

Lymph Node Adiposity Associated with Breast Cancer Sentinel Lymph Node Metastases

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INTRODUCTION

- Axillary lymph node status is a key prognostic factor for breast cancer patients. Lymph node metastases are predictive of recurrence and decreased survival. The 5-year survival rate is 86% for patients with nodal metastases versus 99% for patients without nodal metastases.
- To help guide treatment decisions, Memorial Sloan Kettering Cancer Center (MSK) developed a nomogram that predicts the probability of sentinel lymph node involvement in breast cancer patients based on 8 criteria: age, breast tumor size, type, and grade, special tumor type, tumor location, lymphovascular invasion, multifocality, ER- status and PR-status (Figure 1).
- Axillary lymph nodes are visible on mammography, and their appearance varies based on the degree of fat infiltration. Lymph node adiposity (LNA) corresponds to fat-enlarged nodes (Figure 2).
- Recently our team identified an association between LNA and nodal metastases.
- The purpose of this study is to evaluate the performance of the MSK Breast Cancer Nomogram with and without LNA to assess the added benefit of LNA as a prognostic factor for sentinel lymph node (SLN) positivity.

Figure 1: MSK Breast Cancer Nomogram

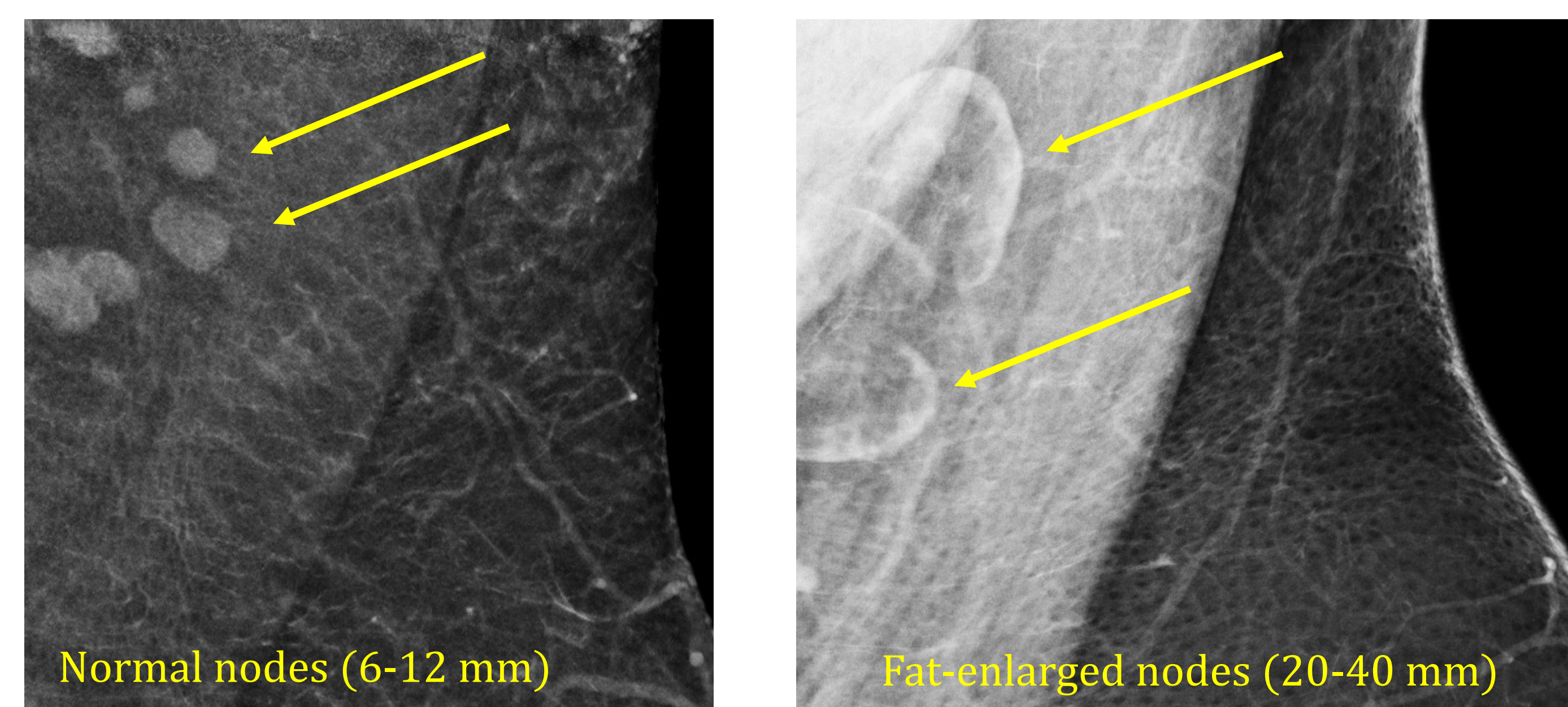
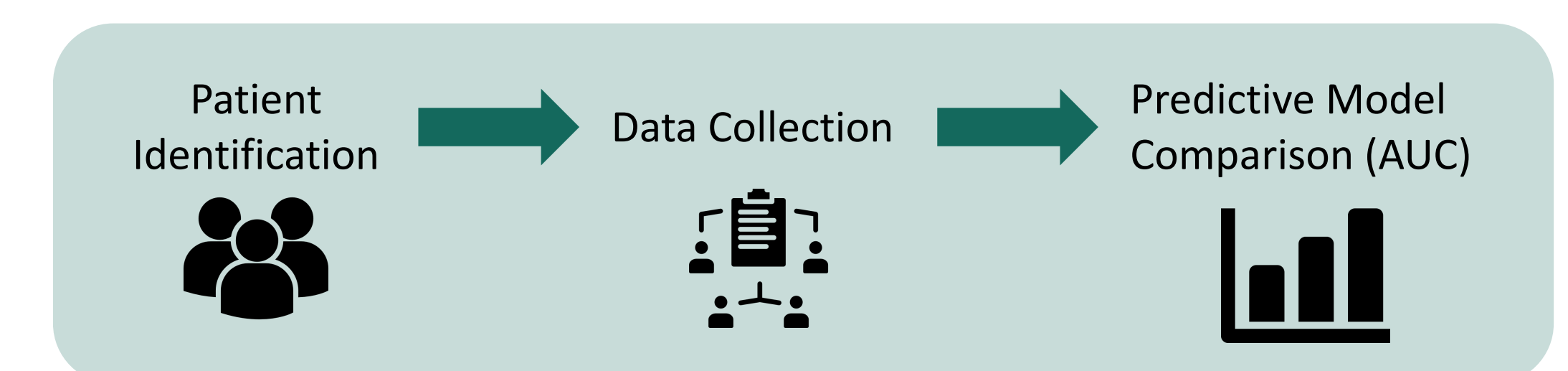


