Do Trends in Population-Level Risk Factors Explain Trends in Gastric and Oesophageal Cancer Rates: Evidence from SEER and NHANES Databases

P3 - D4

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There are racial and sex disparities in gastric and oesophageal cancer incidence despite decreasing rates overall. Oesophageal adenocarcinoma has increased. Risk factor analysis revealed changes in smoking behavior, BMI, and alcohol consumption over time but other modifiable risk factors for these cancers have remained stable.

BACKGROUND

- Gastric and oesophageal cancers are diagnosed in over 25,000 and 19,000 Americans, respectively, each year
- Survival from both cancers is poor with less than 35.7% and 21.7% surviving beyond seven years
- Prevention of these cancers remains important to reduce mortality and modifiable risk factors may be one prevention strategy
- Thus, it is important to understand how the trends in incidence and modifiable risk factors have been changing over time
- We evaluated these trends using two US national resources, and the Surveillance, Epidemiology and End Results (SEER) cancer registry database and the National Health and Nutrition Examination Survey (NHANES)

METHODS

SEER

- Developed by the National Cancer Institute (NCI), stores information on cancer diagnosis, treatment and mortality in the USA
- Covers 8.3-47.9% of the population in 8-22 states
- We extracted data from the SEER 8 for the time period of 1975-2020 including registration information from Connecticut, Atlanta, San Francisco-Oakland, Hawaii, Iowa, New Mexico, Seattle-Puget Sound and Utah
- Gastric or esophagus cancer were identified using the International Classification of Diseases for Oncology, third edition (ICD-0-3). Those did not have a confirmed pathologic diagnosis of gastric or esophageal cancer were excluded. We narrowed to those first malignant
- In total 66,815 gastric cancer patients and 34,850 oesophageal cancer patients met our inclusion criteria and were included in our study
- SEER*Stat statistical software 8.4.2 was used to calculate age-standardized incidence rates and yearly incidence trends that spanned 45 years for gastric and oesophageal cancers overall, by cancer sub-type (cardia and non-cardia gastric cancer; and adenocarcinoma and squamous cell carcinoma of the oesophagus), and by sex and US racial group (White, Black, and Other – American Indian/Alaska Native, Asian Pacific Islander)

NHANES

- Conducted by the CDC National Center for Health Statistics
- Annual surveys and measurements to collect health and nutritional information from a nationally representative sample
- 1999-2020 NHANES was used to evaluate time trends in modifiable risk factors
- Participants ≥18 years were included in the analysis
- Risk factors measurement:
  - **Alcohol consumption** (daily alcohol consumption)
    Moderate drinking: Women: ≤1 drinks; Men: ≤2 drinks
    Heavy drinking: Women: ≥1 drinks; Men: ≥2 drinks were defined as heavy drinker.
  - **Smoking status**: ever smoking at least 100 cigarettes; former smokers stopped at least 12 months prior, current smokers still smoke
  - **Body mass index** (kg/m^2) derived from weight and height measurements
  - **Daily intakes** of calcium, magnesium, vitamin C, E and folate were obtained from 24-hour dietary recalls

