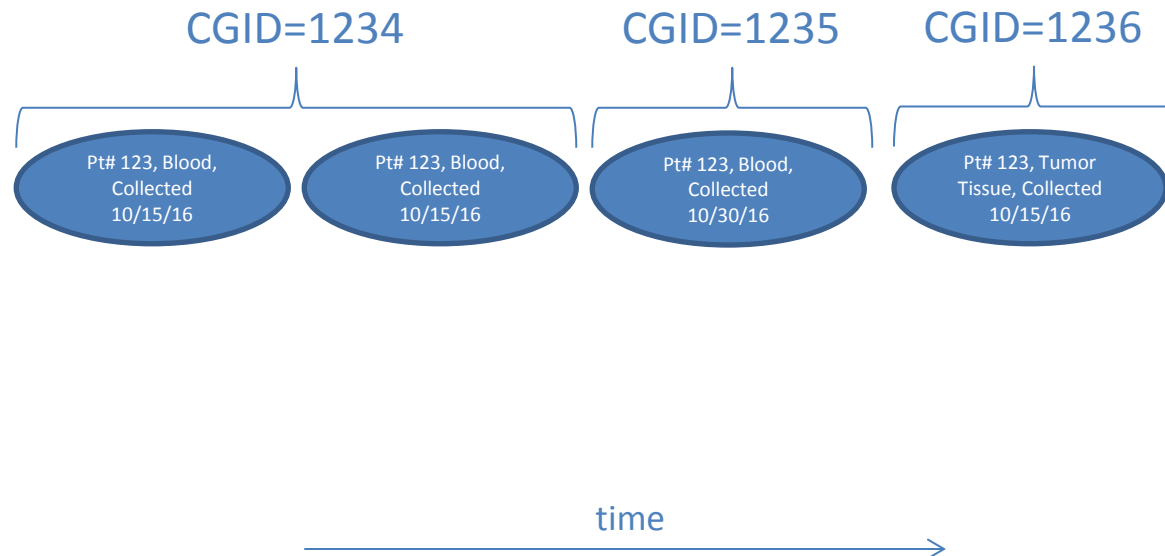# NCH - PEDMATCH

Integration Overview, v1.0-draft

Last revised, 5/9/2016, ESK

Terminology

- Collection Grouping ID ("CGID")
  - Shared by specimens of a given type taken from a patient in one encounter/surgery/draw/etc.
  - Same CGID means specimens are "equivalent" from a PED-MATCH standpoint
  - Specimen messages sent to MATCHBOX will include the CGID
  - CGIDs will be "inherited" by the various aliquots/derivatives from the original specimens
  - Specimens obtained through follow-up requests by BPC (e.g., inadequate/insufficient received) will keep the original CGID if specimens are known to come from the same original encounter/surgery/block/etc.
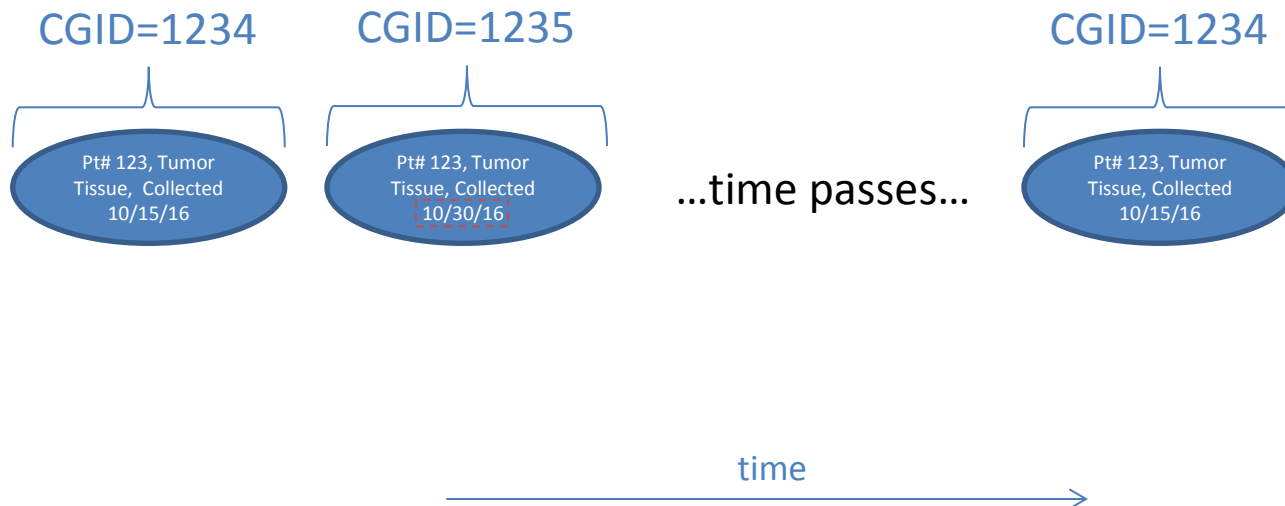
Collection Grouping Examples

