



Johns Hopkins Biological Repository

{ *Evolution of an Academic Repository*



Stacey Cayetano
Clinical Laboratory Manager

Brett Purinton
Repository Operations

Then, *circa 1984*

- ⌘ Biorepository established in the JHSPH, Department of Epidemiology in 1984
- ⌘ Largest in JHSPH school
- ⌘ To support large epidemiology and natural history studies of HIV and other infectious diseases
- ⌘ 4,000 square feet in JHSPH
- ⌘ ~110 upright and chest mechanical freezers

The Vision

- ⌘ Develop a repository and clinical core resource for JHSPH
 - ⌘ Establish the Johns Hopkins Biological Repository
- ⌘ Feasibility Analysis/Business Plan
- ⌘ Dean's office approach
- ⌘ Space constraints in JHSPH
- ⌘ School's 7-year strategic plan

1. Go Green!

Now, *circa 2012*



JOHNS HOPKINS
SCHOOL of PUBLIC HEALTH

- ⌘ JHBR Service Center:
 - ⌘ ~20 full/part time staff and students



- ⌘ Expanded to an additional 6,000 square feet in a new off-site facility on Shannon Drive (*3 miles from JHSPH and 4 miles from Bayview*)
- ⌘ Supporting more than 40 studies of epidemiology, natural history of HIV infections, epigenetics of Autism, COPD and other chronic diseases

Technical and Practical Aspects

...maintaining an Academic Repository Core

∅ THE MOVE

∅ JHBR Core Academic Services

∅ “Greening the Lab” Initiative

∅ Office of Sustainability analysis

∅ Standards of Excellence

THE MOVE

⌘ Procurement of equipment

- ⌘ Capital purchase, depreciation charged annually

⌘ Transfer of material from mechanicals

- ⌘ -80°C storage --- moved by truck, transferred to cryounits on site

- ⌘ -150°C storage --- transferred to cryounits at JHSPH, cryounits moved by truck

⌘ Storage temperature changes/considerations

JHBR Academic Services

⌘ Specimen Management Core

⌘ Sample acquisition
⌘ Processing

⌘ Testing Core

⌘ HIV, HCV, HBV, VL

⌘ Repository Core

⌘ Storage
⌘ Distribution



“Greening the Lab” Initiative



Mechanical freezers

VS.



Cryogenic Units

- ⌘ Minimum facility infrastructure needed; no HVAC, energy efficient
- ⌘ Frozen Sample Capacity (~38,000 vials/freezer VS. ~75,000 vials/cryounit)
- ⌘ Response time for alarm (30 min. for freezers VS. 10 days before product starts to warm)
- ⌘ Lessons learned from Superstorms (Hurricane Katrina and Sandy)

JHU Office of Sustainability

2012 Report



OUR MISSION: The Office of Sustainability provides tools and strategies to the Johns Hopkins community so that the institution is more sustainable and remains strong and vibrant.

OUR VISION: Sustainability is smart and responsible actions that prioritize people, natural resources, and finances to safeguard the health of future generations.

JHU Office of Sustainability

2012 Report



⌘ Preliminary data show:

- ⌘ 50% reduction in energy consumption in mechanical vs. cryogenic units (including production of LN_2), resulting in a overall 3.3% reduction in energy consumption in the JHSPH
- ⌘ Projected reduction in greenhouse gas emissions of 220 metric tons of CO_2

Standards of Excellence



⌘ CLIA, CAP, AAB, VQA, GCLP

⌘ Laboratory Safety

⌘ Annual required by JHMI

⌘ ISBER member

⌘ DNA quantification and Purity Proficiency Program

⌘ **CAP Biorepository Accreditation Program – pending**

JHBR at Shannon Drive



Specimen Management Core

- ⌘ Sample receiving

- ⌘ Sample and aliquot creation in FW

 - ⌘ E-transmittals

 - ⌘ Batch Entry

 - ⌘ GUAID

- ⌘ Position management

 - ⌘ Virtual freezers and freezer section

 - ⌘ Assigning positions to existing aliquots

- ⌘ Post processing

 - ⌘ Aliquot tracking

 - ⌘ Sub-aliquot creation

 - ⌘ Shipping Module

Sample Receiving

Local
Study
Sites

- Hand Delivered
- Batch entry:
 - E-Transmittal Import

National
Study
Sites

- Shipped overnight
- Batch entry:
 - E-transmittal Import
 - Scanned Field

Specimen
Management
Core

```
graph TD; A[Local Study Sites] --> D[Specimen Management Core]; B[National Study Sites] --> D;
```

