

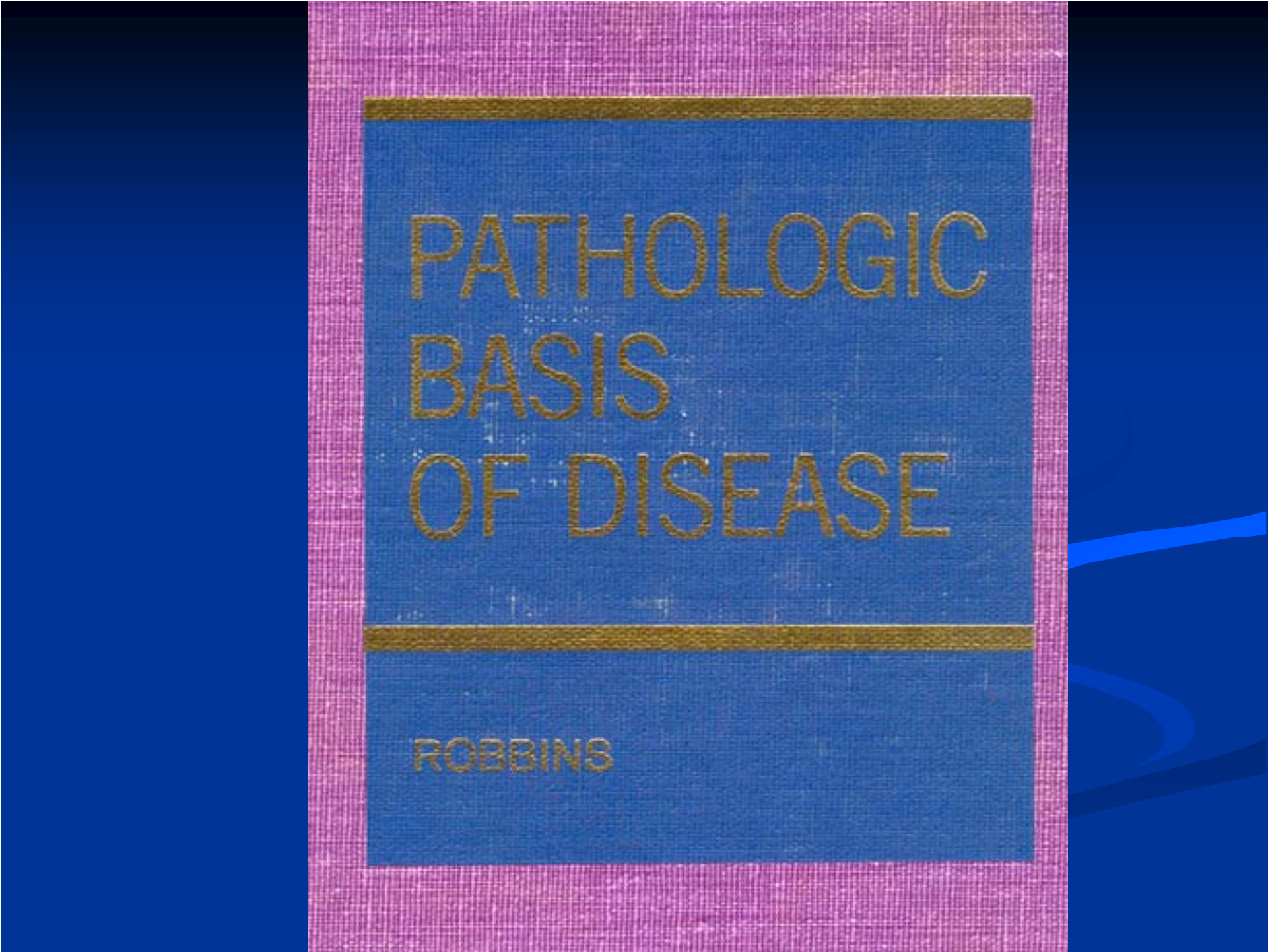
**Training the Pathologist for A Challenging and
Uncertain Future
Reasons for Optimism and Concern**

Stanley R. Robbins Lecture

**Fred Gorstein, M.D.
Thomas Jefferson University Medical Center
March 14, 2006**

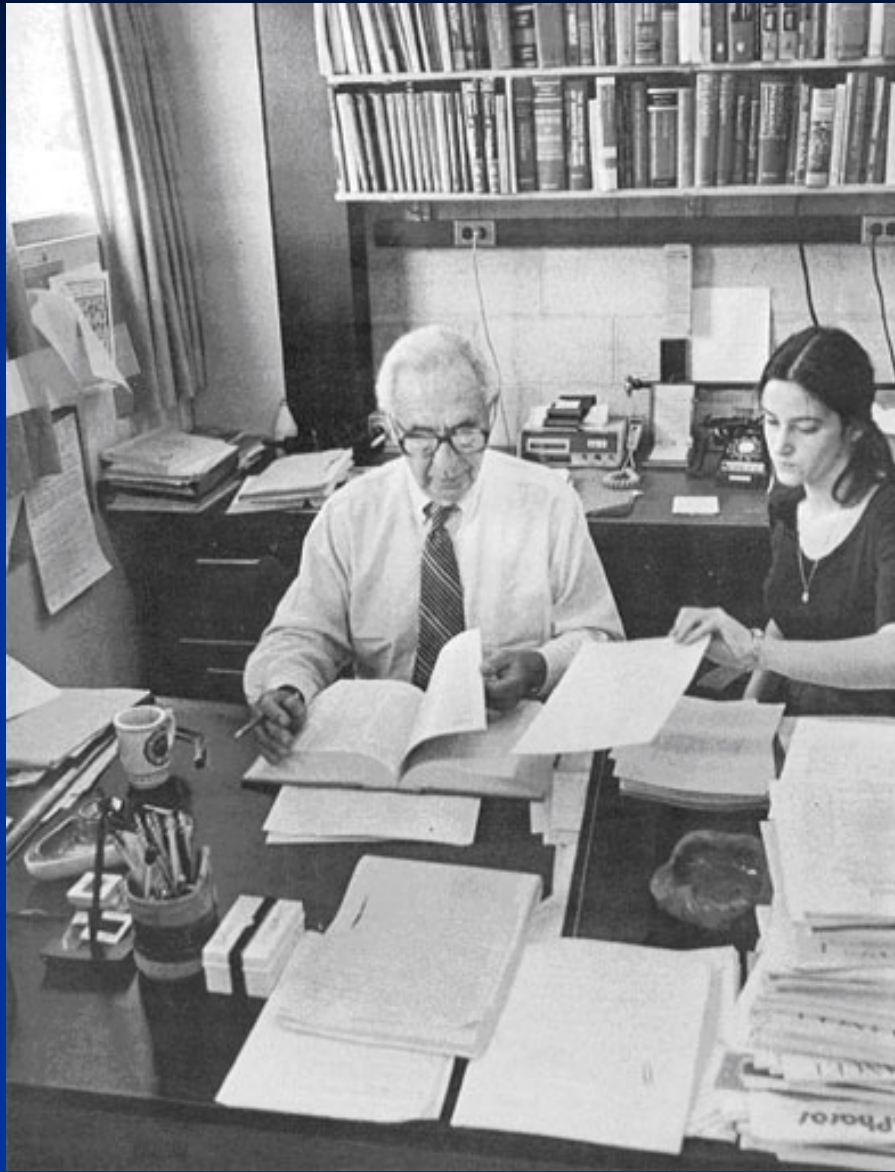
Goals

- The Robbins Heritage – a personal reflection
- Discuss some of the Drivers of Change ... in health care, the medical profession, academic medical centers, and pathology, in particular.
- Impact of Change on Pathology – a SWOT approach
- Priorities to consider and some thoughts about changes in our approach to training
- To ask you to think “outside the box” of our own day-to-day individual institutional experiences



