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Men's Health 2

A global men's health epidemiology within an intersectional framework

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Males have lower life expectancies and greater disability-adjusted life-years (DALYs) than females, and particularly poor outcomes are seen among males in marginalised contexts. In this paper, we provide an epidemiological overview and highlight the intersectional nature of men's health. We analyse mortality and DALYs data from the 1990–2023 Global Burden of Diseases, Injuries, and Risk Factors Studies to illustrate our intersectional framework and draw attention to how health varies in men and to show key themes. Conditions that contribute most to the poor health of males include non-communicable diseases (eg, cardiovascular diseases and cancers), substance use, suicide, injuries (eg, road traffic incidents and interpersonal violence), and respiratory infections (eg, tuberculosis and COVID-19). Although cardiovascular disease and cancer make the largest contributions to men's higher mortality rates, determinants of health such as violence and war, migration, economic stagnation, and labour market changes due to automation and new technologies will disproportionally affect their health in the future. Injuries, violence, and other external morbidity causes often occur at a young age and in unequal distributions across the sexes, making a large contribution to DALYs. Although biology plays a role, the pattern of many diseases contributing to health differences reflects the intersection of health behaviours, shaped by patriarchy, ideas of masculinity, and structural drivers (including commercial determinants of health); many of these are preventable. Although improvements in some health behaviours are seen, exceptions occur in marginalising social conditions (eg, incarcerated men, men experiencing homelessness, men with mental illnesses, men with substance use disorders, men with low income, men who have sex with men, and those who are gender non-conforming). Multiple data sources detail men's shorter life expectancies and the drivers compared with women, but going beyond sex disaggregation remains challenging and is an urgent priority for research and health monitoring.

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See **Series** pages 1866 and 1899

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This is the second in a **Series** of three papers about men's health

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Introduction

In this second paper of the Men's Health Series, we review patterns of men's health and examine the intersecting systems of power that contribute to them. Our approach to men's health is to analyse data and inform health promotion efforts to complement,[1] rather than compete with, efforts to promote the health of other genders.[2] We summarise some key contributors to sex differences in mortality and disability-adjusted life-years (DALYs) using The Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2023 and draw attention to the differences among men. We build on our conceptual framework[1] and, given the limitations of GBD data, draw on published epidemiological data and conduct new illustrative secondary analyses of data to show the syndemic patterns arising from multilevel and intersectional determinants. Throughout this paper we use the terms men and male in line with the panel on gender, sex, and diversity of intersecting male identities in the first paper in the Series.[1]

As detailed,[1] there are stark intersectional inequalities in men's health, shaped by individual-level, community-level, institutional-level, and policy-level determinants that affect chronic stressors and biological vulnerability. For an individual, the patriarchy and masculine ideals are some of the factors that shape health in complex, often contradictory ways, reflecting power, agency, roles, and behaviours. Power shapes risk exposure and health behaviours (eg, smoking, substance use, gambling, and firearm possession). Agency can lead to positive health behaviours through a sense of control and autonomy,[3] whereas lack of agency (perhaps through unemployment, displacement, incarceration, dependency, or lack of kinship) leads to poor health profiles through

Key messages

- Differences in life expectancies and disability-adjusted life years (DALYs) exist between males (especially in marginalised contexts) and compared with females; these reflect intersectional inequalities and the gaps are either persisting or increasing in most countries
- Conditions contributing to the greatest health differences (quantified using DALYs) between males and females include non-communicable diseases (ie, cardiovascular diseases and most cancers), liver failure, suicide and injuries (including road traffic incidents, falls, and violence), and respiratory infections (eg, tuberculosis and COVID-19)
- Poor health outcomes are often concentrated among marginalised and minoritised men, many of whom are experiencing intersecting social disadvantages
- The absence of of intersectionally disaggregated data currently limits systematic and comprehensive analyses, the understanding of which are needed to inform programmes and practices and develop robust approaches to improve men's health

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See Online for appendix

Panel 1: Smoking in Bangladeshi men—an intersectional analysis

Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy is a quantitative approach to exploring intersectionality. We analysed nationally representative cross-sectional data on male youth (aged 15–24 years) in Bangladesh to examine how smoking behaviour varies across multiple and intersecting social positions. In addition, we studied the association between masculinity norms and smoking (the Gender Role Conflict Scale was used to capture alignment with masculine stereotypes [appendix pp 14–15]). Intersectional strata were constructed by cross-classifying three social variables: education (primary or less, secondary, and tertiary), occupation (agriculture and fisheries, skilled labour, services, and students), and household income (low and middle to high), yielding a multidimensional matrix of social positions, with four very small intersectional groups (less than ten individuals) excluded from analyses. We fitted a multilevel model considering each individual as being nested within one of 20 intersectional groups, with a binary variable of current smoking as the outcome. The prevalence of smoking in each intersectional group was then estimated from the model. The intersectional groups with the highest and lowest prevalence were inspected. We then assessed if masculinity norms (tertiles) were additionally associated with smoking. Predicted smoking prevalences ranged from 22% to 67%, illustrating systematic differences in smoking across socio-economic combinations (appendix p 15). Inspection of the ranked intersectional strata reveals substantial inequalities in smoking (table 1). The lowest prevalences were consistently observed among students, particularly those with a low income. In contrast, the highest smoking risks were concentrated among men in higher-income households regardless of education level and occupation.

health-harming behaviours, delayed help-seeking, low treatment adherence, and directly through psychosocial stress.[4–7] Intersectional analyses using data from Bangladesh illustrate how health behaviours differ across different groups of men, shaped by intersecting axes of identity (panel 1).

Men often view themselves through financial roles, physical strength, and leadership roles, and conflicting prioritisations can lead to poor health behaviours. Men in the UK visit their general practitioners (GPs) less often than women, and this difference is greatest for those aged 16–60 years and those in underserved communities, possibly reflecting financial priorities, a lack of gender-responsive services, and masculine norms of stoicism and self-reliance in providers and patients.[8] As health becomes a higher priority or as men feel more vulnerable (eg, those older than 75 years, those with chronic health problems, and those on medication), differences in health care use between different groups of men and between men and women disappear.[9] Communities, environments, and relationships shape health through regional, geographical, societal, and cultural factors. For example, interpersonal relationships are fundamental to men's health—stable relationships, including marriage and cohabitation,[10] are beneficial to men, regardless of country and age.[11,12] The benefits from marriage are usually greater for men than women, reflecting the complexities and nuances of the influence of gender on health.[13] Societal inequalities can be harmful for many men. For example, Indian people within lower castes (such as the Shudra and Dalit castes) have higher mortality rates (odds ratio [OR] 1·72 [1·23–2·41] for both sexes) across their entire life compared with those in higher castes,[14] and consequently have lower life expectancies (60·32 years for men in scheduled castes *vs* 66·09 years for other men).[15] This difference in life expectancy is greater than the difference between religions in India,[15] and reflects avoidable factors (such as smoking and treatable infections), economic and social inequalities, and lack of health care.[14,16–18] British civil servants of low occupational grade experience more rapid health deterioration after retirement, resulting in a physical-age gap of 8 years compared with higher-grade retirees.[19] Displacement and migration can result in a loss of social connections and social status and a loss of access to health care, and can lead to mental health disorders.[13]

