
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

9.3%), while increased in salivary (6.5 to 12.2%), bone/soft tissue (4.3 to 5.3%) and neck (7.3 to 8.9%) specimens, and showed no significant changes for thyroid and liver. The percent of final malignant diagnoses increased in bronchoscopic, pancreatobiliary, and bone/soft tissue specimens, as summarized in Table 1.

**Conclusions:** Implementation of telecytology has dramatically increased utilization of ROSE by cytopathologists in a health system with multiple sites performing biopsies. Although there was no decrease in the overall non-diagnostic rate, this initiative has made the greatest positive impact on final non-diagnostic rate and malignant diagnoses in bronchoscopic and endoscopic procedures. This may be because these biopsies tend to be cellular with non-lesional contamination and require meticulous review of qualitative cellular features by a cytopathologist to accurately determine adequacy, which can improve the ability to make a definitive diagnosis.

| | 2020 | | 2021 | |
|---|---|---|---|---|
| | Without telecytology | | With telecytology | |
| | # | % | # | % |
| Lung Bronchoscopc NonDx | 66 | 20.4% | 40 | 16.5% |
| Lung Bronchoscopc Benign | 156 | 48.1% | 100 | 41.2% |
| Lung Bronchoscopic Atypical | 13 | 4.0% | 15 | 6.2% |
| Lung Bronchoscopic Suspicious | 3 | 0.9% | 3 | 1.2% |
| Lung Bronchoscopic Malignant | 86 | 26.5% | 85 | 35.0% |
| Pancreas NonDx | 17 | 16.7% | 9 | 9.3% |
| Pancreas Benign | 32 | 31.4% | 23 | 23.7% |
| Pancreas Atypical | 12 | 11.8% | 21 | 21.6% |
| Pancreas Suspicious | 6 | 5.9% | 6 | 6.2% |
| Pancreas Malignant | 35 | 34.3% | 38 | 39.2% |
| Salivary NonDx | 3 | 6.5% | 6 | 12.2% |
| Salivary Benign | 26 | 56.5% | 29 | 59.2% |
| Salivary Atypical | 10 | 21.7% | 13 | 26.5% |
| Salivary Suspicious | 2 | 4.3% | 0 | 0.0% |
| Salivary Malignant | 5 | 10.9% | 1 | 2.0% |
| Thyroid NonDx | 48 | 13.9% | 45 | 14.0% |
| Thyroid Benign | 216 | 62.6% | 197 | 61.4% |
| Thyroid Atypical | 60 | 17.4% | 69 | 21.5% |
| Thyroid Suspicious | 3 | 0.9% | 3 | 0.9% |
| Thyroid Malignant | 18 | 5.2% | 7 | 2.2% |
| Neck (non thyroid) NonDx | 15 | 7.3% | 14 | 8.9% |
| Neck (non thyroid) Benign | 123 | 59.7% | 84 | 53.5% |
| Neck (non thyroid) Atypical | 14 | 6.8% | 15 | 9.6% |
| Neck (non thyroid) Suspicious | 1 | 0.5% | 4 | 2.5% |
| Neck (non thyroid) Malignant | 53 | 25.7% | 40 | 25.5% |
| Liver NonDx | 1 | 1.2% | 1 | 1.5% |
| Liver Benign | 11 | 13.1% | 8 | 11.8% |
| Liver Atypical | 3 | 3.6% | 5 | 7.4% |
| Liver Suspicious | 3 | 3.6% | 2 | 2.9% |
| Liver Malignant | 66 | 78.6% | 52 | 76.5% |
| Bone & Soft tissue NonDx | 2 | 4.3% | 2 | 5.3% |
| Bone & Soft tissue Benign | 20 | 43.5% | 15 | 39.5% |
| Bone & Soft tissue Atypical | 3 | 6.5% | 3 | 7.9% |
| Bone & Soft tissue Suspicious | 0 | 0.0% | 0 | 0.0% |
| Bone & Soft tissue Malignant | 21 | 45.7% | 18 | 47.4% |

