

# Intravenous Iodinated Contrast Administration (Adult 17 years and older)

## Site Applicability

All Lower Mainland Medical Imaging (LMMI) sites in Fraser Health (FH), Providence Healthcare (PHC), Provincial Health Services Authority (PHSA), and Vancouver Coastal Health (VCH)

## Practice Level

### Referring Service

Profession	Skill Level	Skill
Physician Nurse Practitioner (NP)	Basic	<ul style="list-style-type: none"> <li>Consult Medical Imaging service as needed</li> </ul>

### Medical Imaging Service

Profession	Skill Level	Skill
Radiologist	Basic	<ul style="list-style-type: none"> <li>Review imaging requisition</li> <li>Protocol imaging exams requiring iodinated contrast media and communicate to the appropriate resource (Medical Radiation Technologist (MRT), clerical team, booking clerk)</li> <li>Consult with referring service as needed</li> <li>Be immediately available to respond to adverse events.</li> </ul>
Medical Radiation Technologist (MRT)	Basic	<ul style="list-style-type: none"> <li>Assist outpatients to complete the <a href="#">contrast safety screening</a> form for contraindications to iodinated contrast media</li> <li>Respond and contact radiologist when an adverse event occurs</li> </ul>
Registered Nurse (RN)	Basic	<ul style="list-style-type: none"> <li>Assist outpatients to complete the contrast safety screening form for contraindications to iodinated contrast media</li> <li>Administer IV hydration fluids as directed by the radiologist</li> <li>Attend to patients pre/intra/post procedure nursing care needs</li> </ul>

## Requirements

- All patients receiving intravenous contrast may be asked to complete, or have completed for them, a [Contrast Safety Screening](#) form prior to the examination to assess for contraindications. This form will be completed in the medical imaging department.
  - Inpatients having multiple imaging studies during a single admission do not require a subsequent Contrast Safety Screening form completed
- Outpatients:** The determination of risk of Contrast Associated–Acute Kidney Injury (CA-AKI) will be determined by a screening questionnaire. Outpatients considered at risk for CA-AKI will require baseline Serum Creatinine (SCr) and estimated Glomerular Filtration Rate (eGFR) within **6 months** of scheduled examination.

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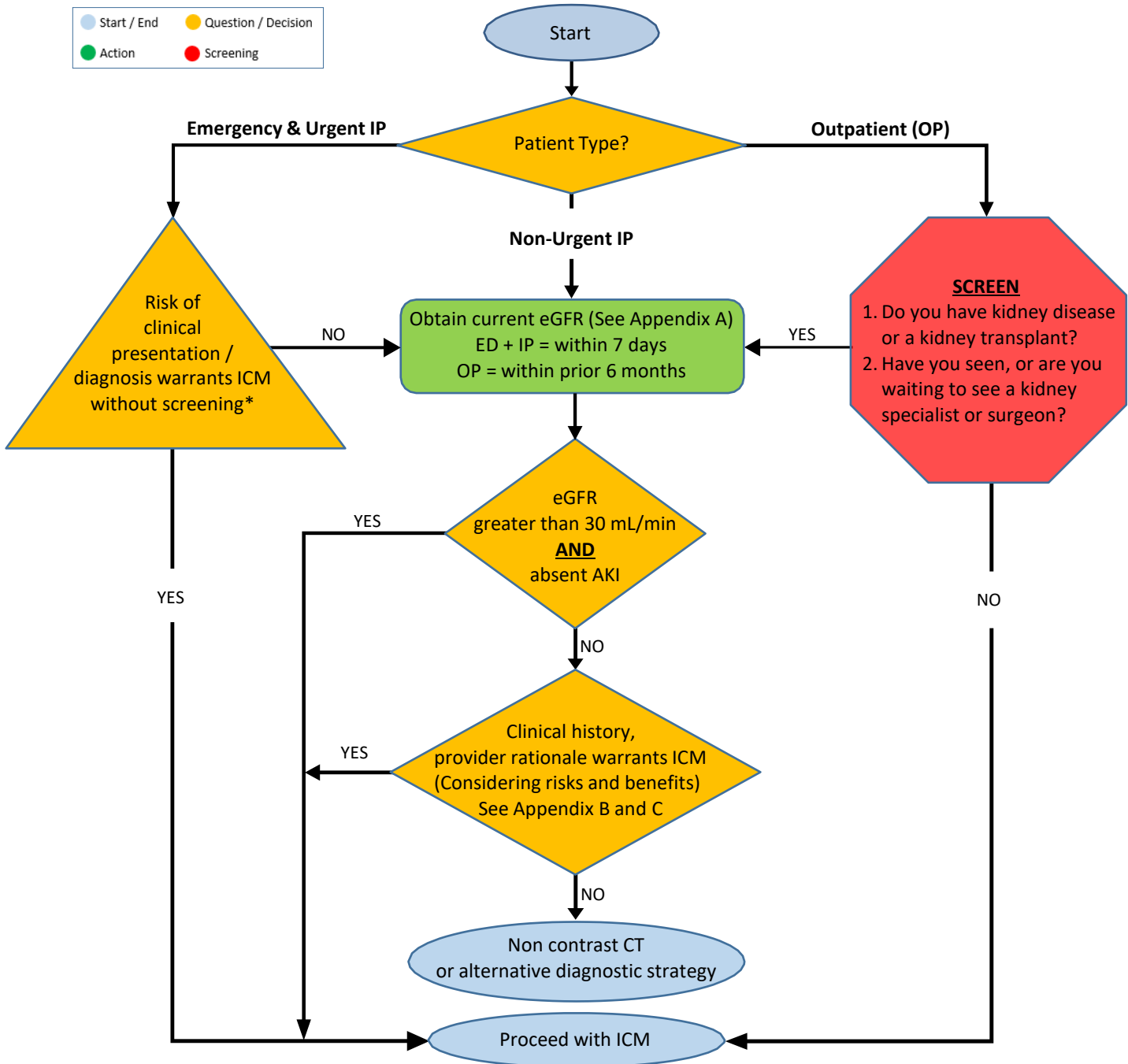
3. **Inpatients:** those with new risk factors, and those at increased risk of renal dysfunction require Serum Creatinine (SCr) and estimated Glomerular Filtration Rate (eGFR) within **7 days** of prior to scheduled examination; however, this should not delay an emergent imaging examination<sup>2</sup>.
4. **Emergency Patients:** for emergent presentation an indicated contrast enhanced imaging study should proceed without delay<sup>2</sup>.

