



# CANCER RESEARCH

Poster Session Abstracts

## Abstract PS6-09: An AI-digital breast cancer risk discrimination platform (PreciseDx) using a representative H&E image and selected clinical variables accurately categorized patients with oncotype Dx low risk recurrence scores (RS)

Michael Joseph Donovan, Nina Shpalensky, Marcel Prastawa, SM Abishek, Richard Scott, Mary Sawyer, Jack Zeineh, and Gerardo Fernandez

DOI: 10.1158/1538-7445.SABCS20-PS6-09 Published February 2021



Article

Info & Metrics

Abstracts: 2020 San Antonio Breast Cancer Virtual Symposium; December 8-11, 2020; San Antonio, Texas

### Abstract

**Background:** Clinical practice guidelines emphasize the critical importance of grading and stage in breast cancer treatment. Although histologic grade is subjective, non-quantitative, skill-dependent, and oftentimes inaccurate it remains an independent prognostic feature and therefore plays a direct role in patient management including neoadjuvant therapy vs surgery, and interpretation of genomic studies. We developed an AI-based platform which combines digital H&E features with select clinical variables to assess risk of breast cancer recurrence and evaluated ability to predict Oncotype low risk RS categorization. **Methods:** Retrospective study to identify a subset of Mt. Sinai, NY invasive ductal breast cancer (IDC) patients from 2010-2016 with H&E stained slides, clinical features and OncotypeDx recurrence scores (RS). **Recurrence endpoint(s):** local- regional, distant-recurrence free and overall survival. Digital images generated with Philips scanning system; reviewed by two pathologist for tumor content and quality prior to image analysis and feature extraction. Support vector machine learning models were used for initial feature performance and final models generated. Positive predictive value (PPV), sensitivity (S) and likelihood ratios (LR) were used for performance. **Results:** 391 patients: mean age 57 years, 100% Stage I/II, 59% Grade 2, and 6%

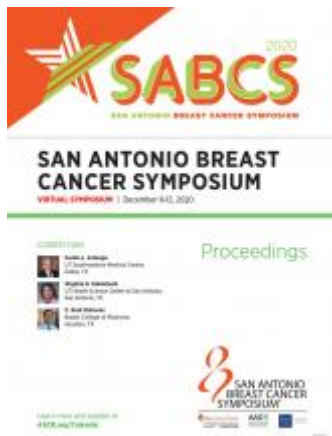
LN+ve 0-3; 97% IDC, 100% ER+ve, 94% PR+ve, 0% Her2 amplified; median follow-up 61 months; 323 (83%) low risk (<=25) RS and 68 (17%) high risk RS (>25). There were 23 events (6%) and 13 (56%) were locoregional recurrence. PreciseDx model with age, and PR levels combined with imaging features reflective of mitotic activity and nuclear characteristics (clinical grade not selected) correctly identified LR RS categorization: PPV of 91%, [95CI 0.87-0.94], Se 92% [0.86-0.95] and positive / negative likelihood ratio : 6.8, and 0.5, respectively. Conclusions: Application of an AI-digital breast cancer risk assessment platform using only the H&E image and limited clinical data successfully classified low risk RS patients with high accuracy. Future models will extend outcome to 10 years and evaluate treatment selection and duration

**Citation Format:** Michael Joseph Donovan, Nina Shpalensky, Marcel Prastawa, SM Abishek, Richard Scott, Mary Sawyer, Jack Zeineh, Gerardo Fernandez. An AI-digital breast cancer risk discrimination platform (PreciseDx) using a representative H&E image and selected clinical variables accurately categorized patients with oncotype Dx low risk recurrence scores (RS) [abstract]. In: Proceedings of the 2020 San Antonio Breast Cancer Virtual Symposium; 2020 Dec 8-11; San Antonio, TX. Philadelphia (PA): AACR; Cancer Res 2021;81(4 Suppl):Abstract nr PS6-09.

©2021 American Association for Cancer Research.

[← Previous](#)

[^ Back to top](#)



February 2021  
Volume 81, Issue 4 Supplement  
[Table of Contents](#)

[Sign up for alerts](#)

[© Request Permissions](#)

[! Article Alerts](#)

[✉ Email Article](#)

[🌐 Citation Tools](#)

[↪ Share](#)

Tweet

Like 0

Advertisement

---

▼ Related Articles

*No related articles found.*

Google Scholar

► Cited By...

► More in this TOC Section

[Home](#)

[Alerts](#)

[Feedback](#)

[Privacy Policy](#)



**Articles**

[Online First](#)

[Current Issue](#)

[Past Issues](#)

[Meeting Abstracts](#)

**Info for**

[Authors](#)

[Subscribers](#)

[Advertisers](#)

[Librarians](#)

**[About Cancer Research](#)**

[About the Journal](#)

[Editorial Board](#)

[Permissions](#)

[Submit a Manuscript](#)

Copyright © 2021 by the American Association for Cancer Research.

*Cancer Research* Online ISSN: 1538-7445

*Cancer Research* Print ISSN: 0008-5472

*Journal of Cancer Research* ISSN: 0099-7013

*American Journal of Cancer* ISSN: 0099-7374