Clinical Guidelines for Adult Heart Transplantation in British Columbia

REVISED: DATE: OCTOBER 27, 2022

The contents of this Clinical Guideline has been prepared by members of the transplant team and reviewed and endorsed by Dr Anson Cheung, Surgical Director Adult Heart Transplant Program and Dr Mustafa Toma, Medical Director Adult Heart Transplant Program.

Signed:  Anson Cheung

Signed:  Mustafa Toma

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022. 

Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022. 

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1 Introduction

1.1 Background

British Columbia's first heart transplant was performed at Vancouver General Hospital in 1988. One hundred and eleven transplants were performed at that site until 1996. At that time, the program was moved to St Paul's Hospital (SPH) when the site was named the Provincial Heart Centre. Since 1996, over 400 heart transplants have been performed at SPH

This Clinical Guideline contains the current practices in the BC Adult Heart Transplant Program. Program members are a part of the Canadian Cardiac Transplant Network (CCTN). This network is an affiliate of the Canadian Cardiovascular Society (CCS) and works closely with the Canadian Society of Transplantation (CST), The International Society for Heart and Lung Transplantation (ISHLT) and the Canadian Blood Services (CBS). The CCTN sets policy for Heart Transplant Programs across the country.

The Adult Heart Transplant Program annually reviews its outcomes and has a mechanism to review practices weekly. An annual report is created by BC Transplant and presented to the team for discussion and planning. A copy of this report is available upon request to the Clinical Nurse Specialist (wchiu@providencehealth.bc.ca).

The Program follows the Canadian Cardiovascular Society Consensus (CCS) Statements and Guidelines as well as resources released by the Canadian Cardiac Transplant Network (CCTN) as a basis for its protocols pre-and post-heart transplant (see hyperlink below). As well, the team refers to the International Society for Heart and Lung Transplant Consensus documents and Guidelines.

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1.2 Philosophy and Decision-making

The team recognizes that decision making around transplant candidacy can be complex as every person referred to us has unique circumstances. Hence very few "absolute" rules exist.

1.2.1 *Guiding Principles*

Our primary focus is the well-being and autonomy of the patient in our care.

Resource utilization, impacts on staff, and program or system issues are not considerations in decision-making for individual patients.

Communication with the patient is clear, respectful, and avoids false hope. In conjunction with the patient, assessment will focus on whether transplantation is the best option given the patient's full medical, lifestyle and psychosocial situation.

It should be remembered that possible alternatives include no intervention and palliative care

The team's responsibility for stewardship of donated organs is enacted by basing practice on the best available evidence including current peer reviewed guidelines for transplantation.

Exclusion criteria are based on those of the Canadian Cardiovascular Transplant Network, the Canadian Cardiovascular Society, and the International Society for Heart and Lung Transplantation, all of which are publically available. When not clear in the guidelines, where possible, decisions regarding aspects of assessment should be evidence-based.

The decision-making process for heart transplantation is clear and there is transparency regarding the reasons for decisions that are made.

Decisions are informed by assessments from the psychosocial team and external specialists (when consulted). Decisions and the decision-making process are documented in the patient's chart.

The decision to implant a VAD and/or list a patient for heart transplant shall be made by the on-service transplant surgeon, the on-service cardiologist and one other cardiologist in the program with input and discussion from colleagues, consulting specialists and the allied health team. If the decision is made outside of normal working hours, the VAD Coordinator on call shall provide input regarding psychosocial information available. In cases where a stalemate exists, the final decision will be made by the heads of cardiac surgery and cardiology or designate/s. This process shall be reviewed at the annually.

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All patients suitable for assessment are viewed as potential transplant candidates and, if identified, every effort is made to mitigate any exclusion criteria.

Medical and psychosocial issues may change over time. Reassessment will be considered when these changes are sustained for a predetermined length of time; or if there are marked changes in the patient's home environment, coping or health behaviors. Mechanical circulatory support (MCS) as a bridge to heart transplant candidacy is considered in cases where modifiable exclusion criteria exist and more time is needed to determine if successful change is possible.

There is a culture of respect among colleagues.

Different perspectives and opinions are expected and valued among colleagues. All are given serious consideration. The expertise and scopes of practice of all team members are respected.

Care providers are mindful of their own set of personal values and beliefs and their potential impact on decisions.

Care must be taken to be cognizant of personal biases that arise both negatively (e.g., patient criminal history, developmental disability, racist patient attitudes) and positively (e.g., patient likeability, expressions of remorse, age, verbal skills, parenting status). "Care must be taken to ensure that psychosocial factors predictive of outcome are not confused with judgments of an individual's social worth." (Journal of Heart and Lung Transplantation listing criteria 2006, Page 1034 http://www.jhltonline.org/article/S1053-2498(06)00460-8/pdf)

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1.3 The Heart Transplant Team

Name	Role	Contact Email	Phone
Alia, Tania	Clinical Pharmacist – ambulatory	talia@providencehealth.bc.ca	604-682-2344
Bashir, Jamil	Heart Transplant Surgeon	jbashir@providencehealth.bc.ca	604-682-2344
Bateni, Bita	Clinical Pharmacy Specialist	BBateni@providencehealth.bc.ca	604-682-2344 x62211
Brownjohn, Kim	Patient/Nurse Educator (for patients surnames H-M)	kbrownjohn@providencehealth.bc.ca	604-682-2344 x62809
Cheung, Anson	**Surgical Director, Heart Transplant Program**	**acheung@providencehealth.bc.ca**	**604-682-2344**
Chiu, Wynne	Clinical Nurse Specialist	wchiu@providencehealth.bc.ca	604-806-8887
Clarke, Brian	Heart Transplant Cardiologist	bclarke@providencehealth.bc.ca	604-682-2344
Cockell, Sarah	Psychologist (for pts surname M-Z)	scockell@providencehealth.bc.ca	604-806-9026
Davis, Margot	Heart Transplant Cardiologist	margot.davis@vch.ca	604-682-2344
Farquhar, Angela	Clerical Assistants (for patient's surname M-Z)	hearttransplant@providencehealth.bc.ca	604-806-8602
Johnson, Ken	Pastoral Care Worker	KAJohnson@providencehealth.bc.ca	604-682-2344 x62787
Lichtenstein, Kevin	Heart Transplant Surgeon	klichtenstein@providencehealth.bc.ca	604-682-2344
Milligan, Rachel	Patient/Nurse Educator (For patients surnames O-Z)	RMilligan1@providencehealth.bc.ca	604-806-8574
Mackey, Josie	Patient/Nurse Educator (For patients surnames A-G)	jmackey@providencehealth.bc.ca	604-806-8887
Macleod, Stefanie	Patient Care Manager	SMacLeod@providencehealth.bc.ca	604-806-8995
Moore, Katrien	Clinic Nurse – vacation relief	KMoore@providencehealth.bc.ca	604-682-2344
Neal, Rachael	Psychologist (for pts surname A-L)	rneal2@providencehealth.bc.ca	604-682-2344 x 633912
Prytula, Shelley	Social Worker	sprytula@providencehealth.bc.ca	604-682-2344 x 66183
Sporer, Margaret	Clerical Assistant (For patient's Surname A-L)	msporer@providencehealth.bc.ca	604-806-8374
Toma, Mustafa	**Medical Director Acute Heart Failure Program**	**mtoma@providencehealth.bc.ca**	**604-682-2344**
Virani, Sean	Heart Transplant Cardiologist	svirani3@providencehealth.bc.ca	604-682-2344

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2 Referral and Workup for Heart Transplant

2.1 Referral

The Adult Heart Transplant Program accepts referrals from around the province of British Columbia and Yukon Territory. From time to time the program also receives out-of-province referrals.

The program provides advanced heart failure therapies for patients who are being assessed for transplant candidacy. Early referral to the program is crucial as late referral significantly affects outcomes. In general, criteria for referral for transplantation candidacy are as follows:

- Age – although no absolute age cutoff, referrals over the age of 70 should have no major co morbidities.
- End-stage heart failure not responding to medical therapy and/or cardiogenic shock with inotrope dependence.
- No other medical or surgical therapies available.
- Absence of
    - Life limiting co morbidities.
    - Life-threatening non-adherence to medical therapy.

Adult patients should be referred to the Pre-Transplant Clinic. Non-emergent referrals should be made using this form. For emergent referrals or questions please call the Transplant Cardiologist on call.

Business Hours: 604-806-8602
After Hours (Transplant Cardiologist on call): 604-877-2240
Toll Free: 1-800-663-6189

Address: St. Paul's Hospital
Pre Heart Transplant Clinic 5C,
1081 Burrard Street
Vancouver, BC, V6Z 1Y6

Sometimes admission is required to complete the assessment process, depending on the patient and their condition. If the patient is a potential heart transplant candidate, the Pre-Transplant clinic will monitor their progress. If the patient is not a candidate – either because they are too well or not suitable, the patient will be transferred to Heart Function clinic or discharged back to the referring physician or clinic, clearly outlining reasons for transfer and criteria for re-referral.

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2.2 Urgent Inpatient Referrals from other Hospitals

Urgent referrals from other centres can be made by contacting the Heart Transplant (HTx) Cardiologist or HTx Surgeon on-call through BC Transplant 604-877-2240 or St Paul's Hospital (604) 682-2344.

2.3 Pediatric Referrals

Pediatric patients should be referred to the Pediatric Heart Transplant Program at BC Children's Hospital.

2.4 Patient Assessment

There are 3 levels of assessment for heart transplant candidacy.

2.4.1 *Routine Heart Transplant Assessment*

Routine assessment is reserved for stable patients where there is a lower level of urgency. Normally this assessment takes approximately 2 weeks to complete in an inpatient setting, and up to 3 months in an ambulatory setting. Time completion depends on availability of the patient for specialized testing and waiting times for other specialty opinions.

Prescriber Orders are entered as a "PowerPlan" (AKA order set) in the Cerner Electronic Medical Health Record (EHR) system. There is a separate powerplan in Cerner for inpatient use versus outpatient use. All the orders within the powerplan for both settings are identical, the difference lies in which department the order is directed to in the EHR once submitted (e.g. inpatient orders are all directed internally at SPH, but ambulatory orders may be organized with departments in patient's local community)

- Inpatient PowerPlan : "TRANSPLANT HEART Assessment (Routine)"
- Outpatient Powerplan: "TRANSPLANT HEART AMB Assessment (Routine)"

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TRANSPLANT HEART Assessment (Routine) (Planned Pending)			
Admit/Transfer/Discharge			
	Verify that an 'Admit to' Order has been entered prior to completing the powerplan (NOT required for direct admit patients)		
Medications			
Vaccinations			
☐	meningococcal conjugate vaccine (meningococcal q...	0.5 mL, IM, once	
	Select pneumococcal 23-valent vaccine unless 2 lifetime doses have been given		
☐	pneumococcal 23-polyvalent vaccine (pneumococcal...	0.5 mL, IM, once, drug form: inj	
	Select influenza vaccine unless already given this year		
☐	influenza virus vaccine, inactivated (influenza vaccine ...	0.5 mL, IM, once	
☐	influenza virus vaccine, inactivated (influenza vaccine ...	0.5 mL, IM, once	
	Select tetanus-diphtheria vaccine unless given in the last 10 years		
☐	tetanus-diphth toxoids (Td) (tetanus-diphtheria (Td) v...	0.5 mL, IM, once, drug form: inj	
	Please note that patients require 3 doses of hepatitis B vaccine for full course		
☐	hepatitis B adult vaccine (hepatitis B (ENGERIX) 20 mcg/mL vaccine)	20 mcg = 1 mL, IM, once, drug form: inj Nurse to follow site policies for hepatitis B vaccinations. To be given at 0, 1 and 6 months	
	For women 45 years of age or younger		
☐	human papillomavirus vaccine	0.5 mL, IM, once, drug form: inj Nurse to follow site policies for human papillomavirus vaccinations. To be given at 0, 2 and 6 months. GARDASIL 9	
	Live Vaccines: Do not order if transplant anticipated within 4 weeks		
	Select measles mumps rubella virus vaccine for adults born after 1956 and not previously immunized unless transplant anticipated within 4 weeks		
☐	measles/mumps/rubella virus vaccine (measles-mumps-rubella (MMR) vaccine)	0.5 mL, subcutaneous, once, drug form: kit Do not administer if transplant anticipated within 4 weeks. For SUBCUTANEOUS use only, reconstitute with diluent ...	
	Select varicella virus vaccine for VZV negative or VZV IgG non-reactive patient unless transplant anticipated within 4 weeks		
☐	varicella virus vaccine (varicella vaccine)	0.5 mL, subcutaneous, once, drug form: kit Do not administer if transplant anticipated within 4 weeks. Reconstitute with diluent provided. For SUBCUTANEOUS...	
Laboratory			
Hematology			
	Group and Screen	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
Chemistry			
	Lactate Dehydrogenase	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Creatine Kinase	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Thyroid Stimulating Hormone with Reflex to Free Thy...	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Uric Acid	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Protein Level (Total Protein Level)	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Prealbumin	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	For diabetic patients		
	For males		
Virology			
	Cytomegalovirus Antibody IgG PHC	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Epstein Barr Virus Antibody IgG	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Herpes Simplex Virus 1/2 Antibody IgG	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	HIV 1/2 Antibody and p24 Antigen PHC	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Hepatitis B Surface Antibody PHC	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Hepatitis B Surface Antigen PHC	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Hepatitis B Core Antibody Total PHC	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Hepatitis C Antibody PHC	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Varicella Zoster Virus Antibody IgG	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Mumps Virus Antibody IgG	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Measles Virus Antibody IgG	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
	Rubella Virus Antibody IgG	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once

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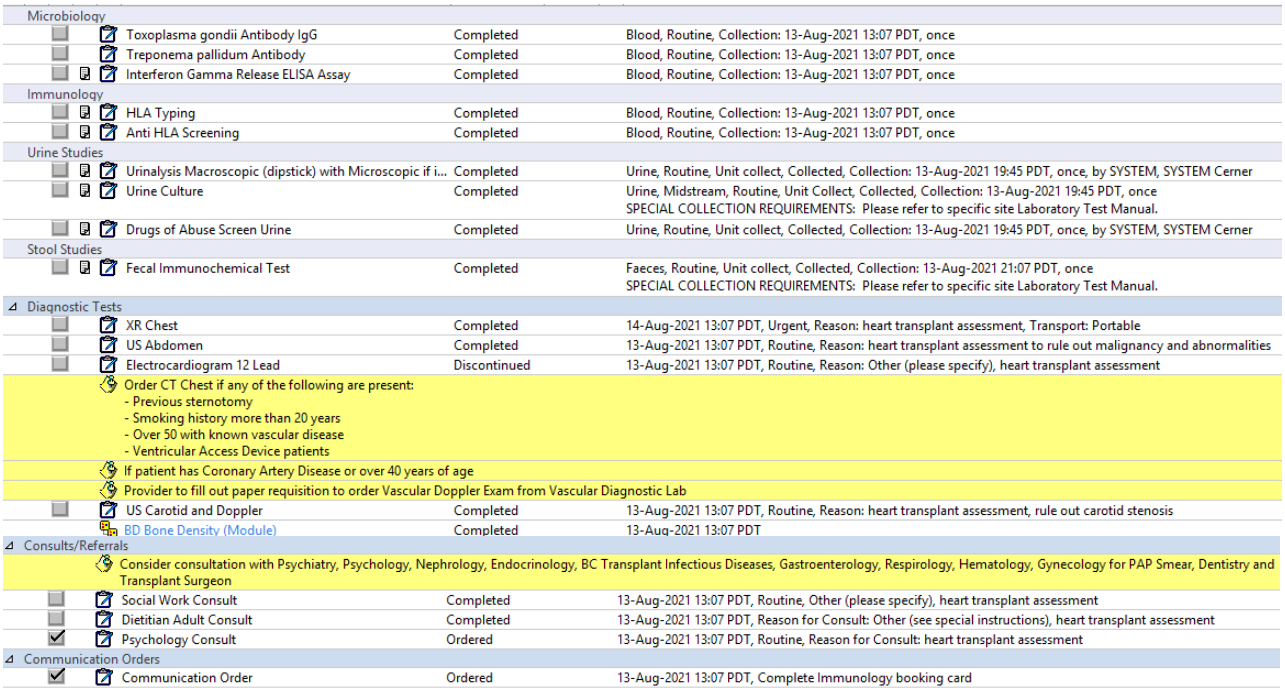

Microbiology		
Toxoplasma gondii Antibody IgG	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
Treponema pallidum Antibody	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
Interferon Gamma Release ELISA Assay	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
Immunology		
HLA Typing	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
Anti HLA Screening	Completed	Blood, Routine, Collection: 13-Aug-2021 13:07 PDT, once
Urine Studies		
Urinalysis Macroscopic (dipstick) with Microscopic if i...	Completed	Urine, Routine, Unit collect, Collected, Collection: 13-Aug-2021 19:45 PDT, once, by SYSTEM, SYSTEM Cerner
Urine Culture	Completed	Urine, Midstream, Routine, Unit Collect, Collected, Collection: 13-Aug-2021 19:45 PDT, once SPECIAL COLLECTION REQUIREMENTS: Please refer to specific site Laboratory Test Manual.
Drugs of Abuse Screen Urine	Completed	Urine, Routine, Unit collect, Collected, Collection: 13-Aug-2021 19:45 PDT, once, by SYSTEM, SYSTEM Cerner
Stool Studies		
Fecal Immunochemical Test	Completed	Faeces, Routine, Unit collect, Collected, Collection: 13-Aug-2021 21:07 PDT, once SPECIAL COLLECTION REQUIREMENTS: Please refer to specific site Laboratory Test Manual.
Diagnostic Tests		
XR Chest	Completed	14-Aug-2021 13:07 PDT, Urgent, Reason: heart transplant assessment, Transport: Portable
US Abdomen	Completed	13-Aug-2021 13:07 PDT, Routine, Reason: heart transplant assessment to rule out malignancy and abnormalities
Electrocardiogram 12 Lead	Discontinued	13-Aug-2021 13:07 PDT, Routine, Reason: Other (please specify), heart transplant assessment
Order CT Chest if any of the following are present: - Previous sternotomy - Smoking history more than 20 years - Over 50 with known vascular disease - Ventricular Access Device patients		
If patient has Coronary Artery Disease or over 40 years of age		
Provider to fill out paper requisition to order Vascular Doppler Exam from Vascular Diagnostic Lab		
US Carotid and Doppler	Completed	13-Aug-2021 13:07 PDT, Routine, Reason: heart transplant assessment, rule out carotid stenosis
BD Bone Density (Module)	Completed	13-Aug-2021 13:07 PDT
Consults/Referrals		
Consider consultation with Psychiatry, Psychology, Nephrology, Endocrinology, BC Transplant Infectious Diseases, Gastroenterology, Respirology, Hematology, Gynecology for PAP Smear, Dentistry and Transplant Surgeon		
Social Work Consult	Completed	13-Aug-2021 13:07 PDT, Routine, Other (please specify), heart transplant assessment
Dietitian Adult Consult	Completed	13-Aug-2021 13:07 PDT, Reason for Consult: Other (see special instructions), heart transplant assessment
Psychology Consult	Ordered	13-Aug-2021 13:07 PDT, Routine, Reason for Consult: heart transplant assessment
Communication Orders		
Communication Order	Ordered	13-Aug-2021 13:07 PDT, Complete Immunology booking card

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2.4.2 *Urgent Heart Transplant Assessment*

Urgent assessment is a “fast-track” version of the routine assessment and designed to be completed within 7 days. This is reserved for patients who are in hospital and NYHA class IV. All other testing is reserved for after the patient is stabilized and the clinical picture is clearer.

