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Global Burden and Temporal Trends of Testicular, Prostate, Kidney, and Bladder Cancers: An Analysis of the Global Burden of Disease Study 2023

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Abstract

Introduction:

Urological cancers remain a substantial global health burden, with marked disparities across socioeconomic settings. This study assessed global trends and inequalities in bladder, kidney, prostate, and testicular cancers and projected mortality to 2040.

Methods

Data on mortality and disability-adjusted life years (DALYs) from 1990 to 2023 were obtained from the Global Burden of Disease Study 2023. Age-standardized mortality rates (ASMRs) and DALY rates (ASDRs) were analyzed by sex, region, and socio-demographic index (SDI). Temporal trends were assessed using estimated annual percentage change and Joinpoint regression. Bayesian age-period-cohort models projected mortality to 2040. Socioeconomic inequalities were evaluated using the slope index of inequality and concentration index.

Results

Globally, ASMRs and ASDRs for all four cancers declined from 1990 to 2023. However, substantial heterogeneity was observed across SDI strata, with increasing mortality for several cancers in low- and middle-SDI regions, particularly kidney and prostate cancers. Males consistently experienced higher mortality and DALY rates than females for bladder and kidney cancers. Absolute ASDR inequalities widened for bladder, kidney, and prostate cancers, whereas relative inequality decreased for kidney and prostate cancers, remained relatively stable for bladder cancer, and approached or crossed the null for testicular cancer. By 2040, mortality is projected to increase for testicular, prostate, and bladder cancers but decline for kidney cancer.

Conclusions

Global progress in urological cancer mortality has been uneven. These findings underscore the need to strengthen prevention, early detection, and access to cancer treatment in lower-SDI settings to address persistent health inequalities.

Introduction

Cancer is a major global public health challenge and a leading cause of death, accounting for approximately 10.55 million deaths in 2023 [1]. Urological cancers—prostate, kidney, bladder, and testicular—remain substantial global health and economic burdens, with marked regional and socioeconomic disparities. Prostate and testicular cancers are male-specific; kidney and bladder cancers affect both sexes, with male predominance. Management remains challenging, especially in metastatic disease, with prostate cancer posing significant therapeutic obstacles [2]. Bladder cancer is more common in men and ranks among the leading causes of cancer incidence and mortality in men worldwide [3]. Kidney cancer is the sixth most commonly diagnosed cancer in men. Testicular cancer is the most prevalent solid malignancy among males aged 15–44 years, accounting for approximately 1–2% of all male neoplasms [4]. Management requires substantial financial

investment and imposes considerable economic burdens on individuals, families, and society [5]. With population aging, urological cancer prevalence is projected to rise, but the burden is heterogeneous across and within regions. A comprehensive appraisal is therefore imperative.

High-income countries have reduced prostate cancer mortality through early detection, notably prostate-specific antigen (PSA) screening, and advanced therapies, whereas low- and middle-income countries face delayed diagnosis, limited screening, and inadequate treatment infrastructure [6–8]. For bladder and kidney cancers, major etiologies include tobacco smoking, occupational chemical exposure, and metabolic syndrome. Given disparities across socio-demographic index (SDI) strata, SDI-disaggregated analyses are essential for region-tailored prevention [9].

The Global Burden of Disease (GBD) studies provide comprehensive data for policy development [10–12]. Based on GBD 2021, prostate cancer age-standardized incidence rates (ASIRs) showed negligible change (estimated annual percentage change [EAPC] = − 0.06), while age-standardized mortality rates (ASMRs) declined (EAPC = − 1.05). North America had the highest incidence but marked mortality reductions; Eastern Europe and sub-Saharan Africa had rising mortality despite lower incidence. Bladder cancer incidence declined globally (EAPC = − 0.35), but increased in Central Europe and Southeast Asia. Kidney cancer ASIRs rose globally (EAPC = 0.72), with Mongolia showing the fastest increase (EAPC = 16.22). Prior research demonstrates substantial geographic heterogeneity [13], yet contemporary evidence remains scarce. GBD 2023 provides updated estimates for 204 countries and territories, including 660 subnational locations, from 1990 to 2023 [14].

We aimed to characterize the global burden and distribution of kidney, bladder, prostate, and testicular cancers from 1990 to 2023 using GBD 2023. We assessed ASMR and age-standardized disability-adjusted life-year rates (ASDRs), their trends across SDI quintiles and regions, projected burden to 2040 using Bayesian age-period-cohort (BAPC) models, and evaluated socioeconomic inequalities. By integrating retrospective analysis, projections, and inequality assessment, this study provides a framework for targeted, equitable cancer control.