- Scenario 1
  - First two specimens grouped together because attributes match ("equivalent" from PED-MATCH standpoint); New (shared) CGID
  - Third specimen was collected separately from first two; New CGID
  - Fourth specimen differs by type; New CGID

CGID=1234   CGID=1235   CGID=1236

Pt# 123, Blood, Collected 10/15/16   Pt# 123, Blood, Collected 10/15/16   Pt# 123, Blood, Collected 10/30/16   Pt# 123, Tumor Tissue, Collected 10/15/16
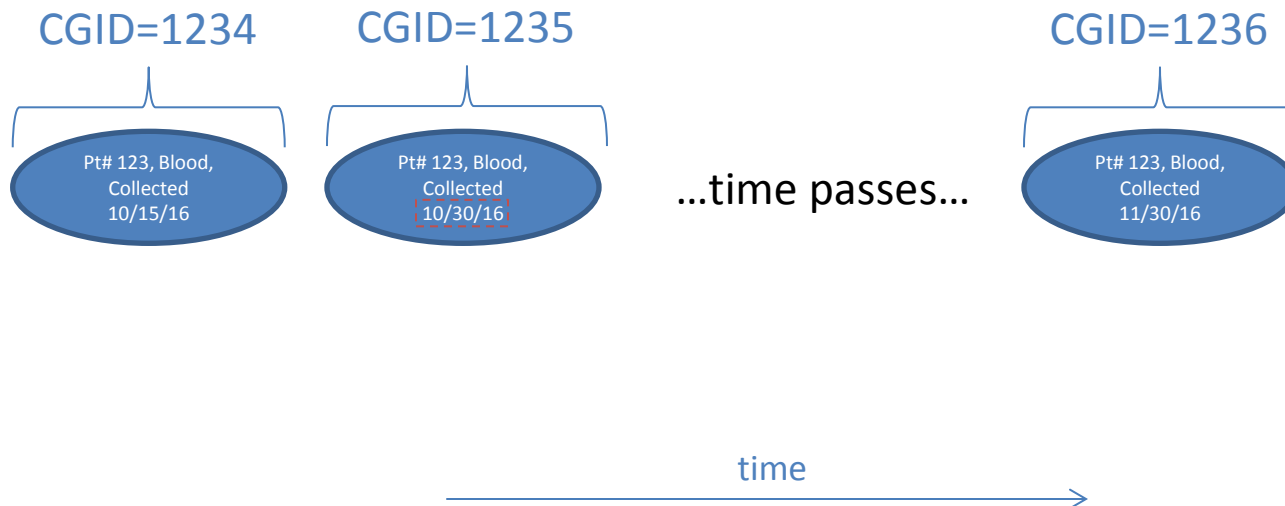
time

Collection Grouping Examples

- Scenario 2
  - First two specimens differ in collection date; Each receives a unique CGID
  - Third specimen—though arriving at the BPC days later—reuses the first specimen's CGID since they are "equivalent" from a PED-MATCH standpoint
    - Late-arriving specimens (e.g., delays in shipping/accessioning)
    - Cases where BPC requests additional portion of existing specimen (e.g., inadequacy) and site is able to indeed provide more from that original specimen

CGID=1234   CGID=1235   CGID=1234

Pt# 123, Tumor Tissue, Collected 10/15/16

Pt# 123, Tumor Tissue, Collected 10/30/16

...time passes...