RESULTS

Gastric Cancer

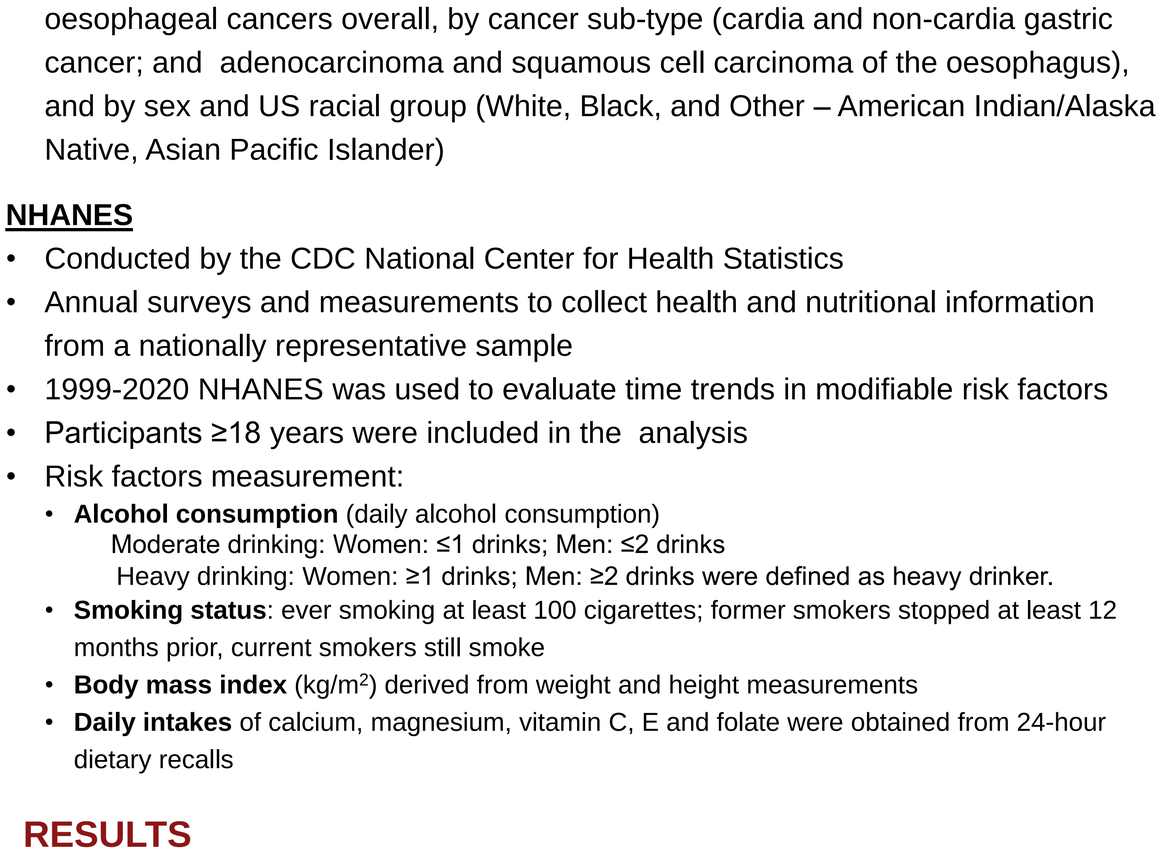

Figure 1. Gastric cancer trends overall and by subtype among males and females by racial group, SEER 1975 to 2020

RESULTS CONTINUED

- After a substantial reduction over time, gastric cancer incidence in the USA is 6.3 per 100,000 (25,554 cases; 2022)
- Cardia gastric cancer incidence among males was twice as high as females, slightly declined for all groups but remains highest for white males and lowest for white females
- Non-cardia gastric cancer incidence showed a steady decline across all race and sex sub-groups, however, 'Other' males had the highest incidence rates, while white females had the lowest incidence throughout the period

Oesophageal Cancer

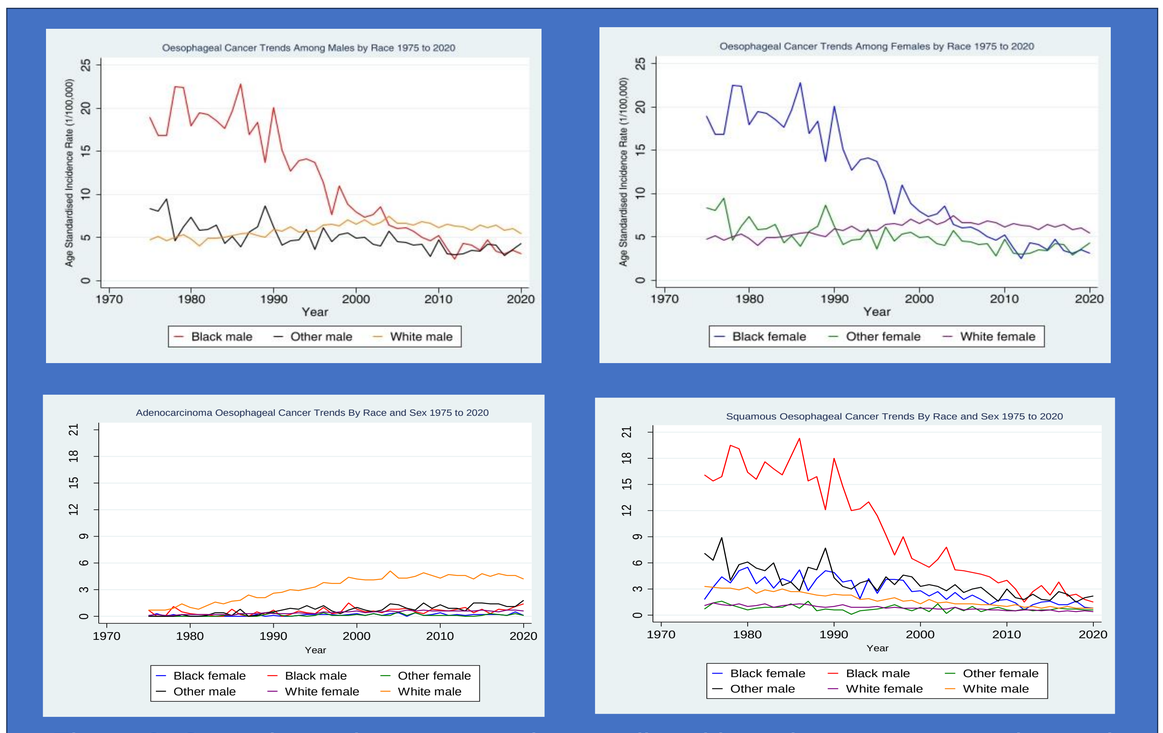

Figure 2. Oesophageal cancer trends overall and by subtype among males and females by racial group, SEER 1975 to 2020

