosis pathway patients)</p> <p>CONSULTS:</p> <p><input type="checkbox"/> Addictions Consult Team Reason: _____</p> <p><input type="checkbox"/> Family Practice (inpatient only) Reason: _____</p> <p><input type="checkbox"/> Social work (ED only) Reason: _____</p> <p>Other: _____</p> <p>MEDICATIONS:</p> <p>Print Admission Medication Reconciliation Orders</p> <p>Print PharmaNet Profile</p> <p>Nicotine Replacement Therapy:</p> <p>Refer to completed Nicotine Replacement Therapy (NRT) Orders (Regional) (PHC-PH242)</p> <p>PRN Medications:</p> <p><input type="checkbox"/> benzotropine _____ mg PO/IM Q _____ H PRN (max 6 mg/24 hours)</p> <p><input type="checkbox"/> lorazepam _____ mg PO/IM Q _____ H PRN (max 20 mg/24 hours)</p> <p>Select one of the following:</p> <p><input type="checkbox"/> loxapine _____ mg PO/IM Q _____ H PRN (max 150 mg/24 hours)</p> <p><input type="checkbox"/> loxapine _____ mg PO/IM Q _____ H PRN (early psychosis max 80 mg/24 hours)</p> <p><input type="checkbox"/> haloperidol _____ mg PO/IM Q _____ H PRN (max 30 mg/24 hours)</p> <p><input type="checkbox"/> haloperidol _____ mg PO/IM Q _____ H PRN (early psychosis max 10 mg/24 hours)</p> <p>Call MD if maximum doses reached in less than 24 hours and more doses are required</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Scheduled Medication for Early Psychosis: Refer to Antipsychotic Treatment Options And Medication Algorithm posted online on: PHC Connect > Clinical > Pharmacotherapeutic Guidelines > Psychiatry</p> </div>
	<p>Printed Name _____ Signature _____ College ID _____ Contact Number _____</p>

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Appendix D: Metabolic Monitoring Flowsheet



METABOLIC MONITORING FLOWSHEET

RISK FACTORS

- ☐ Smoker ☐ Elevated lipids ☐ Obesity ☐ Cardiovascular disease ☐ Sedentary lifestyle
☐ Diabetes ☐ Schizophrenia ☐ Family history (describe): _____

METABOLIC PARAMETERS

Patient's height:		MEASUREMENTS (weekly)					
Measure	Risk Criteria	Baseline	Date:	Date:	Date:	Date:	Date:
Nursing	Waist Circumference	Men greater than 40 inch Women greater than 35 inch					
	Weight (kg)	Refer to BMI criteria					
	BMI*	BMI greater or equal to 30					
	Clinician Initials:						
*Body mass index (BMI) = see chart on back of page		LAB RESULTS					
Measure	Risk Criteria	Baseline	Date:	Date:	Date:	Date:	
Nursing/Pharmacist/ Psychiatrist	Fasting Glucose	Greater than 5.6 mmol/L (fasting) Greater than 11.1 mmol/L (random)					
	Hgb A1C	Greater than 6.5%					
	Triglycerides	Greater than 1.7 mmol/L					
	Total Cholesterol	Greater than 6.1 mmol/L					
	HDL-C	Men: less than 1 mmol/L Women: less than 1.3 mmol/L					
	LDL-C	Greater than 3.4 mmol/L					
Clinician Initials:							
CARDIAC MONITORING							
Measure	Baseline	Date:	Date:	Date:	Date:		
Nursing/Pharmacist/ Psychiatrist	ECG						
	QTc Interval						
Clinician Initials:							

