Pancreatic Cancer Disparities among Gender, Race, and Ethnicity: The PRECEDE Consortium Outcomes and Impact

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ABSTRACT

The Pancreatic Cancer Early Detection (PRECEDE) Consortium was launched internationally to assess the surveillance of high-risk individuals (HRI) of pancreatic cancer, focusing on genetic risk factors. In the early recruitment period of 3 years from May 2020 to March 2022, the PRECEDE gathered analysis-eligible data on 1,113 HRIs. In this issue of *Cancer Prevention Research*, Katona and colleagues reported current portrait of demographics of the participants, with significant disparities in gender, race and ethnicity. Now the PRECEDE Consortium aims at correcting these disparities in the next 3 years and double the percentage of underrepresented groups to more closely represent the demographics of patients.

See related article by Katona et al., p. 343

Globally, pancreatic ductal adenocarcinoma (PDAC) is a major health problem with approximately 500,000 new cases and about 470,000 deaths worldwide every year. PDAC will be the third most deadly cancer and soon become the second most deadly cancer in the United States (1, 2). With a low survival rate at the advanced stage and an increasing number of patients, PDAC remains a major public health challenge (2). Yet, if PDAC is discovered at an early stage, more therapeutic options are available with better survival outcomes. As of 2023, a 5-year survival rate for localized PDAC is 44%, while the rate decreases to 15% for regional and 3% for distant (2). This illustrates the need for early detection and intervention of PDAC.

Advancements in Genomic Analysis on PDAC toward Improved Surveillance

Progress has been made over the years in identifying germline and other genomic mutations linked to high risk of developing PDAC. These genes include; CDKN2A, STK11, PRSS1, BRCA1, BRCA2, PALB2, ATM, MLH1, MSH2, MSH6, PMS2, or EPCAM. Although PDAC screening for the general population is not recommended, the identification of PDAC high-risk genes and pathogenic variants enabled researchers to define and identify high-risk individuals (HRI) for PDAC, in addition to family history-based surveillance. Supporting effectiveness of this approach, a 2018 study found that among 350 HRIs, 9 of 10 incident pancreatic cancers discovered during a median follow-up time of 5.6 years were surgically resectable (3). And a resulting 5-year survival rate was 60% in the surgically treated group, which is remarkably high for pancreatic cancers (3).

The PRECEDE Consortium Aims and Hopes

The Pancreatic Cancer Early Detection (PRECEDE) Consortium is an international, multi-institutional collaborative group of experts to increase survival for pancreatic cancer patients by improving early detection, screening, risk modeling and prevention for those with a heritable risk for pancreatic cancer, through a novel model of collaboration and data sharing. PRECEDE's mission is to transform the early detection and prevention of pancreatic cancer, with the aim of increasing the 5-year survival rate from 10% to 50% within the next 10 years. With over 30 leading academic medical centers across the globe, PRECEDE has assembled the largest high-risk patient cohort, with longitudinal clinical data and biospecimen acquisition and tracking. PRECEDE Consortium was formed in 2018 and the member institutions are from 40 sites in North America, Europe, and Asia as of 2022. The goal of the PRECEDE Consortium is to facilitate earlier diagnosis of PDAC for HRI to increase survival of the disease. The HRIs are to go through screening with MRI and/or endoscopic ultrasound at regular intervals in the local institute they enrolled. Efforts to standardize the procedures among member institutes are recommended and ongoing (4).

In this issue of Cancer Prevention Research, *Katona and colleagues* (5), provided a demographic portrait of the HRIs enrolled in PRECEDE consortium in the first 2 years, up until

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March 2022. Of 1,273 HRIs, 1,173 were determined analysis-eligible. As the total number of enrolled HRIs exceeds 3,000 as of July 2022, the number of enrolled HRIs is quickly increasing. Therefore, the analysis results are to be understood as a current portrait and the results will be subjected to change. Hence, the results are to be used for a call to action, in case a significant disparity is found and indeed, it is the case.

Disparities from Population Demographics as Well as patients with PDAC

Figure 1 (right panels) show racial and ethnicity distributions of the 1,173 HRIs in the PRECEDE consortium at the end of the 2-year period. For reference, U.S. racial demographics from 2020 census data and race/ethnicity categorization of patients with PDAC from the Surveillance, Epidemiology, and End Results (SEER) year 2019 data, accessed March 18, 2023 are presented in left panels as comparison of gender, racial and ethnicity (6, 7). An important aspect of PRECEDE Consortium HRIs is that majority of participants were female (65.9%) and self-reported White (87.7%), with only 2.9% having Hispanic ethnicity. Since the consortium is international, the demographics and PDAC data should be compared with demographic and cancer data from consortium member institutes. Yet, as 82.1% of the HRIs are from the United States, rough estimates can be made with the U.S. data. In **Fig. 1**, it is evident that racial and ethnic distributions of currently analyzed HRIs are significantly far off from the U.S. demographics and from U.S. PDAC patients demographics.

