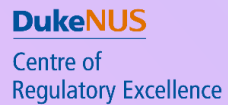


Remote Clinical Monitoring (RCM)

Ms Charissa Chua Li-Sien
Assistant Lead Engineer, Software Engrg & Devt (SEED), Synapxe



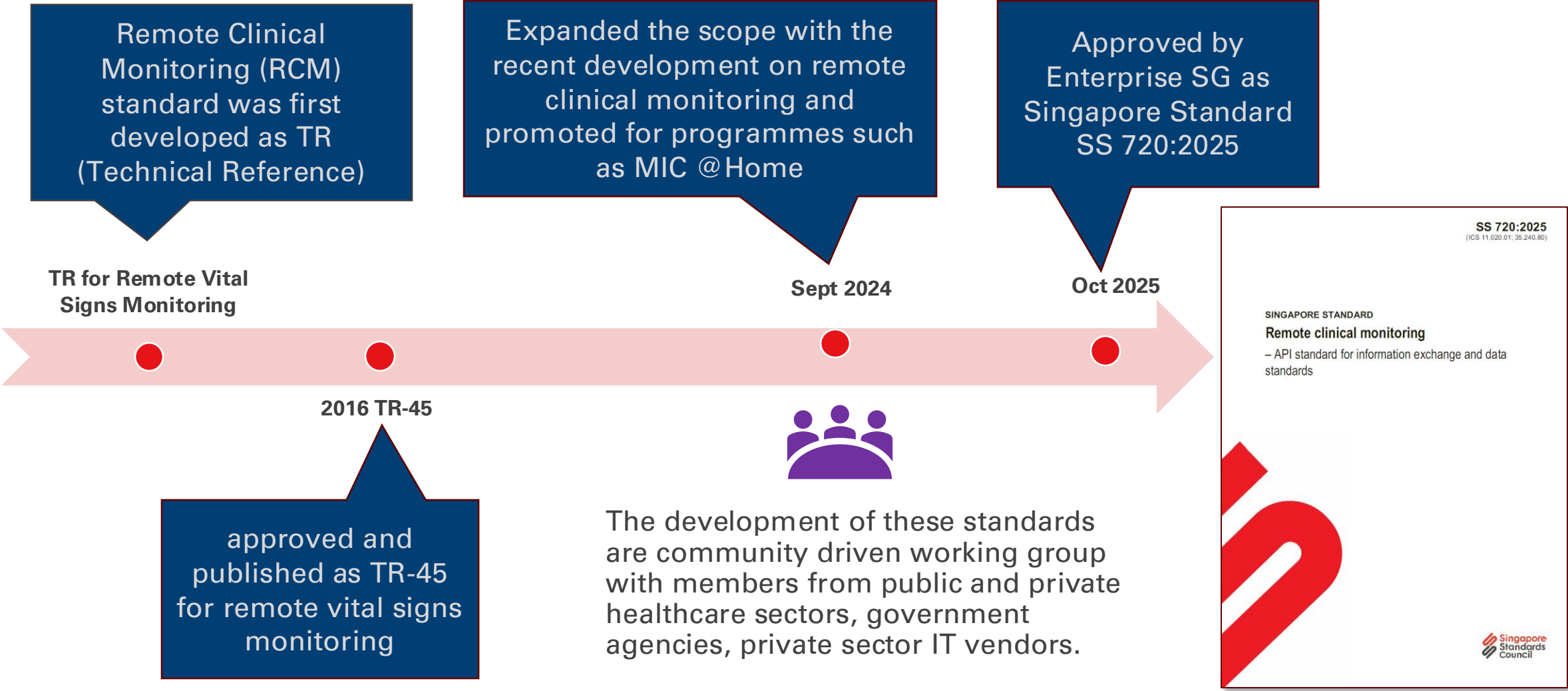
brought to you by:



AGENDA

- What is the RCM standards?
- RCM workgroup members
- Why standards matter?
- How does this standard support the RCM solution?
- HL7 FHIR Design Methodology
- How is HL7 FHIR used in the RCM solution
- How to get myself familiar with the standard?

What is the RCM standards?