At the institutional level, education has a profound impact on health, being consistently linked to improvements in nearly all health outcomes, including mortality.[20] However, the proportion of boys enrolling in and completing secondary and tertiary education has declined since the 1990s, and is lower than the equivalent proportion of girls.[21] It should also be noted that girls continue to face substantial barriers accessing secondary and tertiary education, particularly in low-income countries. Learning poverty rates, defined as being unable to read and understand a simple text by age 10 years, are higher for boys than girls in nearly all countries worldwide. However, these poorer educational outcomes are not experienced equally among boys. For example, in the Nordic countries, girls with a Nordic background have the best outcomes, followed by girls with a migrant background, boys with a Nordic background, then boys with a migrant background.[22] There are repeated concerns that educational systems are not helping all boys thrive, particularly those with social disadvantages, potentially setting up generations of men to go on to experience lifetimes of poor health. Differences in men's educational trajectories between countries with high educational rank (eg, South Korea and Denmark) and falling standards (eg, the USA) account for some observed population-wide differences in health, independent of national wealth.[23] Perhaps more so than the health and education systems, the justice system is designed for men and supposed to be

gender-neutral,[24] but nevertheless men's health is neglected. There are more than 11·5 million people living in prison worldwide, around 90% of whom are men.[25] People who are incarcerated have high rates of mental health disorders, infectious diseases (eg, HIV, Hepatitis B and C, and tuberculosis), and many chronic diseases.[26] These findings reflect the links between reasons for incarceration (such as substance use) and poor health practices within prisons and social determinants of health (eg, there are high rates of incarceration in men experiencing homelessness, minoritised ethnicities, economically deprived men, and men with mental health disorders).[27,28] Systematic reviews show that around 9% of men who are incarcerated in high-income countries (HICs) attempt suicide in prison;[29] men at highest risk of attempting suicide include those with suicidal ideation or who have previously self-harmed, those kept in solitary confinement, and those experiencing victimisation or poor social support. Immediately after release from prison, high rates of preventable deaths occur from alcohol or drug overdose, suicide, and cardiovascular disease,[30] highlighting the need for preventative strategies (and opportunity for improving society and public health and safety).

Life expectancy and DALYs

Differences in life expectancies for men and women emerged during the 19th century and have widened since.[31] This difference is often the result of preventable or modifiable factors (appendix pp 2, 17).[1,32–35] Health patterns by sex can nuance mortality or life expectancy data. Although male individuals tend to have higher mortality rates, female individuals face greater morbidity, particularly from chronic autoimmune, musculoskeletal, and mental health conditions, as well as maternal, sexual, and reproductive risks.[36,37] Overall, male individuals face a higher illness burden: in 1990, global DALYs were 18% higher among males than females, and although this gap has narrowed slightly, it remained 16% higher in 2023 (figure 1; appendix pp 4–10).[36,38] The sex difference is more pronounced for age-standardised death rates, rising from 36% to 38% between 1990 and 2023, with a sharp increase seen during the COVID-19 pandemic (appendix p 18). Mortality and morbidity rates are improving faster for female individuals than for male individuals. Males are at greater risk of dying from infectious and non-communicable diseases and external mortality (injuries and violence) than females (appendix p 19).[39] Although risks vary by region and socioeconomic status, the higher disease burden in males is consistent across most countries and age groups (country-specific results are in the appendix [pp 20–29]).[36]

Sex and gender differences in disease and illness vary by health outcome and context.[36,38] Previous analysis of GBD data has highlighted how poorer health outcomes for male individuals compared with female individuals strongly reflects gender-related factors (as indicated by external causes of death), rather than being due to sex differences.[40] The differences are consistent over time and across most causes, particularly for deaths

	Education	Income, Bangladeshi taka	Occupation	N	Prevalence (95% CI)
Bottom five lowest risk strata					
1	Secondary	≤25 000	Students	4133	22·0% (18·1–26·5)
2	Primary or less	≤25 000	Students	217	28·5% (23·8–33·8)
3	Secondary	>40 000	Students	1776	30·6% (25·6–36·0)
4	Tertiary	≤25 000	Students	619	35·5% (30·1–41·3)
5	Primary or less	>40 000	Students	49	42·6% (36·8–48·7)
Top five highest risk strata					
16	Primary or less	≤25 000	Skilled or industrial	423	57·9% (51·8–63·7)
17	Primary or less	>40 000	Agricultural or fisheries	119	60·1% (54·2–65·8)
18	Secondary	>40 000	Skilled or industrial	144	63·9% (58·1–69·4)
19	Primary or less	>40 000	Skilled or industrial	136	64·0% (58·2–69·4)
20	Secondary	>40 000	Agricultural or fisheries	114	67·2% (61·6–72·3)

Adding masculinity norms to the regression model showed that masculinity was strongly associated with smoking and displayed a clear dose–response relationship.