Pt# 123, Tumor Tissue, Collected 10/15/16
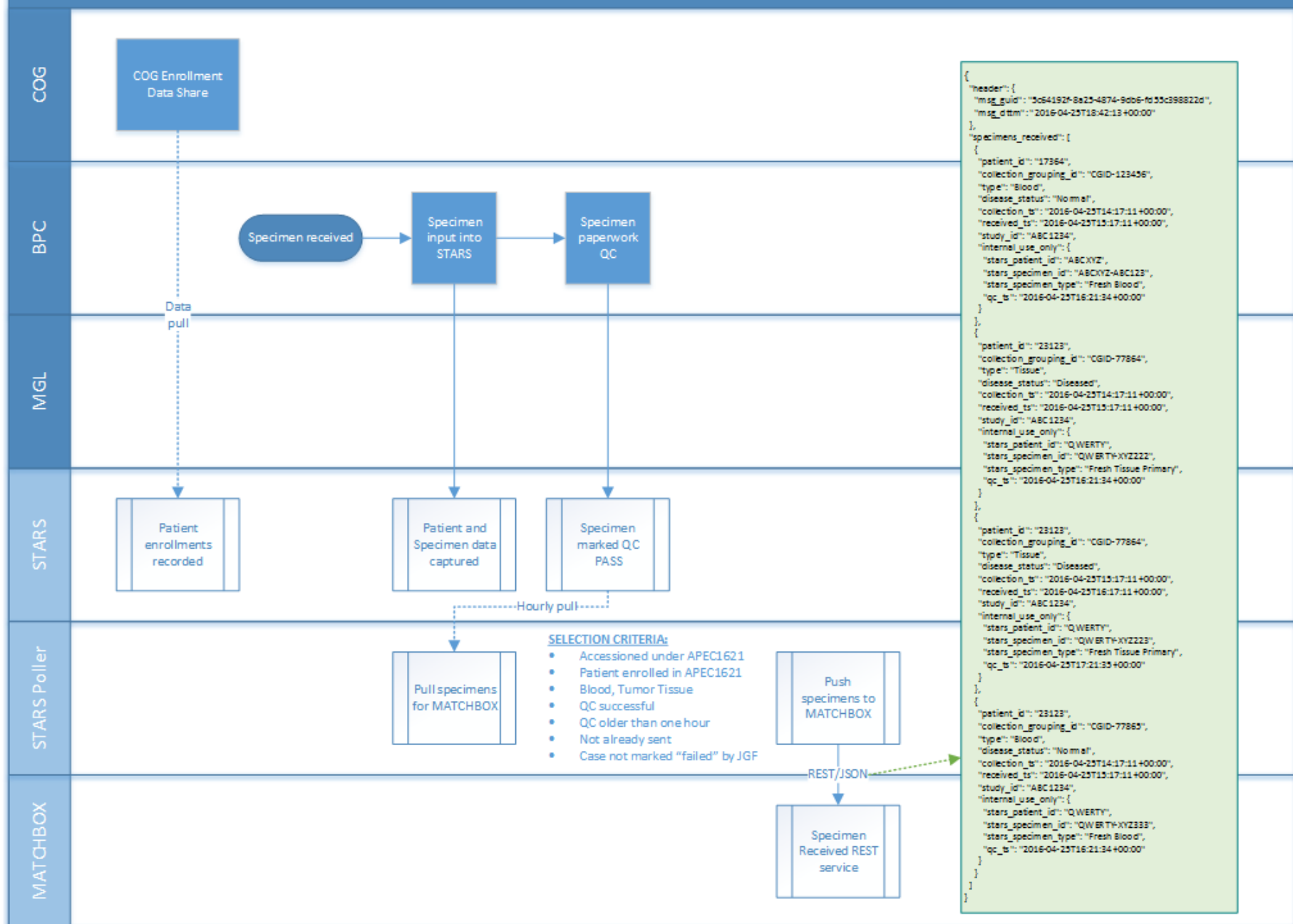
time

Collection Grouping Examples

- Scenario 3
  - First two specimens differ in collection date; Each receives a unique CGID
  - Third specimen arrives at the BPC days later but does NOT reuse the first specimen's CGID since they are not from the same collection and thus not "equivalent" from a PED-MATCH standpoint
    - Cases where BPC requests additional portion of existing specimen (e.g., inadequacy) but site is unable to provide more of the original specimen, instead substituting from another specimen/draw/etc.