## Need to Know

1. A prior history of severe contrast related adverse events is considered a relative contraindication to receiving the same class of contrast media in the future.
  - a. If examination includes contrast, the medical imaging service may choose to use a different contrast media from the culprit agent that caused the adverse event.
2. The eGFR equation is unreliable in pregnancy and therefore generally not reported, or if reported not valid.
  - a. For pregnant and up to 6 weeks post-partum patients, a serum creatinine above **120 µmol/L** may indicate renal dysfunction and suggest clinical consultation between a radiologist and the referring service.
3. Imaging with iodinated contrast media can be performed in patients with peritoneal or hemodialysis regardless of residual urine output and no change in dialysis schedule is required<sup>2</sup>.
4. Regarding IV hydration as a possible strategy to reduce the risk of CA-AKI (See [Appendix A](#) and [Appendix B](#))
  - a. For patients with an eGFR greater than or equal to 30 mL/min/1.73 m<sup>2</sup>, IV hydration is not needed
  - b. For patients with an eGFR less than 30 mL/min/1.73 m<sup>2</sup>, IV hydration prior to contrast administration should be considered if the patient can tolerate. For inpatients, it is up to the referring service to determine if the patient is able to tolerate intravenous (IV) hydration
5. Regarding patients on Metformin (See [Appendix C](#))
  - a. It is up to the referring service to determine if it is safe for the patient to hold metformin. The [Canadian Association of Radiologists \(CAR\)](#) recommendations:
    - i. Do not stop metformin for patients with an eGFR greater than or equal to 30 mL/min/1.73 m<sup>2</sup>
    - ii. Hold metformin, at the time of, or prior to, iodinated contrast administration for patients with an eGFR less than 30 mL/min/1.73 m<sup>2</sup> or with acute kidney injury
    - iii. Consider restarting metformin 48 hours post-contrast procedure and only if the kidney function remains stable (less than 25% increase compared with baseline creatinine) and after re-assessing the on-going use
6. The CAR does not recommend routinely discontinuing renin angiotensin system inhibitors (ACEi and ARB's) or diuretics prior to, or after, iodinated contrast media administration.

## Guideline

### Guidance on Patient Screening for Use of Iodinated Contrast Media (Figure 1)



**\*Any patient requiring urgent or life threatening diagnosis should not have their scan delayed for the purpose of screening**

Definitions: IP = Inpatients, eGFR = estimated Glomerular Filtration Rate; ED = Emergency Department, ICM = Iodinated Contrast Media

Image and content courtesy of Canadian Association of Radiologists (2022) Canadian Association of Radiologists Guidance on Contrast Associated Acute Kidney Injury.

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## Documentation

In the patient's electronic health record as per site-specific protocols, document:

- Allergy Assessment
- Contrast Allergy Pre-medication if required
- Contrast administration
- Adverse events (i.e. adverse drug reaction, extravasation etc.)

