

Profiling of the Retrospective Epidemiology of the Human Papillomavirus and Related Cancers in the United Arab Emirates Population

Ihsan Mahasneh^{1*}, Berjas Abumusimir², Mustapha Enaji³, Ikram Taibi³, Ferdos Ebrahim¹

¹Department of Applied Biology, Biotechnology Program, Faculty of Science, University of Sharjah, Sharjah, United Arab Emirates

²Faculty of Applied Medical Sciences, Al-Ahliyya Amman University, Amman, Jordan

³Research Team of Virology, Oncology and Biotechnologies, Laboratory of Virology, Oncology, Biosciences, Environment and New Energies, Faculty of Sciences and Techniques Mohammedia, University Hassan II of Casablanca, Casablanca, Morocco
Email: *imahasneh@sharjah.ac.ae, berjas_last@yahoo.com, m.ennaji@gmail.com, ikram.taibi96@gmail.com, Ferdos.Ebrahiim@gmail.com

How to cite this paper: Mahasneh, I., Abumusimir, B., Enaji, M., Taibi, I. and Ebrahim, F. (2024) Profiling of the Retrospective Epidemiology of the Human Papillomavirus and Related Cancers in the United Arab Emirates Population. *Journal of Biosciences and Medicines*, 12, 1-9.

<https://doi.org/10.4236/jbm.2024.1210001>

Received: September 3, 2024

Accepted: September 24, 2024

Published: September 27, 2024

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Abstract

The human papillomavirus (HPV) is a leading cause of infectious cancers, leading to a growing global interest on the profiling of HPV-related cancers. Therefore, the aim of the study was to determine the retrospective epidemiological profile of HPV-related cancer in the United Arab Emirates (UAE). The incidence profiling of HPV-related cancers in males and females of UAE of all ages ranged from a minimum of 0.6% to a maximum of 4.5% for testes cancer and colon cancer respectively in males; whilst in females it ranged from a minimum of 1.0% and a maximum of 34% for Hodgkin lymphoma, kidney, bladder, liver and pancreas cancer and breast cancer, respectively. The incidence profiling of HPV-related cancers in males and females of ages 15 - 44 years old ranged from a minimum of 0.1% to a maximum of 11.2% for pancreas cancer, and colon and rectum cancer respectively in males, whilst in females it ranged from a minimum of 0.1% and a maximum of 18% for pancreas and breast cancer, respectively. The mortality profiling of HPV-related cancers in males and females of all ages in the UAE ranged from a minimum of 0.1% for Hodgkin lymphoma and testicular cancer to a maximum of 4.5% for colon and rectum cancer respectively in males, whilst in females it ranged from a minimum of 0.2% and a maximum of 4.5% for pancreas and breast cancer, respectively. The mortality profiling of HPV-related cancers mortality in males and females of ages 15 - 44 years old in the UAE ranged from a minimum of 0.2% to a maximum of 4.3% for testicular cancer and colon cancer respectively in males, whilst in females it ranged from a minimum of 0.2% and a maximum of 7.2% for bladder and breast cancer respectively. In conclusion, the profiling of

HPV-related cancers in UAE for both males and females of all ages is similar to that reported for other parts of the world.

Keywords

HPV, Epidemiology, UAE Population

1. Introduction

Recently, according to the reports on the global screening and vaccination coverage by the World Health Organization (WHO) and the United Nations International Children's Emergency Fund (UNICEF) between 2010 and 2019 that human papillomavirus (HPV) is among the major causative viruses of the infectious cancers, there has been a worldwide growing interest on profiling HPV and cancers [1]. HPV is the name of a group of 200 known viruses which belong to the Papillomaviridae family. These small epitheliotropic viruses have circular double-stranded DNA genome of approximately 8000 base pairs, encapsulated by an icosahedral symmetry capsid, composed of 72 pentameric capsomers and variable number of secondary protein, forming 55 nm a particle without an envelope [2].

It has been reported that HPV has significant contributions to several types of cancers, notably HPV 16 and 18, contributing to high percentage of nearly 70% of malignant tumors, particularly affecting the female reproductive system such as cervical, ovarian and uterine cancers. Annually an estimate of 625,600 women and 69,400 men are diagnosed with HPV-related cancers [3]. In 2019, HPV caused an estimated 620,000 cancer cases in women and 70,000 cancer cases in men [4]. According to the statistics reported by the WHO and the Centers for Disease Control (CDC), HPV is thought to be responsible for about 91% of cervical cancers, 75% of vaginal cancers, 69% of vulvar cancers, 63% of penile cancers, 91% of anal cancers, and 70% of oropharyngeal cancers. The CDC statistics estimate that 85% of people will acquire HPV infections in their lifetime whilst globally, nearly 1 out of 5 men have one or more of the high-risk (HR) HPV strains and each year in the United States, HPV causes about 37,000 cancers in areas of the body where HPV is often found with 25,689 cases among women and 21,022 cases among men [5].

In comparison with other neighboring gulf countries like Saudi Arabia, the HPV prevalence ranges from 9.8% to 43%, predominantly involving HR strains like genotypes 16, 18, and 45, which are strongly linked to cervical cancers [6] [7]. This indicates a significant risk of HPV-related cancers among Saudi women. Local data suggest that approximately 55 women die annually from HPV-related cancers, placing the 10.3 million Saudi women of reproductive age at risk of such malignancies. The aim of the present study is to determine the retrospective epidemiology profile of HPV-related cancers in the UAE which will provide better understanding and health care management of the HPV-related cancers.

