1

Objectives

- Discuss the current role of the breast pathology report
- Define the structure and the format of an effective breast pathology report
- Understand common misinterpretations of the report and how to best communicate uncertainty of diagnosis
- Debate how to best communicate results to patients
- Identify components of an informative molecular pathology report

2

Disclosures

- **Nothing to disclose**

3

Outline

- The role of the pathology report
- The structure of the pathology report with examples
- The standardization of the pathology report
- The format of an effective pathology report
- Common misinterpretations of the pathology report
- Communicating uncertainty re: diagnosis
- Communicating path results to patients
- The informative molecular path report
- Summary

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Background

- More than 40 million surgical pathology reports and 60 million cytology reports were issued in the US in 2020
- >$7.5 billion will be spent to reimburse pathology providers for their professional and technical services
- These pathology reports will be examined by tens of thousands of physicians and will guide follow up care for millions of patients in the US

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Background

- Explosive growth in our understanding of the biology of benign and malignant conditions
- Considerable progress in the range of therapeutic options available, many directly based on results of pathologic evaluation and IHC/molecular analysis
- Active patient participation in therapeutic decision making

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The Role of the Pathology Report

- Traditionally, pathologists communicated their diagnosis through a written report read by the treating clinician
- The pathology report is a crucial tool of communication among a number of stakeholders
- The report:
  - Supports clinical decision-making of the primary care physician and multiple specialists
  - Empowers patients to make informed decisions regarding their care.

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Expanded Role of the Pathology Report

In this new era of precision medicine the role of the pathology report is now at the center of patient care.

- Provides the diagnosis
- Determines disease classification
- Gives prognostic information
- Predicts treatment efficiency
- Supports and guides treatment options
- Determines patient follow-up
- Guides possible referrals

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Key Elements of an Informative and Effective Pathology Report

- Clearly stated information that follows a logical sequence in a way that avoids common misinterpretations
- State-of-art descriptions of morphologic features of lesion(s) as well as relevant classification of the disease in question
- Up-to-date relevant information crucial for guiding treatment
- Up-to –date relevant information of prognostic significance

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The Structure of the Pathology Report

- Patient identification and demographic information
- Information about the procedure and the specimen obtained
- Gross description
- Microscopic description
- FINAL DIAGNOSIS and synoptic report (s)
- Comments or notes
- Final dx/frozen section correlation

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Breast "Lumps"

- Fibrocystic change 40%
- Miscellaneous benign 13%
- Fibroadenoma 7%
- Cancer 10%
- No disease 30%

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Distribution of Histologic Types of Breast Cancer

	Total Cancers
***In Situ* Carcinoma**	**15% - 30%**
Ductal carcinoma in situ	**80%**
Lobular carcinoma in situ	**20%**
Invasive Carcinoma	**70% - 85%**
Ductal carcinoma (no special type)	**79%**
Lobular carcinoma	**10%**
Tubular/cribriform carcinoma	**6%**
Colloid (mucinous) carcinoma	**2%**
Medullary carcinoma	**2%**
Papillary carcinoma	**1%**

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Breast Pathology Reports

Key elements of breast pathology reports in patients with:

- Ductal carcinoma in situ (DCIS)
- Invasive breast carcinoma

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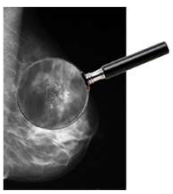
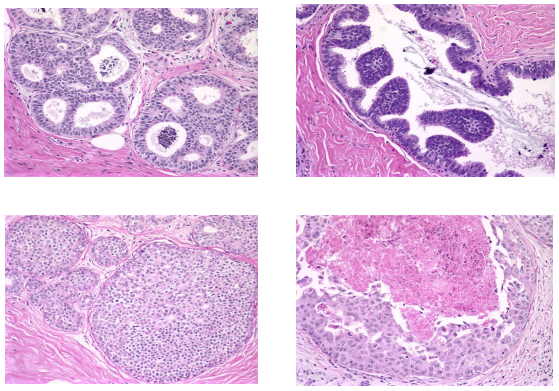
Ductal Carcinoma in Situ (DCIS)

Ductal carcinoma-in-situ of the breast is characterized by tumor cells confined to the ductal system of the breast without light microscopic evidence of invasion through the basement membrane into the surrounding stroma





