SUPPLEMENT 1. PLURAL-ACS supplemental material.

Part 1. Details of Pharmacist Care in the PLURAL-ACS Pilot Program

Medication-Taking Assessment and Identification of Barriers	
1. Identification and resolution of financial barriers to medication-taking (at first telephone call and then as needed)	
Activity	**Options for Resolution**
• Identifying how patient pays for medications • Identifying patient's drug insurance • Identifying any financial barriers to medication-taking	• Assisting with applications for drug coverage authorizations for cardiac medications when indicated, if issues are identified (patient's outpatient cardiologist may be contacted) • Switching therapies to lowest-cost alternative • Using half of double-strength tablet
2. Identification and resolution of other barriers to medication-taking (at first telephone call and then as needed)	
Activity	**Options for Resolution**
• Identifying barriers to accessing community pharmacy	• Identifying patient's pharmacy and any other nearby pharmacy to access medications • Contacting community pharmacy for delivery of medications to patient • Contacting a family member to pick up medications
• Identifying lack of medication availability in the community pharmacy	• Contacting community pharmacy • Referring patient to an alternative community pharmacy that has medication in stock
• Identifying patient-related factors that delay/prevent prescription fill and/or medication-adherence (e.g., intentional or non-intentional non-adherence, performance deficit)	• Providing education on indication for therapy and consequences of medication-adherence (see section 5 of "Therapeutic Review") • Providing strategies to help with medication-taking (e.g., setting up blister packs, dosettes, alarms, medication delivery; involving family member; sending letter to PCP to apply for medication assistance through home care)

	• Intervening to solve AEs/ interactions (see section 3 of "Therapeutic Review")
Therapeutic Review	
1. Medication reconciliation (at first telephone call and then as needed)	
Activity	**Options for Resolution**
• Best possible medication history for all medications (at first telephone call) • Medication reconciliation performed by comparing discharge prescription and patient's current medication list; patient's initial hospital admission medication list is also assessed if any discrepancies are identified (at first telephone call)	• Resolution of medication discrepancies that pose a risk to patient's cardiac condition and/or immediate well-being (at each telephone call)
2. Identification of errors in discharge prescription (at first telephone call)	
Activity	**Options for Resolution**
• Identifying missing medication, inadequate duration, duplicate therapies on discharge prescription	• Ensuring that prescription for DAPT and other ACS medications has been correctly provided for at least 30 days (patient's discharging and/or outpatient cardiologist may be contacted)
3. Identification and resolution of AEs and/or patient-related concerns (at first telephone call and then as needed)	
Activity	**Options for Resolution**
• Focused assessment and resolution of cardiac medication AEs and patient's concerns about therapies • May include assessment for light-headedness, syncope, dyspnea	• Modify therapy to resolve a significant AE (e.g., change ticagrelor to clopidogrel if ticagrelor-induced dyspnea leads to medication non-adherence, change angiotensin-converting enzyme inhibitor [ACEI] to an angiotension II receptor antagonist [ARB] if dry cough likely due to ACEI is hindering adherence) • Modify therapy to address significant patient concern (e.g., change prescribed statin to a different one if patient non-adherence is due to an AE or other concern)

4. Identification of cardiac medication-related issues and therapy optimization (at first telephone call and then as needed)	
Activity	**Options for Resolution**
• Identifying significant drug/food interactions • Ensuring relevant urgent therapy optimization • Identifying use of contraindicated medications	• Modify therapy to resolve drug interactions • Assess and address critically high BP, BG levels • Discontinue contraindicated medications (e.g., NSAIDs, oral decongestants)
5. Streamlined therapy counselling based on baseline medication knowledge (second telephone call and then as needed)	
Activity	**Options for Resolution**

• Assessing baseline medication knowledge of ACS medications
• Determining areas that require counselling (indication, dosing, duration, AEs)
	• Counselling on antiplatelet and oral anticoagulant
	  ○ Indication, dosing, duration, AEs
	  ○ Importance of medication-adherence
	  ○ Notification of other health care professionals if potential need to hold therapy arises
	• Counselling on other ACS medications
	  ○ Indication, duration of each ACS therapy
	  ○ Importance of medication-adherence, not stopping therapy unless told by cardiologist

Final Assessment and Recommendations for Follow-Up	

1. Identification and resolution of any remaining cardiac medication-related issues
2. Identification of any cardiac medication-related issues that require follow-up
3. Preparation of program discharge summary outlining patient's history, current list of medications, care provided during the program, and issues that require follow-up, sent at the end of the program to:
  a. PCP
  b. Community pharmacy
  c. Cardiologist	

Program Communication:

- Documentation of each telephone conversation in Connect Care computer charting system
- Discharge summary routed to cardiologist and faxed to patient's PCP and community pharmacy. This discharge summary will include issues needing follow-up at the end of the program .
- Other documentation will be routed to cardiologist, PCP and community pharmacy based on issues identified throughout the program.

