

# Statistical Data (1978-2020) on Prostate Cancer in the Southern Population of Mexico

## Abstract

Prostate cancer is the main risk factor that increases mortality in men worldwide. Recently, the National Institute of Statistics and Geography of Mexico reported the percentage of mortality from prostate cancer in men of 10.89/10,000 (60 and > 60 years) for patients with this clinical pathology in 2020. This research aimed to evaluate statistical data on prostate cancer in the southern population of Mexico. Mortality rates in southern Mexico were evaluated in 23,527 men with prostate cancer in 1979-2020 years using some data sources such as GLOBOCAN 2020, the Information System of the Mexican Ministry of Health, Google Scholar, and PubMed. The data showed that mortality in patients with prostate cancer in Veracruz City was higher (2018) compared to Campeche (219), Chiapas (977), Guerrero (724), Oaxaca (1356), Quintana Roo (623), and Yucatan (603). The results showed that aging is a risk factor for developing prostate cancer. Besides, this phenomenon could be conditioned through increases in the population of each Mexico city.

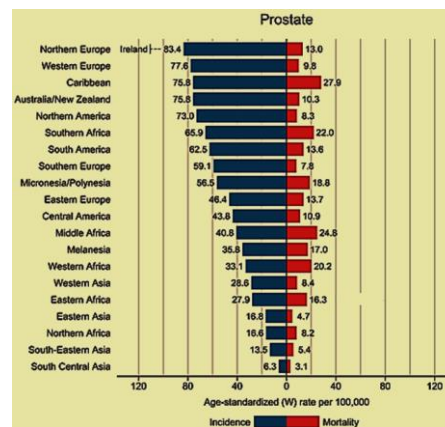
**Keywords:** Prostate, Cancer, Mortality, Mexico

## Introduction

Cancer is one of the main causes of death worldwide, which translates into a decreased life expectancy of the population.<sup>[1-6]</sup> This clinical pathology has been increasing in both developed and developing countries due to various factors involved such as aging and population growth.<sup>[7-10]</sup> Here it is important to mention that there are differences in the type of cancer present in each country; In this sense, GLOBOCAN<sup>[11]</sup> recently reported that in 2020, there was an increase in new cases of cancer in a population of 9,227,484 in women, among which the prevalence of 24.5% (2,261,419 patients) stands out in breast cancer and 9.4% (865634 patients) in the colon and rectal cancers. Regarding the male population (10065305 patients), the prevalence was 14.3% (143594 patients) in lung cancer and 14.1% (1414259) in prostate cancer. Besides, some data indicate that prostate cancer incidence has notably increased in Europe and Northern America compared with Central America and other continents (**Figure 1**).<sup>[11]</sup>

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: Support\_reprints@ccij-online.org



**Figure 1. Age-standardized (world incidence) and mortality rates, prostate cancer.**

Source: GLOBOCAN 2020.<sup>[11]</sup>

Regarding North America and specifically the United States,<sup>[12]</sup> some reports show an incidence of new cases of prostate cancer (268,490) and 12.84% of deaths (34,500) in the year 2022. In addition, recently a study displayed that there was an increase in the incidence and mortality of prostate cancer in Canada during 1992-2010.<sup>[13]</sup> Another data showed that 170,640 Hispano-Americans in the US-Mexico border regions were identified with prostate cancer.<sup>[14]</sup> Another study carried out in Merida-Mexico showed 532 patients with prostate cancer (ASR 29.8) using CanReg5

**How to cite this article:** Figueroa-Valverde L, Rosas-Nexticapa M, Alvarez-Ramirez M, Lopez-Ramos M, Mateu-Armand V, Lopez-Gutierrez T. Statistical Data (1978-2020) on Prostate Cancer in the Southern Population of Mexico. Clin Cancer Investig J. 2023;12(1):7-10. <https://doi.org/10.51847/LkyjT987Fn>

**Lauro Figueroa-Valverde<sup>1\*</sup>, Marcela Rosas-Nexticapa<sup>2</sup>, Magdalena Alvarez-Ramirez<sup>2</sup>, Maria Lopez-Ramos<sup>2</sup>, Virginia Mateu-Armand<sup>2</sup>, Tomas Lopez-Gutierrez<sup>1</sup>**