Table 1: Diagnostic categories by specimen source

## PST102

### Performance of Four Common Tissue Preservatives for Immunohistochemical Testing of Cytology Specimens; Preliminary Findings from an Immunohistochemical Stains Validation Project

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**Introduction:** Regulatory requirements necessitate validation of tests by laboratories in the United States. Immunohistochemical (IHC) stains, pivotal for diagnosis in oncologic cytopathology, have been shown to be affected by specimen preservation and processing. To validate the performance of four different tissue preservatives on cytologic cell block preparations, we assessed the effects of CytoLyt, Roswell Park Memorial Institute medium (RPMI), formalin, and normal saline (NS) on IHC stain performance. Herein, we present our preliminary findings.

**Materials and Methods:** Twenty surgical specimens were sampled within one hour of excision, aliquot of each fixed in all 4 reagents being investigated. These were processed as cell block preparations using the plasma-thrombin method. One hematoxylin and eosin and four IHC stains were performed on each of the cell blocks. The performance of each preservative was assessed by scoring the IHC staining by at least two pathology trainees using the following scale: 0 - no staining; 1- faint staining observed at x100 magnification; 2 - faint staining at x40, and 3 - intense staining at x40. An average performance score was determined for each specimen type on each preservative.

**Results:** One specimen was excluded due to scant cellularity. Only one IHC stain was performed on one of the lung specimens for the same reason. A summary of the average performance of the 4 fixatives is shown in Table 1. CytoLyt showed the best overall average score (2.4/3.0), while formalin and NS performed the worst (2.0/3.0). Interestingly, formalin demonstrated extremes of performance depending on the specimen type, with no staining and no cells preserved in the ovary, while showing an excellent staining in the lung, thyroid, tongue, bladder, and liver.

**Conclusions:** Our data shows the superior performance of the CytoLyt compared to other preservatives, with formalin demonstrating acceptable results in certain specimen types.

**Table 1** Performance of Different Preservatives

| *Specimen (#sampled)* | *Antibodies Tested* | *CytoLyt* | *RPMI* | *Formalin* | *NS* |
|---|---|---|---|---|---|
| *Ovary (2)* | Villin, CK7, CK20, CDX-2, Androgen receptor, Calretinin, Inhibin and Progesterone | 2.5 | 2.6 | 0* | 2.0 |
| *Lung (2) ** | Napsin A, TTF-1, Pan CK, CKAE1/AE3 and TTF-1 | 2.4 | 2.8 | 3.0 | 2.4 |
| *Thyroid (2)* | PAX-8, TTF-1, Thyroglobulin, CK19, HBME1, TTF-1, PAX-8 and CK19 | 3.0 | 2.9 | 3.0 | 2.5 |
| *Pancreas (2)* | Villin, CK7, CK20, CDX-2, CK19, CDX-2, CK20 and Villin | 2.0 | 1.5 | 1.1 | 1.9 |
| *Lymph node (2)* | CK5/6, p40, GATA-3, p63, CD3, CD20, CD23 and PAX-5 | 2.5 | 2.8 | 1.4 | 2.9 |
| *Parotid (1)* | DOG-1, S100, SOX-10 and CK7 | 2.8 | 2.5 | 0.5 | 2.0 |
| *Tongue (1)* | CK5/6, p40, CKWSS and CK7 | 3.0 | 2.3 | 3.0 | 1.5 |
| *Colon (1)* | CK7, CK20, CDX-2 and CA19-9 | 1.8 | 1.3 | 1.8 | 2.0 |
| *Liver (1)* | Villin, CK7, CK20 and CDX-2 | 2.8 | 2.5 | 3.0 | 2.0 |
| *Kidney (1)* | E-cadherin, DOG-1, CD117 and CKAE1/AE3 | 2.5 | 0.8 | 2.3 | 1.5 |
| *Bladder (1)* | GATA-3, p63, Uroplakin and CK7 | 3.0 | 3.0 | 3.0 | 3.0 |
| *Prostate (1)* | CK20, GATA-3, CK20 and p40 | 1.5 | 1.5 | 1.3 | 1.3 |
| *Adrenal (1)* | EpCAM, Inhibin, CK-WSS and MIB-1 | 2.3 | 2.0 | 2.0 | 2.0 |
| *Hernia sac (1)* | D2-40, Calretinin, WT-1 and CK8 | 1.5 | 0.8 | 3.0 | 1.3 |
| *Average Score* | | 2.4 | 2.1 | 2.0 | 2.0 |