Abbreviations: ACS = acute coronary syndrome, AE = adverse effect, BG = blood glucose, BP = blood pressure, DAPT = dual antiplatelet therapy, PCP = primary care provider, NSAID = nonsteroidal anti-inflammatory drug.

Part 2. Patient Assessment Templates

Visit 1**:**

Part I: Medication-Taking	
Access to Community Pharmacy	☐ Preferred community pharmacy updated ☐ Prescription has been taken to this pharmacy ☐ Nearby pharmacy needs to fill prescription Notes:
Discharge Prescription Pick-Up	☐ Picked up prescription from the pharmacy Date:_____. Time to first new Rx pick-up:_____ ☐ Require family member to pick up prescription ☐ Require community pharmacy to deliver prescription Notes:
Medication Availability	☐ Medication not filled due to lack of stock in the community pharmacy ☐ Another pharmacy available to provide this medication Notes:
Financial Barriers	Insurance: ☐ Seniors Blue Cross ☐ Non-group Blue Cross ☐ NIHB ☐ Third party: ☐ No drug coverage
	In the past 12 months, because of cost, did you decide not to fill a prescription, not to refill a prescription, or do anything to make a prescription last longer? ☐ Yes ☐ No Other financial concerns / barriers: Notes:
	Special authorization application required? ☐ Cardiac medication that requires application for special authorization ☐ Medications need to be switched to lowest-cost alternative Notes:
Medication Experience	☐ New: ☐ Chronic:
Regimen Complexity	
Functional Medication Management	

	Self	**Caregiver**	**Other**
Ordering	☐	☐	☐
Pick-up	☐	☐	☐
Administer	☐	☐	☐ Homecare
Organize	☐	☐	☐

		Method: ☐ Vial supply ☐ Dosette - self ☐ Dosette - caregiver ☐ Blister pack -pharmacy ☐ Other:
	Reminders	☐ Scheduled / combined with daily tasks ☐ Caregiver ☐ Alarm ☐ Phone app ☐ Other:

	No	**Yes: Use of aid?**	**Impact on medication-taking / comments**
Cognitive			
Visual			
Hearing			
Mobility			
Swallowing			
Dexterity			

Notes:

ACS Medication Knowledge

Question	
1. Can you list the names of all medications you are currently taking? ☐ No aids ☐ Uses aids: (medication list, bottles)	
2. Can you tell me why you are taking ******?	
3. Do you know how to take your ******?	
4. Do you know when to take your medicine?	
5. Do you know the possible side effects of your medicine?	
6. Do you know what to do if a side effect occurs?	
7. Do you know what to do if you miss a dose?	
Total score	

High medication knowledge is considered a score $\geq$ 5.
Notes:

Medication Adherence

Method:
Adherence:

Which of the following categories best describes your use of prescribed heart medications?
☐ Take all of your pills

<table>
<tr><td></td><td>☐ Take 75%–99% of your pills
☐ Take 50%–74% of your pills
☐ Take less than 50% of your pills
☐ Take none of your pills
☐ Not applicable

Some people have difficulty taking their medications. Have you missed taking any of your medications in the past 2 weeks?
☐ No
☐ Yes
What is the most likely reason for patient to miss a medication?<table><tr><td>☐ Forgetful</td><td>☐ Financial</td></tr><tr><td>☐ Busy schedule/work</td><td>☐ Medication working</td></tr><tr><td>☐ Non-routine day</td><td>☐ Side effect</td></tr><tr><td colspan="2">☐ Other:</td></tr></table>
When you feel better, do you ever stop taking or cut back on your medications?
☐ No ☐ Yes</td></tr>
<tr><td>Other</td><td></td></tr>
<tr><td></td><td>☐ Social supports -
☐ EtOH, cannabis, nicotine -</td></tr>
<tr><td colspan="2">Part II: Therapeutic Review</td></tr>
<tr><td>Allergies</td><td>☐ Updated</td></tr>
<tr><td>BPMH</td><td>☐ Updated</td></tr>
<tr><td>Medication Discrepancy</td><td>☐ Patient-level contribution (e.g., performance deficit):_____
☐ System-level contribution (e.g., prescription missing medication): _____</td></tr>
<tr><td>Cardiac-Medication Considerations</td><td>☐ Contraindicated medication (e.g., NSAID, oral decongestant, herbals, supplements): _____
☐ Notable drug/food interaction: _____
☐ New AE reported by patient (e.g., dyspnea to ticagrelor, diarrhea to colchicine, cough to ACEI, light-headedness, syncope): _____
☐ Medication-specific patient concerns: _____</td></tr>
<tr><td>Visit to ED/or Care Provider</td><td>☐ Patient visited ED</td></tr>
</table>

