Burden of six major types of digestive system cancers globally and in China

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Abstract

Background: Digestive system cancers constitute a significant number of cancer cases, but their burden is not uniform. As Global Cancer Observatory (GLOBOCAN) 2022 has recently updated its estimates of cancer burden, we aimed to investigate the burden of six major digestive system cancers both worldwide and in China, along with geographical and temporal variations in cancer-specific incidence and mortality.

Methods: We extracted data on primary cancers of the esophagus, stomach, colorectum, liver, pancreas, and gallbladder from the GLOBOCAN database for 2022. Age-standardized incidence and mortality rates were calculated and stratified by sex, country, region, and human development index (HDI). We used the 2022 revision of the World Population Prospects (United Nations) to obtain demographic data for various age groups in China from 1988 to 2012 and used the joinpoint model and the average annual percentage change (AAPC) to analyze cancer incidence trends in China.

Results: In 2022, the estimated global incidence of digestive system cancers reached 4,905,882, with an estimated 3,324,774 cancer-related deaths. Colorectal cancer was most prevalent in terms of incidence and mortality. There was a significant correlation between the burden of gastrointestinal cancers and country HDI. From 1988 to 2012, the incidence of esophageal, gastric, and liver cancers declined in China, whereas colorectal and pancreatic cancer incidences continued to increase. By 2050, colorectal and liver cancers are projected to remain the leading cancer types in China in terms of incidence and mortality, respectively.

Conclusions: Digestive system cancers remain a significant public health challenge globally and in China. Although progress has been made in the prevention and control of some cancers, the burden of digestive system cancers persists. The implementation of tertiary prevention strategies must be intensified to reduce the incidence and mortality of digestive system cancers, mitigating their impact on public health.

Keywords: Digestive system cancer; Incidence; Mortality; GLOBOCAN 2022; China; Global; Esophagus cancer; Stomach cancer; Colorectal cancer

Introduction

The epidemiology of cancer varies across different regions of the world, but digestive system cancers continue to pose a significant challenge to public health systems in most areas, and are a major contributor to the burden of cancer.[1] The main types of digestive system cancers include esophageal, gastric, liver, gallbladder, pancreatic, and colorectal cancers. For both sexes, colorectal cancer was the third most common cancer and the second leading cause of cancer-related deaths worldwide in 2022, with an estimated 20 million new cases and 9.7 million deaths.[2] Gastric and liver cancers, including intrahepatic bile duct cancer, ranked as the fifth and sixth leading causes of new cancer cases, respectively, and the fifth and third leading causes of cancer-related deaths.

Due to variations in lifestyle habits, environmental exposure, and disparities in healthcare systems across different regions, there are notable differences in cancer prevalence. The human development index (HDI), developed by the UN Development Program, is a composite statistic used to assess human progress and the overall well-being of countries.[3] It measures three key dimensions of human

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development: health, education, and income. Countries with different HDIs exhibit distinct profiles for common cancer types; nations in transition often experience a higher prevalence of infection-related cancers and a growing burden of cancers associated with Western lifestyles.[4]

Cancer is a leading cause of death in China. Among gastrointestinal malignancies, colorectal, liver, and gastric cancers rank second, fourth, and fifth in incidence, while liver, gastric, colorectal, and esophageal cancers rank second, third, fourth, and fifth in mortality.[5] Compared to 2016, except for liver and gallbladder cancers, incidences of the other four major gastrointestinal cancers have increased. In 2022, the age-standardized incidence rate (ASIR) for colorectal ($20.10/10^5$) and pancreatic cancers ($4.44/10^5$) in the world standard population (Segi's *et al*[6] population) was higher than that in 2016 ($18.05/10^5$ for colorectal cancer and $4.36/10^5$ for pancreatic cancer).[5,7] Given China's large population, even slight changes in cancer incidence and mortality rates can lead to significant shifts in the national economic burden.[4] The Chinese government has implemented various measures to reduce the incidence and mortality rates of cancer; understanding trends in these rates for major cancers can help the country in making targeted changes to healthcare policies.

We utilized recently released data from Global Cancer Observatory (GLOBOCAN) 2022 to investigate the disease burden of six major digestive system cancers across different continents. We also assessed cancer epidemiology in areas with varying HDI levels. Focusing on China, we explored the incidence and mortality rates of the six digestive system cancers and sex-specific trends from 1988 to 2012 using a joinpoint regression analysis. Additionally, future trends in the estimated number of new gastrointestinal cancer-related cases and deaths in China from 2022 to 2050 were determined.