Methods

Data sources

We used GBD 2023 data and methods. GBD 2023 estimates 375 diseases and injuries and 88 risk factors across 204 countries and territories, including 660 subnational locations, 1990–2023. We focused on testicular, prostate, kidney, and bladder cancers, examining mortality, disability-adjusted life years (DALYs), ASMR, and ASDR. Countries were classified into five SDI quintiles (high, high-middle, middle, low-middle, low). SDI integrates per capita income, education, and fertility, ranging from 0 to 1 [15]. Data were publicly available; the University of Washington Institutional Review Board exempted informed consent.

Statistical analyses

ASMR and ASDR with 95% uncertainty intervals (UIs) were used for comparability [15].

Temporal trends from 1990 to 2023 were assessed using EAPC. A linear regression was fitted to the natural logarithm of the age-standardized rate (ASR): $\ln(ASR) = \alpha + \beta x + \varepsilon$; $EAPC = 100 \times [\exp(\beta) - 1]$ with 95% confidence intervals (CIs). An increasing trend was significant if EAPC and lower 95% CI were > 0; a decreasing trend was significant if EAPC and upper 95% CI were < 0; otherwise, the trend was stable [16]. Joinpoint regression

identified changes in trends; annual percentage changes (APCs) and 95% CIs were estimated using Joinpoint Regression Program version 6.1.0 [17]. Analyses used R version 4.5.0; tidyverse and RColorBrewer were used for visualization. BAPC models projected ASMRs from 2024 to 2040 using the BAPC package and the integrated nested Laplace approximation package, based on age-specific mortality from 1990 to 2023.

Measurement health inequalities

Following World Health Organization (WHO) recommendations, the slope index of inequality (SII) and concentration index (CIN) were used to assess absolute and relative socioeconomic inequalities, respectively [18]. SII was estimated using weighted regression of ASDR against the socioeconomic rank of SDI, with larger absolute values indicating greater absolute inequality. CIN quantified the relative concentration of ASDR across the socioeconomic distribution on a scale from − 1 to 1; negative values indicated greater mortality concentration in lower-SDI countries, whereas values closer to zero indicated weaker relative inequality [19].

Results

Global trends

Table 1 and **Supplementary Fig. 1** present global mortality and DALY trends. From 1990 to 2023, global ASMR and ASDR for urological cancers declined. Bladder cancer ASMR fell from 3.43 (95% UI: 3.17–3.68) to 2.61 (2.32–2.88), EAPC − 1.01 (95% CI: −1.07 to − 0.94). Kidney cancer ASMR decreased from 2.05 (1.89–2.21) to 1.83 (1.62–2.00), EAPC − 0.36 (− 0.44 to − 0.27); ASDR declined from 54.23 (49.69–58.87) to 45.51 (40.22–50.58), EAPC − 0.57 (− 0.64 to − 0.49). Prostate cancer ASMR dropped from 6.31 (5.68–6.87) to 5.29 (4.65–5.92), EAPC − 0.76 (− 0.82 to − 0.69); ASDR fell from 115.22 (103.52–126.87) to 97.43 (85.97–109.49), EAPC − 0.72 (− 0.79 to − 0.66). Testicular cancer ASMR declined from 0.16 (0.13–0.19) to 0.14 (0.11–0.17), EAPC − 0.56 (− 0.71 to − 0.40); ASDR decreased from 7.54 (6.26–9.22) to 7.12 (5.68–8.86), EAPC − 0.35 (− 0.50 to − 0.20).

