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Global Pancreatic Cancer Burden and its Demographic Drivers, 1990–2023: A Decomposition Analysis of the Global Burden of Disease Study 2023

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Abstract

Background

Pancreatic cancer is a highly lethal malignancy whose absolute burden may rise because of population growth, population ageing, changes in age-specific disease rates, or combinations of these processes. We quantified the contemporary burden and decomposed the drivers of change across development levels and world regions.

Methods

We performed an ecological analysis of Global Burden of Disease (GBD) 2023 estimates from 1990 to 2023 across five Socio-demographic Index (SDI) groups and seven GBD super-regions. Incidence, deaths and disability-adjusted life-years (DALYs) were described using all-age counts and age-standardised rates. Temporal trends were summarised using estimated annual percentage change. Changes in deaths and DALYs were decomposed using a symmetric Shapley-style framework into population growth, population ageing and age-specific rate change. Secondary analyses examined sex, successive time intervals and geographic inequalities.

Results

Derived global incident cases increased from 226,656 in 1990 to 578,236 in 2023 (+155.1%),

deaths from 220,161 to 552,300 (+150.9%), and DALYs from 5.43 million to 12.28 million (+126.0%). Of the 332,139 additional deaths, population ageing contributed 172,294 (51.9%), population growth 149,062 (44.9%), and age-specific mortality-rate change 10,783 (3.2%). For the 6.84 million increase in DALYs, growth and ageing each contributed approximately 3.46 million, while age-specific rate change offset 82,003 DALYs. Lower-SDI settings showed substantial contributions from population growth and rising age-specific rates, whereas ageing dominated in high-middle- and high-SDI settings. Male age-standardised rates exceeded female rates in every SDI group and super-region in 2023, and relative geographic inequalities narrowed but remained substantial.

Conclusion

The rise in global pancreatic cancer burden since 1990 has been driven predominantly by demographic change, but the balance of drivers varies substantially by development level and region. Cancer-control planning should therefore distinguish demographic expansion from changes in underlying age-specific burden and tailor prevention, diagnostic capacity, treatment and palliative-care services accordingly.

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