Harmonizing Processes and Policies for NCI-Supported Biorepositories

Presentation to National Cancer Advisory Board

September 20, 2005

Presenters

- **Anna D. Barker, Ph.D.,** *Deputy Director for Advanced Technologies and Strategic Partnerships*
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- **Rihab Yassin, Ph.D.,** *Program Director, Division of Cancer Biology*

Compelling Factors that Make Biorepositories and Biospecimens a High Priority for the NCI

NCI: Cancer Led Initiatives Will Benefit All Diseases and Personalized Medicine

- Through our R01s we support the largest contingent of investigators ever assembled to conquer a disease
- Launched caBIG to provide IT infrastructure for "connectivity," and large-scale databases and inter-institutional studies
- Developing a national proteomics-based program in biomarker discovery to provide common technologies and standards
- Collaboratively developing a program to sequence the "cancer genome"
- Nanotechnology initiative to provide advanced systems that can interact with and interrogate cells for diagnosis and treatment

These and many other initiatives required to conquer cancer and realize a future of personalized molecular medicine have one common need – human biospecimens.

Public Trust/Accountability in Government-Supported Biorepositories Is Critical

Health News Daily

NIH Tissue Management System Lacks Explicit Accountability, House Cmte. Says

Thursday, June 23, 2005

The House Energy and Commerce Committee is soliciting details concern
handling of human tissue samples and an explanation for what the panel pe
be a largely ungoverned and vulnerable system.

"There is reason to believe that there are cases where NIH loses hum
samples but has no record of what has been lost," says a June 20 letter to NI
Elias Zerhouni, MD, signed by committee Chair Joe Barton (R-Texas),
Member John Dingell (D-Mich.), Oversight and Investigation Subcommittee
Whitfield (R-Ky.) and subcommittee Ranking Mem

washingtonpost.com AP Associated Press

Committee Seeks Records on Tissue Storage

By KEVIN FREKING
The Associated Press
Monday, June 20, 2005; 6:25 PM

The House Energy and Commerce Committee wrote Dr. Elias Zerhouni on Monday stating that committee staff has learned there is no uniform, centralized authority which regulates the handling of human tissue samples.

Genomic/Proteomic Data May Raise Public Concerns for Genetic Privacy

- Molecular medicine has heightened patient concerns around genetic privacy
- Protection of patient privacy and confidentiality are paramount

Conclusion and Consensus: Biospecimens Are Key to Future of Molecular Medicine

- Biorepositories with high-quality biospecimens and data are needed to:
  - Support the rational development of genomic, proteomic, etc., analysis
  - Identify new targets for therapy, detection, and prevention
  - Develop a molecular-based taxonomy of cancer
  - Integrate huge amounts of molecular and clinical data
  - Ultimately realize the era of personalized medicine

Highlights of NCI's Multi-Year Analysis of Biospecimens and Biorepositories

“Due Diligence” Process

- 2002: NCI leadership identified biorepositories as an area of critical importance
- Unprecedented internal and external review process
  - 2002: Initial NCI surveys, community forums
  - 2003: RAND Report and NBN Blueprint published; Prostate pilot planning initiated
  - 2004: NCI internal study of biorepositories; meetings with NCI staff who oversee biorepositories; Prostate cancer pilot finalized
  - 2005: BCC formed; Dr. Compton joins NCI; whitepapers finalized; two unprecedented workshops

SPORE NBN Pilot Project Is Near Launch

- Concept
  - A study designed to pilot key aspects of an NBN-like concept
- Goal
  - Development of a common biospecimen coordination system and informatics infrastructure for collaborative SPORE projects in prostate cancer

Prostate SPORE National Biospecimen Network Pilot
National Cancer Institute

Home | NBN Blueprint | About the Pilot | Intranet | Calendar | Publications | Contacts

National Biospecimen Network
Concept and Vision:

The Prostate SPORE National Biospecimen Network (NBN) Pilot is a study designed to pilot key aspects of the NBN concept as described in the NBN Blueprint. The NBN concept calls for a national, "best practices"-based tissue resource to manage the standardized collection, processing, storage and distribution of high-quality biospecimens and linked data to support and reduce variability in translational research. The Prostate SPORE NBN pilot will support the development of a common biospecimen coordination system and informatics infrastructure to support collaborative projects related to prostate cancer research currently underway at participating SPOREs across the nation.

