Presentation Objectives

- Describe general trends in specimen types, volumes and distribution of cases in Ontario Cytopathology laboratories
- Describe changes in the cytotechnologist workforce over the last decade
- Newer technologies (immunocytochemistry, molecular)

Institute for Quality Management in Healthcare (IQMH)

- IQMH is a not-for-profit corporation with over 40 years of history and offers proficiency testing, accreditation and education services.
- Centre for PT offers 21 proficiency testing programs in 7 disciplines and includes:
  - Clinical or simulated clinical sample challenges
  - Web-based surveys including scanned/digital images
  - Consensus practice recommendations and guidelines
  - Patterns-of-practice surveys
Cytopathology Patterns-of-Practice Surveys

- Issued every two years
- Gather information about cytopathology practice and assess general trends in the discipline
  - Specimen volumes
  - Processing methods
  - Distribution of cases
  - Quality assurance
  - Workforce

Due to the variability in practice patterns noted, often the data is analyzed in two separate groups:

- **Community laboratories** – private laboratories not affiliated with a hospital
- **Hospital laboratories** – those laboratories contained within or affiliated with a hospital

Cytopathology Testing Across Ontario

Total number of cytopathology cases reported in Ontario (2008-2017)
Gynecological Cytopathology

Number of GYN cytopathology cases reported in Ontario (2008-2017)

Gynecological Preparation Types

- L713 Conventional – 29 Ontario laboratories are licensed; 1134 cases (0.1% of total GYN volume) reported out in 2017; 20 labs reported out 0 in 2017
- L733 Monolayer cell methodology – 36 Ontario laboratories are licensed; all laboratories reported using ThinPrep® or SurePath™ (with 2 labs reporting they use both)

Diagnostic rates for GYN specimens

Proportion of diagnostic categories for GYN specimens (2011-2017)
Non-Gynecological Cytopathology

Number of Non-GYN cytopathology cases reported in Ontario (2008-2017)

Non-Gynecological Specimen Types

Proportion of Non-GYN specimen types reported by Ontario laboratories (2017)

Cytotechnologist Workforce

- IQMH started collecting workforce data in 2010
- 2010: 222.5 FTE cytotechnologists were reported in Ontario laboratories
  - 118.9 in community laboratories
  - 103.6 in hospital laboratories
- 2017: 177.96 FTE cytotechnologists were reported in Ontario laboratories
  - 87.46 in community laboratories
  - 90.5 in hospital laboratories
Cytotechnologist Workforce

FTE Cytotechnologists – Hospital and Community Laboratories (2010-2017)

<table>
<thead>
<tr>
<th>Year</th>
<th>Hospital</th>
<th>Community</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>1000</td>
<td>500</td>
<td>1500</td>
</tr>
<tr>
<td>2011</td>
<td>950</td>
<td>450</td>
<td>1400</td>
</tr>
<tr>
<td>2012</td>
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<td>900</td>
</tr>
<tr>
<td>2017</td>
<td>650</td>
<td>150</td>
<td>800</td>
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Cytotechnologists – Other Duties

<table>
<thead>
<tr>
<th>Hospital Laboratories</th>
<th>Community Laboratories</th>
</tr>
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<tbody>
<tr>
<td>Education of trainees</td>
<td>Education of trainees</td>
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<tr>
<td>Quality assurance</td>
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<tr>
<td>Administration</td>
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</tr>
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<tr>
<td>Histopathology duties</td>
<td>Histopathology duties</td>
</tr>
<tr>
<td>Immunohistochemistry/immunocytochemistry</td>
<td>Immunohistochemistry/immunocytochemistry</td>
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</tbody>
</table>

New Technologies

1. Immunocytochemistry
2. Molecular testing on Cytopathology specimens
Immunocytochemistry

• In 2017:
  – 98% of hospital laboratories offer immunocytochemistry on cytopathology specimens; 31 (78%) hospital laboratories perform the test on site
  – 50% of community laboratories offer immunocytochemistry on cytopathology specimens; no community laboratories perform the test on site

Preparations Provided for Immunocytochemistry

• The most common preparation types provided for ICC testing are:
  – Formalin fixed cell blocks
  – Cytolyt fixed cell blocks
  – More uncommonly, laboratories sent residual ThinPrep® material, cell blocks of other fixation methods and other samples including direct smears, cytospin and fragments of cytology specimens

Immunocytochemistry Testing

• Class I – interpreted in the context of histo/cytomorphological features and clinical data
• Class II – reported as a stand-alone result to a clinician for prognostic or predictive purposes
• Not performed by community laboratories
• Performed by subset of hospital laboratories

<table>
<thead>
<tr>
<th></th>
<th>Class I</th>
<th>Class II</th>
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</thead>
<tbody>
<tr>
<td>Performed</td>
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<td>4</td>
</tr>
<tr>
<td>Validated fully</td>
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<tr>
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Molecular Testing on Cytopathology Specimens

• Asked about non-GYN only
• In 2017:
  – Hospital laboratories – 34 have molecular testing available for cytopathology specimens with one performing it within their laboratory; six do not offer molecular testing
  – Community laboratories – two have molecular testing available for cytopathology specimens through referral to another organization; three do not offer molecular testing

Molecular Tests Available

• EGFR (85%)
• ALK (77%)
• BRAF (85%)
• Other (77%); includes PDL1, T790M, HPV, lymphoma tests

Preparations Provided for Molecular Testing

• The majority of laboratories provide cell blocks (formalin-fixed or alcohol-fixed) for molecular testing
• Slides or residual mixture in cytology preservative is rarely provided for molecular testing
• Adequacy is determined by either counting the number of tumour cells, providing % of tumour cells or other assessment method.
Take Home Messages

• Landscape of GYN testing is changing according to screening guidelines; fewer patients but increased "abnormal" test results
• Non-GYN testing is increasing
• Cytotechnologist workforce is adapting to changing workloads by diversifying and transferring skills
• New testing technologies available which have the ability to enhance patient care

THANK YOU!