Table 1: **Highest and lowest ranking strata for predicted smoking prevalence**

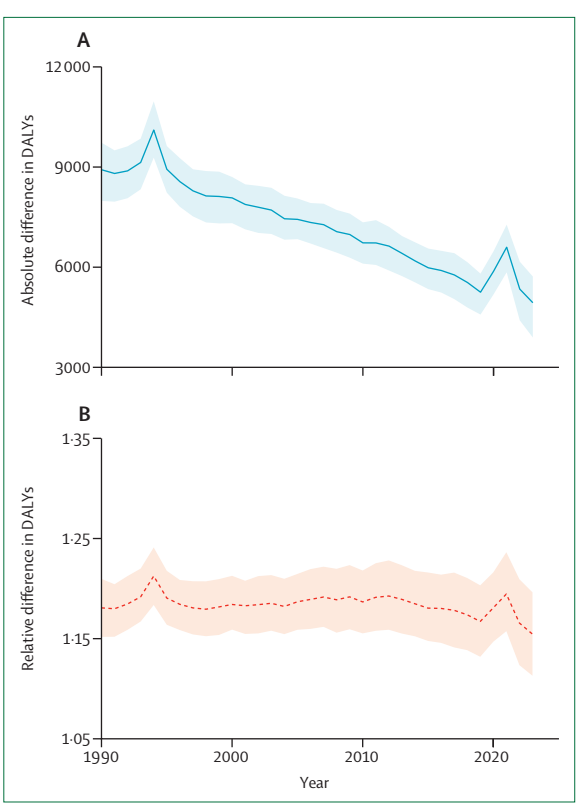
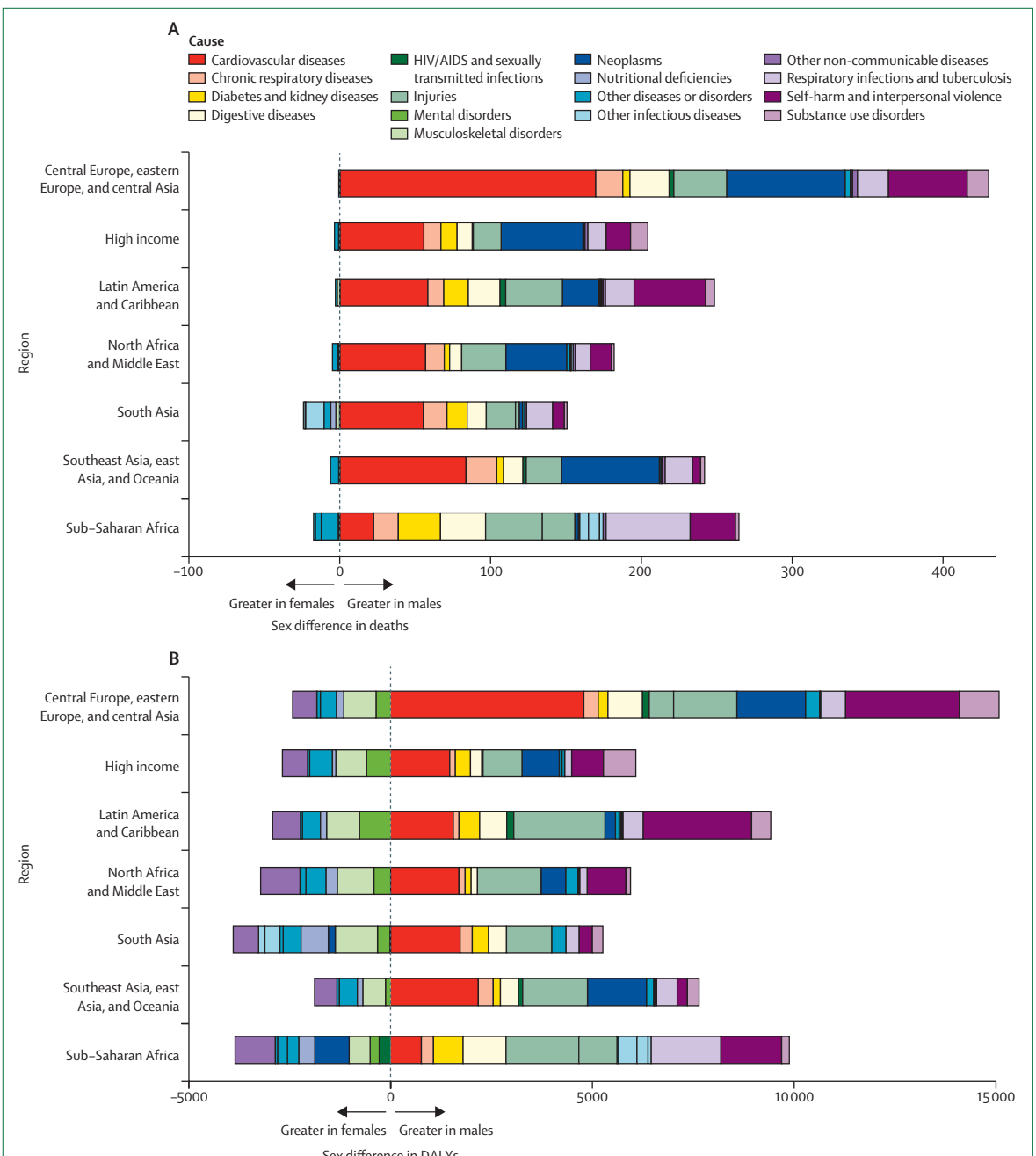


Figure 1: **Trends in absolute sex difference (A) and relative ratio (B) in DALYs over time per 100 000 population**
Data are from The Global Burden of Diseases, Injuries, and Risk Factors Study, 2023. Data are from the Global Burden of Disease Collaborative Network . Shading represents 95% CIs. DALY=disability-adjusted life-year.

For more on the **Global Burden of Disease Collaborative Network data** see https://vizhub.healthdataorg/gbd-results/

(figure 2).[41] The gap in outcomes between males and females is largest in central Europe, eastern Europe, and central Asia; sub-Saharan Africa; and Latin America and the Caribbean (gaps are at least twice as high in these regions than in North America, western Europe, and Australasia). Although there has been an encouraging reduction in the absolute gap over time (appendix pp 20–24), the increase in the comparative DALY burden suggests that improvements are slower for males.

Presenting the data in this way allows us to build on previous analyses to identify causes of higher disease burden in males compared with females, as well as regional differences among male individuals.[42] From 1990 to 2023, the primary causes of global sex death



For more on the **Global Burden of Disease Collaborative Network data** see https://vizhub.healthdata.org/gbd-results/

Figure 2: **Age-standardised death (A) and DALY (B) rates between males and females in 2023, stratified by region**
Cause to the left of the zero indicate diseases that have a higher burden in females, causes on the right are those with a higher burden in males. Presented as the sex difference in age-standardised rates of deaths and DALYs per 100 000 population for each GBD level 2 cause, stratified by GBD region. Data are the Global Burden of Disease Collaborative Network. DALY=disability-adjusted life-year. GBD=The Global Burden of Diseases, Injuries, and Risk Factors Study.

differences were non-communicable diseases (eg, cardiovascular disease, cancer, and diabetes), external causes (eg, suicide, road traffic injuries, falls, and interpersonal violence), communicable diseases (eg, respiratory infections, tuberculosis, HIV/AIDS, and hepatitis), and substance use (eg, alcohol-related and drug-related harms). The largest contributors to mortality and DALY sex differences were cardiovascular disease (1959 additional male DALYs per 100 000 population in 2023), accidental injuries (1651 additional male DALYs per 100 000 population), cancer (711 additional male DALYs per 100 000 population), and self-harm and interpersonal violence (including conflict and terrorism; 857 additional male DALYs per 100 000 population).

Gendered patterns for mental health conditions are complex. Suicide rates are higher in men than women, and suicide is a leading cause of death for men younger than 50 years, particularly in HICs where neuropsychiatric disorders, genetic risk, substance use, and stressful life events are key risks.[43,44] However, females tend to live longer with chronic mental health conditions than males, resulting in more mental illness DALYs (figure 2).[36] Careful consideration for explanations of these differences, including potential limitations in diagnostic practice, is crucial to developing solutions.[1,45]

As illustrated by our framework,[1] gender differences in health-related behaviours are context-dependent and culture-dependent (panel 2; appendix pp 25–29).[34,46] For example, in addition to access to testing and treatment, patterns of HIV infection and treatment in men vary considerably based on criminalisation of homosexuality; the patriarchy; and how cultural and gender norms value

Panel 2: Sports betting

Online sports betting is a rapidly rising health problem that disproportionately affects younger men, those in minority ethnic groups, and those most economically disadvantaged, and is contributing to financial and relationship stresses, binge drinking, and poor mental health.[163–165] Although sports betting is particularly prevalent in Australia, the UK, and the USA, rapid growth has been seen in low-income and middle-income countries.[166] The rise of sports betting reflects ease of access to gambling apps and websites, government policies (either to facilitate gambling or inaction to prevent problem gambling) and addictive, real-time betting options. The American Gaming Association reported commercial revenues increased by 8·7% (to $71·5 billion) between 2024 and 2025.[167] The steepest rises were for sports betting (17·4%, to $15·0 billion) and iGaming (eg, online slots and table games on casino websites; 28·3%, to $9·1 billion), compared with traditional gambling (2·8% rise).