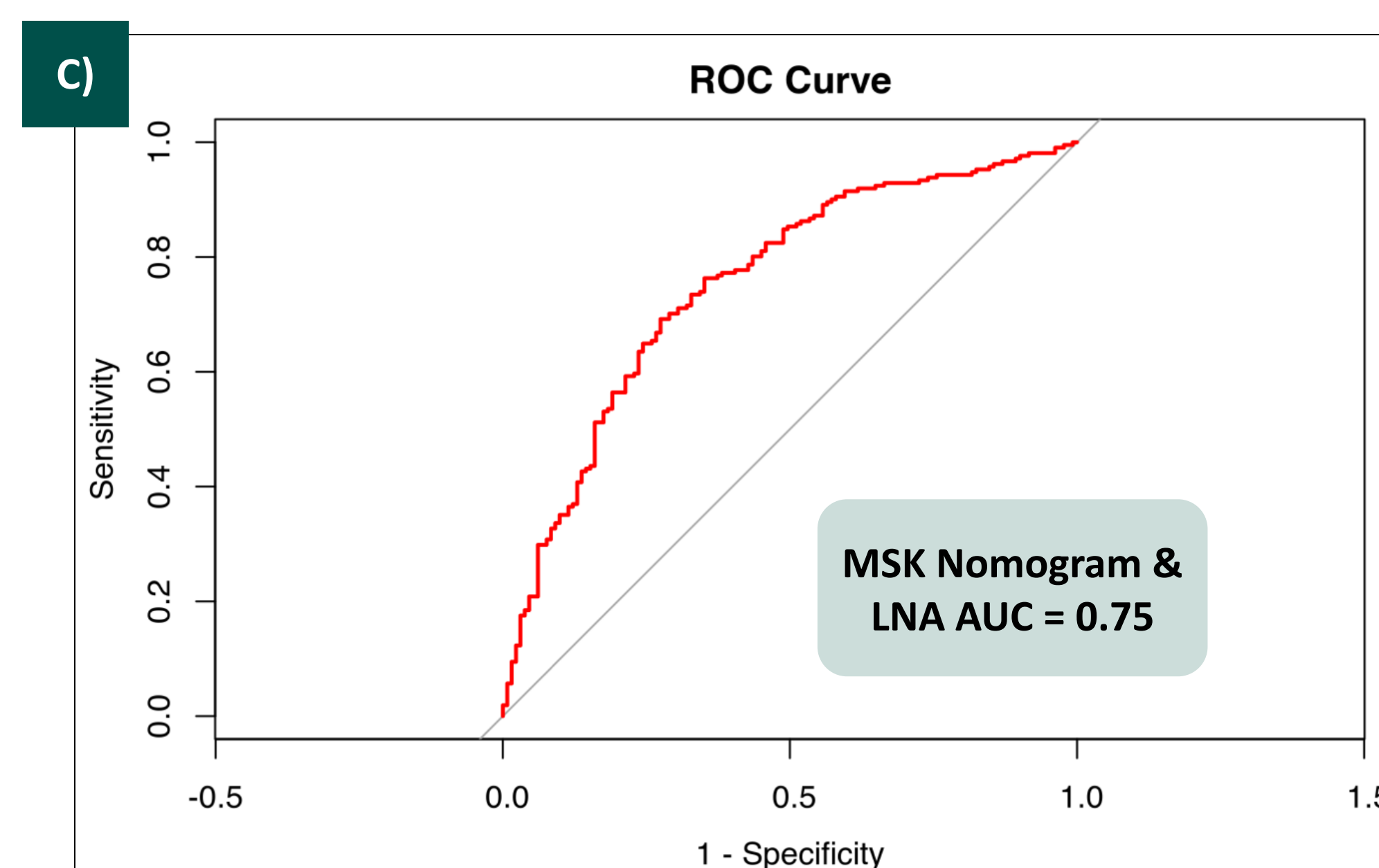
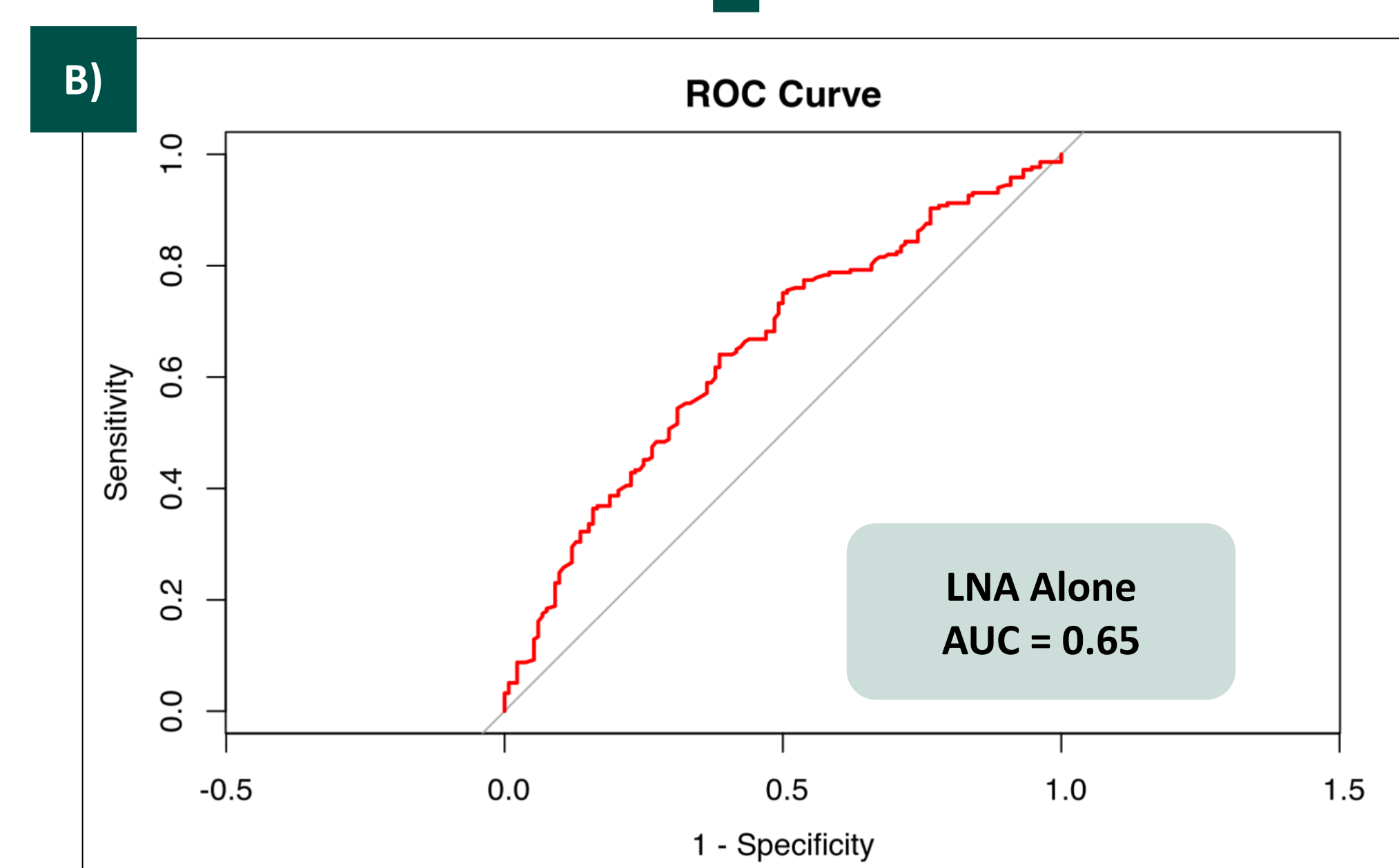
