

OpenSpecimen:

A Biospecimen Management Solution



Goal/Purpose of OpenSpecimen



To provide a Biospecimen Information Management System (BIMS) that is a scalable solution for a biorepository that meets the needs of a broad group of investigators and biobanks.

Why OpenSpecimen?

- **Specimen and Derivative Tracking**
- **Specimen Event Tracking**
- **Epic patient lookup**
- **Annotation** of research and clinical data
- **Query** capability
- **Interface** to PMAP
- **Data Trust's** preferred biospecimen management solution
- **Secure - JHED enabled**
- **Open Source** with strong user community
- **Public API**

OpenSpecimen Stats

- 87 Collection Protocols

	Current
Participants	43679
Specimens	527687
Specimens sent to PMAP	222794
Logins (April)	660
Unique Users (April)	45

OpenSpecimen Adoption Outside of Hopkins

- 70+ centers in 20+ countries
- Recent adopters:
- University Hospital Basel, Switzerland
- Oxford University
- University of Southern California
- University of Western Australia
- The London School of Hygiene & Tropical Medicine
- King's College London
- University of Cape Town
- Baylor College of Medicine
- International Livestock Research Institute
- University of Cyprus Biobank

How does OpenSpecimen work?



Training CP
Dashboard



View Participants

11

Participants

44

Primary Specimens

202

Available Specimens

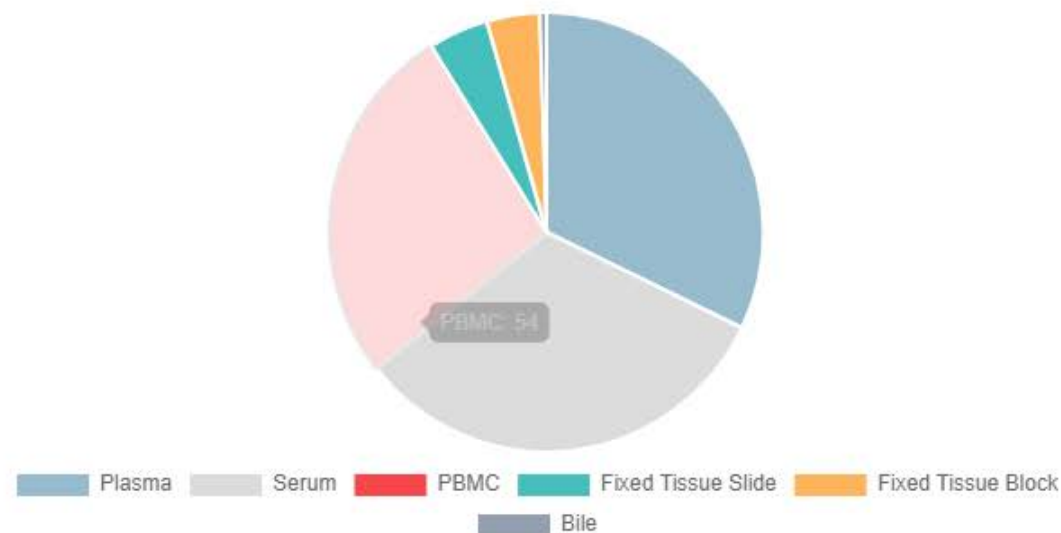
0

Distributed Specimens

Specimen collection and distribution in last quarter



Available specimens by type





Participants



Showing 11 records

[+ Add Participant](#)
[View Specimens](#)
[Lookup and Add](#)
[More ▾](#)

Participant Protocol ID	Name	Master Patient Index	Registration Date	Age
TCP_0120	Not Specified	Not Specified	08-03-2020 00:00	Not Specified
TCP_0101	Not Specified	Not Specified	05-26-2020 00:00	Not Specified
TCP_0009	Not Specified	Not Specified	05-04-2020 00:00	Not Specified
TCP_0007	Not Specified	Not Specified	04-25-2020 00:00	Not Specified
TCP_0008	Not Specified	Not Specified	04-25-2020 00:00	Not Specified
TCP_0006	Not Specified	Not Specified	04-23-2020 00:00	Not Specified
TCP_0001	Not Specified	Not Specified	04-06-2020 00:00	32 yrs
TCP_0002	Not Specified	Not Specified	04-06-2020 00:00	50 yrs
TCP_0003	Not Specified	Not Specified	04-06-2020 00:00	49 yrs
TCP_0004	Not Specified	Not Specified	04-06-2020 00:00	45 yrs
TCP_0005	Not Specified	Not Specified	04-06-2020 00:00	Not Specified

Epic Patient Lookup



Training CP

Register Participant

Patient ID

JH [REDACTED]

Lookup

Cancel





Training CP

Register Participant

Registration Date

08-19-2020



Participant Protocol ID

mandatory



Registration Site



External Subject ID

Name

First Name

Last Name

Middle Name

Birth Date



Patient ID

Gender

☒ Female Gender ☐ Male Gender ☐ Nonbinary ☐ Unknown ☐ Unspecified

Vital Status

☐ Alive ☐ Dead ☐ Unknown ☐ Unspecified

Death Date



Manual Patient Entry



Registration Date

08-19-2020



Participant Protocol ID

mandatory



Registration Site



External Subject ID

Name

First Name

Last Name

Middle Name

Birth Date



Gender

☐ Female Gender ☐ Male Gender ☐ Nonbinary ☐ Unknown ☐ Unspecified

Vital Status

☐ Alive ☐ Dead ☐ Unknown ☐ Unspecified

Death Date



Ethnicity



Custom Fields

- Custom fields can be attached to:
 - Participants
 - Visits
 - Specimens
- Custom field types:
 - Text box
 - Text area (allows line feeds)
 - Numeric
 - Radio Buttons
 - Single and Multi Checkboxes
 - Single and Multi Select Drop Downs
 - Date Picker
 - Sub Forms
- Custom fields are queryable