PATHOLOGIC
BASIS
OF DISEASE


ROBBINS



- “ Diseases must be studied as dynamic processes changing with time, modified by therapy and by host ...all having an effect on the ultimate clinical manifestations...”
- Role of the teacher....
“to point out gaps in our knowledge; to entice the student to join in the search for a greater understanding
(1974)

Robbins Legacy

- the overriding importance of clinical-pathologic correlation... understanding of pathophysiology
- dynamic changes in our understanding of disease must be integrated as they occur
- critical role of the mentor in stimulating curiosity and lifelong self directed learning



Vol 37, No 2 - February 2006

Online Submission & Peer Review is Here:
<http://ees.elsevier.com/ynhupa>

Human PATHOLOGY

Human Pathology...Beginnings

Stanley Robbins

Cesare Tedeschi

Ellis Benson

Gus Damon

Bob Scully

Benjamin Castleman

Bernard Wagner -

Current topics

contributor

1970 - First edition

1972 - Editorial office

Speculating about an Uncertain Future

- A waste of time ?
- Possibly a useful exercise ?

**“It’s hard to make predictions,
especially about the future.”**



– Yogi Berra



“...Trying to predict the future is like trying to drive down a country road at night with no lights while looking out the back window...”

Peter Drucker

“One of the best lessons children learn
through video games is...
that standing still will get them killed
quicker than anything else.”

Jinx Milea and Pauline Little

Why Jenny Can't Lead, 1986

We do have some clues

What are some of the drivers of change that are likely to effect pathology and what pathologists do ?

Basic Health Care Drivers

- Economic limitations.... We can not afford to deliver the best health care in recorded in the history
- Increasing commercialization of health care delivery
- Regulation/Legislation
- Information technology
- Further subspecialization
- Patient demand for access
- Aging population

Sociologic Changes Affecting Healthcare

- Aging Population
 - 1966: 19 M Medicare beneficiaries
 - 2003: 41 M Medicare beneficiaries
 - 2020: ? 60 M beneficiaries **
- Privilege → Right
- Private → Public Funding

** Medicare Trustees – “Financial Condition Better But Broke by 2020”

Global Scientific Development

- **Biotechnology**
 - Genomics/Proteomics
 - Nanotechnology and miniaturization
 - Pharmaceutical Industry
- **Systems/Computational biology**

A Delphi Study of Trends in Pathology Training

Goodale and Gander, 1976:

- Residency programs will consolidate within university programs
- Increased subspecialization
- Increased involvement in basic science
- Increased federal regulation
- Increased number of women entering pathology

AMA Council on Long Range Planning and Development, 1987

Trends in the environment of medicine and their impact on
pathology

- Need for management innovation and adaptation to:
 - Regulatory restrictions
 - Cost-containment
 - Technology and scientific knowledge
 - Funding for biomedical research and training
 - Medical liability
 - Demographic changes in population
- Potential to make substantial contributions to the quality and assessment of medical practice
- Economic pressures will effect site(s) of pathology practice

A Strategic Planning Exercise

“Strategic” Planning – SWOT

- **Vision for the future**
- **Environmental/Market assessment - (SWOT)**
 - **Strengths**
 - **Weaknesses**
 - **Opportunities**
 - **Threats**
- **Goals, Objectives and Strategies**

Vision

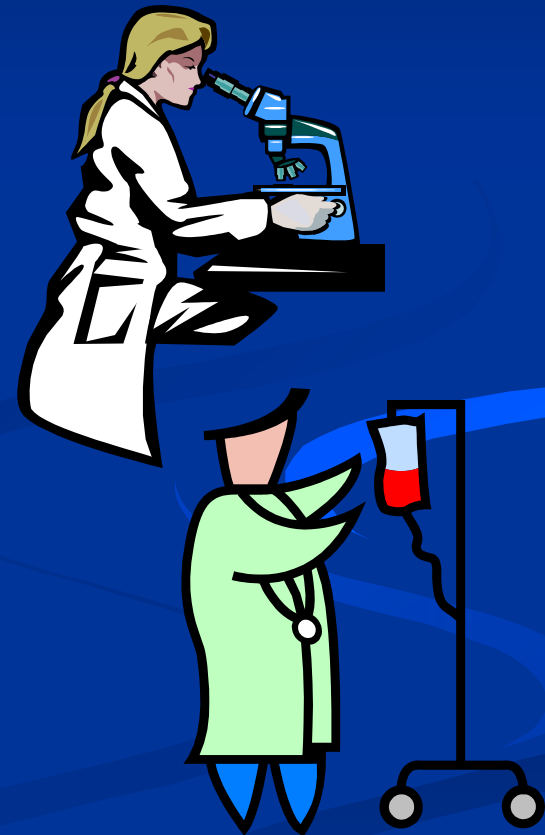
What is pathology?

“Pathology is what pathologist do ! ”

James Barger/WH Hartmann

Vision: Pathologists will continue to be the providers of choice for the following professional services

- Anatomic Pathology
 - Surgical pathology
 - Cytopathology (FNA)
 - GI, GYN, GU, Breast, Derm
- Clinical Pathology
 - Transfusion medicine
 - Hematopathology (Coag)
 - Clinical consultation
 - Laboratory Management (Inspection strategy)



D. Wilkinson

Vision: Pathologists will become the providers of choice for the following professional services

- Molecular Pathology (MGP)
 - Diagnosis
 - Prognosis
 - Response to therapy (Herceptin, Iressa, Tarceva, Gleevec)
 - Detection of minimal residual disease
- Medical Information Management
- Quality Improvement
- Translational Research Core Labs



D. Wilkinson

“Strategic” Planning – SWOT

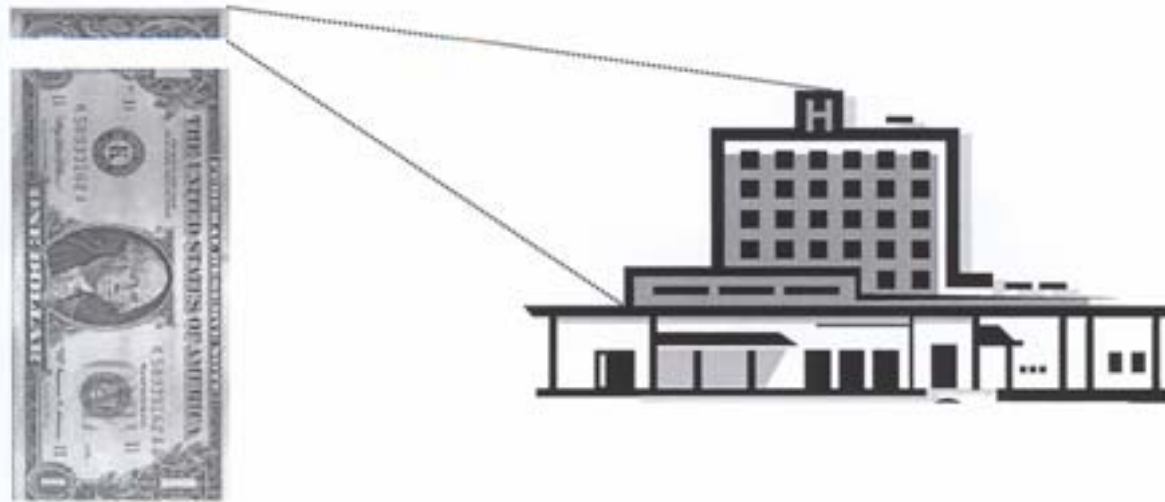
- Vision for the future
- Environmental/Market assessment - (SWOT)
 - Strengths
 - Weaknesses
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Strengths :