E-Transmittal

	Sample ID	STUDY	Visit Type	Visit	Sample Date	Lab Code	Draw Time	SERUM	HIV/Hep	Liver Prof	PBMC	FLOW	VL	EDTA	CBC- Diff, PLT	Hgb A1C	Chem Profile	BUN/Creat	Protein Urine	Pap	OTHER	Phleb
1	38354	ALIVE	V	07	5/28/13	1	9:46 AM	2	0	1	1	1	1	1	1	0	0	0	0	0		RS
2	79044	ALIVE	V	12	5/28/13	1	10:05 AM	2	0	1	1	1	1	1	1	0	0	0	0	0		RS
3	12431	ALIVE	S	20	5/28/13	0	10:27 AM	2	1	1	0	0	0	1	0	0	0	0	0	0		RS
4	30434	ALIVE	S	13	5/28/13	0	10:42 AM	2	1	1	0	0	0	1	1	1	1	1	0	0		RS

⌘ Electronic manifest of incoming samples

⌘ Generated by study personnel

⌘ Batch Entry:

⌘ Imported directly to FW to create samples

⌘ No hand entry by JHBR staff, all study data is generated by the study staff

Batch Entry

- ⌘ E-transmittal used to import ID's to batch entry format
- ⌘ Study specific batch entry
 - ⌘ Aliquots auto generated with volume information per study design



E-transmittal Import

- ⌘ Sample collection data and test requisitions
 - ⌘ Ex: Collection Date, Blood Volume, Vacutainer Types
 - ⌘ Tests: HIV, HIV Viral Load, Urinalysis, RPR
- ⌘ All subject labels printed simultaneously

GUAID

(Globally Unique Aliquot ID)

- ⌘ FW generated unique identifier for every vial
- ⌘ 2-D bar code and human readable on every label



- ⌘ Benefits:
 - ⌘ Easily select individual vials from the database during work flow
 - ⌘ 'Select By Scanned Field'
 - ⌘ Track all aliquots with a single identifier instead of combinations of identifiers
 - ⌘ GUAID Vs. Sample ID + Sample Date + Sample Type
 - ⌘ Easily ship/update vials during sample pulls or testing
 - ⌘ GUAID provides an easily linked blind ID for testing

Position Management

⌘ Virtual Freezers Vs Physical Freezers

- ⌘ No tracking of shelf/rack information
- ⌘ Freezers are established with a 1-999 box count

⌘ Benefits:

- ⌘ No dealing with different freezer configurations and sizes
- ⌘ No transferring electronic data when units go down
- ⌘ Larger quantity of physical boxes per virtual freezer