CGID=1234   CGID=1235   CGID=1236

Pt# 123, Blood, Collected 10/15/16   Pt# 123, Blood, Collected 10/30/16   …time passes…   Pt# 123, Blood, Collected 11/30/16

time

"Specimen Received" Integration Message

- **<u>DIRECTION</u>**: Outbound from BPC to MATCHBOX
- **<u>TIMING</u>**: Sent when new specimens of interest are detected in STARS
  - Specimen is accessioned under APEC1621
  - Patient is enrolled in APEC1621
  - Specimen type of Blood or Tumor Tissue
  - Accessioning paperwork QC is successful
- **<u>CONTENT</u>**:
  - Technical Message Headers (*msg_guid*, *msg_dttm*)
  - List of specimens
    - PED-MATCH attributes (*patient_id*, *collection_grouping_id*, *type, disease_status, study_id, received_ts, collection_ts*)
    - Additional (troubleshooting) attributes (*stars_patient_id*, *stars_specimen_id*, *stars_specimen_type*, *qc_ts*)
  - Timestamps conveyed in GMT/ISO-8601

BPC / PED-MATCH – Process and Integration Overview – Specimens Received (Success)

COG

COG Enrollment Data Share

BPC

Specimen received → Specimen input into STARS → Specimen paperwork QC

MGL

Data pull

STARS

Patient enrollments recorded

Patient and Specimen data captured

Specimen marked QC PASS

Hourly pull

STARS Poller

Pull specimens for MATCHBOX

SELECTION CRITERIA:
- Accessioned under APEC1621
- Patient enrolled in APEC1621
- Blood, Tumor Tissue
- QC successful
- QC older than one hour
- Not already sent
- Case not marked "failed" by JGF

Push specimens to MATCHBOX

REST/JSON

MATCHBOX

Specimen Received REST service

```json
{
 "header": {
  "msg_guid": "5c64192f-8a25-4874-9db6-fd55c398822d",
  "msg_dttm": "2016-04-25T18:42:13+00:00"
 },
 "specimens_received": [
  {
   "patient_id": "17364",
   "collection_grouping_id": "CGID-123456",
   "type": "Blood",
   "disease_status": "Normal",
   "collection_ts": "2016-04-25T14:17:11+00:00",
   "received_ts": "2016-04-25T15:17:11+00:00",
   "study_id": "ABC1234",
   "internal_use_only": {
    "stars_patient_id": "ABCXYZ",
    "stars_specimen_id": "ABCXYZ-ABC123",
    "stars_specimen_type": "Fresh Blood",
    "qc_ts": "2016-04-25T16:21:34+00:00"
   }
  },
  {
   "patient_id": "23123",
   "collection_grouping_id": "CGID-77864",
   "type": "Tissue",
   "disease_status": "Diseased",
   "collection_ts": "2016-04-25T14:17:11+00:00",
   "received_ts": "2016-04-25T15:17:11+00:00",
   "study_id": "ABC1234",
   "internal_use_only": {
    "stars_patient_id": "QWERTY",
    "stars_specimen_id": "QWERTY-XYZ222",
    "stars_specimen_type": "Fresh Tissue Primary",
    "qc_ts": "2016-04-25T16:21:34+00:00"
   }
  },
  {
   "patient_id": "23123",
   "collection_grouping_id": "CGID-77864",
   "type": "Tissue",
   "disease_status": "Diseased",
   "collection_ts": "2016-04-25T15:17:11+00:00",
   "received_ts": "2016-04-25T16:17:11+00:00",
   "study_id": "ABC1234",
   "internal_use_only": {
    "stars_patient_id": "QWERTY",
    "stars_specimen_id": "QWERTY-XYZ223",
    "stars_specimen_type": "Fresh Tissue Primary",
    "qc_ts": "2016-04-25T17:21:35+00:00"
   }
  },
  {
   "patient_id": "23123",
   "collection_grouping_id": "CGID-77865",
   "type": "Blood",
   "disease_status": "Normal",
   "collection_ts": "2016-04-25T14:17:11+00:00",
   "received_ts": "2016-04-25T15:17:11+00:00",
   "study_id": "ABC1234",
   "internal_use_only": {
    "stars_patient_id": "QWERTY",
    "stars_specimen_id": "QWERTY-XYZ333",
    "stars_specimen_type": "Fresh Blood",
    "qc_ts": "2016-04-25T16:21:34+00:00"
   }
  }
 ]
}
```

"Specimen Received" Integration Message

Terminology (continued)

- Workflow Exception
  - Something that does not follow the happy path
  - Does not necessarily imply failure—could be informative
  - May be a patient-level or specimen-level issue
- Workflow Exception Severity
  - "Advisement" = Correctable situation or status update
  - "Failure" = Non-correctable situation (with likely downside implications for patient's involvement in Ped-MATCH)
- Workflow Exception Details
  - Will include a discrete "exception_reason" from a pre-defined list (e.g., "path_not_concordant"); semantics still being defined—future draft will propose
  - May include a free-form textual "exception_notes" with additional details to help understand the context of the exception (e.g., "Specimen appears to have been contaminated")

