

# BioRepository Alliance of Georgia - Oncology Program (BRAG-Onc)

The goal of BRAG-Onc is to establish a state-wide process for banking specimens from a population that reflects the ethnic and cultural diversity of the state to support basic, translational, and clinical research.

*The project is a companion for other GCC initiatives: the state-wide clinical trials network GA-CORE, and the Scholars program*

# Organization

- A collaborative network of contributing institutions with a central repository, providing long term storage capabilities and connected by a web based database
- Existing repositories could share data: “virtual repository”
- Resource for Cancer Investigators in GA
- Support from Georgia Cancer Coalition and institutions

# Central Repository at MCG

- Database development, maintenance and security
- Oversight of all compliance functions
- Development of protocols and training personnel at contributing institutions as needed
- Coordinating inventory maintenance and access by investigators
- Exploring additional funding opportunities for BRAG-Onc
- Integration with other GCC and state cancer initiatives

# Governance:

## Oversight at three levels

- External advisory board for the state-wide process
- Steering committee with representatives from all sites
- Local boards for the management of individual nodes in the network

# Biorepository Alliance of Georgia

HAMILTON  
**health**

Hutchison  
Gordon

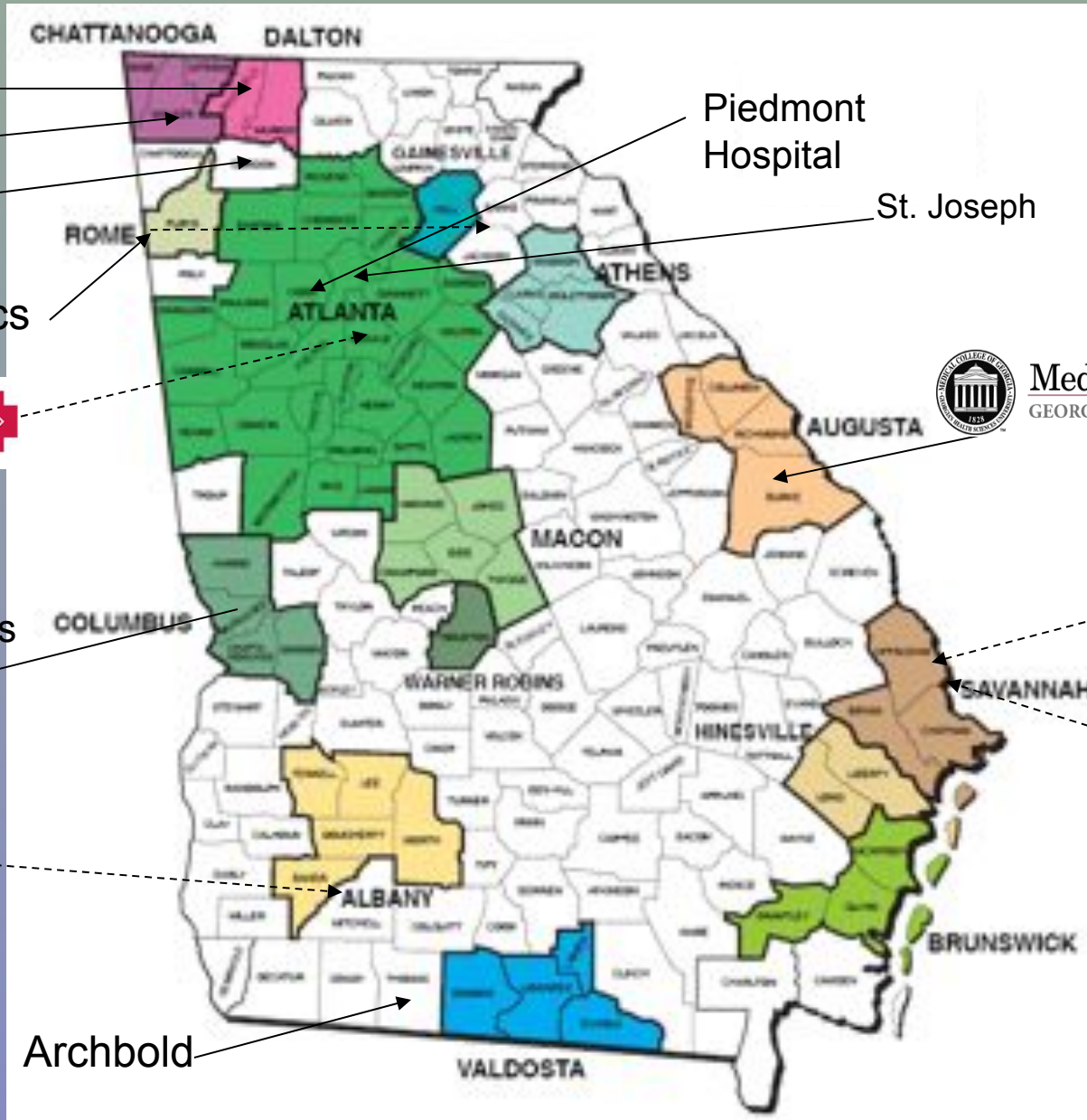
Harbin Clinics

DeKalb  
Medical Center



Amos/Columbus  
Regional

PHOEBE PUTNEY  
MEMORIAL HOSPITAL



Piedmont  
Hospital

St. Joseph



Medical College of Georgia  
GEORGIA'S HEALTH SCIENCES UNIVERSITY

Memorial  
HEALTH  
University Medical Center

St. Joseph's Candler

Archbold

# BRAG-Onc Participating Institutions

Institution	Location	Phase
<b>MCG, Coordinating center</b>	<b>Augusta</b>	<b>Accrual</b>
<b>Amos Cancer Center</b>	<b>Columbus</b>	<b>Accrual</b>
<b>DeKalb Medical Center</b>	<b>Decatur</b>	<b>Accrual</b>
<b>Piedmont Hospital</b>	<b>Atlanta</b>	<b>IRB completed; ready to start accrual</b>
<b>St. Joseph Hospital</b>	<b>Atlanta</b>	<b>IRB</b>
<b>Hamilton Medical Center, NW Regional Hub</b>	<b>Dalton</b>	<b>Accrual</b>
<i>Redmond Medical Center</i>	<b>Rome</b>	<i>Accrual</i>
<i>Floyd Medical Center</i>	<b>Rome</b>	<i>Accrual</i>
<i>Gordon Hospital</i>	<b>Calhoun</b>	<i>Accrual</i>
<i>Hutcheson Medical Center</i>	<b>Fort Oglethorpe</b>	<i>Accrual)</i>
<b>Phoebe Putney Medical Center SW hub</b>	<b>Albany</b>	<b>Accrual</b>
<i>Archbold</i>	<b>Thomasville</b>	<i>Accrual</i>
<b>Lewis Cancer Center, St. Joseph / Candler</b>	<b>Savannah</b>	<b>Accrual</b>
<b>Memorial Health</b>	<b>Savannah</b>	<b>Accrual</b>