Powerplan: [TRANSPLANT HEART Assessment (Urgent):]

TRANSPLANT HEART Assessment (Urgent) (Planned Pending)		
Admit/Transfer/Discharge		
Verify that an 'Admit to' Order has been entered prior to completing the powerplan (NOT required for direct admit patients)		
Use this powerplan if decision regarding transplant listing needs to be made within a week		
Laboratory		
Check only if not done in last 48 hours or if indicated		
Hematology		
☑ CBC and Differential	Blood, Routine, Collection: T;N, once	
☑ INR and PTT Panel	Blood, Routine, Collection: T;N, once	
☑ Group and Screen	Blood, Routine, Collection: T;N, once	
Chemistry		
☑ Basic Metabolic Panel (Lytes, Urea, Creat, Gluc)	Blood, Routine, Collection: T;N, once	
☑ Liver Panel (Bilirubin Total, ALP, Alb, ALT, GGT)	Blood, Routine, Collection: T;N, once	
☑ Aspartate Aminotransferase	Blood, Routine, Collection: T;N, once	
☑ Lactate Dehydrogenase	Blood, Routine, Collection: T;N, once	
☑ Creatine Kinase	Blood, Routine, Collection: T;N, once	
☑ Uric Acid	Blood, Routine, Collection: T;N, once	
☑ Thyroid Stimulating Hormone	Blood, Routine, Collection: T;N, once	
☑ Protein Level (Total Protein Level)	Blood, Routine, Collection: T;N, once	
☑ Prealbumin	Blood, Routine, Collection: T;N, once	
☑ Natriuretic Peptide B Prohormone	Blood, Routine, Collection: T;N, once	
For diabetic patients		
☐ Hemoglobin A1C	Blood, Routine, Collection: T;N, once	
For males		
☐ Prostatic Specific Antigen	Blood, Routine, Collection: T;N, once	
Virology		
☑ Cytomegalovirus Antibody IgG PHC	Blood, Routine, Collection: T;N, once	
☑ Epstein Barr Virus Antibody IgG	Blood, Routine, Collection: T;N, once	
☑ Herpes Simplex Virus 1/2 Antibody IgG	Blood, Routine, Collection: T;N, once	
☑ HIV 1/2 Antibody and p24 Antigen PHC	Blood, Routine, Collection: T;N, once If not performed in this admission	
☑ Hepatitis B Surface Antibody PHC	Blood, Routine, Collection: T;N, once	
☑ Hepatitis B Surface Antigen PHC	Blood, Routine, Collection: T;N, once	
☑ Hepatitis B Core Antibody Total PHC	Blood, Routine, Collection: T;N, once	
☑ Hepatitis C Antibody PHC	Blood, Routine, Collection: T;N, once	
☑ Varicella Zoster Virus Antibody IgG	Blood, Routine, Collection: T;N, once	
Microbiology		
☑ Toxoplasma gondii Antibody IgG	Blood, Routine, Collection: T;N, once	
☑ Treponema pallidum Antibody	Blood, Routine, Collection: T;N, once	
☑ Mumps Virus Antibody IgG	Blood, Routine, Collection: T;N, once	
☑ Measles Virus Antibody IgG	Blood, Routine, Collection: T;N, once	
☑ Rubella Virus Antibody IgG	Blood, Routine, Collection: T;N, once	
☑ Interferon Gamma Release ELISA Assay	Blood, Routine, Collection: T;N, once	
Immunology		
☑ Cytotoxic Antibody Screen	Blood, Routine, Collection: T;N, q4week for 12 week	
☑ HLA Typing	Blood, Routine, Collection: T;N, once Heart transplant assessment	
☑ Anti HLA Screening	Blood, Routine, Collection: T;N, once	

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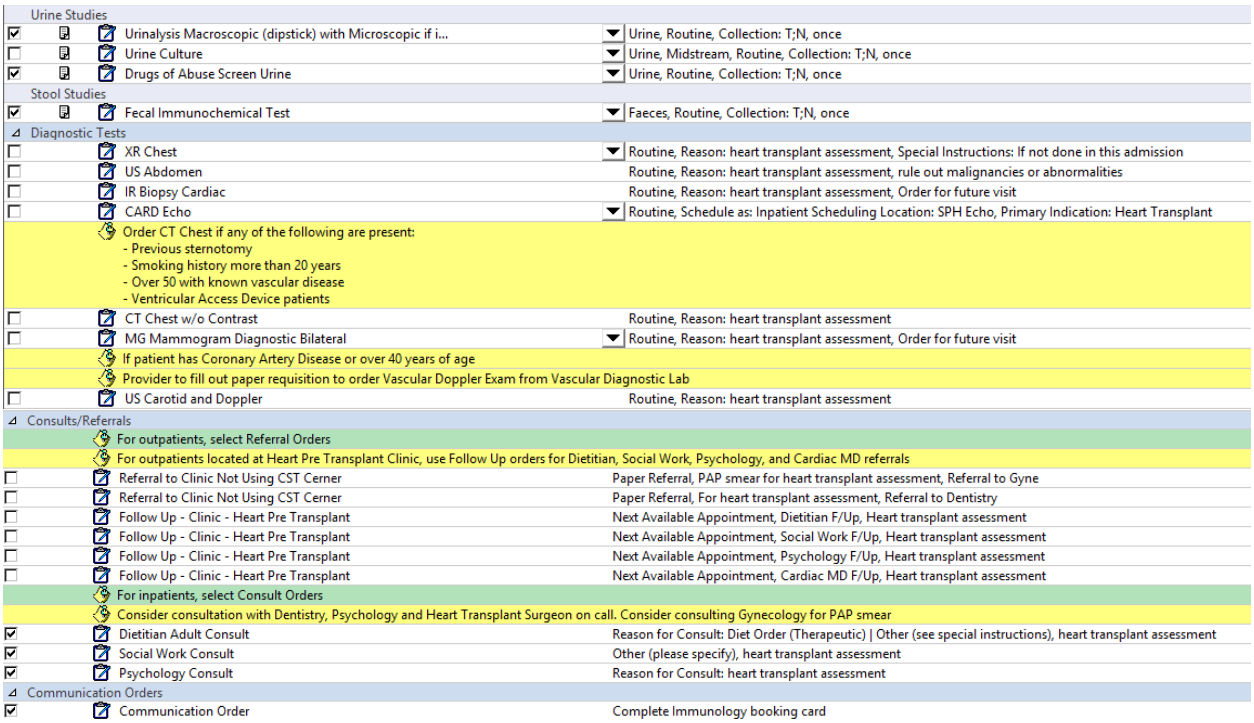

Urine Studies		
☑	Urinalysis Macroscopic (dipstick) with Microscopic if i...	Urine, Routine, Collection: T;N, once
☐	Urine Culture	Urine, Midstream, Routine, Collection: T;N, once
☑	Drugs of Abuse Screen Urine	Urine, Routine, Collection: T;N, once
Stool Studies		
☑	Fecal Immunochemical Test	Faeces, Routine, Collection: T;N, once
Diagnostic Tests		
☐	XR Chest	Routine, Reason: heart transplant assessment, Special Instructions: If not done in this admission
☐	US Abdomen	Routine, Reason: heart transplant assessment, rule out malignancies or abnormalities
☐	IR Biopsy Cardiac	Routine, Reason: heart transplant assessment, Order for future visit
☐	CARD Echo	Routine, Schedule as: Inpatient Scheduling Location: SPH Echo, Primary Indication: Heart Transplant
	Order CT Chest if any of the following are present: - Previous sternotomy - Smoking history more than 20 years - Over 50 with known vascular disease - Ventricular Access Device patients	
☐	CT Chest w/o Contrast	Routine, Reason: heart transplant assessment
☐	MG Mammogram Diagnostic Bilateral	Routine, Reason: heart transplant assessment, Order for future visit
	If patient has Coronary Artery Disease or over 40 years of age	
	Provider to fill out paper requisition to order Vascular Doppler Exam from Vascular Diagnostic Lab	
☐	US Carotid and Doppler	Routine, Reason: heart transplant assessment
Consults/Referrals		
	For outpatients, select Referral Orders	
	For outpatients located at Heart Pre Transplant Clinic, use Follow Up orders for Dietitian, Social Work, Psychology, and Cardiac MD referrals	
☐	Referral to Clinic Not Using CST Cerner	Paper Referral, PAP smear for heart transplant assessment, Referral to Gyne
☐	Referral to Clinic Not Using CST Cerner	Paper Referral, For heart transplant assessment, Referral to Dentistry
☐	Follow Up - Clinic - Heart Pre Transplant	Next Available Appointment, Dietitian F/Up, Heart transplant assessment
☐	Follow Up - Clinic - Heart Pre Transplant	Next Available Appointment, Social Work F/Up, Heart transplant assessment
☐	Follow Up - Clinic - Heart Pre Transplant	Next Available Appointment, Psychology F/Up, Heart transplant assessment
☐	Follow Up - Clinic - Heart Pre Transplant	Next Available Appointment, Cardiac MD F/Up, Heart transplant assessment
	For inpatients, select Consult Orders	
	Consider consultation with Dentistry, Psychology and Heart Transplant Surgeon on call. Consider consulting Gynecology for PAP smear	
☑	Dietitian Adult Consult	Reason for Consult: Diet Order (Therapeutic) | Other (see special instructions), heart transplant assessment
☑	Social Work Consult	Other (please specify), heart transplant assessment
☑	Psychology Consult	Reason for Consult: heart transplant assessment
Communication Orders		
☑	Communication Order	Complete Immunology booking card

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2.4.3 *Emergent Heart Transplant Assessment*

Emergent assessment is reserved for patients who present in cardiogenic shock and candidacy needs to be determined within 24 hours. Often, these patients will undergo assessment for Ventricular Assist Device implantation as a bridge to transplantation also.

TRANSPLANT HEART Assessment (Emergent) Powerplan:

TRANSPLANT HEART Assessment (Emergent) (Initiated)
Last updated on: 21-Aug-2021 12:04 PDT by: Toma, Mustafa, MD

Admit/Transfer/Discharge		
Verify that an 'Admit to' Order has been entered prior to completing the powerplan (NOT required for direct admit patients)		
Use this powerplan if decision regarding transplant listing needs to be made within 24 hours		
Laboratory		
Check only if not done or if indicated		
Hematology		
Group and Screen	Ordered (Coll...	Blood, STAT, Unit collect, Collected, Collection: 21-Aug-2021 01:30 PDT, once, by Rarang, Mary Jane, RN
Chemistry		
Basic Metabolic Panel (Lytes, Urea, Creat, Gluc)	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner
Liver Panel (Bilirubin Total, ALP, Alb, ALT, GGT)	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner
Natriuretic Peptide B Prohormone	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner SPECIAL COLLECTION REQUIREMENTS: Please refer to specific site Laboratory Test Manual.
Aspartate Aminotransferase	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner
Lactate Dehydrogenase	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner
Uric Acid	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner
Creatine Kinase	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner
Thyroid Stimulating Hormone	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner
Protein Level (Total Protein Level)	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner
Albumin Level	Canceled	Blood, STAT, Unit collect, Collection: 21-Aug-2021 12:02 PDT, once
Virology		
Cytomegalovirus Antibody IgG PHC	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Epstein Barr Virus Antibody IgG	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Herpes Simplex Virus 1/2 Antibody IgG	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
HIV 1/2 Antibody and p24 Antigen PHC	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once If not performed in this admission
Hepatitis B Surface Antibody PHC	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Hepatitis B Surface Antigen PHC	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Hepatitis B Core Antibody Total PHC	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Hepatitis C Antibody PHC	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Varicella Zoster Virus Antibody IgG	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Microbiology		
Toxoplasma gondii Antibody IgG	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Treponema pallidum Antibody	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Mumps Virus Antibody IgG	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Measles Virus Antibody IgG	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Rubella Virus Antibody IgG	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Interferon Gamma Release ELISA Assay	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once
Immunology		
Cytotoxic Antibody Screen	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner
HLA Typing	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner
Anti HLA Screening	Completed	Blood, STAT, Unit collect, Collected, Collection: 22-Aug-2021 11:33 PDT, once, by SYSTEM, SYSTEM Cerner
Urine Studies		
Urinalysis Macroscopic (dipstick) with Microscopic if i...	Ordered (Pen...	Urine, STAT, Unit collect, Collection: 21-Aug-2021 12:02 PDT, once
Drugs of Abuse Screen Urine	Ordered (Pen...	Urine, STAT, Unit collect, Collection: 21-Aug-2021 12:02 PDT, once
Diagnostic Tests		
US Abdomen	Completed	23-Aug-2021 08:22 PDT, STAT, Reason: heart transplant assessment, rule out malignancies or abnormalities
Consults/Referrals		
Consider Consultation Heart Transplant on Call and Psychology		
Social Work Consult	Completed	21-Aug-2021 12:02 PDT, Routine, Other (please specify), Notify Transplant Social Worker on 68603 of patient admis...
Communication Orders		
Communication Order	Ordered	21-Aug-2021 12:02 PDT, Complete Immunology booking card

2.4.4 *High Risk Cardiac Surgery – Mechanical Support Backup*

Since 2016, the program no longer offers long-term mechanical support backup to high risk patients except in rare circumstances. In these cases, short or intermediate-term support will be offered as a “bridge to decision”. These devices buy time to make a more complete assessment and offer the possibility of weaning if appropriate.

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.

Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

2.5 *Patient and Family Preparation*

All patient information is reviewed by patients and families for readability and appropriate content.

When first referred, the patient and caregivers are given a copy of an introductory booklet. This booklet provides a short, easy to understand overview of heart transplantation and what to expect. Further information is offered once candidacy has been established.

If they would like more information, they are referred BC Transplant website and if they wish and demonstrate understanding, are given the longer, more comprehensive manual. The teaching plan for each patient and family member is prepared based on a number of key points:

- Clinical condition
- Where they are in the assessment process
- Ability to take in information due to low cardiac output
- Literacy
- Ability to speak and read English (The manual is available in Chinese)
- Environment
- Psychological state
- Care plan established with the patient, family and team

It must be recognized that many patients are suffering from low cardiac output and as well, are likely to be overwhelmed by the medical information provided to them.

2.6 *Psychosocial Assessment*

Assessment performed by the psychosocial team is in concordance with the 2018 ISHLT Consensus document: ISHLT/ATM/AST/ICCAC/STSW recommendations for psychosocial evaluation of adult cardiothoracic transplant candidates and candidates for long-term mechanical circulatory support, as well as per Canadian Cardiovascular Society/Canadian Cardiac Transplant Network Position Statement on Heart Transplantation, 2020

2.6.1 ***Psychology Assessment***

The psychologist routinely assesses all stable patients being considered for heart transplantation using a semi-structured interview. This assessment focuses on the following: 1) the ability of the social support network to cope with the stressors of heart transplant care; 2) patient understanding of the requirements, risk and benefits of transplant; 3) adherence to medical care plan; 4) psychopathology; 5) cognitive assessment.

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Psychological/psychiatric contraindications are first reviewed by the psychologist and where necessary a psychiatrist is consulted for further assessment and/or a second opinion. A score of psychosocial risk factors called Stanford Integrated Psychosocial Assessment for Transplant (SIPAT) is determined and reported. The Psychologist will also recommend referral for further neurocognitive testing if indicated.

2.6.2 *Social Work Assessment*

The Social Worker collects a detailed social history, which includes assessment of

- Social support
- Financial situation
- Relocation concerns
- Lifestyle issues
- Advance care planning
- Other relevant information

The Social Worker works with the team, the patient and family to establish a workable travel, accommodation and family support plan for presentation to the team.

The Social Worker also provides ongoing counseling and assistance as required.

2.6.3 *Dietary Assessment*

A full dietary assessment is performed by a registered dietitian. Ongoing support and teaching is performed when required. This information is then used to aid in decision making when considering a patient for transplant/VAD candidacy.

2.7 Selection of Candidates

The team's decision-making process has been outlined earlier. A "Candidate Selection Form" (below) is completed and from that, a care plan determined.

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.

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HEART TRANSPLANT PROGRAM
CANDIDATE SELECTION FORM

Date: _____

Diagnosis: _____

Medical/Surgical Contraindications

- ☐ NONE
- ☐ Neurological
- ☐ Cardiovascular
- ☐ Respiratory
- ☐ GI/Hepatic
- ☐ Renal
- ☐ Urogenital
- ☐ Skin/Eyes
- ☐ Musculoskeletal
- ☐ Hematologic
- ☐ Endocrine
- ☐ OTHER

Lifestyle Management Contraindications

- ☐ NONE
- ☐ Smoking
- ☐ Substance use/abuse
- ☐ Exercise
- ☐ Medications
- ☐ Diet
- ☐ Weight
- ☐ Fluid restriction
- ☐ Missed appointments
- ☐ OTHER

Psychosocial Contraindications

- ☐ NONE
- ☐ Psychiatric disorder
- ☐ Personality disorder
- ☐ Poor coping
- ☐ Cognitive deficits
- ☐ Social support system limitations
- ☐ Relocation concerns
- ☐ Financial concerns
- ☐ OTHER

Additional Information

- ☐ An invitation for dissenting opinions
- ☐ Input from all appropriate team members

Date re-listed: _____

Signatures:

1 _____

2 _____

3 _____

TRANSPLANT TEAM DECISION: **Transplant Candidate:** ☐ Yes ☐ No
VAD Candidate: ☐ Yes ☐ No ☐ Deferred ☐ BTC ☐ BTT

Decision approved by: Cardiologist on-service: _____

Cardiologist: _____

Surgeon on-service: _____

Plan: _____

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Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

2.7.1 *Smoking, Cannabis use and Vaping*

2.7.1.1 Definitions

- Cannabis refers to cannabis, its by-products, and cannabinoids (natural or synthetic)
- Smoking – can be of cannabis or nicotine
- Medically prescribed cannabis – legally prescribed and obtained
- Ingested cannabis/cannabinoids – eaten in the form of edibles, etc.
- Smoked cannabis – ignited and inhaled
- E Cigarettes - any portal where the user inhales vapour of any kind through an electronic cigarette currently marketed
- Vaping - inhaling any vapour created by E Cigarettes
- Non-therapeutic – not prescribed by a physician and/or where the patient's psychosocial workup shows that use is displaying substance use disorder or points to other high risk behaviours.

2.7.1.2 Policy

Smoking of nicotine 6 months prior to transplant listing is an absolute contraindication.

Regular cannabis use is not recommended before or after transplant. We recommend 6 months of abstinence from **smoking, inhaling, or vaping** prior to transplant listing, and continued abstinence post-transplant. Regular cannabis use is known to interfere with post-transplant immunosuppressive drug levels.

If there is an element of addiction or substance use disorder for any substance determined by the psychology or psychiatry team during the pre-transplant assessment period (i.e. making quitting more challenging), efforts will be made by the team to connect patients with alternative therapies or addiction services in lieu of the substance (e.g. sleeping aid, analgesics, etc). Patients must show a period of abstinence, with a minimum of 3 months, and ideally 6 months if clinically stable to promote lasting behavioral change

Ventricular Assist Device (VAD) implantation can be considered for smokers and vapers as a Bridge to Candidacy if:

- They are deemed to have high likelihood of dying before the 6 months is complete and
- There is agreement by the team that there is a good likelihood of quitting given the evidence presented

2.7.2 *Illicit Substance Use*

Canadian and International Guidelines suggest recent (last 6 months) illicit substance use is a contraindication for heart transplant.

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VAD implantation as bridge to candidacy could be considered where it is determined by experts in Addiction Medicine and psychosocial team that the patient has favourable likelihood of abstaining. The patient and family must understand the implications of continued use (no chance of transplantation).

2.7.3 ***Team Meetings***

The team meets every Tuesday morning over Zoom from 07:30-08:30.

Changes in patient status on the waitlist are discussed here and updated on PROMIS by the transplant nurse. External consultants are invited to join the discussion whenever applicable.

Heart Failure Education Rounds are held weekly to review relevant literature. Members from the multidisciplinary team are invited to present on a Heart failure, mechanical circulatory support or transplant topic.

Each year, the team reviews the patient outcomes and in turn, reviews and revises protocols.

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.

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3 Transplant Listing

3.1 Patient Listing

Patients and families are seen by the team in the clinic or in hospital and informed of the listing decision. Coaching and education is commenced around expectations and life on the waiting list. In addition, detailed instructions around the call-in for transplant are reviewed.

The transplant coordinators complete a checklist to ensure all requirements for listing have been completed (see below):

NURSE RESPONSIBILITY	**Date Completed**	**Initials**
Provide patient with the "Living With a Heart Transplant" manual & "Risk of Disease Transmission from Organ Donors"		
Review "While on the Transplant List" handout with the patient		
Obtain signed copies of the Canadian Blood Services Consent for Patients to Participate in the Canadian Transplant Registry (CTR)		
Review the patient's medication list. Notify physician & pharmacist if patient is on: ☐ Novel Oral Anticoagulant (NOAC) - ask MD if patient should switch to warfarin ☐ Sirolimus - ask MD if patient should switch to alternative ☐ Ensure patient has not received a live vaccine with 1 month of listing		
Confirm: ☐ Immunology has recent sample (1 month) for monthly tray ☐ Confirm patient has 2 resulted Group & Screen		
Clarify with Cardiologist if donor criteria is required in comment section (e.g. donor age older than 60 years; will accept beyond east of Manitoba)		
☐ Ensure the Heart Transplant Program Candidate Selection Form (#3674) is signed (signed twice if VAD patient is being re-listed)		
Complete the "Listing Status Log" located in the AdHoc - PreHeart Transplant Clinic Cerner form		
Ask **Social Worker** to: ☐ Create a travel plan ☐ Confirm accommodation location		
Ask **Program Assistant** to: ☐ Add patient to the Transplant List on PROMIS ☐ Confirm with patient which 3 phone numbers to put on list ☐ Distribute updated Transplant List to on-call Cardiologist, Cardiac Surgeon and on-call RN ☐ Add donor criteria if applicable to comment section ☐ Obtain and distribute updated immunology list to cardiologist ☐ Organize monthly standing orders for PRAs (copies for lab, patient and chart) ☐ Fax booking form to VGH Immunology and email Michele Konevecki informing her of the new activation. Michele.Konevecki@vch.ca ☐ Ensure patient is registered in the CBS National Organ Waitlist and comments are present if applicable ☐ Ensure "5A COVID-19 NP & non-contrast CT testing for pre-transplant patients" note is placed on the front of the patient's chart ☐ Ensure Surgeon on call is aware that the following surgical consents need to be signed. Consent for Treatment; Consent for Transfusion of Blood and/or Blood Products		

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3.2 Prioritizing Patients on the Heart Transplant Wait List

Once listed, the patient is activated on the PROMIS database. This database is administered by BC Provincial Renal Agency and BC Transplant. It links directly with the National Organ Waitlist which is administered by Canadian Blood Services. Urgently listed patients (classified as Status 4 or 4S) automatically appear on the National Organ Waitlist to initiate interprovincial organ sharing. For more details on how this relationship works, contact BC Transplant directly.

Priority for listing can be found in the Canadian Cardiac Transplant Network (CCTN) document – Adult Heart Transplant Listing Criteria in Canada 2021 – which outlines the definitions for determining "status" on the transplant list.

3.3 Combined Heart and Kidney Transplantation

In otherwise eligible candidates with renal failure that is considered by the nephrologist to warrant renal transplantation, a decision re candidacy will be made collaboratively with nephrology.

Two approaches to combined transplantation can be taken.