Pathology data/information is essential for effective health care delivery and in today's environment represents a tremendous bargain

Laboratory tests impact 70% to 80% of hospital decisions.

The Impact of Laboratory Results on Health Care Spending



Laboratory tests account for only 3 to 5 cents of every health care dollar spent.

BUT . . .

Laboratory tests impact more than 70% of the health care decisions that are made.

(70/70/70 Rule –)

- Pathology is central to the clinical database and problem solving process. More than 70% of health care data in the medical record is derived from Pathology
- 70% of medical decisions/critical health care events involve pathology data
- 70% of all pathology testing is oncology related

STRENGTHS

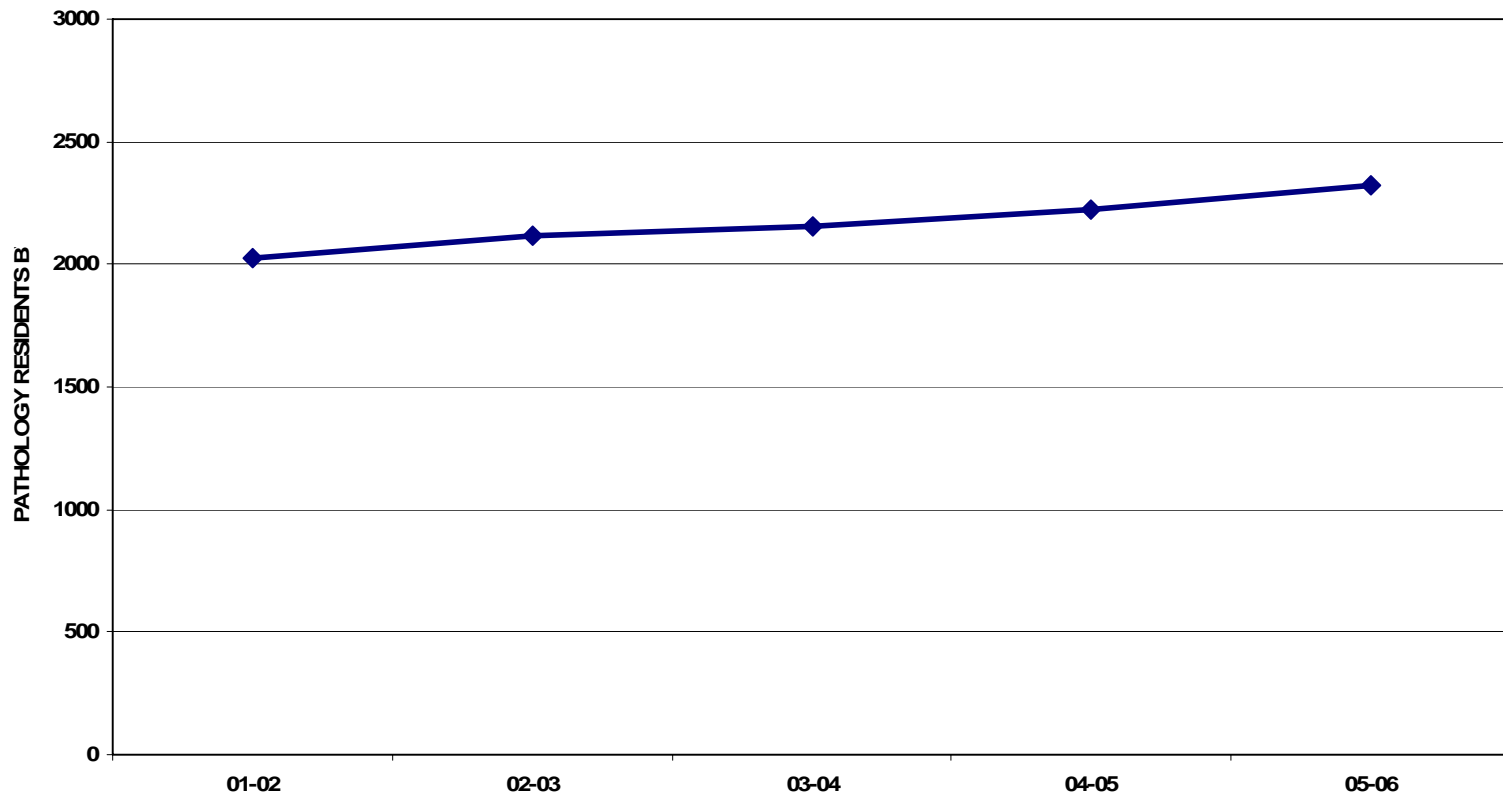
- The Pathologist's natural role as a consultant who has direct access to clinical staff, and the administrative infrastructure
principal interpreter of data and transmitting information, especially in smaller institutions
- key to many applications research studies (primary or as a collaborator)
- Key role in QA, QI
- All human tissue specimens are processed through pathology