RCM Workgroup members

Convenor : Mr Victor Chai Zhonghua
Secretary: Mr Wong Siow Kay
Members: Dr Ang Yi Yang
Dr Cui Shan
Mr Sumit Khemani
Mr Johnathan Lau
Dr Lim Soh Min
Dr Ng Wee Hoe
Dr Ravinder Singh Sachdev
Ms Tan Lei Noh
Dr Rex Tan
Ms Jane Wang Lu
Ms Charissa Chua

The organisations in which the experts of the Working Group are involved are:

*A*STAR – National Metrology Centre*
Aevice Health Pte Ltd
Cadi Scientific Pte Ltd
National Healthcare Group
Nervotec Pte Ltd
Rocesco Technologies
Smartfuture Pte Ltd
Synapxe Pte Ltd

Why standards matter?

- Standards help businesses keep up with evolving industry trends, technologies and operation around the world.
- They also open doors to new markets with globally recognized benchmarks.
- All Health IT companies will benefit from these new standards, including product vendors, system integrators, and HealthTech startups.
- These standards will provide standardized data exchange approach to help reduce integration cost.
- Standards can be purchased at <https://www.singaporestandardseshop.sg/>

How does this standard support the RCM solution?

Purpose

- Standard APIs for interoperability between RCM device solutions and the following types of systems:
 - EMR / CMS (Used by healthcare professionals)
 - Patient Portal (Used by residents)