1. Combined heart/kidney transplant from the same donor
2. Staged heart transplant followed by a kidney transplant from another donor

The first approach is preferred; however, it is recognized that due to long renal waitlists, it is not always possible to achieve this as these candidates "jump the queue" for cadaveric renal transplant.

If a dialysis patient were a suitable candidate for combined transplant then a simultaneous cadaveric transplant could be performed. If the patient was not on dialysis and had renal dysfunction a plan would be created in conjunction with renal and cardiac teams together on an individual basis.

Standard Operating Procedure and Flow Sheet are found below:

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.
Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

3.3.1 *Standard Operating Procedure – Combined Heart and Kidney Transplant*

ST. PAUL'S HOSPITAL PROVIDENCE HEALTH CARE	**Combined Cardiac & Renal Transplantation**	**Doc. No.:**	003
		Approved.:	
		Rev. Date:	Sept 7, 2022

1. REVISION HISTORY

Revision	Description of Changes	CO Ref.	Effective Date	Approved By:
00	Initial Release	N/A	Mar 28, 2011	Dr.A.Ignaszewski, Dr. A. Cheung & Dr. D. Landsberg, Dr Bashir
01	Update		August 12, 2013	Dr.A.Ignaszewski, Dr. A. Cheung & Dr. D. Landsberg, Dr Bashir BCT ODHD team, W Chiu, J Kealy, A Kaan
02	Update		Sept 6, 2022	Dr. A. Cheung, Dr. M. Toma, Dr. D. Landsberg, BCT ODHD team, L Young, K Brownjohn, J Mackey, K Uy, W. Chiu

2. PURPOSE

To describe the process for activating and calling in recipients for combined heart and kidney transplant from the same deceased donor.

3. SCOPE

Organ Donation Hospital Development (ODHD) team at BCT, the Pre-heart transplant team at St. Paul's Hospital, the Pre-Renal Transplant team at St. Paul's Hospital (SPH) and the Pre-Renal Transplant team at Vancouver General Hospital.

4. GENERAL REQUIREMENTS

4.1. The heart recipient patient is selected by the Transplant Cardiologist and Surgeon.

4.2. Cross-checking crossmatch and ABO matching information is the responsibility of the Transplant Surgeon, Cardiologist and clinical team in the OR according to hospital protocols.

4.3. Patients that are considered for this combined procedure must first be found to be suitable candidates for cardiac transplantation alone

4.4. Relative contraindications to the combined procedure:

4.4.1. Criteria that would prevent listing as cardiac recipient alone (other than renal impairement/failure

4.4.2. Renal failure due to diabetes

4.4.3. Potentially reversible renal failure

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4.4.4. Creatinine of greater than 200 that is not felt to be reversible with cardiac transplant alone but less than that requiring dialysis within the usual acceptable limits of listing for renal transplant would need to be assessed for a potential living donor.

4.5. All potential heart/kidney recipients should be seen by anesthesia in pre-admission clinic

5. ACTIVATION PROCEDURE

5.1. Upon decision and approval by both heart and kidney transplant team that a patient is a combined heart/kidney recipeint candidate for the same deceased donor (from formal candidacy review discussion in multidiciplinary rounds with both teams present). Ensure all clinical members involved are familiar with details of this SOP

5.2. SPH Pre-heart transplant team will activate patient per usual procedures but in addition:

5.2.1. Liase with renal transplant team regarding approval of combined transplant

5.2.2. Ensure anesthesia consult is made

5.3. SPH Pre-Renal Transplant team will activate patient per usual procedures but in addition:

5.3.1. Liase with heart transplant team regarding approval of combined transplant

5.3.2. Confirm whether candidate is eligeable for kidney only if heart transplant deosn't proceed

5.3.3. Notify patient's hemodialysis unit regarding the collection of a specimen monthly for immunology

5.3.4. Inform BCT data entry clerk re: heart/kidney combined transplant so that activation status is accurate in PROMIS, and patient will appear on the weekly renal waitlist

5.3.5. Confirm in PROMIS patient is activated under Program: Heart

5.3.6. Notify immunology via email of heart/kidney combined activation

5.4. Fax a note to immunology at VGH stating patient activated for combined heart/kidney transplant and that they are a priority on the renal list

5.5. Contact retrieval coordinator at BCT to notify of activation, send copy fo this SOP

5.6. Contact Clinical Coordinator at St. Paul's Hospital renal program and VGH renal program of activation

5.7. Activate patient on PROMIS as Status 2

5.8. Notify Head of Anesthesia department when patient listed

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6. RESPONSIBILITIES & PROCEDURE (When donor becomes available)

6.1.1. BC Transplant OHDH Coordinator:

6.1.2. Organ Donor Coordinator (ODS) offers heart from BC donor to Tx cardiologist (usual process for clearing National HS listing patients, etc.) with relevant donor and organ function details (as per SOP: Organ Offering and Allocation Extra Renal ODHD-ODS.02.004).

6.1.3. If Cardiologist indicates interest in using heart for heart/kidney combo recipient, ODS to request Tx Cardiologist for back up heart recipient (if available, in case Tissue Typing crossmatch is positive). If no matching BC recipients as a back up recipient, offer heart extraprovincially as a back-up offer.

6.1.4. At time of kidney allocation, ODS to inform Transplant Nephrologist of prioritizing one of the kidneys for the heart/kidney combo recipient and allocate other kidney as per usual procedure.

6.1.5. If the descision is made to allocate to the heart/kidney recipient ODS should give the nephrologist the next patient on the list as a back up.

6.1.6. Transplant nephrologist confirms acceptance of kidney for heart/kidney combo recipient.

6.1.7. ODS to confirm final acceptance of organs for heart/kidney combo transplant recipient with cardiologist and transplant nephrologist.

6.1.8. If for any reason, heart/kidney combo transplant can not proceed, allocate heart to back up recipient, and kidney to the back up recipient (as per SOPs: Organ Offering and Allocation Extra Renal, Organ Offering and Allocation Renal). If no matching BC recipients, offer organs extraprovincially.

6.1.9. In the unlikely scenario of an import heart offer, ODS will offer the heart to the transplant cardiologist as per usual practice. If the cardiologist indicates interest in the heart for the heart/kidney combo, ODS will enquire from the offering OPO if a kidney could also be received for transplant. Necessary arrangement for tissue typing cross match will be arranged as logistics allow.

6.1.10. The cardiologist will

6.1.11. Informs retreival heart coordinator and backup recipient details

6.1.12. Notify the Nephrologist (through BCT after hours number or through Hotsheet) and decide on whether or not to proceed

6.1.13. Notify on call cardiac surgeon

6.1.14. Arrange for backup recipient to be immunologically worked up in case heart/kidney crossmatch positive

6.1.15. Informs retrieval heart coordinator/units if backup recipient to be transplanted

6.1.16. The Nephrologist will

6.1.17. Arrange possible backup patient in case of positive crossmatch

6.1.18. Liase with Cardiologist with results of the crossmatch

6.1.19. Notify Renal Surgeon

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6.1.20. Arrange for dialysis if necessary

6.1.21. Cardiac Surgeon will
6.1.22. Liaise with Renal Surgeon
6.1.23. Perform usual transplant duties

6.1.24. Renal Surgeon will
6.1.25. Liaise with Cardiac Surgeon and Nephrologist
6.1.26. Perform usual transplant duties

6.1.27. Heart coordinator on call (via VAD hotline 604-250-2658) will perform usual transplant recipient call in procedures for both heart/kidney and backup recipients

6.1.28. Renal coordinator will
6.1.29. Ensure monthly CAS are performed preoperatively
6.1.30. Perform usual transplant call in procedures, if appropriate

5. REFERENCE/ASSOCIATED DOCUMENTS

Form, Recipient Activitation
Reference, VGH Transplant Checklist – Liver, Kidney, P/K
Reference, VGH Transplant Checklist – Lungs
Reference, Responsibilities for On-Call Nephrologist Regarding Cadaveric Kidney and/or Pancreas Transplantation
SOP-001- Heart Transplant Recipient Notification and Preparation
SOP –002- Call Triage for Heart Transplant patients after hours
SOP, Organ Offering and Allocation Extra Renal ODHD-ODS.02.004
SOP, Organ Offering and Allocation Renal ODHD-ODS.02.005

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3.4 Immunological Screening and Monitoring while Waiting for Transplant

All patients undergoing transplant assessment require Cytotoxic Antibody Screen (also called calculated Panel Reactive Antibody – cPRA). This test is only performed at the Vancouver General Hospital Immunology lab. See below for pre-transplant

	All listed candidates with cPRA 0-80%	**All listed candidates with cPRA >80%**
Blood sample for flow crossmatch in case of transplant to Immunology	Monthly	Q Monthly + Consultation with Immunology at time of listing – to risk stratify & review potential removal of low risk antibodies
cPRA	Q 6 Monthly	Q 2 Monthly + histogram sent for cardiologist review Re-consultation between Immunology & cardiologist if changes present

For all scenarios, if sensitizing event occurs – i.e. blood transfusion, major surgery (e.g.VAD implant), major infection requiring IV antibiotics, perform cPRA 3-4 weeks after event (e.g. blood transfusion date or date of DIAGNOSIS of infection) and then revert to above criteria.

3.5 Hepatitis C Donors

As of July 2021, in collaboration with BCT, the heart transplant program began the process to offer and allocated Hepatitis C (HCV) NAT RNA positive donor hearts to pre-consented recipients.

The SOP that encompasses the organ donation team's process is described here, and patient education material can be found here

This is the consent form that is to be signed and scanned into Cerner EMR and can be found here via the BCT internal documents

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.

Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

INFORMED CONSENT FORM
Willing to Accept a Donor Offer From
HCV NAT- Positive Donors

Patient Label

1. I understand that I may be offered an organ from a donor with hepatitis C infection (HCV NAT- positive). This will be because my transplant doctor feels the benefit of accepting this organ outweighs the risk. The specific benefits and risks of taking this organ have been explained to me and will be discussed again at the time of transplantation. I can refuse the organ and my status on the waiting list will not be affected.

2. I understand that receiving an organ from a hepatitis C infected (HCV NAT-positive) donor means that I will become infected with hepatitis C.

3. I understand that I will receive effective hepatitis C antiviral treatment immediately after my transplant.

4. I understand that the treatment for hepatitis C is very effective and more than 95% of patients with Hepatitis C infection can be successfully treated with 12 weeks of very safe and well tolerated medications.

5. I understand that the cost of the hepatitis C treatment will be covered.

6. I understand that I can ask a transplant physician about any questions that I may have on receiving an organ from hepatitis C infected donors at any time to assist me in making an informed decision.

I understand the above and would be willing to be offered an organ from hepatitis C NAT-positive donor.

Name: (Mr., Mrs., Ms.) _____ _____
SURNAME GIVEN NAMES

SIGNATURE:_____ _____
(PATIENT OR GUARDIAN) (PRINT NAME IF NOT THE PATIENT)

_____ DATE:_____
(Relationship to Patient if not the Patient)

WITNESS _____ _____
(SIGN) (PRINT NAME)

DATE:_____

STATEMENT BY PROFESSIONAL INTERPRETER
COMPLETE **ONLY** IF A PROFESSIONAL INTERPRETER IS USED TO OBTAIN CONSENT.
I have translated the above information to the:_____Patient/Client____parent___legal guardian or representative and I have interpreted their responses to the health care provider.

_____ _____ _____
SIGNATURE OF INTERPRETER PRINT NAME DATE SIGNED

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.

Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

3.5.1 *Hepatitis C NAT Positive Donor Acceptance Heart Transplant Program Standard Operating Procedure*

STANDARD OPERATING PROCEDURE DOCUMENT #

Hepatitis C NAT Positive Donor Acceptance Heart Transplant Program

Site Applicability:
SPH Heart Transplant Program
Scope:
This protocol outlines the St. Paul's Hospital Heart Transplant Program's process in accepting a Hepatitis C Virus Nucleic Acid Amplification Testing (NAT) positive donor heart to transplant into a Hepatitis C negative recipient **INCLUSION CRITERIA** • Listed heart transplant candidate • Informed consent for Hepatitis C NAT+ donor obtainable • Patient is registered for Fair Pharmacare **EXCLUSION CRITERIA** • Clinically significant liver disease, including any of the following: o Active Hepatitis B infection or is Hepatitis B Core positive o Previous Hepatitis C infection o Persistently elevated liver transaminases of any etiology * Where there is concern regarding liver disease, hepatology consult should be sent (e.g. cirrhosis on imaging)
Procedures:
Considerations: o Outpatient Pharmacist will be consulted confirming patient is on Fair Pharmacare & patient aware of deductible limit per year prior to listing. Social Work will help provide education to patients about application for Fair Pharmacare during transplant assessment o Patient's ability to pay for the medication regimen should be reviewed by the social worker & outpatient pharmacist after consent is obtained. If there are issues with finances, Pharmacist will explore financial assistance programs with the manufacturers (AbbVie or Gilead)

Effective date: 28/SEP/2020 Page 1 of 6

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.

Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

Considerations, cont.

- Patient's cognitive ability to follow extensive medication regimen should be reviewed by the transplant team

OBTAINING CONSENT

1. Discussion regarding appropriateness of accepting a Hep C donor should happen at the gridding process during interdisciplinary rounds
2. Approaching patients for consent of Hep C donor should ideally happen once the patient is listed. However, it is recognized that this discussion may take place prior to listing for some patients depending on their scenario or clinical stability
3. If the patient meets inclusion criteria, and it is deemed appropriate timing to approach patient for dialogue regarding Hep C donors, the on call transplant cardiologist will begin discussion with patient at their next scheduled clinic visit. Education material will be provided to the patient at this time.
4. If the patient is agreeable to proceed, referral should be made to Transplant Infectious Disease with Dr. Alissa Wright
5. Consent to Hep C donor should be signed by the patient & transplant cardiologist after patient has seen Dr. Wright, at the next scheduled clinic visit
6. If patient is an inpatient, follow the same process but all discussions/referrals will be completed in an inpatient context during hospitalization

LISTING

1. Once consent is signed, Nurse will notify Clerk to update heart transplant active list.
2. Clerk will select "Accept Hep C Donor" on PROMIS activation page as "yes". Updated list will be distributed to the cardiologist and on call nursing team as per usual process

OFFERING HEP C NAT + DONOR ORGAN

1. Once a Hep C + organ has been accepted, the Cardiologist will phone the patient to have discussion about Hep C + donor offer and explain over phone If patient agrees to proceed. If patient agrees:
2. Cardiologist will notify On call RN as per usual process
3. Email notification from the Organ Donation Specialist will be sent to Dr. Alissa Wright, BCCDC & BCT Transplant Pharmacist, Dom Khoo (+/- group pharmacist email) as per BCT SOP: Use of HCV NAT RNA Positive Donors & Resistance Testing

DURING HOSPITALIZATION

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.

Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

1. Therapy should begin on POD 0 (or as soon as possible) – Bita Bateni will coordinate medication procurement for hospital use.
2. Antivirals are preferably taken PO as intact tablets. If patient needs NG administration in immediate post op days, tablets may be crushed.
3. If hospitalization is prolonged - Consult Transplant ID, Dr. Alissa Wright, who agreed to see inpatients under this protocol

Medication review/ interactions:

A thorough medication review by the inpatient pharmacist must be done on admission and prior to introduction of a new medication due to potential for many drug interactions with Maviret. Some of the drug interaction include (but not limited to):

- Amiodarone
- Carbamazepine
- Cyclosporine
- Digoxin
- Phenobarbital
- Pheyntoin
- PPI ** Weak minor interaction- ok to use daily dose immediately post op, but reassess if patient needs as soon as clinically feasible** refrain from BID dosing
- Rifampin
- Statin **note: pravastatin should stay at 20 mg/day dose until end of HCV treatment

DISCHARGE

1. Post-Transplant RN will:
    a. ensure patient has follow up with the Transplant ID team as an outpatient
    b. ensure pt has follow up blood work in outpatient setting (as part of biopsy PP lab phase)
2. Inpatient transplant pharmacist/ Cardiologist will
    a. Dictate on D/C summary cc to inform GP & Transplant ID that patient has received Hep C+ donor heart and will be on treatment and surveillance by the Post-Transplant Clinic
    b. ensure patient is discharged on Antivirals - MAVIRET: Glecaprevir 100 mg & Pibrentasvir 40 mg, Three tablets once daily x 8 weeks:
    c. ensure patient be dispensed enough MAVIRET tablets on discharge until next transplant clinic appointment
    d. Review patient's Statin medication as Simvastatin and Atorvastatin has significant contraindication with Maviret and needs to be switched to another type of statin. Pravastatin dose should remain 20 mg/day until end of HCV treatment.

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3. Refill medications: will be dispensed monthly by Burrard Pharmasave due to high cost and importance of medication adherence, drug will be kept with and dispensed weekly (or intervals deemed appropriate) by the outpatient transplant pharmacist (Tania Alia) at subsequent clinic visit

SERIAL SURVEILLANCE SCHEDULE

The following blood test will need to be performed on a regular surveillance schedule. Orders for blood work needs to be entered "ad hoc" in Cerner CST, with options to add to existing Powerplan per below:

- HCV Quantitative RNA (NAT) by PCR
- AST, ALT, Bilirubin
- INR, PTT

This will be aligned with the Post-Heart Transplant biopsy/blood work protocol when applicable:

HCV Quantitative RNA (NAT) Testing Schedule

Time point post-transplant	Powerplan where order located & should be placed
Daily for first 7 days	TRANSPLANT HEART Heart Transplant Post-Operative (Multiphase) – "*CSICU Admission*" phase
Week 1	TRANSPLANT HEART Heart Transplant Post-Operative (Multiphase) –"*Transfer*" phase
Week 2	TRANSPLANT HEART BIOPSY – Week 2
Month 1	TRANSPLANT HEART BIOPSY – Week 4
Month 2	TRANSPLANT HEART BIOPSY – Week 8
Month 3	TRANSPLANT HEART BIOPSY – Week 12
Month 6	TRANSPLANT HEART BIOPSY – Week 30
Year 1	TRANSPLANT HEART AMB Post Clinic Annual Visit
Year 2	TRANSPLANT HEART AMB Post Clinic Annual Visit
Year 3	TRANSPLANT HEART AMB Post Clinic Annual Visit

Screening is completed at year 3 unless otherwise specified by Transplant Infectious Disease team

Implementation:

Patients currently on the heart transplant list under the 4S status should be the first set of patients approached for consent. Next, patient's wait time on the list should be prioritized, with the longest waiting patients first approached, and then move backwards.

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Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

Related Documents:
BCT Use of Hepatitis C (HCV) NAT RNA Positive Donors SOP: ODHD-ODS.02.007 Informed Consent Form Pt education information

References: (if applicable)

Aslam, S., Yumul, I., Mariski, M., Pretorius, V. & Adler, E. (2019). Outcomes of heart Transplantation from hepatitis C virus-positive donors. *Journal of Heart and Lung Transplantation*, 38:1259-1269

Aslam, S. et al. (2020). Utilization of hepatitis C virus-infected organ donors in cardiothoracic transplantation: An ISHLT expert consensus statement. *Journal of Heart and Lung Transplantation*, 39(5):418-432

Bruno, S. et al. (2019). Heart Transplantation From Hepatitis C-Positive Donors in the Era of Direct Acting Antiviral Therapy: A Comprehensive Literature Review. *Transplant Direct*, 5: e486; doi: 10.1097/TXD.0000000000000928

Frager, S. et al. (2019). Heart Transplantation for Hepatitis C Virus Non-Viremic Recipients from Hepatitis C Virus Viremic Donors. *Cardiology in Review*, 27(4): 179-181

International Society of Heart Lung Transplant, Press Release, April 4, 2019: https://ishlt.org/ishlt/media/Documents/ISHLT2019_Hep-C_PressRelease.pdf

Kilic, A. et al. (2020). Outcomes of Adult Heart Transplantation Using Hepatitis C-Positive Donors. *Journal of American Heart Association*, 9:e014495. DOI: 10.1161/JAHA.119.014495.

Schelendorf, K. et al. (2020). Expanding Heart Transplant in the Era of Direct-Acting Antiviral Therapy for Hepatitis C. *Journal of American Heart Association Cardiology*, 5(2): 167-175

Woolley, A. et al (2019). Heartand Lung Transplants from HCV-Infected Donors to Uninfected Recipients. *The New England Journal of Medicine*, 380(17): 1606-1617

APPROVALS		
Medical & Surgical Heart Transplant Program Director	*Dr. Mustafa Toma; Dr. Anson Cheung*	*September 28, 2020*

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.

Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

Transplant Infectious Disease Program, Director	*Dr. Alissa Wright*	*September 28, 2020*
Clinical Nurse Specialist	*Wynne Chiu*	*September 28, 2020*
Clinical Pharmacy Specialist	*Bita Bateni*	*September 28, 2020*
BC Transplant	*Ed Ferre (Provincial Operations Director); Dom Khoo (Pharmacist); Heidi Butler (Clinical Operations Manager)*	*September 28, 2020*
DEVELOPERS/OWNER		
Clinical Nurse Specialist	*Wynne Chiu*	*September 28, 2020*

REVISION HISTORY			
Revision#	Description of Changes	Prepared by	Effective Date
OO	*Initial Release*	*Wynne Chiu*	*September 28, 2020*

4 The Transplant

4.1 Matching Donor to Recipient - immunology

The on-call transplant cardiologist when triaging a donor call from BC Transplant, will receive the following donor immunology information from the on call Organ Donation Coordinator:

- Blood group
- List of cross-referenced antibody status with potential recipients on our local transplant list done by the immunology team– This screening process is called a “Virtual Crossmatch”

After the virtual crossmatch, and whether it is negative or positive, the cardiologist will determine a maximum of 3 listed recipients who may be a potential match for the donor. The cardiologist determines this based on other matching criteria such as blood group, age, size, sex, ischemic time and clinical acuity. This is communicated to the immunology team on call through the organ donation coordinator. The immunology team will then perform the second screening/matching process, which is called a “Flow Crossmatch”.

