

**CARDIAC CARE NETWORK**



## **Cardiac Care Network of Ontario**

### **Cardiac Wait Times Patient Triage Business Rules**

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**TABLE OF CONTENTS**

1. Introduction ..... 3

    1.1. Document Purpose ..... 3

    1.2. Document Structure..... 3

2. Algorithms..... 4

    2.1 Procedure List ..... 4

3. Cath Lab – Diagnostic..... 5

    3.1 Coronary Angiogram ..... 5

        3.1.1 Description ..... 5

        3.1.2 WTIS Inputs ..... 5

4. Cath Lab – Intervention..... 6

    4.1 PCI ..... 6

5. Surgical..... 7

    5.1 CABG ..... 7

    5.2 Valve..... 8

        5.2.1 Aortic Stenosis..... 8

        5.2.2 Mitral Regurgitation..... 9

        5.2.3 Aortic Regurgitation ..... 9

6. Electrophysiology..... 10

    6.1 Implant - ICD ..... 10



## 1. Introduction

### 1.1. Document Purpose

The purpose of this document is to provide a single master source reference that describes the patient triage wait time algorithms that are used to determine an urgency score (where applicable), and a recommended maximum wait time (RMWT) for a patient waiting for a specified cardiac procedure. These algorithms have been developed by the Cardiac Care Network of Ontario (CCN).

The document describes how the algorithms have been developed within the WTIS-CCN (a module of the Ontario provincial Wait Time Information System) while maintaining the integrity of the underlying CCN triage business rules. This also includes the alignment of logical clinical categories; emergent, urgent, semi-urgent and elective, to standardized provincial priority levels with associated access targets for each procedure.

### 1.2. Document Structure

The algorithms described in this document are grouped by service detail category as specified in the WTIS-CCN. For each algorithm, a brief historical synopsis, description and list of field inputs are provided.



## 2. Algorithms

### 2.1 Procedure List

The following table lists all cardiac procedures and outlines those procedures that have an associated prioritization algorithm, URS score, Recommended Maximum Wait Time (RMWT), Access Target, and Priority.

If Service Detail 2 = Valve only (AS, MR, AR), system calculates the patient’s priority using one or more valve algorithms (AS, MR, AR). The most urgent priority value is reported on the GUI.

If Service Detail 2 = CABG + Valve (AS, MR, AR), system calculates the patient’s priority using the CABG algorithm and one or more valve algorithms (AS, MR, AR). The most urgent priority value is reported on the GUI.

If Service Detail 2 = CABG + Valve (other), system calculates the patient’s priority using the CABG algorithm.

Procedure			Algorithm	URS	RMWT	Access Target	Priority
Service Area	Service Detail 1	Service Detail 2					
Cardiac	Cath Lab - Diagnostic	Coronary Angiogram (for CAD)	●	●	●	●	●
		Other					
	Cath Lab - Intervention	PCI	●		●	●	●
		Congenital/Structural Valve Intervention					
		Other					
	Surgical	CABG	●	●	●	●	●
		CABG + Valve Other	●	●	●	●	●
		CABG + Valve (AS, AR, MR)	●		●	●	●
		Valve Only AS	●		●	●	●
		Valve Only AR	●		●	●	●
		Valve Only MR	●		●	●	●
		Valve Only Other					
		Congenital/Structural					
		Aortic Operation					
	Other						
	Electrophysiology	Implant – ICD	●		●	●	●



### 3. Cath Lab – Diagnostic

#### 3.1 Coronary Angiogram

##### 3.1.1 Description

The coronary angiogram algorithm is based on the severity of clinical symptom status and diagnostic tests to generate a URS (urgency rating score and recommended maximum wait times).

The access target is the upper bound of the RMWT range for a specific priority level. It should be noted that patients are not triaged nor monitored clinically based on the access target. The RMWT is the only indicator used by CCN to assess a patient’s wait experience.

##### 3.1.2 WTIS Inputs

The coronary angiogram algorithm in the WTIS derives a URS based on inputs from the following 7 required fields:

- Primary Reason (required to initiate the algorithm)
- CCS/ACS Class (primary contributor to the URS calculation)
- Exercise ECG Risk
- Functional Imaging Risk
- History of MI
- Recent MI
- Ischemic Change Type

A RMWT value is determined based on the following formula:

URS	RMWT (days)
1	0
>1 and <=2	URS – 1
>2 and <=3	$[(URS - 2) * 2] + 1$



>3 and <=4	$[(URS - 3) * 4] + 3$
>4 and <=5	$[(URS - 4) * 7] + 7$
>5 and <=6	$[(URS - 5) * 28] + 14$
>6 and <=7	$[(URS - 6) * 42] + 42$
>7	84

A priority value and access target is determined based on the following range of RMWT values.