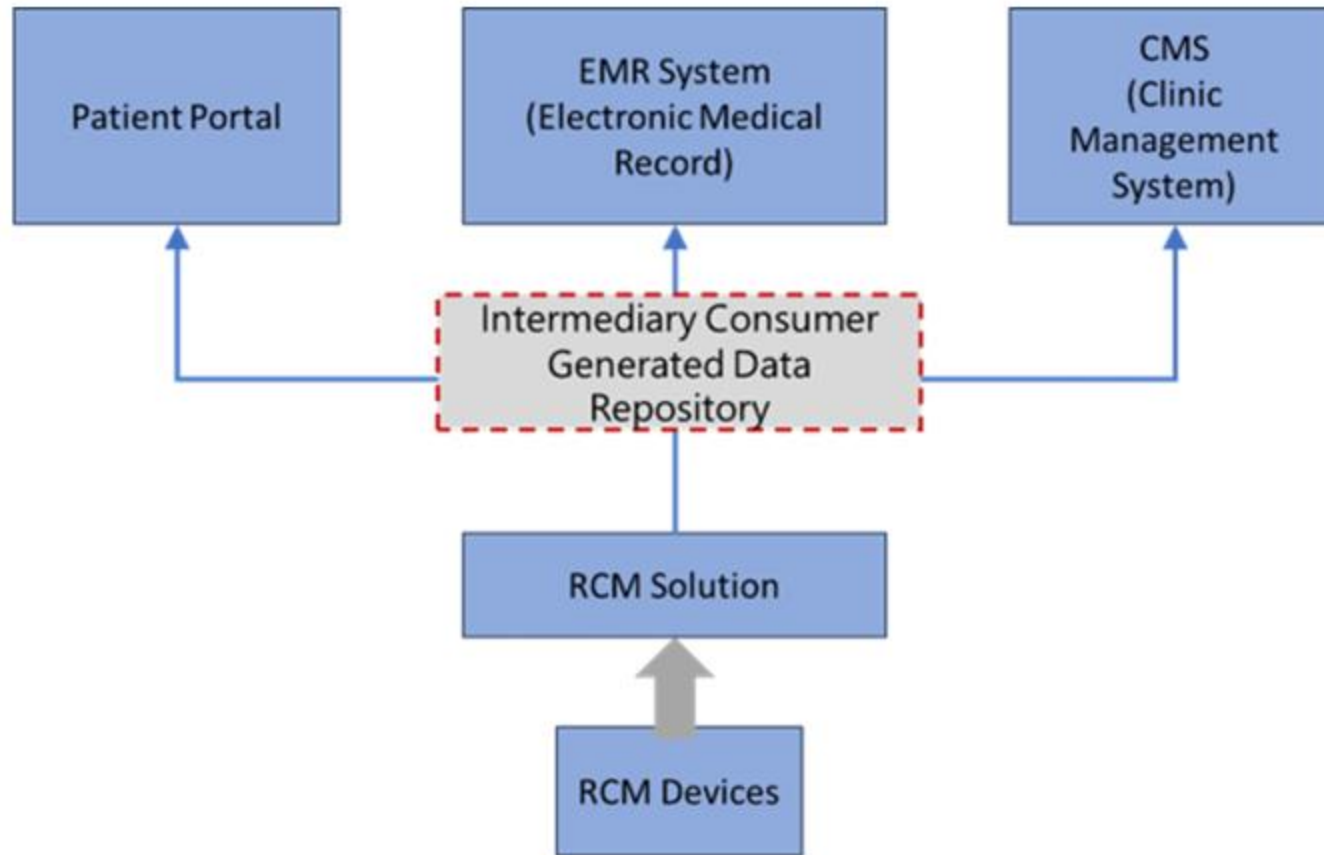
Benefits

- Any EMR/CMS/Portal can work with any RCM solution → plug & play integration
- Lower deployment costs for medical device integration
- Based on HL7[®] FHIR[®] interoperability standards

Scope of APIs

- Patient registration & care programme association
- RCM data submission
- RCM alert submission

How does this standard support the RCM solution?



Provides HL7 FHIR based APIs for RCM solution to integrate with various systems such as EMR and CMS

- Create patient
- Send RCM data
- Send alerts

HL7 FHIR Design Methodology is “Resource”

<https://www.hl7.org/fhir>

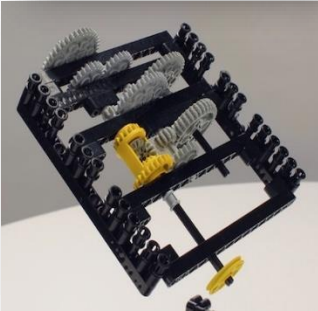
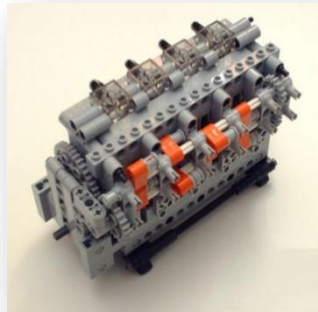
The philosophy behind FHIR is to build a **base set of resources** that, **either by themselves or when combined, satisfy the majority of common use cases**. FHIR resources aim to define the information contents and structure for the core information set that is shared by most implementations. There is a **built-in extension mechanism** to cover the remaining content as needed.

Each Resource defines a small amount of highly-focused data. A single resource doesn't say very much, but a collection of Resources taken together creates a useful clinical record. It also defines the interaction that map the actions that a user takes (look up patient records, make a note in their history, etc.) to perform specific operations on the relevant resources.

Data Types



Resources



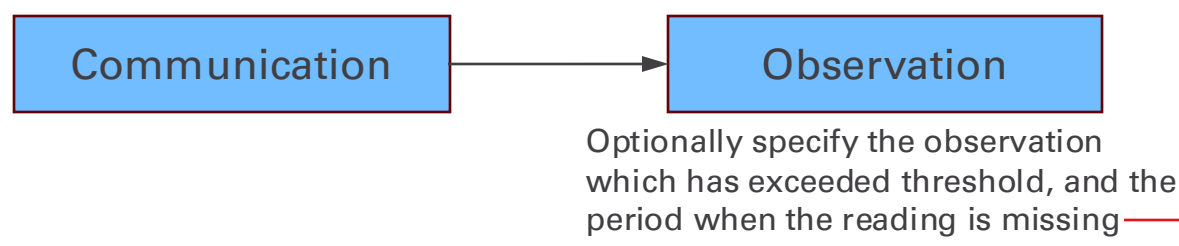
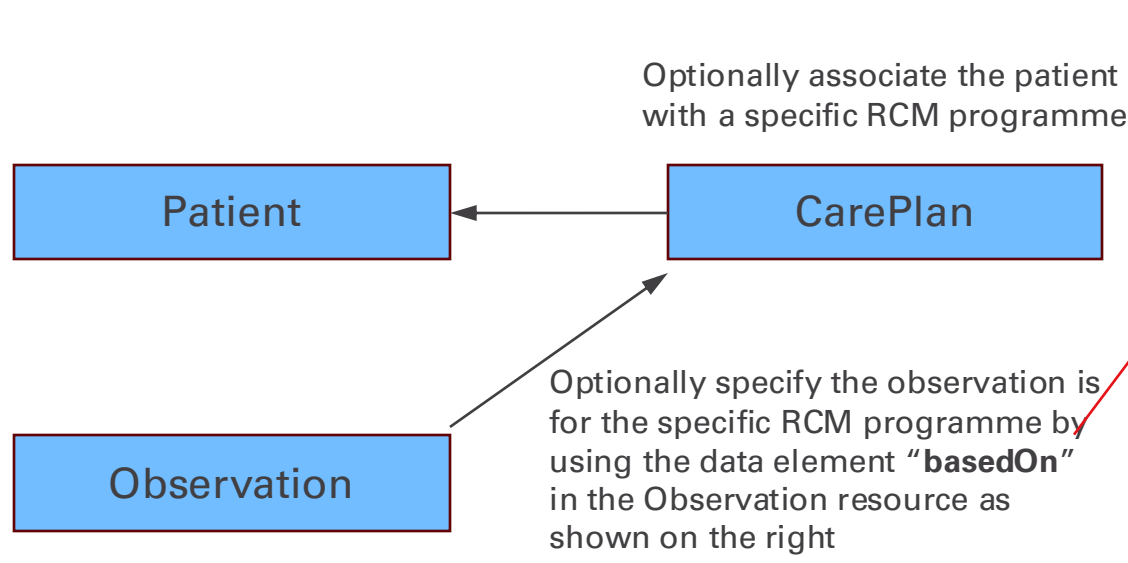
Extensions