<sup>1</sup>Pharmacochimistry Research Laboratory, Faculty of Biological-Chemical Sciences, University Autonomous of Campeche; Humberto Lanz Cárdenas s/n, Ex Hacienda Kalá, C.P. 24085, Campeche, Mexico. <sup>2</sup>Nutrition Laboratory, Faculty of Nutrition, University of Veracruz, Medicos y s/n Odontologos 910210, Unidad del Bosque, Xalapa, Mexico.

## Address for correspondence:

Lauro Figueroa-Valverde,  
Pharmacochimistry Research  
Laboratory, Faculty of Biological-  
Chemical Sciences, University  
Autonomous of Campeche;  
Humberto Lanz Cárdenas s/n, Ex  
Hacienda Kalá, C.P. 24085,  
Campeche, Mexico.  
E-mail: lfiguero@uacam.mx

## Access this article online

Website: [www.ccij-online.org](http://www.ccij-online.org)

DOI: [10.51847/LkyjT987Fn](https://doi.org/10.51847/LkyjT987Fn)

## Quick Response Code:



software, age-standardized incidence rates (ASR/100,000 person-years).<sup>[15]</sup> In addition, a report on the burden of cancer in Mexico (1990-2013) showed 29,428 prostate cancer patients, of whom 6,520 died.<sup>[16]</sup> Another study carried out in a population of 32,349 patients with prostate cancer in Mexico in 1980-1995 showed a higher standardized mortality ratio in Baja California Sur (183.28) compared to cities in southern Mexico such as Campeche (83.27), Chiapas (83.60), Guerrero (57.69), Quintana Roo (47.87), Oaxaca (60.49), Veracruz (80.72) and Yucatan (97.23).<sup>[17]</sup> All these reports indicate variations in mortality from prostate cancer in Mexico; for this reason, more statistical data is required on this clinical pathology to make a good diagnosis and adequate treatments for its control. Analyzing this hypothesis, the objective of this study was to evaluate the data generated in relation to the total deaths from prostate cancer in southern Mexico from 1979 to 2020.

## Materials and Methods

### Data source

The status of incidence and mortality rates of prostate cancer in 2020 was analyzed by obtaining data from several countries or territories from the GLOBOCAN 2020.<sup>[11]</sup> Besides, statistical data on prostate cancer in Mexico was through the information system of the Health Secretary of Mexico.<sup>[18]</sup> Other sources of information such as Google Scholar and PubMed were used to describe some prostate cancer statistics.

## Results and Discussion

The results shown in **Table 1** indicate that Colima (1771, 7.54%), Mexico City (1036, 4.4%), Guanajuato (1277, 5.43%), Hidalgo (2188, 9.31%), Jalisco (1074, 4.57%), and Nayarit (1357, 5.77%) had the highest mortality and incidence due to prostate cancer problems compared with other Mexico cities. The results showed an increase in prostate cancer in patients with 65 and > 65 years in the following regions such as; the State of Mexico, Michoacán, Jalisco, and Querétaro, compared to other cities in central and northern Mexico.

**Table 1. Mortality values of prostate cancer in central and north Mexico from 1979-2020 years.**

City	45 to 64 years	65 and > 65 years
Aguascalientes	11	200
§N. B.C.	308	27
¥N. B.C.	2	70
Coahuila	27	522
Colima	5	130
Chihuahua	47	570
Mexico City	131	1638
Durango	22	309
Guanajuato	49	985
Hidalgo	18	515
Jalisco	58	1216
Mexico State	155	2029

Michoacan	52	1022
Morelos	19	464
Nayarit	15	285
Nuevo Leon	23	647
Puebla	58	1298
Queretaro	15	269
San Luis Potosi	36	732
Sinaloa	34	498
Sonora	20	416
Tamaulipas	36	612
Tlaxcala	4	279
Zacatecas	14	487

§N. B.C. = North Baja California.