STRENGTHS

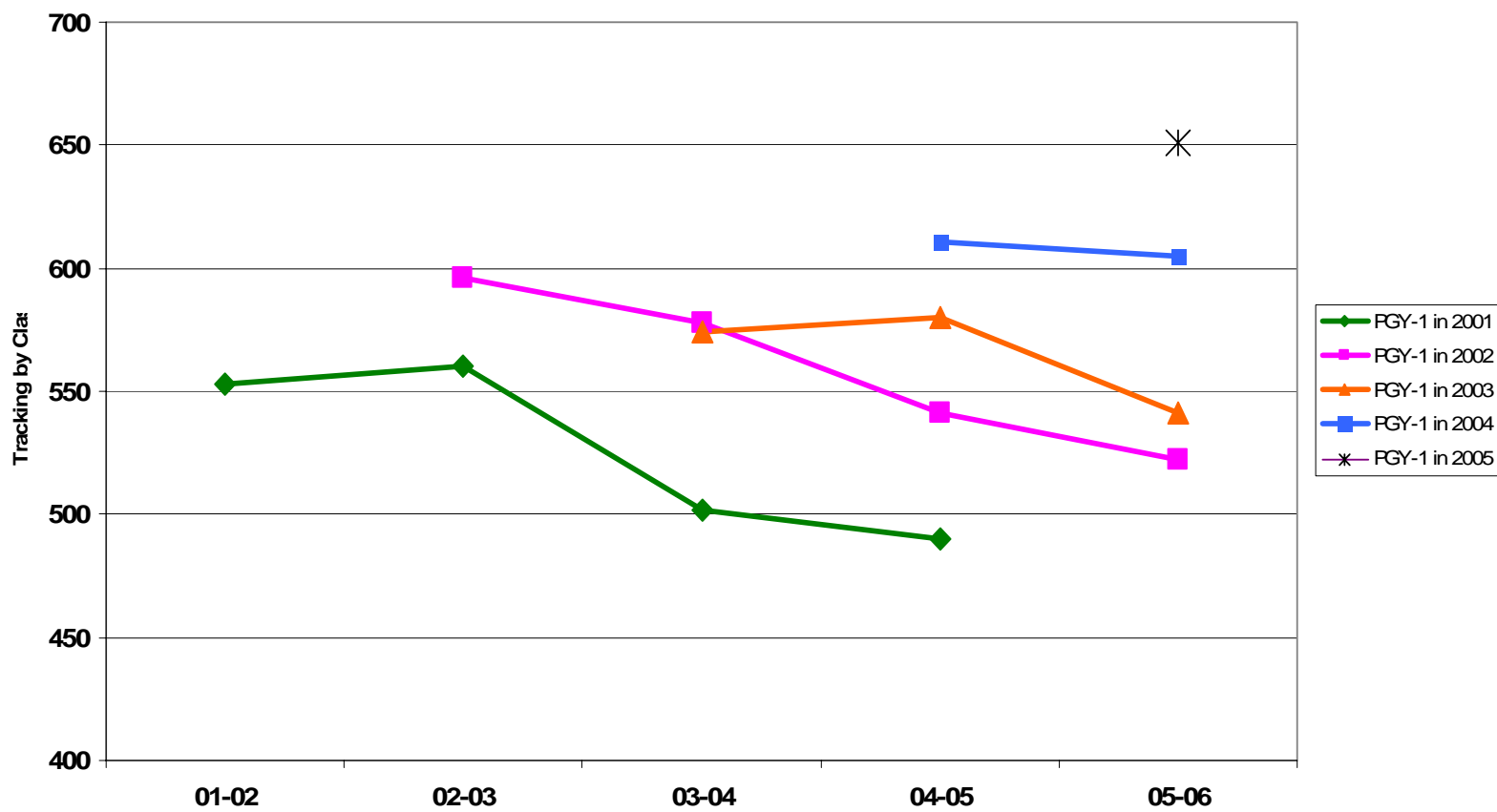
- A increasing number of pathology departments have well developed technology development and applications research programs ... and have initiated training in these areas
- Broad-based Systems biology programs: Harvard, Princeton, Univ. of Washington, ISB (Seattle), University of Pittsburgh, MIT, Southwestern, U.Penn and many others are in process.

Pathology has never been more popular among medical students. ... for various reasons

PATHOLOGY RESIDENTS BY YEAR



PATHOLOGY GME DATA



“Strategic” Planning – SWOT

- Vision for the future
- Environmental/Market assessment - (SWOT)
 - Strengths
 - **Weaknesses**
 - Opportunities
 - Threats
- Goals, Objectives and Strategies

Weaknesses

- pathologist does little to drive the economics and, in general, has few levers to bring about change
- length of the training program makes it difficult to include broad exposure to “new technology”
- many programs cannot provide a valid experience in many of the new techniques and approaches: gene analysis, proteomics, information technology, what’s more computational biology

Weaknesses

- most departments have few linkages to biomedical and clinical facilities to develop strong technologic translational research
- Competition in the development of new technology comes many sources
- Lack of sustained independent extramural funding for applications research

Opportunities !

- well positioned to effect change beginning in the undergraduate medical curriculum
- most departments have abundant opportunity to engage in collaborative applications research within their medical center.
- access to tissues for research
- access to data ...

“Strategic” Planning – SWOT

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- Environmental/Market assessment - (SWOT)
 - Strengths
 - Weaknesses
 - Opportunities
 - **Threats**
- Goals, Objectives and Strategies

Threats

- Questionable financial support (marginal reimbursement)
- Lack of interaction in biomedical engineering and systems/computational biology
- Lack of support for translational research makes utilization of new technology difficult ..
- Strong competition from the for - profit sector. (commercial labs, big Pharma, biomedical research facilities)

Reading CT Scans in at night in India, or more?

- Nocturnal CT Scan reading
- Pathology – cytopathology, surgical path
- Telemedicine, world wide? After hours service from the Pacific rim????
 - Dermatology
 - Neurology
 - Critical Care Medicine
 - Telephone Triage
 - CRNA Supervision
 -Robotic Procedures????

The Big Questions for Pathology ?

- How can the pathologist maintain a central position in the diagnostic process and evolve from our traditional role as tissue and clinical laboratory diagnostician to *Diagnostic Specialist* ?
What are the barriers, impediments and competition ?
- Can we maintain a major role in basic and translational research?
- Will the current model of the academic pathology department continue to remain viable ? If not what are the alternatives?

Strategic Priorities for Pathology

- Bioinformatics.....
- Take the lead in defining the molecular definition of disease and the related translational research
- Strengthen the role in tissue collection, analysis, classification and databasing
- Change at an ever increasing rate will occur. The ability to accept/embrace change will be key to success
- Promote a multi discipline – system approach to disease management, patient safety, etc.