INTERVENTIONS

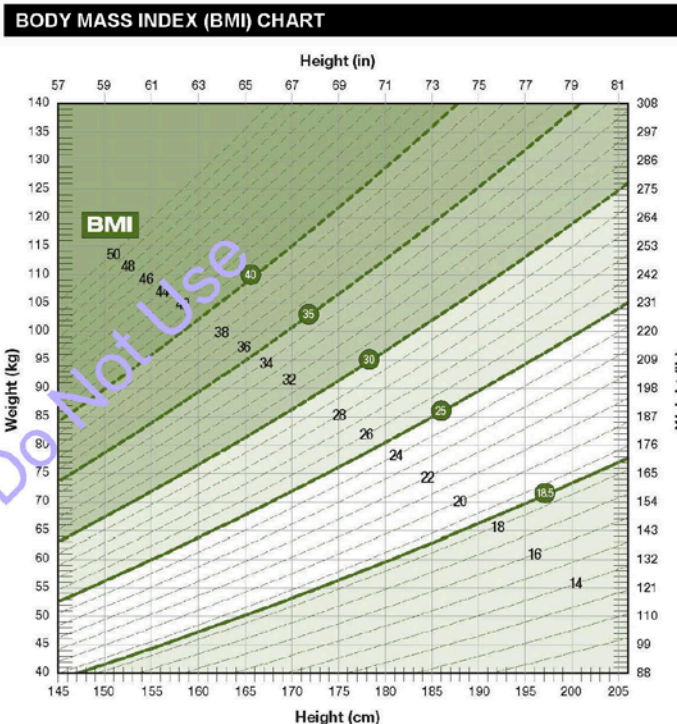
Intervention	RN/RPN	RD	MD	Pharmacist
Discuss metabolic risks				
Discuss smoking cessation				
Discuss diet				
Discuss physical activity				
Switch antipsychotic medication				

Intervention	RN/RPN	RD	MD	Pharmacist
Increase frequency of blood work				
Referral to dietician				
Referral to family practice				
Other:				

RECOMMENDED INTERVENTIONS	
Clinical Context	Interventions
Preventing weight gain	<ul style="list-style-type: none"> Education: educate the patient and family/support person(s) on the importance of lifestyle habits including nutrition, smoking cessation, and physical activity. Medication selection: upon initiating or changing treatment with a psychotropic medication, the risk of metabolic repercussions should be carefully considered. This is especially important for patients with a family history of or already established metabolic disturbances or cardiovascular disease.
When weight gain has occurred or elevated blood lipids are detected <ul style="list-style-type: none"> Triglycerides greater than 1.7 mmol/L HDL less than 1 mmol/L (male); less than 1.3 mmol/L (female) LDL greater than 3.4 mmol/L 	<ul style="list-style-type: none"> Education: intensify educative efforts regarding lifestyle change and weight reduction Medication: consider switching to another medication with less metabolic effects Consultation: consider consulting with family practice to discuss medication against weight gain or elevated blood lipids. Consider increasing frequency of blood work: <ul style="list-style-type: none"> Fasting blood glucose once monthly Lipid profile quarterly
When raised blood sugar levels are detected <ul style="list-style-type: none"> IFG 5.6 to 7 mmol/L Diabetes greater or equal to 7 mmol/L 	<p>If impaired fasting glucose (IFG):</p> <ul style="list-style-type: none"> intensify educative efforts regarding lifestyle change and weight reduction consider switching to another medication consultation with family practice consider repeating blood work, if still IFG, offer an oral glucose tolerance test (OGTT) <p>If diabetes:</p> <ul style="list-style-type: none"> consultation with family practice ensure diabetes follow-up on discharge


RECOMMENDED METABOLIC MONITORING SCHEDULE				
	Baseline	Weekly	3 Months	Annually
Medical History**	X			X
Weight/BMI	X	X		
Waist Circumference	X	X		X
Pulse and Blood Pressure	X	X		X
Fasting Glucose	X		X	X
Fasting Lipids	X		X	X

**Personal and family history of obesity, diabetes, hypertension, and cardiovascular disease




For a quick determination of BMI (kg/m²) use a straightedge to help locate the point on the chart where height (in inches or cm) and weight (lb or kg) intersect. Read the number on the dashed line closest to this point. For example, an individual who weighs 69 kg and is 173 cm tall has a BMI of approximately 23.