# Design

- High quality specimens appropriate for molecular analysis, richly annotated with relevant data (specimen and patient information)
- Obtained with ethical, informed consent
- All tissue specimens examined by pathologists prior to release for banking
- Appropriate data management and security, including honest broker function

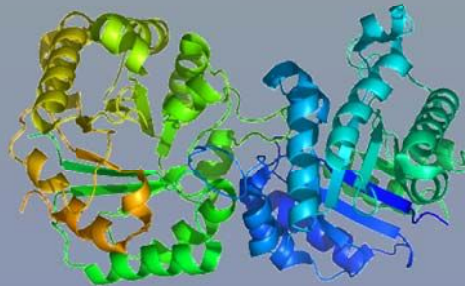
# Molecular Research Using Human Specimens

Finding the targets for detection, therapy, prevention

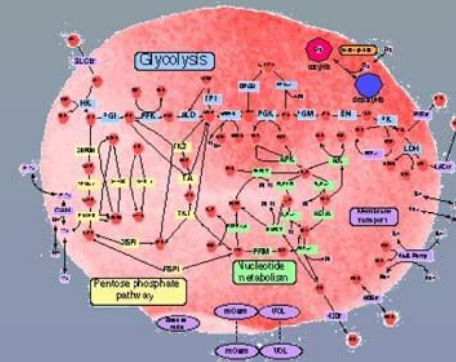
**Genomics**



**Proteomics**



**Metabolomics**



**All Depend  
On High-Quality  
Human Biospecimens**

# TCGA Lessons Learned

*(C. Compton, MD)*

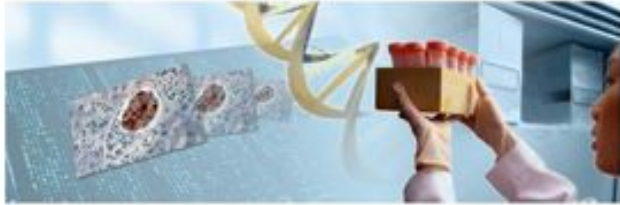
- Biobank inventory drop-out rates as high as 95 – 99%
- Molecular QC failure rates for qualifying samples typically 30%

	<b>Repository 1 (Major Academic Site)</b>	<b>Repository 2 (Major Academic Site)</b>
<b># Frozen samples logged in collection</b>	<b>5000+</b>	<b>1200+</b>
<b># Samples meeting spec upon detailed review of inventory</b>	<b>1392</b>	<b>120</b>
<b># Samples meeting physical/pathological specs</b>	<b>174</b>	<b>18</b>

**Before full pathology review**



# NCI Best Practices for Biospecimen Resources



## National Cancer Institute Best Practices for Biospecimen Resources

June 2007

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

### Objective:

- Provide a baseline for operating standards on which to build as the state of the science evolves
- Accepted by National Cancer Advisory Board, June 2007

# Biorepositories: some basic requirements

- Patient consent and regulatory compliance
- Standardized protocols and QA measures
- Documented QC for specimens (Pathology)
- Long term storage facilities with monitoring and back-up
- Policies for access and utilization
- Appropriate data management system

*Best Practices for Biorepositories*

*NCI and ISBER guidelines*

# Design

- Bank all tumor types, with matched normal tissue and blood samples (biofluids, tumor cells)
- Annotate extensively:
  - a) specimens: collection, handling and storage conditions; quality control
  - b) patients: demographic and clinical information
- De-identified specimens to researchers; “Honest Broker” function for longitudinal studies

# Banking Process

- **Consenting**
- Sample collection
- Inventory management
- Data management

## The team:

- Clinical research nurses
- Surgeon and OR staff
- Pathologist and staff
- Tissue bank personnel
- IT support

# Procurement



Tissue specimens from surgery are banked only after examination by Pathologist



Specimens are rapidly frozen in liquid nitrogen and stored in vapor phase LN at  $-190^{\circ}\text{C}$



MNC isolated from bone marrow and peripheral blood



Serum and plasma obtained from blood

# Types of Specimens

## Collected routinely:

### Tissue:

- Fresh frozen: tumor and matched normal, other control tissue
- Fixed tissue blocks ( in “Molecular Friendly Fixative)

### Blood: serum, plasma, buffy coats

## Available on demand:

- fresh tissue; cells; other biofluids (ascites, saliva, urine, etc.,)