Training CP

Register Participant

Gender ☐ Female Gender ☐ Male Gender ☐ Nonbinary ☐ Unknown ☐ Unspecified

Vital Status ☐ Alive ☐ Dead ☐ Unknown ☐ Unspecified

Death Date



Ethnicity

Race

Cohort

Cohort A

Therapy

Therapy Type

Start Date

End Date

04-06-2020



08-03-2020



08-19-2020



Participants, Visits and Specimens



Training CP / Participants

TCP_0120



Edit

+ Add to Another Protocol

Anonymize

Print

Delete



Registration Date Aug 03, 2020

Gender Not Specified

Birth Date Not Specified

Ethnicity Not Specified



Patient ID Not Specified

Race Not Specified



Social Security Number

Vital Status Not Specified



Occurred Visits

Event Label	Name	Date	Collection Stats	Utilization Stats	
Baseline	TCP_0120_Baseline1	Aug 03, 2020	5	16 5	



Pending Visits

Visit	Date	Pending Specimens	
Follow Up	Not Specified	2	Collect
Adhoc	Not Specified	0	Collect
Baseline A	Not Specified	1	Collect

>>

Activity

Created By Hope Whitaker

Created On Aug 03, 2020 14:36

Number of Revisions 2 ([View all](#))





... / TCP_0120 / Visits

Follow Up



Edit

+ Add Specimen

Print

Delete

Hide Activity



Name

TCP_0120_Follow Up1

Visit Site

Training

Status

Complete

Clinical Diagnosis

Not Specified

Activity

Created By

Bob Lange [alt1]



Visit Date

Aug 19, 2020

Clinical Status

Not Specified

Created On

Aug 19, 2020 11:37



Surg Path Number

Not Specified

Specimens

<input type="checkbox"/>	Description	Label	Location
<input type="checkbox"/>	<input checked="" type="radio"/> Whole Blood (Serum)	TCP_0120_Follow Up1_WB	Not Stored
<input type="checkbox"/>	<input checked="" type="radio"/> Derived Serum	TCP_0120_Follow Up1_WB_Se1	Training_F_03_S_01_R_0...
<input type="checkbox"/>	<input checked="" type="radio"/> Derived Serum	TCP_0120_Follow Up1_WB_Se2	Training_F_03_S_01_R_0...
<input type="checkbox"/>	<input checked="" type="radio"/> Derived Serum	TCP_0120_Follow Up1_WB_Se3	Training_F_03_S_01_R_0...
<input type="checkbox"/>	<input checked="" type="radio"/> Derived Serum	TCP_0120_Follow Up1_WB_Se4	Training_F_03_S_01_R_0...
<input type="checkbox"/>	<input checked="" type="radio"/> Derived Serum	TCP_0120_Follow Up1_WB_Se5	Training_F_03_S_01_R_0...
<input type="checkbox"/>	<input checked="" type="radio"/> Whole Blood (Plasma)	TCP_0120_Follow Up1_WB2	Not Stored

»



Training CP / TCP_0120 / Follow Up
TCP_0120_Follow Up1_WB



Edit

+ Create

Add to Cart

Print

Delete

More

Hide Activity

Lineage

Derivative

Collection

Aliquots

Type

Whole Blood (Fluid)

Anatomic Site

Not Specified

Laterality

Not Specified

Initial Quantity

0 ml

Available Quantity

0 ml

Concentration

Not Specified

Pathology

Not Specified

Storage Location

Not Stored

Biohazards

Not Specified

Created On

Aug 19, 2020 11:36

Freeze/Thaw Cycles

Not Specified

Specimens

<input type="checkbox"/>	Description	Label	Location
<input type="checkbox"/>	Derived Serum	TCP_0120_Follow Up1_WB_Se1	Training_F_03_S_01_R_0...
<input type="checkbox"/>	Derived Serum	TCP_0120_Follow Up1_WB_Se2	Training_F_03_S_01_R_0...
<input type="checkbox"/>	Derived Serum	TCP_0120_Follow Up1_WB_Se3	Training_F_03_S_01_R_0...
<input type="checkbox"/>	Derived Serum	TCP_0120_Follow Up1_WB_Se4	Training_F_03_S_01_R_0...