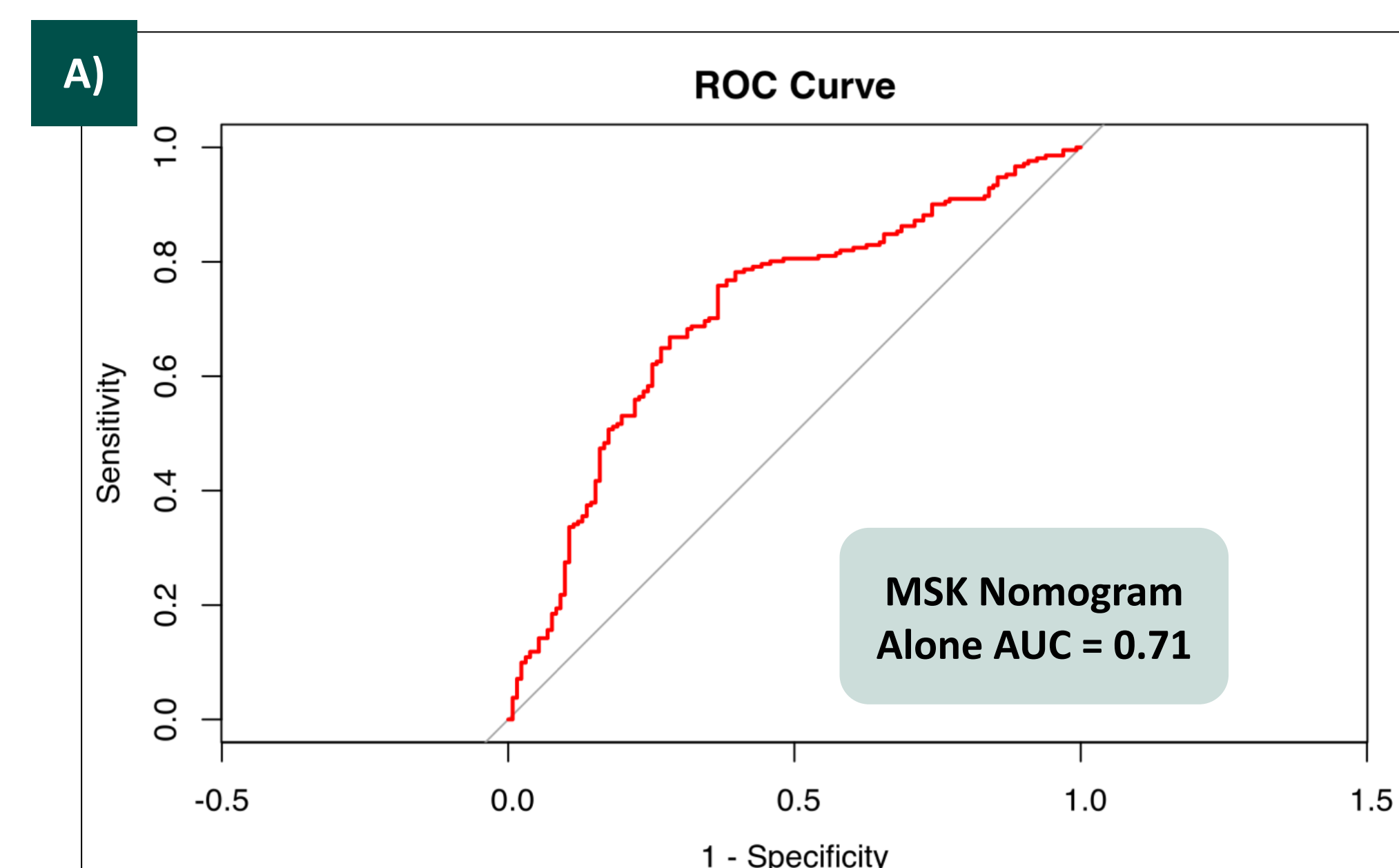
Figure 2: Normal and Fat Enlarged Axillary Lymph Nodes on Mammography