Methods

Study design

The current GLOBOCAN database provides estimates of cancer incidence and mortality by country, cancer site, and sex for 2022, and is available at the Global Cancer Observatory (https://gco.iarc.fr/today/home).[8] This database was utilized to perform a descriptive secondary analysis of the burden of six digestive system cancers (esophageal, gastric, liver, gallbladder, pancreatic, and colorectal cancers). To evaluate future cancer incidence and mortality in China, we obtained data from CANCER TOMORROW (https://gco.iarc.fr/tomorrow/en) up until 2050. Additionally, we obtained the 2022 revision of the World Population Prospects released by the United Nations.[9]

Technical information and participants

We extracted the number of new cases and deaths for the six digestive system cancers globally, across six continents as well as for individual countries, using codes from the International Classification of Diseases 10th Revision (ICD-10): esophagus (C15), stomach (C16), liver (C22, including intrahepatic bile ducts), gallbladder (C23), pancreas (C25), and colorectum (C18–21). Additionally, we categorized regions based on HDI levels (the cutoff points are <0.550, 0.550–0.699, 0.700–0.799, and ≥0.800 for low HDI, medium HDI, high HDI, and very high HDI, respectively)[10] and retrieved estimates of the ASIR and age-standardized mortality rate (ASMR) for these cancers.

Cancer data from GLOBOCAN 2022 and population estimates from the United Nations were utilized to estimate cancer profiles in China from 1988 to 2012. This period was chosen because the GLOBOCAN 2022 database provides continuous data on incidence and mortality rates in China only for these years. We extracted the number of new cases and deaths from the GLOBOCAN 2022 database separated by sex and by age, with age groups defined as under 50 years and 50 years and above. Segi's world standard population was used for the age standardization of rates in the joinpoint regression analysis.[6,11]

Statistics

The estimated numbers of new cases and deaths, as well as the ASIR and ASMR of the six digestive system cancers, were described across 27 countries and regions within the 6 continents. The cancer burden in these regions was ranked based on the ASIRs and ASMRs. We then categorized world regions and countries into quartiles based on HDI and described the ASIR and ASMR of regions with different HDI levels.

For digestive system cancers in China, we utilized joinpoint regression to analyze the incidence and mortality trends stratified by gender or age.[12] To assess the magnitude and direction of trends from 1988 to 2012, we derived the average annual percentage change (AAPC) and the corresponding 95% confidence interval (CI). In the joinpoint regression stratified by gender, we segmented age data into groups every 10 years. The AAPC provides a geometrically weighted average of the annual percentage changes derived from joinpoint trend analysis, with weights assigned based on the length of each segment during the specified time interval. Joinpoint regression was performed using the Joinpoint Regression Program 5.1.0 (National Cancer Institute, USA). We used the projected data on cancer incidence and mortality from GLOBOCAN 2022, spanning 2022–2050, to assess the future burden of cancer.

Results

Global incidence distribution

In 2022, the estimated global incidence of digestive system cancers reached 4,905,882, constituting 24.6% of all new cancer cases worldwide [Table 1]. Colorectal cancer has a significantly higher incidence than other digestive system cancers, with an estimated 1,926,425 new cases and an ASIR of 18.4/100,000, ranking fourth among all newly diagnosed cancers globally. Following colorectal cancer, gastric cancer had the second highest incidence rate

Table 1: Estimated incidence of digestive system cancers for six continents in 2022.