Advertising and social media influence many men to start gambling.[168–171] In the USA, nearly half of men aged 18–49 years use online sportsbook accounts.[163] Systematic reviews report that men (49·1% [95% CI 45·5–52·6]) are more likely to gamble than women (37·4% [32·0–42·5]), are more likely to do risk gambling (associated behavioural symptoms or adverse personal, social, or health-related consequence; 11·9% [8·2–16·5] *vs* 5·5% [2·5–8·5] for women), and are more likely to be problematic gamblers (2·5% [0·9–3·0] *vs* 1·0% [0·5–1·8] for women).[168] Men enter gambling-related treatments at younger ages than women.[172] Young males and adolescent males, those in minoritised ethnic groups (especially indigenous populations), and those most socially and economically disadvantaged appear particularly vulnerable due to gambling's ease of availability, the use of digital money (and a disconnect with real world money), the use of gendered marketing that positions gambling as an integral part of engaging with sports and within male-bonding (through shared gambling experiences), and messaging that successful gamblers advance their social status among peers.[168,173,174]

The financial consequences of problem gambling are clear. Federal Reserve Bank of New York estimates that sports betting legalisation led to a ten-fold rise in sportsbook spending and a subsequent rise in credit delinquency (eg, missed or defaulted loan payments).[175] This financial effect was most dramatic in individuals younger than 40 years and is associated with other signs of excessive debt (eg, debts sent to collection agencies and bankruptcies).[176] There is spillover from territories that allow sports betting into neighbouring ones that do not, creating a double hit in that these regions have to deal with the consequences of gambling without the additional tax revenues (which paradoxically increases pressure to legalise sport betting further). In recognition of these financial consequences, in July, 2025, the US state of Illinois introduced a tax for online wagers (25 cents for the first 20 million wagers, and 50 cents thereafter).[177] In the following months there was a 13·7–16·6% reduction in the number of wagers in Illinois, although individual bet values increased.[167] In other countries, regulators have prohibited marketing that targets young individuals or sharing personal data that could be used by gambling companies for marketing.[166]

The health consequences of problem gambling take longer to emerge and are more nuanced, as it can co-exist with other health conditions or substance abuse. High-severity problem gamblers have poorer diets, do less exercise, are more likely to smoke, and have poorer general health, than low-severity or non-problem gamblers.[178] Alcohol consumption appears highest in low-severity gamblers, suggesting the importance of the context (eg, gambling in alcohol-focused locations). Longitudinal studies suggest there are higher premature mortality rates in problem gamblers (1·5-fold rise for men) compared with non-problem gamblers and non-gamblers, and that the difference is greatest in those aged 20–49 years (4·6-fold rise);[179] in this study by Karlsson and Håkansson, one third of deaths were from suicide, with a history of depression being the strongest risk factor.

masculinity, discrimination, and confidentiality concerns.[47] In South Africa, circumcision rates (in light of HIV prevention) range from 13 to 86%,[48] reflecting differing ideas of masculinity by rural and urban settings, ethnicity (eg, Hehe-speaking and Bena-speaking people do not traditionally practice circumcision), beliefs (eg, fear of pain or delayed healing, shame and embarrassment from older men undergoing circumcision next to younger men, and fear of enforced sexual abstinence), health-care availability, and an individual's wealth.[49] Similarly, gendered differences in many cancer outcomes reflect regional and cultural patterns in health behaviours combined with structural factors.[50] Men living with housing and financial insecurity are less likely to attend colorectal cancer screening and colonoscopy than those without such insecurities, and therefore have fewer screen-detected cancers.[51] For example, within the USA, screening adherence is associated with many factors, including race and ethnicity; insurance coverage; and food, housing, employment, and transport insecurity.[1,52] Differences in rates among men attending screenings are lowest for lung cancer, perhaps reflecting risk factor awareness (eg, smoking), impressions of disease severity, or the social acceptability of this cancer (eg, compared with bowel or male breast cancer).[53]

The impact of collective violence, such as war and conflict, is particularly gendered, as explained in the first paper in this Series (appendix pp 19–24).[54] In conflict zones, such as those in Rwanda and Syria, women have outlived men by more than 10 years, despite facing substantial challenges including displacement and gender-based violence.[1] Differences in life expectancy can widen in contexts of health inequalities and adversity, highlighting the importance of examining how social, political, and environmental factors intersect to influence health outcomes for men and women.

Cardiovascular diseases

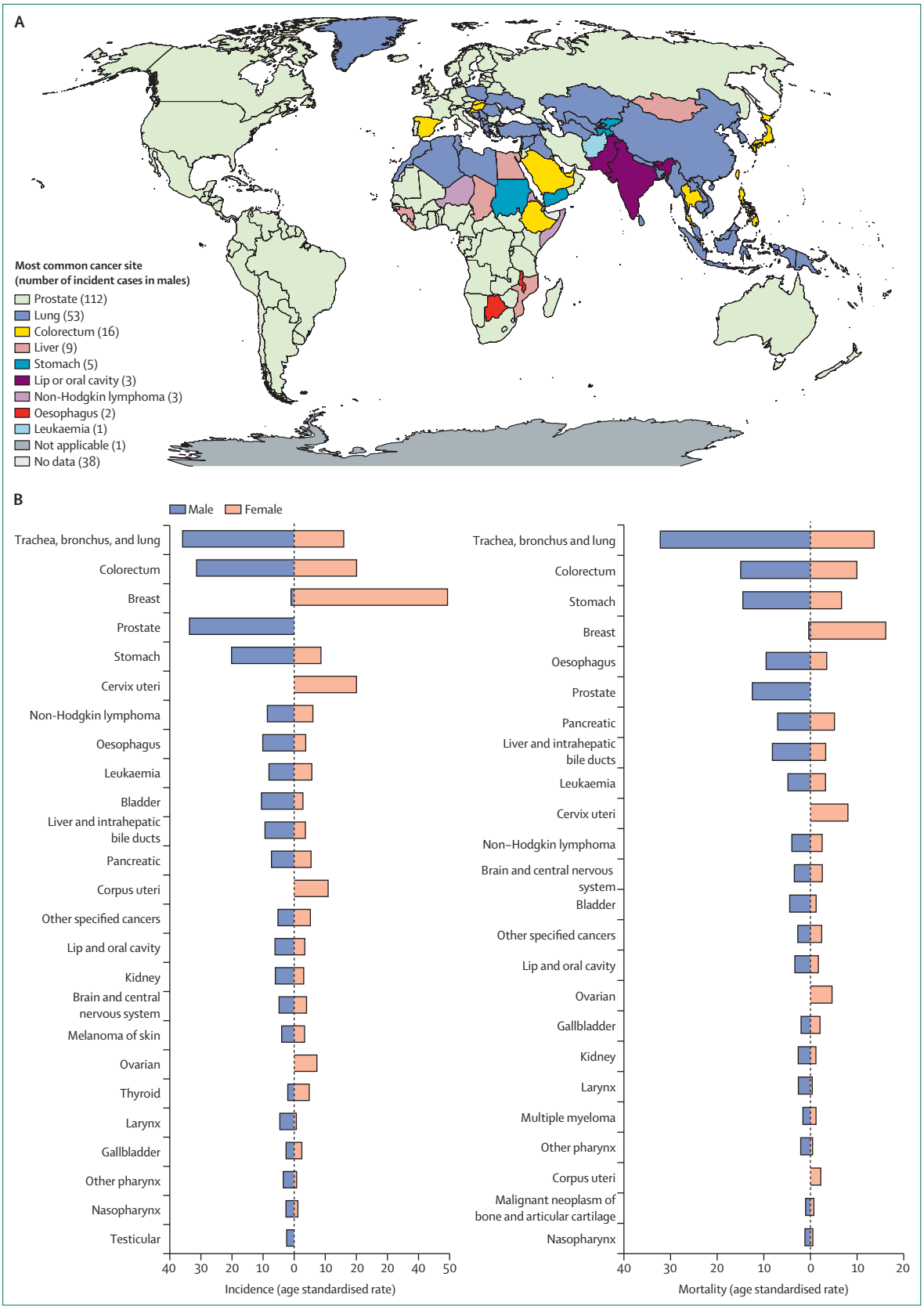
Cardiovascular diseases make the largest contribution to excess mortality and DALYs in males (figure 2). In 2023, there were 10·8 million cardiovascular disease deaths among males (compared with 10·1 million for females), including ischaemic heart disease (5·5 million), ischaemic stroke (1·8 million), and haemorrhagic stroke (2·3 million).[38] Although biological factors contribute to this elevated risk,[55,56] social determinants of health are also important.[1] The exact biological pathways underpinning sex differences are poorly understood and evidence can be contradictory. For example, the relative importance of testosterone in contributing to excess cardiovascular disease in men is debated,[57] especially since it probably plays a small role compared with other major factors (such as tobacco, ultra-processed foods, and alcohol) that are underpinned by commercial determinants.[58–60]