If this Flow Crossmatch is negative, then the donor would be considered an appropriate immunological match for the specified recipient(s). However, if the Flow Crossmatch is positive, then two options are possible:

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1. The transplant cardiologist will choose an alternate recipient that had a negative Flow Crossmatch (if available)
2. The transplant cardiologist may confer with the immunologist on-call to determine the significance of the positive flow cross-match and the mean fluorescence intensity (MFI) of the donor specific antibody. In the case that an organ is transplanted with a positive crossmatch, there is a conversation with the cardiac surgeon on-call to discuss the clinical situation, rationale for transplanting in this scenario and for identifying pre-intra- and post-operative strategies to minimize the risk of rejection.

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.
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4.2 Donor Criteria

An organ donor deemed suitable first by the criteria outlined by BC Transplant (BCT) and then between the cardiologist and surgeon on call.

Additionally, the HTx surgeon and cardiologist use the following exclusion criteria to assess donor suitability:

- Poor Ejection Fraction
- diffuse atherosclerosis
- congenital or valvular heart diseases that are not easily correctable.

4.3 Exceptional Distribution of Organs

Exceptional Distribution (ED) of organs refers to organs obtained from a donor for whom the donor suitability assessment identified an increased risk for disease transmission

The decision & procedures regarding whether a donor is designated as ED is detailed on the BCT ED Standard Operating Procedure (SOP) document.

BCT has a physician handbook to support physicians in presenting information to patients. This link to BCT internal documentation can only be accessed from inside the PHC system. A Summary of ED Criteria is also available through BCT.

Appendix A contains the PHC consent form and Patient Information Brochure

The workflow to ensure education and consent of listed recipients for ED donors is detailed below:

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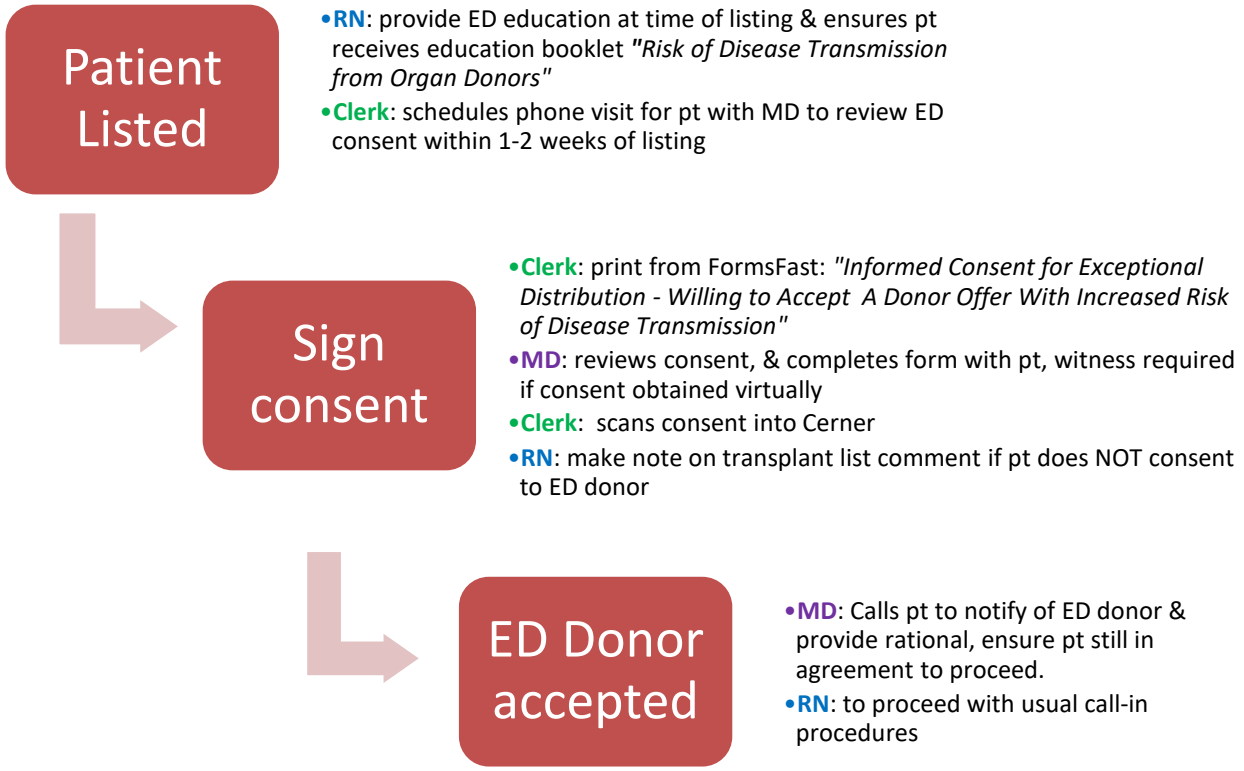

At time of transplant, the cardiac surgeon will receive, review and sign part B of the BC Transplant Exceptional Distribution Form, which would then be returned to BCT. The BCT quality assurance team will then send a copy of this completed form, and any applicable follow up treatment required to the implant team.

4.4 Call in for Heart Transplant

The recipient is agreed upon between the cardiologist and surgeon on call. The process for allocation is outlined previously.

The Heart Transplant Coordinator is notified (on call coordinator if after hours: 604-250-2658) by the Heart Transplant Cardiologist and informed as to who needs to be called in as well as approximate timing and any other pertinent information.

Once the patient has been called in and appropriate areas informed by the Coordinator on call, it is the responsibility of the Cardiologist and Cardiac Surgeon to manage the patient's clinical care.

The form used to call in patients is below:

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.
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Heart Transplant Recipient Call-In Progress Notes

DOB:

PHN:

Date/Time		
Call received from		
Call-in	☐ Primary ☐ Backup	
Planned OR Time		
Latest acceptable arrival time to hospital		
Remind patient/s:	☐NPO ☐Hold Coumadin & all meds	☐Bring meds (in case dry run) ☐Possibility of dry run

Travel Instructions

Where possible, patients to make their own way into the hospital
Discuss travel plan with pt and determine whether ETA fits with above latest acceptable time

If standard flight or ferry is NOT able to get the patient here at the above ETA:

FLIGHT

Call Uniglobe for flight booking, tell them you're with BC Transplant HTx program & ask for Kimberly Walsh (24/7 on call)

- 1-416-564-6759, or 1-866-252-4942 (press 1)
- Email: kwalsh@tehcentre.com

Provide Kimberly with
patient's contact information
required ETA
Ask Kimberly to phone you back with travel plans for patient
Inform Cardiologist if any delays

If the patient requires a ferry and it is a high volume time (eg stat holiday etc)
Obtain patients:
vehicle colour_____, year _____, make _____,
license plate number _____ and departure terminal _____

Then call BC Ferries –1-888-223-3779 and inform them that the patient requires Medical Assured Loading

Call patient back with instructions to board ferry

ETA

If Delay – Notify Cardiologist on-call

Notify following departments / persons – inform of. SPH # 604-682-2344

5A	62304	* remind to pick up chart	CNL/CN:
CSICU	62117		CNL/CN:

Form completed by:	Signature:	Print name:

Last revised June 25, 2016

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4.5 Pre-operative Protocol

The following Cerner Powerplans are ordered and initiated by the physician on call when a patient is called in for their heart transplant. Patients are admitted to the unit 5A (Cardiology), unless otherwise determined by the cardiologist:

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.

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4.5.1 *TRANSPLANT HEART Pre Operative/Admission*

TRANSPLANT HEART Pre Operative / Admission (Planned Pending)	
▲ Admit/Transfer/Discharge	
Verify that an 'Admit to' Order has been entered prior to completing the powerplan (NOT required for direct admit patients)	
☑ Discharge Patient Instructions	If heart transplant surgery is cancelled instruct patient to follow up with family physician
☑ Communication Order	If heart transplant surgery is cancelled, ensure that implantable defibrillator has been reactivated and anticoagulatio...
If heart transplant surgery is cancelled, ensure patient is aware to resume pre-admission medications	
▲ Status	
☑ Code Status	Attempt CPR, Full Code
▲ Patient Care	
☑ Cardiac Monitoring	May suspend for transport/shower
☑ Vital Signs	Routine, as per unit policy Notify treating provider if temperature greater than 37.5 DegC (if different from baseline)
☑ Pulse Oximetry	Routine, as per unit policy
☑ Notify Treating Provider	If LVAD alarms low flow or high watts
☑ Notify Treating Provider	If LVAD patient MAP less than 55 mmHG or more than 90 mmHg
☐ Communication Order	During business hours, notify Electrophysiology Providers to turn off AICD shock function If after-hours, notify cardiac surgeon to turn off AICD shock function in the OR and document on pre-op checklist. ...
For Diabetic Patients	
☐ POC Glucose Whole Blood	q4h, while NPO Notify provider if below 4 mmol/L or above 10 mmol/L
☑ Pre-Op Skin Preparation	Patient to have Chlorhexidine shower pre-op
☑ Insert Peripheral IV Catheter	T;N If not already in place
☐ Insert Peripheral IV Catheter	If inotropes required
☑ Saline Lock Peripheral IV	PRN
☐ Patient Isolation	**Select an order sentence**
▲ Activity	
☑ Activity as Tolerated	T;N
▲ Diet/Nutrition	
☑ NPO	Except for Medications
▲ Medications	
☑ Hold Medication(s)	Clinical event: pre heart transplant, Medication(s) to be held: ASA and P2Y12 inhibitors (e.g. clopidogrel, ticagr, Instr...
☑ Hold Medication(s)	Clinical event: pre heart transplant, Medication(s) to be held: ACE inhibitors/ARB, Instructions: Hold on admission
☑ Hold Medication(s)	Clinical event: pre heart transplant, Medication(s) to be held: warfarin, Instructions: Hold on admission
☑ Hold Medication(s)	Clinical event: pre heart transplant, Medication(s) to be held: hypoglycemic medications, Instructions: Hold on day ... Hypoglycemic medications include: glyBURIDE, gliCLAZide, linagliptin, metFORMIN, insulin
☑ Hold Medication(s)	Clinical event: pre heart transplant, Medication(s) to be held: IV heparin, Instructions: Stop heparin on call to OR
☐ vitamin K	10 mg, IV, once, drug form: inj, first dose: STAT
☐ vitamin K	10 mg, PO, once, drug form: inj, first dose: STAT
☐ LORazepam (LORazepam sublingual PRN range dose)	dose range: 0.5 2 mg, sublingual, q2h, PRN agitation, drug form: tab-sublingual
☑ ranitidine	150 mg, PO, 120 min pre-op, drug form: tab Administer 2 hours prior to surgery
☑ zopiclone	3.75 mg, PO, qHS, PRN insomnia, drug form: tab
Inotrope Infusion	
☐ CARD Cardiac Unit Inotrope Infusion (Module)	
▲ Laboratory	
Hematology	
☑ CBC and Differential	Blood, Urgent, Collection: T;N, once
☑ INR and PTT Panel	Blood, Urgent, Collection: T;N, once Notify provider on call if INR above 1.8
☑ Group and Screen	Blood, Urgent, Collection: T;N, once
Chemistry	
☑ Basic Metabolic Panel (Lytes, Urea, Creat, Gluc)	Blood, Urgent, Collection: T;N, once
☑ Magnesium Level	Blood, Urgent, Collection: T;N, once
☑ Phosphate Level	Blood, Urgent, Collection: T;N, once
☑ Calcium Ionized Serum	Blood, Urgent, Collection: T;N, once
☑ Liver Panel (Bilirubin Total, ALP, Alb, ALT, GGT)	Blood, Urgent, Collection: T;N, once
☑ Creatine Kinase	Blood, Urgent, Collection: T;N, once
☑ Lactate Dehydrogenase	Blood, Urgent, Collection: T;N, once
☑ Protein Level (Total Protein Level)	Blood, Urgent, Collection: T;N, once
☐ Natriuretic Peptide B Prohormone	Blood, Urgent, Collection: T;N, once
Immunology	
☑ Pre-Transplant Serum Storage	Blood, Urgent, Collection: T;N, once
ORDERING INSTRUCTIONS: CBC and Differential is required to be ordered concurrently with immunophenotyping T Cell B Cell NK Cell Blood	
☑ Immunophenotyping T Cell B Cell NK Cell (Immunop...	Blood, Urgent, Collection: T;N, once
Urine Studies	
☑ Urinalysis Macroscopic (dipstick)	Urine, Urgent, Collection: T;N, once
☑ Urine Culture (Urine C&S)	Urine, Midstream, Urgent, Collection: T;N, once
▲ Diagnostic Tests	
☑ XR Chest	Urgent, Reason: PA and Lateral, Pre heart transplant
▲ Consults/Referrals	
☑ Social Work Consult	Routine, Other (please specify), Patient called in for heart transplant. Heart transplant allied health team member to ...
☑ Dietitian Adult Consult	Routine, Reason for Consult: Other (see special instructions), Patient called in for heart transplant. Heart transplant ...
☑ Spiritual Health Services Consult	Routine, Other (please specify), Patient called in for heart transplant. Heart transplant allied health team member to ...
☑ Psychology Consult	Routine, Reason for Consult: Patient called in for heart transplant, Heart transplant allied health team member to fol...

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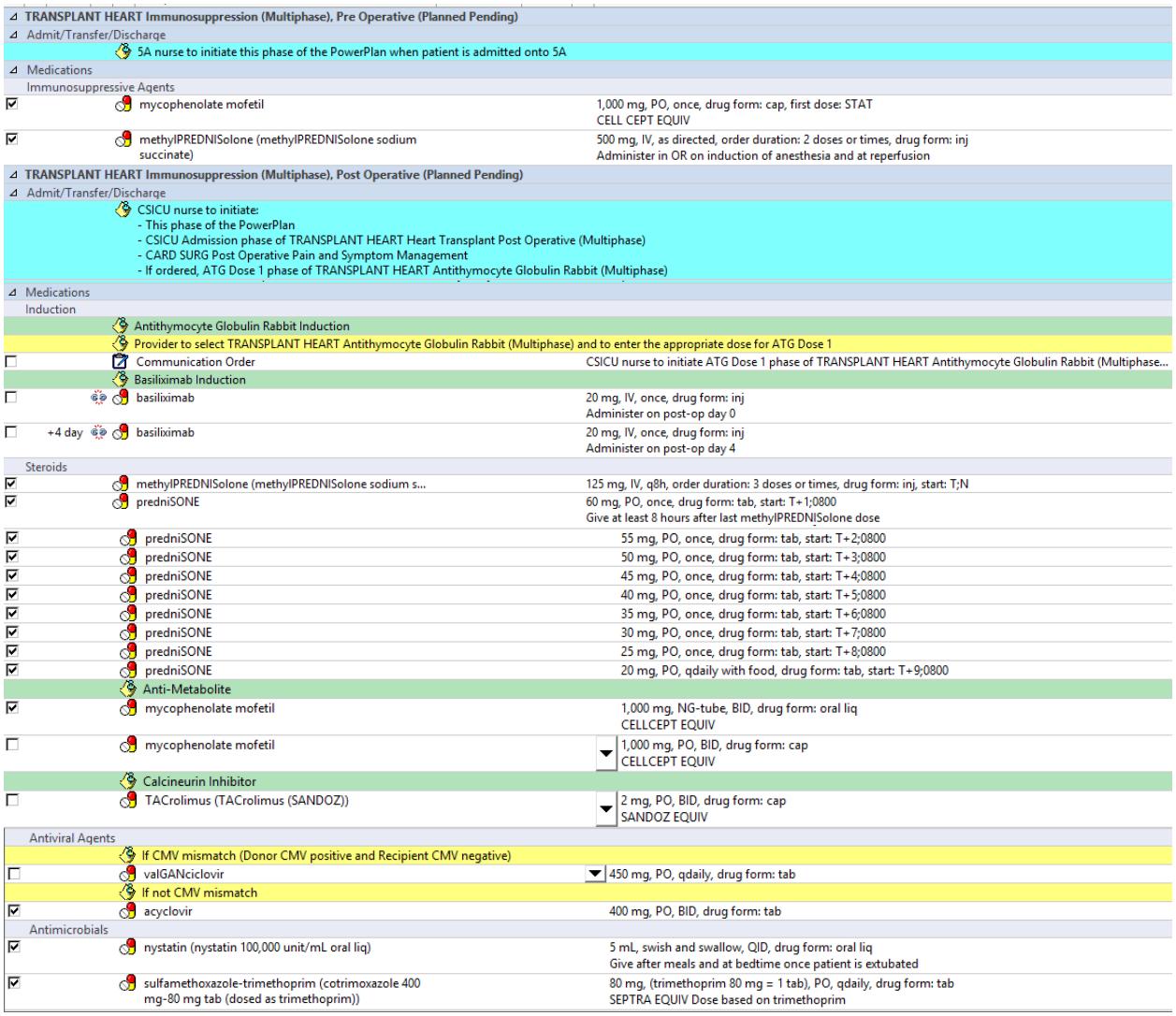
4.5.2 ***TRANSPLANT HEART Immunosuppression (Multiphase)***



TRANSPLANT HEART Immunosuppression (Multiphase), Pre Operative (Planned Pending)		
Admit/Transfer/Discharge		
	5A nurse to initiate this phase of the PowerPlan when patient is admitted onto 5A	
Medications		
Immunosuppressive Agents		
☑	mycophenolate mofetil	1,000 mg, PO, once, drug form: cap, first dose: STAT CELL CEPT EQUIV
☑	methylPREDNISolone (methylPREDNISolone sodium succinate)	500 mg, IV, as directed, order duration: 2 doses or times, drug form: inj Administer in OR on induction of anesthesia and at reperfusion
TRANSPLANT HEART Immunosuppression (Multiphase), Post Operative (Planned Pending)		
Admit/Transfer/Discharge		
	CSICU nurse to initiate: - This phase of the PowerPlan - CSICU Admission phase of TRANSPLANT HEART Heart Transplant Post Operative (Multiphase) - CARD SURG Post Operative Pain and Symptom Management - If ordered, ATG Dose 1 phase of TRANSPLANT HEART Antithymocyte Globulin Rabbit (Multiphase)	
Medications		
Induction		
	Antithymocyte Globulin Rabbit Induction	
	Provider to select TRANSPLANT HEART Antithymocyte Globulin Rabbit (Multiphase) and to enter the appropriate dose for ATG Dose 1	
☐	Communication Order	CSICU nurse to initiate ATG Dose 1 phase of TRANSPLANT HEART Antithymocyte Globulin Rabbit (Multiphase...
	Basiliximab Induction	
☐	basiliximab	20 mg, IV, once, drug form: inj Administer on post-op day 0
☐	+4 day basiliximab	20 mg, IV, once, drug form: inj Administer on post-op day 4
Steroids		
☑	methylPREDNISolone (methylPREDNISolone sodium s...	125 mg, IV, q8h, order duration: 3 doses or times, drug form: inj, start: T;N
☑	predniSONE	60 mg, PO, once, drug form: tab, start: T+1;0800 Give at least 8 hours after last methylPREDNISolone dose
☑	predniSONE	55 mg, PO, once, drug form: tab, start: T+2;0800
☑	predniSONE	50 mg, PO, once, drug form: tab, start: T+3;0800
☑	predniSONE	45 mg, PO, once, drug form: tab, start: T+4;0800
☑	predniSONE	40 mg, PO, once, drug form: tab, start: T+5;0800
☑	predniSONE	35 mg, PO, once, drug form: tab, start: T+6;0800
☑	predniSONE	30 mg, PO, once, drug form: tab, start: T+7;0800
☑	predniSONE	25 mg, PO, once, drug form: tab, start: T+8;0800
☑	predniSONE	20 mg, PO, qdaily with food, drug form: tab, start: T+9;0800
	Anti-Metabolite	
☑	mycophenolate mofetil	1,000 mg, NG-tube, BID, drug form: oral liq CELLCEPT EQUIV
☐	mycophenolate mofetil	1,000 mg, PO, BID, drug form: cap CELLCEPT EQUIV
	Calcineurin Inhibitor	
☐	TACrolimus (TACrolimus (SANDOZ))	2 mg, PO, BID, drug form: cap SANDOZ EQUIV
Antiviral Agents		
	If CMV mismatch (Donor CMV positive and Recipient CMV negative)	
☐	valGANciclovir	450 mg, PO, qdaily, drug form: tab
	If not CMV mismatch	
☑	acyclovir	400 mg, PO, BID, drug form: tab
Antimicrobials		
☑	nystatin (nystatin 100,000 unit/mL oral liq)	5 mL, swish and swallow, QID, drug form: oral liq Give after meals and at bedtime once patient is extubated
☑	sulfamethoxazole-trimethoprim (cotrimoxazole 400 mg-80 mg tab (dosed as trimethoprim))	80 mg, (trimethoprim 80 mg = 1 tab), PO, qdaily, drug form: tab SEPTRA EQUIV Dose based on trimethoprim

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4.5.3 *Transplant Heart Antithymocyte Globulin Rabbit (Multiphase) – if applicable*

4.6 The Transplant Surgery

The surgery is performed by the Transplant Cardiac Surgeon on-call.

It is the responsibility of the Transplant Cardiac Surgeon to verify with the OR and BC Transplant teams involved in the organ retrieval, the correct blood group of the organ donor and the organ recipient before the transplant procedure commences.