¥N. B.C. = South Baja California.

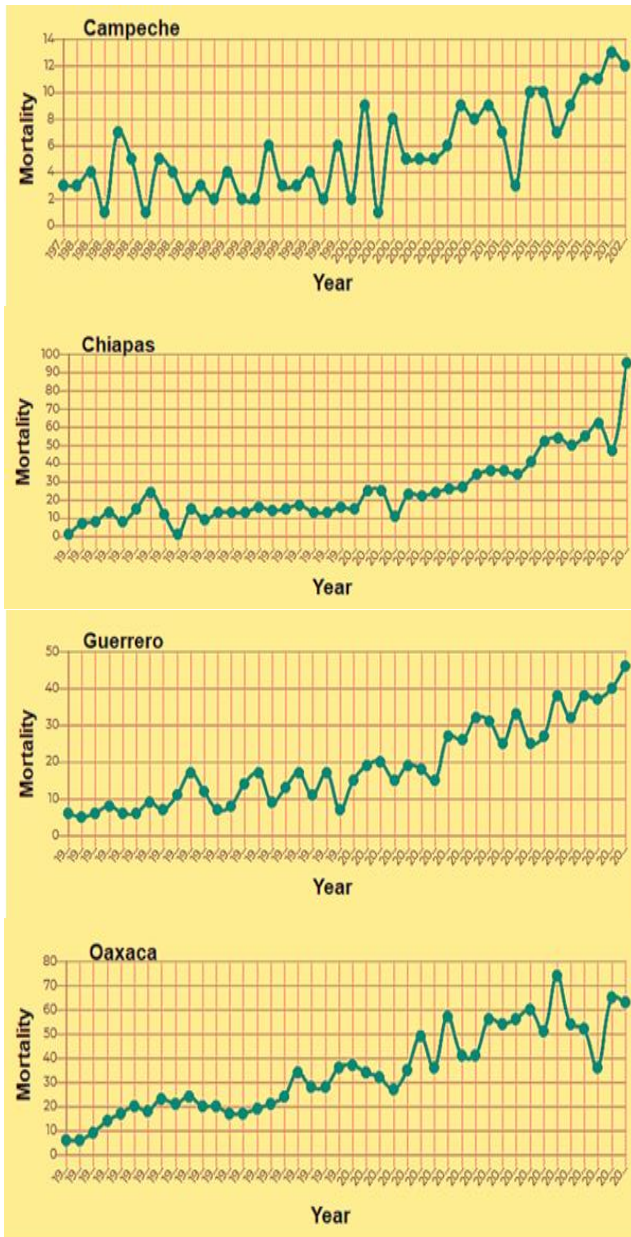
Source: Health Secretary, General Directorate of Health Information. <http://sinaiscap.salud.gob.mx:8080/DGIS/>

This phenomenon could be due to several risk factors, such as a lifestyle that involves a diet high in saturated fat.<sup>[19-23]</sup> This hypothesis is supported by some reports; indicating that prostate cancer is related to increased fat intake.<sup>[24]</sup> For example, a prospective population study of 25,708 Norwegian men showed that a high-fat diet may be a risk factor to produce prostate cancer.<sup>[25]</sup> Furthermore, prostate cancer in a population of 4,577 men was associated with fat intake as a risk factor that increases mortality.<sup>[26]</sup> However, contrary to these reports, a study that included 37,349 cases showed that fat intake is not linked to prostate cancer.<sup>[27]</sup> Analyzing these and other reports suggests that, prostate cancer rates vary substantially by race, ethnicity, geography, and hormonal levels.<sup>[28-34]</sup> Therefore, these factors could determine the mortality degree of prostate cancer patients in central and northern Mexico cities. Analyzing these reports, alternative research was carried out on prostate cancer in the Southern population of Mexico using the information system of the Health Secretary of Mexico.<sup>[18]</sup> The Statistical data (1979-2020) shown in **Table 2**, and **Figures 2 and 3** indicate that mortality is higher in patients with 65 and > 65 years in the Chiapas, Veracruz, and Oaxaca cities. However, in Tabasco City, the mortality is higher in patients with 45-64 years.