Gender roles, relations, and identities are important and interact with the structural and commercial determinants to shape the substantial differences in health behaviours and outcomes in men and women.[1,56] These differences have varied over time and across the world—for example, sex differences in smoking prevalence have narrowed substantially in the USA, with higher rates in older females than older males in recent years.[61] Similarly, changing patterns of cigarette use have led to a higher prevalence in adolescent girls than boys in HICs, although vaping and e-cigarette use is increasing in both.[62] Smoking patterns vary dramatically by nation.[63] In many HICs, smoking rates are declining in men, although it remains common among those living in marginalising conditions, potentially driven by chronic stressors, as highlighted in our framework in the first paper in this Series.[64] For example, high smoking prevalences are reported for incarcerated men, men experiencing homelessness, men with mental illness, men with substance use disorders, and men with low income.[65,66] Several other cardiovascular disease risk factors were more common in males than females in the GBD 2023 study, including alcohol use, unhealthy diets, and hypertension (appendix pp 17, 25–29). As with smoking, these risks vary considerably between diverse male populations.

Inequalities in cardiovascular disease also exist among men, and might reflect underlying structural inequities experienced by marginalised and minoritised groups. Men in marginalised and minoritised groups might have limited access to health care, which amplifies social disadvantage to negatively affect health,[1] and heightens cardiovascular disease risk factors. For example, there is a higher incidence of (overall and poorly controlled) hypertension among Black Americans in the USA compared with other ethnicities, and cardiovascular disease is more common among South Asian people in the UK compared with those of European ancestry, partly due to higher prevalence of diabetes.[67,68] However, patterns of cardiovascular disease across sex and gender and race and ethnicity are complex. For instance, despite Black women having a higher prevalence of hypertension than Black men in the USA,[68] younger age groups of Black women have a lower incidence of stroke than younger Black men.[69]

Cancer

In 2023, 13·7 million male individuals were diagnosed with cancer, compared with 12·2 million female individuals.[70] Variations in population, structural, and commercial determinants affect cancer patterns (figure 3; appendix pp 11–13).[1] Although prostate cancer is globally the most common male cancer (prevalence is particularly high in men of African descent),[71] lung cancer is the most common in much of Asia, probably reflecting tobacco use,[70] and lip and oral squamous cell carcinoma is the most common in India, Sri Lanka, and Pakistan, probably reflecting tobacco smoking, chewing of smokeless tobacco products (eg, gutka or paan



(Figure 3 continues on next page)

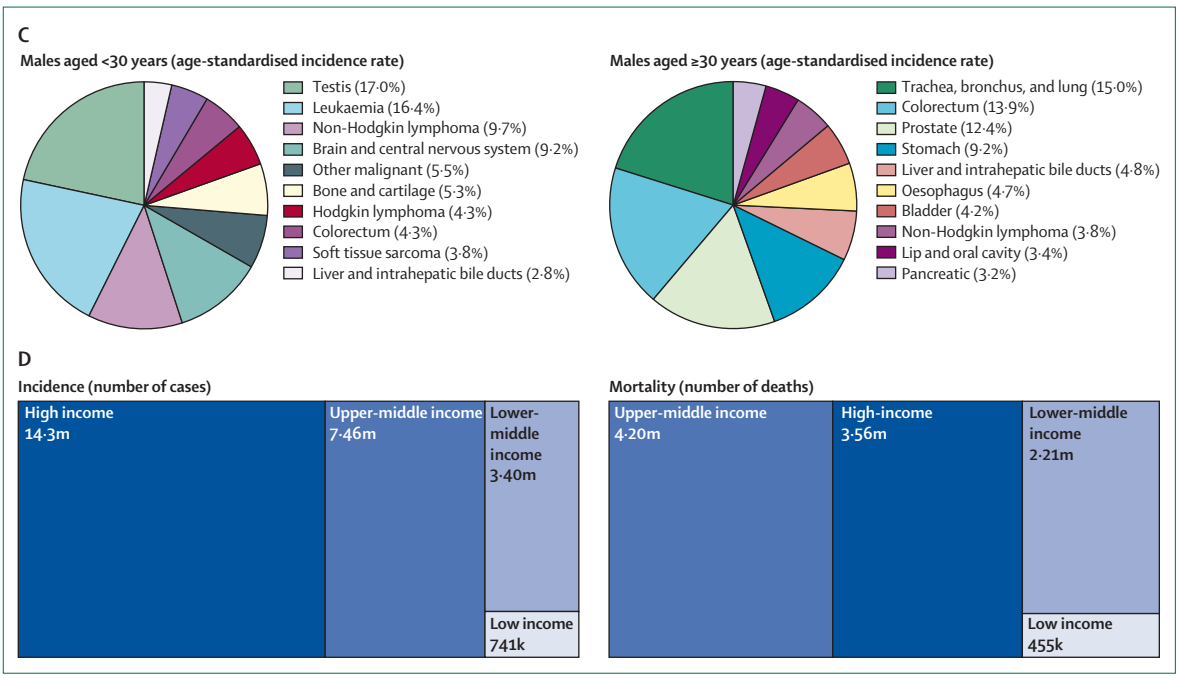


Figure 3: **Patterns of cancer in males in 2023**
(A) Map of the most common cancers in males. (B) Tornado plots showing the most common cancers (incidence and mortality), ranked by age-standardised rates and sorted by global numbers, for males and females. (C) The ten most common cancers (incidence) in males (aged <30 years *vs* ≥30 years). (D) Tree plot of cancer incidence and mortality (numbers of cases), according to the Human Development Index. Data are from the Global Burden of Disease Collaborative Network.