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5 Post-Heart Transplant

5.1 Most Responsible Physician

The most responsible physician until transfer to 5A is the Transplant Surgeon.

5.2 Post-Operative Orders

The following Cerner PowerPlans would be used:

5.2.1 *CARD SURG Heart Transplant Post Operative (Multiphase), CSICU Admission*

CARD SURG Heart Transplant Post Operative (Multiphase), CSICU Admission (Planned Pending)		
Admit/Transfer/Discharge		
	Complete Transfer Medication Reconciliation	
☑	Nurse to Discontinue Order Set/Phase	Discontinue TRANSPLANT HEART Pre Operative/Admission PowerPlan
Status		
☑	Code Status	Attempt CPR, Full Code
Patient Care		
☑	Vital Signs	Routine, as per unit policy Notify provider of any new fever above 38 DegC
☑	Critical Care Goals	MAP goal: 65 mmHg or greater, SBP goal: less than 140 mmHg, Hgb goal: 75 g/L, SpO2 goal: 92% or greater, keep ...
☑	Sedation Assessment (Richmond Agitation Sedation S...	q4h and PRN
☑	Richmond Agitation Sedation Scale Goal (RASS Goal)	RASS goal of -5, Unrousable, RASS goal start at -5, wean sedation to meet goal of RASS 0
☑	Provide Forced Air Warmer	Provide warming blanket for temperature below 35.5 DegC
☑	Communication Order	Check intrinsic rhythm as per CSICU Pacemaker Protocol. Manage arrhythmias or pacemaker malfunction as per CS...
Lines/Tubes/Drains		
☑	Pulmonary Artery Catheter Monitoring	If patient has PAC and as per unit policy and protocol
☐	Remove Pulmonary Artery Catheter	When patient is hemodynamically stable Remove pulmonary artery catheter when: - Patient is 8 hours post-op - Patient is off all inotropes for 4 hours - Pat...
☑	Chest Tube Care	Chest Tube Number 1, Type Chest tube, Suction: -20 cm H20 suction, Device Pleur-Evac Sahara drainage system
☑	Remove Chest Tube	If removal criteria is met Chest tube removal criteria: - Drainage is less than 100 mL in the past 4 hours - Chest tube has been in a minimum...
☐	Insert Orogastric (OG) Tube	Tube to low intermittent or continuous suction, insert large bore
Activity		
☑	Activity as Tolerated	Progress as tolerated: supine, side to side, elevated HOB, sitting, dangle, stand
☐	Bedrest	Turn patient q2h, maintain HOB 30 degrees or greater If stable, mobilize POD 0
Diet/Nutrition		
	Review the most current diet order for therapeutic requirements, food texture and fluid thickness. Add anything to be carried forward to the new Diet Order	
☑	Communication Order	RN to start clear fluid diet POD 0
☑	Adjust Diet as Tolerated	T+1;0830, Start: Full Fluid Diet, Advance/Adjust to: General Diet, no salt packages. RN or RD to place subsequent di...
☑	Fluid Restrictions	1.5 L/day, Including feeds, Including IV fluids
Continuous Infusions		
Maintenance Fluids		
☑	sodium chloride 0.9% (sodium chloride 0.9% (NS) con...	order rate: 30 mL/h, IV, drug form: bag
☑	sodium chloride 0.9% (sodium chloride 0.9% (NS) con...	order rate: 5 mL/h, IV, drug form: bag
☑	dextrose 5% (dextrose 5% (D5W) continuous infusion)	order rate: 5 mL/h, IV, drug form: bag
Bolus Fluids		
☑	plasmalyte (plasmalyte bolus)	500 mL, IV, once, PRN other (see comment), order duration: 24 hour, drug form: bag PRN Reason: hypotension or low cardiac index
☐	TM Albumin Transfusion (Module)	
Medications		
Antimicrobials		
	ceFAZolin can be safely administered to patients with penicillin allergy, including anaphylaxis. Do NOT administer if severe delayed skin reaction to any beta-lactam (e.g. drug reaction with eosinophilia and systemic symptoms, Stevens-Johnson syndrome, toxic epidermal necrolysis)	
☑	ceFAZolin	2,000 mg, IV, q8h interval, order duration: 3 doses or times, drug form: bag

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Vasoactive / Inotropic Agents		
☑	milrinone titratable infusion (200 mcg/mL) in D5W sta...	titrate, IV, mcg/kg/min starting rate, 0 mcg/kg/min minimum rate, 0.75 mcg/kg/min maximum rate, titrate instruct...
☑	NORepinephrine titratable infusion (16 mcg/mL) in D...	titrate, IV, mcg/min starting rate, 0 mcg/min minimum rate, 20 mcg/min maximum rate, titrate instructions: titrate ...
☑	nitroglycerin titratable infusion (0.2 mg/mL) in D5W s...	titrate, IV, mcg/min starting rate, 0 mcg/min minimum rate, 200 mcg/min maximum rate, titrate instructions: titrat...
☐	PHENYLephrine titratable infusion (100 mcg/mL) in D...	titrate, IV, mcg/min starting rate, 0 mcg/min minimum rate, 200 mcg/min maximum rate, titrate instructions: titrat...
☑	vasopressin titratable infusion (0.2 unit/mL) in D5W st...	titrate, IV, unit/min starting rate, 0 unit/min minimum rate, 0.04 unit/min maximum rate, titrate instructions: titrate ...
☐	Nitric Oxide Therapy	0 to 40 ppm inhaled, PRN Respiratory Therapist to wean nitric oxide if Cardiac Index is above 2.0 and PaO2 is above 80. Decrease by 50% every...
Antihypertensives		
☐	hydrALAZINE (hydrALAZINE PRN range dose)	dose range: 5 to 10 mg, IV, q20min, PRN hypertension, drug form: inj To maintain critical care goals. Maximum 50 mg/24 h
☐	labetalol (labetalol PRN range dose)	dose range: 5 to 10 mg, IV, q5min, PRN hypertension, drug form: inj To maintain critical care goals. Maximum 50 mg/24 h. Hold if heart rate less than 60 beats per minute
Sedatives		
☑	proPOFol titratable infusion (20 mg/mL)	titrate, IV, mcg/kg/min starting rate, 0 mcg/kg/min minimum rate, 100 mcg/kg/min maximum rate, titrate instructi... *ALERT* 2 concentrations available. Verify concentration. proPOFol 20 mg/mL
☑	proPOFol	20 mg, IV, as directed, PRN sedation, order duration: 2 doses or times, drug form: inj Maximum 40 mg. For mechanically ventilated patients only. Do not administer if SBP less than 90 mmHg. Notify pr...
☐	dexmedeTOMidine titratable infusion (4 mcg/mL) in ...	Titrate, IV, 0.2 mcg/kg/h minimum rate, 1 mcg/kg/h maximum rate, titrate instructions: titrate to maintain RASS goal
Analgesics		
☑	HYDROmorphone (HYDROmorphone PRN range dose)	dose range: 0.2 to 0.6 mg, IV, q5min, PRN pain, drug form: inj DILAUDID EQUIV
☑	fentanyl (fentanyl PRN range dose)	dose range: 25 to 50 mcg, IV, q5min, PRN pain, drug form: inj
☑	acetaminophen	1,300 mg, rectal, once, drug form: supp Administer within 2 hours of admission to CSICU. Maximum acetaminophen 4 g/24h from all sources
Anticoagulation Reversals		
☐	protamine	50 mg, IV, once, drug form: inj 50 mg per 500 mL of pump blood
☐	protamine	150 mg, IV, once, administer over: 6 hour, drug form: inj Infuse at 25 mg/h for 6 hours
Stress Ulcer Prophylaxis		
☑	pantoprazole	40 mg, IV, once, drug form: bag
Modules		
☑	ICU Insulin Infusion - Critical Care (Module)	Planned Pen...
☑	CARD SURG Electrolyte Replacement (Module)	Planned Pen...
Laboratory		
Hematology		
☑	CBC and Differential	Blood, Urgent, Unit collect, Collection: T;N, once
☑	CBC and Differential	Blood, AM Draw, Unit collect, Collection: T+1;0330, qdaily for 3 day
☑	INR and PTT Panel	Blood, Urgent, Unit collect, Collection: T;N, once
☑	INR and PTT Panel	Blood, AM Draw, Unit collect, Collection: T+1;0330, qdaily for 3 day
☑	Nurse to place Lab Order	Nurse to place lab order for INR and PTT prior to chest tube removal
Chemistry		
☑	Electrolytes Urea Creatinine Panel	Blood, Urgent, Unit collect, Collection: T;N, once
☑	Electrolytes Urea Creatinine Panel	Blood, AM Draw, Unit collect, Collection: T+1;0330, qdaily for 3 day
☑	Magnesium Level	Blood, Urgent, Unit collect, Collection: T;N, once
☑	Magnesium Level	Blood, AM Draw, Unit collect, Collection: T+1;0330, qdaily for 3 day
☑	Liver Panel (Bilirubin Total, ALP, Alb, ALT, GGT)	Blood, Urgent, Unit collect, Collection: T;N, once
☑	Phosphate Level	Blood, Urgent, Unit collect, Collection: T;N, once
☑	Phosphate Level	Blood, AM Draw, Unit collect, Collection: T+1;0330, qdaily for 3 day
☑	Arterial Plus Blood Gas	Arterial Blood, Urgent, Unit collect, Collection: T;N, once
Virology		
☑	Cytomegalovirus (CMV) Viral Load PHC	Blood, AM Draw, Collection: T+1;0330, qMon for 5 week
Diagnostic Tests		
☑	Electrocardiogram 12 Lead	Urgent, Reason: Other (please specify), CSICU Admission Unless V or AV paced
☑	XR Chest	Urgent, Reason: CSICU Admission, Transport: Portable, Portable Reason: Requires constant monitoring/observation
☑	Conditional Order - One Time	If/when chest tubes are removed, then RN to place an order for XR Chest post removal
Respiratory		
☑	Invasive Ventilation	Vt: 6 to 10 mL/kg, PEEP: 5 to 15 cm H2O, Titrate O2 to keep SpO2 92% or greater, RR below 25/min Notify treating provider if PEEP requirements go above 10 cm H2O. When hemodynamically stable, wean from mec...
Consults/Referrals		
☑	Physical Therapy Consult	Reason for Consult: CSICU Admission
☐	Dietitian Adult Consult	Reason for Consult: Other (see special instructions), Reason: CSICU Admission
CARD SURG Heart Transplant Post Operative (Multiphase), CSICU Admission, ICU Insulin Infusion - Critical Care (Module) (Planned Pending)		
Patient Care		
☑	Communication Order	ICU Insulin Infusion protocol
Continuous Infusions		
☑	insulin regular titratable infusion (1 unit/mL) in NS standard	titrate, IV, unit/h starting rate, 0 unit/h minimum rate, 20 unit/h maximum rate, titrate instructions: Titrate as per ins... Protocol for Patient NOT currently receiving insulin infusion Blood glucose: 4 mmol/L or LESS: administer 25 mL...
Medications		
☑	insulin regular (insulin regular - bolus dose from protocol)	bolus dose as per protocol, IV, as directed, PRN hyperglycemia, drug form: inj Protocol for Patient NOT currently receiving insulin infusion Blood glucose: 4 mmol/L or LESS: administer 25 mL...
☑	dextrose 50% (dextrose 50% inj)	12.5 g, IV, q15min, PRN hypoglycemia, drug form: inj For blood glucose 4 mmol/L or LESS: administer 12.5 g (25 mL) of dextrose 50% IV push and notify provider. Check ...

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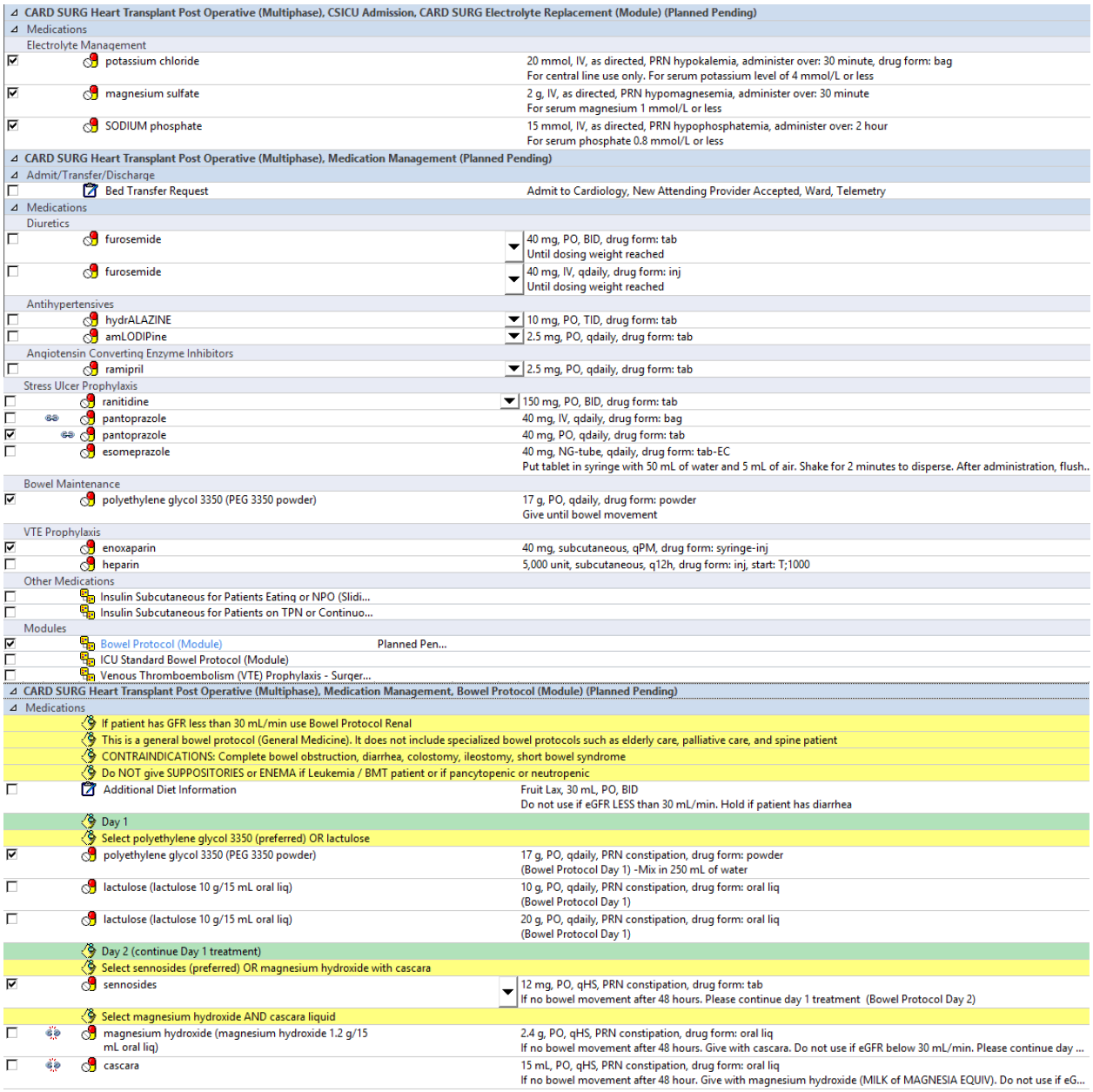

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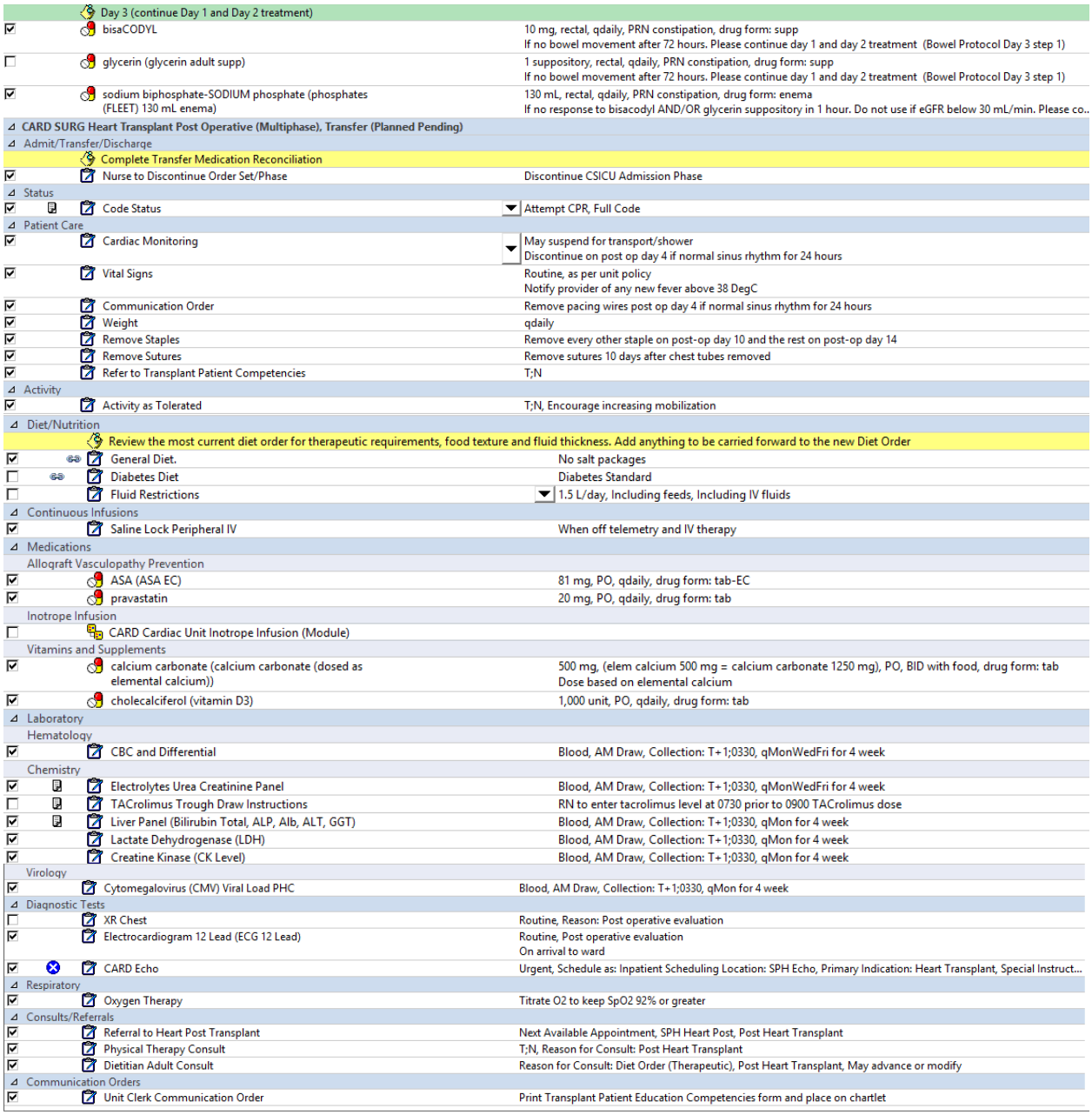

Day 3 (continue Day 1 and Day 2 treatment)	
☑ bisaCODYL	10 mg, rectal, qdaily, PRN constipation, drug form: supp If no bowel movement after 72 hours. Please continue day 1 and day 2 treatment (Bowel Protocol Day 3 step 1)
☐ glycerin (glycerin adult supp)	1 suppository, rectal, qdaily, PRN constipation, drug form: supp If no bowel movement after 72 hours. Please continue day 1 and day 2 treatment (Bowel Protocol Day 3 step 1)
☑ sodium biphosphate-SODIUM phosphate (phosphates (FLEET) 130 mL enema)	130 mL, rectal, qdaily, PRN constipation, drug form: enema If no response to bisacodyl AND/OR glycerin suppository in 1 hour. Do not use if eGFR below 30 mL/min. Please co..
CARD SURG Heart Transplant Post Operative (Multiphase), Transfer (Planned Pending)	
Admit/Transfer/Discharge	
Complete Transfer Medication Reconciliation	
☑ Nurse to Discontinue Order Set/Phase	Discontinue CSICU Admission Phase
Status	
☑ Code Status	Attempt CPR, Full Code
Patient Care	
☑ Cardiac Monitoring	May suspend for transport/shower Discontinue on post op day 4 if normal sinus rhythm for 24 hours
☑ Vital Signs	Routine, as per unit policy Notify provider of any new fever above 38 DegC
☑ Communication Order	Remove pacing wires post op day 4 if normal sinus rhythm for 24 hours
☑ Weight	qdaily
☑ Remove Staples	Remove every other staple on post-op day 10 and the rest on post-op day 14
☑ Remove Sutures	Remove sutures 10 days after chest tubes removed
☑ Refer to Transplant Patient Competencies	T;N
Activity	
☑ Activity as Tolerated	T;N, Encourage increasing mobilization
Diet/Nutrition	
Review the most current diet order for therapeutic requirements, food texture and fluid thickness. Add anything to be carried forward to the new Diet Order	
☑ General Diet.	No salt packages
☐ Diabetes Diet	Diabetes Standard
☐ Fluid Restrictions	1.5 L/day, Including feeds, Including IV fluids
Continuous Infusions	
☑ Saline Lock Peripheral IV	When off telemetry and IV therapy
Medications	
Allograft Vasculopathy Prevention	
☑ ASA (ASA EC)	81 mg, PO, qdaily, drug form: tab-EC
☑ pravastatin	20 mg, PO, qdaily, drug form: tab
Inotrope Infusion	
☐ CARD Cardiac Unit Inotrope Infusion (Module)	
Vitamins and Supplements	
☑ calcium carbonate (calcium carbonate (dosed as elemental calcium))	500 mg, (elem calcium 500 mg = calcium carbonate 1250 mg), PO, BID with food, drug form: tab Dose based on elemental calcium
☑ cholecalciferol (vitamin D3)	1,000 unit, PO, qdaily, drug form: tab
Laboratory	
Hematology	
☑ CBC and Differential	Blood, AM Draw, Collection: T+1;0330, qMonWedFri for 4 week
Chemistry	
☑ Electrolytes Urea Creatinine Panel	Blood, AM Draw, Collection: T+1;0330, qMonWedFri for 4 week
☐ TACrolimus Trough Draw Instructions	RN to enter tacrolimus level at 0730 prior to 0900 TACrolimus dose
☑ Liver Panel (Bilirubin Total, ALP, Alb, ALT, GGT)	Blood, AM Draw, Collection: T+1;0330, qMon for 4 week
☑ Lactate Dehydrogenase (LDH)	Blood, AM Draw, Collection: T+1;0330, qMon for 4 week
☑ Creatine Kinase (CK Level)	Blood, AM Draw, Collection: T+1;0330, qMon for 4 week
Virology	
☑ Cytomegalovirus (CMV) Viral Load PHC	Blood, AM Draw, Collection: T+1;0330, qMon for 4 week
Diagnostic Tests	
☐ XR Chest	Routine, Reason: Post operative evaluation
☑ Electrocardiogram 12 Lead (ECG 12 Lead)	Routine, Post operative evaluation On arrival to ward
☑ CARD Echo	Urgent, Schedule as: Inpatient Scheduling Location: SPH Echo, Primary Indication: Heart Transplant, Special Instruct...
Respiratory	
☑ Oxygen Therapy	Titrate O2 to keep SpO2 92% or greater
Consults/Referrals	
☑ Referral to Heart Post Transplant	Next Available Appointment, SPH Heart Post, Post Heart Transplant
☑ Physical Therapy Consult	T;N, Reason for Consult: Post Heart Transplant
☑ Dietitian Adult Consult	Reason for Consult: Diet Order (Therapeutic), Post Heart Transplant, May advance or modify
Communication Orders	
☑ Unit Clerk Communication Order	Print Transplant Patient Education Competencies form and place on chartlet

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5.3 Immunosuppression Intra- and Immediately Post-Operatively

Immunosuppressive regimen immediately prior to transplant and intra-operatively can be found in the Heart Transplant Admission PPO.

