For patients presenting with clinical N1 disease who are treated with NAC several prospective clinical trials have assessed the false negative rate (FNR) of SLN after NAC. The American College of Surgeons Oncology Group (ACOSOG) Z1071 study reported a false negative rate (FNR) of SLN surgery of 12.6% in patients with cN1 disease with 2 or more SLNs resected. This was lower at 10.6% when dual tracer technique was utilized. Additional analysis showed that when a clip was placed in the positive node at diagnosis and the clipped node was resected as one of the SLNs, the FNR was 6.8%. The Canadian study (SN FNAC – sentinel node following neoadjuvant chemotherapy) reported a FNR of 13.3% when defining SLN with isolated tumor cells (ITC) as negative and 8.4% when including ITC in the definition of a positive SLN. The SENTINA study from Europe reported an overall FNR of 14.2%, however when excluding patients with only a single SLN removed the FNR was 9.8%.

Further work marking the index biopsy proven positive ('clipped') node and preoperative localization and resection of the localized clipped node at time of SLN surgery (termed targeted axillary dissection) has been shown to have a FNR of 2.4%.

Importantly, multiple ways to decrease the FNR of axillary surgery after NAC have been identified – including use of dual tracer mapping, resection of at least 2 SLNs, placing a marker in the biopsy-proven positive node and ensuring resection of that node at surgery, and use of IHC to evaluate for residual disease in the SLNs.

Surgeons are incorporating SLN after NAC into their clinical practice for patients with cN1 disease who have a good clinical and imaging response to NAC and omitting ALND in patients who convert to pN0 disease with good oncologic outcomes.

For patients found to have residual positive SLN(s) after NAC ALND remains the standard of case, although this is also being questioned in ongoing clinical trials. Early data from retrospective studies of highly selected patient populations with short term follow up indicates that omission of ALND may be oncologically safe in patients with isolated tumor cells identified in the SLNs. Some

retrospective studies have also shown low axillary recurrence rates with omission of ALND in patients with residual node positive disease (micrometastases and some with macrometastases), although prospective randomized data has not yet been reported. A large cohort study of patients with micrometastatic disease after NAC (ypn1mi) showed higher rates of axillary recurrence at 5 years in patients with triple negative breast cancer swho had omission of ALND. Data from prospective randomized trials is awaited to provide level I evidence to guide clinical practice and to update guidelines.