Table 1
Global trends in mortality and DALY of urological cancer

Categories	Mortality			DALY		
	ASMR per 100,000 population (95% UI)		EAPC (95% CI)	ASDR per 100,000 population (95% UI)		EAPC (95% CI)
	1990	2023		1990	2023	
Bladder cancer						
Global	3.43(3.17–3.68)	2.61(2.32–2.88)	-1.01(-1.07 - -0.94)	70.66(65.55–76.17)	50.79(46.26–56.39)	-1.23(-1.31 - -1.16)
Low SDI	1.87(1.29–2.65)	2.00(1.39–2.84)	-0.11(-0.28–0.06)	40.71(28.36–57.25)	43.27(30.47–61.14)	-0.14(-0.34–0.05)
Low-middle SDI	1.44(1.08–1.94)	1.41(1.01–1.89)	-0.22(-0.34 - -0.10)	30.54(22.87–41.40)	29.88(21.52–40.13)	-0.22(-0.36 - -0.09)
Middle SDI	2.02(1.72–2.43)	1.79(1.48–2.20)	-0.73(-0.93 - -0.53)	47.68(38.32–57.29)	39.34(32.61–48.35)	-1.00(-1.22 - -0.79)
High-middle SDI	2.48(2.16–2.89)	1.76(1.55–1.99)	-1.31(-1.47 - -1.16)	54.22(47.44–62.32)	36.09(32.45–40.66)	-1.51(-1.68 - -1.35)
High SDI	4.29(4.00–4.54)	3.29(2.99–3.50)	-0.96(-1.01 - -0.91)	88.83(83.87–94.02)	62.87(58.74–66.43)	-1.24(-1.30 - -1.18)
Kidney cancer						
Global	2.05(1.89–2.21)	1.83(1.62–2.00)	-0.36(-0.44 - -0.27)	54.23(49.69–58.87)	45.51(40.22–50.58)	-0.57(-0.64 - -0.49)
Low SDI	0.69(0.45–0.97)	0.86(0.61–1.13)	0.79(0.74–0.83)	21.60(14.19–30.22)	25.92(18.10–34.02)	0.70(0.63–0.77)
Low-middle SDI	0.66(0.49–0.87)	0.83(0.63–1.04)	0.86(0.80–0.91)	19.63(14.41–25.51)	24.02(18.10–30.23)	0.79(0.73–0.86)
Middle SDI	0.71(0.54–0.94)	0.97(0.76–1.19)	1.18(1.09–1.27)	22.64(17.26–28.46)	28.73(22.04–35.35)	0.91(0.83–0.99)
High-middle SDI	1.07(0.90–1.40)	1.20(1.04–1.50)	0.35(0.26–0.44)	32.74(27.58–41.29)	34.09(29.28–42.46)	0.09(0.02–0.17)
High SDI	2.97(2.79–3.15)	2.58(2.34–2.74)	-0.48(-0.60 - -0.37)	79.23(74.15–84.18)	62.14(57.32–65.78)	-0.82(-0.94 - -0.70)
Prostate cancer						
Global	6.31(5.68–6.87)	5.29(4.65–5.92)	-0.76(-0.82 - -0.69)	115.22(103.52–126.87)	97.43(85.97–109.49)	-0.72(-0.79 - -0.66)
Low SDI	6.61(4.46–9.26)	7.79(5.26–11.07)	0.24(0.13–0.35)	120.50(82.17–169.39)	143.66(99.14–204.88)	0.26(0.13–0.38)
Low-middle SDI	3.99(2.85–5.24)	4.69(3.54–6.08)	0.41(0.34–0.48)	72.74(51.46–96.13)	84.81(63.23–109.90)	0.34(0.26–0.42)

Categories	Mortality			DALY		
Middle SDI	3.51(2.68–4.32)	4.39(3.22–5.47)	0.64(0.54–0.74)	63.94(47.92–78.32)	80.60(59.94–101.37)	0.69(0.60–0.77)
High-middle SDI	4.54(3.90–5.44)	3.98(3.43–4.64)	-0.58(-0.74 - -0.43)	79.72(68.20–96.23)	72.08(62.55–84.20)	-0.51(-0.64 - -0.37)
High SDI	7.29(6.83–7.65)	5.54(4.95–5.96)	-1.08(-1.15 - -1.01)	136.00(127.36–144.10)	103.60(93.90–111.64)	-1.05(-1.12 - -0.98)
Testicular cancer						
Global	0.16(0.13–0.19)	0.14(0.11–0.17)	-0.56(-0.71 - -0.40)	7.54(6.26–9.22)	7.12(5.68–8.86)	-0.35(-0.50 - -0.20)
Low SDI	0.13(0.07–0.23)	0.13(0.07–0.20)	-0.48(-0.73 - -0.23)	6.78(3.73–11.97)	6.38(3.69–9.80)	-0.55(-0.81 - -0.28)
Low-middle SDI	0.10(0.06–0.17)	0.12(0.08–0.18)	0.41(0.30–0.51)	5.01(3.11–8.01)	5.96(3.71–8.76)	0.49(0.38–0.60)
Middle SDI	0.10(0.07–0.13)	0.12(0.08–0.17)	0.74(0.67–0.81)	4.25(3.11–6.03)	5.76(3.79–7.91)	0.93(0.87–0.99)
High-middle SDI	0.15(0.12–0.18)	0.17(0.14–0.20)	0.07(-0.16–0.29)	6.50(5.30–7.79)	8.71(7.41–10.27)	0.61(0.38–0.85)
High SDI	0.20(0.18–0.22)	0.14(0.13–0.15)	-1.21(-1.35 - -1.06)	9.76(8.63–10.76)	7.63(6.83–8.63)	-0.94(-1.08 - -0.79)

By SDI, trends diverged. Bladder cancer mortality decreased in all SDI strata except low SDI, with the steepest decline in high-middle SDI (EAPC − 1.51, 95% CI − 1.68 to − 1.35). Kidney cancer mortality rose in low through high-middle SDI—most steeply in middle SDI (EAPC 0.91, 0.83–0.99)—but fell in high SDI. Prostate cancer increased in low, low-middle, and middle SDI, but declined in high-middle and high SDI, with the largest reduction in high SDI (EAPC − 1.05, − 1.12 to − 0.98). Testicular cancer increased in low-middle and middle SDI but decreased in low and high SDI. These patterns highlight heterogeneous burden and the need for region-tailored policies.