	Cancer types							
Continents	**Esophagus**	**Colorectum**	**Pancreas**	**Stomach**	**Liver**	**Gallbladder**	**All**	**Rank**
Worldwide	511,054	1,926,425	510,992	968,784	866,136	122,491	4,905,882	–
Asia	382,892	966,399	232,537	691,791	607,361	88,112	2,969,092	–
China	224,012	517,106	118,672	358,672	367,657	31,132	1,617,251	1
Japan	19,926	145,756	47,627	126,724	41,388	10,814	392,235	2
India	70,637	70,038	13,661	64,611	38,703	21,780	279,430	4
Republic of Korea	2437	29,560	8891	29,267	14,791	3264	88,210	10
Indonesia	1382	35,676	5734	3852	23,805	627	71,076	12
Viet Nam	3686	16,835	1251	16,277	24,502	293	62,844	13
Thailand	3333	20,173	3314	4089	27,936	1823	60,668	14
Turkey	1339	21,718	8636	12,773	5039	792	50,297	15
Europe	53,513	538,262	146,477	135,610	88,871	12,670	975,403	–
Russian Federation	9345	83,693	21,842	38,883	11,748	2137	167,648	5
Germany	7310	62,544	21,869	14,088	9959	1661	117,431	7
Italy	2479	54,784	15,710	13,501	11,886	1171	99,531	8
France	4942	51,636	15,895	7673	12,172	636	92,954	9
UK	9601	49,429	11,351	6034	8223	1343	85,981	11
North America	21,888	183,973	67,089	29,675	48,485	5229	356,339	–
United States of America	18,747	160,186	60,127	25,554	43,492	4719	312,825	3
Canada	3136	23,725	6939	4113	4974	510	43,397	16
Latin America and the Caribbean	20,366	145,120	41,032	74,379	42,769	10,434	334,100	–
Brazil	10,985	60,118	14,670	23,021	13,599	2249	124,642	6
Mexico	1433	16,082	5822	9516	8603	1292	42,748	18
Argentina	2142	15,863	5554	4460	2504	810	26,873	19
Colombia	1019	11,163	2812	8938	2591	669	27,192	21
Peru	370	4943	1807	6380	2068	1100	16,668	23
Africa	29,965	70,428	18,993	33,352	73,844	5512	232,094	–
Egypt	1543	5940	3349	3285	27,946	787	36,910	17
South Africa	3312	7338	2779	1919	2650	359	18,357	22
Nigeria	567	8114	1344	1857	4382	245	16,509	24
Ethiopia	1494	6551	944	2394	2798	413	14,594	25
Morocco	433	5306	1229	2355	1112	530	10,965	26
Oceania	2430	22,243	4864	3977	4806	534	38,854	–
Australia	1755	17,088	3988	2837	3333	370	29,371	20
New Zealand	396	4070	661	497	382	73	6079	27

–: Not available.

(9.2/100,000). Subsequent gastrointestinal cancer prevalence, in descending order, included liver (8.6/100,000), esophageal (5.0/100,000), pancreatic (4.7/100,000), and gallbladder cancers (1.2/100,000).

Within the domain of gastrointestinal malignancies, Asia has emerged as the predominant contributor, accounting for 60.5% of new global gastrointestinal cancer cases. Subsequent continental distributions delineated Europe, North America, Latin America, and Africa contributing to 19.9%, 7.3%, 6.8%, and 4.7%, respectively; Oceania had the lowest incidence, with 38,854 new cases. Colorectal cancer has emerged as the most prevalent digestive system neoplasm in Asia, Europe, North America, Latin America, and Oceania; in contrast, Africa exhibits a distinct epidemiological profile, with liver cancer being the most common. Gallbladder cancer consistently had the lowest incidence rates across all six continents.

When examining specific countries, the burden of gastrointestinal tumors in China was particularly severe. In 2022, the estimated number of new cases reached 1,617,251, significantly surpassing that in other nations. In contrast, New Zealand demonstrated effective control of gastrointestinal cancer burden, with the incidence of nearly all digestive system cancers (excluding colorectal cancer) remaining below 1000 cases for each type.

A robust socioeconomic correlation was evident between the incidence of digestive system cancers and mean national HDI values [Figure 1]. Colorectal and pancreatic cancers were significantly associated with HDI. As the HDI increased, incidence rates increased, with rates in high-HDI countries being nearly five times higher than those in low-HDI countries. In countries with very high HDI, the ASIR of pancreatic cancer was 7.9/100,000 person-years, while in countries with low HDI, it was only