Activity

Created By Bob Lange [alt1]

Created On Aug 19, 2020 11:37

Recent Events

Bob Lange [alt1] created Collection Event on Aug 19, 2020 11:36
Bob Lange [alt1] - Aug 19, 2020

Bob Lange [alt1] created Received Event on Aug 19, 2020 11:36
Bob Lange [alt1] - Aug 19, 2020

Bob Lange [alt1] created Processing Event on Aug 19, 2020 11:36
Bob Lange [alt1] - Aug 19, 2020





Training CP / TCP_0120 / Visits

Specimen Collection : Follow Up

Visit Details
 Visit Date
 08-19-2020

 Visit Site
 Training

Collection Details
 Collector

Collection Date

08-19-2020



11 : 36

Received Details
 Receiver

Receive Date

08-19-2020



11 : 36

Description	Label	Quantity	Container	More	Position	Status		
<input checked="" type="checkbox"/> ● Whole Blood (Serum)	<input checked="" type="checkbox"/> Auto	0 ml	Not Stored			Collected	<input type="checkbox"/>	<input checked="" type="checkbox"/>
● Derived Serum	<input checked="" type="checkbox"/> Auto	1 ml	Training_F_03_S_01_R_02_B_01 (5)			Collected	<input type="checkbox"/>	<input checked="" type="checkbox"/>
● Derived Serum	<input checked="" type="checkbox"/> Auto	1 ml	Training_F_03_S_01_R_02_B_01 (6)			Collected	<input type="checkbox"/>	<input checked="" type="checkbox"/>
● Derived Serum	<input checked="" type="checkbox"/> Auto	1 ml	Training_F_03_S_01_R_02_B_01 (7)			Collected	<input type="checkbox"/>	<input checked="" type="checkbox"/>
● Derived Serum	<input checked="" type="checkbox"/> Auto	1 ml	Training_F_03_S_01_R_02_B_01 (8)			Collected	<input type="checkbox"/>	<input checked="" type="checkbox"/>
● Derived Serum	<input checked="" type="checkbox"/> Auto	1 ml	Training_F_03_S_01_R_02_B_01 (9)			Collected	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> ● Whole Blood (Plasma)	<input checked="" type="checkbox"/> Auto	0 ml	Not Stored			Collected	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Queries



Queries

New Query

Save

Get Count

View Records

Add Filter



Collection Protocol

Participant

Visit

Specimen

Search Field



Identifier

Lineage

Specimen Label

Barcode

Class

Type

Anatomic Site

Laterality

Expression and Filters

AND

OR

\cap

NOT



(...)

1

and

2

Filters

1

Participant >> Gender **Equals** Female Gender



2

Specimen >> Type **Is One Of** ["Serum", "Plasma"]





Queries

New Query



Actions ▾

✓ Select All

Specimens ▾

🛒 Add to Cart ▾

📊 New Dashlet

🔗 Help

PPID	Name	Specimen Label	Type	Collection Date	Container Name	Container Position
TCP_0002	TCP_0002_Baseline1	TCP_0002_Baseline1_...	Serum	Apr 06, 2020 10:51	Training_F_02_S_03_R...	67
TCP_0002	TCP_0002_Baseline1	TCP_0002_Baseline1_...	Serum	Apr 06, 2020 10:51	Training_F_02_S_03_R...	68
TCP_0002	TCP_0002_Baseline1	TCP_0002_Baseline1_...	Serum	Apr 06, 2020 10:51	Training_F_02_S_03_R...	69
TCP_0002	TCP_0002_Baseline1	TCP_0002_Baseline1_...	Serum	Apr 06, 2020 10:51	Training_F_02_S_03_R...	70
TCP_0002	TCP_0002_Baseline1	TCP_0002_Baseline1_...	Serum	Apr 06, 2020 10:51	Training_F_02_S_03_R...	71
TCP_0002	TCP_0002_Baseline1	TCP_0002_Baseline1_...	Plasma	Apr 06, 2020 10:51	Training_F_02_S_03_R...	72
TCP_0002	TCP_0002_Baseline1	TCP_0002_Baseline1_...	Plasma	Apr 06, 2020 10:51	Training_F_02_S_03_R...	73
TCP_0002	TCP_0002_Baseline1	TCP_0002_Baseline1_...	Plasma	Apr 06, 2020 10:51	Training_F_02_S_03_R...	74
TCP_0002	TCP_0002_Baseline1	TCP_0002_Baseline1_...	Plasma	Apr 06, 2020 10:51	Training_F_02_S_03_R...	75
TCP_0002	TCP_0002_Baseline1	TCP_0002_Baseline1_...	Plasma	Apr 06, 2020 10:51	Training_F_02_S_03_R...	76
TCP_0004	TCP_0004_Baseline1	TCP_0004_Baseline1_...	Serum	Apr 15, 2020 12:16	Training_F_02_S_05_R...	37
TCP_0004	TCP_0004_Baseline1	TCP_0004_Baseline1_...	Serum	Apr 15, 2020 12:16	Training_F_02_S_05_R...	38





Queries

New Query



2



2



20

Actions ▾

New Dashlet

Help

PPID	Value Type	Plasma	Serum	Total
Grand Total	Specimen Count	10	10	20
	Available Quantity	10	10	20
TCP_0002	Specimen Count	5	5	10
	Available Quantity	5	5	10
TCP_0004	Specimen Count	5	5	10
	Available Quantity	5	5	10



Storage Containers



Containers

Training_F_02 → Training_F_02_S_03 → Training_F_02_S_03_R_0...