Testicular cancer

Supplementary Fig. 2 shows the global distribution of ASMR and ASDR. In 1990, Monaco had the highest ASMR and ASDR; by 2023, Mexico ranked highest for both. High SDI showed persistent declines, whereas middle SDI rose consistently; other strata initially declined then rebounded.

Prostate cancer

Supplementary Fig. 3 depicts the geographical distribution. Dominica had the highest ASDR and ASMR in both 1990 and 2023. Globally, both metrics declined. High SDI showed similar declines, whereas low SDI showed a marked upward shift after 2019.

Kidney cancer

Supplementary Fig. 4 presents the global mapping. Czechia had the highest ASDR and ASMR in 1990; by 2023, Uruguay led both. Globally, both declined, as in high SDI. Other SDI strata were relatively stable with marginal increases.

Bladder cancer

Supplementary Fig. 5 illustrates the distribution. In 1990, Egypt had the highest ASDR and San Marino the highest ASMR; by 2023, Iraq led both. Globally, both declined, especially in high and high-middle SDI; other strata were relatively flat.

Joinpoint regression for sex groups analysis

Supplementary Fig. 6 presents Joinpoint regression by cancer and sex. Bladder cancer showed the largest numerical decline in 2017–2020 (APC − 1.57), but the 95% CI (− 3.64 to 0.5) included zero. Prostate cancer declined substantially during 2002–2014: APC − 1.20 (− 1.30 to − 1.10) for ASMR and − 1.13 (− 1.21 to − 1.05) for ASDR. Sex-stratified analyses for bladder and kidney cancers showed males consistently had a higher burden. Declines occurred in both sexes, with the largest reduction in female bladder cancer ASDR during 1990–2005 (APC − 2.34, − 2.58 to − 2.10).

Disease burden prediction

Figure 1 presents BAPC projections. Despite past declines, testicular cancer ASMR is expected to rise to approximately 0.315 (95% UI 0.232–0.398) globally by 2040, and prostate cancer to 10.827 (8.575–13.079). Bladder cancer ASMR is projected to increase to 4.012 (3.048–4.976) in males and 1.294 (0.922–1.667) in females by 2040. Kidney cancer ASMR is expected to continue decreasing, reaching 2.086 (1.289–2.883) in males and 0.960 (0.607–1.312) in females by 2040. Thus, previous downward trends may reverse for testicular, prostate, and bladder cancers.

Inequality analysis

Figure 2 shows SII results. For all four cancers, SII remained positive in 1990 and 2023, indicating higher ASMR in higher SDI countries. Testicular cancer SII declined from 5.804 (95% CI 3.303–8.305) to 4.006 (1.915–6.098), but overlapping confidence intervals indicated no significant narrowing. Bladder cancer SII increased from 73.568 (57.765–89.370) to 119.653 (102.083–137.222); kidney cancer from 65.295 (53.341–77.249) to 111.953 (96.593–127.314); prostate cancer from 159.929 (123.314–196.545) to 260.870 (214.618–307.121). Thus, absolute inequality widened significantly for bladder, kidney, and prostate cancers. Figure 3 shows CIN results. CIN point estimates remained negative for all four cancers, indicating concentration of ASDR in lower-SDI countries. In 2023, testicular cancer CIN was − 0.065 (95% CI − 0.193 to 0.056), crossing zero. Bladder CIN was stable at − 0.366 (− 0.466 to − 0.234) in 1990 and − 0.374 (− 0.426 to − 0.280) in 2023. Kidney CIN attenuated from − 0.437 (− 0.499 to − 0.324) to − 0.389 (− 0.438 to − 0.280). Prostate CIN improved from − 0.423 (− 0.489 to − 0.284) to − 0.282 (− 0.368 to − 0.162). Overall, absolute disparities widened for bladder, kidney, and prostate; relative inequality decreased for kidney and prostate, remained stable for bladder, and numerically attenuated for testicular cancer.

Discussion

This study estimated the global urological cancer burden from 1990 to 2023. Globally, burden declined, potentially reflecting advances in diagnosis and treatment and control of modifiable risk factors [20]. However, the overall decline conceals heterogeneity. In low and middle SDI regions, several cancers increased. For example, kidney cancer ASMR in low SDI had a positive EAPC of 0.79 (95% CI 0.74–0.83).