Selection of induction agent depends on patients cPRA level pre-operatively or whether they have donor specific antigens (DSA) identified. The table below outlines the current process.

VIRTUAL CROSSMATCH			
NEGATIVE	**POSITIVE**		
Usual induction with Basiliximab on Day 0 and Day 4	Induction with rATG Monitor DSA as per protocol	**NEGATIVE**	**FLOW CROSSMATCH**
Discuss with Immunologist to determine whether the result is clinically relevant or not. May require further testing. If not a clinically relevant result, usual induction with Basiliximab on Day 0 and Day 4 If relevant, induction with rATG as per post-transplant order set.	Commence desensitization therapy as per protocol including rATG induction.	**POSITIVE**	

5.3.1 ***Basiliximab Induction***

- All patients who have cPRA <20% and negative virtual and/or flow crossmatch will receive Basiliximab induction as order per the TRANSPLANT HEART Immunosupression (Multiphase), Pre Operative Phase

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5.3.2 *Antithymocyte Globulin (rATG) Induction*

All patients with cPRA ≥ 20% OR high-risk as outlined above will receive rATG induction as per TRANSPLANT HEART Antithymocyte Globulin Rabbit (Multiphase) – cardiologist to enter orders for "Day 1" as induction therapy (and leave in planned state, to be activated by bedside CSICU nurse)

In cases where there is concern over higher risk of infection, (e.g. chronic VAD driveline infection) the cardiologist may consider using Basilixamab versus rATG. Similarly in patients who are Epstein - Barr virus donor positive and recipient negative, rATG should be avoided.

Post-Heart Transplant Desensitization Therapy

- rATG induction
- Other immunosuppression as per standard protocol/powerplan
- Refer to Antibody Mediated Rejection treatment section
- Discuss Plan with Renal Team – in general:
    - PLEX every day x 5 runs
    - PLEX every second day x 5 runs
    - IVIG 0.1g/kg after each PLEX
    - Discuss timing of Rituximab at team rounds. Only necessary if DSA continues to be positive

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5.4 Post-Transplant Recovery

5.4.1 *Early Post-Operative Phase*

Close surveillance by the CSICU team and early intervention are the key. Post-operative Powerplans address prophylactic and preventative measures used to minimize complications.

Daily rounds by the Heart Transplant team occur in collaboration with the CSICU and other relevant teams.

5.4.2 *Combined Heart-Kidney Transplant*

In the case of combined heart and kidney transplantation, the Renal Transplant Team controls the immunosuppressive regimen.

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5.5 Transfer to 5A (post-operative ward)

Most patients can be transferred to the ward within 2-5 days. Once hemodynamically stable and no longer requiring critical care surveillance, Heart Transplant Transfer Orders (below) are completed.

5.5.1 *Transfer orders*

Refer to CARD SURG Heart Transplant Post-Operative (Multiphase), Transfer

5.5.2 *Most Responsible Physician on 5A*

The most responsible physician is now the Heart Failure/Transplant Cardiologist. The patient is seen daily by a member of the Transplant Cardiology team.

5.5.3 *Infection Control*

Where possible, patients are nursed in a private room. This is primarily to enable more undisturbed time for rest and patient teaching. Standard infection control measures are used. Isolation procedures are only implemented with a specific order (e.g. severe neutropenia).

5.5.4 *Immunosuppression*

Triple therapy primarily with tacrolimus, mycophenolate mofetil and prednisone are initiated in the majority of patients. This is tailored according to clinical condition. The Heart Transplant Transfer Orders outline the immunosuppressive regimen used.

In the case of heart-kidney transplant recipients, the Renal Transplant Team controls the immunosuppressive regimen.

See BC Transplant Clinical Guidelines for Transplant Medications for the current accepted target blood levels for heart transplant recipients. This manual also contains detailed information about immunosuppressant medications.

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5.5.5 *Patient Education*

Patient education is initiated as soon as feasible. The program uses a competency-based teaching program that is performed by all experienced nurses and allied health team members on 5A.

The post-transplant Patient Educator sees the patient and family to ensure they understand what they have learned and to provide outpatient information.

The Dietitian, Social Worker and Physiotherapist spend time with the patient and family to provide information around going home. The Psychologist is also available if required.

Patients learn to self-medicate while in the hospital and either the patient or a family member must show competence before discharge.

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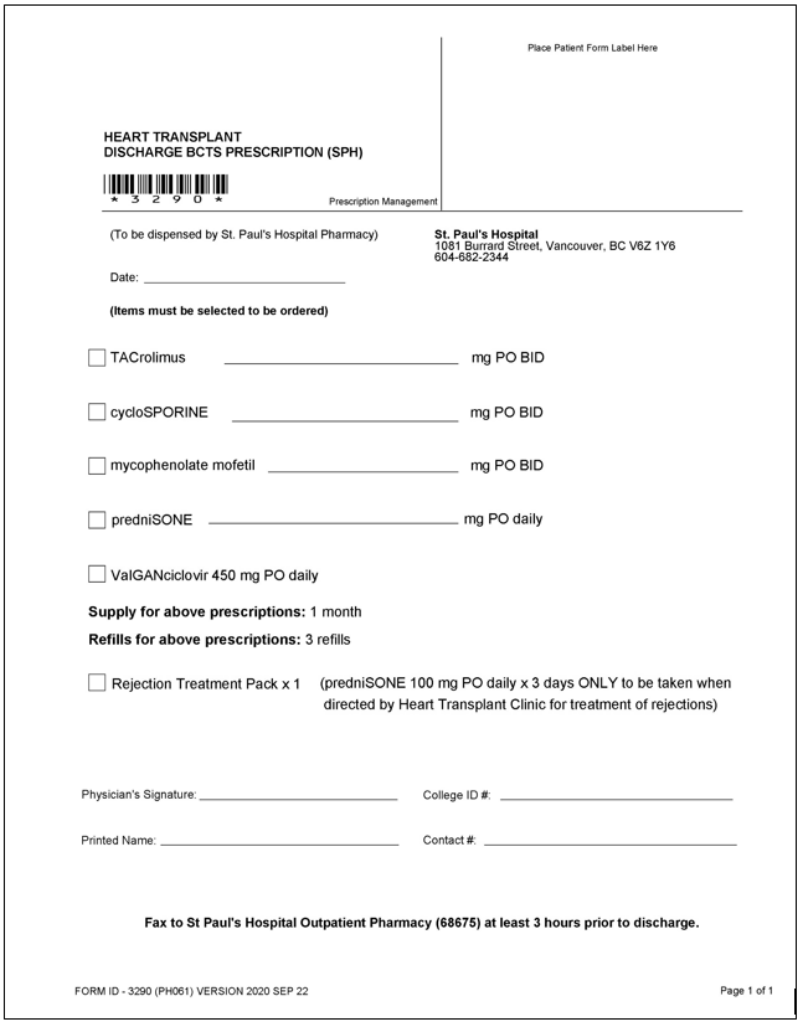
5.6 Discharge

Discharge from hospital occurs when the patient has completed education training and has demonstrated understanding and/or competence with self-medication, self-reporting of symptoms and other aspects of self-care. Patients are usually discharged within 10-14 days of surgery.

5.6.1 *Discharge Prescriptions*

Discharge medications are carefully reconciled by the pharmacist and cardiologist prior to prescriptions generated using the Cerner EMR. Transplant specific medications as listed below are prescribed and organized by the SPH Ambulatory Pharmacy and will be supplied to the patient prior to discharge. Ongoing refill of these transplant specific medications are done through SPH ambulatory pharmacy or BCT specified pharmacies in the community.



Place Patient Form Label Here

HEART TRANSPLANT
DISCHARGE BCTS PRESCRIPTION (SPH)

* 3 2 9 0 *

Prescription Management

(To be dispensed by St. Paul's Hospital Pharmacy)

St. Paul's Hospital
1081 Burrard Street, Vancouver, BC V6Z 1Y6
604-682-2344

Date: _____

(Items must be selected to be ordered)

☐ TACrolimus _____ mg PO BID

☐ cycloSPORINE _____ mg PO BID

☐ mycophenolate mofetil _____ mg PO BID

☐ predniSONE _____ mg PO daily

☐ ValGANciclovir 450 mg PO daily

Supply for above prescriptions: 1 month

Refills for above prescriptions: 3 refills

☐ Rejection Treatment Pack x 1 (predniSONE 100 mg PO daily x 3 days ONLY to be taken when directed by Heart Transplant Clinic for treatment of rejections)

Physician's Signature: _____ College ID #: _____

Printed Name: _____ Contact #: _____

Fax to St Paul's Hospital Outpatient Pharmacy (68675) at least 3 hours prior to discharge.

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6 Long-Term

6.1 Follow-up

Regular and frequent early follow-up ensures close surveillance as well as ongoing education regarding medications, diet and exercise.

Follow-up plans are documented on a detailed patient biography in Cerner EMR using the *Post Transplant Assessment PowerForm.* Below is a summary of the approximate surveillance schedule for post heart transplant patients in the first year:

	Week 2	Week 3	Week 4	Week 6	Week 8	Week 10	Month 3	Month 4	Month 4.5	Month 5.5	Month 7.5	Month 9	1 Year	Visits every 6 months up to 5 years	Annual Visit testing
Biopsy	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑	☑		
Typical Prednisone dose	17.5mg	15mg	12.5mg	10mg	7.5mg	5mg	2.5mg	off							
Full Bloodwork													☑		☑
Mini Bloodwork	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑		☑	Every 3 months	☑	
Chest Xray													☑		☑
ECG													☑		☑
Angiogram (if GFR <30 review with MD & consider DSE)					☑								☑		2 mos, 1, 2 5, 10 years, then every 5 years after that
Echo													☑		☑

Full bloodwork CBC, diff, plats, lytes, BUN, Creat, LFTs, alb tot/dir bili, Ca phos, Mg, HgbA1C (for diabetics), TSH, lipis, CyA or Tac levels

Mini Bloodowrk lytes, BUN, Creat, CyA or Tac level

CAVEAT While patient on Prednisone for immune suppression, the time points are as a guide only & time points are determined by prednisone dose

If patient has had mulitple rejection episodes, the time periods may change. Check "Trasplant Biography" Powerform for rejection history

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6.2 Immunological Surveillance Post-Transplant

A new finding of Donor Specific Antibodies with a mean fluorescence intensity (MFI) over 5,000 is considered to require treatment.

	DSA	**Echo**	**Endomyocardial Biopsy**
DSA present and/or Virtual/Flow XM POSITIVE	Week 1 Month 1, 3, 6 Year 1 2, 3, 4, 5 Thereafter if indicated	Week 1 Month 3, 6, 9, 12 Annually and if indicated	As per routine (specify C4D staining required)
Post AMR Treatment	Week 1, 4 Month 3, 6, 9 Year 1, 2, 3, 4, 5 Thereafter if indicated	Month 3, 6, 9, 12 Annually and if indicated	If < 1 year post transplant, Bx as per routine Otherwise, month 1, 3, 6, 12 post-treatment (specify C4D staining required)
No DSA present **or** **Virtual/Flow XM NEGATIVE but cPRA>80%**	Month 1 Year 1 If DSA found, discuss plan with cardiologist	As per routine	As per routine
DSA found for any reason other than above	If DSA found, repeat in three months Discuss plan with cardiologist	Echo x 1 and if dysfunction follow AMR pathway	As per routine

DSA = Donor Specific Antibody; XM = Crossmatch; cPRA = Calculated Panel Reactive Antibody; AMR = Antibody mediated rejection; Bx = Biopsy

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6.3 Long-term care - Approach

The heart transplant clinic aims to improve long-term survival of heart transplant recipients under their care by providing support through:

- Self-management education and counseling
- Heart Transplant related follow-up
- Providing support to primary care providers
- Providing an efficient and safe service

6.3.1 *Primary Care Involvement*

Establish a partnership with Primary Care Providers (PCP), recognizing that active involvement in patient management with clear communication is a key factor in influencing outcomes.

Below is an example letter that is sent to the patient's PCP when they first go home.

Dear Dr,

Please find attached a copy of the discharge summary for x.

Now that x has been discharged, we would like to outline what you can expect from our clinic in relation to care of your patient. We would like to enter into a partnership with you.

Summary of Heart Transplant Clinic visit schedule

Testing	1 month	Up to 6 months	6 months to 1 Year	Annually
Heart Biopsy	Weekly until 1 month	Second weekly until 5 months	Then month 6, 8 and 1 year	After 1 year, only if indicated
Renal function and immunosuppressive levels	As above	As above	As above	As above
Coronary artery disease screening tests				Yearly

Our commitment – We will:

- Manage the patient's immunosuppression for life.
- Continue to manage specific medications **that we prescribe.**
- Manage lipids and hypertension.
- Order cardiac diagnostic procedures
- Refer to cardiac rehab
- Send you a summary sheet of each clinic visit with our plans.
- Send a yearly summary letter
- Phone you if we have any concerns.
- Send you a discharge summary if the patient has been hospitalized here.

We ask that you:

- Manage other non-cardiac chronic conditions such as diabetes
- Keep the program here informed of major changes to the patient's condition
  - Malignancies
  - Infections
  - Surgery
  - Major morbidities
  - Death
- Administer yearly flu shots
- Organize routine malignancy screening particularly
  - Bowel
  - Breast
  - Gynae
  - Skin (at least 6 monthly)

We look forward to managing this patient with you. We would appreciate feedback if you have any so that we can continue to provide consistent care with you.

Who to call

Business hours	604-806-8374
After hours local	604-877-2240
After hours toll-free	1-800-663-6189

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6.3.2 *Readmissions to Hospital*

6.3.2.1 Heart Transplant and Immunosuppression related issues

Patients readmitted to St. Paul's hospital where possible, will be cared for directly by the Heart Transplant Cardiologist in 5A. Recognizing that there may be logistical or medical issues that prevent this, the Heart Transplant Cardiologist should be actively involved in their management plan.

6.3.2.2 Non-heart transplant related issues

It is the role of the Heart Transplant Cardiologist to provide advice in a consultative manner around immunosuppression and cardiac medications. Regular updates will be sought by the team members in order to provide input when necessary.

6.4 Immunosuppression

See BCT Pharmacy Manual for detailed information about suggested dosing and blood levels

6.4.1 *Tacrolimus*

Time Post-Transplant (Months)	**Tacrolimus* Trough Blood Concentration (ng/mL)** **12 hours Post-Dose**
Less than 3	9 to 12
3 to 6	8 to 9
6 to 12	6 to 8
Greater than 12	4 to 8

6.4.2 *Cyclosporine*

***Time Post Transplant** (Months)*	***Cyclosporine Trough Concentration (ng/mL)***
0 to 3 months	300 to 350
3-6 months	200 to 300
6 to 12 months	150 to 250
Greater than 12 months	100 to 150

***Time Post Transplant** (Months)*	***Cyclosporine C_2 Concentration (ng/mL)***
Less than 1 month	1200 to 1400
2 to 3 months	1000 to 1200
4 to 5 months	800 to 1100
6 to 12 months	700 to 1000
12 to 24 months	600 to 800

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Greater than 24 months	400 to 600
When eGFR is less than 45mL/min/1.73m²	
Less than 1 month	1000 to 1200
2 to 3 months	800 to 1100
4 to 5 months	700 to 900
6 to 12 months	600 to 800
12 to 24 months	400 to 600
Greater than 24 months	300 to 400

6.4.3 *Sirolimus*

Time Post Transplant (Months)	**Sirolimus Trough Concentration (ng/mL)*** (When sirolimus is used with tacrolimus or cyclosporine +/- mycophenolic acid and steroids)	**Sirolimus Trough Concentration (ng/mL)*** (When sirolimus is used as a single agent +/- steroids)
All	4 to 8	8 to 12

6.4.4 *Mycophenolate*

Patient Status	**Mycophenolic Acid* Trough Blood Concentrations (mg/L) 12 hours Post Dose**
Stable and no transplant rejection	1.7 to 4
Has transplant rejection	2.5 to 4
Has MPA side effects and is stable	1.7

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7.1 Cellular Rejection Treatment

Acute cellular rejection monitoring is performed using the endomyocardial biopsy (EMBx). The first one is usually performed prior to discharge at around 10 – 14 days post-operatively. EMBx are performed on Wednesday mornings and prn for emergencies. The standard EMBx surveillance protocol is outlined earlier.

An endomyocardial biopsy result of ISHLT 2R or above is considered significant enough to treat actively. In general, the following schedule is followed at the discretion of the Heart Transplant Cardiologist. Treatment protocol is as follows:

Protocol for Treatment of Acute Rejection – St Paul's Hospital

As much as is possible, patients with cardiac rejection will be treated on an outpatient basis. The severity of the rejection and accompanying signs and symptoms such as low BP, shortness of breath, arrhythmia, fever, decreased exercise capacity may require inpatient treatment.

ISHLT Grade of Rejection	*< 3 months post-Tx*	*> 3 months post-transplant*	*Hemodynamic Compromise*
Grade 0R	Nil	Nil	Assessed individually
Grade 1R	Nil	Nil	1g IV Solumedrol x 3 days Admit to CCU • Echo • Monitor • +/- inotropes • Consider ATG
Grade 2R	100mg Prednisone po x 3 days	100mg Prednisone po x 3 days	1g IV Solumedrol x 3 days Admit to CCU • Echo • Monitor • +/- inotropes • Consider ATG
Grade 3R	1g IV Solumedrol x 3 days Admit 5a • Consider ATG • Optimize immunosuppression	1g IV Solumedrol x 3 days Admit 5a • Echo • Monitor • +/- inotropes • Consider ATG • Optimize immunosuppression	1g IV Solumedrol x 3 days Admit to CCU • Echo • Monitor • +/- inotropes • Consider ATG • Optimize immunosuppression

Nursing Considerations:

- Close monitoring of hemodynamic parameters such as BP, heart rate, rhythm and symptoms of pump failure such as fluid retention and shortness of breath should be carefully monitored and reported immediately.
- Prednisone is discontinued while the patient is receiving Solumedrol.
- If the patient was a CMV mismatch, or if they required Acyclovir post transplant due to HSV prophylaxis, they will need prophylactic antiviral treatment reinitiated as per infection protocol.
- Septra will need to be reinitiated as per infection protocol
- If the patient had steroid induced Diabetes in the immediate post-transplant period, this will likely re-occur. Check with the physician to see if he wants to order any therapy.