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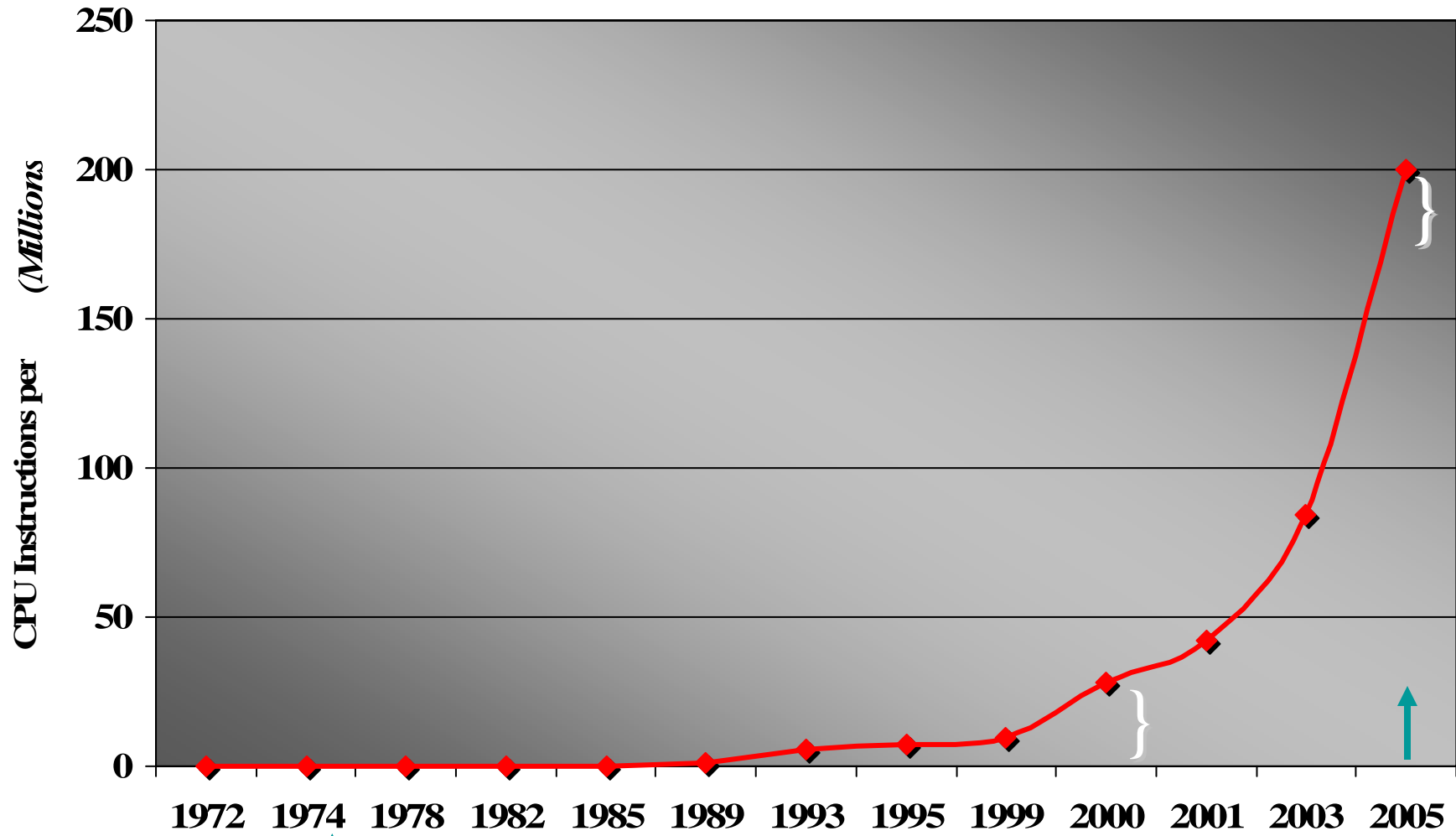
The evolution of the pathologist from medical consultant to information specialist

W.M. Murphy Am.J. Surgical Pathology 26(1)99-102. 2002

Priority 1 - Bioinformatics

- Data integration (AP, CP, Molecular, other)
- Database management/data mining and integration.
- Decision support systems
- Computational/Systems biology

Growth in Computing Power



Hawkings, S. *The Universe in a Nutshell*. 2001

Human PATHOLOGY

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John Sinard and Jon Morrow
Human Path 32: 2, 143, 2001

Editorial

Informatics and Anatomic Pathology: Meeting Challenges and Charting the Future

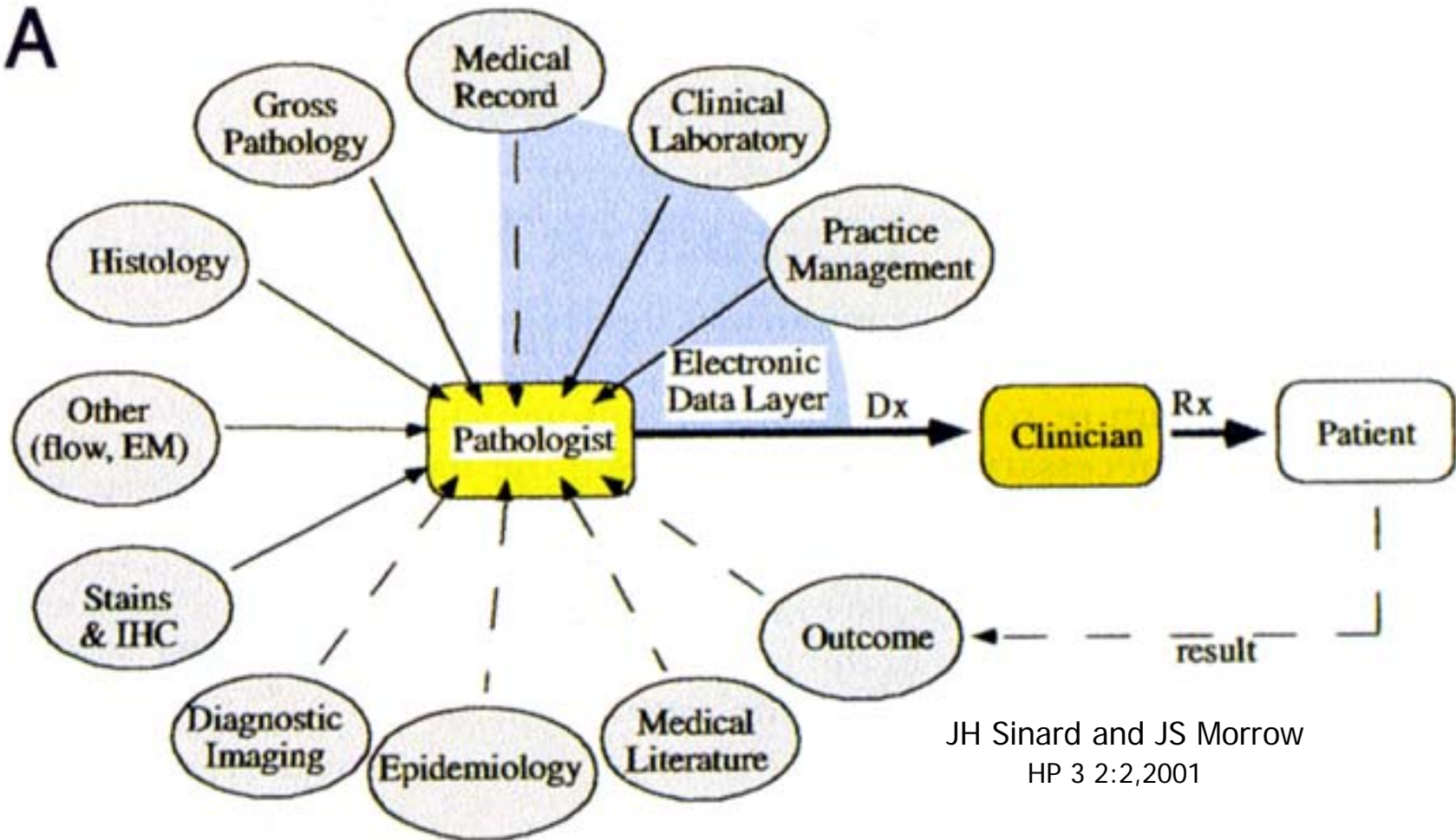
The histologic evaluation of tissue by a trained pathologist was arguably the single most information-rich and decisive, diagnostic assessment tool available in 20th century medicine. This fact has assured the enduring relevance and importance of Anatomic Pathology as a diagnostic profession. In the 21st century, massively parallel methodologies for the analysis of genes and protein expression, coupled with knowledge of the human genome and the molecular basis of many disorders and drug susceptibilities, will provide comparable information rich data streams to aid in the

plene, progress on informatics solutions that address pieces of the overall problem is being made, and specific barriers to their widespread application can be identified. For these efforts to be reduced to practice, anatomic pathologists need to recognize the pivotal importance of these tools and work to embrace them in new practice and training paradigms.