RPMI- Roswell Park Memorial Institute medium; NS- Normal saline; *- No cells present on the two cell blocks; **- Only one immunohistochemical stain performed for one of the specimens.

Table 1. Performance of Different Preservatives

## PST103

### Quantifying the Hidden Impact of the COVID-19 Pandemic: The Cytology Perspective

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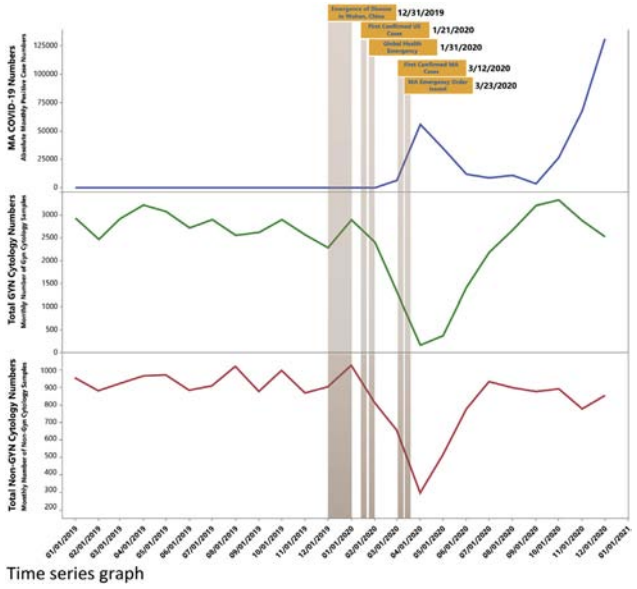
**Introduction:** The burden of the COVID-19 pandemic is often enumerated in lives lost, but the strain on health care resources and mobility limitations

contributes to the burden of non-COVID-related disease. In this study, we aimed to evaluate this hidden impact of the pandemic through a time series review of cytology samples at a single institution.

**Materials and Methods:** Pathology reports for all cytology specimens received from January 2019 through December 2020 at our institution were reviewed. Time series analysis was performed using moving averages, smoothing, time trend analysis, and tests of homogeneity.

**Results:** The number of gynecologic and non-gynecologic cytology specimens showed a significant downward trend with the onset of the pandemic. Breakpoint analysis showed that the downward trend occurred just one day after the first COVID-19 case was identified in Massachusetts and 9 days prior to the declaration of a health emergency. The average monthly number of gynecologic samples prior to the pandemic was 2745, which fell to 587.7 (-78.6%) during the first wave (3/12/2020-6/4/2020). The daily average of non-gynecologic samples was 46 prior to the pandemic, which declined to 24 (-47.8%). A detailed review of reports demonstrated that during the first 3 months of the pandemic, 154 fewer malignant cases were identified compared to a moving average in the prior year. Although specimen numbers slowly returned to baseline following the first wave of the pandemic, there is no evidence that the earlier decline was offset/corrected during the timeframe of this study.

**Conclusions:** The deleterious effects of the COVID-19 extend beyond any direct mortality attributed to the disease. The significant decrease in diagnostic cytology specimens during this period has profound implications. In the best-case scenario, this means delayed care for many patients; in the worst-case, missed disease with adverse outcomes that will be measured in the coming years.




