Evaluation of the clinical utility of the nuclear-localized AR-V7 biomarker in CTCS in the context of physician intuition measured through physician therapy choice propensity and patient risk

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**Background**
- Clinical utility requires a demonstration that use of the biomarker result improves the outcome for a patient relative to the norm of the biomarker and relying only on information available uncontextualized of the biomarker.
- We previously conducted two cross-sectional studies to evaluate the relationship between nuclear-localized AR-V7 status and patient outcome, and twice observed superior survival for ORCP patients with AR-V7+ Taxane + vs Taxane - prior to initiation of AR-V7 or Taxane at Memorial Sloan Kettering (MSK) between December 2012 and September 2016. Of these, 397 contained sufficient information (56 patients for each phenotype choice) and 236 were with the intended use of the biomarker.
- All samples were tested with the Epic Sciences CTC test for AR-V7 nuclear protein and treatment choice was at discretion of the attending physician without knowledge of AR-V7 test result.

**Methods and Patient Demographics**
- 459 pre-therapy patient samples were collected from MSK PC patients in the clinical who were candidates for initiation of AR-V7 or Taxane at Memorial Sloan Kettering (MSK) between December 2012 and September 2016. Of these, 397 contained sufficient information (56 patients for each phenotype choice) and 236 were with the intended use of the biomarker.
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**Physician Propensity to Use Taxane vs. ARSI**
- A model identifies thomost important factors in the propensity to give an ARS-7 or Taxane in a real world setting at MSKCC. The size of the arrow indicates the relative weight for each feature derived from the model.
- The propensity score of 0.0 means certain to give an ARS-7 or Taxane. The decision to give an ARS-7 or Taxane have large overlapping Propensity score. Many ARS-7+) patients were very similar to Taxane.
- ARS-7+) patients were weighted based on a number patients with similar propensity scores who received the other drug type. Logistic choice was used in the technique to normalize for the therapy choice bias in the population of patients.

**Optimized Patient Risk Assessment**
- A model identifies the most important factors in the propensity to give an ARS-7 or Taxane in a real world setting at MSKCC. The size of the arrow indicates the relative weight for each feature derived from the model. Features that were significant for therapy choice included but not limited to:
- Prognostic factors associated with worse overall survival and their relationship to the model for ARS-7+) features were:

**References**

**Discussions**
- At a tertiary care center, factors most influencing the decision to administer an ARS-7 or Taxane are the presence of liver metastasis, the number of prior therapies, and whether the therapy was an ARS-7+) compared to a Taxane.
- When physician choice propensity was accounted for, there was no discernable survival difference between ARS-7+) and Taxane.
- Even patients who were confident in choosing an ARS-7+) or those with lower progression could not predict survival.
- Previously the patient risk was used to guide therapy choice shown by a CPE. Post-trial knowledge of patient risk factors within the cohort, ARS-7+) contributes to prediction of patient risk.

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