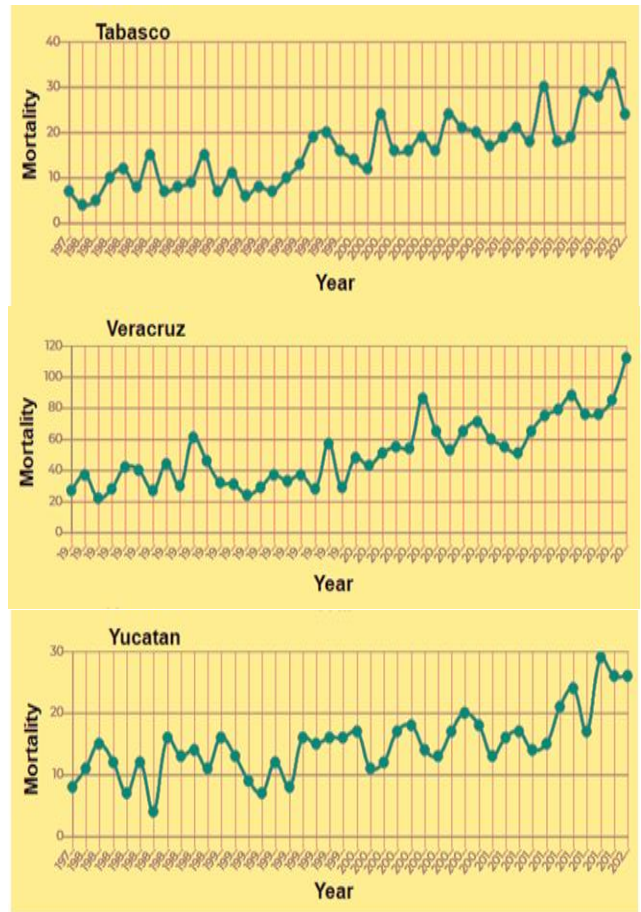
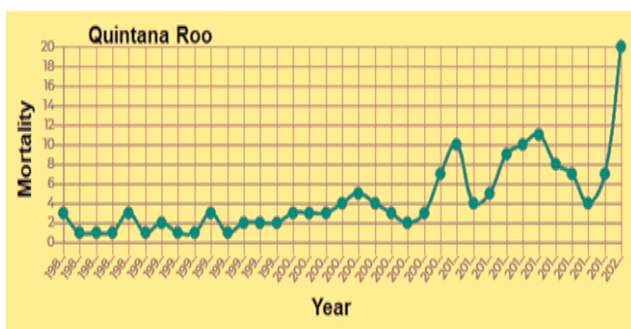
**Table 2. Mortality percentage of prostate cancer in South Mexico from 1979 to 2020 years**

City	45-64 years	65 and > 65 years
Campeche	13	219
Chiapas	73	977
Guerrero	64	724
Oaxaca	74	1356
Quintana Roo	156	150
Tabasco	655	623
Veracruz	132	2018
Yucatan	22	603

Source: Health Secretary, General Directorate of Health Information. <http://sinaiscap.salud.gob.mx:8080/DGIS/>



**Figure 2. Statistical data on prostate cancer Campeche, Chiapas, Guerrero and Oaxaca from 1979 to 2020.**  
Source: Health Secretary, General directorate of Health information. <http://sinaiscap.salud.gob.mx:8080/DGIS/>



**Figure 3. Statistical data on prostate cancer Quintana Roo, Tabasco, Veracruz and Yucatan from 1979 to 2020.**  
Source: Health Secretary, General directorate of Health information. <http://sinaiscap.salud.gob.mx:8080/DGIS/>

These reports suggest that the higher age of the population is one of the risk factors for developing prostate cancer. These studies are supported by other studies which show a direct relationship between age and prostate cancer.<sup>[35-40]</sup> However, the differences in mortality degree from prostate cancer in each city could depend on other factors such as the size of the population sample involved in each study or the lack of early detection of this clinical pathology, mainly in the rural areas of each region; resulting problems in the registry or information about prostate cancer in Mexico, which can generate difficulties in diagnostic certainty. In this sense, the statistical data generated by the health sector in Mexico are very important to try to establish a good diagnosis in the population for the control of this clinical pathology.