Solution



HL7 FHIR resources and resource reference to ensure data quality and relationship



```

Observation (DomainResource)
  identifier : Identifier [0..*]
  instantiates[x] : DataType [0..1] « canonical(ObservationDefinition) | Reference(ObservationDefinition) »
  basedOn : Reference [0..*] « CarePlan | DeviceRequest | ImmunizationRecommendation | MedicationRequest | NutritionOrder | ServiceRequest »
  partOf : Reference [0..*] « MedicationAdministration | MedicationDispense | MedicationStatement | Procedure | Immunization | ImagingStudy | GenomicStudy »
  status : code [1..1] « ObservationStatus! »
  category : CodeableConcept [0..*] « ObservationCategoryCodes? »
  code : CodeableConcept [1..1] « LOINCcodes?? » « C »
  subject : Reference [0..1] « Patient | Group | Device | Location | Organization | Procedure | Practitioner | Medication | Substance | BiologicallyDerivedProduct | NutritionProduct »
  focus : Reference [0..*] « Any »
  encounter : Reference [0..1] « Encounter »
  effective[x] : DataType [0..1] « dateTime | Period | Timing | instant »
  issued : instant [0..1]
  performer : Reference [0..*] « Practitioner | PractitionerRole |
  
```

```

Communication (DomainResource)
  identifier : Identifier [0..*]
  instantiatesCanonical : canonical [0..*] « PlanDefinition | ActivityDefinition | Measure | OperationDefinition | Questionnaire »
  instantiatesUri : uri [0..*]
  basedOn : Reference [0..*] « Any »
  partOf : Reference [0..*] « Any »
  inResponseTo : Reference [0..*] « Communication »
  status : code [1..1] « EventStatus! »
  statusReason : CodeableConcept [0..1] « CommunicationNotDoneReason?? »
  category : CodeableConcept [0..*] « CommunicationCategory?? »
  priority : code [0..1] « RequestPriority! »
  medium : CodeableConcept [0..*] « ParticipationMode?? »
  subject : Reference [0..1] « Patient | Group »
  topic : CodeableConcept [0..1] « CommunicationTopic?? »
  about : Reference [0..*] « Any »
  encounter : Reference [0..1] « Encounter »
  sent : dateTime [0..1]
  received : dateTime [0..1]
  recipient : Reference [0..*] « CareTeam | Device | Group | HealthcareService | Location | Organization | Patient | Practitioner | PractitionerRole | RelatedPerson | Endpoint »
  sender : Reference [0..1] « Device | Organization | Patient | Practitioner | PractitionerRole | RelatedPerson | HealthcareService | Endpoint | CareTeam »
  reason : CodeableConcept [0..*] « Any; SNOMEDCTClinicalFindings?? »
  note : Annotation [0..*]
  
```

```

TriggeredBy
  observation : Reference [1..1] « Observation »
  type : code [1..1] « TriggeredByType! »
  reason : string [0..1]
  