✓ Training_F_02

▶ Training_F_02_S_06

▶ Training_F_02_S_07

✓ Training_F_02_S_03

✓ Training_F_02_S_03_R_01

▶ Training_F_02_S_03_R_01_B_01

▶ Training_F_02_S_03_R_01_B_02

▶ Training_F_02_S_03_R_01_B_03

▶ Training_F_02_S_03_R_01_B_04

Assign Positions

☐ Use Barcode ☐ Vacate existing specimens

<input type="checkbox"/>	1	<input type="checkbox"/>	2	<input type="checkbox"/>	3	<input type="checkbox"/>	4	<input type="checkbox"/>	5	<input type="checkbox"/>	6	<input type="checkbox"/>	7	<input type="checkbox"/>	8	<input type="checkbox"/>
WIT_0038_B...	WIT_0015_2...	WIT_0015_6...	WIT_0016_B...	WIT_0016_2...	WIT_0016_6...	WIT_0017_B...	WIT_0017_2...	WIT_0017_6...								
<input type="checkbox"/>	10	<input type="checkbox"/>	11	<input type="checkbox"/>	12	<input type="checkbox"/>	13	<input type="checkbox"/>	14	<input type="checkbox"/>	15	<input type="checkbox"/>	16	<input type="checkbox"/>	17	<input type="checkbox"/>
WIT_0018_B...	WIT_0018_2...	WIT_0018_6...	WIT_0019_B...	WIT_0019_2...	WIT_0019_6...	WIT_0023_2...	WIT_0059_B...	WIT_0066_S...								
<input type="checkbox"/>	19	<input type="checkbox"/>	20	<input type="checkbox"/>	21	<input type="checkbox"/>	22	<input type="checkbox"/>	23	<input type="checkbox"/>	24	<input type="checkbox"/>	25	<input type="checkbox"/>	26	<input type="checkbox"/>
WIT_0073_B...	WIT_0073_B...	WIT_0073_B...	WIT_0073_B...	WIT_0075_B...	WIT_0073_B...	WIT_0075_B...	WIT_0075_B...	WIT_0075_B...	WIT_0073_B...							
<input type="checkbox"/>	28	<input type="checkbox"/>	29	<input type="checkbox"/>	30	<input type="checkbox"/>	31	<input type="checkbox"/>	32	<input type="checkbox"/>	33	<input type="checkbox"/>	34	<input type="checkbox"/>	35	<input type="checkbox"/>
WIT_0073_B...	WIT_0073_B...	WIT_0075_A...	WIT_0075_A...	WIT_0075_A...	WIT_0075_A...	WIT_0075_B...	WIT_0075_B...	WIT_0075_B...	WIT_0075_B...							
<input type="checkbox"/>	37	<input type="checkbox"/>	38	<input type="checkbox"/>	39	<input type="checkbox"/>	40	<input type="checkbox"/>	41	<input type="checkbox"/>	42	<input type="checkbox"/>	43	<input type="checkbox"/>	44	<input type="checkbox"/>
WIT_0075_B...	WIT_0075_B...	WIT_0075_B...	WIT_0075_B...	WIT_0075_B...	WIT_0075_B...	WIT_0075_B...	WIT_0078_B...	WIT_0078_B...	WIT_0078_B...							

Specimen Distribution



+ Add Participant

Actions ▾

🛒 Add to Cart ▾

👥 View Participants

🔍 Lookup and Add

More ▾

🔍 Search

3 records selected

<input type="checkbox"/>	Label	Created On	Type	Anatomic Site	Pathology Status	Quantity	Location
<input checked="" type="checkbox"/>	TCP_0120_Follow Up1_WB_Se4	08-19-2020 11:36	Serum	Not Specified	Not Specified	1 ml	Training_F_03_S_01_R_02_B_01 (8)
<input checked="" type="checkbox"/>	TCP_0120_Follow Up1_WB_Se3	08-19-2020 11:36	Serum	Not Specified	Not Specified	1 ml	Training_F_03_S_01_R_02_B_01 (7)
<input checked="" type="checkbox"/>	TCP_0120_Follow Up1_WB_Se2	08-19-2020 11:36	Serum	Not Specified	Not Specified	1 ml	Training_F_03_S_01_R_02_B_01 (6)
<input type="checkbox"/>	TCP_0120_Follow Up1_WB2_PI3	08-19-2020 11:36	Plasma	Not Specified	Not Specified	1 ml	Training_F_03_S_01_R_02_B_01 (12)
<input type="checkbox"/>	TCP_0120_Follow Up1_WB2_PI5	08-19-2020 11:36	Plasma	Not Specified	Not Specified	1 ml	Training_F_03_S_01_R_02_B_01 (14)
<input type="checkbox"/>	TCP_0120_Follow Up1_WB_Se1	08-19-2020 11:36	Serum	Not Specified	Not Specified	1 ml	Training_F_03_S_01_R_02_B_01 (5)
<input type="checkbox"/>	TCP_0120_Follow Up1_WB2_PI1	08-19-2020 11:36	Plasma	Not Specified	Not Specified	1 ml	Training_F_03_S_01_R_02_B_01 (11)

Filters

Label

Lineage

Min. Created On



Max. Created On



Type

Anatomic Site

Pathology Status

Min. Quantity

Max. Quantity





Orders

Create Order

1 Order Details

2 Specimens

3 Invoice

Distribution Protocol

ABC to XYZ

Name

ABC to XYZ_08-19-2020 23:32:21

Receiving Institute

JHMI

Receiving Site

DRD

Requestor

Bob Lange [alt1]