For more on the **Global Burden of Disease Collaborative Network data** see https://vizhub.healthdata.org/gbd-results/

masala), betel-quid chewing, challenges to oral hygiene, alcohol use, and viral infections.[72] The risks of lip and oral squamous cell carcinoma are highest in men within lower castes, reflecting cultural practices shaped by structural drivers. Alcohol and tobacco consumption rates are falling in men across India (12% reduction for both from 2016 to 2021), but their use is falling more slowly in men who are less affluent or within lower castes—tobacco use prevalence changed from 62% to 63% between 2000 and 2012 in the least affluent households versus 44% to 37% in the most affluent households.[73,74] The tobacco industry's use of advertising with high profile personalities and news network coverage to undermine tobacco control legislations helps create these structural drivers.[75,76] In keeping with these trends, men from lower castes also have more lung, stomach, and oesophageal cancers than men from higher castes.[77,78] In sub-Saharan Africa, immunosuppression from HIV infection combined with endemic human herpesvirus 8 make Kaposi Sarcoma common in male individuals.[79] The Asia-Pacific region accounts for 75% of the global deaths from hepatocellular carcinoma, reflecting chronic hepatitis B and C, steatotic liver disease, and alcohol-associated liver diseases.[80] Vaccination programmes are expected to reduce hepatocellular carcinoma incidence.[80] Cancer patterns vary with age (appendix p 31); in men younger than 30 years, testicular cancer, leukaemia, lymphoma, and cancers of the central nervous system account for most cancers (figure 3). In shared anatomical sites, men have a greater incidence of all cancers compared with women, except for thyroid, breast, gallbladder, and anal cancers.[70,81]

Males are also at greater risk of dying from cancer (11·4% lifetime risk) than females (8·0% risk, figure 3; appendix p 30).[70,82] Lung cancer is the leading cause of cancer death among men,[83] and the largest differences in survival for men compared with women are from leukaemia[84] and cancers of the pharynx and upper digestive tract, liver, skin, bladder, and kidney.[85] These findings suggest that there are behavioural (eg, smoking and alcohol consumption), environmental, or biological differences. In central Africa and central America, prostate cancer is the most common cause of cancer mortality, reflecting limited availability of effective treatments, biological risks, and low rates of early detection using Prostate Specific Antigen (PSA) testing.[71] Cancer prognosis is poor in many low-income and middle-income countries (LMICs), reflecting geographical distributions, types of cancers (poor survival rates from lip and oral cancer in South Asia, Kaposi Sarcoma in East Africa, and hepatocellular carcinoma in southeast Asia), and availability of treatments. Regardless of an individual's risk, men often exhibit longer delays than women before seeking help, and there are fewer cancer screening programmes for men.[86–90] The global cancer burden in males is expected to almost double by 2050 (appendix p 32), faster than the rise for females, and the rise is expected to be greatest in LMICs.

There are large inequalities in risks of and outcomes from cancer among men. Men who are marginalised (ie, pushed to the margins of society with limited access to resources, power, and influence) or minoritised (ie, made less powerful because of systemic oppression)[1] tend to fare worse than those who do not face these structural disadvantages. For example, Black American and native Hawaiian men have higher risks of lung cancer than White, Latino, and Asian men,[91] which might partly be due to differential exposure to structural racism,[92,93] cultural differences,[91] and commercial interests, such as targeted advertising (eg, menthol cigarettes targeted to Black Americans).[94] Transgender people and other members of the LGBTQ+ community have specific risks from cancer through smoking, alcohol use, and high-risk sexual activity,[95,96] potentially driven by stress arising from their minoritised status within many societies.[97,98] Engagement with health care can be difficult due to service design, stigma, and discrimination (eg, databases inaccurately recording sex so that transgender men miss their cervical smears) and a lack of medical education.[99–101] Incarcerated males have increased risks of cancer compared with the general male population, and quality of care in prisons is often poor.[26] People in prisons face specific challenges regarding control and choice,[96,102] communication barriers (eg, low health literacy, fear, lack of confidentiality regarding their medical consultations and decisions, and difficulty attending appointments), and restricted autonomy (eg, lack of control regarding treatment choices and adherence).[103] Men experiencing homelessness are at high risk for cancer (particularly respiratory, colorectal and urological) through behaviours, chronic infections, and limited access to affordable housing and health care.[104,105] Mental health issues, addiction, low health literacy, institutional fear, and limited health care access also pose barriers to medical engagement and lead to lower survival rates than matched populations.[96,105]

External causes

In 2023, there were an estimated 3·3 million deaths in male individuals from external causes (eg, trauma, interpersonal violence, road traffic incidents, and suicide), compared with 1·6 million in female individuals.[38] Since these deaths often occur at a young age, they make a large contribution to DALYs. Alcohol and other drugs are often contributory factors for many external death causes, reflecting their role in an individual's power in many societies (for instance, smoking and high alcohol consumption can elevate social status).[106–108] This link highlights the need to address commercial determinants of health, targeted marketing, and harmful consumption. Alcohol is a major driver of accidental deaths, intimate partner violence, and community violence.[109,110] External causes of death are often socially patterned, with characteristics such as socioeconomic position, race and ethnicity, and sexual or gender minority status shaping the distribution of external causes of death.

Interpersonal violence refers to violence between family and intimate partners or community violence.[111] While harms from interpersonal violence are largely experienced by women and children, community violence might result in a larger disease and mortality burden (although under-reporting of violence hampers data collection). For both interpersonal and community violence, men are more likely to be the perpetrators than women. Most victims of community violence are also men (panel 1), and it is likely that gay, bisexual, and transgender men experience a higher prevalence of both physical and sexual violence. Still, more high-quality data are needed to explore this phenomenon in different settings.[112] Competition over scarce resources and breakdown of social relationships and trust within communities can create the conditions for cycles of violence. Familial features (such as larger familial size, stress, and unwanted pregnancies) predict interpersonal violence.[113] Interpersonal violence is the most common cause of death in young men in Latin America and is concentrated in geographical hotspots.[114] Within these hotspots in Brazil, cumulative poverty (OR 1·33 [95% CI 1·20–1·46]) and poverty into early adulthood (1·35 [1·11–1·64]) predict future violence and homicide,[115] although causality is uncertain.[116]

Collective violence, perhaps best exemplified by wars, might increase over the coming years through many factors, including the effects of the climate change emergency.[117] The impacts of war are strongly gendered: men remain more likely to be involved directly in armed conflict, experience higher mortality risks, and have high rates of mental health disorders; in contrast, women and girls often face specific severe consequences of war, such as sexual trauma, and greater indirect impacts of war, such as those arising through infrastructure collapse, forced displacement, and disease outbreaks.[1,54,118,119]

Suicide is a major contributor to the lower life expectancy of males, with an estimated 536 000 deaths worldwide in 2023, compared with around 231 000 in females.[38] The higher male suicide burden contrasts with the higher rates of formally diagnosed mood disorders (largely comprising depression and anxiety) among women. There are specific subgroups of men who experience higher suicide risk: Indigenous men, men experiencing social and material deprivation, men with low education levels, men experiencing a chronic physical or mental illness, men with adverse childhood events, men in contact with the criminal justice system, and older men (panel 3).[120,121] Some drivers of suicide appear more important for men than women. For example, recessions are associated with increased male suicide, even during recessions in more recent years when sex differences in employment have diminished (panel 4).[122] Although suicide attempts are more common in women than men, men tend to use more

Panel 3: Suicide in older men

Suicide prevention strategies combine population-based interventions, which include restricting access to means (such as removing ligatures in institutional settings), and targeted approaches informed by intersectional analyses to focus on people at high risk.[44] Groups at high risk include people who have self-harmed, which affects 16 million persons worldwide. The subsequent 1-year suicide rate after self-harming is at least 20-fold higher than the suicide rate for the general population.[180] Longitudinal studies have reported that 1·6% of people with clinical self-harm diagnoses went on to die from suicide within the next 12 months and 3·9% died within the next 5 years.[181] Self-harm is therefore one of the strongest individual-level risk factors in psychological autopsy studies.[182]

A recent UK study reported that, compared with women, men have a three-fold increased risk of death from suicide after self-harm.[180] This risk is even higher in older men—in men aged 55 years and older, the incidence rate of suicide in 12 months after self-harm was 1873 per 100 000 people, compared with 111 per 100 000 in women aged 15–24 years. On a population level, despite there being many more presentations in younger women, the absolute number of deaths in older men was 40% higher than in these younger women.