<table>
<tr><td></td><td>☐ Patient hospitalized
☐ Patient visited care provider (e.g., PCP, walk-in clinic)
Date: _____ Planned or unplanned: _____</td></tr>
<tr><td>Pharmacokinetic / Dynamics</td><td>Renal Function:
<table>
<tr><td></td><td>Scr</td><td>eGFR</td><td>K</td><td>Notes:</td></tr>
<tr><td>Current (date)</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Baseline (date)</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">☐ CKD
☐ Updated labs required</td></tr>
</table>
Hepatic Function:*</td></tr>
<tr><td>Risk Factor and Comorbidity Considerations</td><td>Risk Factors:
☐ HTN (BP=)
☐ Dyslipidemia (LDL=) Next lipid panel due:
☐ Diabetes (A1C _%)
☐ Positive family history
☐ Smoking
☐ EtOH
☐ Other: _____

Comorbidities:
☐ HF LVEF: _____
☐ AFIB (CHADS2 = __); Anticoagulation regimen: Rate / rhythm control:
☐ VT
☐ Anemia Hgb: ____
☐ Other: _____</td></tr>
<tr><td>Current ACS Regimen

Hosp:
PCI:
LV clot:
EF:
BNP:</td><td>☐ ASA
☐ P2Y12 inhibitor
☐ Warfarin
☐ DOAC
☐ Statin Optimum dose?:
☐ Ezetimibe
☐ Beta-blocker
☐ ACEI/ARB
☐ MRA
☐ Other:</td></tr>
</table>

Patient Follow-Up	☐ Patient has follow-up with PCP in 1–2 weeks Notes:

Visits 2 and 3:

Assessment and Follow-up	
Visit to ED/or Care Provider	☐ Patient visited ED ☐ Patient hospitalized ☐ Patient visited care-provider (e.g., PCP, walk-in clinic) Date:_____ Planned or unplanned: _____
Change in Medications	☐ Any new medication or change in regimen since last visit (e.g., prescribed, OTC, herbals): Date:_____ Prescriber/Initiator:_____
Cardiac-Medication Considerations	☐ Contraindicated medication (e.g., NSAID, oral decongestant, herbals, supplements): _____ ☐ Notable drug/food interaction: _____ ☐ New AE reported by patient (e.g., dyspnea to ticagrelor, diarrhea to colchicine, cough to ACEI, light-headedness, syncope): _____ ☐ New medication-specific patient concerns: _____
Medication-Taking	☐ Missed any doses or delayed taking any doses: _____
Therapy Optimization Assessment	☐ Home BP readings: _____ ☐ Home BG readings: _____ ☐ Home weight: _____

Abbreviations: ACEI = angiotensin-converting enzyme inhibitor, ACS = acute coronary syndrome, AE = adverse effect, AFIB = atrial fibrillation, ARB = angiotensin II receptor blocker, ASA = acetylsalicylic acid, BNP = B-type natriuretic peptide, BPMH = best possible medication history, CKD = chronic kidney disease, DOAC = direct oral anticoagulant, ED = emergency department, EF = ejection fraction, eGFR = estimated glomerular filtration rate, EtOH = alcohol, HF = heart failure, HTN = hypertension, K = potassium, LDL = low-density lipoprotein, LV = left ventricle, LVEF = left ventricular ejection fraction, MRA = mineralocorticoid receptor antagonist, NIHB = Non-Insured Health Benefit, OTC = over-the-counter medications, PCI = percutaneous coronary intervention, PCP = primary care provider, Rx = prescription, SCr = serum creatinine, VT = venous thrombosis.

Part 3. Discharge Summary Template

PLURAL-ACS Pilot Program

Date:

Primary Care Provider:
Cardiologist:
Community Pharmacy:

Re: PLURAL-ACS Piot Program Discharge Summary
DOB:
ULI:

Please be advised that your patient,_____, was referred to the PLURAL-ACS Pilot Program, where _____ received pharmacist-led follow-up care after being discharged from the Mazankowski Alberta Heart Institute on _____ following a _____.

Follow-up took place over the course of one month via scheduled telephone visits. A detailed review and assessment of _____'s medications was undertaken. A summary is provided below (please refer to hospital discharge summary for details regarding hospital stay).