Execution Date

08-19-2020



23 : 32

Courier Tracking URL

Sender Comments

Cancel

Next

Save Draft

Distribute



JOHNS HOPKINS
INSTITUTE for CLINICAL &
TRANSLATIONAL RESEARCH

Orders

TCP_08-20-2020 00:09:03

Showing 3 records

Label	Type	Collection Protocol	Quantity	Status
TCP_0120_Follow Up1_WB_Se4	Serum	Training CP	1 ml	DISTRIBUTED_AND_CLOSED
TCP_0120_Follow Up1_WB_Se3	Serum	Training CP	1 ml	DISTRIBUTED_AND_CLOSED
TCP_0120_Follow Up1_WB_Se2	Serum	Training CP	1 ml	DISTRIBUTED_AND_CLOSED

Specimen Catalog

Filters

Specimen Type

- ☐ Fluid - Buffy Coat Fluid
- ☐ Fluid - Not Specified
- ☐ Frozen Tissue
- ☐ Molecular - Buffy Coat
- ☐ PBMC
- ☒ Plasma
- ☒ Serum

WIT Catalog

5,060

5,112

20,291

Cart 0

Dashboard

Type	Collection Date	Available Quantity	Identifier
Serum	Mar 15, 2016 00:00	5.00	3304146
Plasma	Mar 15, 2016 00:00	5.00	3304147
Serum	Aug 15, 2016 00:00	5.00	3304202
Plasma	Aug 15, 2016 00:00	5.00	3304203
Serum	Feb 26, 2016 00:00	5.00	3303978
Plasma	Feb 26, 2016 00:00	5.00	3303979
Serum	Apr 15, 2016 00:00	5.00	3304150
Plasma	Apr 15, 2016 00:00	5.00	3304151
Serum	Sep 15, 2016 00:00	5.00	3304213
Plasma	Sep 15, 2016 00:00	5.00	3304214
Serum	Mar 26, 2016 00:00	5.00	3303990
Plasma	Mar 26, 2016 00:00	5.00	3303991
Serum	May 15, 2016 00:00	5.00	3304154

PMAP Interface

[Search Results](#) > [open_specimen](#) > specimen_metadata

specimen_metadata

Table definition

Created May 22, 2019 3:05 PM

Updated Aug 13, 2020 6:00 PM

Description

Metadata about biospecimens being tracked in the OpenSpecimen specimen tracking system. These metadata provide information such that specimens of interest can be identified by specimen type, collection date, availability and patient.

Columns (15)

Name



Export

 [available_qty](#) decimal(24,8)

The quantity of the specimen that is available for potential use.

[Quick View](#) [collection_protocol_id](#) intNumeric unique, immutable ID for the collection protocol. Used by the OpenSpecimen software system to locat... [Quick View](#)

Contacts

Metadata Editor
Diana GumasData Steward
Bob LangeSubject Matter Expert
Jim Potter