Pathology Informatics

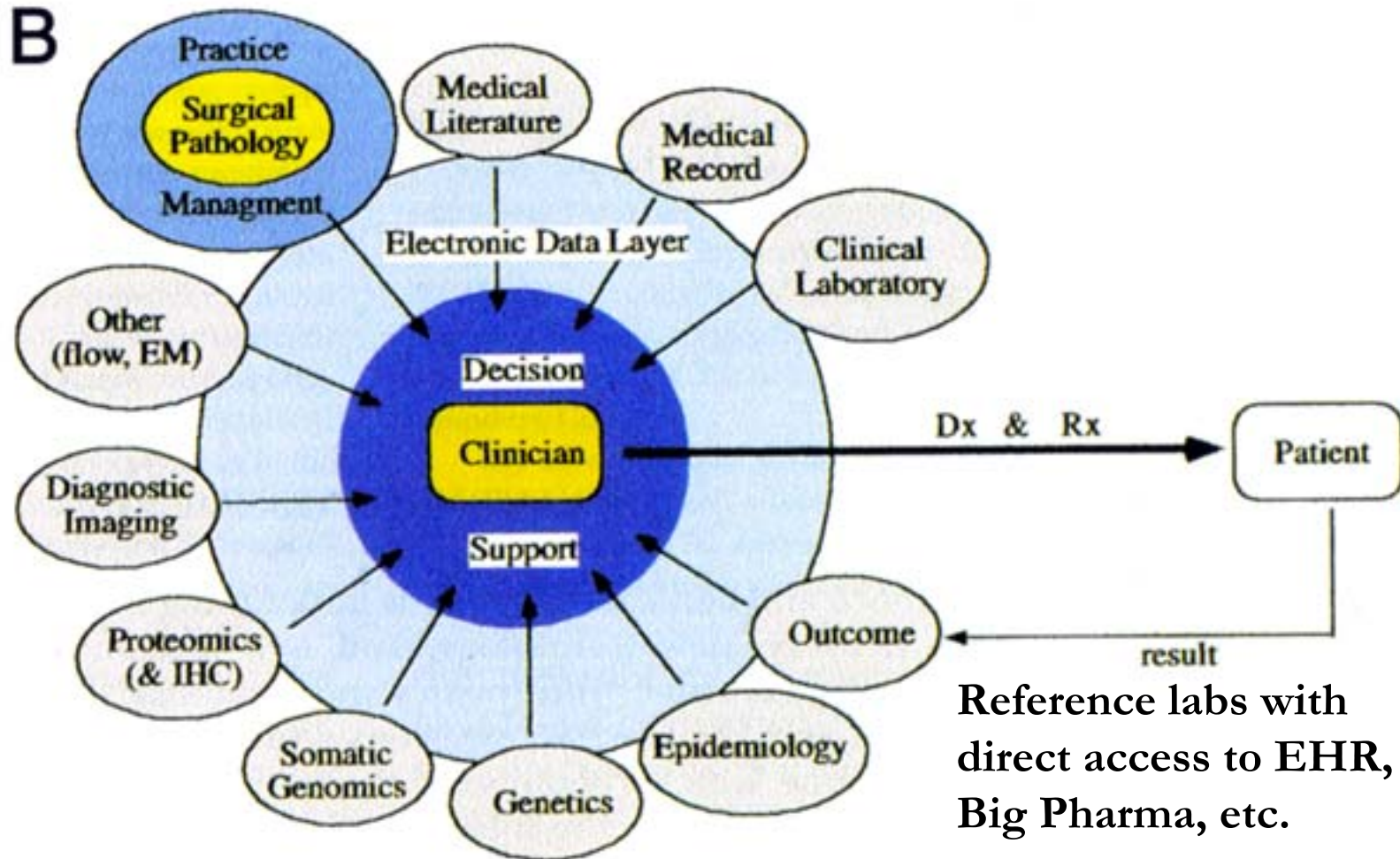
PRESENT

A



JH Sinard and JS Morrow
HP 3 2:2,2001

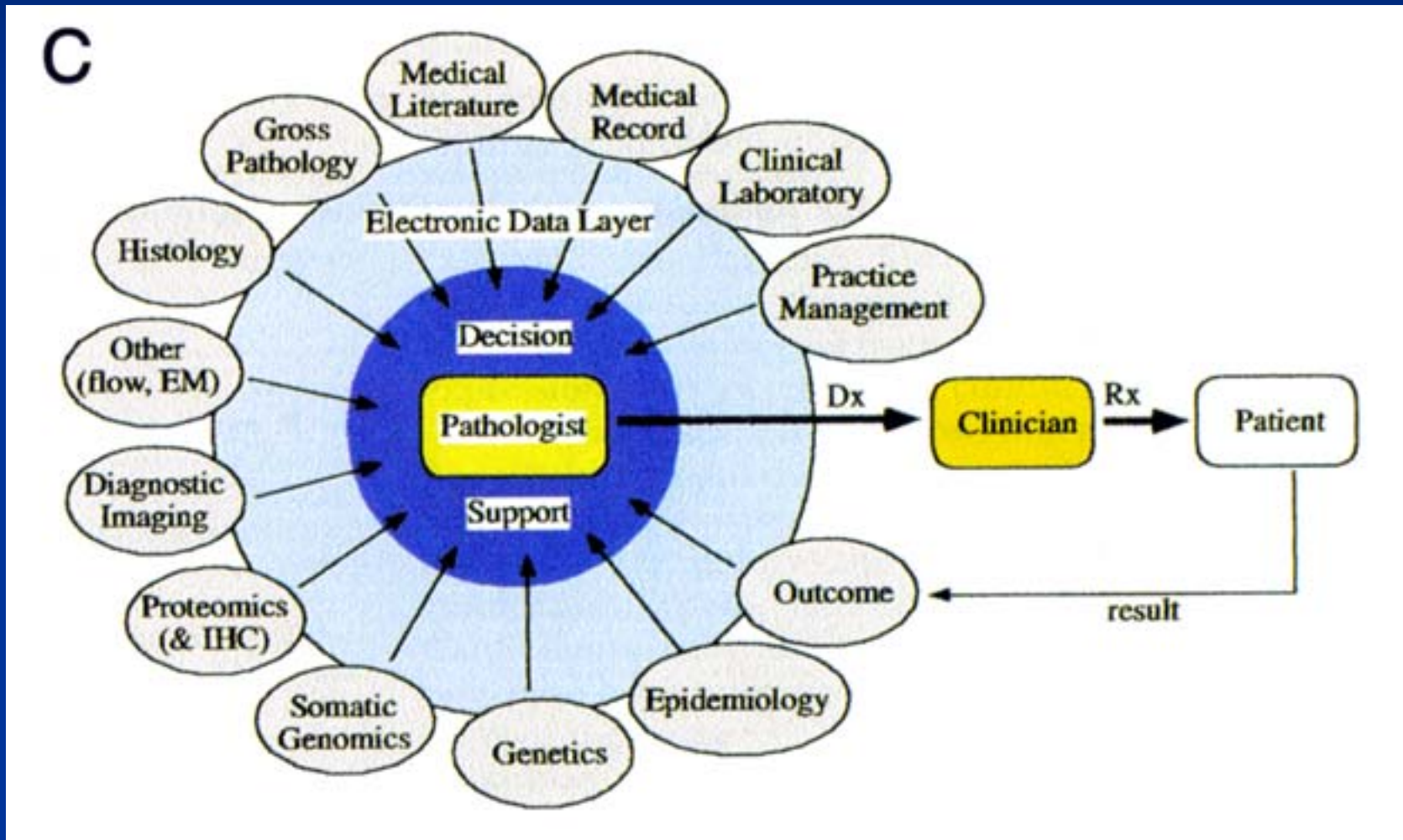
EVOLVING ?