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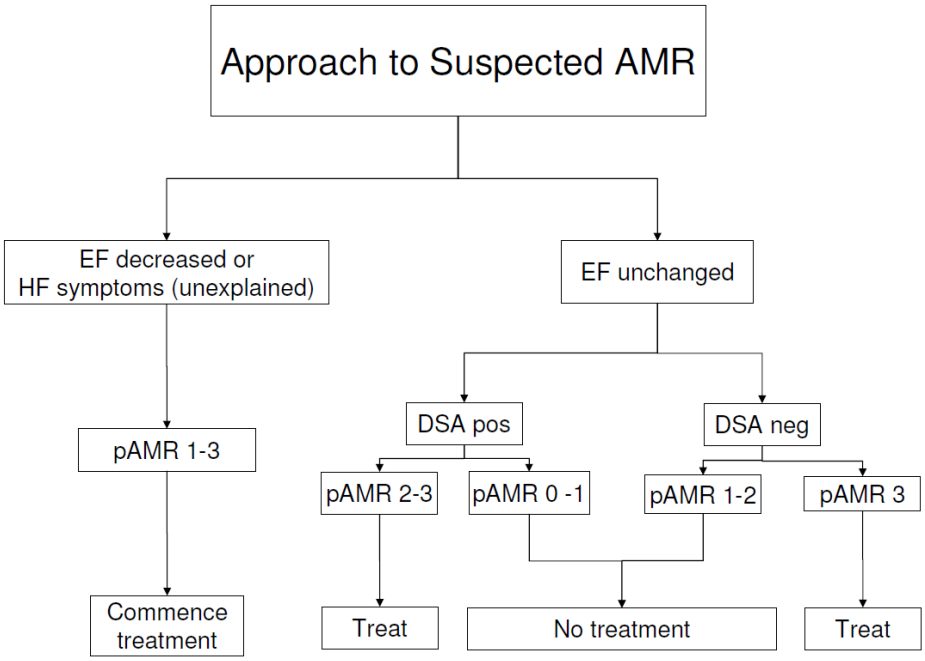
7.2 Antibody Mediated Rejection

Guideline for approach to AMR management is per algorithm below. However, each case is individualized and plan/treatment is brought to multidisciplinary team for discussion. Patient's symptomology, graft function, transplant date, infection and rejection history is taken into careful consideration.



Reference for pathology antibody-mediate rejection category per ISHLT:

Category	Description
pAMR 0: Negative for pathological AMR	Both histological and immunopathologic studies are negative
pAMR 1 (H+): Histopathologic AMR alone	Histological findings present and immunopathologic findings negative
pAMR1 (I+): Immunopathologic AMR alone	Histological findings negative and immunopathologic findings positive
pAMR 2: Pathological AMR	Both histological and immunopathologic findings are present
pAMR 3: Severe pathological AMR	Severe AMR with histopathologic findings of interstitial hemorrhage, capillary fragmentation, mixed inflammatory infiltrates, endothelial cell pyknosis and/or karyorrhexis, and marked edema

AMR indicates antibody-mediated rejection; and pAMR, pathological antibody-mediated rejection category.
Modified from Berry et al[3] with permission from the International Society for Heart and Lung Transplantation. Copyright © 2011, International Society for Heart and Lung Transplantation.

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7.2.1 ***Antibody Mediated Rejection (AMR) Treatment***

TRANASPLANT HEART Antibody Mediated Rejection (AMR) (Multiphase), AMR Initiation

(Example below only shows Plex 1, additional day orders available on the PowerPlan)

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TRANSPLANT HEART Antibody Mediated Rejection (AMR) (Multiphase), AMR Initiation (Planned Pending)		
Admit/Transfer/Discharge		
48 hours prior to commencing PLEX treatment, provider to communicate plan via AMR Planning and Summary Flowsheet		
Provider to consult Nephrology to set up PLEX every second day for 5 runs		
Medications		
To order rituximab administration, select TRANSPLANT SERVICES Rituximab Infusion for Biopsy Proven Antibody Mediated Transplant Rejection PowerPlan. If not possible to give 48 hours before, administer immediately after first PLEX		
BC Transplant Antibody Mediated Rejection (AMR) Cardiac Protocol		
☐ TRANSPLANT HEART KIDNEY Rituximab for Biopsy Pr...		
☐ Hypersensitivity / Anaphylaxis Treatment (Module)		
☑ methylPREDNISolone (methylPREDNISolone sodium s...	500 mg, IV, qdaily, order duration: 3 doses or times, drug form: inj	
☑ sulfamethoxazole-trimethoprim (cotrimoxazole 400 mg-80 mg tab (dosed as trimethoprim))	80 mg, (trimethoprim 80 mg = 1 tab), PO, qdaily, drug form: tab SEPTRA EQUIV. Dose based on trimethoprim	
Consider providing patient with prescription for cotrimoxazole-trimethoprim as patients are on this treatment for 3 to 6 months		
If patient CMV positive, Donor positive/negative or if patient is CMV negative/ donor positive, select valGANciclovir		
☐ valGANciclovir	900 mg, PO, qdaily with food, order duration: 4 week, drug form: tab	
Laboratory		
Order Cytotoxic Antibody Screen if not done in the last month		
☐ HLA Donor Specific Antibody	Blood, Routine, Collection: T;N, once	
If patient CMV positive, Donor positive/negative or if patient is CMV negative/ donor positive, select valGANciclovir		
☐ Cytomegalovirus (CMV) Viral Load PHC	Blood, Routine, Collection: T;N, qweek 8 week	
TRANSPLANT HEART Antibody Mediated Rejection (AMR) (Multiphase), AMR Orders for PLEX 1 (Planned Pending)		
Admit/Transfer/Discharge		
Nurse to initiate this phase of the PowerPlan when patient is receiving PLEX 1		
Medications		
To order rituximab administration, select TRANSPLANT SERVICES Rituximab Infusion for Biopsy Proven Antibody Mediated Transplant Rejection PowerPlan. If not possible to give 48 hours before, administer immediately after first PLEX		
☐ TRANSPLANT HEART KIDNEY Rituximab for Biopsy Pr...		
☐ Hypersensitivity / Anaphylaxis Treatment (Module)		
Blood Products		
Patient to receive 0.1 g/kg IV after each PLEX run		
☑ TM IVIG Inpatient (Module)	Planned Pen...	
TRANSPLANT HEART Antibody Mediated Rejection (AMR) (Multiphase), AMR Orders for PLEX 1, TM IVIG Inpatient (Module) (Planned Pending)		
Medications		
☑ sodium chloride 0.9% (sodium chloride 0.9% (NS) bolus)	50 mL, IV, as directed, PRN other (see comment), order duration: 1 doses or times, drug form: bag PRN Reason: routine line flush following the completion of blood product transfusion	
Blood Products		
Approved medical conditions and prerequisites		
Consultation with site Pathologist is available - contact TM		
Order Group and Screen if patient has no ABO/Rh on record		
Refer to Adjusted Body Weight Calculator to calculate ideal & dosing weight		
PRIMARY AND SECONDARY IMMUNE DEFICIENCY: Dose is 0.4 g/kg every 3-4 weeks		
Pre-infusion IgG level required every 6 months		
Monitor trough levels to maintain low normal range		
☐ Baseline IgG Result		
Steady state IgG concentrations are achieved after 4-5 IVIG doses given monthly, as the same dose/interval. Obtain a trough level and adjust the dose accordingly		
☐ IgG	Blood, Routine, Collection: T;N, once	
☐ Administer - IV Immune Globulin Transfusion	Routine, g, once, IV, Immunology: Primary Immune Deficiency, T;N Informed consent must be present on patient record. Transfuse dose as issued by TM. Dose may be adjusted based on ...	
FETAL NEONATAL ALLOIMMUNE THROMBOCYTOPENIA (F/NAIT): Dose is 1 g/kg every week		
☐ Administer - IV Immune Globulin Transfusion	Routine, g, once, IV, Hem: Fetal Neonate Alloimmune Thrombocyt, T;N Informed consent must be present on patient record. Transfuse dose as issued by TM. Dose may be adjusted based on ...	
Acute IDIOPATHIC THROMBOCYTOPENIC PURPURA (ITP): One dose of 1 g/kg, with a second dose within 48 hours if the platelet count has not increased to above 20 x 10^9/L		
☐ Administer - IV Immune Globulin Transfusion	Routine, g, once, IV, Hem: Adult ITP, T;N Informed consent must be present on patient record. Transfuse dose as issued by TM. Dose may be adjusted based on ...	
Chronic IDIOPATHIC THROMBOCYTOPENIC PURPURA (ITP) post-splenectomy: Dose is 0.5 to 1 g/kg every 4 weeks		
Gradually decrease to minimum effective dose at maximum intervals to maintain safe platelet levels		
Re-evaluate every 3 to 6 months		
Consider alternative therapies for patients who do not receive a durable response for a minimum of 2 to 3 weeks		
☐ Administer - IV Immune Globulin Transfusion	Routine, g, once, IV, Hem: Adult ITP, T;N Informed consent must be present on patient record. Transfuse dose as issued by TM. Dose may be adjusted based on ...	
GUILLAIN-BARRE SYNDROME (GBS), incl. Miller-Fisher syndrome and other variants: Dose is 2 g/kg over 2-5 days.		
☐ Administer - IV Immune Globulin Transfusion	Routine, g, qdaily, for 2 doses or times IV, Neuro:GBS, MFS, panautonomic polyneuropa, T;N Informed consent must be present on patient record. Transfuse dose as issued by TM. Dose may be adjusted based on ...	
CHRONIC INFLAMMATORY DEMYELINATING POLYNEUROPATHY (CIDP): Initial dose is 2 g/kg over 2-5 days. Maintenance therapy: lowest dose to maintain clinical efficiency, 0.5-1 g/kg every 4-8 weeks		
☐ Administer - IV Immune Globulin Transfusion	Routine, g, qdaily, for 2 doses or times IV, Neuro: CIDP, including MADSAM variant, T;N Informed consent must be present on patient record. Transfuse dose as issued by TM. Dose may be adjusted based on ...	
MULTIFOCAL MOTOR NEUROPATHY (MMN): Initial dose is 2 g/kg over 2-5 days. Maintenance therapy: lowest dose to maintain clinical efficiency, 0.5-1 g/kg every 3-6 weeks		
☐ Administer - IV Immune Globulin Transfusion	Routine, g, qdaily, for 2 doses or times IV, Neuro: Multifocal Motor Neuropathy, T;N Informed consent must be present on patient record. Transfuse dose as issued by TM. Dose may be adjusted based on ...	
MYASTHENIA GRAVIS (MG): Initial dose is 2 g/kg over 2-5 days. If short-term maintenance therapy is required, 0.5-1 g/kg every 3-4 weeks		
☐ Administer - IV Immune Globulin Transfusion	Routine, g, qdaily, for 2 doses or times IV, Neuro: Myasthenia gravis, T;N Informed consent must be present on patient record. Transfuse dose as issued by TM. Dose may be adjusted based on ...	
PEMPHIGUS VULGARIS: Dose is 2 g/kg over 5 days		
☐ Administer - IV Immune Globulin Transfusion	Routine, g, qdaily, for 5 doses or times IV, Dermatology: Pemphigus vulgaris, T;N Informed consent must be present on patient record. Transfuse dose as issued by TM. Dose may be adjusted based on ...	

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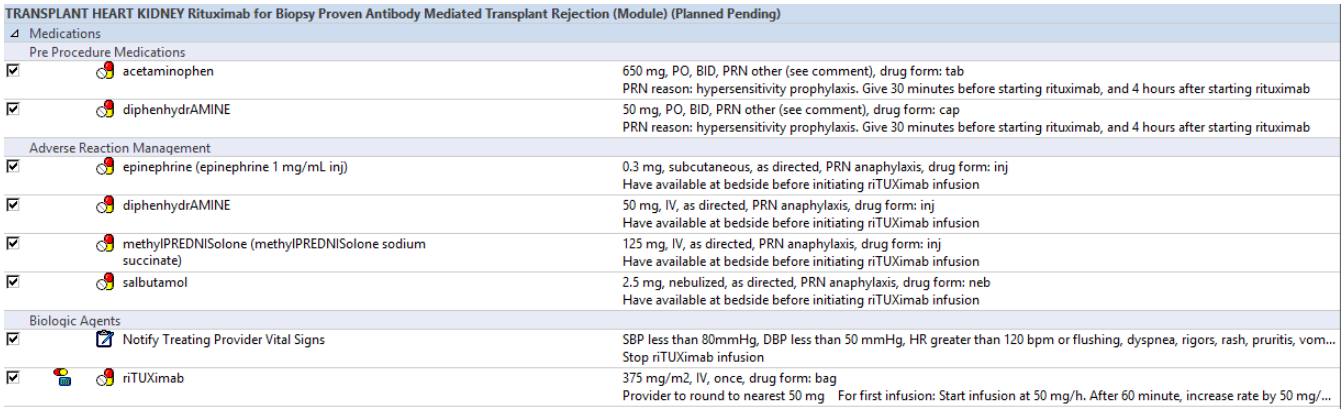
7.2.2 *Transplant HEART KIDNEY Rituximab for Biopsy Proven AMR Rejection (Module)*



7.2.2.1 After Initial AMR Treatment

If 50% drop in DSA MFI not seen following treatment, a second round of Section 5.2 can be considered.

Additional Rituximab dosing should be considered if no drop in CD 19/20 result.

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If second round does not demonstrate a 50% drop in DSA MFI, discussion with the team should occur, with creation of an individualized treatment plan that should be documented on the patient biography outlining frequency of surveillance and what action is required.

In the long term, for all AMR patients, once initial round is completed, continue IVIG at 1g/kg which may be divided into 2 doses over 2 days if necessary monthly x 3. This is to be arranged via Medical Short Stay.

7.3 Infection Prophylaxis

The program refers to the Clinical Guidelines for Transplant Medications for directions towards post-transplant infection prophylaxis

After transplantation, and depending on donor/recipient virology history status, all patients are placed on prophylaxis for:

- Cytomegalovirus
- Herpes Simplex Virus
- Pneumocystis jiroveci Pneumonia
- Candidiasis
- Toxoplasmosis

7.3.1 *Cytomegalovirus (CMV)*

In addition to following the CMV Prophylaxis and Treatment Regimen for Heart Transplant Recipients in the BCT Medication document, depending on the induction agent given, the type of prophylaxis would be adjusted to further lower the chance of CMV reactivation post-transplant.

CMV Status		
Donor	**Recipient**	**Prophylaxis**
Negative	Negative	No prophylaxis
Positive	Negative	Val**GAN**ciclovir 900mg PO daily for 6 months*
Any	Positive	*Basilixamab induction:* No prophylaxis
		rATG induction: Val**GAN**ciclovir 900mg PO daily* for 3 months (or Ganciclovir 5mg/kg/dose IV q24 when cannot tolerate PO dose).

*Dose adjust per renal function

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7.3.2 *Herpes Simplex Virus (HSV)*

HSV status			
Donor	**Recipient**	**Prophylaxis** **for 3 months post-transplant**	**Treatment**
Any or not available	Any	Val**A**cyclovir 500mg BID* *Patients on valganciclovir or ganciclovir (for CMV prophylaxis) are covered for HSV – no need to prophylax with Val**A**cyclovir* If any treatment for rejection is administered, consider re-initiation of HSV prophylaxis for 2-4 weeks	Val**A**cyclovir 1g TID (duration dependent on infection severity)

*Dose adjust per renal function

7.3.3 *Pneumocystic jiroveci Pneumonia (PJP)*

PJP PROPHYLAXIS
Continue until prednisone weaned post-transplant *Reinitiate for 2-4 weeks if treatment for rejection initiated* *Continue for as long as a patient is on prednisone any dose*
DRUG OF CHOICE Trimethoprim-sulfamethoxazole (Septra ®) one single strength tablet daily*
ALTERNATIVES IF SULFA ALLERGIC • Desensitization to trimethoprim-sulfamethoxazole is preferred if possible • Dapsone 100mg po every Mon/Wed/Fri, until off Prednisone. Requires testing for G6PD prior to initiation • Aerosolized pentamidine 300mg once monthly via Respirigard Nebulizer (requires respiratory therapist), until off Prednisone • Atovaquone 1,500mg po daily. This is the last choice given cost

*Dose adjust per renal function

7.3.4 *Toxoplasmosis*

TOXOPLASMOSIS PROPHYLAXIS			
TOXOPLASMA STATUS			
DONOR	**RECIPIENT**	**PROPHYLAXIS**	**DURATION**
Negative	Negative	Per PJP prophylaxis	Until prednisone discontinued. Reinstitute prophylaxis (per PJP dose) if treated for rejection

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Positive	Negative	Trimethoprim-sulfamethoxazole one double strength tablet daily*	Minimum 12 months – consult Transplant ID as outpatient
Any	Positive	Per PJP prophylaxis	Until prednisone discontinued. Reinstitute prophylaxis (per PJP dose) if treated for rejection

*Dose adjust per renal function

7.3.5 *Candidiasis*

CANDIDIASIS PROPHYLAXIS
ALL PATIENTS until discharge (longer if indicated)
Nystatin 500,000 units/ml, swish and swallow 1mL QID post op during hospital stay.

7.3.6 *Hepatitis B*

Organ	Donor HBV Status	Recipient HBV Status	Anti-Viral Therapy Post Tx
Heart	HBV core **positive** **AND** Hep B DNA **detectable**	Any hepatitis B status	Refer to Transplant ID to determine treatment
	HBV core **positive** **AND** Hep B DNA **undetectable**	HBV core **negative** regardless of HBV surface antibody status	Monitor for HBV reactivation* No prophylaxis
	HBV core **negative**	HBV core **positive**	Monitor for HBV reactivation* May consider a referral to Transplant ID or hepatologist to monitor for Hep B reactivation

*Monitor for HBV reactivation at every 3 months for one year then every 6 months. Tests to be done: hepatitis B surface antigen, hepatitis B core antibody, hepatitis B surface antibody and hepatitis B DNA

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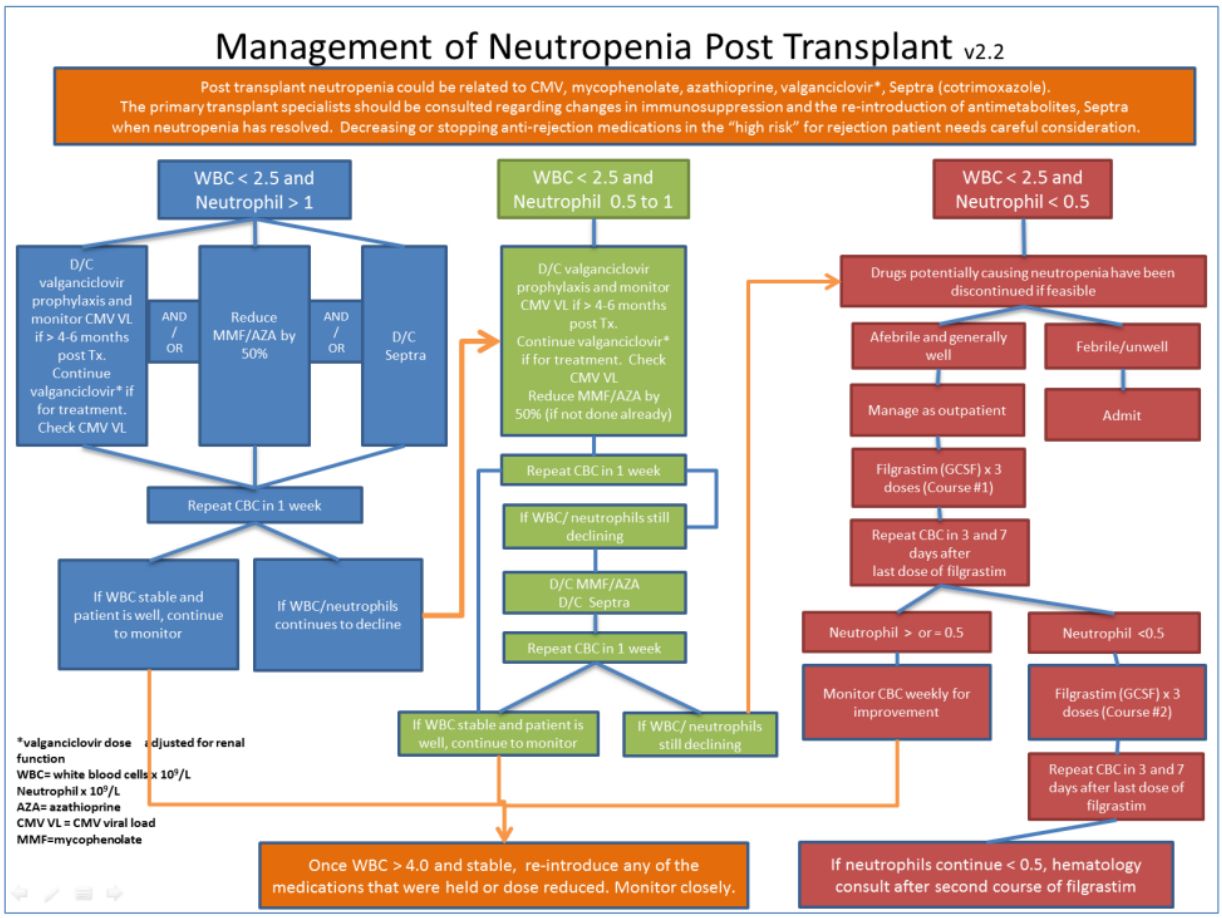
7.4 Neutropenia/Leukopenia

Refer to Clinical Guidelines for Transplant Medications page 35-38 for details for treatment. The following is the algorithm that is followed to determine treatment:



7.5 Other Post-Transplant Medications

In general, the following medication changes apply, depending on the individual's situation.

- Pantoprazole is generally discontinued when prednisone is discontinued.
- Calcium decreases or is discontinued (depending on dietary intake) when prednisone is discontinued. This will be determined with the dietitian if needed.
- Vitamin D supplements are continued for life.
- Statin/Aspirin/Antiplatelet medications are continued for life unless contraindicated (for prevention of Cardiac Allograft Vasculopathy)
- Antihypertensive and other cardiac medications are provided as indicated.