Testicular cancer in middle SDI had the largest EAPC in incidence (0.74, 0.67–0.81). Although highly curable, global incidence increased from 1990 to 2021 [21]. This may reflect demographic shifts, improved healthcare delivery, and etiological risk factors. Platinum-based chemotherapy has made global mortality EAPC negative. Mao et al. documented rising incidence with declining mortality across 22 European countries, suggesting early detection, cisplatin-based regimens, and specialized care improved survival [21]. However, our findings indicate mortality reductions were largely restricted to high SDI, while middle and low SDI had rising mortality, implying access disparities.

Prostate cancer shows a similar imbalance. Global incidence has risen [12, 22], while ASMR and ASDR declined, partly due to PSA screening. In high SDI, declining mortality likely reflects early detection, risk stratification, and definitive therapies. In lower SDI, later-stage diagnosis and limited specialized care constrain survival [23]. Variations in PSA testing contribute to divergent incidence trends [24]. European guidelines advocate risk-adapted pathways with PSA, magnetic resonance imaging-based triage, and selective biopsy; active surveillance is recommended for low-risk tumors to reduce overtreatment [25]. Thus, higher incidence in developed settings may not indicate greater underlying burden.

For bladder cancer, non-muscle-invasive and muscle-invasive diseases differ in prognosis and treatment [26]. Population disparities are shaped by tobacco exposure, occupational carcinogens, prompt hematuria evaluation, access to cystoscopy and pathology, accurate staging, and intravesical and curative therapies [27]. In high and high-middle SDI, endoscopic resection has reduced mortality [28], consistent with declining ASMR and ASDR. Other SDI quintiles had stable trends, likely reflecting barriers: delayed hematuria work-up and cystoscopy [29]; insufficient intravesical bacillus Calmette–Guérin and surgical infrastructure [30]; and suboptimal quality of care predisposing to undertreatment, especially in older patients. These obstacles offset benefits from declining smoking.

Kidney cancer SDI-stratified trends largely paralleled bladder cancer, except in high-middle SDI, where bladder cancer declined significantly but kidney cancer showed no substantive change. Guidelines do not recommend population-based renal cell carcinoma screening because evidence does not support a favorable benefit-to-harm ratio; detected cases are often incidental and may include indolent tumors [29]. Concurrent mortality decline suggests improved management may offset overdiagnosis harms. In lower SDI settings, limited diagnostic and therapeutic infrastructure may translate rising incidence into higher mortality and DALY burden, reinforcing inequities [29].

Bladder and kidney cancers show sex-specific patterns. Despite declining ASMR and ASDR in both sexes, males persistently have higher rates, largely due to differential risk exposure. Lifestyle factors—tobacco, alcohol, obesity—are significant, with male susceptibility exacerbated by cumulative exposure [31]. Male-dominated occupational settings involve industrial carcinogens implicated in urological cancers [32]. Although males have a threefold higher bladder cancer incidence, females often present with advanced-stage disease [33]. Sex steroid hormones and receptors may modulate oncogenesis and progression [34]. Sexual dimorphisms exist in immune function and responsiveness [35], females have enriched immunological microenvironments, including antiviral T

cells, underlying distinct innate and adaptive responses [36]. Thus, sex-specific prevention and treatment are needed.

BAPC results underscore the need to intensify control. From 1990 to 2023, absolute A disparities widened for bladder, kidney, and prostate cancers, while relative inequality improved for kidney and prostate, persisted for bladder, and nearly disappeared for testicular cancer. Tobacco smoking remains the predominant risk factor, accounting for about half of bladder cancer cases; smoking prevalence declined faster in high-income countries but stagnated or rose in many low- and middle-income settings [37]. Improved relative inequality for kidney cancer, alongside a widening absolute gap, reflects faster mortality reductions in middle SDI countries [38], whereas absolute disparity persists due to high-SDI burden. For prostate cancer, incidence is three times lower in low-income than high-income countries, but mortality is 1.3 times higher, yielding a five-fold higher mortality-to-incidence ratio in low-income settings [39]. ASMR decline in high-income countries stems from PSA screening, effective therapies, and better access. In low-income settings, high ASMR persists despite lower incidence due to insufficient screening, delayed diagnosis, and limited availability [40]. Future policies must accelerate mortality reductions in lower-SDI regions while preventing therapeutic advances from exacerbating survival gaps.

This study is subject to several limitations. Country-level estimates may obscure within-country heterogeneity. GBD 2023 lacks data on tumor stage, grade, molecular biomarkers, screening, treatment, or healthcare utilization, precluding stage- and grade-specific comparisons. Age-standardized rates limit examination of age-specific patterns. Restricted urological disease definitions may underestimate burden. Projections depend on BAPC assumptions and historical patterns and may not capture future changes. Sparse data in low- and middle-income countries and diagnostic biases may compromise precision and generalizability.