- View More Information About the Pilot
- View Blueprint Report
- Public Comments

WHAT'S NEW

FUNDING OPPORTUNITIES

- **Now Available**
  Development of a Common Biospecimen Coordination System and Informatics Infrastructure for NCI Prostate SPOREs
- **Now Available**
  caBIG Year 2 Evaluation Project RFP

CALENDAR

- **April 12-13, 2005**
  Annual caBIG Meeting
  Bethesda, MD
- **April 15, 2005**
  NBN Pilot CDE and Use Case Meeting
  Bethesda, MD
- **May 4-5, 2005**
  Tissue Banks and Pathology Tools Workspace Meeting
  St. Louis, MO
- **May - June 2005**
  NBN Pilot Workflow and Use Case Teleconference Series
- **July 9-12, 2005**
  13th Annual SPORE Investigators Workshop
  Washington, DC

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U.S. Department of Health and Human Services
National Institutes of Health
National Cancer Institute

Inventory of NCI-Supported Biospecimen Resources

- Objectives
  - Estimate number of NCI-supported programs that collect, store, and distribute human biospecimens (excluding individual investigator collections)
  - Estimate number of cancer/normal cases – cancer and normal specimens collected
  - Determine specimen preservation methods
  - Determine use of databases and automated specimen tracking systems
  - Analyze patterns of sample distribution
  - Collect information on SOPs, informed consent, QA/QC measures, and available inventory
  - Estimate the level of NCI funding

Inventory Results

- NCI and the cancer research community can significantly improve our return on investment
- Overall, NCI-supported programs lack:
  - Common SOPs, standards, and management principles
  - Common definitions
  - Computerized, common access to information on specimens and cases
  - Any form of systematic coordination and distribution

At present, the enterprise lacks connectivity and ability to share samples, data, and information.

NCI Biorepository Coordinating Committee (BCC)

- Formed following prior report to the NCAB – and subsequent presentation to the Executive Committee
  - Representatives appointed by NCI Division Directors
- Advises the NCI leadership on issues related to harmonization/policies for NCI-supported biorepositories

Biorepository Coordinating Committee Workshops

Jim Vaught, Ph.D., NCI

Rihab Yassin, Ph.D., NCI

NCI-BCC Sponsored Workshops

- Workshop Descriptions
  - Best Practices for Establishing and Maintaining Biorepositories that Support Cancer Research
    - Mark Rubin, Dana-Farber Cancer Institute, Chair
  - Biospecimen Access and Ethical, Legal, and Policy Issues
    - Arthur Caplan, University of Pennsylvania, Chair
- Overall Approach for Workshops
  - BCC drafted white papers for distribution to workshop participants before the meeting
  - BCC obtained input from workshop experts on key issues, proposed solutions, and questions included in the white papers

Best Practices for Establishing and Maintaining Biorepositories that Support Cancer Research ("Biospecimen Collection Workshop")

July 18-20, 2005

Biospecimen Collection Workshop Goals

- Analyze current issues and propose approaches for harmonizing processes and policies
- Identify and suggest Best Practices to establish and maintain biorepositories to support cancer research
- Address operation, infrastructure, informatics, and quality assurance/quality control issues

Biospecimen Collection Workshop Topics

- Purpose and Use of Biorepositories
- Cross-Cutting Issues for Biorepositories
- Analytical Methods for Biospecimen-based Research
- Best Practices for Biospecimen Collection, Processing, Storage, Retrieval, and Dissemination
- Establishing Biorepository Evaluation and Monitoring Criteria
- Access to Biospecimens
- Designing Repositories to Support Research with Emerging Technologies
- Priority Setting for Biorepositories

Biospecimen Access and Ethical, Legal, and Policy Issues ("ELP Workshop")

June 23-24, 2005

ELP Workshop Goals

- Analyze issues and propose approaches for harmonizing processes and policies
- Facilitate the collection and unencumbered future use of biospecimens and associated data while protecting human research participants and doing better science
- Emphasize NCI-addressable issues, but identify areas where the NCI should partner with other organizations
- Initiate a process including public comment and further engagement of biomedical research community

ELP Workshop Topics

- Informed Consent
- Privacy, Confidentiality, and Data Security Protections
- IRBs and Governance
- Ownership, Legal, and Policy Issues
- Access to Biospecimens and Data

Review of Recommendations

Julie Schneider, D. Phil.

