Technologic and Operational Best Practices

Elizabeth H Hammond MD
Vice Chair, Group Banking Committee NCI

NATIONAL CANCER INSTITUTE

Scope of Presentation

OBBR Office of Biorepositories and Biospecimen Research

- Definition of Repositories
- Scope of the Qualified Sample Issue
- Best Practice Resources
- Specimen Handling and Processes
- Monitoring and Storage
- Packaging and Shipping
- Data and Consent Issues

Biospecimen Repository Definition

OBBR Office of Biorepositories and Biospecimen Research

- Collection of human specimens and associated data for research purposes
- Physical entity where the collection is stored
- Formal organizations
- Informal collections
- Individual researchers

Scope of Qualified Sample Issue

OBBR Office of Biorepositories and Biospecimen Research

- Samples stored as a virtual tissue resource.
- Samples collected under variety of protocols without standardization or collaboration among collecting entities
- Samples collected without specific regard for defined uses like RNA extraction or proteomics
- Best practice resources exist but adoption is slow
- Reimbursements for collection do not cover costs involved, This creates a strong incentive to ‘make do’ with resources on hand

Magnitude of Issue

OBBR Office of Biorepositories and Biospecimen Research

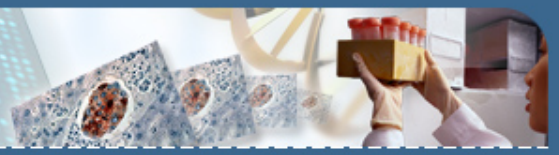
Cancer Genome Atlas Project found that only 2-4% of frozen samples in best available repositories were qualified for their project

Cancer Genome Atlas
Search for Qualified Samples

OBBR Office of Biorepositories and Biospecimen Research

	Repository 1	Repository 2
Frozen Samples in Collection	5000	1200
Samples meeting specifications (no physical review)	1392	120
Samples meeting specifications (physical review, but no pathology review)	174	18
Sample yield if all pass pathology review	3.5%	1.5%

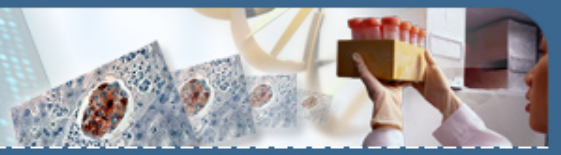
Data courtesy OBBR, Martin Ferguson presentation



Best Practice Resources

OBBR Office of Biorepositories and Biospecimen Research

- **ISBER: www.isber.org**
  - *Best Practices for Repositories I: Collection, Storage, and Retrieval of Human Biological Materials for Research Materials for Research* **(Cell Preservation Technology Vol 3, 2005)**
- **NCI: http://biospecimens.cancer.gov/practices**
  - *NCI Best Practices For Biospecimens Resources.*



Specimen Handling

OBBR Office of Biorepositories and Biospecimen Research

- **Protocol must be clear, specific and flexible**
  - Anticipate clinical situations for biopsy consent issues
  - Create and use template documents
  - Use charts to simplify understanding
  - Explain uses of samples so that rationale for specimen handling will be clear
- **Specimen Kits should be customized to the protocol**
  - Include separate instruction sheet
  - Include all necessary tube types/equipment
  - Provide information in variety of formats

Protocol Chart

OBBR Office of Biorepositories and Biospecimen Research

Tissue Requirements Table

Kit Instructions

OBBR Office of Biorepositories and Biospecimen Research

Plug Kit Instructions

Blood Kit Instructions

RNA later Instructions

Specimen Handling, Con't.