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7.5.1 *Graft Vasculopathy Surveillance and Treatment*

Providence HEALTH CARE How you want to be treated.	**Surveillance for Cardiac Allograft Vasculopathy (CAV)**	**Created.:** June 2016
		Revised: October 2022

1. Purpose

To outline surveillance for CAV

2. Scope

Adult heart transplant recipients

3. Responsibilities

Cardiologist

- Ensure clear plan exists for each patient
- Individualize plan according to clinical situation
- Initiate appropriate treatment if necessary

Post Transplant Clinic Nurse

- Ensure up to date plan and summary record is updated in the "Post Transplant Assessment" Powerform, specifically in the following sections:
  - Transplant Patient Biography – Overall Care Plan
  - Surveillance Log – Coronary Artery Vasculopathy

Post Transplant Clinic Clerk

- Ensure tests are booked in accordance with plan
- Ensure PROMIS is kept up to date

4. Procedure

DONOR SURVEILLANCE

Donor angiograms should be sought in the following situations

Males ≥40 years

High risk donors

- eg. Females with risk factors, cocaine use, etc

RECIPIENT SURVEILLANCE

Discussion at team rounds should occur if there are unusual circumstances.

DSE's no longer indicated unless specific indications exist

In the presence of normal renal function:

- ❑ Selective coronary angiograms (SCA) with Optical Coherence Tomography (OTC), unless patient has established epicardial disease, should be performed at years 1, 2 and 5
- ❑ Thereafter, SCA (without OCT) at year 10, then q5 yearly if normal (patients transferred to our program in between these years should have an individual plan prepared to fit in with our eventual schedule)

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- ❑ If abnormal, SCA frequency should be individualized and the plan charted on the patients Biography. The following should be considered
    - Severity of disease
    - Speed of progression
    - Renal function
    - Type of disease
    - Symptom burden
- ❑ If PCI performed, follow-up SCA should be performed 6 months after procedure and follow-up plan individualized.

In the presence of abnormal renal function:

- ❑ Surveillance should be individualized and documented on the PowerForm. In general, dobutamine stress echo should be performed instead.

TREATMENT

- If CAV diagnosed through SCA on OCT with intimal-medial thickness (IMT) increase by 0.5mm (incremental) or 1mm (absolute):
    - ASA
    - Statin targeting LDL < 2.0
    - Consider conversion to sirolimus, substitute in place of MMF – discuss at team rounds especially if patient is >2 years post-transplant
    - Reduce CNI 50% at initiation
    - PCI if lesions amenable
    - Individualize frequency of surveillance angiography (document on Biography)
    - Consider re-transplant
        - Consider ICD
        - At relisting stop sirolimus

5. Revision history

Revision	Description of Changes	Effective Date	Approved By:
00	Initial Release	August 2016	Cheung, Toma
01	Revision	September 2017	Toma, Cheung
03	Revision	Oct 2022	Toma, Cheung

7.5.2 *Cancer Surveillance*

Patients are encouraged to visit their Primary Care Provider regularly to screen for potential malignancies. Skin cancers are the most frequent cancer found in transplant recipients and therefore the following skin cancer precautions are in place:

- Patients are encouraged to visit their GP regularly for skin screening
- Where possible, referral to dermatology for yearly screening

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Mammography, colon, cervical, prostate and lung screening should be done in accordance with recommendations by BC Cancer Agency and organized by Primary Care Provider.

7.5.3 *Dental care*

Patients should be encouraged to have regular dental checkups every 6 months or as indicated. Antibiotic prophylaxis regime is based on the Canadian Dental Association position on Prevention of Infective Endocarditis.

7.5.4 *Immunization*

Yearly influenza vaccinations are advised by the program for heart transplant recipients. Pneumovax if needed is also recommended. Prior to travel, patients are encouraged to discuss vaccinations with the team in collaboration with vaccination clinics.

Live vaccines are not recommended for transplant recipients.

7.5.5 *Pregnancy*

Male and female patients are encouraged to discuss conceiving children and pregnancy with the Heart Transplant Cardiologist prior to planning a family. Patients are informed that some drugs may harm the unborn child and so careful planning with Primary Care Provider, the transplant team and referral to the Cardiac Obstetrics clinic at St Paul's prior to conceiving.

Pregnancy is not recommended in the first year after heart transplant at this program.

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Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

8 References

Berry, G. J., Burke, M. M., Andersen, C., Bruneval, P., Fedrigo, M., Fishbein, M. C., . . . Angelini, A. (2013). The 2013 international society for heart and lung transplantation working formulation for the standardization of nomenclature in the pathologic diagnosis of antibody-mediated rejection in heart transplantation. *Journal of Heart & Lung Transplantation, 32*(12), 1147-1162. doi:http://dx.doi.org/10.1016/j.healun.2013.08.011

Chih, S., Tinckam, K. J., & Ross, H. J. (2013). A survey of current practice for antibody-mediated rejection in heart transplantation. *American Journal of Transplantation, 13*(4), 1069-1074. doi:http://dx.doi.org/10.1111/ajt.12162

Chih, S., McDonald, M., Dipchand, A., Kim, D., Ducharme, A., Kaan, A., … Senechal, M. (2020). Canadian Cardiovascular Society/Canadian Cardiac Transplant Network Position Statement on Heart Transplantation: Patient Eligibility, Selection, and Post-Transplantation Care. *Canadian Journal of Cardiology*, 36(3), 335-356. DOI: https://doi.org/10.1016/j.cjca.2019.12.025

Copeland, H., Knezevic, I., Baran, D., Rao, V., Pham, M., Gustafsson, F.,…Hall, S. Donor Heart Selection: Evidence-Based Guidelines for Providers. *Journal of Heart & Lung Transplantation*, Articles in Press. DOI: https://doi.org/10.1016/j.healun.2022.08.030

Costanzo, M. R., Dipchand, A., Starling, R., Anderson, A., Chan, M., Desai, S., . . . International Society of Heart and Lung Transplantation,Guidelines. (2010). The international society of heart and lung transplantation guidelines for the care of heart transplant recipients. *Journal of Heart & Lung Transplantation, 29*(8), 914-956.

Dew, M.A., DiMartini, A.F., Dobbels, F., Grady, K.L., Jowsey-Gregoire, S.G., Kaan, A., … Zimbrean, P.C. (2018). The 2018 ISHLT/APM/AST/ICCAC/STSW recommendations for the psychosocial evaluation of adult cardiothoracic transplant candidates and candidates for long-term mechanical circulatory support.

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Journal of Heart & Lung Transplantation, 37(4), 803-823. DOI: https://doi.org/10.1016/j.healun.2018.03.005

Haddad, H., Isaac, D., Legare, J., Pflugfelder, P., Hendry, P. J., Chan, M., . . . White, M. (2009). Canadian cardiovascular society consensus conference update on cardiac transplantation 2008: Executive summary. *Canadian Journal of Cardiology, 25*(4), 197-205. doi:http://dx.doi.org/10.1016/S0828-282X(09)70061-3

Kobashigawa, J., Colvin, M., Potena, L., Dragun, D., Crespo-Leiro, M., Delgado, J.,… Zuckermann, A. (2018). The management of antibodies in heart transplantation: An ISHLT consensus document. *Journal of Heart and Lung Transplantation*, 37(5), 537-547. DOI: https://doi.org/10.1016/j.healun.2018.01.1291

Kobashigawa, J., Crespo-Leiro, M. G., Ensminger, S. M., Reichenspurner, H., Angelini, A., Berry, G., . . . Consensus Conference Participants. (2011). Report from a consensus conference on antibody-mediated rejection in heart transplantation. *Journal of Heart & Lung Transplantation, 30*(3), 252-269. doi:http://dx.doi.org/10.1016/j.healun.2010.11.003

Mehra, M. R., Kobashigawa, J., Starling, R., Russell, S., Uber, P. A., Parameshwar, J., . . . Barr, M. (2006). Listing criteria for heart transplantation: International society for heart and lung transplantation guidelines for the care of cardiac transplant candidates - 2006. *Journal of Heart and Lung Transplantation, 25*(9), 1024-1042.

Mehra, M. R., Canter, C. E., Hannan, M. M., Semigran, M. J., Uber, P. A., Baran, D. A., . . . International Society for Heart Lung Transplantation (ISHLT) Heart Failure and Transplantation Council. (2016). The 2016 international society for heart lung transplantation listing criteria for heart transplantation: A 10-year update. *Journal of Heart & Lung Transplantation, 35*(1), 1-23.

Ross, H., Hendry, P. J., Dipchand, A., Giannetti, N., Hirsch, G., Isaac, D., . . . White, M. (2003). Can J cardiol vol 19 no 6 may 2003 620 2001 canadian cardiovascular society consensus conference on cardiac transplantation. *Canadian Journal of Cardiology, 19*(6), 620-654.

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Tait, B. D., Susal, C., Gebel, H. M., Nickerson, P. W., Zachary, A. A., Claas, F. H. J., . . . Opelz, G. (2013). Consensus guidelines on the testing and clinical management issues associated with HLA and non-HLA antibodies in transplantation. *Transplantation, 95*(1), 19-47. doi:http://dx.doi.org/10.1097/TP.0b013e31827a19cc

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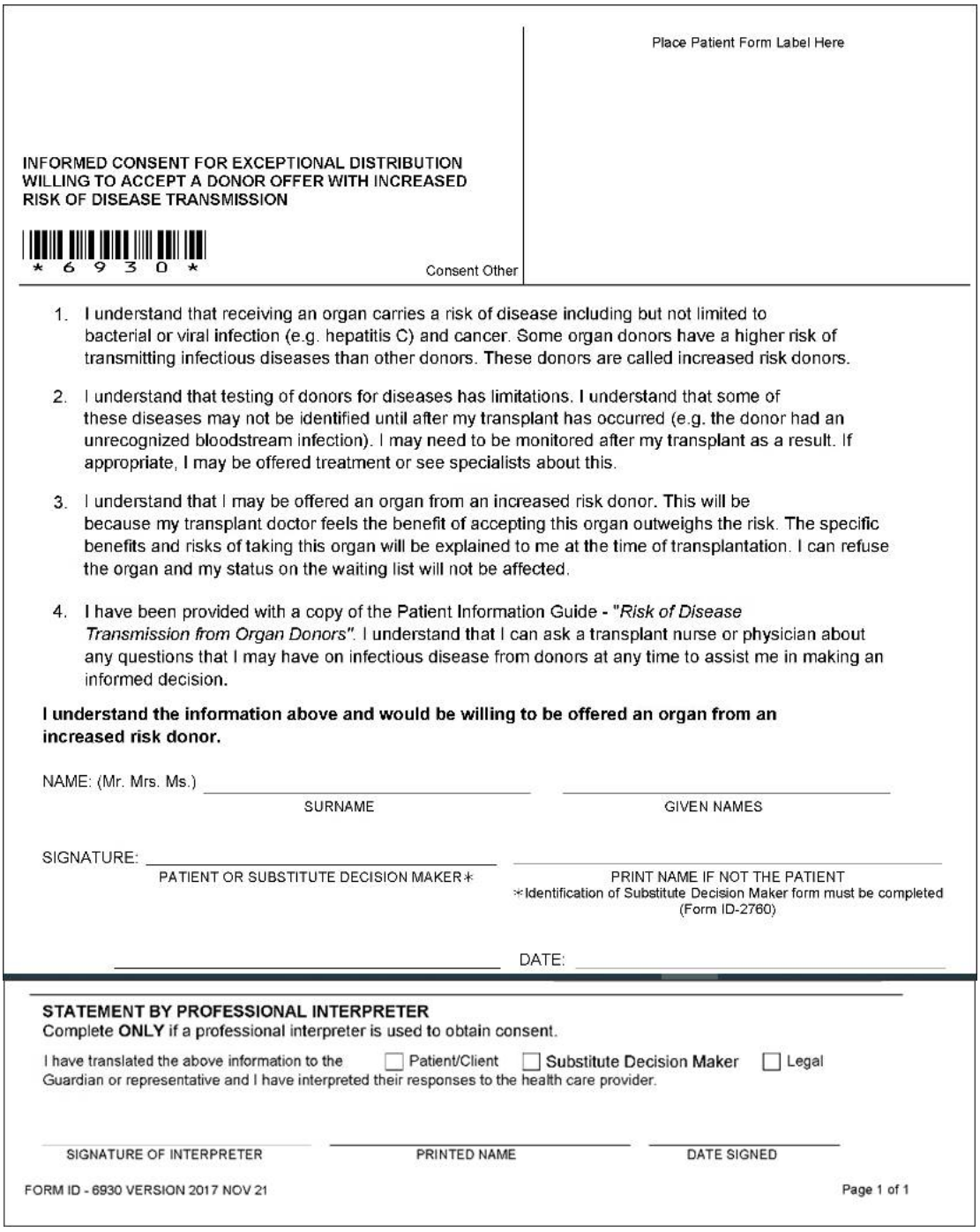
9 APPENDIX A – Exceptional Distribution Physician Handbook

9.1 PHC Exceptional Distribution Consent form



Place Patient Form Label Here

INFORMED CONSENT FOR EXCEPTIONAL DISTRIBUTION WILLING TO ACCEPT A DONOR OFFER WITH INCREASED RISK OF DISEASE TRANSMISSION

* 6 9 3 0 *

Consent Other

1. I understand that receiving an organ carries a risk of disease including but not limited to bacterial or viral infection (e.g. hepatitis C) and cancer. Some organ donors have a higher risk of transmitting infectious diseases than other donors. These donors are called increased risk donors.
2. I understand that testing of donors for diseases has limitations. I understand that some of these diseases may not be identified until after my transplant has occurred (e.g. the donor had an unrecognized bloodstream infection). I may need to be monitored after my transplant as a result. If appropriate, I may be offered treatment or see specialists about this.
3. I understand that I may be offered an organ from an increased risk donor. This will be because my transplant doctor feels the benefit of accepting this organ outweighs the risk. The specific benefits and risks of taking this organ will be explained to me at the time of transplantation. I can refuse the organ and my status on the waiting list will not be affected.
4. I have been provided with a copy of the Patient Information Guide - "*Risk of Disease Transmission from Organ Donors*". I understand that I can ask a transplant nurse or physician about any questions that I may have on infectious disease from donors at any time to assist me in making an informed decision.

I understand the information above and would be willing to be offered an organ from an increased risk donor.

NAME: (Mr. Mrs. Ms.) _____ _____
SURNAME GIVEN NAMES

SIGNATURE: _____ _____
PATIENT OR SUBSTITUTE DECISION MAKER* PRINT NAME IF NOT THE PATIENT
*Identification of Substitute Decision Maker form must be completed (Form ID-2760)

_____ DATE: _____

STATEMENT BY PROFESSIONAL INTERPRETER
Complete **ONLY** if a professional interpreter is used to obtain consent.

I have translated the above information to the ☐ Patient/Client ☐ Substitute Decision Maker ☐ Legal Guardian or representative and I have interpreted their responses to the health care provider.

_____ _____ _____
SIGNATURE OF INTERPRETER PRINTED NAME DATE SIGNED

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Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.

Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

9.2 PHC Patient Information Handout for Exceptional Distribution

Risk of Disease Transmission from Organ Donors

Reviewed by Dr. Anson Cheung and Approved Oct 28, 2022.

Reviewed by Dr. Mustafa Toma and Approved Oct 28, 2022.

Introduction

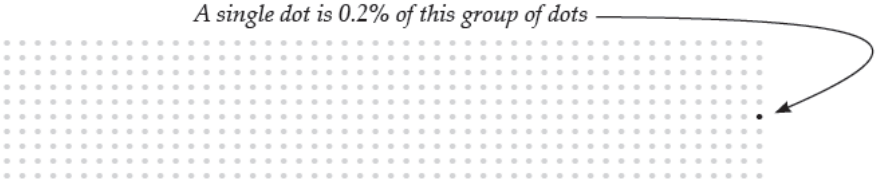
Receiving an organ transplant carries many risks, including the risk of getting a disease from the donor. This is true for every organ we transplant.

BC Transplant makes every effort to minimize these risks.

Getting a disease from an organ donor is rare - it is estimated to happen in about 0.2% (or 1 in 500) of all transplants.

How much is 0.2%?

A single dot is 0.2% of this group of dots



This booklet walks you through our screening process and answers some of the questions you may have about the risk of disease transmission from transplantation.

How are organs screened and tested for disease?

All organ transplants in Canada are regulated by Health Canada. Health Canada has strict screening requirements to minimize the risk of transmitting any disease from a donor. This screening and testing is similar to what is done for blood donation.

We do the following tests on ALL DONORS:

1) **A thorough review of the donor's past medical and social history**
2) **A physical exam of the donor and donor organs. We check for signs of intravenous (IV) drug use, evidence of infections and any other potential sign of risk.**
3) **Screening of the blood for infection**

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Limitations in screening and testing

Organ donors are extensively screened and tested, but there are still limitations:

- There are not screening tests for every infection. For example, we do not currently have a good tuberculosis test in deceased donors.
- Testing is not 100% accurate. Although it is rare, sometimes a test will come back negative even though the person has an infection. This is most common when an infection first happens, because it takes time for the infection and the body's immune response to develop. The time when we can't detect these early infections is called the "window period".
- Our risk assessment relies on a person who is not the donor telling us a history about the donor. They may not know everything about the donor.

It is impossible to know everything about an individual donor.

What is an Increased Risk Donor?

An increased risk donor is someone who has certain behaviours that are associated with a higher risk of transmitting infectious diseases to transplant recipients (See Table 1 below). These donors may test negative for infections, but they may still be a risk for spreading HIV, Hepatitis C virus, and Hepatitis B virus to transplant patients in the period where the infection(s) cannot be detected by the tests (i.e. during the window period).
Organs are considered to come from an increased risk donor if the donor has any of the identified behaviours in the table below.

Table 1. **Health Canada Criteria for Increased Risk Donors**

- Injection drug user in the past five years
- A man who has had sex with another man in the past five years
- Person who has engaged in sex in exchange for money or drugs in the past five years
- Person who has had sex in the past 12 months with a person who meets any of the above three criteria, or with anyone known or suspected to have HIV, hepatitis C virus, or hepatitis B virus.
- Exposure to these viruses in the past 12 months through percutaneous inoculation or open wound
- Prison, lock up, jail or juvenile detention for 72 hours in the past 12 months
- Non-sterile tattooing or piercings in the past 12 months
- Close contact with anyone with clinically active viral hepatitis (e.g. living in the same house where kitchen and bathroom are shared) in the past 12 months

Adapted from GSA standards 2012, Annex E.

You will be informed if your donor is an increased risk donor when the organ is offered to you.

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You will only be offered an organ from an increased risk donor if your transplant doctor feels the benefit of getting a transplant outweighs the risk of getting an infection from the organ. The benefit will be that you are able to get a transplant right away instead of waiting longer.

The actual risk will vary by the type of organ you are receiving and the risk factor. If the current tests are negative, this risk will be very low (less than 1%).

The specific risk and benefits will be discussed in detail with you when an offer is made. The choice is yours.

Are there other types of increased risk donors?

In addition to the risks in Table 1, donors may also have had cancer or risk of having an infection such as tuberculosis. In certain circumstances when your benefit is high and the risk to you is felt to be low you may be offered an organ from a donor with one of these risks. This will be discussed with you when the organ is offered to you and the choice is yours.

What about a donor who has been exposed to hepatitis C?

It is possible that a donor may have been infected with hepatitis C virus but could have naturally fought off the infection or could have been treated and cured. In this situation, if current testing for the virus in the potential donor is negative, your risk of getting infected is very low (less than 1%). Your doctor will discuss this with you when the organ is offered to you, and you may decide not to take this risk. The choice is yours.

What is the difference between an organ from an increased risk donor and one from a standard organ donor?

If someone is an increased risk donor, it only means that the donor engaged in activities before their death that increase the chance they got an infection right before they died. All donors are screened for infectious diseases including HIV, hepatitis B, and hepatitis C. However, even with negative test results, there is still a very small chance that an organ from an increased risk donor has an infection that could be transmitted during transplant. The doctor offering you the organ will be able to explain the risk.

The increased risk of infection from the donor does not affect how well the organ will work. In fact, on average, increased risk donors tend to be of younger age with better organ function.

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Why would I think about accepting an organ from an Increased Risk Donor?

Accepting an organ from an increased risk donor may increase your chance of getting a transplant. It can also mean you may get your transplant more quickly than if you wait for an organ from a donor without these risks.

These are the facts:

- **ORGANS ARE SCARCE. There is a constant shortage of organs and tissue that can be used for transplant.**
- **There are more than 600 British Columbians waiting to get life-saving organ transplants.**
- **Every three days, someone dies while waiting for an organ transplant.**
- **The waiting times for organ transplants can be up to several years depending on the organ.**

Why would I be offered an increased risk organ?

You will only be offered an organ from an increased risk donor if a transplant doctor at your hospital feels that the benefits of transplanting you with the organ are greater than the risk of getting an infection. Otherwise the organ will not be offered to you. When the organ is offered to you, a transplant doctor will speak with you about the risks and benefits of accepting the increased risk organ versus waiting for another organ.

How will I know if I develop an infection?

If you accept the organ, you will be monitored after your transplant to make sure that you do not have an infection. In the unlikely case that you do get an infection, treatments are available. Specialists, such as infectious disease doctors, will treat you if needed.

Who decides if I should accept an Increased Risk Organ?

The decision to accept the increased risk organ is entirely **YOURS.** If you decide not to accept the organ, you will not lose your place on the waiting list. If you have questions about organs from increased risk donors, discuss this with a member of your health care team while you are waiting for your transplant.

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If I do not agree to accept an increased risk organ, will it hurt my chances of getting a standard organ?

NO. Everyone has a different level of how much risk they are willing to accept for themselves. The decision to accept the organ is yours. If you decide not to accept the organ, you will not lose your place on the waiting list.

Questions to ask my healthcare team

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