RMWT (days)	Priority	Access Target (days)
>=0 and <=2	1	2
>2 and <=7	2	7
>7 and <=28	3	28
>28	4	84

## 4. Cath Lab – Intervention

### 4.1 PCI

The PCI algorithm is based on the values of 5 different fields:

- CCS/ACS Class
- Unprotected LM
- 3 Vessel Disease with Proximal LAD
- Vein Graft Lesion
- Survival Dependent Vessel

A RMWT is determined based on the above inputs. A priority value and access target is determined based on the RMWT value.

RMWT (days)	Priority	Access Target (days)
>=0 and <=2	1	2
>2 and <=7	2	7
>7 and <=14	3	14
>14	4	28



## 5. Surgical

### 5.1 CABG

The CABG algorithm is based on the values of 19 different fields:

- CCS/ACS Class
- Native Stenosis: LM
- Native Stenosis: Proximal LAD
- Native Stenosis: Mid/Distal LAD
- Native Stenosis: Circumflex
- Native Stenosis: RCA
- Graft Patency: LAD
- Graft Patency: Circumflex
- Graft Patency: RCA
- Previous CABG Procedure
- LV Function
- Dialysis
- Diabetes
- CVD
- COPD
- History of CHF
- Exercise ECG Risk
- Functional Imaging Risk
- Recent MI

A URS score is determined based on the above inputs. A RMWT value is determined based on the following mapping:

URS	RMWT (days)
1	0
>1 and <=2	URS – 1
>2 and <=3	$[(URS - 2) * 2] + 1$
>3 and <=4	$[(URS - 3) * 11] + 3$
>4 and <=5	$[(URS - 4) * 28] + 14$
>5 and <=6	$[(URS - 5) * 48] + 42$
>6 and <=7	$[(URS - 6) * 90] + 90$
>7	180



A priority value and access target is determined based on the RMWT value.

RMWT (days)	Priority	Access Target (days)
>=0 and <=2	1	2
>2 and <=14	2	14
>14 and <=42	3	42
>42	4	180

## 5.2 Valve

### 5.2.1 Aortic Stenosis

The aortic stenosis algorithm is based on the values of 17 different fields:

- NYHA
- Patient Wait Location
- Aortic Valve Area
- Aortic Peak Instant Gradient
- Aortic Mean Gradient
- Syncope
- LVEF
- Previous CABG Procedure
- Native Stenosis: LM
- Native Stenosis: Prox LAD
- Native Stenosis: Mid/Distal LAD
- Native Stenosis: Circumflex
- Native Stenosis: RCA
- Graft Patency: LAD
- Graft Patency: Circumflex
- Graft Patency: RCA
- Medically Unstable

A RMWT value is determined based on the above inputs. A priority value and access target is determined based on the RMWT value.

RMWT (days)	Priority	Access Target (days)
>=0 and <=7	1	7





>7 and <=14	2	14
>14 and <=30	3	30
>30	4	90

### 5.2.2 Mitral Regurgitation

The mitral regurgitation algorithm is based on the values of 16 different fields:

- NYHA
- Patient Wait Location
- LVEF
- LVESD
- Atrial Fibrillation
- Previous CABG Procedure
- Native Stenosis: LM
- Native Stenosis: Prox LAD
- Native Stenosis: Mid/Distal LAD
- Native Stenosis: Circumflex
- Native Stenosis: RCA

### 5.2.3 Aortic Regurgitation

The aortic regurgitation algorithm is based on the values of 15 different fields:

- NYHA
- Patient Wait Location
- LVEF
- LVESD
- LVEDD
- Previous CABG Procedure
- Native Stenosis: LM
- Native Stenosis: Prox LAD
- Native Stenosis: Mid/Distal LAD
- Native Stenosis: Circumflex
- Native Stenosis: RCA
- Graft Patency: LAD
- Graft Patency: Circumflex
- Graft Patency: RCA



- Medically Unstable

A RMWT value is determined based on the above inputs. A priority value and access target is determined based on the RMWT value.

RMWT (days)	Priority	Access Target (days)
$\geq 0$ and $\leq 7$	1	7
$> 7$ and $\leq 14$	2	14
$> 14$	3	42

## 6. Electrophysiology

### 6.1 Implant - ICD

The implant - ICD algorithm is based on the values of 2 different fields:

- Implant Indication
- Priority

A priority value is determined based on the priority field input. A RMWT value and access target is determined based on the priority value.

RMWT (days)	Priority	Access Target (days)
5	1	5
56	2	56