Carolyn Compton, M.D., Ph.D.

Office of the Director, NCI

Overview of Recommendations

- Recommendations include strategies and actions to:
  - Implement first-generation Best Practices
  - Evaluate current biorepositories
  - Address complex ethical, legal, and policy issues
  - Establish management structure to coordinate NCI's future efforts

Goals of the Recommendations

- Optimization of valuable NCI-supported resources
- A “chain of trust” to ensure:
  - Accountability in the protection of patient information
  - Effective stewardship of Federal resources
- Investigator access to the highest quality, privacy-protected, specimens collected and maintained using common SOPs
- Improve quality of resulting scientific data

Recommendation Categories

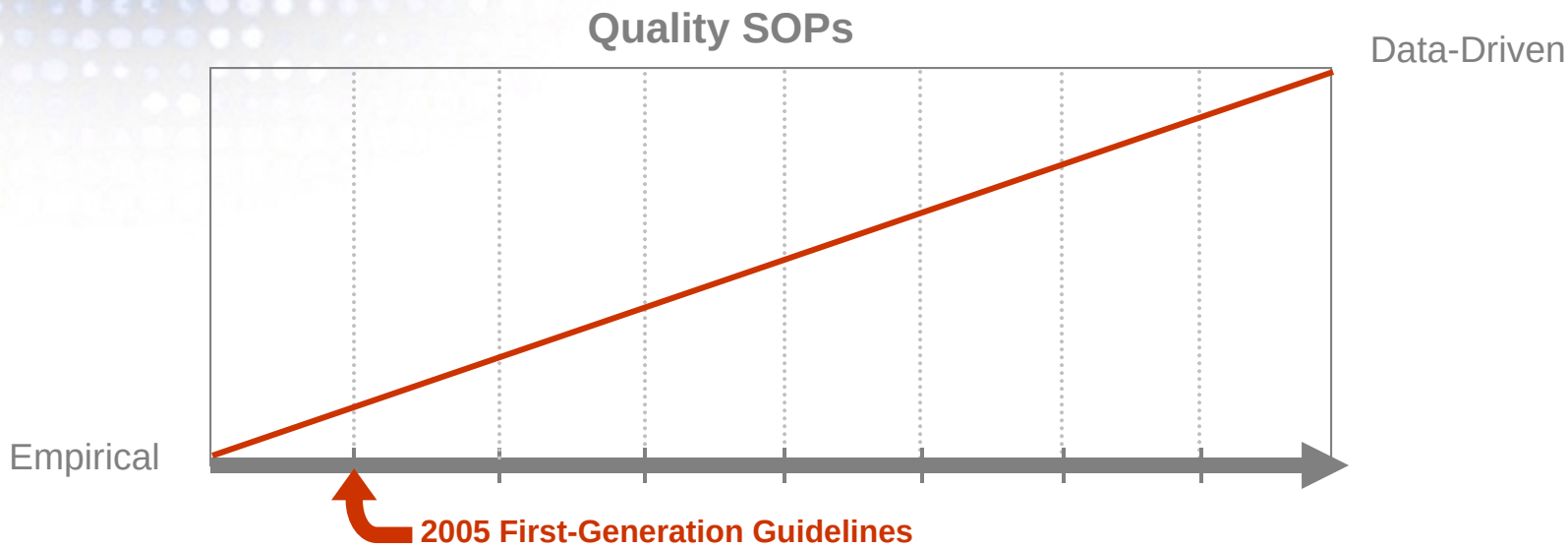
- Optimizing Biorepositories for Cancer Research through Common Best Practices
- Implementing Quality Assurance and Quality Control
- Implementing Informatics Systems
- Categorizing and Assessing Biorepositories
- Addressing Ethical, Legal, and Policy Issues
- Establishing Reporting Mechanisms
- Providing Administration and Management Structure