Tags



Biospecimen



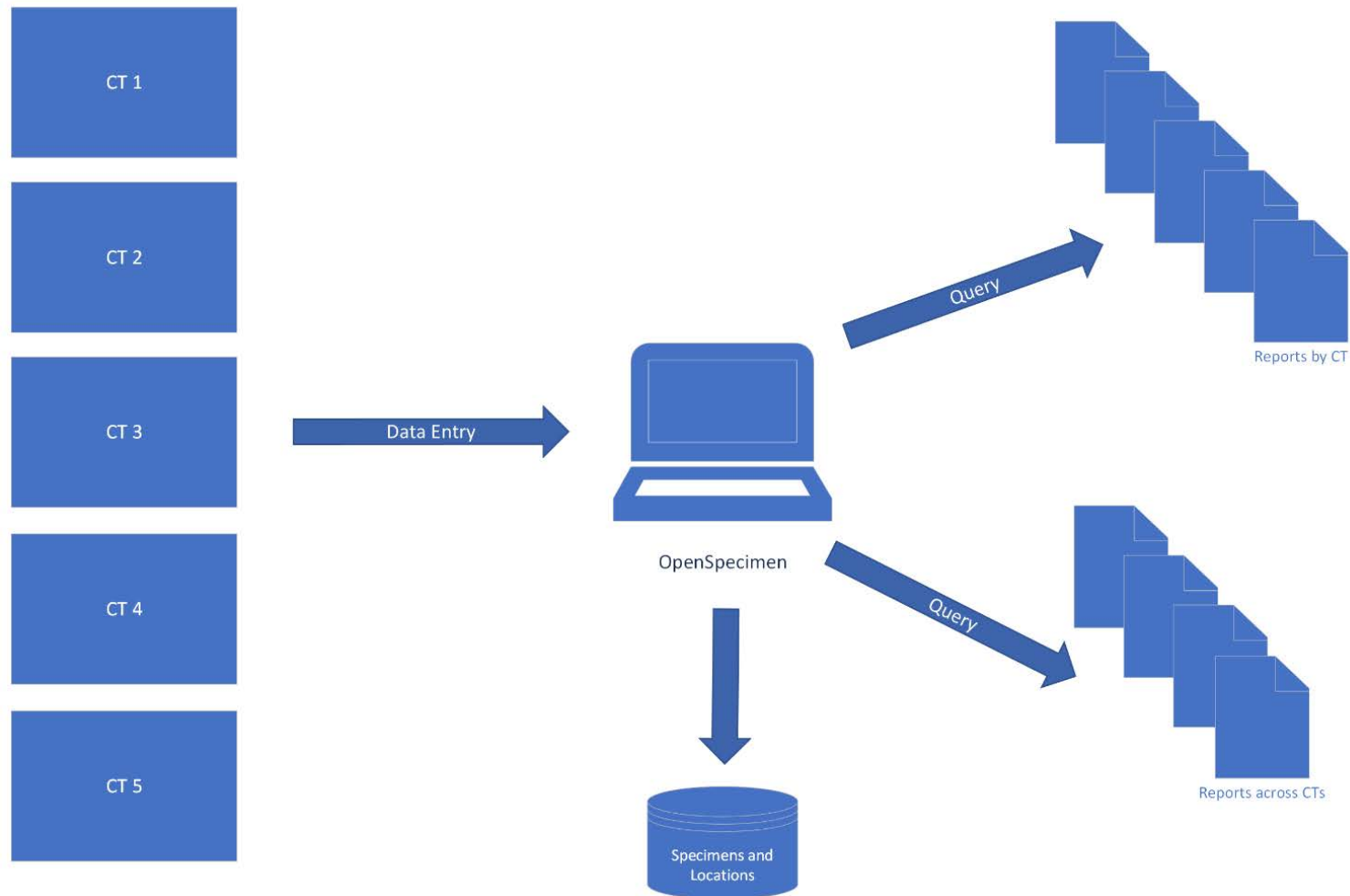
Other features

- Autogeneration of participant, visit and specimen identifiers
- Auto-storage of specimens
- Bulk loading of participants, visits, specimens, events and distributions
- Granular role-based authorization

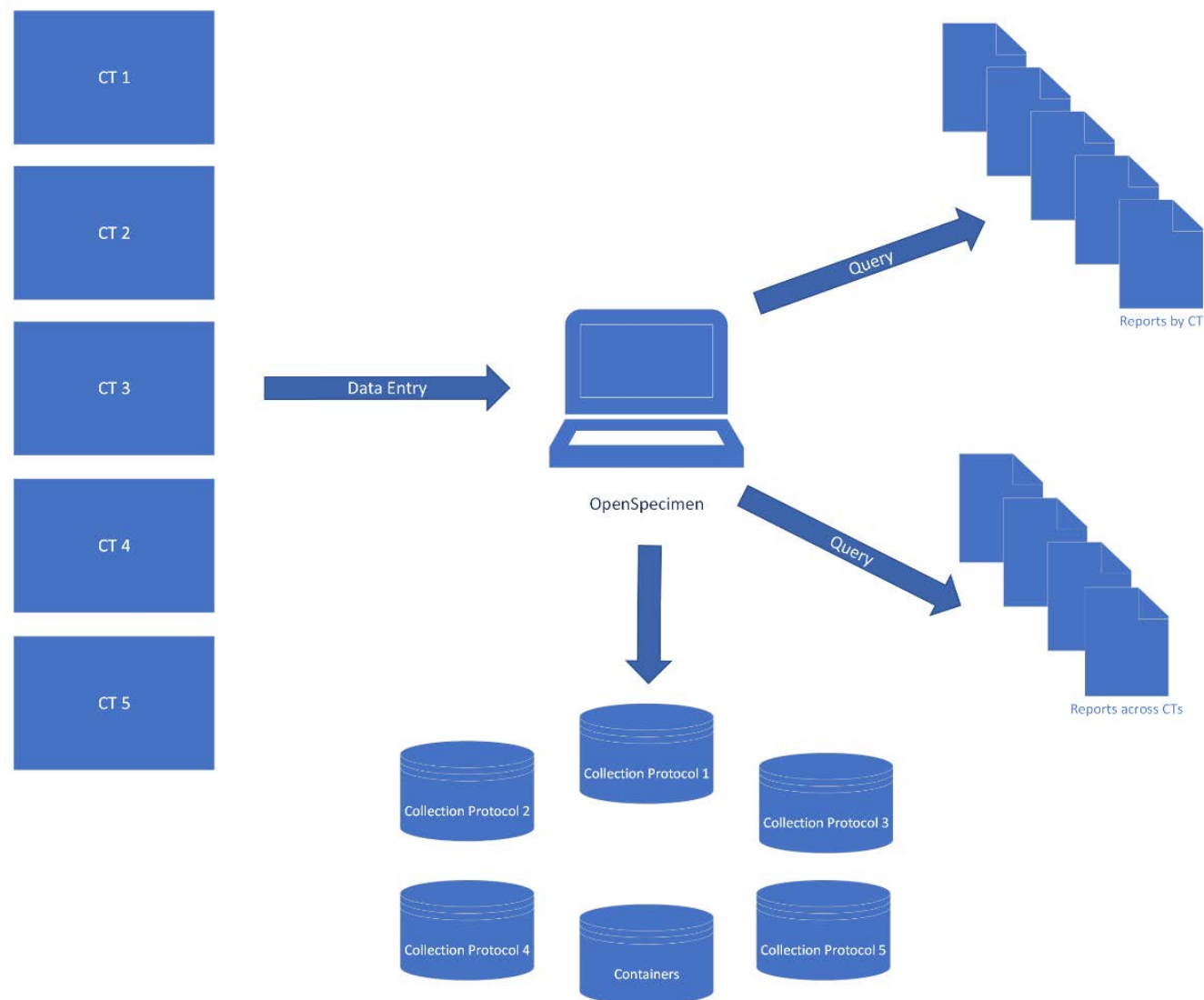
Implementations of OpenSpecimen

- Arking Lab
- CB-UADbiorepository
- Myositis Center
- Pancreas PMCOE
- JHU GI/Imm