Appendix E: Metabolic Syndrome Patient Brochure



Promoting wellness. Ensuring care.

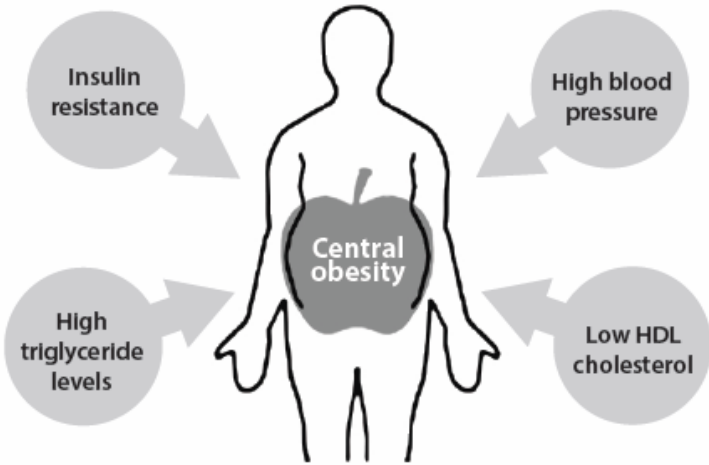


How you want to be treated.

Metabolic Syndrome (MetS)

What is Metabolic Syndrome (MetS)?
Metabolic Syndrome (MetS) is a term used to describe a group of conditions that puts people at a higher risk of developing Type 2 diabetes, heart disease and other heart-related problems.

The 5 Symptoms of Metabolic Syndrome


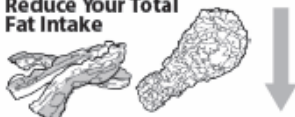









If you have 3 or more of the following conditions, you are considered to have (MetS):	Reference values	Your values Date:
Elevated fasting blood glucose	more than 5.6 mmol/L (fasting) more than 11.1 mmol/L (random)	
Elevated blood pressure	more than 140/90	
Elevated triglycerides	more than 1.7 mmol/L	
Reduced high density lipoprotein cholesterol (HDL)	Men more than 1.0 mmol/L Women more than 1.3 mmol/L	
Elevated waist circumference	Men more than 102 cm Women more than 88 cm	


Where can I get more information?
If you have any questions, contact HealthLink BC by calling 8-1-1. You can speak to a registered nurse, a registered dietitian, a qualified exercise professional, or a pharmacist.