METHODS

- Patients with pre-operative breast MRI for newly diagnosed breast cancer from 2011-2019 were identified in the Dartmouth Hitchcock Medical Center Radiology database.
- Electronic medical records were reviewed to obtain all relevant clinical data for the MSK nomogram to calculate the likelihood of sentinel lymph node metastases.
- The area under the curve (AUC) was calculated for predicting positive SLN with A) the MSK Breast Cancer Nomogram alone, B) LNA alone, and C) the MSK Breast Cancer Nomogram with LNA



RESULTS & DISCUSSION



- AUC was utilized to determine the accuracy of different models for predicting SLN positivity
- AUC of the MSK Breast Cancer Nomogram alone (A) is 0.71
- LNA alone model (B) showed an AUC of 0.65, highlighting the potential ability to independently predict SLN metastases
- MSK Breast Cancer Nomogram & LNA yielded an AUC of 0.75, showing improvement of the MSK Breast Cancer Nomogram model alone

Summary Table:

MSK Nomogram Alone	LNA Alone	MSK Nomogram & LNA
AUC = 0.71	AUC = 0.65	AUC = 0.75

CONCLUSION

In our study, LNA alone was predictive of SLN metastases, and the addition of LNA to the MSK Breast Cancer Nomogram improves the accuracy of the MSK Breast Cancer Nomogram to identify patients with positive SLNs. As clinical management of the axilla in patients with breast cancer continues to de-escalate with less invasive procedures adopted to determine the status of axillary nodes, the ability to predict positive SLNs prior to surgery will become increasingly relevant for breast cancer treatment.

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