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Histologic Parameters of Clinical Significance in DCIS

- Size / extent of lesion
- Architectural patterns
- Nuclear grade
- Necrosis
- Margin status
- Tumor marker status

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Clear and Concise Breast Pathology Report for DCIS

Right breast; needle localization lumpectomy:

- Ductal carcinoma in situ (DCIS), comedo type, nuclear grade 3, with necrosis, and lobular extension.
- DCIS is present on 3 out of 9 slides examined, largest continuous diameter of DCIS 0.7 cm.
- Microcalcifications in DCIS and benign breast tissue.
- Atypical ductal hyperplasia (ADH) and flat epithelial atypia (FEA).
- Remaining of breast tissue with sclerosing adenosis, cysts, apocrine metaplasia and columnar cell changes.
- Margins free of DCIS and atypia (closest margin is posterior, at 0.2 cm away).
- Sentinel lymph node #1; excision: One benign lymph node (0/1).
- DCIS tumor markers as follows:
  ER: negative (0%)
  PR: negative (<1%, weak)

Breast Marker Reference Ranges

Marker	Negative	Low Positive	Positive
ER	<1%	1-9%	>10%
PR	<1%	1-9%	>10%

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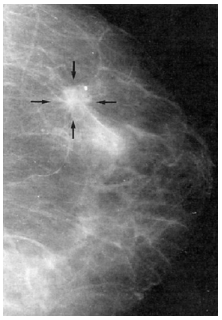
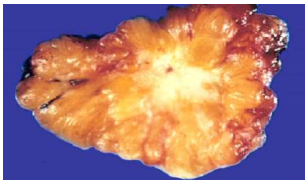
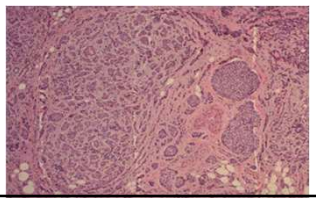
Invasive Ductal Carcinoma

- Most common subtype of breast Ca
- Hard consistency, stellate appearance
- Histology: cords or solid nests of malignant cells invading into stroma
- Association with in situ carcinomas







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Histologic Parameters of Clinical Significance in Invasive Carcinoma

- Tumor Size
- Histologic type
- Histologic grade
- LVI
- Margins
- Microcalcifications
- Lymph Node status
- Breast Tumor Markers (ER/PR, HER-2/neu, Ki-67 etc.)

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Clear and Concise Breast Pathology Report for Invasive Carcinoma

Left breast mass; needle localization lumpectomy:

- Infiltrating ductal carcinoma, grade 2 (3+2+1), two foci, measuring 2.3 cm and 0.5 cm in greatest dimension.
- Ductal carcinoma in situ (DCIS), cribriform type, nuclear grade 2.
- Focal lobular carcinoma in situ (LCIS), classic type.
- Margins free for invasive carcinoma and DCIS (closest margin, lateral, at 0.2 cm away).
- No lymphatic /vascular invasion seen.
- Biopsy cavity changes.
- Atypical ductal hyperplasia (ADH) and flat epithelial atypia (FEA).
- Microcalcifications in malignant and benign breast tissue.
- Remaining of breast tissue with usual ductal hyperplasia, apocrine metaplasia and small cysts.
- Lymph node, sentinel#1; excision: One benign lymph node (0/1).
- pT2(m)N0
- Staging Summary (plus tumor marker table)

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Clear and Concise Breast Pathology Report for Breast Tumor markers

Left breast mass; Breast Tumor Markers (for the 2.3 cm IDC):

Tumor Marker	Result/Intensity of staining	Interpretation
Estrogen Receptor (ER)	80%, moderate to strong	Positive
Progesterone Receptor (PR)	60%, strong	Positive
HER2	Score 1+	Negative
Ki-67	40%	High/Unfavorable
p53	1%	Negative

Ref: Breast Cancer Tumor Marker Reference Ranges for ER, PR, hER2, Ki-67 and p53

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Standardization of Pathology Reports

- Recommendations by professional societies
- Guidelines, checklists, protocols, templates, practice parameters
- 1988 mandated gynecologic cytology reporting (CLIA) using the Bethesda consensus standard
- 2004 American College of Surgeons Commission on Cancer required as condition for cancer program accreditation that surgical pathology reports conform to the CAP cancer reporting protocols
- CAP also requires that all CAP-accredited laboratories include all elements of the CAP cancer protocols in their surgical pathology reports

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Format of the Effective Pathology Report

- Arrangement and configuration of headings, text blocks, graphic elements on paper or computer screen to optimize communication
- All practicing pathologists receive inquiries from clinicians regarding information that is present in the pathology report but the clinician has overlooked
- 30% of pathology report content was incorrectly identified by clinicians even when they were given plenty of time to focus on reports

Ref: Powsner et al, Clinicians are from Mars and pathologists are from Venus: clinician interpretation of pathology reports. Arch Pathol Lab Med 2000, 124:1040-1046

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Measures of Effective Communication

- Improved reader memory of content and better recall
- Fewer errors either of recognition of content or recall
- Less time required by the reader to correctly examine and understand the report
- Increased likelihood of taking a correct action
- Increased subjective satisfaction with the communication experience

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Formatting Principles

- Use headlines to emphasize key findings
- Maintain layout continuity
- Optimize information density for readers
- Reduce clutter
- Make sure format is preserved over electronic interfaces

Ref: Formatting Pathology Reports; Applying four design principles to improve communication and patient safety; by Paul N. Valenstein, Arch Pathol Lab Med, 132:84-94, 2008

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Use Headlines to Emphasize Key Findings

- Inverted pyramid style
- Increases likelihood that key facts are successfully communicated


The New York Times

U.S. ATTACKED

HIJACKED JETS DESTROY TWIN TOWERS AND HIT PENTAGON IN DAY OF TERROR

President Vows to Exact Punishment for 'Evil'

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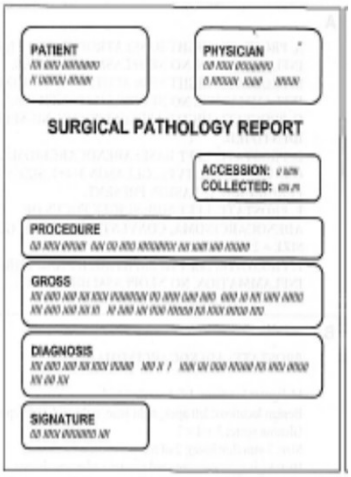
Maintain Layout Continuity and Optimize Information Density for the Reader


Figure 4. The white square outlines 6 essential gauges that are identically positioned in the cockpit of almost all aircraft.

- 117769111984
- 117 769 111 984
- 1 1776 911 1984



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Optimize Information Density for Readers Depending on their Background

""**Official" Pathology report** with scientific terminology released to breast cancer specialists

- Left breast mass; needle localization lumpectomy:
- Infiltrating ductal carcinoma, grade 2 (3+2+1), measuring 2.3 cm and 0.4 cm in greatest dimension.
- Ductal carcinoma in situ (DCIS), cribriform type, nuclear grade 2.
- Focal lobular carcinoma in situ (LCIS), classic type.
- Margins free for invasive carcinoma and DCIS (closest margin, lateral, at 0.2 cm away).
- Atypical ductal hyperplasia (ADH) and flat epithelial atypia (FEA).
- Biopsy cavity changes.
- Microcalcifications in malignant and benign breast tissue.
- Remaining of breast tissue with usual ductal hyperplasia, apocrine metaplasia, small cysts.
- Sentinel lymph node #1; excision: One benign lymph node (0/1).
- pT2(m)N0

Example of brief "patient friendly" Breast Pathology report

- Left breast mass: CANCER
  - Cancer type: invasive ductal carcinoma
  - Cancer grade: moderately differentiated (grade 2 of 3)
  - Size of cancer: 2 areas measuring 2.3 cm and 0.4 cm
  - All areas surrounding cancer: free
  - Nodes under the arm: free

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Reduce Report Clutter

- Human capacity is limited
- Distracters interfere with short term memory
- Distracters can be symbols, pictures, font changes, colors
- Avoid all text that conveys unnecessary information
- Human Factors Division of the Federal Aviation Authority: "What does the pilot need to know"
- "What does the clinician need to know"- e.g., breast margins: BBT

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Format Preservation Over Electronic Interfaces

- Always be mindful of how your reports transfer over electronic interfaces to reach the clinicians
- Know the limitations of your IT, especially in regards to maintaining the format of staging summaries, tables etc.
- Work with your IT to address possible problems

