Breakout Session
BioSpecimen Science

January 28th, 2008
OBBR Best Practices Forum
Seattle, WA

INTRODUCTION

Beatrice Knudsen, MD., PhD.

Fred Hutchinson Cancer

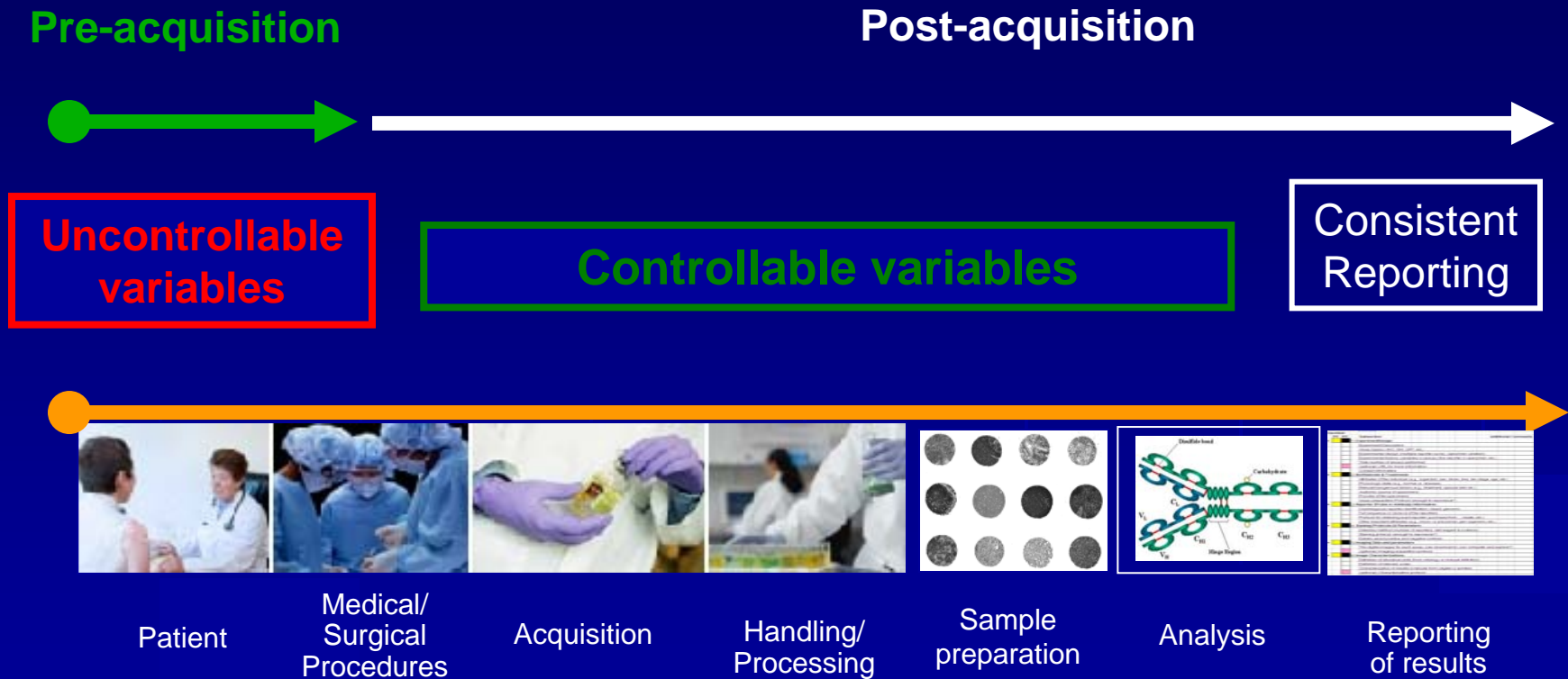Research Center

Seattle, WA

Objectives of the Breakout Session

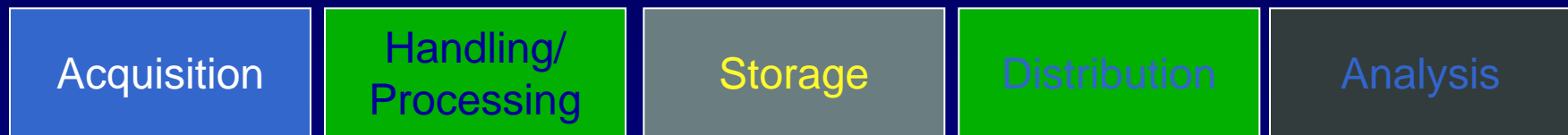Examine problems with collected and banked tissues and how to overcome them