PRECEDE Consortium Future Mission Advancements

Demographics of current enrollments indicated significant disparities from population and patients with PDAC. As a call to action, *Katona and colleagues* (5), states to "double the percentage of underrepresented groups in the PRECEDE Consortium at a rate that more closely represents the demographics of patients." This would be a good outreach aim for each consortium member institute. Another strategic direction for the PRECEDE consortium management would be to seek and add new consortium member institutes from the centers serving underserved demographics, especially, Black, Hispanic, and American Indian. Pancreatic cancer disproportionately affects Black Americans. This population has the highest incidence rate of pancreatic cancer of all ethnic/racial groups in the U.S. and Black PDAC patients are shown to have poorer

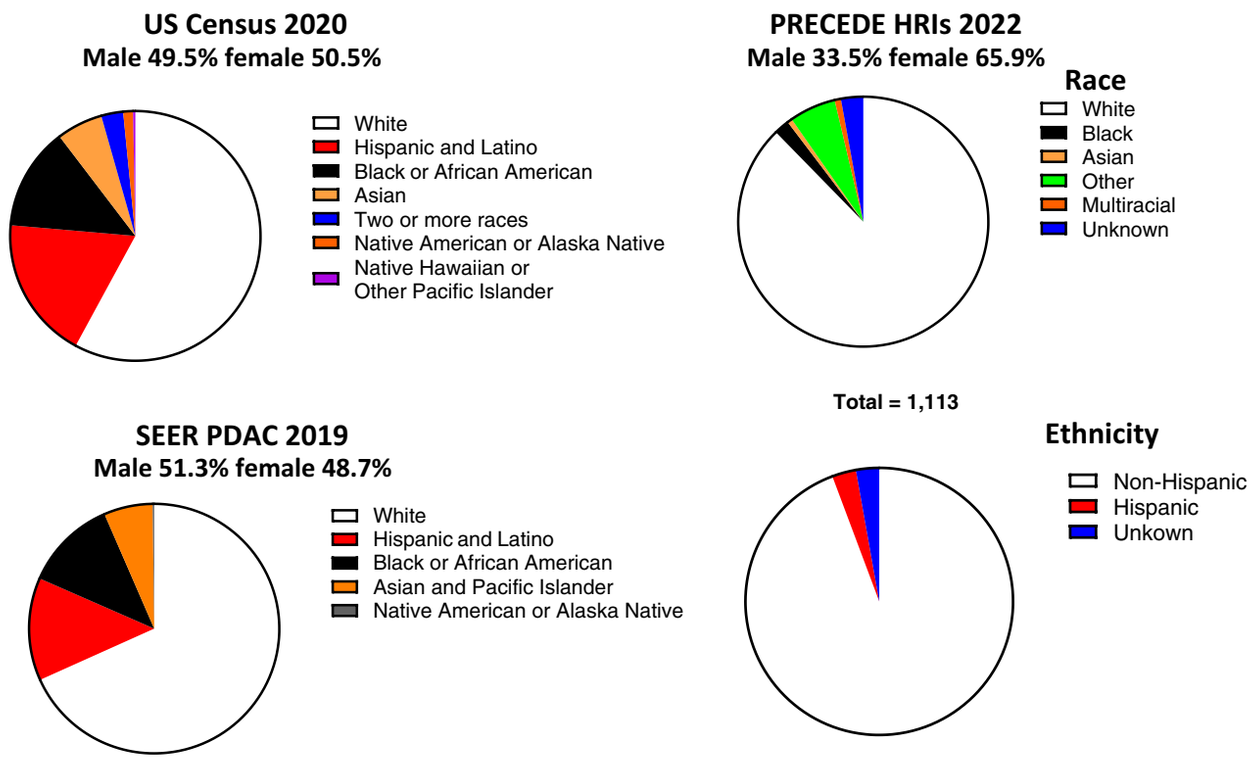

Figure 1.
Current demographics of the PRECEDE HRI does not reflect those of general population or of patients with PDAC in gender, race, and ethnicity. Gender, race, and ethnicity representations in current HRIs in the PRECEDE consortium are visualized with pie charts (right). For reference, racial/ethnic demographics from U.S. Census Bureau, 2020 data (6) and PDAC patients' data from the SEER (2019 data; ref. 7) are presented (left). The disparity illustrates the need to increase enrollments from Black, Hispanic, Asian, American Indian, and male HRIs.

outcomes (8, 9). Importantly, more than 97% of HRIs consented to use imaging data and biosamples for research without any difference in rate of consent based on race/ethnicity, sex, or age. This is considered an excellent opportunity for pancreatic cancer research when enrolling the demographics of representing patients.

The racial disparity is often attributed to socioeconomics, and biological influences at the molecular level remain under-investigated. Yet, biological differences among race groups are emerging (10). To investigate molecular racial differences, a good number of cancer and tissue samples are needed. However, cancer sample numbers in the NCI Genomic Data Commons (GDC) database from Black, Asian and American Indians are also highly limited. Among 2,742 pancreatic cancer samples, 1,607 are from White, but only 71 from Asian, 64 from Black, and only one from American Indian, according to the NCI GDC database, accessed March 18, 2023 (11). Thus, outreach efforts toward institutes serving a high Black or American Indian population for datasets and tissue samples would further aid to achieve the PRECEDE mission.

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Authors' Contributions

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