Evolving ?

- Digital imaging, EHS, data archiving, internet access, national databases being assembled by big pharma, reference labs ...
- New computational strategies for data capture, organization, interpretation and presentation, decision-support algorithms and disease management protocols All within reach of the pathologist

POSSIBLE



Strategic Priorities for Pathology

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Priority 2 – Molecular Definition of Disease

- Analysis of gene and protein expression
- An understanding the molecular basis of an increasing number of disorders
- Targets for drug therapy defined by molecular markers
- Technologies capable of producing massive amounts of data
- Computational capability permitting the integration of vast arrays of data

TISSUE MICROARRAY TECHNOLOGY

Moch, H., et.al (2001 Jan). Tissue microarrays: Advances in Anatomic Pathology, 8(1) 14-20.

- Tissue microarray technology makes it possible now to sample up to 1,000 tumors on one glass slide, which can then can be analyzed **IN CONTEXT** by fluorescence in situ hybridization, RNA in situ hybridization, or immunohistochemistry.
- Microarray technology has the potential to significantly accelerate molecular studies that seek associations between molecular changes and clinicopathologic features of the cancer
- potential to improve quality control and standardization of staining methods and interpretation.



“Eureka! I’ve discovered the gene that makes us think that everything’s determined by genes!”

- molecular studies ... only one component of the diagnostic process
- traditional methods are required, in fact essential, in the evaluation of tumors and management of patients.
- The data obtained from the molecular biology-based studies must be always interpreted ... with the clinical history, immunomorphologic findings ... other pertinent ancillary data.
- **Routine evaluation of tissues using traditional light microscopy remains the backbone of pathologic evaluation!**

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Priority 3

Tissue Collection, Analysis and Classification/“data basing”

Tissue Collection, Analysis and Databasing

- “ Academic Pathology must strive to drive the agenda for human tissue collection, analysis, and databasing.”
- Pathology as the enabler of the study and treatment of human disease, generates data crucial to virtually every molecular study of human tissue
- Should position itself to be the institutional driver of technology development and implementation

Tissue Studies

- Operate high quality pathology resource laboratories
- Provide expertise for the concept and design of research projects
- Maintain databases that link morphologic and molecular information with the requisite tissue repositories
- Provide education and mentorship of technology users

JM Crawford and ML Tykocinski. Lab. Investigation 85:9, 1056-1059. 2005

- The value of molecular biology-based diagnostics is potentially questionable if the tissue samples are not initially accurately characterized.
- The question that molecular diagnostics may be trying to answer may be the wrong one or the answer obtained may be interpreted incorrectly, if the context of the clinicopathologic situation has not been clearly defined using traditional diagnostic techniques

Herrara, et. al (2004)

Strategic Priorities for Pathology

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Priority 4
Ability to Accept/Embrace Change



“Don’t Mind Dr. Ashley. After looking through a microscope all day, anything large startles him”

“Faced with the choice between
changing one's mind and
proving that there is no need to do so,
almost everybody gets busy
on the proof.”

John Kenneth Galbraith
American Economist

“Dealing with Change”

- Building self confidence with progressive increase in responsibility
- Continuing involvement in operations and participation in planning and problem solving
- Self directed learning and the ability to critically assess the “literature”
- ?

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Priority 5

Multidisciplinary Interaction

A Systems Approach is key to
successful interaction

- Problem solving
- Disease management
- Patient safety

ACGME/RRC PATH Competency “Systems Based Practice”

“Residents must demonstrate an awareness and responsiveness to the larger context and *system(s)* of health care, and the ability to effectively call on system resources to provide pathology services that are of optimum value”

ACGME Jan 2002

Teaching/Learning to be a Team Player

A System ?

- A network of interdependent components that work together to accomplish a shared aim.
- Every “System” should have an aim (no aim/goals ..no system).
- Every system must be managed. Management requires a “knowledge of the interrelationships between all the components within the system and the people who work in it.”

W. E. Deming, The New Economics, 1993

A System

- A System is a network, interdependent and multidisciplinary, with shared goals which exists to deal with un-met needs and solve problems..
- To function effectively, it requires a blameless philosophy
- A hierarchy of “systems” exist all around us beginning with the trainee within the department, in the institution, within the health care system and ultimately within society... concentric circles
- Most of us are unaware of the multiple “systems” within which we function

System

A good System makes it hard to do the wrong thing and easy to do the right thing.... a bad system: the reverse.....

Paul Batalden, M.D.

ACGME System Competencies

- Understand how their practices impact other health care professionals, the health care organization and the larger society.. and how the elements of the system affect their own practice
- Practice cost-effective health care and resource allocation that does not compromise quality of care, including methods of controlling health care costs and resource allocation
- How types of medical practices and delivery systems differ(group practice, HMOs, PHOs, managed care, etc.)
- **Know how to partner with other health care providers and health care managers to assess, coordinate and improve health care**

Systems in Pathology

- Information systems
- AP and CP divisions: within which each lab section functions as a microsystem
- Service or disease-specific systems: transplantation services, molecular pathology and genetic testing/counseling, specialty and disease-oriented systems
- Transfusion Services: regional blood center, blood bank lab and satellites, nursing and other support personnel
- Ambulatory lab services/reference labs
- Medical Examiner – as part of a larger system

A Systems Approach to Patient Safety

- “Advocate for quality patient care and assist patients in dealing with system complexities” ACGME
- Multi-disciplinary patient safety programs:
At Jefferson, 85% of medical errors are due to systems failures and not individual incompetence or errors in judgment. (to an extent the “perpetrator” is often a victim of systems failure)
- **Bottom line competency : Understand the system-basis approach to error reduction and be able to effectively use systematic approaches to reduce errors and improve patient care.**

Teaching it

- Didactic lectures.... Useful to begin the process, but of limited value in the long run. (helpful to review objectives, goals, methodology, evaluation tools, overview, etc)
- Hands-on experience (multiple opportunities each day)
Response to incident reports - review and resolution .. Root cause analysis
- Participate in accrediting agency activities (CAP, JCAHO, RRC inspection, AABB, etc)

Systems In Practice

- Interactions with clinical services, nursing, paraprofessional groups, etc.
- Participation in working meetings with hospital administration, financial management, utilization review, QI activities, laboratory-related issues

Systems Based Practice

Self Directed Learning Opportunities

- Projects assigned to each individual resident.. or the resident chooses a relevant topic/problem of interest. (short and long term)
- Input from technical and attending staff
- Lab Administration rotation (Information systems, risk management and operational issues, supervise projects)
- Tutorials (i.e. CAP management college, CAP inspector training, THCI modules)

Resident Projects in Systems Basis of Practice

- Design of a core laboratory
- Develop a point of care testing site
- Evaluation of instrumentation
- Study of billing errors in coding and processing
- (lack of) Compliance documentation
- Development of lab utilization guidelines (troponin, satellite site coagulation studies)
- Evaluation daily incident reports.
- Design and implementation of a resident web site..
- Evaluation of evidence based decision making

Systems thinking...