⌘ Real time scanning and assigning of positions

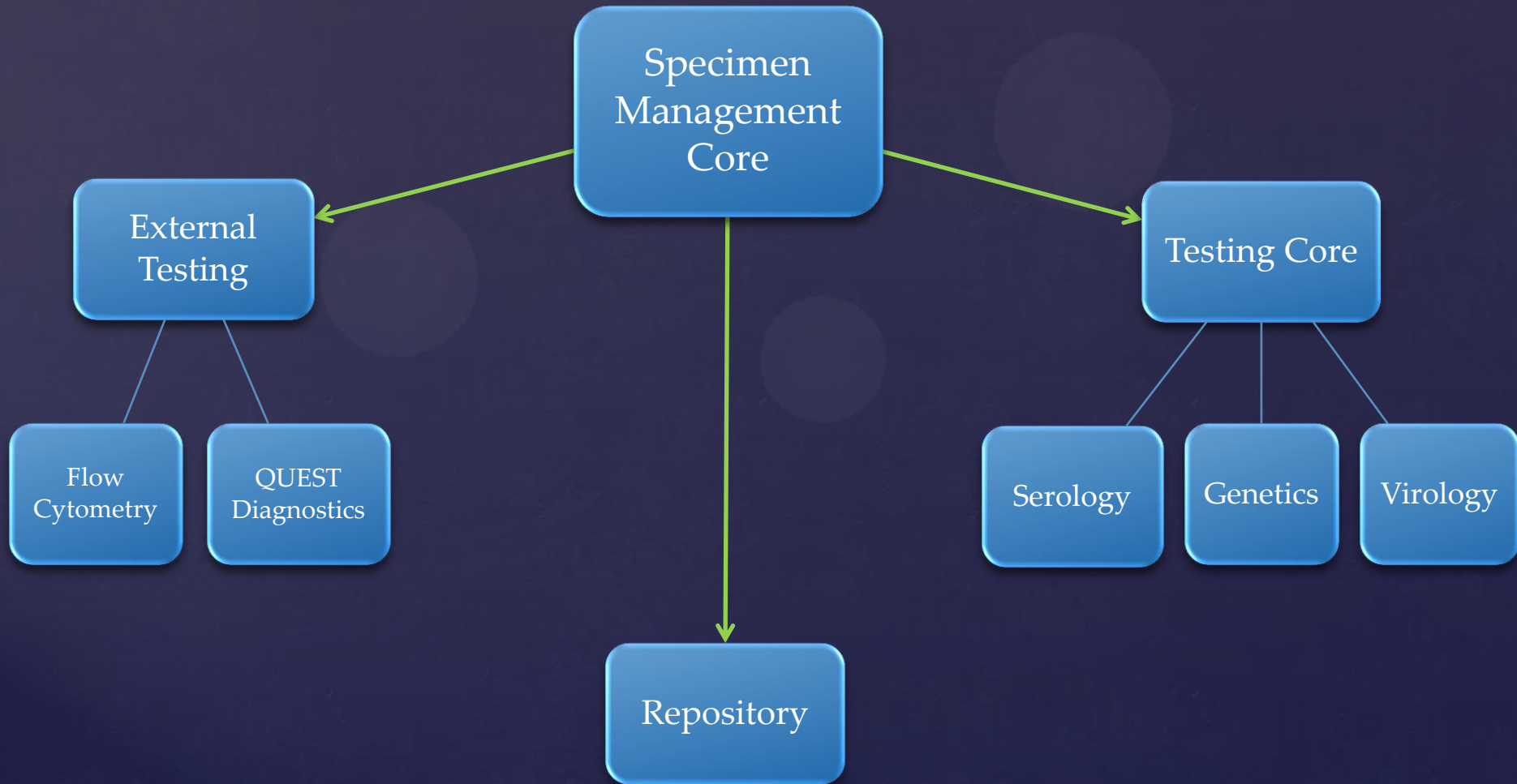
- ⌘ 'Select By Scanned Field'
- ⌘ 'Assign Positions to Existing Aliquots'

⌘ Benefits:

- ⌘ NAP tracked
- ⌘ Easily QC positions while putting vials away
- ⌘ Easily adjust pre-set volume in aliquots if necessary



Post Processing Work Flow



Aliquot Tracking

- ⌘ Sub-aliquoting

- ⌘ Used for all down stream processes

- ⌘ DNA/RNA Isolation

- Parent = WBC; Sub-Aliquot = WBC DNA*

- ⌘ Serologic Test Results

- Parent = Serum; Virtual Sub-Aliquot = SERO TST*

- ⌘ Virologic Test Results

- Parent = EDTA Plasma; Virtual Sub-Aliquot = VIRO TST*

- ⌘ Pull, aliquot and ship protocols

- ⌘ Tracks parent source of sample or data

- ⌘ Parent Vial Updates and the Shipping Module

Generating Run Lists

- ⌘ Test requisitions come in with the sample on the e-transmittal
 - ⌘ Simple binary system 1 = test, 0 = no test
- ⌘ Advanced Search
 - ⌘ Weekly/Bi-weekly advanced search generates a list of ID's that have had tests requested
 - ⌘ Technician exports a run list and pulls from the testing repository
 - ⌘ Sub-aliquots are generated
 - ⌘ Sub-aliquot sample type = test requested by study personnel