```

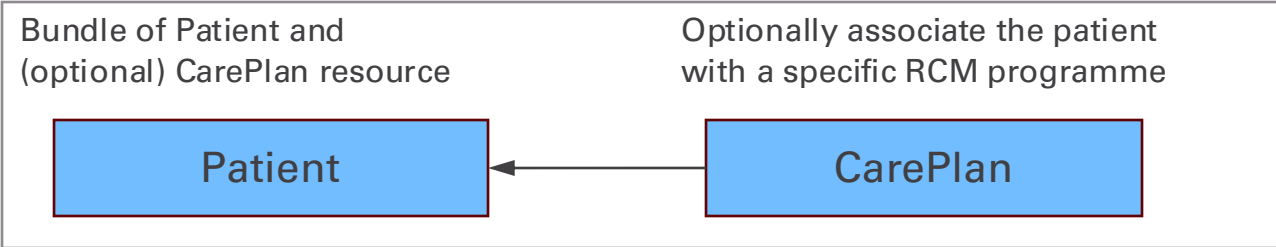
```

Component
  code : CodeableConcept [1..1] « LOINCcodes?? » « C »
  value[x] : DataType [0..1] « Quantity | CodeableConcept | Integer | Range | Ratio | SampledData | time | dateTime | Attachment | Reference(MolecularSequence) »
  dataAbsentReason : CodeableConcept [0..1] « DataAbsentReasonCodes+ »
  interpretation : CodeableConcept [0..*] « ObservationInterpretationCodes+ »
  
```

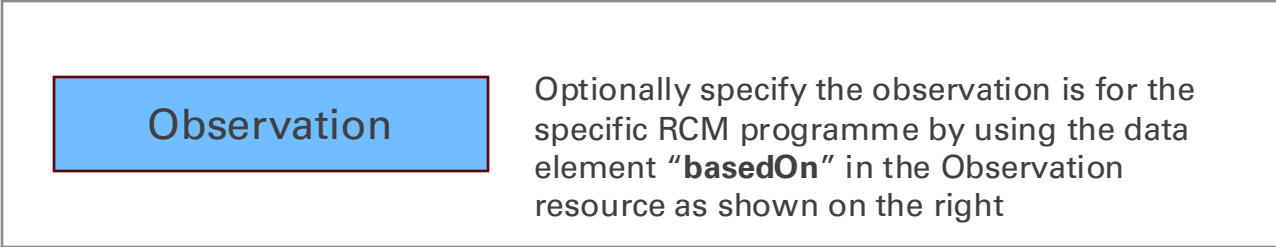
```

Payload
  content[x] : DataType [1..1] « Attachment | Reference(Any) | CodeableConcept »
  
```

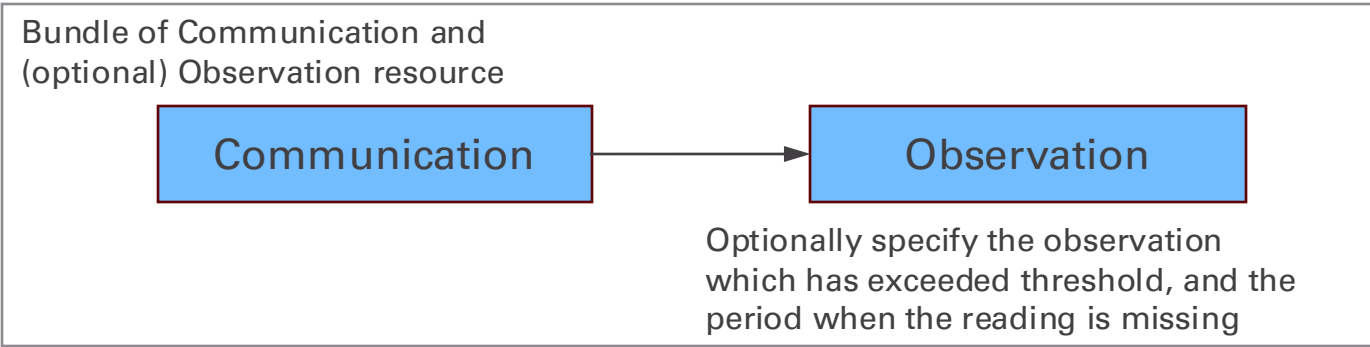
Standardised structure and content for the RCM APIs



API: Create patient



API: Send RCM data



API: Send communication alerts

How to get myself familiar with the standard?

- Reference implementation of the RCM APIs: <https://apidocs.healthx.sg/rcm/Resources>
- The implementation guide: <https://apidocs.healthx.sg/guides>

THANK YOU

brought to you by:

