Histotechnological problems in dermatopathology and their possible consequences

Zsolt B. Argenyi, M.D.
Professor of Pathology & Dermatology
Director of Dermatopathology
University of Washington, Seattle, WA, USA
What a timely topic!

- Election year
  - Major health care reform
    - Technological explosions
      - Global economic changes
        - Patient privacy issues
Dermatopathologists are also under the microscope

Provide High Quality Health Care

- Correct Diagnosis
- Safety
- Timelines
- Effectiveness
- Efficiency
- Equivity
- Patient centeredness
- (per Institute of Medicine)
How to avoid error by

a) Increase accuracy → correct diagnosis
b) Increase precision → consistency for reproducibility

Think Global

Act Specific
Percentages of errors in the various phases of TAT

- Preanalytic phase: 32-75%
- Analytic phase: 13-32%
- Postanalytic phase: 9-31%

Error Root Cause Analysis

Worksteps

- connections
- pathways

200-300 steps

- preanalytic
- analytic
- postanalytic
## Examples of Substeps

<table>
<thead>
<tr>
<th>SUBSTEP</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accessioning steps</strong></td>
<td></td>
</tr>
<tr>
<td>Specimen receipt in laboratory (transport hand-off)</td>
<td>Hospital/transport/courier personnel hand of specimens to laboratory personnel.</td>
</tr>
<tr>
<td>Identification check</td>
<td>Laboratory personnel check that specimen containers and requisition contain appropriate matching identifiers.</td>
</tr>
<tr>
<td>Assignment of unique laboratory identifier</td>
<td>Specimens are assigned unique identifiers in laboratory information systems.</td>
</tr>
<tr>
<td><strong>Gross Examination steps</strong></td>
<td></td>
</tr>
<tr>
<td>Identification check</td>
<td>Laboratory personnel check that issues and accompanying information match.</td>
</tr>
<tr>
<td>Gross examination of specimen</td>
<td>Laboratory personnel visually examine specimens in terms of volume and other characteristics (color, lesions, etc). Descriptions are included in pathology reports.</td>
</tr>
<tr>
<td>Sectioning of specimen</td>
<td>For larger specimens, laboratory personnel may use a variety of cutting instruments to examine further the internal specimen characteristics.</td>
</tr>
<tr>
<td><strong>Processing steps (for histologic examination)</strong></td>
<td></td>
</tr>
<tr>
<td>Tissues processed</td>
<td>Tissues are placed in one of several types of processors that dehydrate the tissues.</td>
</tr>
<tr>
<td>Identification check</td>
<td>Laboratory personnel visually match tissue cassettes received with records and evaluate cassette integrity following processing.</td>
</tr>
<tr>
<td>Tissues embedded in paraffin</td>
<td>Laboratory personnel embed tissue in paraffin to create tissue blocks.</td>
</tr>
<tr>
<td>Tissues thinly sectioned</td>
<td>Laboratory personnel use microtomes to thinly section the paraffin blocks. The thin sections are placed on glass slides.</td>
</tr>
<tr>
<td>Slides stained</td>
<td>Hematoxylin and eosin is the preferred stain for most histologic tissue sections.</td>
</tr>
<tr>
<td>Slides cover-slipped</td>
<td>A thin layer of glass or plastic is placed on top of the slide.</td>
</tr>
<tr>
<td>Slides transported to pathologists</td>
<td>Slides from the same patient (case) are assembled and brought to the pathologist for interpretation.</td>
</tr>
<tr>
<td><strong>Interpretation steps</strong></td>
<td></td>
</tr>
<tr>
<td>Identification check</td>
<td>Pathologists match the tissue slides and requisition information.</td>
</tr>
<tr>
<td>Pathologists examine slides microscopically</td>
<td>Pathologists place slides under light microscopes and examine the tissues. Diagnostic interpretations are made using histologically observed criteria. Pathologists may choose to order ancillary tests, such as immunohistochemical tests.</td>
</tr>
<tr>
<td>Pathologists prepare a report</td>
<td>Reports contain an interpretation based on findings from microscopic and gross examinations.</td>
</tr>
<tr>
<td><strong>Reporting steps</strong></td>
<td></td>
</tr>
<tr>
<td>Reports sent to clinical providers</td>
<td>Reports are sent in a variety of ways including mail, facsimile, and the internet.</td>
</tr>
</tbody>
</table>
Interpretation steps

“Misinterpretation”

Cognitive problems

Upstream or system failure

Poor quality specimen

Over dx

Under dx

Individual issues

Skills

Fatigue

Lack of 2nd opinion

ERROR SCALE
Key Elements of Systemic Quality Control Improvement

1. Effective test ordering
2. Clinical information
3. **Procurement of high quality tissue**
4. Appropriate tissue handling
5. Quality tissue interpretation
6. Timely follow-up
7. Effective Communication
8. Secondary review
Procurement of the highest tissue quality

Sampling related

Quality

False

Interpretation related

Negative

Positive
This is the **No Blame Box**. The slides of 40 false-negative cytology errors were evaluated by a pathologist, assessed in terms of specimen quality and amount of tumor. Each oval represents the assessment of specimen quality and amount of tumor present for each of the 40 cases. The pathologist classified the majority of specimens to be of poor quality.

### Pre-Analytic Dermatology Specimen Defects

<table>
<thead>
<tr>
<th>Clinic</th>
<th>Gross Dissection</th>
<th>Histopathology</th>
<th>Action/ Countermeasure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen mis/ not labeled</td>
<td></td>
<td></td>
<td>Contact Physician Office Relabeling policy</td>
</tr>
<tr>
<td>No specimen in bottle</td>
<td></td>
<td></td>
<td>Contact Physician Office Look in procedure suite</td>
</tr>
<tr>
<td>Specimen over inked</td>
<td></td>
<td></td>
<td>Review inking procedures</td>
</tr>
<tr>
<td>Specimen poorly sectioned</td>
<td></td>
<td></td>
<td>Review Gross Manual</td>
</tr>
<tr>
<td>Too many portions of tissue in block</td>
<td></td>
<td></td>
<td>Review Gross Manual</td>
</tr>
<tr>
<td>Tissue poorly (under)processed</td>
<td></td>
<td></td>
<td>Reprocess</td>
</tr>
<tr>
<td>Tissue improperly embedded (No epithelium)</td>
<td></td>
<td></td>
<td>Melt down tissue block</td>
</tr>
<tr>
<td>Tissue over/under faced in</td>
<td></td>
<td></td>
<td>Contact Histology Lab</td>
</tr>
<tr>
<td>Poor tissue microtomy</td>
<td></td>
<td></td>
<td>Complete Histology QA Feedback Form</td>
</tr>
<tr>
<td>Poor Staining</td>
<td></td>
<td></td>
<td>Complete Histology QA Feedback Form</td>
</tr>
</tbody>
</table>

**Tissue grossing steps**
Dermatopathology related technical issues

1. Which are the most common ones?
2. What consequences do they have?
3. How can we avoid them?
Histologic processing and reporting of cutaneous pigmented lesions: Recommendations based on a survey of 94 dermatopathologists

Olga Kolman, MD, Mai P. Hoang, MD, Adriano Piris, MD, Martin C. Mihm, Jr, MD, FACP, and Lyn M. Duncan, MD

Boston, Massachusetts

Conclusions: Based on the results of this survey we have arrived at the following recommendations: (1) ink all specimens that are ellipses or designated as excisions; (2) tips should be evaluated separately if the specimen is an ellipse; (3) obtain levels in cases with tumor in the tip but not at ink if the specimen is an ellipse or excision and the diagnosis is atypical nevus or melanoma; and (4) report margins on all atypical nevi and melanomas. (J Am Acad Dermatol 2010;63:661-7.)
### Real life scenarios

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Causes</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tissue is present, but no apparent lesion</td>
<td>Incorrect clinical sampling&lt;br&gt;Lesion “lost” in processing&lt;br&gt;• True lost&lt;br&gt;• “Pseudo lost”&lt;br&gt;Suboptimal processing</td>
<td>Call physician&lt;br&gt;Correlate with clinical info, photos, diagram. Reprocess</td>
</tr>
<tr>
<td>2. Tissue is present, but lesion is inconsistent with clinical information</td>
<td>Incorrect clinical sampling&lt;br&gt;Lesion is not sectioned properly&lt;br&gt;• Not deep enough&lt;br&gt;• Malorientation</td>
<td>Correlate with clinical info, photos, diagram.&lt;br&gt;Reorient; step sections.</td>
</tr>
<tr>
<td>3. Tissue is present but lesion is suboptimal to evaluate</td>
<td>Clinically incorrectly sampled&lt;br&gt;Technically not sufficiently sampled&lt;br&gt;• Maloriented&lt;br&gt;• Margin is not present&lt;br&gt;• Over/under stained&lt;br&gt;• Poorly fixed&lt;br&gt;• Contaminated</td>
<td>Communicate with physician&lt;br&gt;Reprocess and deeper sections</td>
</tr>
</tbody>
</table>
Virtual tissue loss resulting incorrect diagnosis
Epithelial Remnants of Isthmus-Catagen Cysts

Kenneth S. Resnik, MD, and Mario DiLeonardo, MD

(Am J Dermatopathol 2004;26:194–199)
Incorrect Diagnosis due to inadequate Sampling
The relationship between biopsy technique and uncertainty in the histopathologic diagnosis of melanoma.

Pariser RJ, Divers A, Nassar A
Eastern Virginia Medical School, USA.
Basal Cell Carcinoma

Clues to Its Presence in Histologic Sections When the Initial Slide Is Nondiagnostic

Helen M. Haupt, M.D., Jere B. Stern, M.D., and Mouta S. Dilaimy, M.D.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Total</th>
<th>BCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stromal fibrosis</td>
<td>19</td>
<td>11 (58%)</td>
</tr>
<tr>
<td>Inflammation</td>
<td>18</td>
<td>7 (39%)</td>
</tr>
<tr>
<td>No specific findings</td>
<td>13</td>
<td>4 (31%)</td>
</tr>
<tr>
<td>Epidermal atypia</td>
<td>12</td>
<td>12 (100%)</td>
</tr>
<tr>
<td>Empty dermal space</td>
<td>12</td>
<td>9 (75%)</td>
</tr>
<tr>
<td>Absent dermis</td>
<td>12</td>
<td>6 (50%)</td>
</tr>
<tr>
<td>Absent epidermis</td>
<td>11</td>
<td>8 (73%)</td>
</tr>
<tr>
<td>Telangiectasia</td>
<td>10</td>
<td>3 (30%)</td>
</tr>
<tr>
<td>Calcification</td>
<td>6</td>
<td>5 (83%)</td>
</tr>
<tr>
<td>Equivocal adnexae</td>
<td>3</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>Ulceration</td>
<td>2</td>
<td>1 (50%)</td>
</tr>
</tbody>
</table>

BCC, basal cell carcinoma.
The perennial question of “deeper sectioning”

Goal

Most accurate diagnosis

Lowest costs
What can we do to make it better?

**Retroactive**
1. Step sections
2. Reprocessing
   - Inefficient
   - Tissue consuming
   - Costly

**Proactive**
1. Optimal clinical information
2. Utilization of clinical images
3. Diagrams
4. Guided sectioning
5. “Prospective step sections”
   - Cost effective
   - ⬆ Turn around time
   - Better diagnostic accuracy
Deeper sections;
Few facts

1. No standard techniques for deeper sectionings

2. Variable recut rate per institutions
   1. Volume
   2. Technologist skill
   3. Referral pattern
   4. Biopsy technique
   5. Geographic location
   6. Pathologist expertise level

3. Only few studies addressed the issue
   1. General concept
   2. Lesion specific approach
Utility of deeper sections and special stains for dermatopathology specimens

Chetan P. Maingi and Klaus F. Helm

Section of Dermatology and Pathology, Hershey Medical Center of the Pennsylvania State University, Hershey, Pennsylvania, USA
Table 1. Utility of additional sections

<table>
<thead>
<tr>
<th>Additional sections</th>
<th>No.</th>
<th>%</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not provide additional information</td>
<td>69</td>
<td>62.7</td>
<td>(54, 72)</td>
</tr>
<tr>
<td>Helped make a more accurate diagnosis</td>
<td>26</td>
<td>23.6</td>
<td>(16, 32)</td>
</tr>
<tr>
<td>Help find a benign skin neoplasm not seen on the original sections</td>
<td>9</td>
<td>8.18</td>
<td>(4, 13)</td>
</tr>
<tr>
<td>Help diagnose a malignant skin neoplasm not seen on the original sections</td>
<td>5</td>
<td>4.54</td>
<td>(1, 8)</td>
</tr>
<tr>
<td>Help diagnose a scabies infection by demonstrating a mite not present in original sections</td>
<td>1</td>
<td>0.91</td>
<td>(-1, 3)</td>
</tr>
</tbody>
</table>

Total: 110 100

Table 2. Reasons for additional sections

<table>
<thead>
<tr>
<th>Reason for additional sections</th>
<th>No.</th>
<th>%</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial findings were non-diagnostic</td>
<td>41</td>
<td>33.9</td>
<td>(25, 42)</td>
</tr>
<tr>
<td>Reassurance</td>
<td>40</td>
<td>33.1</td>
<td>(25, 41)</td>
</tr>
<tr>
<td>Superficial biopsy</td>
<td>28</td>
<td>23.1</td>
<td>(16, 31)</td>
</tr>
<tr>
<td>Poor sections (large tips, poor orientation)</td>
<td>9</td>
<td>7.44</td>
<td>(3, 12)</td>
</tr>
<tr>
<td>Attempts to find focal pathology (small lesion, wrong area biopsied, rule out folliculitis)</td>
<td>3</td>
<td>2.48</td>
<td>(0, 5)</td>
</tr>
</tbody>
</table>

Totals: 121 100

Table 3. Type of case on which levels were ordered

<table>
<thead>
<tr>
<th>Type of case</th>
<th>No.</th>
<th>%</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neoplasm of the skin</td>
<td>81</td>
<td>74.3</td>
<td>(66, 82)</td>
</tr>
<tr>
<td>Benign</td>
<td>67</td>
<td>61.5</td>
<td>(53, 71)</td>
</tr>
<tr>
<td>Malignant</td>
<td>14</td>
<td>12.8</td>
<td>(7, 19)</td>
</tr>
<tr>
<td>Inflammatory process of the skin</td>
<td>29</td>
<td>26.4</td>
<td>(18, 35)</td>
</tr>
</tbody>
</table>

Total: 110 100

Table 4. Utility of additional sections in the diagnosis of all cases

<table>
<thead>
<tr>
<th>Additional cuts</th>
<th>No.</th>
<th>%</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provided additional information</td>
<td>41</td>
<td>37.3</td>
<td>(28, 46)</td>
</tr>
<tr>
<td>Helped make a more accurate diagnosis</td>
<td>26</td>
<td>23.6</td>
<td>(16, 32)</td>
</tr>
<tr>
<td>Helped establish a diagnosis that could not be made on original cuts</td>
<td>15</td>
<td>13.6</td>
<td>(7, 20)</td>
</tr>
</tbody>
</table>

Total no. of cases that required additional cuts: 110 100

Table 6. Utility of additional sections in the diagnosis of neoplasms of the skin

<table>
<thead>
<tr>
<th>Additional cuts</th>
<th>No.</th>
<th>%</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helped provide additional information about the diagnosis of a skin neoplasm</td>
<td>35</td>
<td>43.2</td>
<td>(32, 54)</td>
</tr>
<tr>
<td>Helped provide a more accurate diagnosis of a skin neoplasm</td>
<td>21</td>
<td>25.9</td>
<td>(16, 35)</td>
</tr>
<tr>
<td>Helped establish the diagnosis of a skin neoplasm not seen on original cuts</td>
<td>14</td>
<td>17.3</td>
<td>(9, 26)</td>
</tr>
<tr>
<td>Helped establish the diagnosis of a benign skin neoplasm not seen on original cuts</td>
<td>9</td>
<td>11.1</td>
<td>(4, 18)</td>
</tr>
<tr>
<td>Helped establish the diagnosis of a malignant skin neoplasm not seen on original cuts</td>
<td>5</td>
<td>6.17</td>
<td>(1, 11)</td>
</tr>
</tbody>
</table>

Total no. of neoplasm cases: 81 100

Ref. Maingi, et al.
Utility of Step Sections

Demonstration of Additional Pathological Findings in Biopsy Samples Initially Diagnosed as Actinic Keratosis

Henry R. Carag, MD; Victor G. Prieto, MD, PhD; Liza S. Yballe, MD; Christopher R. Shea, MD

Conclusions: In biopsy samples initially diagnostic of actinic keratosis, examination of step sections contributes clinically important information. Step sections are particularly useful when a clinical diagnosis of skin cancer is present. The results of this study confirm the pathogenetic importance of actinic keratosis as a precursor to fully evolved malignant neoplasia and suggest that such lesions merit thorough histological study.

Arch Dermatol. 2000;136:471-475
Diagnostic yield of step sections of initially diagnosed as actinic keratosis

69 cases with 10 step sections (50 µm intervals)

- 33% new diagnosis
  - 13% CIS
  - 4% BCC
  - 3% SCC

Ref. Carag, et al.
Issue of cost effectiveness

Example (figures from 2000 from an academic institution)

10 additional sections $31.54
690 steps $2,176.26

Cost effectiveness = new dx yield = total costs/# new dx

1. New dx = $94.62
2. Cancer dx = $155.45
3. Intuitive ca dx = $435.25

Ref. Carag, et al.
Issue of cost effectiveness

Conclusion

1. No generally accepted standards
2. Utilization of additional information to make the decision on the needs of recuts; which correlates with higher yield;
   1. Ulceration on first level
   2. Clinical diagnosis of skin cancer
   3. Pathologic diagnosis of skin cancer
3. Decision remains difficult to make a compromise
Impact of Thorough Block Sampling in the Histologic Evaluation of Melanomas

Senait W. Dyson, MD; Jonathan Bass, MD; Jerome Pomeranz, MD; Christine Jaworsky, MD; Jessica Sigel, MD; Stephen Somach, MD

Conclusions: Level sectioning through an entire block of a melanoma specimen provides additional information in the classification and management of melanomas. Extensive block sampling will result in more accurate information regarding histologic parameters of melanoma, but the yield must be balanced with the extra cost of materials, time, labor, and the potential disadvantage of not retaining tissue for future use.

Arch Dermatol. 2005;141:734-736
Table 2. Additional Findings on Deeper Sections in 100 Consecutive Melanomas Compared With Initial Sections

<table>
<thead>
<tr>
<th>Additional Finding</th>
<th>Cases, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased tumor thickness</td>
<td>43</td>
</tr>
<tr>
<td>Increased level of invasion</td>
<td>10</td>
</tr>
<tr>
<td>Precursor nevi</td>
<td>4</td>
</tr>
<tr>
<td>Ulceration</td>
<td>3</td>
</tr>
<tr>
<td>Regression</td>
<td>2</td>
</tr>
</tbody>
</table>
Conclusions

1. Step sectioning results in more accurate diagnosis and prognostic parameters
2. Unable to offer standard recommendations
3. Should be a compromise for
   1. Extra costs
   2. Time
   3. Labor
   4. Exhaustion of tissue for future use
New Approach

Prospective Step Sections for Small Skin Biopsies

Andrea K. Bruecks, MD; Jill M. Shupe, MLT; Martin J. Trotter, MD, PhD

Conclusions.—In our laboratory, the use of prospective step sections is essentially cost-neutral and case turnaround time is improved by 9% to 45%. Step sections result in a changed diagnosis in 7% of small skin biopsy specimens.

(Arch Pathol Lab Med. 2007;131:107–111)
Utilization of prospective sectioning

500 cases

- 3 slides with a ribbon of 6 sections in 50 μm intervals

- 12% non diagnostic on level 1
- 7% changed the diagnosis
<table>
<thead>
<tr>
<th>Case No.</th>
<th>Age, y/Sex</th>
<th>Site</th>
<th>Diagnosis</th>
<th>Diagnostic Slide</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>17/F</td>
<td>Cheek</td>
<td>Folliculitis</td>
<td>3</td>
<td>Benign</td>
</tr>
<tr>
<td>10</td>
<td>55/F</td>
<td>Leg</td>
<td>Basal cell carcinoma</td>
<td>2</td>
<td>Malignant</td>
</tr>
<tr>
<td>38</td>
<td>37/F</td>
<td>Cheek</td>
<td>Fibrous papule</td>
<td>3</td>
<td>Benign</td>
</tr>
<tr>
<td>45</td>
<td>38/F</td>
<td>Back</td>
<td>Solar lentigo</td>
<td>2</td>
<td>Benign</td>
</tr>
<tr>
<td>105</td>
<td>75/F</td>
<td>Arm</td>
<td>Scar</td>
<td>2</td>
<td>Benign</td>
</tr>
<tr>
<td>113</td>
<td>69/M</td>
<td>Finger</td>
<td>Actinic keratosis</td>
<td>3</td>
<td>Exclude malignant</td>
</tr>
<tr>
<td>125</td>
<td>40/F</td>
<td>Unknown</td>
<td>Basal cell carcinoma</td>
<td>2</td>
<td>Malignant</td>
</tr>
<tr>
<td>160</td>
<td>69/M</td>
<td>Canthus</td>
<td>Ruptured cyst</td>
<td>2</td>
<td>Benign</td>
</tr>
<tr>
<td>189</td>
<td>44/F</td>
<td>Chest</td>
<td>Hemangioma</td>
<td>2</td>
<td>Benign</td>
</tr>
<tr>
<td>225</td>
<td>70/F</td>
<td>Nose</td>
<td>Seborrheic keratosis</td>
<td>2</td>
<td>Benign</td>
</tr>
<tr>
<td>296</td>
<td>64/M</td>
<td>Forehead</td>
<td>Basal cell carcinoma</td>
<td>2</td>
<td>Malignant</td>
</tr>
<tr>
<td>307</td>
<td>46/M</td>
<td>Forehead</td>
<td>Basal cell carcinoma</td>
<td>2</td>
<td>Malignant</td>
</tr>
<tr>
<td>345</td>
<td>72/M</td>
<td>Breast</td>
<td>Verrucous keratosis</td>
<td>2</td>
<td>Exclude malignant</td>
</tr>
<tr>
<td>346</td>
<td>77/F</td>
<td>Breast</td>
<td>Benign lichenoid keratosis</td>
<td>2</td>
<td>Benign</td>
</tr>
<tr>
<td>407</td>
<td>67/F</td>
<td>Cheek</td>
<td>Actinic keratosis</td>
<td>3</td>
<td>Exclude malignant</td>
</tr>
<tr>
<td>432</td>
<td>44/F</td>
<td>Neck</td>
<td>Syringoma</td>
<td>3</td>
<td>Benign</td>
</tr>
<tr>
<td>447</td>
<td>37/F</td>
<td>Shoulder</td>
<td>Benign lichenoid keratosis</td>
<td>2</td>
<td>Benign</td>
</tr>
<tr>
<td>472</td>
<td>56/F</td>
<td>Nose</td>
<td>Fibrous papule</td>
<td>2</td>
<td>Benign</td>
</tr>
<tr>
<td>479</td>
<td>42/F</td>
<td>Shoulder</td>
<td>Nevus</td>
<td>2</td>
<td>Benign</td>
</tr>
</tbody>
</table>
### Table 2. Diagnosis Changed*

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Age, y/Sex</th>
<th>Site</th>
<th>Slide 1</th>
<th>Slide 2</th>
<th>Slide 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>70/M</td>
<td>Nose</td>
<td>AK</td>
<td>AK</td>
<td>SCC in situ</td>
</tr>
<tr>
<td>29</td>
<td>75/M</td>
<td>Ear</td>
<td>Inverted follicular keratosis</td>
<td>Trichilemmoma</td>
<td>Trichilemmoma</td>
</tr>
<tr>
<td>63</td>
<td>27/F</td>
<td>Nose</td>
<td>Cyst</td>
<td>SCC</td>
<td>SCC</td>
</tr>
<tr>
<td>72</td>
<td>73/F</td>
<td>Cheek</td>
<td>AK</td>
<td>AK</td>
<td>SCC in situ</td>
</tr>
<tr>
<td>84</td>
<td>50/F</td>
<td>Scalp</td>
<td>SK, inflamed</td>
<td>BCC</td>
<td>BCC</td>
</tr>
<tr>
<td>95</td>
<td>19/M</td>
<td>Face</td>
<td>Lentigo</td>
<td>Nevus</td>
<td>Nevus</td>
</tr>
<tr>
<td>147</td>
<td>62/F</td>
<td>Face</td>
<td>AK</td>
<td>SCC in situ</td>
<td>SCC in situ</td>
</tr>
<tr>
<td>203</td>
<td>32/M</td>
<td>Trunk</td>
<td>Nevus</td>
<td>Nevus</td>
<td>Dysplastic nevus</td>
</tr>
<tr>
<td>215</td>
<td>55/F</td>
<td>Nose</td>
<td>Fibrous papule</td>
<td>BCC</td>
<td>BCC</td>
</tr>
<tr>
<td>279</td>
<td>42/M</td>
<td>Forearm</td>
<td>Nevus</td>
<td>Dysplastic nevus</td>
<td>Dysplastic nevus (severe)</td>
</tr>
<tr>
<td>306</td>
<td>60/M</td>
<td>Scrotum</td>
<td>Epidermal hyperplasia</td>
<td>Hemangioma</td>
<td>Hemangioma</td>
</tr>
<tr>
<td>310</td>
<td>45/F</td>
<td>Thigh</td>
<td>Lentigo</td>
<td>Nevus</td>
<td>Nevus</td>
</tr>
<tr>
<td>395</td>
<td>69/M</td>
<td>Shoulder</td>
<td>AK</td>
<td>SCC in situ</td>
<td>SCC in situ</td>
</tr>
<tr>
<td>459</td>
<td>79/F</td>
<td>Nose</td>
<td>AK</td>
<td>BCC</td>
<td>BCC</td>
</tr>
<tr>
<td>464</td>
<td>83/M</td>
<td>Ear</td>
<td>AK</td>
<td>SCC in situ</td>
<td>SCC in situ</td>
</tr>
</tbody>
</table>

*AK indicates actinic keratosis; SCC, squamous cell carcinoma; SK, seborrheic keratosis; and BCC, basal cell carcinoma.
Conclusion

1. Step sections were required in about 30% of the cases
2. Improved turnaround time 9% - 45%
3. Cost effectiveness or cost neutral
Additional methods to decrease errors and increase diagnostic accuracy

1. Insistence of appropriate clinical information
2. Utilization of clinical photography at grossing the specimen and at the sign-out
3. Systemic use of grossing diagram for correlation
4. Application of ex-vivo dermoscopy at grossing
5. Utilization of dermoscopic image at the grossing and at the sign-out
6. Grossing protocol relevant for biopsy type
Key Elements of Systemic Quality Control Improvement

1. Effective test ordering
2. Clinical information
3. Procurement of high quality tissue
4. Appropriate tissue handling
5. Quality tissue interpretation
6. Timely follow-up
7. Effective Communication
8. Secondary review
Relevance of Pertinent Clinical Information

Clinical information
1. More accurate diagnosis
2. Narrowed differential diagnosis
3. Reduced costs
   - Turn around time
   - Resource utilization
Necessity of Clinical Information in Surgical Pathology

A College of American Pathologists Q-Probes Study of 771,475 Surgical Pathology Cases From 341 Institutions

Raouf E. Nakhleh, MD; Gordon Gephardt, MD; Richard J. Zarbo, MD, DMD

Conclusions.—This study establishes an aggregate rate of cases with inadequate clinical information for diagnosis (0.73%) and documents the extent of problems caused by inadequate clinical information. The criticality of appropriate clinical information provided to the pathologist is identified for specific anatomic sites and disease processes and is reflected in changed diagnoses or revised reports.

(Arch Pathol Lab Med. 1999;123:615–619)
How informative are dermatopathology requisition forms completed by dermatologists? A review of the clinical information provided for 100 consecutive melanocytic lesions

Jeanette M. Waller, MD, a and Daniel C. Zedek, MD a,b
San Francisco, California

Conclusion: Important clinical information regarding pigmented lesions is often not provided on the requisition form. Potential reasons for this deficit and suggestions for improvement are discussed. (J Am Acad Dermatol 2010;62:257-61.)
The Influence of Clinical Information in the Histopathologic Diagnosis of Melanocytic Skin Neoplasms

Gerardo Ferrara¹, Zsolt Argenyi², Giuseppe Argenzano³, Rino Cerio⁴, Lorenzo Cerroni⁵, Arturo Di Blasi¹, Elisa A. A. Feudale⁶, Caterina M. Giorgio³, Cesare Massone⁵, Oscar Nappi⁷, Carlo Tomasini⁸, Carmelo Urso⁹, Iris Zalaudek⁵, Harald Kittler¹⁰, H. Peter Soyer¹¹*


Editor: Per Westermark, Uppsala University, Sweden

Received September 14, 2008; Accepted March 27, 2009; Published April 30, 2009

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Material and Methods

- 99 equivocal melanocytic lesions including all melanomas excised from Jan 04 to Dec 05
- 5 diagnostic scenarios
- D1 (no information), D2 (age, sex, location), D3 (clinical diagnosis), D4 (clinical image), D5 (dermoscopic image)
- Dx options: malignant, benign, “I am not sure”
Material and Methods II

- Level of diagnostic confidence (1–5)

**LDC 1:** No diagnostic certainty: no diagnosis can be made.

**LDC 2:** Low diagnostic certainty: a diagnosis is felt as slightly more likely.

**LDC 3:** Moderate diagnostic certainty: a diagnosis is favoured, but with some elements of doubt.

**LDC 4:** High diagnostic certainty: a diagnosis is strongly favoured.

**LDC 5:** Absolute diagnostic certainty: no other diagnosis is possible.
Increase of Level of Diagnostic Confidence

After Dr. Soyer, Queensland Institute of Dermatology
Melan-A-Positive “Pseudomelanocytic Nests”: A Pitfall in the Histopathologic and Immunohistochemical Diagnosis of Pigmented Lesions on Sun-Damaged Skin.

Helmut Beltraminelli, MD
Laila El Shabrawi-Caelen, MD
Helmut Kerl, MD
Lorenzo Cerroni, MD

Am J Dermatopathol 2009; 31:305-8
Limitations of Histopathologic Analysis in the Recognition of Melanoma

A Plea for a Combined Diagnostic Approach of Histopathologic and Dermoscopic Evaluation

H. Peter Soyer, MD
Cesare Massone, MD
Gerardo Ferrara, MD
Giuseppe Argenziano, MD

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Key Elements of Systemic Quality Control Improvement

1. Effective test ordering
2. Clinical information
3. Procurement of high quality tissue
4. Appropriate tissue handling
5. Quality tissue interpretation
6. Timely follow-up
7. Effective Communication
8. Secondary review
When Dermoscopy is the Pathologist’s Friend
Ex Vivo Dermoscopy of Melanocytic Tumors

Time for Dermatopathologists to Learn Dermoscopy

Alon Scope, MD; Klaus J. Busam, MD; Josep Malvehy, MD; Susana Puig, MD, PhD; Steve A. McClain, MD; Ralph P. Braun, MD; Ashfaq A. Marghoob, MD

Conclusions: Dermoscopy can be applied to fixed tissues, with findings comparable to those of in vivo examination. This observation may serve as the first step toward using dermoscopy to guide tissue sectioning in gross pathology.

Arch Dermatol. 2007;143(12):1548-1552
Dermatoscopy Turns Histopathologist’s Attention to the Suspicious Area in Melanocytic Lesions

Juergen Bauer, MD; Gisela Metzler, MD; Gernot Rassner, MD; Claus Garbe, MD; Andreas Blum, MD

**Conclusions:** Specific dermatoscopic patterns of malignancy can be found in highly suspicious areas, e.g., broadened networks, radial streaming, pseudopods, or dots located at the periphery. The dermatoscopic-histopathologic correlation can improve the diagnosis of melanoma. Therefore, the clinician should point to the most suspicious area with a drawing or image, and the suspected diagnosis of melanoma and the history of the lesion should be also mentioned.

*Arch Dermatol.* 2001;137:1338-1340
Lesion Number: 2
Date: 04/15/2005 Fri
Diagnosis:
Location: R. genus ant. dextr.
Management:

ID = 247
Sex:
The importance of guided sectioning of melanocytic lesions

1). More control on margin evaluation

2). Better assessment of prognostic parameters

3). Implication on sentinel lymph node dissection and further therapy.
Conclusions

1. Errors related to the various phases of the total testing process are abundant in dermatopathology
2. Only a few studies addressed these problems without establishing standards
3. In addition to having impact on patient management it also effects;
   1. Costs
   2. Laboratory efficiency
   3. Reimbursement
   4. Legal matters
4. The pathologist overfocused on the analytic phase of the work should pay equal attention to the pre- and post-analytical steps to improve diagnostic accuracy and more efficient laboratory management
5. Dermatopathology is a unique field where cost-effectiveness and higher diagnostic accuracy can be further improved by numerous, relatively simple, and effective methods