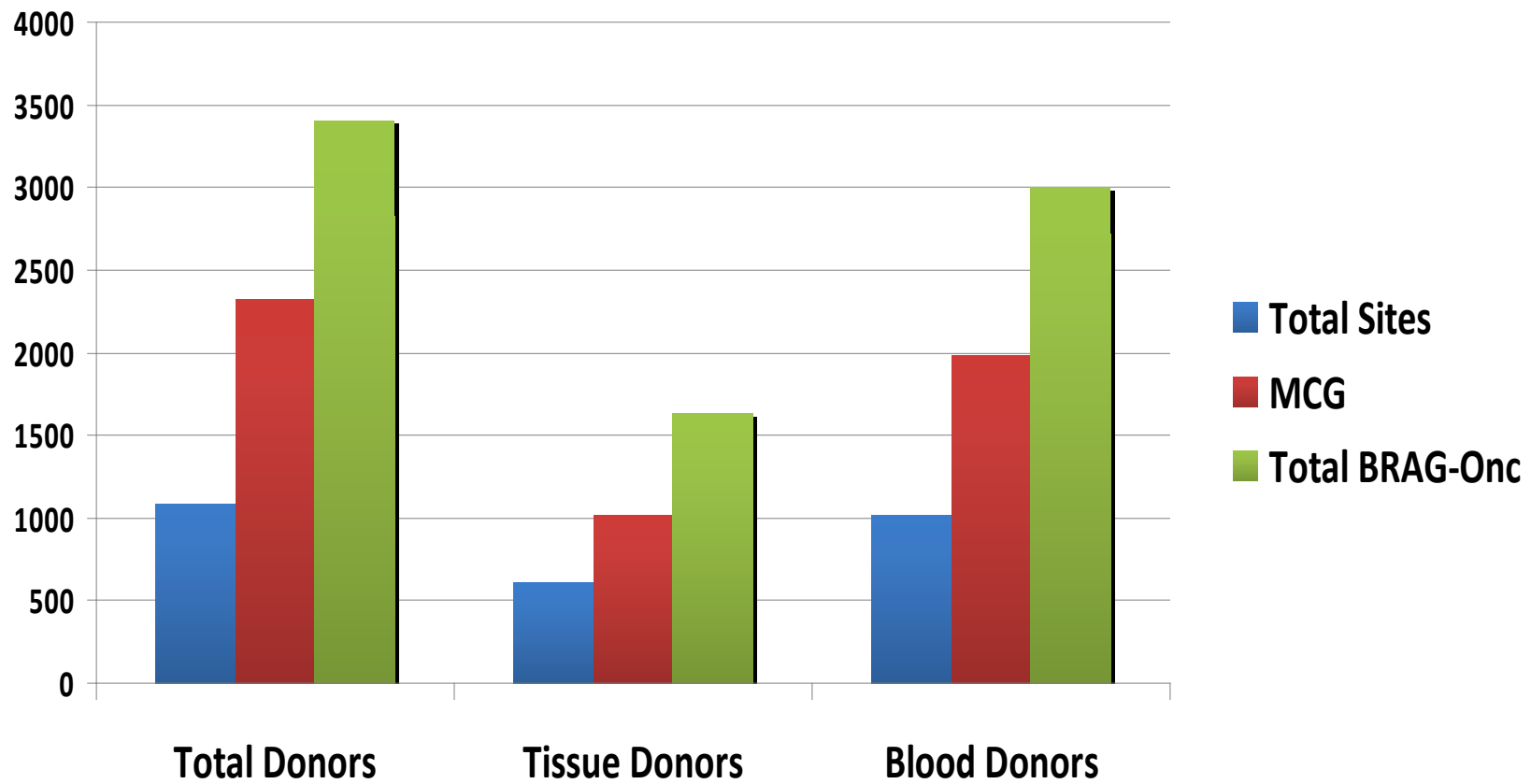
## Other Services

- Molecular derivatives: DNA, RNA, etc.,
- Tissue culture (collaborations): early passage or primary tumor cells
- TMA; LCM, Histology (IHC) with Pathology Research services

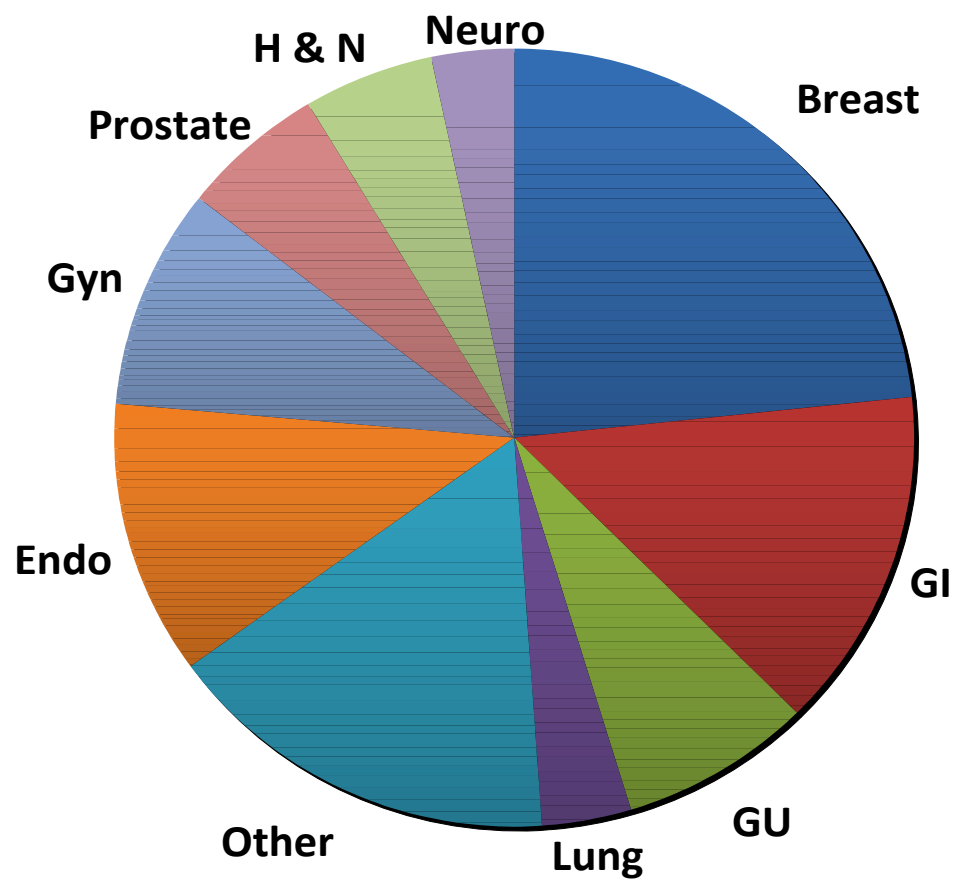
# BRAG-Onc Sample Collection

Site	Consented	Blood	Tissue
Breast	756	709	348
GYN	276	145	200
GU	243	217	126
Prostate	171	162	108
GI	453	389	286
Thoracic/Lung	113	104	68
Neuro	103	87	52
Head and Neck	161	147	45
Other*	541	469	169
<b>TOTALS</b>	<b>2817</b>	<b>2429</b>	<b>1402</b>
	Consented	BM Aspirate	Peripheral Blood
Bone Marrow Donors	550	874	802
<b>Total Donors</b>	<b>3367</b>		