### Conclusion

This study reports statistical data on the incidence and mortality of prostate cancer in South Mexico. The results showed that aging is a risk factor for developing prostate cancer. Besides, this phenomenon could be conditioned through increases in the population of each Mexico city.

### Acknowledgments

None.



### Conflict of interest

None.

### Financial support

None.

### Ethics statement

None.

### References

- Pienta KJ, Gorin MA, Rowe SP, Carroll PR, Pouliot F, Probst S, et al. A Phase 2/3 Prospective Multicenter Study of the Diagnostic Accuracy of Prostate Specific Membrane Antigen PET/CT with <sup>18</sup>F-DCFPyL in Prostate Cancer Patients (OSPREY). *J Urol.* 2021;206(1):52-61.
- Rawla P. Epidemiology of prostate cancer. *World J Onc.* 2019;10(2):63-89.
- Dunn M, Kazer M. Prostate cancer overview. *Sem Oncol Nurs.* 2011;27(4):241-50.
- Litwin M, Tan H. The diagnosis and treatment of prostate cancer: a review. *J Am Med Assoc.* 2017;317(24):2532-42.
- Crawford E. Epidemiology of prostate cancer. *Urol.* 2003;62(6):3-12.
- Pernar C, Ebot E, Wilson K, Mucci L. The epidemiology of prostate cancer. *Cold Spring Har Pers Med.* 2018;8(12):a030361.
- Zhang L, Yang B, Zhang H, Wang J, Wang H, Zhao X. Prostate cancer: an emerging threat to the health of aging men in Asia. *Asian J Androl.* 2011;13(4):574.
- Freeland J, Crowell P, Giagfaglione J, Boutros P, Goldstein A. Aging of the progenitor cells that initiate prostate cancer. *Cancer Lett.* 2021;515:28-35.
- Fang J, Metter E, Landis P, Chan D, Morrell C, Carter H. Low levels of prostate-specific antigen predict long-term risk of prostate cancer: results from the Baltimore Longitudinal Study of Aging. *Urol.* 2001;58(3):411-6.
- Yancik R. Population aging and cancer: a cross-national concern. *Cancer J.* 2005;11(6):437-41.
- GLOBOCAN U. New Global Cancer Data. Available from: <https://www.uicc.org/news/globocan-2020-new-global-cancer-data>.
- Washington C, Goldstein DA, Moore A, Gardner U Jr, Deville C Jr. Health Disparities in Prostate Cancer and Approaches to Advance Equitable Care. *Am Soc Clin Oncol Educ Book.* 2022;42:1-6. doi:10.1200/EDBK\_350751
- Siegel RL, Miller KD, Fuchs HE, Jemal A. Cancer Statistics, 2021. *CA Cancer J Clin.* 2021;71(1):7-33.
- Taylor ZD, Chew L, Tumey T, Gard CC, Woods ME. Differences in incidence, staging, and survival of urologic cancers in patients under 65 living in the US-Mexico border region. *Curr Urol.* 2022:10-97.
- Leal Y, Torres J, Gamboa R, Mantilla-Morales A, Piña-Sanchez P, Arrieta O. Cancer Incidence in Merida, Mexico 2015-2018: First Report from the Population-based Cancer Registry. *Arch Med Res.* 2022;53(8):859-66.
- Gómez-Dantés H, Lamadrid-Figueroa H, Cahuana-Hurtado L, Silverman-Retana O, Montero P. The burden of cancer in Mexico, 1990-2013. *Salud Pub Mexico.* 2016;58(2):118-31.
- Tovar-Guzmán V, Hernández-Girón C, López-Ríos O, Lazcano-Ponce E. Prostate cancer mortality trends in Mexico, 1980–1995. *Prostate.* 1999;39(1):23-7.
- Mexican government. Information System of the Secretary of Health. Available from: <http://sinaiscap.salud.gob.mx:8080/DGIS/>
- Wolk A. Diet, lifestyle and risk of prostate cancer. *Acta Oncol.* 2005;44(3):277-81.