Two implications arise. First, underlying causes of suicide deaths in older men need addressing through a public health approach. Reducing access to means in the community should consider factors that are more concentrated in men, including gun ownership, gambling, and alcohol use. There is new evidence that increasing unit pricing for alcohol has reduced deaths in Scotland,[183] which has also been reported in the USA and Switzerland for suicide specifically.[184] Associations between self-harm and suicidal thoughts with gambling are consistent and strong,[185] and recent research using population registers in Norway found a five-fold increased risk of suicide mortality in people with diagnosed gambling disorders.[186] Chronic stressors are important, particularly modifiable ones such as physical health problems and factors relating to employment and relationship stability. Community-based initiatives that foster stronger interpersonal relationships and mitigate loneliness are likely to play a role. In some countries, the effects of drug misuse, chronic unemployment, and weaker social networks are thought to be important in explaining the high suicide rates in older adult men.

A second implication is that risk stratification for suicide risk in vulnerable populations, including older men who self-harm, is an important way to allocate resources for further treatment and management of suicide risk in an evidence-based way, improve the consistency and quality of prognostic assessment in this population, and highlight modifiable risk factors.[187] Guidelines in some countries, including England, recommend that everyone presenting to hospital with self-harm is assessed and treated using the same clinical approach. As there is a 17-fold difference between older men and the most common group presenting to hospital (younger men), this approach potentially overlooks the new evidence that risk stratification is possible and accurate in this population.[188,189] Further, this approach overlooks the contribution that a more personalised assessment has made in other parts of medicine for vulnerable populations, such as cardiovascular risk calculators in people with diabetes,[190] atrial fibrillation,[191] or hypertension.[192] From an ethics perspective, not prioritising according to risk threatens to indirectly discriminate against older men, who already experience inequalities in access to mental health care.[193]

lethal methods. For example, self-injury is around twice as common in men than in women aged 40–59 years in England, whereas self-poisoning is more common in women.[123] More lethal methods are consistent with suicide deaths (60% of suicide deaths in men are from hanging, versus 45% in women). The proportion of deaths from hanging in men has been increasing since 2000.[124] In the USA, where the proportion of suicide deaths in men is higher than in women, 61% of suicide deaths in men were from firearms (compared with 35% in women).[125] Alcohol is strongly associated with increased suicide risk, with associations being broadly similar for men and women;[126] however, since alcohol consumption is more common in men, this reflects a far greater increase in absolute suicide burden. Intimate partner relationship distress and disruption are substantial risk factors for male suicidality and suicide. Contact with the criminal justice system is also a risk factor—the absolute burden of suicide in men in prisons and men with comminity sentences is higher than that of women.[127,128]

Communicable diseases

Communicable diseases do not contribute as much to men's poorer health as other causes of death or disability, but some conditions are noteworthy. The COVID-19 pandemic disproportionately affected males.[129] In 2023, there were an estimated 0·38 million COVID-19 deaths in females and 0·47 million deaths in males.[38] COVID-19 exacerbated existing ethnic and racial health inequalities, with large differences in exposure risk and mortality reported globally.[130] Black and other minoritised men in the USA and the UK tended to have a higher rate of mortality from COVID-19 than White men in each country.[131,132] Although this disease burden is expected to decrease, it will probably contribute to the lower life expectancy of male individuals for some time.

Tuberculosis also disproportionately affects men—there are more cases among males (60% of the total), and men with tuberculosis experience poorer health outcomes than women (65% of tuberculosis-related deaths are in males). These differences might be partly driven by lower levels of

engagement with treatment, remaining infectious for longer, and differing patterns of social contact. There are axes of inequity that magnify each other between gender and social disadvantage; as shown in the first paper in this Series, tuberculosis infection risk is greater in those experiencing material deprivation, overcrowding, or social exclusion.[133]

Patterns for some infectious diseases are more complex. Globally, males experience fewer DALYs from HIV (22 million) than females (23 million),[38] but opposing patterns are seen in Latin America and the Caribbean and in central and eastern Europe, with this burden concentrated among men who have sex with men (MSM). The emergence of mpox also highlights the greater disease burden among MSM,[134] particularly for infectious diseases. This burden is underpinned by processes of stigmatisation that can lead to reduced health care access, poorer quality of care, and ineffective health promotion initiatives.[1,135]

Social and structural determinants of health

Public policies hold huge potential to improve or harm men's health, particularly for the most vulnerable. The experience of the transition from communist to market-based societies following the collapse of the USSR illustrates this. In Russia, political upheaval led to major disruption to employment and rapid changes to men's roles within society, resulting in reduced life expectancy, driven by a large increase in alcohol-related mortality.[136–138] However, government policies played an important role in determining the extent of these changes, with marked variations in health trends across post-Communist countries. Mass privatisation programmes have been linked to higher mortality rates in these countries, and they are also associated with increased unemployment rates.[139] The protective role of belonging to a social organisation was also suggested, with mortality rates not rising when such social connections were common.[137,139]

The adverse health effects of economic recessions more generally are consistently gendered, affecting men's health disproportionately, with rises in rates of common mental disorders, substance-related disorders, and suicide-related mortality.[140] Despite the increasing participation of women in the labour market, the disproportionate effect among men seems to have remained consistent over time (eg, in the 2008 Great Recession) and across the world (although most of the available evidence arise from HICs), potentially reflecting the centrality of employment to masculine identities (panel 4).[141] The effects of unemployment on mental health differ across different groups of men. Although retirement is generally helpful for health, there is a trade-off between reductions in work-related stress and physical demands, and losses of purpose, social networks, and mobility.[142] Consequently, retirement can increase inequalities in health, reflecting financial security, social support (including relationships), and previous health.[19] Rising ages for pension payment in many countries might widen inequalities, with healthy high-earning men continuing to work (and reaping associated health benefits) and low-wage (often manual) workers or those in poor health retiring through disability, registering for unemployment, or having to work with little job security (with detrimental health effects).[143]

Panel 4: Differential effects of unemployment on mental health

We analysed representative longitudinal data from the UK Household Longitudinal Study (UKHLS) to estimate the causal effects of unemployment on poor mental health across intersectional groups. The UKHLS administers surveys to residents of approximately 40 000 households who are interviewed annually, collecting self-reported information on employment status, health, and detailed sociodemographic variables. The analysis focused on working-age people (25–64 years), covering 2009–19, thereby avoiding the potential disruption arising from the COVID-19 pandemic. We followed previously used methods, applying marginal structural models to address time-varying confounding informed by a directed acyclic graph, to estimate the causal effect of becoming unemployed among working-age participants (appendix p 16).[194,195] Poor mental health was assessed using the General Health Questionnaire-12 scale, with the presence of probable anxiety or depression defined by caseness (a score of ≥4 of 12). Doubly robust logistic regression models with inverse probability of treatment weighting estimated the causal effects of unemployment on mental health (expressed as odds ratios and absolute risk differences). We estimated stratified estimates across intersectional groups of interest (gender combined with age, education, and marital status).

We found larger effect sizes of unemployment among men than women, echoing the broader literature, which finds that employment has greater health benefits for men than women (table 2). The effect sizes were larger among partnered men than single men, but there was no effect modification by education or age. This finding potentially reflects the greater social responsibilities perceived by partnered men.