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Misinterpreting the Pathology Report

- Complexity of the report
- Vague wording
- Highly technical terminology
- New terminology for newly recognized entities
- Use of different systems for tumor grading or staging
- Inadequate pathology knowledge by clinicians especially junior clinicians due to lack of pathology training during med school and residency
- Misinterpretation is more common when the pathologist and the treating physician are not in **the same institution**

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Communicating Pathology Results to Patients

- Patient access to their medical record including complex reports
- Pathology reports are written using highly technical terminology at reading levels above the average capability of most Americans
- "Tumor": benign vs malignant
- Include a brief description of the diagnosis with lay terminology summarizing the findings
- Proposed ideas: pathologists to provide patient-centered care by meeting with patients to discuss the findings of pathology reports at the bedside or at specialized "Pathology Explanation Clinics"
- Pilot programs were highly successful: reduce misunderstandings and give patients a feeling of empowerment

Ref: Mirham L. et al, Am J Clin Pathol, 156:521-528, 2021

Gibson B. et al, Acad Pathol, Vol 5: 2374289518756306, 2018

www.cancer.net/blog/2016-05/biopsy-5-things-every-patient-should-know. Accessed July 19, 2023

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Communicating Uncertainty: Why Won't the Pathologist Given me a Clear Diagnosis?

- Despite what many clinicians and patients believe, a diagnosis is NOT always black and white
- Avoidable reasons of uncertainty
  - Inadequate clinical information
  - Inadequate sampling
  - Mislabeling of specimen
  - Pathologists' lack of specialized expertise
- Unavoidable reasons of uncertainty
  - Tumors of uncertain malignant potential
  - Technical issues
  - Rare entities not well characterized
  - True diagnostic challenges
  - Need for a holistic approach and clinical/radiological and pathological evaluation

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Communicating Uncertainty

- Different perception of the absolute degree of accuracy of the pathology reports between clinicians and pathologists
- Statements conveying how confident the pathologist is of the diagnosis
  - The lesion has some features of…
  - The lesion is suspicious for…
  - The lesion is consistent with…
  - A diagnosis of xxx is favored
- MD Anderson study: 3 tier system for conveying uncertainty
  - The lesion is "suggestive of": 25% certainty
  - The lesion is "suspicious for": 50% certainty
  - The lesion is "consistent with": 75% certainty
- Efforts to standardize ways to communicate uncertainty are under **way**

Ref: Bracamonte E. et al, Academic Pathology, 3:1-7, 2016
Prieto V.G. et al, Virchows Archiv, 481:759-766, 2022

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Misinterpreting the Pathology Report; Possible Solutions

- Need for synchronization of the knowledge base between treating clinicians and pathologists
- Need for targeted rotations in pathology for residents and fellows
- Need for adherence to current updates for reporting tumor grading and staging released by ASCO/CAP
- Use of synoptic reporting inclusive of all crucial information
- Constant bidirectional communication and trust between clinician and pathologist

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Summary

The **informative** breast pathology report should contain the elements needed to:

support the **clinical decision-making** and should be written with an understanding of the **therapeutic implications** of each piece of the included **diagnostic** information.

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Summary (cont'd)

The following principles can help pathologists communicate more efficiently with our clinical colleagues and patients

- Use of diagnostic headlines to emphasize key points
- Maintain layout continuity of reports over time
- Optimize information density depending on who are your readers
- Reduce extraneous information or clutter
- Communicate uncertainty in a consistent way
- Consider the inclusion of a brief "patient friendly" summary

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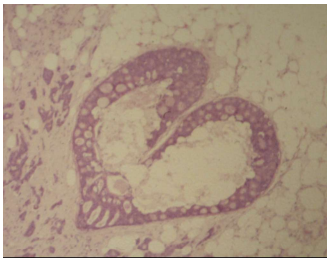
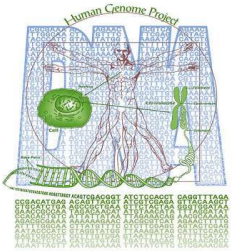
Thank you!





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THANK YOU

[Place QR code here]

Before you go…

Complete the online course evaluation!

Take less than 3 minutes to provide your feedback and help shape the next pathology meeting!

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Questions?

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COLLEGE of AMERICAN PATHOLOGISTS

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