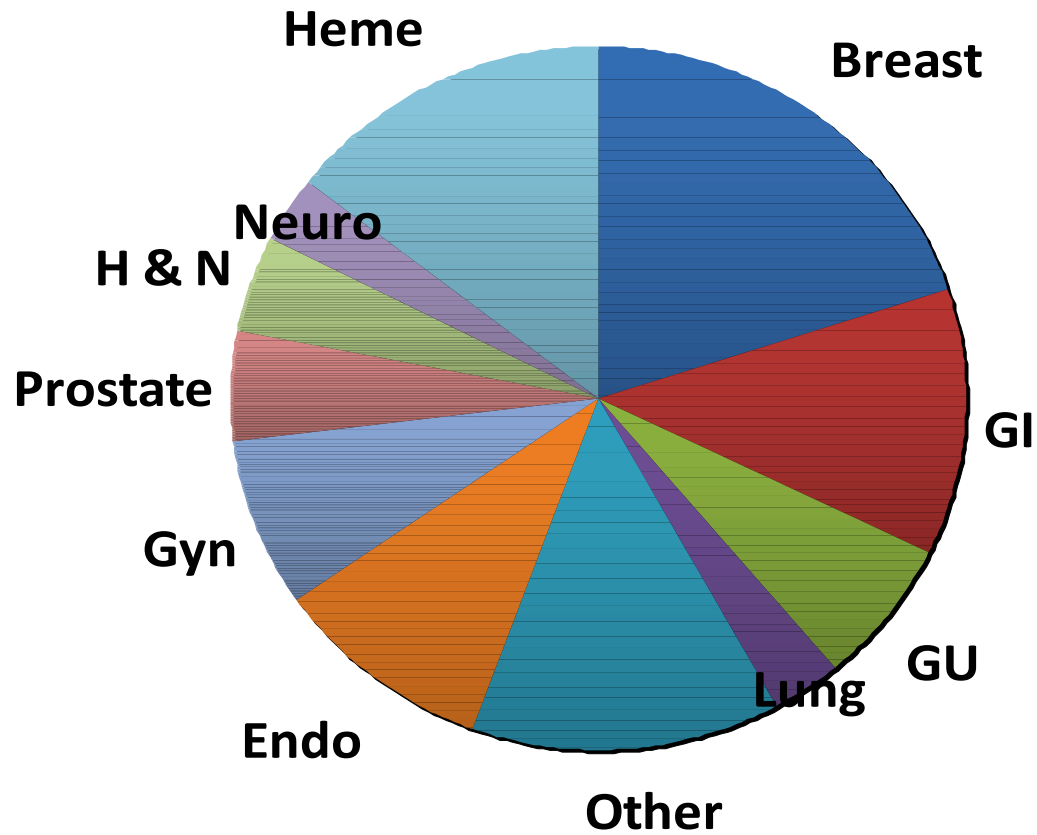
## BRAG-ONC Accrual Summary for 2009



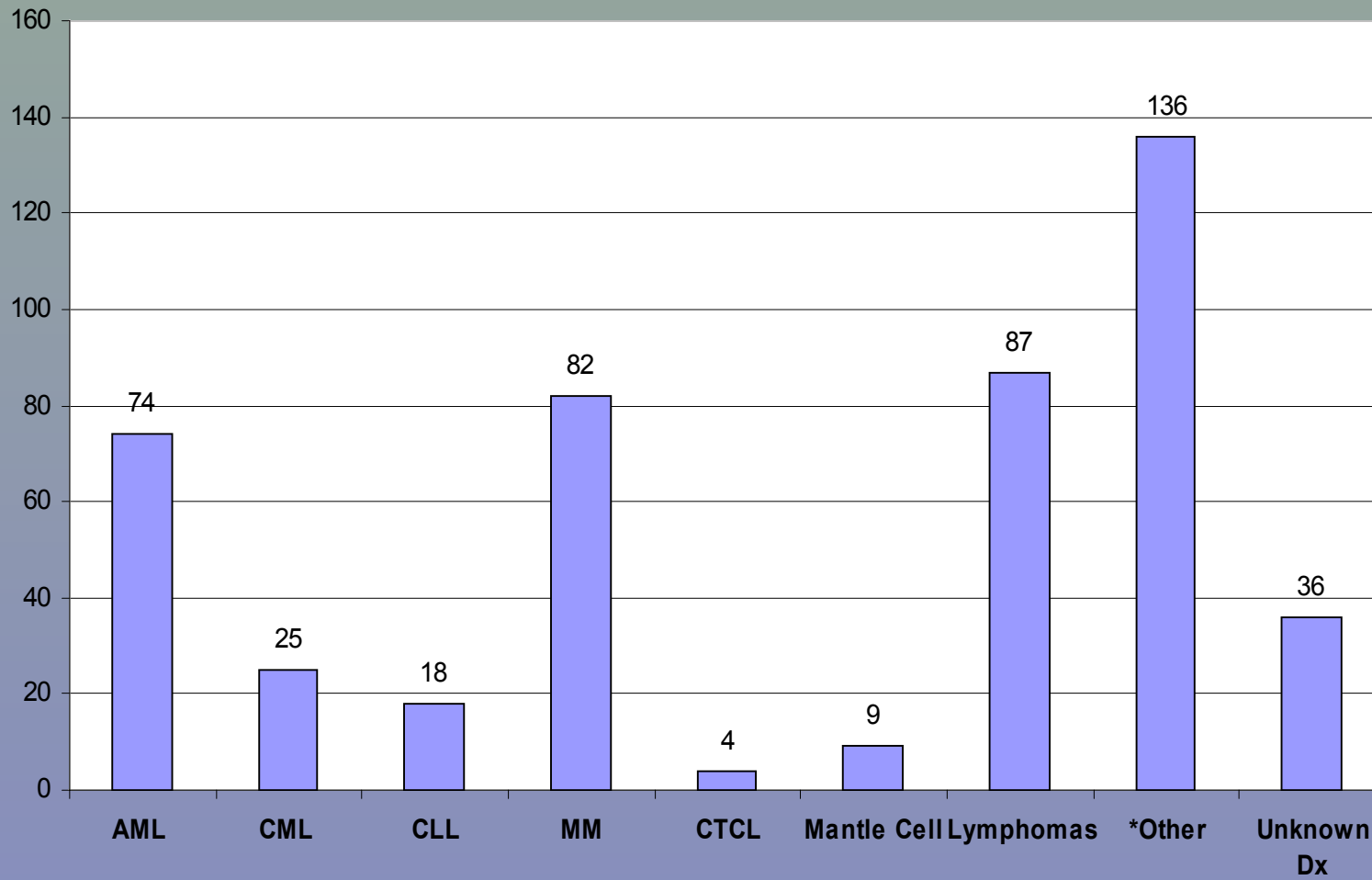
**BRAG-Onc. Accrual by Anatomic Site**



# BRAG-Onc. Accrual by Cancer Site



## Bone Marrow Repository 08.06.09



# Quality Control for Tissue:



- A representative slide is prepared from each tissue specimen and reviewed by a Pathologist; information captured in the database
- Digital images of QC slides stored using *Aperio*; link to repository database

# QC Form

## Edit Sample Properties

Properties

Custom

**QA**

Sharing

Related Samples

Donor

Requests

Attachments

Field Name	Value
% Necrosis	0
% Normal Tissue	0
% Tumor	100
Aliquots Represented	0003401-05 (01-03)
Collection Site (Site of Origin)	COLN
Presumed Tissue Type	Adenocarcinoma

Add

Delete

Link to digital slide in  
*Aperio*

# Access to Specimens

- Steering Committee for policies and process
- Utilization Committee: researchers and clinicians
- Application submission and review



Distribution