(A Discipline of Systems.. A Mind Shift)

- Seeing interrelationships rather than linear cause and effect chains
- Seeing the process of change over time, rather than as snapshots
- Cause and effect are not usually related in time and space...
- Small changes can produce big results..
- ... there is no blame !!
- Inter relationships and multidisciplinary are implicit in a systems approach

Discussion Points

- The Robbins Heritage
- Drivers of Change ... in health care, the medical professions, academic medical centers, and pathology in particular.
- Impact of Change on Pathology – a SWOT approach
- Priorities to consider
- Some thoughts about changes in our training programs and some options.

FROM COMPETENCE TO CAPABILITY

COMPETENCE

WHAT INDIVIDUALS KNOW OR ARE ABLE TO DO IN
TERMS OF KNOWLEDGE, SKILLS, ATTITUDE

CAPABILITY

EXTENT TO WHICH INDIVIDUALS CAN ADAPT TO
CHANGE, GENERATE NEW KNOWLEDGE, AND
CONTINUE TO IMPROVE THEIR PERFORMANCE

Brit. Med. J. 323:799-803, 2001

What are our options ?

- “Steady as she goes” – jam everything into a four year program.. One size fits all
- Expand our programs per ADASP and ACLIPS
 - AP - 3 years plus fellowship
 - CP - 2 years plus fellowship
- Develop a new “core” program

Park City Curriculum

October 1, 1988

**PARK CITY REPORT
ON
COMBINED AP/CP
RESIDENCY TRAINING**

Association of Pathology Chairmen
Graduate Medical Education Committee

Park City Participants

Ronald S. Weinstein

H. Clark Anderson

Desmond Burke

Pasquale A. Cancilla

Ramzi S. Cotran

Herbert Derman

William A. Gardner, Jr

Leonard Jarett

Werner H. Kirsten

Perry A. Lambird

Michael Lamm

John M. Matsen

Robert Pritchard

Jack Strong

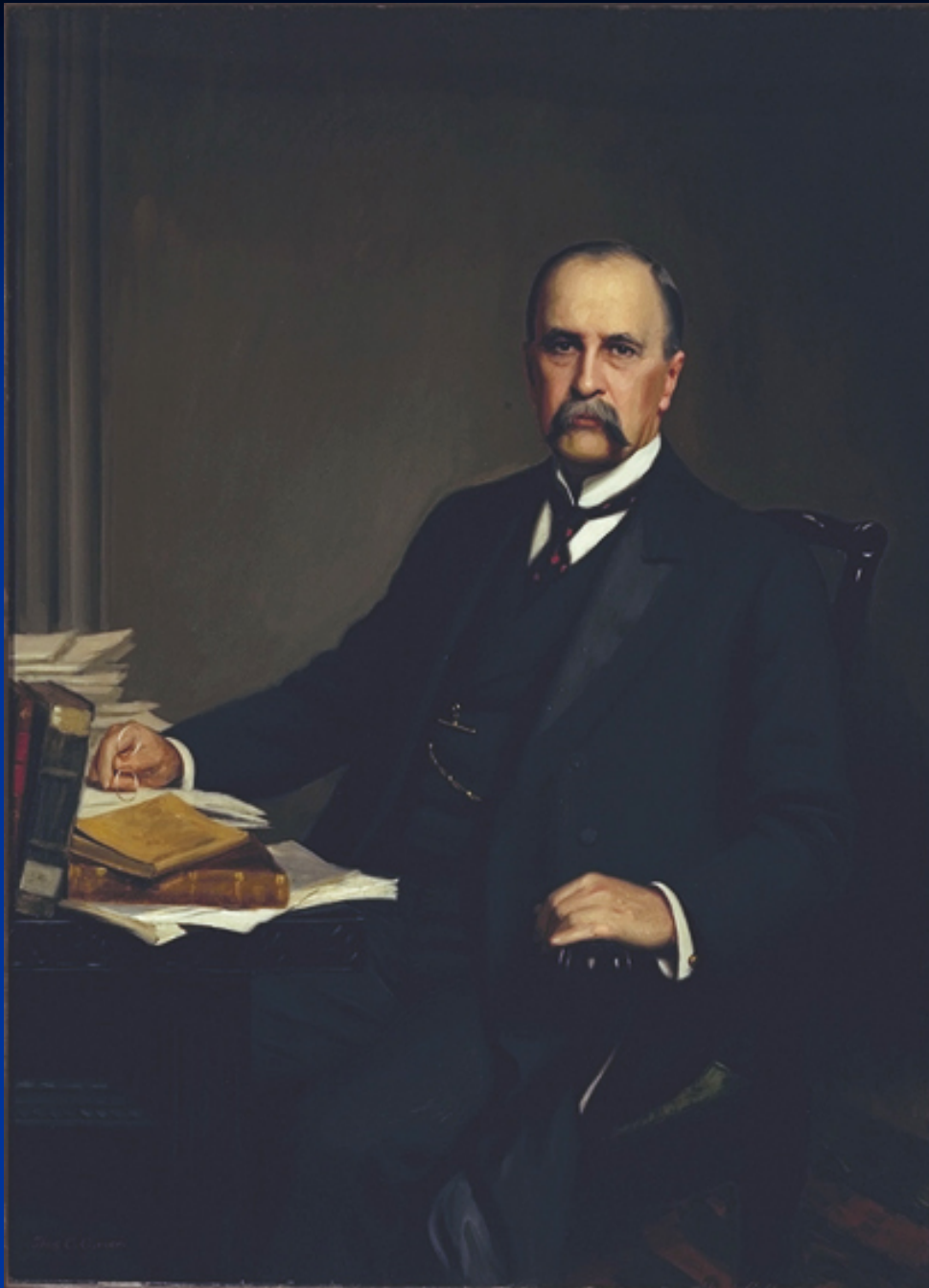
Thomas Shaw

Park City Recommendations - 1988

- Core – Three years in major areas of AP and CP
(include molecular pathology, computer science and management)
- Two years of additional training which could include:
 - General AP and/or CP
 - A subspecialty of Pathology
 - Research
 - A clinical year of experience (med., peds., etc)

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The best preparation
for tomorrow is to do
today's work superbly
well.

Sir William Osler
1910

Preparation for the future is not an episodic, special event...

It is the day to day examination of
the How, and Why we
Do What We Do,
Better Tomorrow than Today,
and the Who We Aspire to Be
as We Do It

Thomas Nasca, M.D.

Dean, Thomas Jefferson University, Jefferson Medical
College 2005

The Future ?

- Can be influenced by us
- “Be the steamroller ... or become part of the road.”..... Leo Furcht
- The “future” certainly ain’t going to be what it used to be.

Thanks to

All the residents (164) in
programs over 43 years

William Gardner, jr

David Wilkinson

Fred Silva

Deborah Powell

Emanuel Rubin

Marvin Kuschner

George Michalopoulos

David Hartwig

Bernard Wagner

Ramzi Cotran

Thomas Nasca

William Hartmann

Stanley Robbins



Thank you