Conclusion

Based on GBD 2023, global ASMR and ASDR for bladder, kidney, prostate, and testicular cancers declined overall from 1990 to 2023, but progress was uneven. Declines concentrated in high and high-middle SDI regions, while several low and middle SDI regions experienced rising mortality, particularly for kidney and prostate cancers. Absolute ASDR inequalities widened for bladder, kidney, and prostate cancers, and projections suggest mortality for testicular, prostate, and bladder cancers may increase by 2040. Targeted strategies are needed to strengthen early detection and treatment access in lower-SDI regions while preventing overdiagnosis in high-SDI settings, ensuring more equitable future gains.

Declarations

Conflict of interest statement:

The authors declare that they have no competing interests.

Ethics, Consent to Participate, and Consent to Publish declarations

not applicable.

Authors' contributions:

Conceptualization: Jincong Li, Yang Liu; Methodology: Jincong Li; Formal analysis and investigation: Jincong Li, Yang Liu; Writing - original draft preparation: Jincong Li; Writing - review and editing: Jincong Li; Resources: Shudong Zhang; Supervision: Shudong Zhang

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Competing interests: The authors declare that they have no competing interests.

Data Availability

The data supporting the findings of this study are publicly available from the Global Burden of Disease (GBD) Study 2023 through the Institute for Health Metrics and Evaluation (IHME) Global Health Data Exchange (GHDx) and GBD Results Tool. The datasets used in this study can be accessed at https://ghdx.healthdata.org/ and https://vizhub.healthdata.org/gbd-results/. All data analyzed in this study were obtained from these publicly available sources.