Time series graph

## PST104

### Rapid On-site Evaluation (ROSE) of FNA Specimens by Cytotechnologists Improves Subsequent Core Biopsy Adequacy for Clinical Trials

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**Introduction:** Several studies have attested to improvement of adequacy with rapid on-site evaluation (ROSE), some reports cite an average adequacy rate of 70% to 100%. This holds significance because adequacy is of paramount importance in tissue collection for clinical trials. The aim of this study is to evaluate the role of ROSE performed by cytotechnologists on trial-associated FNA specimens.

**Materials and Methods:** Clinical trial fine needle aspiration biopsies (FNA-B) performed at a large academic institution were analyzed over 10 months using a comprehensive chart review of the electronic medical records (EMR). SPSS was utilized for statistical analysis.

**Results:** 325 FNA-B were collected for 57 clinical trials. 225 individual patients each had an average of 1.4 FNA-B procedures as a result of a multi-departmental collaborative effort. ROSE was performed for all patients with evaluation of adequacy by cytotechnologists (Figures 1). 79% of samples were considered adequate, 14% less than optimal, and 7% inadequate, with the latter two categories designated as 'less than adequate'. The imaging modalities were ultrasound-guided (n = 271, 83.3%) and computed tomography (CT) guided (n = 54, 16.6%). The most common tumor types were of pancreatic, lower gastrointestinal and lung origin (Figure 2). The most reported specimen sources were liver, lymph node, and lung (Figure 2). We found there was a statistically significant association between adequate sampling and ultrasound-guided biopsies (83.0%) when compared with CT-guided biopsies (57.4%) (Figure 3, $p<0.01$). 42.1% of lung samples were highly associated with a 'less than adequate' assessment when compared to 12.7% of liver samples (Figure 4, $p<0.01$). However, there was no significance relationship between tumor type, sex, race or age and adequacy.

**Conclusions:** ROSE performed by cytotechnologists on aspirated material improves adequacy for clinical trials. Both the imaging modality and tumor specimen source hold statistical significance as it relates to assessment of adequacy.

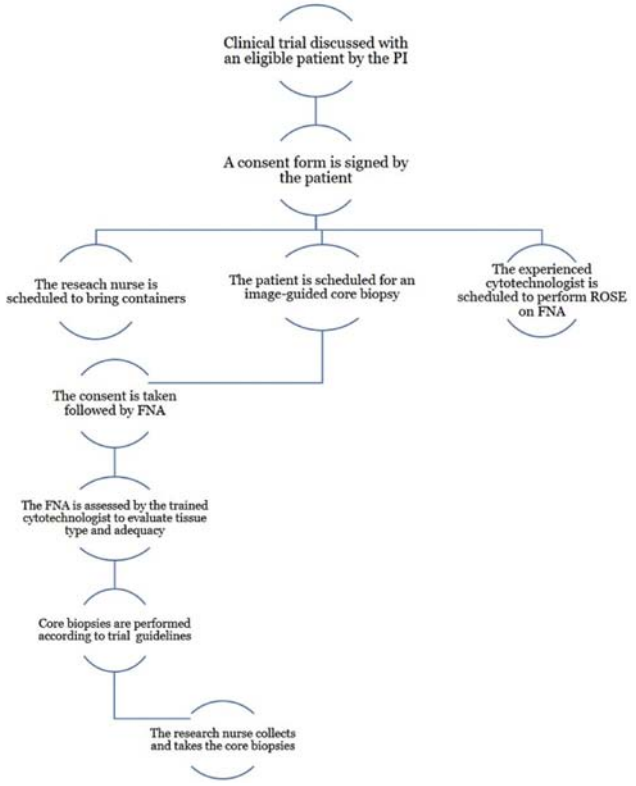


**Figure 1** Sequence of Enrollment and FNA-B per Case