Regulatory, Financial, and Access Considerations

899 POPULATION COVERAGE OF HLA-A*02:01, *02:05, *02:06 ACROSS SELECTED CANCER TYPES IN THE UNITED STATES

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Background GSK is investigating an autologous TCR T-cell therapy for solid tumors that recognizes the cancer testis antigen, NY-ESO-1, presented on the cancer cell surface by specific HLA-A*02 sub-types. The aim of this study was to estimate the number of patients in the US in 2020 with HLA-A*02 genotype subtypes HLA-A*02:01, 02:05, 02:06 across selected cancer types (invasive lung, ovarian, gastric, esophageal, invasive and in-situ bladder and multiple myeloma), accounting for racial variation.

Methods This study was carried out in three parts utilizing three national datasets. 1. The prevalence of each cancer type was estimated by race utilizing prevalence rates from US Surveillance, Epidemiology, and End Results (SEER) 1975–2018 data.¹ 2. The US population coverage for the specific HLA-A*02 subtype (%) by race in 2020, was estimated utilizing Hardy Weinberg Principles and allele frequencies extracted from the allele frequency net database (US National Marrow Donor Program (NMDP) population only).² 3. The estimated population coverage for the specific HLA-A*02 subtype expression (%) by cancer subtype, was calculated using US Census (2019) data.³ For the purpose of this analyses, single race population estimates were used. Race was categorized as 'White', 'Black', 'Asian/Pacific Islander', 'Native American' and 'Other'. The Hispanic population was included as a proportion of each category, where appropriate. Limitations include the seven assumptions underlying Hardy-Weinberg equilibrium, which were met, and the assumption that the NMDP, SEER and US Census data are reflective of the US population. Predictive and prognostic clinical characteristics including histological subtypes were not accounted for in this analysis.

Results Across selected cancer types, the most prevalent race category was White, reflecting the racial distribution of the US (table 1). Of these cancer types, multiple myeloma and invasive gastric cancer are represented by the lowest proportion of White patients and the highest proportion of Black patients. Results of the HLA sub-type distribution by race are presented in the table below. The overall proportion of patients who are HLA-A*02:01, *02:05 or *02:06 positive is estimated to be between 41.7% (multiple myeloma) and 45.8% (invasive and in-situ bladder) in the US accounting for the racial variations in each cancer type of interest.

Conclusions The proportion of patients with specific HLA-A*02 subtypes is similar across selected cancers, accounting for racial variation in the US. Racial variation by cancer type is an important consideration when estimating the size of eligible populations for T-cell therapies requiring specific HLA-A*02 histocompatibility.

Abstract 899 Table 1 Proportion of patients who are HLA-A*02:01, *02:05, or *02:06 positive by race and cancer subtype

Cancer type	Estimated US 25-year prevalence by cancer type in 2020, n	Racial distribution by cancer type, %*	Estimated distribution by race of HLA*02:01, *02:05 and *02:06 subtypes in the overall US population, %	Estimated overall proportion of HLA-A*02:01, *02:05 and *02:06 positive population accounting for racial variation, n (%)
	US Census, 2019, SEER (1975–2018)	US Census, 2019, SEER (1975–2018)	NMDP, 2020	US Census 2019
Invasive lung	431,833	80.0% White, 7.8% Black, 2.7% Asian/ Pacific Islander, 0.0% Native American, 9.5% Other	HLA *02:01: 43.6% White, 21.9% Black, 18.8% Asian/ Pacific Islander, 40.3% Native American, 35.9% Other	189,557 (43.9)
Invasive & in-situ bladder	528,415	85.4% White, 3.7% Black, 1.5% Asian/ Pacific Islander, 0.0% Native American, 9.4% Other		241,970 (45.8)
Multiple myeloma	117,986	73.4% White, 14.8% Black, 2.0% Asian/ Pacific Islander, 0.0% Native American, 9.7% Other	HLA *02:05: 2.5% White, 3.5% Black, 1.1% Asian/ Pacific Islander, 1.4% Native American, 3.4% Other	49,177 (41.7)
Invasive ovarian (Female only)	149,911	83.0% White, 4.5% Black, 3.1% Asian/ Pacific Islander, 0.0% Native American, 9.3% Other		67,419 (45.0)
Invasive gastric	92,800	73.8% White, 10.0% Black, 6.5% Asian/ Pacific Islander, 0.0% Native American, 9.7% Other	HLA *02:06: 2.1% White, 0.1% Black, 8.1% Asian/ Pacific Islander, 11.7% Native American, 4.7% Other	39,061 (42.1)
Invasive oesophageal	37,200	88.6% White, 4.7% Black, 1.7% Asian/ Pacific Islander, 0.0% Native American, 9.8% Other		16,912 (45.5)

*'White' includes US NMDP European Caucasian, North American Amerindian, Middle Eastern or North Coast of Africa. 'Black' includes US NMDP African, African American pop 2, Black South or Central American or Caribbean Black. 'Asian/ Pacific Islander' includes US NMDP Chinese, Filipino, Japanese, Korean, South Asian Indian, South East Asian, Hawaiian, Other Pacific Islander or Vietnamese. 'Native American' includes Alaskan Native or Aleut or American Indian South or Central America. 'Other' includes Caribbean Hispanic, Hispanic South or Central American or Mexican or Chicano. SEER, Surveillance, Epidemiology, and End Results.

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