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Figures

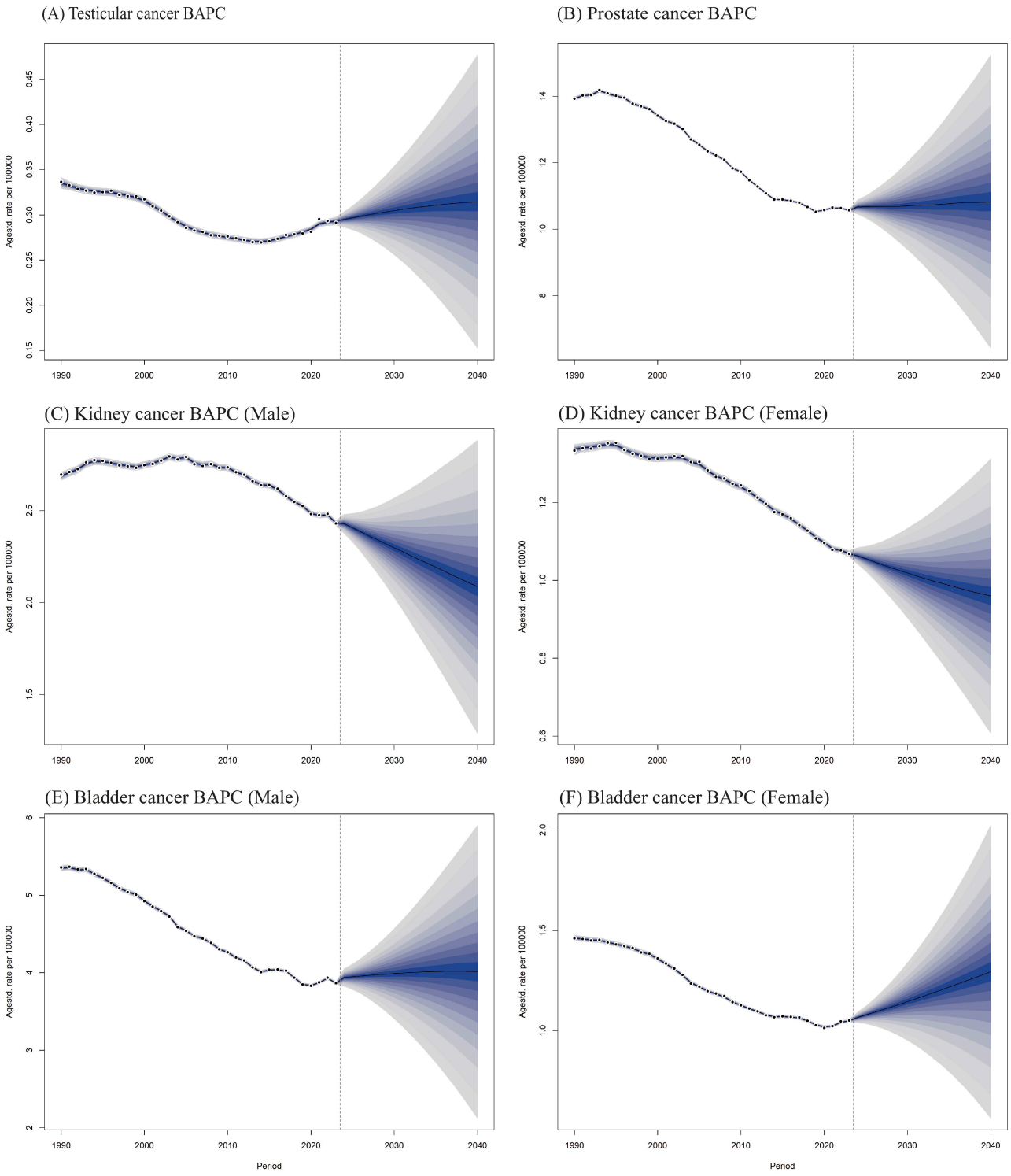


Figure 1

Predicted trends using BAPC models in ASMR from 2024 to 2040. (A) Testicular cancer BAPC results (B) Prostate cancer BAPC results (C) Kidney cancer BAPC results of male (D)Kidney cancer BAPC results of female (E) Bladder cancer BAPC results of male (F) Bladder cancer BAPC results of female

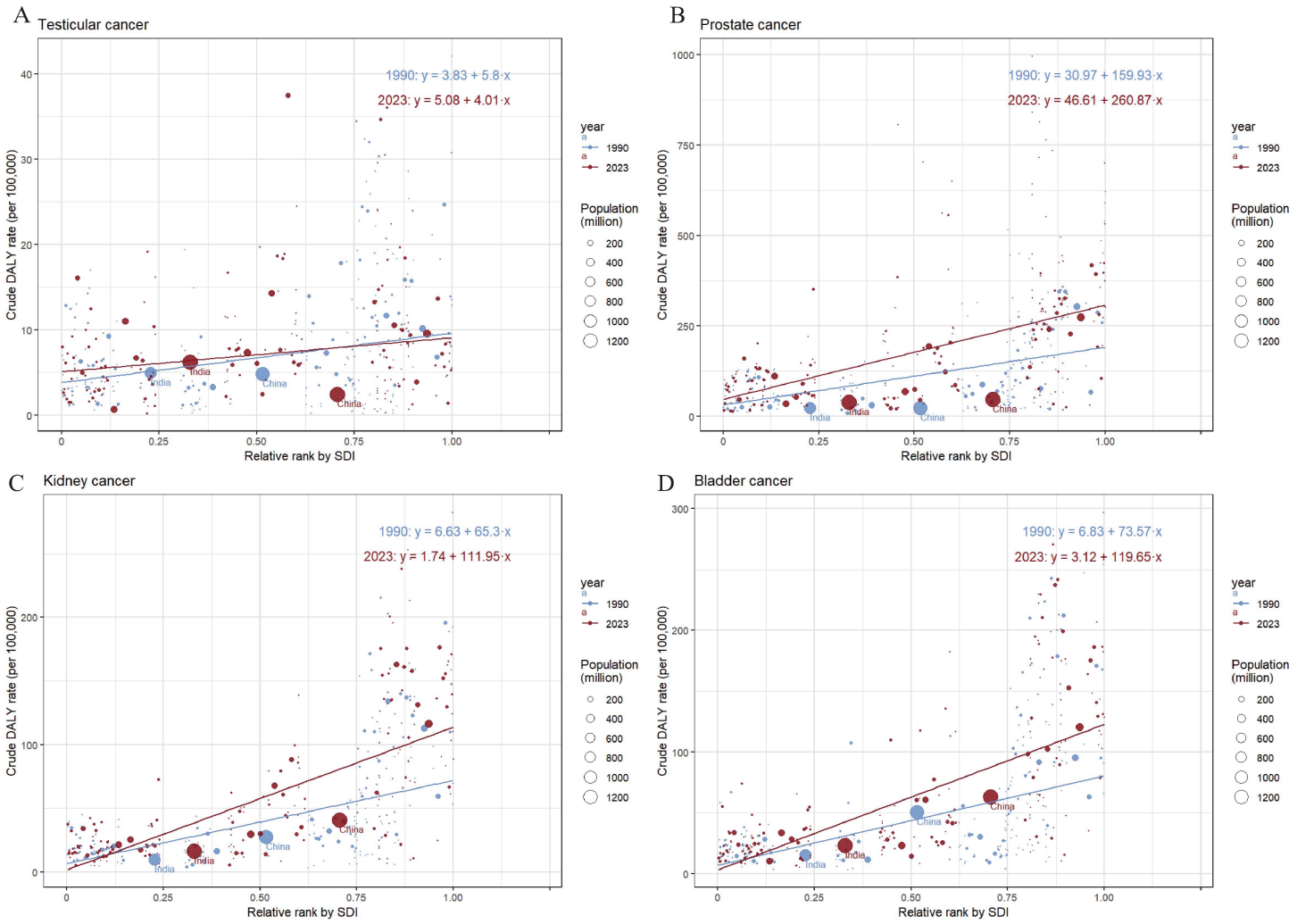


Figure 2

Health inequality regression curves of urological cancers from 1990 to 2023. (A) Testicular cancer (B) Prostate cancer (C) Kidney cancer (D) Bladder cancer