# Biorepository Informatics

# Repository Informatics Strategy

- Software:TissueMatrix (web accessible)  
Donor and event driven
- Sample management (inventory):  
procurement and distribution
- Clinical annotation:

# TissueMatrix: web based database



 Inventory Summary	 Database Queries	 Get Sample Information	 Register Samples	 Remove from Inventory	 Place in Inventory
 Move Samples	 Discard Samples	 Dispense Samples	 Create Collection Kits	 Derive Aliquot Samples	
 Security Settings	 System Configuration				

# Specimen Management

- Donor Information: accession and de-identification
- Consent tracking
- Barcoding
- Location of specimens
- Annotation of specimens: conditions (collection, handling, preparation of derivatives and storage) and reference SOPs
- QC information
- Distribution to investigators

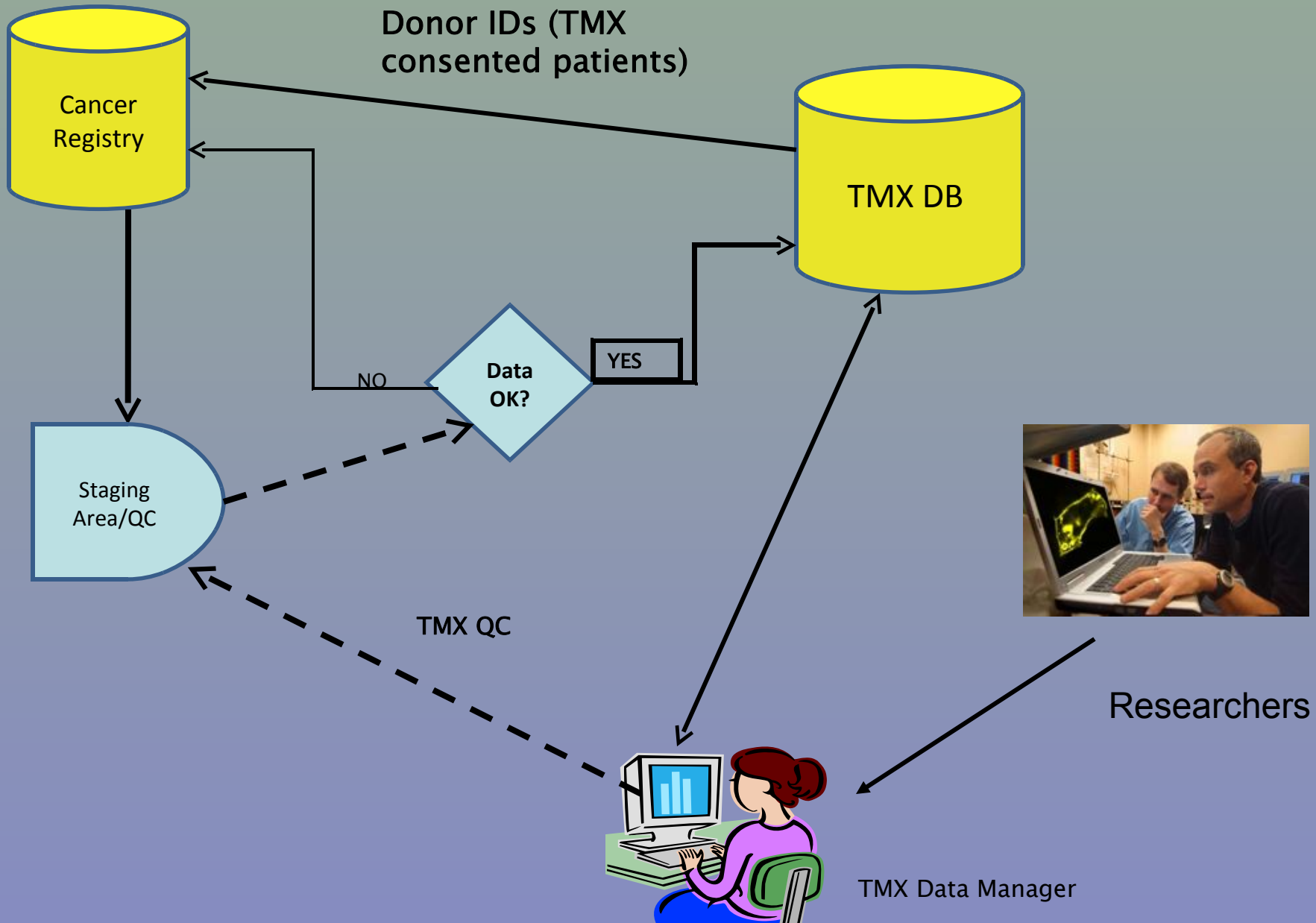
# Clinical Annotation

- Clinical annotation:
  - Access information only for consented patients
  - Pre-filtered from the Cancer Registry and from Pathology Reports