Pertinent Cardiac History:

Cardiac Drug Therapy:

Clinical Issues Addressed During the Program:

Clinical Issues that Require Follow-Up:
I have identified the following concerns/issues as part of my review that require follow-up:
1. Medication-Taking:

2. Cardiovascular Risk Factors:

Risk Factor:		Comments:
☐ Hypertension	☐ treated ☐ controlled ☐ requires assessment	Home Blood Pressure:_____.

☐ Lipids	☐ treated ☐ controlled ☐ requires assessment	Requires a lipid panel in 2-4 weeks. If LDL-C remains above 1.8 mmol/L (or non-HDL above 2.4 mmol/L), patient would require further optimization of lipid therapy.
☐ Diabetes	☐ treated ☐ controlled ☐ requires assessment	A1C:_____. Home blood glucose:_____.
☐ Smoking	☐ treated ☐ controlled ☐ requires assessment	
☐ Overweight	☐ treated ☐ controlled ☐ requires assessment	BMI: ____. Education provided on role of lifestyle modifications and to initiate them under the recommendations of the cardiac rehab program.

3. Other:

Thank you for the opportunity to participate in the care of this patient.

Sincerely,
XXXXX
XXXXX
XXXXX

Part 4. List of Cardiac Medications

Category of Medication

- Acetylsalicylic acid
- P2Y12 inhibitors
- Oral anticoagulants
- Statins
- Ezetimibe
- Beta-blockers
- Angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers
- Mineralocorticoid receptor antagonists
- Nitroglycerin SL spray or topical patch
- Dihydropyridine calcium channel blockers
- Diabetic medications with cardiovascular benefit: metformin, SGLT-2 inhibitors, GLP-agonists

Abbreviations: GLP = glucagon-like peptide, SGLT-2 = sodium-glucose transport protein 2, SL = sublingual.

Part 5. Definitions of Cardiac Medication-Related Issues

General Cardiac Medication Issues

- Adverse effects: any side effect that is assessed to be secondary to newly initiated or titrated cardiac medication (e.g., new nose bleeds after initiation of dual antiplatelet therapy)
- Patient medication concern: apprehension or question regarding a cardiac medication brought forward by the patient that required pharmacist intervention (e.g., patient asks which medication for gout is safe to take in light of patient's cardiac condition)
- Contraindicated medication: any medication that is contraindicated with patient's cardiac condition (e.g., pseudoephedrine post–acute coronary syndrome)
- Therapy optimization required: when objective measurements of medication effect fail to meet guideline-directed targets after program pharmacist has confirmed patient adherence to therapy and after at least 5 drug half-lives have passed (e.g., average home blood pressure consistently above 135/85 mm Hg for patient with hypertension; fasting blood glucose consistently above 7 mmol/L for patient with diabetes mellitus; patient having cravings and relapsing with current smoking cessation regimen).
- Assistance with medication adherence: patient is assessed to be at high risk of medication non-adherence based on current medication administration and/or patient expresses need for assistance with adherence (e.g., establishment of blister packs after patient demonstrates confusion regarding administration and timing of current medications)
- Drug/food interaction: any drug or food item that is categorized to be at least a level C interaction based on Lexicomp database with prescribed cardiac medications and that has not previously been addressed (e.g., phosphodiesterase-5 inhibitor and nitroglycerin patch, omega-3 supplementation and antiplatelet therapy)
- Follow-up on ordered blood work required: outpatient blood work to assess the effects of a recently added medication (e.g., serum creatinine after addition of an angiotensin-converting enzyme inhibitor, serum potassium after addition of spironolactone) that was ordered by the discharging cardiology team is not followed up on, leaving the patient at risk of potential harm

Patient-Level Medication Issues

Note: The term "medication adherence" is the extent to which medication intake behaviour corresponds with the recommendations of the health care provider.[1] Therefore, "non-adherence" in our study was defined as any situation since the last scheduled visit where medication was not taken as indicated in the discharge prescription (includes withholding of medication entirely, taking the incorrect dose, or changing the frequency of the medication-taking). This includes any time that less than 100% of the pills were taken since the last scheduled visit.