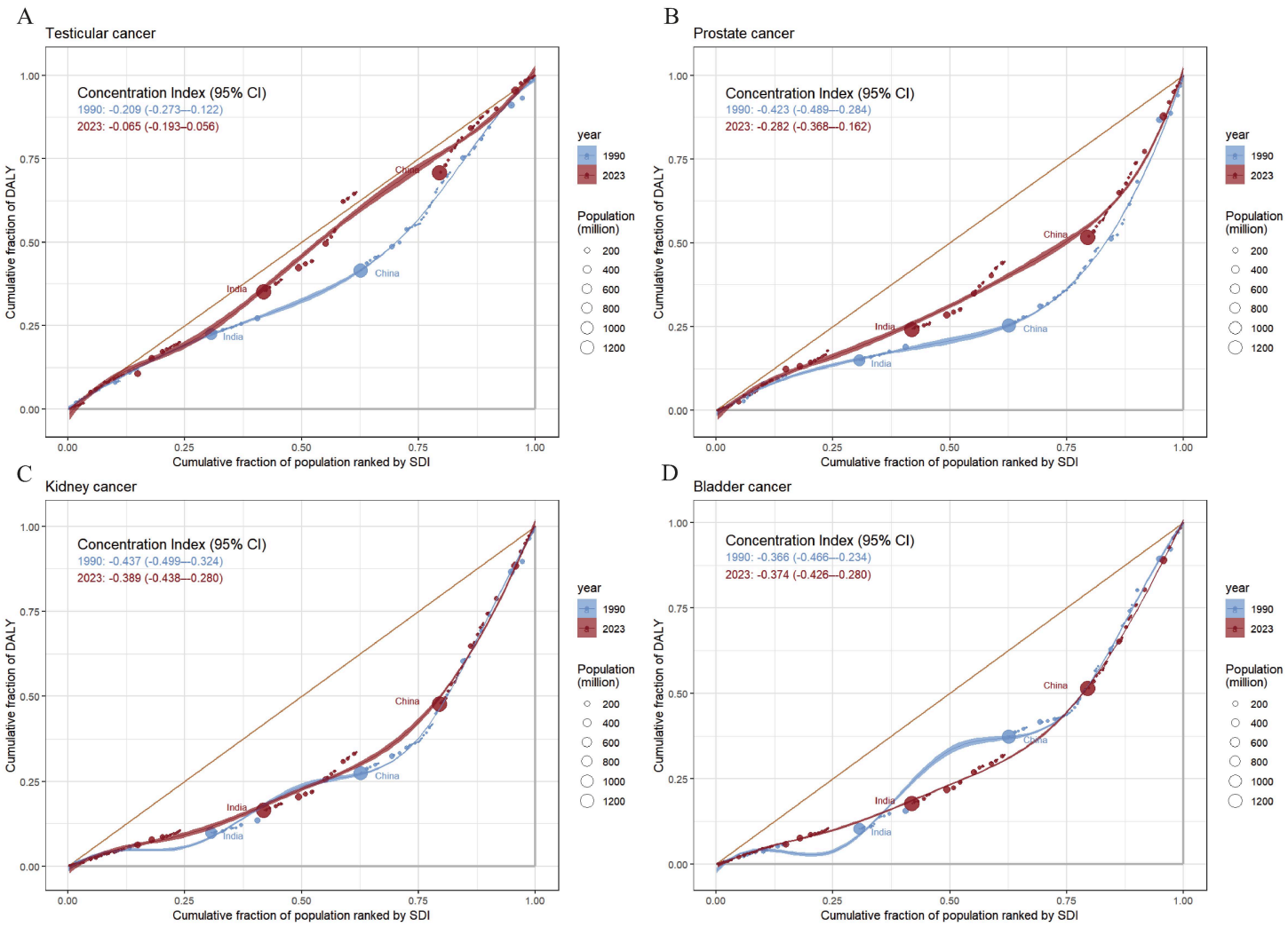


Figure 3

Concentration curves of urological cancers from 1990 to 2023. (A) Testicular cancer (B) Prostate cancer (C) Kidney cancer (D) Bladder cancer

Supplementary Files

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