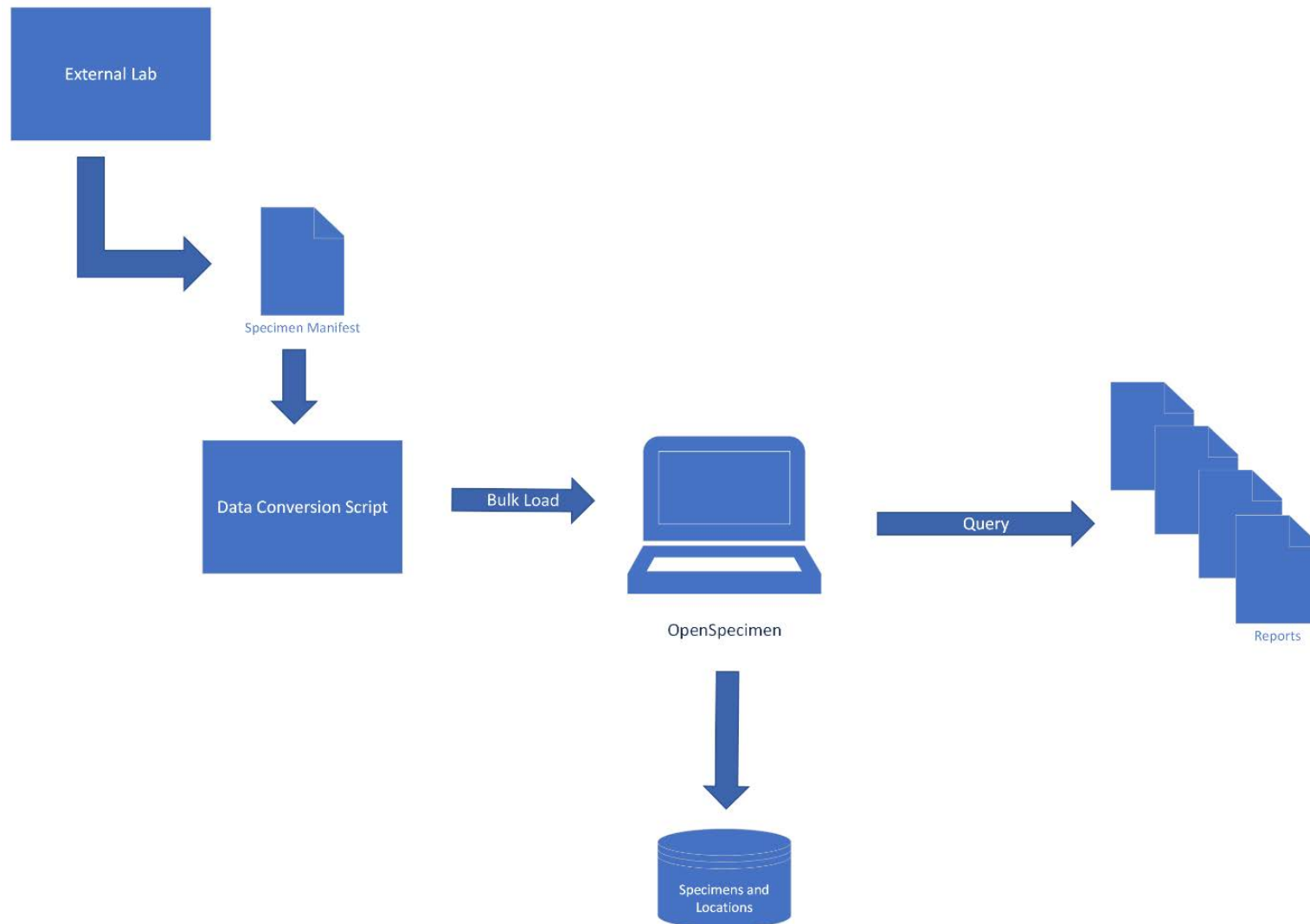
Workflows



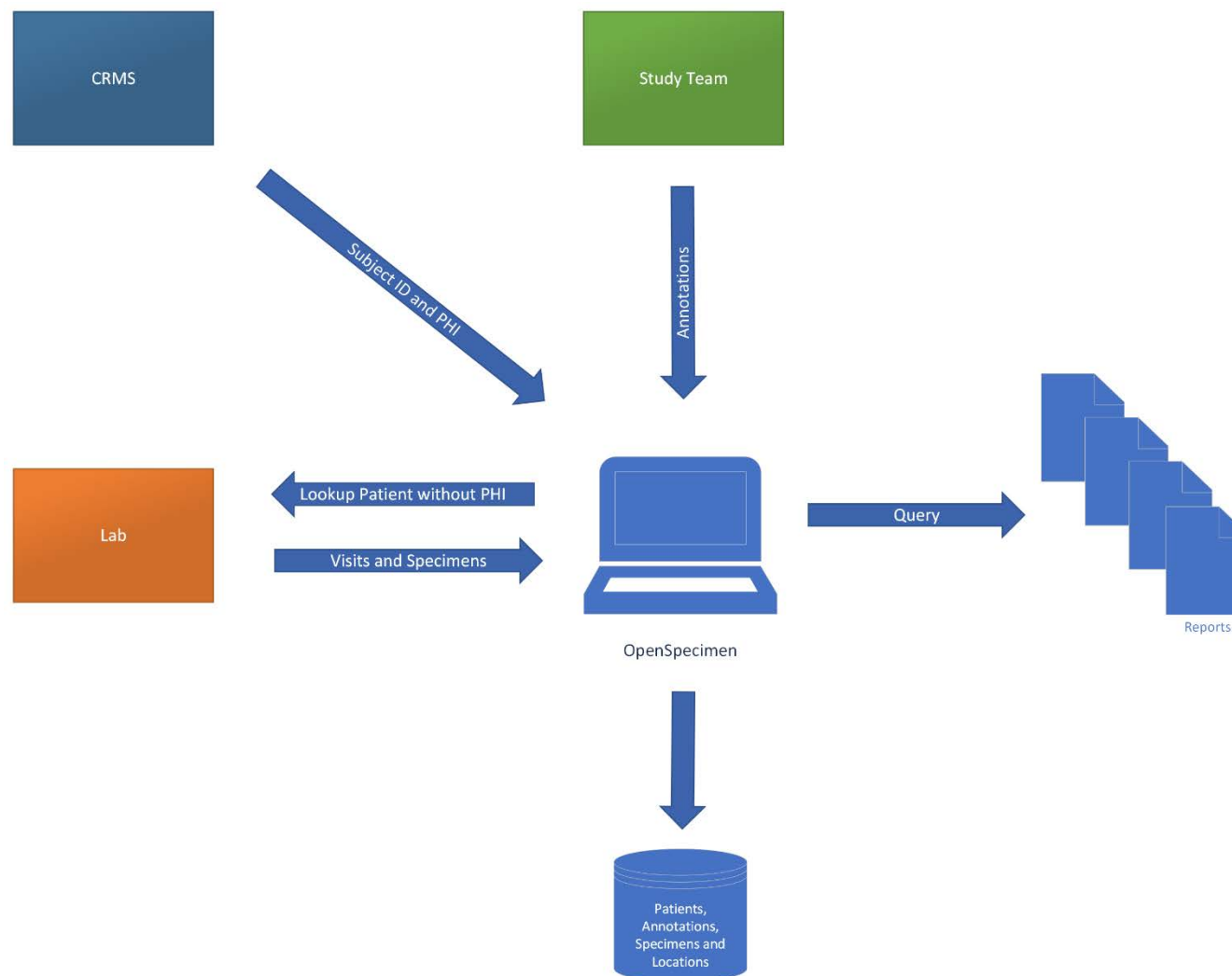
Workflows



Workflows



Workflows



New Features

- Our version: v6.1
- Current version: v8.0
- We are hoping to leverage our credits to have Krishagni do some of the upgrade work

New Features

- Collection Protocol Groups
- Disable email notifications per user
- Assign Jobs per user
- Quick Access Widgets on Home page
- Roles/Privileges:
 - Separate roles for Visits and Specimens
 - Assign Query privilege per user
- Containers
 - Transfer event on moving a container at specimen level
 - UI display improvements
 - New reports: Empty Slots, Utilization
- Specimen Collection:
 - Display forms based on rules
 - Hide anticipated visits based on conditions

New Features

- Better bulk functionality in the UI:
 - Bulk update specimens via UI
 - Create derivatives along with aliquots
 - Edit available quantity and freeze-thaw cycles while transferring specimens from one location to another.
- Catalog/Dashboard
 - Dashlets edit, delete, and exp/imp
 - Hide dashboards within the catalog.
 - Hide buttons like 'Sign In' or 'Sign Up' (for catalogs are shared with researchers who do not need login.
 - Reorder dashlets.
- Queries:
 - Ability to search for more than 1000 values when adding criteria on text fields like MRN, label, barcode etc. using 'is one of' and 'is not one of' operator.