	Odds ratio (95% CI)	Percentage change (95% CI)
All women	2·09 (1·83–2·39)	11·5% (9·1–13·9)
All men	3·17 (2·77–3·62)	17·0% (14·5–19·4)
Stratified results within men		
High education	3·20 (2·54–4·04)	17·3% (13·1–21·5)
Medium education	3·21 (2·60–3·97)	16·7% (13·0–20·5)
Low education	3·19 (2·39–4·26)	16·0% (11·1–20·8)
Younger working age	3·28 (2·61–4·11)	17·6% (13·6–21·6)
Older working age	3·22 (2·71–3·82)	16·8% (13·7–20·0)
Single	2·19 (1·77–2·72)	11·3% (7·7–14·9)
Partnered	3·59 (3·06–4·22)	18·8% (15·8–21·7)

Table 2: **Causal effects of unemployment on poor mental health across intersectional groups**

Chronic stressors

Chronic stressors, such as those from financial strain (including employment, debt, and housing insecurity), relationship challenges, and conflict with societal norms of masculinity intersect with social and structural determinants of health. For example, extremes of employment strain, from overwork and burnout to unemployment, are associated with chronic stress that shape men's power and agency for health behaviours.[4]

With regards to overwork, cohort studies from Finland and South Korea show lower self-reported health, less vitality, and lower general health in men with longer working hours, possibly through an interaction with less sleep.[144,145] Financial insecurity exacerbates many diseases through an effect on health behaviour or the causes of that disease. Longitudinal retrospective cohorts report that financial security (and upward financial mobility) reduces the risk cardiovascular events over 20 years by around 16%, whereas insecurity leads to a 15% increase in risk of a future event; these risks are greater in men than women.[146] Similarly, systematic reviews report that poor social relationships (leading to loneliness and isolation) increase the risk coronary heart disease by 29% and stroke by 32%, regardless of sex.[147] Multiple studies detail that chronic stress also arises through compliance or conflict with societal norms of masculinity.[148–151]

Biological vulnerability

Male biology affects physiology and risk of disease, and changes with age. Testosterone is beneficial to muscle mass production, bone density, red cell production, libido, and mood, which are in turn protective of osteoporosis, diabetes, and depression.[152] However, higher testosterone concentrations are associated with risk taking and poor health behaviours, hypertension, and aggression.[153] Testosterone suppresses part of the immune system, leading to more severe infections (eg, COVID-19 and flu), impaired vaccine response, and slower wound healing.[154] Impaired immunity might explain why men have fewer autoimmune disorders (such as rheumatoid arthritis, relapsing-remitting multiple sclerosis, and systemic lupus erythematosus) than women.[155] With ageing, testosterone concentrations decrease, which affects energy metabolism, fat distribution, bone density, and mood. Anatomically, men have higher visceral fat (which can be inflammatory), more atherogenic lipid profiles, and earlier onset of vascular stiffness than women.[156–158] These differences lead to earlier onset and higher rates of cardiovascular disease in men than women. The XY genotype in men leads to X-linked conditions (eg, haemophilia, Duchenne's muscular dystrophy, and colour blindness) and susceptibility to loss of unique DNA from the Y chromosome. Loss of the Y chromosome is the most common post-zygotic mutation in men and increases with ageing, smoking, pollution, and environmental factors.[159] Loss of the Y chromosome results in pleiotropic, cell-type-specific effects, such as immune-modulation when affecting leukocytes, disturbance of platelet–erythrocyte production in bone marrow (potentially leading to more thromboembolic events), and levels of sex hormone-binding globulin. Disease associations (and higher risks in men) with potential mechanistic consequences of loss of the Y chromosome have been observed for Alzheimer's disease (through microglia cells), azoospermia, cardiovascular diseases (monocytes and macrophages infiltrating cardiac muscle), and immunotherapy responses for advanced cancers through changes in the tumour microenvironment.[82]

Limitations of the evidence

It is worth reflecting on the evidence we have used to inform this review. Due to our reliance on available data, we present predominantly a binary view of gender and have often been reliant on sex-disaggregated data. This approach underplays the complexity of gendered experiences in the real world, and the current data are not sufficient to fully inform an intersectional framework, which would offer a more nuanced picture of the inequalities and inequities in and across women's and men's health.[160] We also focus on measures that affect mortality and life expectancy (which are typically greater in men), rather than morbidity (which is typically higher in women). Although mortality-based measures are more reliably gathered, that potentially reflects the structural prioritisation of men's experiences within many societies—an issue that the analyses presented within this review potentially reinforce. We also acknowledge that there are many valuable ways of defining and measuring health,[161] some of which might relate more to vitality than life expectancy and could favour men.[162] Choices about measurement might lead to different assessments of men's health and different goals for the future. We acknowledge we have not been able to conduct comprehensive searches of the existing evidence base, having searched only two databases (PubMed and Google Scholar), supplemented by citation searching, given the breadth of the material covered within this paper. We might therefore have missed important literature from LMICs, although we did try to purposively seek case studies from these parts of the world to supplement the evidence base. Furthermore, we were unable to explore how the effects of exposures (such as obesity and physical activity) differ between men and women within our analysis.

There are multiple important data gaps that must be acknowledged. For example, when contextualising intersecting health inequalities (eg, sociodemographic characteristics that interact with gender), many datasets, particularly those collected through surveys, are often underpowered for intersectional analyses, and the most comprehensive data are from HICs. Therefore, the generalisability of findings are potentially limited to those settings, and we might be overlooking considerable health inequalities between and across men in LMICs. In accompanying articles,[1,45] we discuss these gaps and identify topics on which more robust data collection is key if we wish to understand men's health, sex and gender health differences, and how sex and gender intersect with other social characteristics.

Conclusion

Despite limitations in global health data, we summarise what is currently known about the epidemiology of men's

health globally, and provide case studies to illustrate specific patterns in-depth. Multiple risk factors and causes contribute to males' shorter life expectancies and greater DALYs compared with female individuals; however, this is only part of the picture. There are huge variations within men, with those experiencing health-harming social, economic, commercial, and political drivers of health bearing the greatest challenges. Solutions to address men's health and the wide-ranging inequalities will come from understanding how different types of masculinity are experienced within specific contexts and how they intersect with other social and structural determinants of health, exploring sex differences and gender diversities, and implementing evidence-based interventions that prevent and delay the main causes of death and ill-health. The goal is to forge a global commitment and explicit strategy to improving men's health. The third paper in this Series builds on this paper to provide recommendations for how this goal can be achieved.[45]

Contributors

JWFC contributed to conceptualisation, literature search, methodology, figures, analysis, writing the original draft, writing (review and editing), and supervision. RMT contributed to literature search, methodology, figures, analysis, writing the original draft, and resources. DMG contributed to conceptualisation, analysis, and writing. WM contributed to analysis, and writing (review and editing). JG contributed to analysis, figures, and writing (review and editing). FM and SFR contributed to analysis and writing (review and editing). SF contributed to analysis, writing the original draft, and writing (review and editing). BRE, MLB, WN, JLO, DP, and SJH contributed to writing (review and editing). LSF contributed to analysis and writing (review and editing). RT contributed to conceptualisation, analysis, and writing (review and editing). ST contributed to conceptualisation, analysis, and writing (review and editing). SVK contributed to conceptualisation, literature search, methodology, figures, analysis, writing the original draft, and supervision.

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