In the patient safety learning system (PSLS) document:

- Adverse drug reactions to contrast
- Extravasation of contrast
- Patient safety events

## Related Documents

### Lower Mainland Medical Imaging

- [Breast Milk and Contrast Media Patient Pamphlet](#)
- [Contrast Administration: Intraosseous \(IO\) Route](#)
- [Contrast Safety Screening \(Adult and Pediatric\)](#)
- [Extravasation of Non-Ionic Intravascular Iodinated Contrast Management Guidelines](#)
- [Pregnancy Screening and Radiation Safety Guidelines](#)
- [Adverse Reactions - Reporting and Documentation in Medical Imaging Departments](#)

### Fraser Health Authority

- [Prevention of Post Contrast - Acute Kidney Injury - In-Patients \(Adults\) - Pre-Printed Order](#)
- [Contrast Allergy Pre-Medication Orders \(Adult\) Routine / Non-urgent \(more than 12 hours\)](#)
- [Contrast Allergy Pre-Medication Orders \(Adult\) - Urgent / Emergent \(less than 12 hours\)](#)

### Vancouver Coastal Health

- [Contrast Allergy Pre-Medication Orders \(Adult\) - Routine/Non-urgent](#)
- [Contrast Allergy Pre-Medication Orders \(Adult\) - Urgent and Emergent](#)
- [Prevention of Post Contrast - Acute Kidney Injury for Inpatients](#)
- [Prevention of Post Contrast - Acute Kidney Injury for Outpatient and Emergency Department Patients](#)

### Other

- [BC Cancer Drug Manual](#)
- [BC Newborn Screening Program](#)
- [GFR Calculator - National Kidney Foundation](#)

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## References

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## Appendices

- Appendix A: [Bloodwork to Assess eGFR and Serum Creatinine](#)
- Appendix B: [Intravenous \(IV\) Hydration](#)
- Appendix C: [Metformin Management](#)

## **Appendix A: Bloodwork to assess eGFR and Serum Creatinine**

### **Pre - Procedure Instructions**

**Emergency Department and Inpatients** – eGFR drawn within prior 7 days

**Outpatients** – eGFR within prior 6 months if patient's respond "Yes" to any of the following contrast screening questions:

1. Do you have Kidney disease?
2. Have you had a kidney transplant?
3. Do you see or are you waiting to see a kidney specialist or surgeon?

### **During and Post - Procedure Instructions**

1. Follow-up bloodwork should be completed for patients that:
  - Present with Acute Kidney Injury (AKI)
2. If patient is to be discharged, provide patient with a lab requisition for follow-up serum creatinine in 48 to 72 hours post procedure.

### **Note:**

1. Any patient requiring urgent or life threatening diagnosis should not have their scan delayed for the bloodwork screening.
2. The eGFR equation is unreliable in pregnancy and therefore generally not reported, or if reported not valid. For pregnant patients and those up to 6 weeks post partum, a serum creatinine above 120 micromol/L may indicate renal dysfunction and recommend clinical consultation between a radiologist and the referring service.

## Appendix B: Intravenous (IV) Hydration

### Note:

1. For inpatients and ER patients it is up to the referring service to determine if the patient can tolerate the recommended IV hydration strategy. Clinical consultation with a radiologist may be appropriate.
2. There is a lack of evidence to either support or refute the use of IV hydration for prophylaxis of CA-AKI in high-risk patients (severe CKD, eGFR  $\leq 30$  mL/min/1.73 m<sup>2</sup>). As such, the [CAR] working group makes no recommendation in this regard and institutions may choose practices best suited to their local environments.<sup>2</sup>

### Pre-Procedure Instructions

- Sodium Chloride 0.9% IV infused at **3 mL/kg/hour x 1 hour** (maximum 330 mL/hour)  
**\*OR\***
- As determined by referring service

### During and Post - Procedure Instructions

- Sodium Chloride 0.9% IV infused at **2 mL/kg/hour x 3 hours** (maximum 220 mL/hour)  
**\*OR\***
- As determined by referring service

## **Appendix C: Metformin Management**

### **Note:**

It is up to the referring service to determine if the patient with an eGFR less than 30 mL/min or AKI can tolerate metformin management recommendations. Clinical consultation with a radiologist may be appropriate.

### **Pre-Procedure Instructions**

HOLD Metformin on day of procedure

### **Post - Procedure Instructions**

RESUME Metformin 48 to 72 hours post iodinated contrast administration and only if kidney function remains stable (less than 25% increase compared with baseline creatinine<sup>2</sup>) and the ongoing use of metformin has been re-assessed by referring service



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<b>Revision History:</b>	<b>Version</b>	<b>Date</b>	<b>Description/Key Changes</b>	<b>Revised By</b> (Name and Position)
	1.0	24-Jun-2013	Initial Release “Contrast Induced Nephropathy Prevention Guidelines” Document #: MIPC-130624-01	Sean West, CT RPL
	2.0	15-Jul-2014	Minor revisions Document #: MIPC-130624-01	Sean West, CT RPL
	3.0	09-AUG-2023	Align with 2023 ACR Manual on Contrast Media. Revised language and content to align with 2022 CAR Guidance on Contrast Associated Acute Kidney Injury Revised statements on IV hydration and medication management. Added a flowchart for guidance on patient screening for iodinated contrast media. Added RN to practice level table	Sean West, CT RPL
	4.0	17-AUG-2023	Change “urologist” to “surgeon” in flowchart	Sean West, CT RPL

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