- Non-intentional medication non-adherence: non-deliberately taking the prescribed cardiac medication differently than as prescribed (reasons may

include forgetfulness, confusion regarding therapy administration, performance deficit)
- Continued preadmission medication: patient continuing to take previously discontinued home cardiac medications or regimen that was changed at discharge, as confirmed with discharge prescription (e.g., patient continues to take amlodipine despite this drug being discontinued during hospitalization and at discharge)
- Intentional medication non-adherence: deliberately taking the prescribed cardiac medication differently than as prescribed (reasons may include patient's concern regarding cost of therapy or apprehension regarding therapy effects)
- Medication not picked up: patient fails to pick up new cardiac medication from the pharmacy after discharge, despite not having any at home
- Discontinued medication: patient deliberately and permanently discontinues cardiac medication (e.g., permanently discontinues taking atorvastatin therapy due to concern about adverse effects and refuses to restart atorvastatin therapy)

<u>System-Level Medication Issues</u>

- Insufficient prescription duration: medication inadvertently prescribed for less than the intended duration on the discharge prescription, as confirmed with the discharge summary and directly with the discharging team (e.g., clopidogrel prescribed for 1 month despite decision of discharging team to prescribe for the intended 12 months following ACS)
- Drug cost a barrier: patient unable to pick up cardiac medication(s) as he/she is unable to afford them
- Non-indicated therapy: medication that is not indicated (for patient's cardiac condition or any other reason) is inadvertently included in the discharge prescription, as confirmed with the discharge summary and directly with the discharging team (e.g., pantoprazole included in discharge prescription after it is confirmed that patient's chest pain from ACS was incorrectly assessed to be acid reflux before admission)
- Insufficient pass-medication supply: supply of new medications provided to patient at discharge (to ensure continuity of therapy until patient can fill prescription in community pharmacy) does not last until patient can reach his/her community pharmacy
- Omitted medication: cardiac medication that patient received during hospital stay and that is prescribed to continue is inadvertently omitted from the discharge prescription, as confirmed with the discharge summary and directly with the discharging team
- Conflicting information: information regarding cardiac medication regimen is inconsistent between discharge prescription and discharge summary (e.g., discharge prescription includes rivaroxaban and clopidogrel for a patient's antithrombotic therapy, while discharge summary includes acetylsalicylic acid and clopidogrel)
- Unavailable medication at pharmacy: newly prescribed discharge cardiac medication is not available at patient's community pharmacy, which prevents the patient from not picking up the medication

- Failure to reconcile home medication: medication that patient was taking at home before hospital admission was not reconciled in the discharge prescription, leading to patient being unsure as to whether or not he/she should take it

Abbreviation: ACS = acute coronary syndrome.

Reference

1. Hugtenburg JG, Timmers L, Elders PJM, Vervloet M, van Dijk L. Definitions, variants, and causes of nonadherence with medication: a challenge for tailored interventions. *Patient Prefer Adherence.* 2013;10;7:675-82.

Part 6. Number and Percentage of Cardiac Medication–Related Issues

	Day 1 Visit No. (%) of Issues (*n*=155)	Day 10 Visit No. (%) of Issues (*n*=60)	Day 30 Visit No. (%) of Issues (*n*=33)	Additional Visits No. (%) of Issues (*n*=7)	Total No. (%) of Issues (*n*=255)
General Cardiac Medication Issues					
Adverse Effects	17 (11)	28 (47)	7 (21)	0	52 (20)
Therapy Optimization Required	8 (5)	12 (20)	10 (30)	0	30 (12)
Patient Medication-Concern	8 (5)	7 (12)	8 (24)	4 (57)	27 (11)
Assistance with Adherence	16 (10)	0	0	0	16 (6)
Contraindicated Medication	14 (9)	0	0	0	14 (5)
Drug/Food Interaction	12 (8)	1 (2)	0	0	13 (5)
Follow-up on Ordered Blood Work Required	0	1 (2)	0	0	1 (0.39)
Patient-Level Medication Issues					
Non-intentional Non-adherence	13 (8)	5 (8)	4 (12)	2 (29)	24 (9)
Medication Not Picked Up	10 (6)	0	0	0	10 (4)
Continued Preadmission Medication	7 (5)	0	0	0	7 (3)
Intentional Non-adherence	2 (1)	2 (3)	2 (6)	0	6 (2)
Discontinued Medication	1 (1)	2 (3)	2 (6)	0	5 (2)
System-Level Medication Issue					
Insufficient Prescription Duration	17 (11)	1 (2)	0	0	18 (7)
Omitted Medication from Prescription	15 (10)	0	0	0	15 (6)

Drug Cost a Barrier	6 (4)	0	0	0	6 (2)
Conflicting Information	2 (1)	0	0	1 (14)	3 (1)
Non-Indicated Therapy	2 (1)	0	0	0	2 (1)
Unavailable Medication at Pharmacy	1 (1)	1 (2)	0	0	2 (1)
Insufficient Pass-Med Supply	3 (2)	0	0	0	3 (1)
Failure to Reconcile Home Medication	1 (1)	0	0	0	1 (0.39)