Recommendations

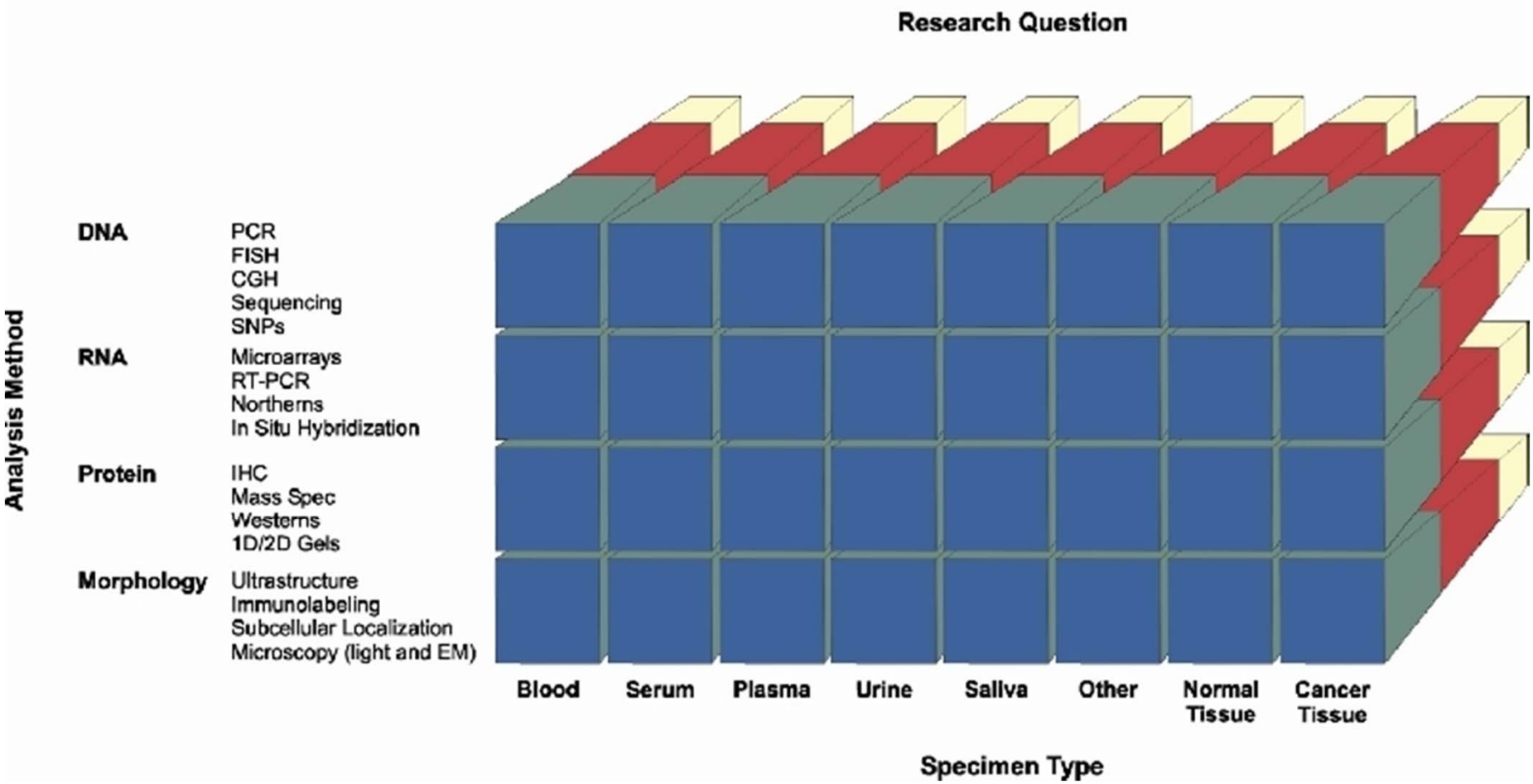
Optimizing Biorepositories for Cancer Research

1 & 2. Adopt “first-generation” collection guidelines and provide them to investigators, and over time evolve them into data-driven best practices

Pathway to Scientifically Validated Biorepository Practices



Suggested Framework for Future Development of 2nd Generation Research-Based Best Practices



Recommendations

Optimizing Biorepositories for Cancer Research, cont.