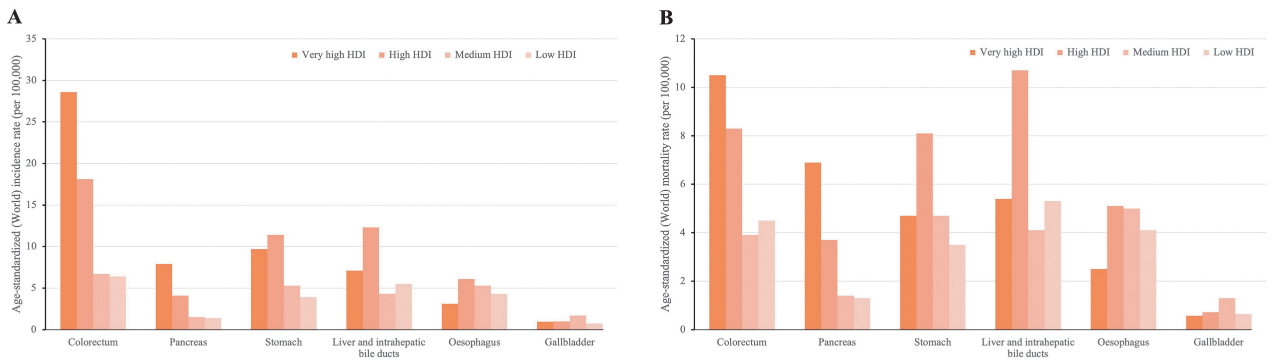

Figure 1: Estimated incidence (A) and mortality (B) of digestive system cancers globally in 2022 according to human develop index. HDI: human development index.

1.4/100,000; in contrast, the incidence rates of gastric and liver cancer in very high-HDI countries were slightly lower than those in high-HDI countries but remained higher than those in medium- and low-HDI countries. The incidence rate of esophageal cancer was lowest in very high-HDI countries, and was even lower than that in low-HDI countries, despite decreasing from high- to low-HDI countries. The incidence of gallbladder cancer showed relatively minor variations across countries with different HDI levels, with slightly higher rates in countries with medium HDIs.

Global mortality distribution

Table 2 shows the epidemiological data on the mortality of digestive system cancers within diverse geographic regions spanning six continents, with an estimated 3,324,774 cancer-related deaths reported in 2022. Colorectal cancer was the primary cause of mortality within the digestive system cancer spectrum, contributing to 27.2% of all global cancer deaths; it was the third leading cause of all cancer-related deaths, with an ASMR of 8.1/100,000. Liver cancer, accounting for 22.8% of gastrointestinal cancer-related deaths, followed by gastric (19.9%), pancreatic (14.1%), esophageal (13.4%), and gallbladder cancers (2.7%).

The mortality rates of digestive system tumors in Asia far exceeded those in other regions, constituting 62.1% of global deaths, and China had the highest mortality burden in Asia. Mortality trends related to digestive system cancers in Europe, North America, Latin America, and Oceania aligned with the global pattern of incidence, with colorectal cancer remaining the leading cause of mortality among all digestive system tumors. Liver cancer had the highest mortality rate in Asia and Africa, while gallbladder cancer had the lowest mortality rate across all continents.

The mortality patterns of different digestive system cancers across varying HDI levels also mirrored the incidence trends. Colorectal and pancreatic cancers exhibited higher mortality rates in high-HDI countries than in countries with other HDI levels. Gastric and liver cancers mortality rates were highest in high-HDI countries, especially for liver cancer, which obviously surpassed rates for other HDI levels with an ASMR of 10.7/100,000. The mortality rate of gallbladder cancer subtly fluctuated across differing HDI levels, with slightly elevated rates in countries with medium HDIs.

Incidence trends by sex and by age in China

The incidence trends, segmented by gender and age group, are displayed in Tables 3 and 4, respectively, as determined from the joinpoint regression analysis. Overall, the incidence rates of esophageal, gastric, and liver cancers declined from 1988 to 2012, with AAPCs and corresponding 95% CIs of –5.00% (–5.26% to –4.76%), –3.77% (–4.14% to –3.50%), and –2.74% (–2.93% to –2.55%), respectively. Over the past two decades, esophageal cancer experienced the most substantial incidence decline, followed by gastric and liver cancers. Incidence rates of gastric and liver cancers showed relatively minor differences between males and females. However, a faster decline in esophageal cancer incidence was observed in females (AAPC: –5.28%, 95% CI: –5.83% to –4.79%) compared with males (AAPC: –3.51%, 95% CI: –4.06% to –3.18%). In contrast, incidences (both sexes) of colorectal cancer (AAPC: 1.15%, 95% CI: 1.05%–1.27%) and pancreatic cancer (AAPC: 1.14%, 95% CI: 0.73%–1.47%) have steadily increased. The incidence rate of colorectal cancer has significantly increased among males (AAPC: 1.44%, 95% CI: 1.26%–1.66%) compared with females (AAPC: 0.82%, 95% CI: 0.69%–0.98%).