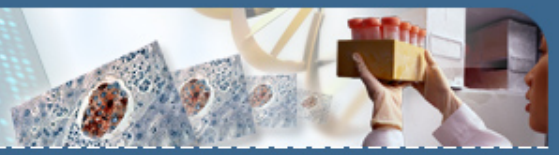
OBBR Office of Biorepositories and Biospecimen Research

- **Accessioning documents must request relevant information in clear data entry format**
- **Appropriate personnel types must be defined**
- **Reimbursement/incentives to appropriate parties must be specified**
- **Help line to answer questions must be readily accessible**

Processing Time and Methods

OBBR Office of Biorepositories and Biospecimen Research

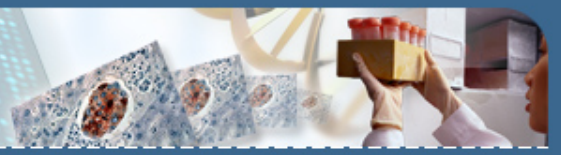
- **Minimize handling time for all tissue types**
- **Create flexible scenarios for each type**
- **Emphasize handling speed**
  - Readily available personnel
  - Readily available kits
  - Readily available equipment
- **Emphasize need to aliquot**



Standardized Procedures

OBBR Office of Biorepositories and Biospecimen Research

- **Standardized institutional process**
  - Customized to workflow
  - Clear, simple customized instructions
  - Separate instructional materials
    - Videos, posters, handouts
  - Available necessary equipment
  - Backup procedures and personnel



Standardized Procedures, Con't.

OBBR Office of Biorepositories and Biospecimen Research

- **Clearly specified training**
  - Who should be trained
  - Who should train them
  - Training content and process
- **Simple redundant communication strategies**
- **Backup procedures**
  - Who to call
  - When to call

Specimen Annotation

OBBR Office of Biorepositories and Biospecimen Research

- **All specimens must be clearly and permanently annotated**
  - Date/time of collection
  - Date/time of freezing
  - If RNAlater is used, it must be noted along with time/temperature of refrigeration
  - Freezing temperature
  - Specimen identification and protocol number
  - Specimen type (pre treatment FNA)

Inventory Tracking

OBBR Office of Biorepositories and Biospecimen Research

- **Specimen tracking should be done according to standardized database elements**
  - CaBIG compatible
  - GBC process
- **Information about quality and quantity of samples remaining provided in universal format so that export to web based system will be simplified**

Storage, Shipping, Disposal

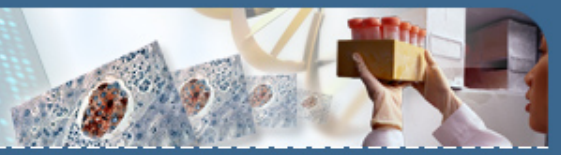
OBBR Office of Biorepositories and Biospecimen Research

- Must be stored in stabilized state
- Must be aliquoted
- Temperature should be appropriate for specimen type
- Temperature must be monitored
- Storage system should promote easy identification of samples for shipping
- Shipping to conform to IATA guidelines

Quality Assurance Monitoring

OBBR Office of Biorepositories and Biospecimen Research

- **All samples must be assessed for quality**
  - Blood collected according to standard protocol
    - Appropriate volume
    - Appropriate anticoagulant/tube type
    - Conditions appropriate to assays planned
  - Tissue with tumor present/absent
    - Assessed pathologically when received
  - DNA/RNA quality and quantity from samples
  - Number of freeze thaw cycles



Consent and Confidentiality

OBBR Office of Biorepositories and Biospecimen Research

- **Provide algorithm to tissue procurement staff about when/where consent must be obtained and using what document**
- **Assure compliance with all federal and local IRB requirements**
- **Assure compliance with all HIPAA and other institutional confidentiality requirements**

Summary

OBBR Office of Biorepositories and Biospecimen Research

- **Success in obtaining samples requires careful preparation and planning**
  - Provide standardized protocol, instructions and training
  - Allow flexible implementation by institution
  - Provide help line to answer questions
  - Comply with all regulations locally and nationally in advance of protocol initiation
- **Monitoring is required to evaluate success including QA of samples, process, and training of personnel**
- **Incentives for procurement personnel must be in place**