 - Ability to limit specimens based on total quantity of aliquots by parent or patient. For e.g. Find all available aliquots with total quantity of 20 ml plasma per patient.

New Features

- Admin
 - Impersonate Users
 - Ability to close collection protocol so that new registrations are not allowed
 - Dropdown Manager: Archive and Edit values
 - Bulk Import Collection Protocols (CP) via CSV

Fee For Service

- Goes into effect July 1, 2021
 - Monthly charges begin when a collection protocol goes into production
 - Hourly charges start regardless of environment
- Some collection protocols will qualify for use of phase out funds
- Departmental Pricing

Steering Committee

- Meets the third Tuesday of each month
- Attendees include:
 - OpenSpecimen Team: Dr. Dan Ford (Vice Dean for Clinical Research), Jim Potter (Faculty Lead), Diana Gumas (Senior Director), Matt Courtemanche (IT Manager), Bob Lange (Project Leader), Hope Whitaker (IT Specialist)
 - Others: Dr. Stuart Ray, Dr. Alex Barras, Dr. Chris Chute, various members of the research community

Contact Us

- If you have further questions or to schedule a demo for your study team(s), reach out to us:

—openspecimen@lists.johnshopkins.edu

—https://ictr.johnshopkins.edu/programs_resources/programs-resources/i2c/openspecimen-tracking/



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Where Science and People Connect