# Cancer Registry

- Demographics
- History
- Tumor information
- Cancer ID
- Staging procedures
- Stage (clin & path)
- Tumor Markers
- Clin history/exposure
- Clinical dx workup
- General
- Surgery
- Radiation Rx
- Chemotherapy
- Complications
- Hormone Rx
- Immunotherapy
- Case status

# Interface between TissueMetrix (TMX) and Cancer Registry

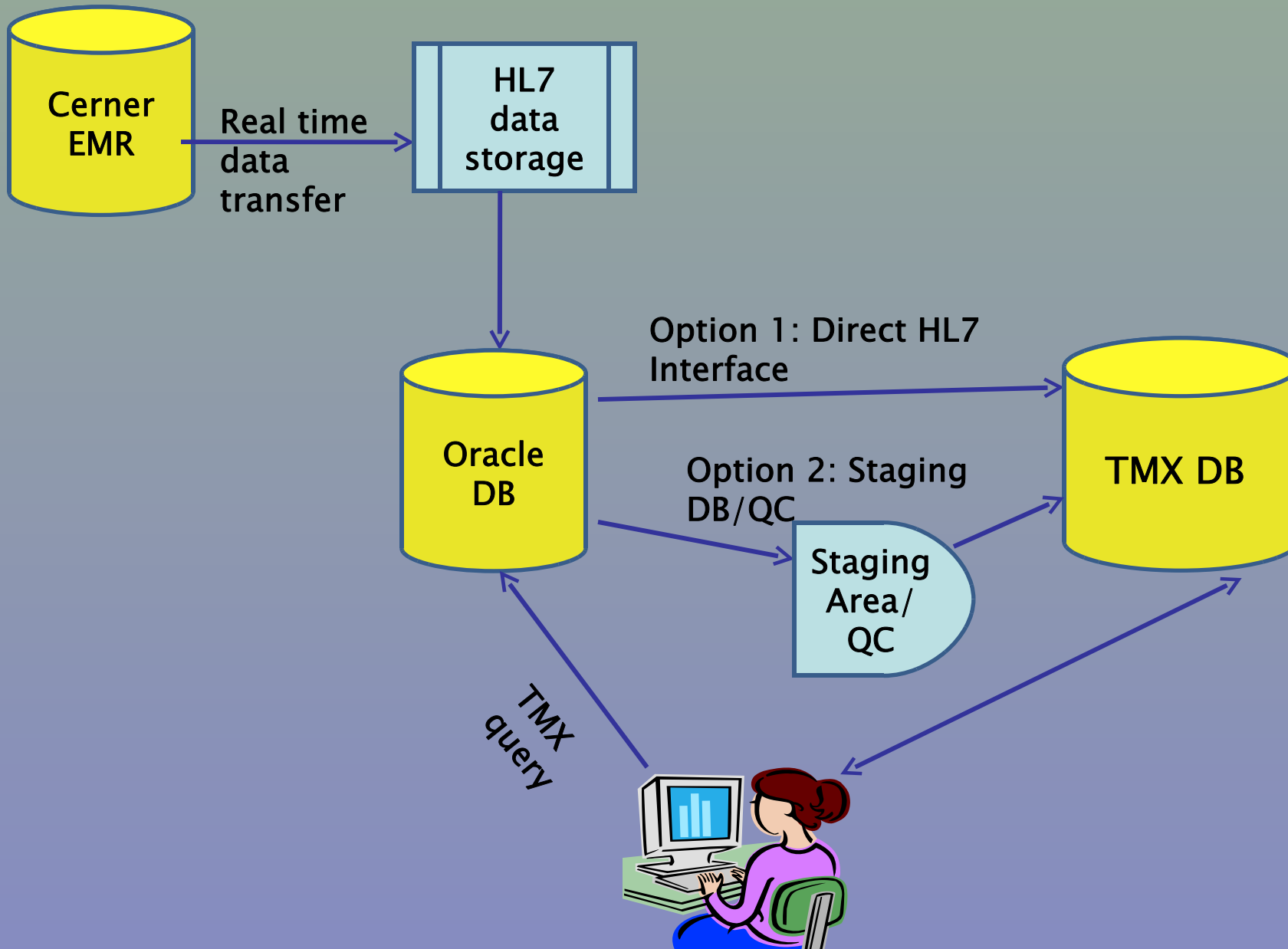


# Annotation

Standardized/codified reporting formats and terminology

- Cancer Registries
- Pathology:
  - *Standard format for surgical pathology reporting: CAP checklist (Synoptic Report)*
  - SNOMED dictionary: standardized terminology*

# Interface between TissueMetrix and Pathology Reporting System





# Challenges.....



CONSENT



CLINICIAN

Sure I want to be involved, just let me know what I have to do be in charge.



PATHOLOGIST

You want me to do more?