3 & 4. Define a minimal clinical data set that accompanies each biospecimen and implement a standard validation methodology to ensure accuracy and consistency

Recommendations

Implementing Quality Assurance and Quality Control

5. Implement a quality management system (such as ISO 9000 or GMP/GLP) that minimally includes:
   a) Overall QA/QC policy document
   b) Standard Operating Procedures (SOPs)
   c) Verification of staff training
   d) Documentation of biospecimen quality
   e) QA/QC spot-checking
   f) Periodic compliance auditing

Recommendations

Implementing Informatics Systems

6. Build towards a caBIG-driven informatics system that records and tracks each biospecimen, addressing:

   a) Functionality: *Does it do what the repository needs?*
   b) Integration and Interoperability: *Can it communicate with other systems?*
   c) Development Practices: *Does it follow software development standards?*
   d) Ethical and Legal Issues: *Does it help meet regulatory standards?*
   e) Informatics System Assessment and Auditing: *Can it be used as auditing tool?*

Recommendations

Categorizing and Assessing Biorepositories

7 & 8. Establish guidelines for categorizing biorepositories and then evaluate them based on criteria including:

a) Research mission
b) Level of patient consent
c) Extent of associated clinical data
d) Physical characteristics and quality of biospecimens

Recommendations

Addressing Ethical, Legal, and Policy Issues

9. Develop and promote use of a standard informed consent document
10. Work with caBIG to establish patient privacy protection guidelines, with approaches such as data encryption, coding, and varying levels of staff access

Recommendations

Addressing Ethical, Legal, and Policy Issues, cont.

12. Help develop guidelines (by applying NIH Research Tools Guidelines) to clarify IP issues and the rights of institutions that house biorepositories
13. Provide a model Material Transfer Agreement to facilitate biospecimen sharing across institutions
14. Partner with appropriate organizations to develop guidelines for biospecimen and clinical data distribution, consistent with:
    a) Ethical principles
    b) Laws and regulations
    c) IP policies
    d) Consent form language

Recommendations

Addressing Ethical, Legal, and Policy Issues, cont.

15. Require submission of plans for custodianship of biospecimens and data during and after NCI grant or award
16. Encourage user fees that fairly reflect recovery of costs and assist in developing models and planning tools
    a) Multiple possible models exist
    b) There are numerous complexities due to funding sources and how biorepository costs may be aggregated with other costs

Recommendations

Addressing Ethical, Legal, and Policy Issues, cont.

With other institutes/organizations/agencies:

17. Develop a strategy to harmonize Common Rule, HIPAA, and FDA regulations as applicable to biorepositories
18. Develop a national policy for addressing biospecimen ownership and custodianship issues at the highest appropriate level within DHHS
19. Develop guidelines for disclosing research results to patients

Recommendations

Establish Reporting Mechanisms

21. Collect information on biorepositories to inform funding priorities and decisions
22. Develop a plan and budget to support qualifying existing biorepositories
23. Publicize existing biorepositories to encourage use

Recommendations

Establish NCI Official Office to Oversee and Coordinate Biorepositories and Enable Biospecimen Research

24-27. Implement activities of NCI Office of Biorepositories and Biospecimen Research (OBBR)

a) Ensure that OBBR fulfills:

   i. Biorepository coordination across NCI

   ii. Biospecimen banking research

   iii. Biorepository guidance development, including collaboration with appropriate external professional bodies

b) Establish standing NCI committee (BCC)

c) Establish external advisory committee

Conclusion and Future Directions

- Biobanking as a new area of research
- Professional oversight of biospecimen standards by standards organizations
- Development of new technologies for biorepository operations, and vice versa

Finally, Work With – and Learn From – the Global Community

- UK Biobank: 500,000 participants; $73 million from private/public sources
- National Cancer Tissue Resource: UK; $8 million
- Biobank Japan: 300,000 participants; $180 million in government funds
- DeCode Genetics: 80,000 participants; $135-$250 million to create the Health Sector Database
- Estonia: 100,000 participants expected; $7 million
- Assemble the Key Leaders in 2005 and Initiate Harmonization Discussions

Key Action Items for 2005-06

- Formalize Administrative Structures
  - OBBR and BCC
- Finalize 1st Generation Biorepository Operation Guidelines following Public Comment
- Establish Biospecimen Research Program
  - Intramural – Bethesda/Frederick
  - Extramural – RFAs/RFPs
- Establish a Future Guidelines Development Mechanism
  - Collaboration with Professional Organizations
- Finalize Specimen and Data Access Policies