**Gleason grade progresses in a race-dependent manner**

Jordan H. Creed1, Shivanshu Awasthi1, Kosj Yamoah1,2, Travis A. Gerke1

1 Moffitt Cancer Center, Department of Cancer Epidemiology, Tampa, FL

2 Moffitt Cancer Center, Department of Radiation Oncology, Tampa, FL

**Background:** In patients who undergo radical prostatectomy, Gleason grade is assessed at biopsy and once more at surgical pathology. Upgrading from biopsy to pathologic Gleason occurs for 20-40% of men and has important treatment implications. Debate exists as to whether Gleason grade is a static tumor feature, implying that upgrading results from biopsy sampling variability. Conflicting evidence suggests that upgrading rates may be different in African American men (AAM) compared to European American men (EAM).

**Methods:** We leveraged data from the National Cancer Database (NCDB), which contains records on 213,956 prostate cancer patients who underwent radical prostatectomy. Gleason upgrading was defined as an increase in pathologic Gleason category (<6, 3+4, 4+3, 8, 9-10) from biopsy Gleason category. Time to treatment (TTT) was calculated as the number of days between prostate cancer diagnosis and surgery. Relative risk ratios and 95% confidence intervals of upgrading per 30 day increase in TTT were calculated with Poisson regression. Multivariable models were stratified by race and adjusted for biopsy Gleason, race, age, and tumor size.

**Results:** Upgrading was observed in 59,959 (28%) patients, and no differences were found in upgrading rates by race, age, or tumor size. TTT was significantly longer in patients with upgrading compared to those whose grade was stable or decreased (2.3 and 2.2 median months, respectively, p < 2.2e-16). In multivariable models, patients who underwent surgery experienced a 1.39% increased risk of upgrading for each additional TTT month. When stratified by race, AAM had an increased risk of upgrading for each month of treatment delay compared to EAM (3.30% vs 1.05%). Patients who underwent surgery within 60, 90, 120, 150, and 150+ days experienced an increased risk of upgrading by 10%, 12%, 13%, 13% and 15%, respectively, to those who had surgery within the first 30 days post-diagnosis.

**Conclusions:** Results from this study suggest that Gleason grade progresses over time, and that this progression is more pronounced in AAM. Such findings provide further evidence that prostate cancer in AAM is biologically distinct and uniquely aggressive.

**Key Words:** Prostate cancer, Gleason grading, treatment delays, cancer disparities