- Ornish D, Weidner G, Fair W, Marlin R, Pettengill E. Intensive lifestyle changes may affect the progression of prostate cancer. *J Urol.* 2005;174(3):1065-70.
- Mills P, Beeson W, Phillips R, Fraser G. Cohort study of diet, lifestyle, and prostate cancer in Adventist men. *Cancer.* 1989;64(3):598-604.
- Wilson K, Giovannucci E, Mucci L. Lifestyle and dietary factors in the prevention of lethal prostate cancer. *Asian J Androl.* 2012;14(3):365.
- Checkoway H, DiFerdinando G, Hulka BS, Mickey DD. Medical, lifestyle, and occupational risk factors for prostate cancer. *Prostate.* 1987;10(1):79-88.
- Allott E, Arab L, Su L, Farnan L, Fontham E, Mohler J. Saturated fat intake and prostate cancer aggressiveness: results from the population-based North Carolina-Louisiana Prostate Cancer Project. *Prostate Cancer Prost Dis.* 2017;20(1):48-54.
- Veierød M, Laake P, Thelle D. Dietary fat intake and risk of prostate cancer: a prospective study of 25,708 Norwegian men. *Int J Cancer.* 1997;73(5):634-8.
- Richman E, Kenfield S, Chavarro J, Stampfer M, Giovannucci E, Willett W, et al. Fat intake after diagnosis and risk of lethal prostate cancer and all-cause mortality. *J Am Med Assoc.* 2013;313(14):1318-26.
- Xu C, Han F, Zeng X, Liu T, Li S, Gao Z. Fat intake is not linked to prostate cancer: a systematic review and dose-response meta-analysis. *PLoS one.* 2015;10(7):e0131747.
- Rebbeck T. Prostate cancer genetics: variation by race, ethnicity, and geography. *Sem Rad Oncol.* 2017;27(1):3-10.
- Taitt H. Global trends and prostate cancer: a review of incidence, detection, and mortality as influenced by race, ethnicity, and geographic location. *Am J Men's Health.* 2018;12(6):1807-23.
- Powell I, Banerjee M, Bianco F, Wood D, Dey J, Lai Z, et al. The effect of race/ethnicity on prostate cancer treatment outcome is conditional: a review of Wayne State University data. *J Urol.* 2004;171(4):1508-12.
- Hellerstedt B, Pienta K. The current state of hormonal therapy for prostate cancer. *CA: a cancer J Clin.* 2002;52(3):154-79.
- Shaneyfelt T, Husein R, Bubley G, Mantzoros C. Hormonal predictors of prostate cancer: a meta-analysis. *J Clin Onc.* 2000;18(4):847.
- Kelly W, Scher H, Mazumdar M, Vlamis V, Schwartz M, Fossa S. Prostate-specific antigen as a measure of disease outcome in metastatic hormone-refractory prostate cancer. *J Clin Oncol.* 1993;11(4):607-15.
- Florina MG, Mariana G, Csaba N, Gratiela VL. The Interdependence between diet, microbiome, and human body health—a systemic review. *Pharmacophore.* 2022;13(2):1-6.
- Bechis S, Carroll P, Cooperberg M. Impact of age at diagnosis on prostate cancer treatment and survival. *J Clin Oncol.* 2011;29(2):235-41.
- DePinho RA. The age of cancer. *Nature.* 2000;408(6809):248-54.
- Nelen V. Epidemiology of prostate cancer. *Recent Results Cancer Res.* 2007;175:1-8.
- Brawley O. Prostate cancer epidemiology in the United States. *World J Urol.* 2012;30(2):195-200.
- Grönberg H, Damber J, Lenner P. Patient age as a prognostic factor in prostate cancer. *J Urol.* 1994;152(3):892-5.
- Quon H, Loblaw A, Nam R. Dramatic increase in prostate cancer cases by 2021. *BJU Int.* 2011;108(11):1734-8.