

Association of Area Deprivation Index with Prostate Cancer Incidence Outcomes in a Contemporary North American Cohort

Mohit Butaney, MD; Marco Finati, MD; Giuseppe Cirulli, MD; Mathew Davis, MD; Shane Tinsley; Sohrab Arora, MD; Alberto Briganti, MD; Francesco Montorsi, MD; Craig Rogers, MD; Firas Abdollah, MD

Vattikuti Urology Institute, Henry Ford Health, Detroit, Michigan

Introduction: Socio-economic status and geographical location contribute to disparities in prostate cancer (PCa) outcomes, which are particularly evident for Non-Hispanic Black (NHB) men. The Area of Deprivation Index (ADI) could offer a distinctive and valuable metric for measuring the impact of these factors in underprivileged areas on disparities in cancer outcomes. Our study examined the impact of ADI on Prostate Cancer (PCa) incidence and lethality over a contemporary North American population.

Methods: Our institutional database included electronic medical records for all men who received at least one PSA test within Henry Ford Health (HFH), between 1995-2019. An ADI score was assigned to each patient based on their residential census block group, ranked as a percentile of deprivation relative to the national level. All patients were further categorized into ADI quartile, where the highest quartile (Q4: 75-100) represented individuals with the most disadvantageous socio-economic status. The main outcomes were PCa incidence and lethal PCa, defined as any metastatic PCa or death due to PCa occurred within our cohort. Competing-risk cumulative incidence and multivariable regression tested the impact of ADI on PCa outcomes. A formal ADI x race interaction term was introduced to examine whether the relationship between ADI and PCa outcomes varies between NHB and NHW men.

Results: We included 134,366 patients, 25% of whom were NHB. Median follow-up was 8.8 years. When NHB patients were categorized based on their ADI quartile, the 20-years PCa incidence rates were 11.5%, 13.5%, 12.6% and 12.1% ($p=0.009$) for the first, second, third and fourth quartile respectively. For the same quartiles, 20-years incidence rates in NHW were 8.8%, 7.8%, 6.8% and 5.4% ($p<0.001$). Lethal PCa rates for these quartiles were 2.0%, 1.4%, 1.2% and 2.3% ($p<0.001$) in NHB, versus 0.92%, 0.79%, 0.93% and 1.2% ($p=0.140$) in NHW. At multivariate analysis, individuals from the third (ADI 50-74, HR: 0.89, 95% CI: 0.83-0.95) and the fourth quartile (ADI ≥ 75 , HR: 0.80, 95% CI: 0.75-0.86) showed significant reduced HRs for PCa incidence, when compared with the first quartile (ADI <25 , all $p<0.001$). NHB (vs NHW) men were persistently at higher hazard for both PCa incidence and lethality across all ADI strata (all $p<0.001$), although the interaction term was significant only for PCa incidence

Conclusions: Our study is the first comprehensive evaluation of the association between neighborhood deprivation and race in PCa outcomes in a contemporary North American cohort. Living in more deprived areas was associated with a lower hazard for PCa incidence but not for lethality, although individuals in the highest ADI quartiles showed the worst lethal disease rates. NHB men persistently exhibited worse oncological outcomes, when compared with NHW individuals. This racial disparity became more prominent with an increase in ADI, but this trend was observed only for incidence.