"Workflow Exception" Integration Message

```json
{
  "header": {
    "msg_guid": "0391c030-8317-4cbb-82d2-40a091dd5768",
    "msg_dttm": "2016-05-25T18:42:13+00:00"
  },
  "workflow_exceptions": [
    {
      "patient_id": "17364",
      "collection_grouping_id": "CGID-123456",
      "event_ts": "2016-04-25T14:17:11+00:00",
      "exception_severity": "failure",
      "exception_reason": "insufficient_material_available",
      "exception_notes": "Qty of specimen inadequate; Site contacted but no further specimen unavailable",
      "exception_guid": "d4ef1e3b-0226-4fd6-90e7-aaaec3fb6158",
      "internal_use_only": {
        "stars_event_id": 123456,
        "stars_event_entered_by": "jgf"
      }
    },
    {
      "patient_id": "2222",
      "event_ts": "2016-04-25T14:17:11+00:00",
      "exception_severity": "failure",
      "exception_reason": "patient_not_enrolled_on_protocol",
      "exception_notes": "COG data share does not indicate current patient enrollment in AEPC1621",
      "exception_guid": "500a2e62-fce2-45b1-a3fc-fe975e0f0930",
      "internal_use_only": {
      }
    },
    {
      "patient_id": "4444",
      "collection_grouping_id": "CGID-2222",
      "event_ts": "2016-05-25T14:17:11+00:00",
      "exception_severity": "advisement",
      "exception_reason": "insufficient_material_available",
      "exception_notes": "Qty of specimen inadequate; Site contacted 5/25; Awaiting additional specimen",
      "exception_guid": "08f63895-f3b2-4e2d-88ed-22cfff686f96",
      "internal_use_only": {
        "stars_event_id": 234567,
        "stars_event_entered_by": "tabler01"
      }
    }
  ]
}
```

object {2}
  header {2}
    msg_guid : 0391c030-8317-4cbb-82d2-40a091dd5768
    msg_dttm : 2016-05-25T18:42:13+00:00
  workflow_exceptions [3]
    0 {8}
      patient_id : 17364
      collection_grouping_id : CGID-123456
      event_ts : 2016-04-25T14:17:11+00:00
      exception_severity : failure
      exception_reason : insufficient_material_available
      exception_notes : Qty of specimen inadequate; Site contacted but no further specimen unavailable
      exception_guid : d4ef1e3b-0226-4fd6-90e7-aaaec3fb6158
      internal_use_only {2}
        stars_event_id : 123456
        stars_event_entered_by : jgf
    1 {7}
      patient_id : 2222
      event_ts : 2016-04-25T14:17:11+00:00
      exception_severity : failure
      exception_reason : patient_not_enrolled_on_protocol
      exception_notes : COG data share does not indicate current patient enrollment in AEPC1621
      exception_guid : 500a2e62-fce2-45b1-a3fc-fe975e0f0930
      internal_use_only {0}
        (empty object)
    2 {8}
      patient_id : 4444
      collection_grouping_id : CGID-2222
      event_ts : 2016-05-25T14:17:11+00:00
      exception_severity : advisement
      exception_reason : insufficient_material_available
      exception_notes : Qty of specimen inadequate; Site contacted 5/25; Awaiting additional specimen
      exception_guid : 08f63895-f3b2-4e2d-88ed-22cfff686f96
      internal_use_only {2}
        stars_event_id : 234567
        stars_event_entered_by : tabler01

powered by ace

http://www.jsoneditoronline.org/?id=8980b0e336c36ef69c6bd471f07f6c6d

Workflow Exception Scenarios

- Specimen Adequacy
  - Insufficient Material
  - Incorrect/Unexpected Material
  - Requesting additional material
  - No further material available
- Pathology Review
  - Pathology Not Concordant
  - Insufficient Tumor Present / High Necrosis
- Extraction
  - Low Yield / QNS
  - Extraction QC Failure
  - General Laboratory Failure (catch all, e.g., contaminated specimen)
- Patient Issues
  - Patient Identity Mismatch
  - Patient Not Enrolled (based on enrollment data from COG data share)

To be continued…

- Definition of specific attributes for grouping specimens for CGID derivation
- Semantics and messaging scenarios for "specimen failed" messaging

Testing Screen Mock Ups

- …scenarios for JGF…

GitHub Repo

- Public repository

- Read-only access to NCH design documents, sample messages, etc.

- Supports versions and branching

- https://github.com/NCH-BPC-Informatics/pedmatch-arch-docs