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## Oestrogen receptor, progesterone receptor and HER2 protein expression status of breast cancer: a laboratory audit

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**Introduction:** Regular audits on the status of breast cancer (BC) biomarkers help to identify deviations in standard procedures and to maintain the quality of service.

**Objectives:** To compare oestrogen and progesterone receptor (ER/PR) and HER-2/neu expression status of BCs in the local setting with the standard benchmark values of UK-NEQAS-ICC and ISH breast biomarker audit.

**Methodology:** BC biomarkers reported on either trucut biopsies or resection specimens at the Department of Pathology, Faculty of Medicine, University of Colombo, from January 2017 to November 2019, were included. The specimen type and ER/PR/HER-2neu status were extracted from the histopathology reports. Percentages and p-values were calculated and compared with the benchmark values. The positive controls were achieved for each test.

**Results:** 159 cases, 142 trucut biopsies and 17 resection specimens were included. Overall ER+/PR+, ER-/PR-, ER+/PR-, ER-/PR+ rates were 65.4% (104/159), 16.98% (27/159), 7.55% (12/159) and 10.06% (16/159), respectively. 28.93% (46/159), 62.89% (100/159) and 8.18% (13/159) of cases were HER-2/neu+, HER-2/neu- and HER-2/neu equivocal, respectively. The overall ER-/PR+ cases (10.06%) were significantly higher than the benchmark values ( $p=0.0001$ ). ER-/PR+ rates calculated for trucut (9.8%;14/142) and resection specimens (11.8%;2/17) also showed significantly higher rates (each,  $p=0.00001$ ).

**Discussion:** Higher ER-/PR+ rates could be either a true deviation in our population or false negative ER results due to laboratory errors, the common causes include longer cold-ischaemia time, prolonged fixation (>72hours) and insufficient antigen retrieval. Prolong storage of pre-cut sections (>6 weeks) and interpretational errors also can contribute to false negativity. Though rare, false positive PR results may occur due to the use of inappropriately high antibody concentrations and prolonged antigen retrieval time.

**Conclusion:** Strict quality control measures at each analysis are required to avoid false positive/negative results in BC biomarker assays.

**Keywords:** oestrogen receptors, progesterone receptors, benchmark values

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