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Letter-to-Editor

Concern regarding the use of mortality-to-incidence ratios as a proxy for cancer survival estimates

Sir,

We read with interest the article by Kalita *et al*[1] published in the November 2024 issue of the Indian Journal of Medical Research. The authors highlight several aspects of global cancer trends, but their interpretation and use of the mortality-to-incidence (M/I) ratio as a proxy for population-based cancer survival causes concern. The authors state that the M/I ratio provides a population-based indicator of survival and can be considered as a comparative indicator of disparities in cancer outcomes and treatment availability. Unfortunately, neither statement is correct.

The M/I ratio was designed as a rough indicator of the completeness of cancer registration[2]. It was never intended as an estimator of cancer survival[3]. It has no theoretical basis as a proxy for cancer survival. It is not a valid proxy for cancer survival in practice, either, whether at five years or at any other time interval since diagnosis.

Cancer incidence measures the number (or the rate per 1,00,000 population) of new diagnoses in a given year, while cancer mortality reflects the number (or rate) of deaths from that cancer in that year[4]. Many people who die from cancer in a given year would have been diagnosed in previous years. This is increasingly so where cancer survival is improving over time. For the same reason, the proportion of cancer survivors who die from another cause of death is also increasing. When cancer is not the underlying cause of death, those deaths are not included in cancer mortality rates. Cancer mortality and cancer incidence rates, therefore, relate to two different cohorts of patients.

Cancer survival estimates reflect the probability of survival up to one, five or 10 years after diagnosis. Population-based cancer survival estimates require follow up of individual patients between diagnosis and death, or loss to follow up. The M/I ratio lacks any temporal relationship to individual patient diagnoses. It contains no information about access to treatment, either.

Finally, the quality and completeness of cancer incidence and mortality data vary considerably between countries, which renders M/I invalid for international comparison, especially when estimated for an entire continent. Registration of deaths by age, sex, and cause is incomplete or absent in many countries. Many countries also lack robust national cancer registration systems. High M/I ratios, such as the value above 70 per cent cited for Africa, reflect under-reporting of incidence, rather than an estimate of survival.

Unlike survival estimates derived from population-based cancer registries, the M/I ratio (or its complement) does not enable quality control of individual cancer patient records; it does not produce the classical curve of survival by time since diagnosis; it does not reflect survival by age, stage, SES, race/ethnicity or region; it does not take account of background mortality, as is the case with net survival; it does not enable evaluation of the effectiveness of health services; it does not enable derivation of secondary measures of outcome, such as 'cure', or avoidable premature deaths, and it does not enable robust comparison between countries[5].

The M/I ratio is no longer a useful indicator for the completeness of cancer registration, and it has never been a valid proxy for survival. We encourage readers to avoid using the M/I ratio (or its complement) as an indicator of cancer survival or of access to treatment.

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Yifan Wang[1], Carla Espinoza-Vallejos[2] & Michel P. Coleman[2,3,*]
[1]Department of Epidemiology and Population Health,
[2]Cancer Survival Group, London School of Hygiene

and Tropical Medicine & [3]Cancer Division, University College London Hospitals NHS Foundation Trust, London, United Kingdom

[*]*For correspondence*: michel.coleman@lshtm.ac.uk

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