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Recommendations	What can I do?
Take Your Medications 	<input type="checkbox"/> Continue to take your prescribed medications <input type="checkbox"/> If concerned about MetS or weight gain, review medication changes with your psychiatrist or pharmacist
Reduce Your Total Fat Intake 	<input type="checkbox"/> Try plant-based protein foods (beans, soybeans, lentils, chickpeas, edamame, tofu and veggie ground round) <input type="checkbox"/> Choose lean meats (skinless poultry and lean ground beef) <input type="checkbox"/> Eat less processed meats (bacon and sausages) <input type="checkbox"/> Eat less fast-food burgers, deep-fried chicken and greasy pizza
Increase Omega-3 Fats 	<input type="checkbox"/> Eat fresh, frozen or canned fish 2-3 times per week <input type="checkbox"/> Choose fatty fish (salmon, sardines, tuna, mackerel and trout) <input type="checkbox"/> Try mashing canned sardines with mustard and using it in your sandwiches and salads
Increase Fibre 	<input type="checkbox"/> Try barley, brown rice, lentils, kidney beans and black beans Choose whole-grain breads for your sandwiches <input type="checkbox"/> Roast vegetables like squash, sweet potatoes and yams <input type="checkbox"/> Add fresh, frozen or canned high-fibre fruits (apples, pears and peaches) and berries to your bran cereals or oatmeal
Make Half of Your Plate Non-Starchy Vegetables 	<input type="checkbox"/> Try stir-frying green beans, broccoli, onions and celery <input type="checkbox"/> Add low-sodium canned vegetables (tomatoes, peas, carrots and corn) and beans to a hearty chili or soup <input type="checkbox"/> Add in frozen vegetables like kale and spinach to bulk up your soups and stews <input type="checkbox"/> Try roasting brussel sprouts, eggplant, cauliflower and beets <input type="checkbox"/> Make a salad by tossing together bean sprouts, cucumber, peppers and lettuce
Choose Healthy Fats 	<input type="checkbox"/> Use vegetable oils (canola, olive, avocado and flaxseed) <input type="checkbox"/> Use non-hydrogenated margarine instead of butter <input type="checkbox"/> Try guacamole or add avocados to your tacos, nachos, sandwiches and salads
Choose Healthy Snacks 	<input type="checkbox"/> Replace chips with unsalted nuts and seeds <input type="checkbox"/> Spice up your plain popcorn with spices or nutritional yeast <input type="checkbox"/> Snack on fresh fruit in season <input type="checkbox"/> Munch on dried apple, banana or vegetable chips <input type="checkbox"/> Try hummus with whole grain crackers or raw vegetables <input type="checkbox"/> Add peanut butter or string cheese to plain rice cakes <input type="checkbox"/> Combine plain yogurt or cottage cheese with fruit
Drink More Water, Be More Active and Quit Smoking! 	<input type="checkbox"/> Aim for 30 minutes of physical activity 5 times a week <input type="checkbox"/> Include higher intensity activity 2-3 times per week (brisk walking, jogging, biking, swimming) to improve heart health <input type="checkbox"/> Include resistance or body-weight exercises (push-ups, pull-ups, crunches, weights, squats, lunges and planks) <input type="checkbox"/> Carry a water bottle to keep you hydrated wherever you go <input type="checkbox"/> Aim for 9-12 cups of fluids (water, tea, milk and coffee) daily <input type="checkbox"/> Replace pop or juice with sparkling water <input type="checkbox"/> If you smoke, ask your doctor for smoking cessation resources


 HealthLinkBC


 St. Paul's Hospital

This material has been reviewed and approved by patients, families and staff.



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Appendix F – Framingham Risk Score; Estimation of 10 Year Cardiovascular Disease Risk

FRAMINGHAM RISK SCORE (FRS)

Estimation of 10-year Cardiovascular Disease (CVD) Risk

Step 1¹

In the "points" column enter the appropriate value according to the patient's age, HDL-C, total cholesterol, systolic blood pressure, and if they smoke or have diabetes. Calculate the total points.

Risk Factor	Risk Points		Points	
	Men	Women		
Age				
30-34	0	0		
35-39	2	2		
40-44	5	4		
45-49	7	5		
50-54	8	7		
55-59	10	8		
60-64	11	9		
65-69	12	10		
70-74	14	11		
75+	15	12		
HDL-C (mmol/L)				
>1.6	-2	-2		
1.3-1.6	-1	-1		
1.2-1.29	0	0		
0.9-1.19	1	1		
<0.9	2	2		
Total Cholesterol				
<4.1	0	0		
4.1-5.19	1	1		
5.2-6.19	2	3		
6.2-7.2	3	4		
>7.2	4	5		
Systolic Blood Pressure (mmHg)	Not Treated	Treated	Not Treated	Treated
<120	-2	0	-3	-1
120-129	0	2	0	2
130-139	1	3	1	3
140-149	2	4	2	5
150-159	2	4	4	6
160+	3	5	5	7
Smoker	Yes	4	3	
	No	0	0	
Diabetes	Yes	statin-indicated condition		
	No	0	0	
Total Points				

¹ Adapted from: D'Agostino RB et al. (i). General cardiovascular risk profile for use in primary care: The Framingham Heart Study. Circ 2008;117:743-53.

² Adapted from: Genest J et al. (i). 2009 Canadian Cardiovascular Society/Canadian guidelines for the diagnosis and treatment of dyslipidemia and prevention of cardiovascular disease in the adult. Can J Cardiol. 2009;25(10):967-976.