- How preanalysis conditions affect tissue quality

- Efforts towards understanding, recording and standardizing conditions that affect measurements in tissues

- Discussion of the most important improvements that are needed for the collection and banking of high-quality tissues

Lifecycle of a Biospecimen Sources of Variability

Pre-acquisition

Post-acquisition

Uncontrollable variables

Controllable variables

Consistent Reporting

Patient

Medical/ Surgical Procedures

Acquisition

Handling/ Processing

Sample preparation

Analysis

Reporting of results

Adapted from Dr. Moore

Post-surgical Causes of Variability

Acquisition	Handling/ Processing	Storage	Distribution	Analysis

○——————————— Degradation of Bioanalytes ————○

Transit time | Fixative
Fixation time
Processing | Temperature
Humidity
Atmosphere | Handling | Sample preparation

↑

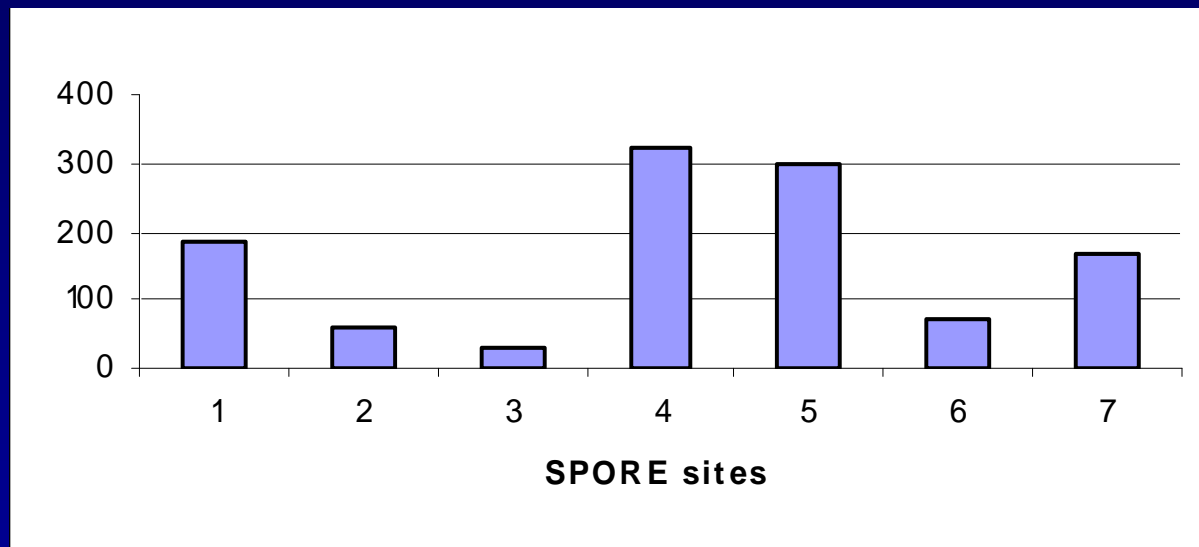Inter-SPORE Biomarker Project
IPBS Study
ENDPOINT MEASURE:
IMMUNOHISTOCHEMISTRY
FOR PROTEIN DETECTION

