**Background:**

Timely and accurate interpretation of breast biopsies are crucial for effective patient care. A literature review in 2023 analyzed data from 419 breast centers between 2005 and 2019, revealing that the time from diagnostic imaging to core needle biopsy has decreased significantly, from a mean of 9.0 to 6.3 days (p < 0.001).1 In 2019, Laws et al. implemented pathways with expedited biopsy, early surgical referral, and support from a nurse navigator to reduce wait times; patients reported significantly reduced anxiety, and 70% of patients were satisfied with wait times.2

**Methods:**

Our study focuses on developing an AI-driven platform aimed at improving breast biopsy interpretation turnaround times by automating immunohistochemistry orders for neoplastic cases. The proposed solution involves using AI-augmented diagnoses deployed on whole slide imaging to stratify breast biopsies into neoplastic and non-neoplastic pathways. Neoplastic cases are further classified into in situ disease—ductal carcinoma in situ (DCIS) and lobular carcinoma in situ (LCIS)—and invasive disease—invasive ductal carcinoma (IDC) and invasive lobular carcinoma (ILC). By enabling breast pathologists to receive immunohistochemistry( in addition to hematoxylin and eosin) stained slides simultaneously, this approach is expected to reduce turnaround times by approximately one day, ensuring faster diagnostic reporting, facilitating same-day signout, and improving clinical workflow efficiency.

Prior whole slide imaging classification using AI models have focused on using image features from a single magnification scale. This study uses Multi-Scale Co-attention Convolution to account for different magnifications of the images simultaneously. We selected x20 magnification level as the primary input, then used x5 magnification level, and x40 magnification level to update the primary input. Doing this ensures we consider both the primary input features, coarse-grained features, and fine-grained visual cues.

**Results:**

**Figure 1: Performance Evaluation of Breast Cancer Subtype Classification Model: Confusion Matrix and Classification Metrics**

The Confusion Matrix as well as accuracy metrics presented in Figure 1 originated from our test data.

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**Conclusions:**

Beyond improving turnaround times, this initiative demonstrates how digital pathology, through validated whole slide imaging platforms, is transforming the standard of care in pathology by integrating AI-based solutions. This transition marks a critical step toward more robust, scalable, and efficient diagnostic practices.