AJCC Session
Panel Discussion: Breast Cancer

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Staging and Precision Medicine/Prognostication Tools

- Prognostication: estimation of outcome
  - AJCC - survival at 5 years
- Anatomic stage is the strongest prognostic factor for solid tumors
- Many other factors modify outcome
Breast Cancer Prognostic Factors

• Critical for current practice and meaningful classification of patients
• Prognostic stage groupings with non-anatomical factors incorporated into bins with TNM to describe all possible combinations
• 7th Edition describes 32 unique bins (permutations of T,N,M parameters) within which to classify patients
  – T (4), N (4), M (2) = 4 x 4 x 2 = 32
Breast Cancer 8th Edition vs. 7th Edition: Evolution of Practice

- 8th Edition describes 768 unique bins
  - T (4), N (4), M (2), G (3), H (2), E (2), P(2): \(4 \times 4 \times 2 \times 3 \times 2 \times 2 \times 2 = 768\) bins
  - Adding 3 new factors with binary definitions: \(768 \times 2 \times 2 \times 2 = 3,072\) bins
  - Adding 10 new factors: \(393,216\) bins

- Bin model relatively inflexible: a calculator becomes a necessity

- The 8th Edition of the AJCC Cancer Staging Manual represents a significant step towards individualization of treatment

- The Personalized Medicine Core offers an additional perspective: individualized prognosis using computational approaches
Classifier vs. Calculator: Roles in Precision Medicine

• Classifiers group patients into ordered risk strata with probability estimate cut-points.
  – TNM system is a classifier with ordered strata (I, II, III, IV) of increasingly poor prognosis.
  – Classifiers are constrained by the number of categories that are manageable.
  – Classifiers are limited by the variability of prognosis of patients within a given risk class.

• Prognostication tools are risk calculators with individualized probability estimates.
  – Algorithms are designed to deliver more precise estimates of outcome for an individual patient through computational integration of a variety of patient-specific data elements.

• AJCC regards both as necessary
Analysis of Prognostication Tools: State of the Science

• Intensive search to locate all exiting prognostication tools
• Initial observations: wide variation in quality, consistency, outcome assessed, included elements and validations (internal or external)
• Development and publication of guidelines for prognostication tool quality
• Systematic application of guidelines to all existing tools
• Results published in 8th Edition Breast Chapter
30 prognostication models/tools were identified and reviewed.

Only two were found to have met all predefined AJCC inclusion and none of the exclusion criteria, and both have been externally validated.

- Adjuvant! Online (currently unavailable)
- PREDICT-Plus

Adjuvant! Online: developed to assist decision-making about adjuvant therapy in early-stage disease

- Probability estimates made according to a proprietary system

PREDICT-Plus developed to predict outcome in women treated for early breast cancer in the United Kingdom

- Open system
Going Forward

- AJCC encourages the development of high-quality prognostication tools by the community.
- Tools are needed for all patients, not just those with early stage disease.
- AJCC published quality criteria will serve as a guideline for tool development.
- AJCC PMC will continue to review and report on the quality of newly generated tools as a service to the community.