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“Parish-Level Socioeconomic and Health Predictors of Pancreatic Cancer Burden in Louisiana”

INTRODUCTION: Pancreatic cancer is frequently diagnosed at an advanced stage because early symptoms are nonspecific and population-based screening is unavailable. Although survival disparities are well documented, geographic variation in pancreatic cancer burden and its community-level correlates remains incompletely characterized. Louisiana bears a substantial pancreatic cancer mortality burden. This study aims to characterize parish-level variation in pancreatic cancer mortality, incidence, and late-stage presentation across Louisiana and examine associations with socioeconomic, behavioral, metabolic, and healthcare-access factors.

METHODS: We conducted a cross-sectional ecologic analysis of Louisiana's 64 parishes using population-level Cancer InFocus data. Outcomes included age-adjusted pancreatic cancer mortality from 2019-2023, in addition to age-adjusted incidence rates and proportion of late-stage diagnoses (regional and distant stages combined) from 2018-2022. Parish-level predictors included median household income, poverty prevalence, rural population percentage, adult obesity prevalence, adult smoking prevalence, adult diabetes prevalence, and patient-to-primary care physician (PCP) ratios, which represent the number of residents served by one PCP in a parish. Spearman rank correlations were used to assess bivariate associations. Suppressed parish data was omitted from analysis, leaving 58 parishes for mortality, 53 parishes for incidence, and 42 parishes for late-stage proportion analyses. Univariate and bivariate maps were used to describe geographic patterns.

RESULTS: Parish-level mortality was positively associated with poverty prevalence ($p = 0.40$, $p = .002$), adult smoking prevalence ($p = 0.36$, $p = .005$), and adult diabetes prevalence ($p = 0.29$, $p = .025$), and inversely associated with median household income ($p = -0.31$, $p = .018$). Incidence was inversely associated with median household income ($p = -0.42$, $p = .002$) and positively associated with poverty prevalence ($p = 0.41$, $p = .002$), adult diabetes prevalence ($p = 0.34$, $p = .012$), rurality ($p = 0.33$, $p = .015$), and smoking prevalence ($p = 0.31$, $p = .024$). No significant associations were observed for adult obesity prevalence or population-to-PCP ratio, and none of the parish-level predictors were associated with proportion of late-stage diagnosis. Visual inspection of bivariate maps suggested co-occurrence of higher pancreatic cancer burden and adverse socioeconomic or behavioral characteristics in north-central Louisiana.

CONCLUSION: Pancreatic cancer mortality and incidence demonstrated modest-to-moderate parish-level associations with socioeconomic and health-related characteristics. These exploratory ecologic findings do not establish individual-level causation or directly demonstrate delayed diagnosis. Multivariable spatial analyses, stabilized estimates for low-count parishes, and individual-level evaluations of diagnostic delays are needed to identify areas of diagnostic vulnerability.