There was a notable difference in the incidence trends of gastrointestinal cancers between the population aged 50 years and above and those below 50 years. Colorectal cancer (AAPC: 0.80%, 95% CI: 0.69%–0.93%) and pancreatic cancer (AAPC: 0.73%, 95% CI: 0.35%–1.08%) have shown an increasing trend from 1988 to 2012 among those aged 50 years and above, while other cancers have exhibited a decline. For the population below 50 years old, the incidence rates of all cancers have been declining.

Predictions of future incidence and mortality in China

Figure 2 illustrates projected changes in the incidence and mortality of digestive system cancers in China until 2050. By 2050, the number of new colorectal cancer cases is projected to increase to 869,000, remaining the leading digestive system cancer in terms of incidence, representing approximately 11.9% of all cancer cases in China.

Table 2: Estimated mortality of digestive system cancers for six continents in 2022.

	Cancer types							
Continents	Esophagus	Colorectum	Pancreas	Stomach	Liver	Gallbladder	All	Rank
Worldwide	445,391	904,019	467,409	660,175	758,725	89,055	3,324,774	–
Asia	329,803	462,252	212,243	462,606	530,928	66,821	2,064,653	–
China	187,467	240,010	106,295	260,372	316,544	24,543	1,135,231	1
India	66,410	40,993	12,759	57,727	36,953	16,407	231,249	2
Japan	12,161	60,473	43,265	43,807	26,420	7252	193,378	3
Indonesia	1330	19,255	5833	3242	23,383	432	53,475	11
Viet Nam	3470	8454	1226	13,264	23,333	209	49,956	12
Thailand	3097	10,158	3280	3070	27,143	1285	48,033	13
Republic of Korea	1521	11,595	7582	8517	12,595	2091	43,901	14
Turkey	1134	11,698	8415	10,457	4929	504	37,137	16
Europe	47,212	247,842	138,644	95,431	79,091	8203	616,423	–
Russian Federation	8359	41,447	20,672	27,306	11,377	1321	110,482	5
Germany	6399	26,544	21,292	8729	8712	1057	72,733	7
Italy	2094	24,188	14,903	9885	9606	743	61,419	8
France	4304	21,218	14,669	4963	10,478	270	55,902	9
UK	8595	22,868	10,769	4232	7326	787	54,577	10
North America	19,116	66,155	56,044	13,367	35,075	2453	192,210	–
United States of America	16,469	54,614	49,491	10,976	30,931	2136	164,617	4
Canada	2642	11,521	6534	2391	4130	317	27,535	18
Latin America and the Caribbean	18,895	73,647	38,319	57,895	39,351	7047	235,154	–
Brazil	10,393	28,884	14,294	18,138	13,041	1458	86,208	6
Mexico	1271	8283	5267	7226	7673	844	30,564	17
Argentina	1967	8800	5097	3379	2147	528	21,918	19
Colombia	924	5640	2573	6901	2396	519	18,953	20
Peru	332	2527	1628	4767	1809	647	11,710	25
Africa	28,276	46,087	17,770	28,730	70,315	4198	195,376	–
Egypt	1510	3096	3186	2469	26,971	578	37,810	15
South Africa	3025	4591	2360	1622	2401	182	14,181	22
Nigeria	540	5912	1283	1599	4252	222	13,808	23
Ethiopia	1422	4863	842	2212	2683	375	12,397	24
Morocco	415	2892	1181	2075	1047	373	7983	26
Oceania	2089	8036	4389	2146	3965	333	20,958	–
Australia	1526	5715	3552	1335	2591	194	14,913	21
New Zealand	302	1704	628	304	336	63	3337	27

–: Not available.

Table 3: Average annual percent change of age-standardized incidence of digestive system cancers in China, 1988–2012 (%).