IPBS Study: Variability in Tissue Processing

Data from 7 academic centers on tissue processing time
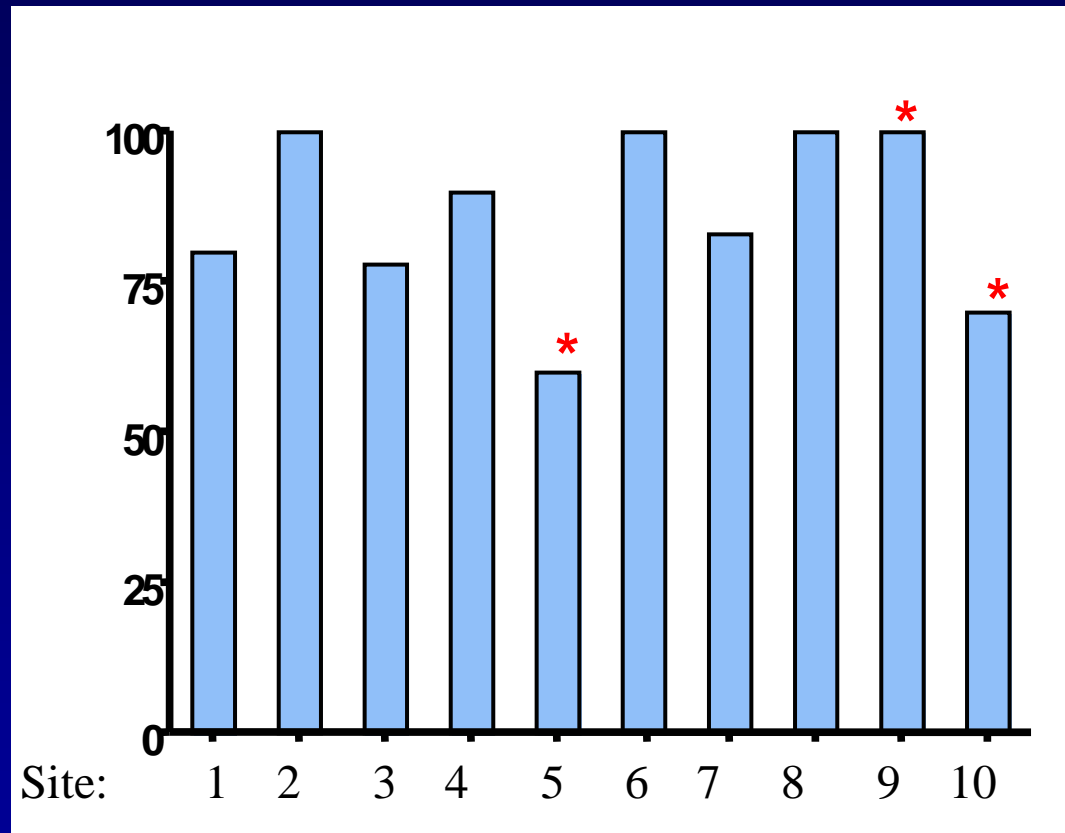(from ethanol into paraffin blocks)

Range: **40** to **310** minutes
What is the effect on immunoreactivity?

Data assembled by A De Marzo, G Netto, L True

IPBS Study: Variability in Immunohistochemistry

% of Tumors with AMACR Staining 3-4

Significant difference in mean staining intensity between sites:
MDA=2.7, UMICH=2.8, UCSF=4.0, p=0.0002
(mean=3.3, median=3.0)

IPBS Study Conclusions

- Significant variability in processing schedules
- Good correlation among sites for some markers of normal prostate glands (e.g. p27)
- Significant variation for tumor markers (AMACR and Ki-67)
  - Due to tumor heterogeneity ?
- Interaction between processing and biomarker measurements ?

Tissue Analysis for Personalized Medicine

| PATIENT | TISSUE | ANALYSIS | TREATMENT | PATIENT |

- The measurements encompass multiple endpoints to identify the best treatment and predict responses to treatment. Measures include assays using DNA, RNA, Protein, Lipid, Carbohydrates….

Tissue sample   BIOANALYTE   Platform

- The bioanalytes differ in stability during tissue collection, processing and analysis

Goals of Discussion

- Where is the biggest need for critical data that will improve the quality of banked tissues ?

- What are the obstacles to generate and implement protocols of high quality tissue collection ?

Degradation of Bioanalytes

Acquisition	Handling/ Processing	Storage	Distribution	Analysis
Transit time	Fixative Fixation Processing	Temperature Humidity Atmosphere	Handling	Sample preparation