Test Results

- ⌘ Lab tests are all run using an individual GUAID instead of a Sample ID
- ⌘ All electronic data is exported from automated instrumentation
- ⌘ Final run result files are imported directly into FW utilizing the GUAID
 - ⌘ Example aliquot UDF's: Test Result, Operator, Flag, Assay, OD Value, Control Values

CLIA Certified Test Result Reporting

- ⌘ Test results are exported from FW with sample identifying information attached
- ⌘ Lab Manager and Lab Director review and approve results before being sent to study personnel

JHBR Billing

- ⌘ JHBR is a not for profit service center
 - ⌘ Studies are billed only for aliquots created
 - ⌘ Rates are calculated on a yearly basis to balance revenues and expenditures
- ⌘ Monthly Invoicing
 - ⌘ Advanced search
 - ⌘ Count Report by 'Aliquot Sample Type' provides N's for study invoices

Search Parameters | Schedule Options

Search Name: Make Search: ☒ Public
☐ PrivateTable to Search: Notes: Select FieldSelect Comparison OperatorEnter Value or Select Field

▼ Samples

- # of PBMC (10mil)
- # of PBMC (5mil)
- #PBMC Frozen
- 260/280
- ACTG
- ACTG PID
- Anal Pap
- Appointment Time
- Attachment Alias
- BAL

is equal to

is not equal to

is greater than

is greater than or equal to

is less than

is less than or equal to

contains

does not contain

empty field

non-empty field

Value Optional FiltersMaximum Number of Aliquots to return: Max Number of Aliquots per Sample to return:

Add a line:

Modify SearchSearch Expression Preview

STUDY is equal to MACS CVD 2
(and Aliquot Creation Date is greater than or equal to 05/01/2013
and Aliquot Creation Date is less than 06/01/2013)
and Freezer Section Name non-empty field
and Parent Aliquot ID is equal to 0



Previous

Next



Execute Search



Help



Save



Cancel

Historic Data Merge

- ‡ JHBR services began in mid 1980's
 - ‡ Historic repositories were tracked on paper and hand entered into study specific databases by DCC's
- ‡ Upload of historic data into FW
 - ‡ Within the last 36 months ~1 million vials of historic data has been imported to our FW database
 - ‡ 2 Step process
 - ‡ Import to create sample records
 - ‡ Import sample type specific repositories to create aliquots under sample records
- ‡ Repository audit
 - ‡ E-audit: Comparison of FW export to DCC repository
 - ‡ Physical audit: 5-10% physical vial QC with FW Export

DCC Data Integration

- Internal to JHSPH

 - Limited direct access

 - Read access only

 - Pre-formatted advanced search

 - Pre-formatted repository export



- External to JHSPH

 - FROST via SOAP Server

 - Read access only

 - Pre-formatted advanced search

 - Pre-formatted repository export



Contact Us

⌘ WEBSITE: <http://www.jhsph.edu/biorepository/>

⌘ GENERAL EMAIL: jhbriab@jhsph.edu

⌘ DIRECTOR:
Homayoon Farzadegan, hfarzade@jhsph.edu
Phone: 410-955-3786

⌘ MANAGER:
Stacey Cayetano, smeyerer@jhsph.edu
Phone: 410-502-0182

⌘ MAILING/SHIPPING:
Johns Hopkins Biological Repository
Johns Hopkins Bloomberg School of Public Health, Room W6620
615 North Wolfe Street
Baltimore, MD 21205
Phone: (410) 955-7203
Fax: (410) 614-2640

*Thank you Dataworks for the
opportunity to introduce JHBR*



The only academic cryogenic facility within Johns Hopkins University