RESEARCHER

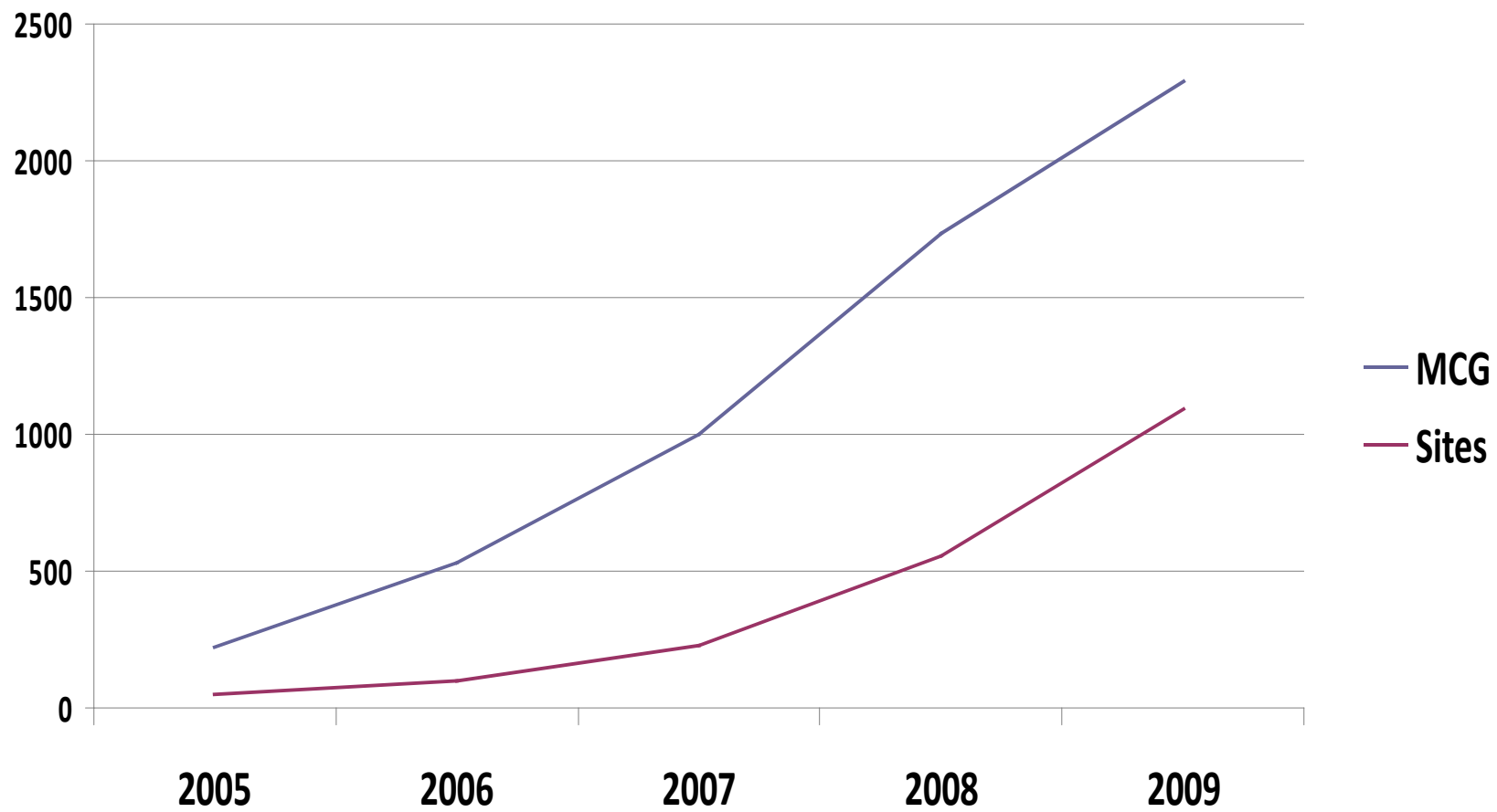
I need 100 samples of tumor and normal brain tissue on Monday !

*C. Morrison, MD*

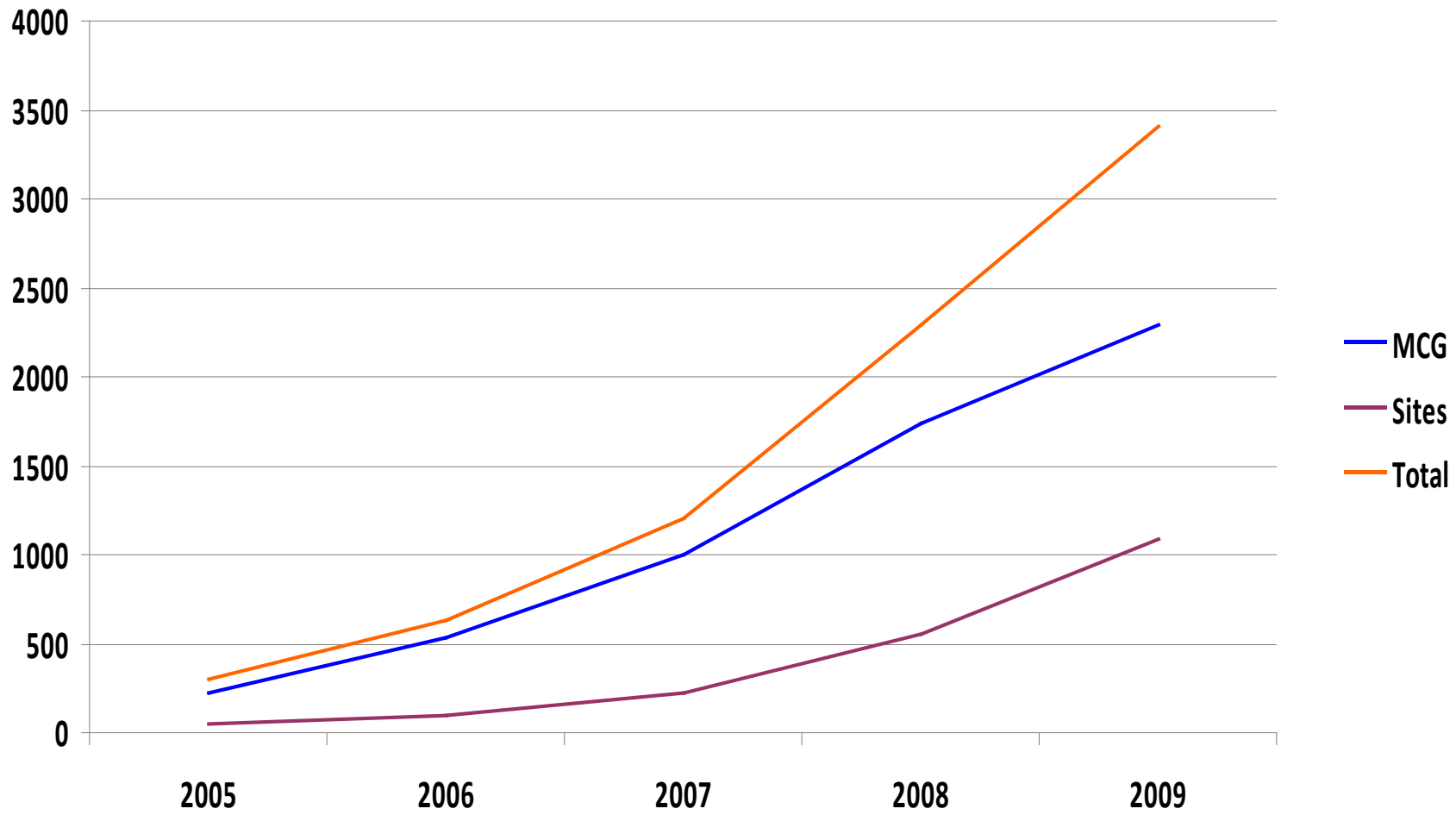
# BRAG-Onc as a resource:

- How the BRAG-Onc repository can support your research

## BRAG-Onc. Cumulative Accrual



# BRAG-Onc. Cumulative Accrual



# BRAG-Onc

- Rate of accrual from participating institutions has increased dramatically
- The collection is rapidly reaching the size and diversity required to support research
- Increased visibility- NCI
- Grant applications for additional sources of funding

## Next:

- Accelerate accrual rate
- Develop mechanism for distribution of specimens
- Complete database development (clinical)  
caBIG: common data elements;
- adopting in the future;
- Collaborations for new funding opportunities

# BRAG-Onc as a resource:

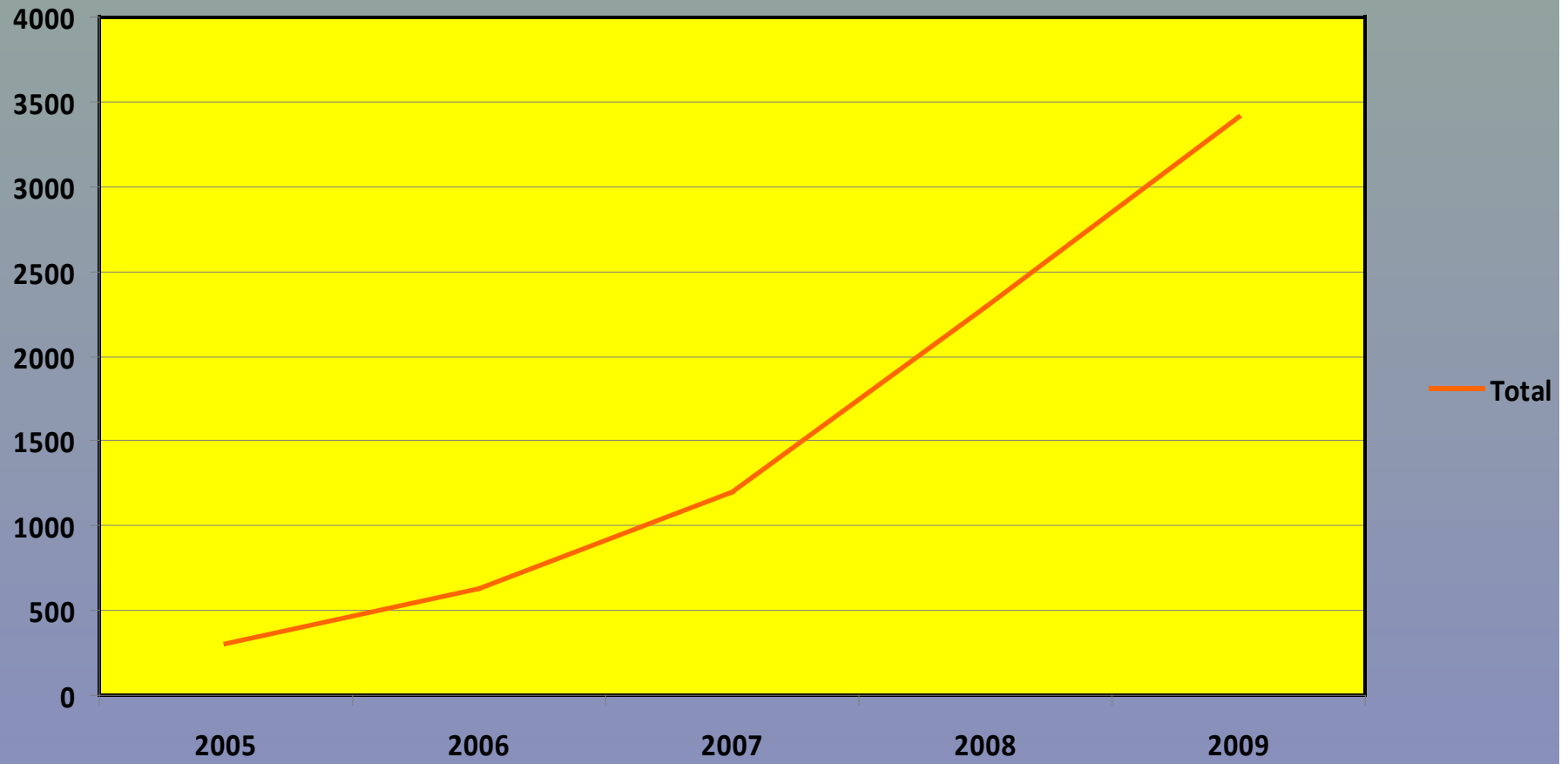
- How the BRAG-Onc repository can support your research
- How the research community can support BRAG-Onc ?

# Building Research infrastructure



- Building and developing
- Sustaining long term

# BRAG-Onc. Cumulative Accrual



# BRAG-Onc Information

- To obtain a copy of specimen inventory
- Obtain a copy of the application for specimens
- To volunteer as reviewer or the Steering Committee
- Suggestions or other information

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706-721-5279

General Newsletters

Conference call with participating sites