	Male		Female		All	
Caner sites	AAPC	95% CI	AAPC	95% CI	AAPC	95% CI
Esophagus	–3.51	–4.06 to –3.18	–5.28	–5.83 to –4.79	–3.78	–4.12 to –3.47
Colorectum	1.44	1.26 to 1.66	0.82	0.69 to 0.98	1.15	1.05 to 1.27
Pancreas	1.04	0.58 to 1.43	1.18	0.83 to 1.60	1.14	0.73 to 1.47
Stomach	–2.97	–3.34 to –2.61	–2.99	–3.28 to –2.58	–2.89	–3.19 to –2.59
Liver	–1.83	–2.02 to –1.64	–2.22	–2.54 to –1.82	–1.87	–2.18 to –1.56
Gallbladder	–0.09	–0.43 to 0.72	0.26	–0.54 to 1.32	0.11	–0.31 to 0.61

AAPC: Annual average percentage change; CI: Confidence interval.

The number of new cases of gastric cancer is expected to surpass that of liver cancer, reaching 619,000, positioning it as the second most common digestive system cancer. Liver cancer had the slowest projected growth rate among digestive system cancers, with an incidence rate of 52.17%. Although gallbladder cancer had a lower incidence rate, its incidence growth rate was remarkably high at 90.35%.

Table 4: Average annual percent change of age-standardized incidence of digestive system cancers in China by age, 1988–2012 (%).

	Patients <50 years		Patients ≥50 years		All	
Caner sites	AAPC	95% CI	AAPC	95% CI	AAPC	95% CI
Esophagus	–3.02	–4.14 to –2.03	–4.29	–4.62 to –3.97	–3.78	–4.12 to –3.47
Colorectum	–1.04	–1.51 to –0.60	0.80	0.69 to 0.93	1.15	1.05 to 1.27
Pancreas	–0.82	–2.44 to 0.61	0.73	0.35 to 1.08	1.14	0.73 to 1.47
Stomach	–4.28	–4.95 to –3.79	–3.43	–3.71 to –3.15	–2.89	–3.19 to –2.59
Liver	–3.55	–4.17 to –3.11	–2.29	–2.56 to –2.03	–1.87	–2.18 to –1.56
Gallbladder	–1.00	–2.65 to 0.70	–0.27	–0.70 to 0.22	0.11	–0.31 to 0.61

AAPC: Annual average percentage change; CI: Confidence interval.

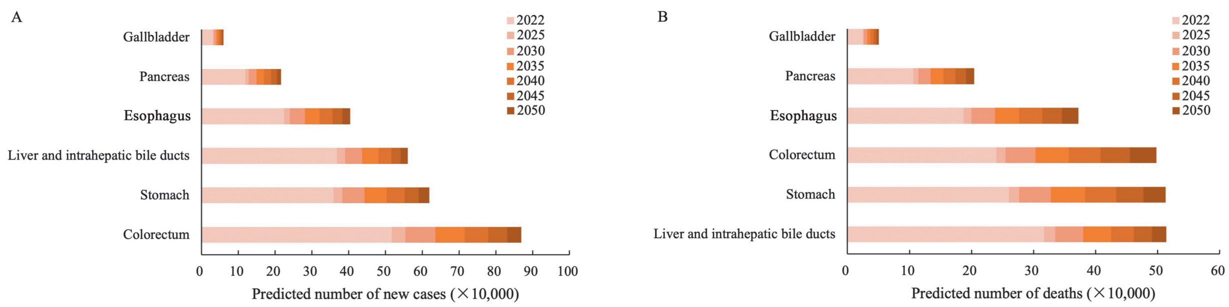

Figure 2: Estimated increase in the number of new cases (A) and deaths (B) of digestive system cancers in China, 2022–2050.

In terms of mortality, liver cancer was projected to remain the leading cause of gastrointestinal cancer deaths in 2050, with a projected mortality of 514,000 individuals; however, it exhibited the smallest growth rate with an increase of 62.15%. Gastric cancer was the second leading cause of mortality, followed by colorectal cancer, with projected mortalities of 513,000 and 498,000, respectively. There is expected to be a significant increase in colorectal cancer mortality, reaching a rate of 107.5%; similarly, the projected mortality rate of gallbladder cancer steeply increased, reaching 106.12%, although its contribution to cancer-related deaths in China remained relatively low (1.05%).