³ Adapted from: Anderson T et al. (i). 2012 Update of the Canadian Cardiovascular Society guidelines for the diagnosis and treatment of dyslipidemia for the prevention of cardiovascular disease in the adult. Can J Cardiol. 2013;29(2):151-167.

⁴ apoB, apolipoprotein B stat, CVD, cardiovascular disease, FRS: Framingham Risk Score, HDL-C: high-density lipoprotein cholesterol, LDL-C: low-density lipoprotein cholesterol.

⁵ Statins indicated as initial therapy

⁶ Consider LDL-C < 1.6 mmol/L for subjects with acute coronary syndrome (ACS) within past 3 months

Provided courtesy of  **Canadian Cardiovascular Society**
Leadership. Knowledge. Community.

Patient's Name: _____ Date: _____

Step 2¹

Using the total points from Step 1, determine the 10-year CVD risk* (%).

Total Points	10-Year CVD Risk (%) ²	
	Men	Women
<3 or less	<1	<1
-2	1.1	<1
-1	1.4	1.0
0	1.6	1.2
1	1.9	1.5
2	2.3	1.7
3	2.8	2.0
4	3.3	2.4
5	3.9	2.8
6	4.7	3.3
7	5.6	3.9
8	6.7	4.5
9	7.9	5.3
10	9.4	6.3
11	11.2	7.3
12	13.3	8.6
13	15.6	10.0
14	18.4	11.7
15	21.6	13.7
16	25.3	15.9
17	29.4	18.5
18	30	21.5
19	30	24.8
20	30	27.5
21+	30	30

* Double cardiovascular disease risk percentage for individuals between the ages of 30 and 59 without diabetes if the presence of a positive history of premature cardiovascular disease is present in a first-degree relative before 55 years of age for men and before 65 years of age for women. This is known as the modified Framingham Risk Score.³

Step 3¹

Using the total points from Step 1, determine heart age (in years).

Heart Age, y	Men	Women
<30	<0	<1
30	0	
31		1
32	1	
34	2	2
36	3	3
38	4	
39		4
40	5	
42	6	5
45	7	6
48	8	7
51	9	8
54	10	
55		9
57	11	
59		10
60	12	
64	13	11
68	14	12
72	15	
73		13
76	16	
79		14
>80	≥17	15+

Step 4^{2,3}

Using 10-year CVD risk from Step 2, determine if patient is Low, Moderate or High risk.⁴ Indicate Lipid and/or Apo B targets

Risk Level ¹	Initiate Treatment If:	Primary Target (LDL-C)	Alternate Target
High FRS ≥20%	• Consider treatment in all (Strong, High)	• <2 mmol/L or ≥50% decrease in LDL-C (Strong, Moderate)	• Apo B ≤0.8 g/L or • Non-HDL-C ≤2.6 mmol/L (Strong, High)
Intermediate FRS 10-19%	• LDL-C ≥3.5 mmol/L (Strong, Moderate) • For LDL-C <3.5 mmol/L consider if: • Apo B ≥1.2 g/L • OR Non-HDL-C ≥4.3 mmol/L (Strong, Moderate) • Men ≥50 and women ≥60 with 1 risk factor; low HDL-C, impaired fasting glucose, high waist circumference, smoker, hypertension	• <2 mmol/L or ≥50% decrease in LDL-C (Strong, Moderate)	• Apo B ≤0.8 g/L or • Non-HDL-C ≤2.6 mmol/L (Strong, Moderate)
Low FRS <10%	• statins generally not indicated	• statins generally not indicated	• statins generally not indicated
Statin-indicated conditions^{5,6}	• Clinical atherosclerosis* • Abdominal aortic aneurysm • Diabetes mellitus Age ≥ 40 years 15-year duration for age ≥ 30 years (DM1) Microvascular disease • Chronic kidney disease (age ≥ 50 years) eGFR <60 mL/min/1.73 m ² or ACR > 3 mg/mmol		
Lipid targets LDL-C: _____ or Apo B: _____			

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