- Oesophageal cancer incidence rate is 4.2 per 100,000 (18,747 cases; 2022)
- Oesophageal adenocarcinoma incidence has increased over the years particularly among White males, and passed squamous cell carcinoma as the most prevalent type
- Conversely, squamous cell carcinoma incidence declined substantially over time and remains highest for Other and Black males

Modifiable Risk Factors

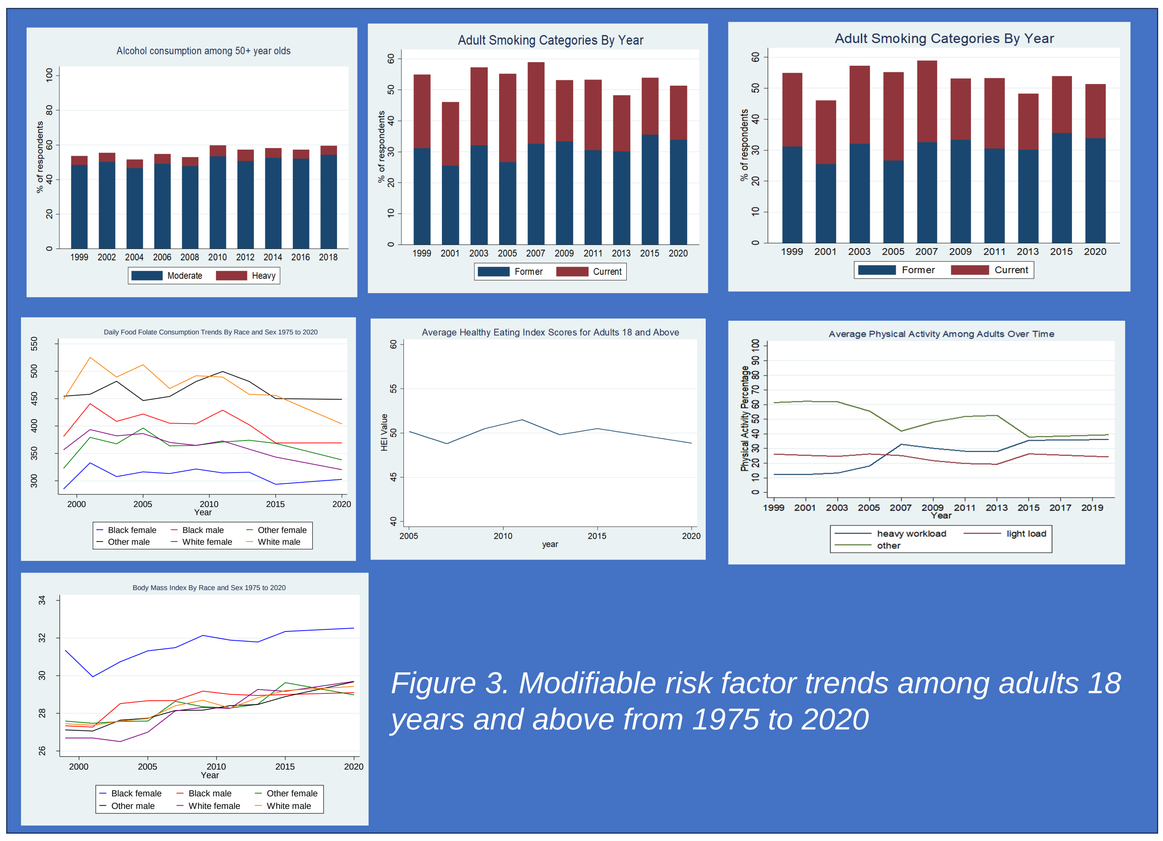

Figure 3. Modifiable risk factor trends among adults 18 years and above from 1975 to 2020

- Several modifiable risk factors remained fairly stable over time
- Moderate alcohol intake increased among the ≥50 age group, while heavy alcohol intake increased among the 20-50 age group
- BMI levels increased among White males and Black females, while heavy physical activity increased among the population from 11% to 39%
- The number of current smokers decreased from 24% in 1999 to 17% in 2020

LIMITATIONS

- Direct associations could not be evaluated

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