Discussion

Our study offers a comprehensive and contemporary analysis of the global and Chinese landscapes of digestive system cancers in 2022, illuminating the disparities observed across various geographical, socioeconomic, and temporal dimensions. Digestive system cancers remain a serious global public health concern, constituting approximately one-third of all cancer incidences and mortality burdens.

Among the six digestive system cancers studied, colorectal cancer had the most severe burden in terms of both incidence and mortality, accounting for approximately 40% of all new cases and 30% of all deaths; additionally, it holds the top position for both incidence and mortality in the majority of continents. The incidence and mortality of colorectal cancer were higher in countries with higher HDI levels, largely influenced by the lifestyle and dietary habits prevalent in these countries such as high-fat diets, excessive red meat consumption, sedentary behavior, smoking, and drinking.[13–16] Encouragingly, due to the adoption of healthier lifestyles and the widespread promotion of colorectal cancer screening in recent years, developed countries have witnessed a decline in the incidence of colorectal cancer.[17–18]

Liver cancer is another tumor of significant concern. While colorectal cancer imposes a substantial burden on most regions, liver cancer stands out as the digestive system cancer with the highest incidence and mortality rates in Africa; it was also the leading cause of death due to digestive system tumors in Asia. Although the etiological factors for liver cancer may vary across regions, chronic hepatitis B and C infections and exposure to aflatoxins are among the primary risk factors in areas with low to medium levels of development.[19,20] Unlike colorectal cancer, the incidence and mortality of liver cancer across countries did not increase with increasing HDI levels. In both very high- and low-HDI settings, the age-standardized incidence and mortality rates of liver cancer were not as high as those in countries with high HDIs. In countries with high HDIs experiencing rapid social and economic development, significant changes in various cancer epidemiological trends are more likely to occur.[21] Population aging, along with the prevalence of conditions such as obesity, diabetes, and hypertension, exacerbates the incidence and progression of liver cancer, especially when traditional risk factors remain uncontrolled.[22,23]

With increasing economic and societal development in China, significant changes in the lifestyle and population structure have occurred over the past three decades. These changes have led to notable shifts in the incidence and mortality rates of digestive system cancers. From 1988 to

2012, there was a declining trend in the incidence rates of digestive system cancers such as gastric, esophageal, and liver cancers. The decline in the incidence of esophageal cancer was particularly significant, with a nearly 30% decrease in the number of new cases, which was more pronounced in females. Esophageal cancer is associated with lifestyle and dietary habits; factors such as smoking, excessive alcohol consumption, and consumption of hot beverages and foods are known to increase the incidence of esophageal cancer.[24–27] The difference in the incidence of esophageal cancer between men and women is primarily attributed to factors such as male exposure to risk factors such as smoking and alcohol consumption, as well as physiological differences between sexes. Effective preventative measures targeting high-risk factors and the successful implementation of screening programs for esophageal cancer may be the main reasons for the recent decline in its incidence in China.[28,29] In contrast, colorectal and pancreatic cancers incidences in China have increased annually over the past two decades and were expected to reach alarming levels by 2022 (especially among individuals aged 50 years and above), accounting for half of all new gastrointestinal cases in Asia and highlighting the need for focused attention and intervention. It is anticipated that by 2050, colorectal cancer will continue to have the highest burden of all gastrointestinal tumors in China, with a steep increase in mortality rates. This indicates that efforts should focus on primary prevention, screening, early detection, and treatment. Although the mortality rate of liver cancer is increasing slowly, it is expected to remain the leading cause of death among digestive system cancers in China owing to its large current mortality base. Currently, gallbladder cancer does not impose a high burden on gastrointestinal cancer incidence and mortality in China; however, both rates are rapidly increasing, warranting attention.

Although GLOBOCAN provides comprehensive estimates of cancer incidence, mortality, and trends across various regions, our study had some limitations. The estimation of the incidence and mortality rates is subject to bias owing to variations in the coverage and quality of cancer registration systems across different countries and regions. Additionally, owing to the lack of data reported by GLOBOCAN, the AAPC for the mortality rates of digestive system cancers in China could not be estimated.

Overall, this study comprehensively analyzed the incidence and mortality rates of digestive system cancers both globally and in China. Although recent efforts in the prevention and control of digestive system cancers have made some progress, the burden remains substantial both globally and in China. It is imperative to strengthen the implementation of tertiary prevention strategies targeting key types of digestive system cancers to reduce the burden of incidence and mortality.

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