2. Materials and Methods

2.1. Data Availability

Data on HPV-related cancer associated were made available by the Ministry of Health of UAE in association with the Center the Institut Català d'Oncologia (ICO) HPV Center [8], L'Hospitalet del Llobregat (Barcelona) Spain (E-mail: hpvcentre@iconcologia.net) and the International Agency for Research on Cancer (IARC), World Health Organization (WHO) (<https://www.who.int>).

2.2. Data Analysis

Data analysis was conducted using Chi-square test for comparison of the profiling of HPV-related cancers incidence and mortality for both males and females of all ages, with a particular emphasis on ages between 14 and 44 years old in UAE as estimates.

3. Results

3.1. Profiling of the HPV-Related Cancers Incidence in Males and Females of All Ages

Profiling of the HPV-related cancers incidence in males and females of all ages in UAE is given in **Figure 1**. The incidence profiling of the HPV related cancers in males and females of UAE of all ages ranged from a minimum of 0.6% for testes cancer to a maximum of 4.5% for colon and rectum cancer in males, whilst in females it ranged from a minimum of 1.0% for Hodgkin lymphoma, kidney, bladder, liver and pancreas cancer and a maximum of 34% for breast cancer. The incidence rate of the HPV-related cancers in females ranged between a minimum of 0.03 to a maximum of 33.7 for the vaginal and breast cancers, respectively. The incidence rate of the HPV-related cancers in males ranged between a minimum of 0.07 to a maximum of 4.51 for the Kaposi sarcoma and the colon and rectum cancers, respectively.

3.2. Profiling of the HPV-Related Cancers Incidence in Males and Females of Ages between 15 and 44 Years Old

Profiling of the HPV-related cancers incidence to other cancers among men and women 15 - 44 years of age in UAE is given in **Figure 2**. The incidence profiling of the HPV-related cancers in males and females of ages between 15 and 44 years old ranged from a minimum of 0.1% to a maximum of 11.2% for pancreas cancer and colon and rectum cancer respectively in males, whilst in females it ranged from a minimum of 0.1% and a maximum of 18% for pancreas and breast cancer respectively. The incidence rate of HPV-related cancers in females ranged between a minimum of 0.05 to a maximum of 17.8 for the pancreas and breast cancers, respectively. The incidence rate of HPV-related cancers in males ranged between a minimum of 0.02 to a maximum of 1.81 for the Kaposi sarcoma and the colon and rectum cancers, respectively.

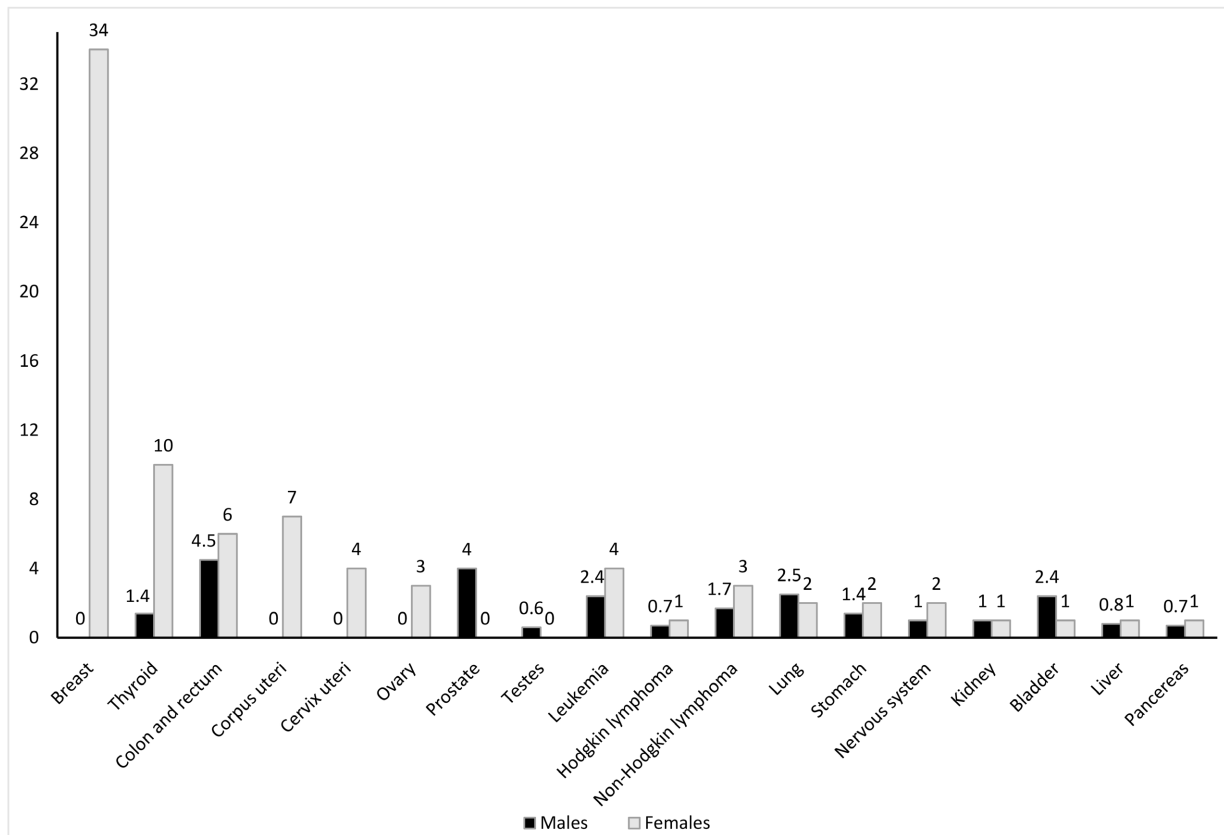


Figure 1. Profiling of the HPV-related cancers incidence in males and females of all ages in the UAE as estimated in 2020.

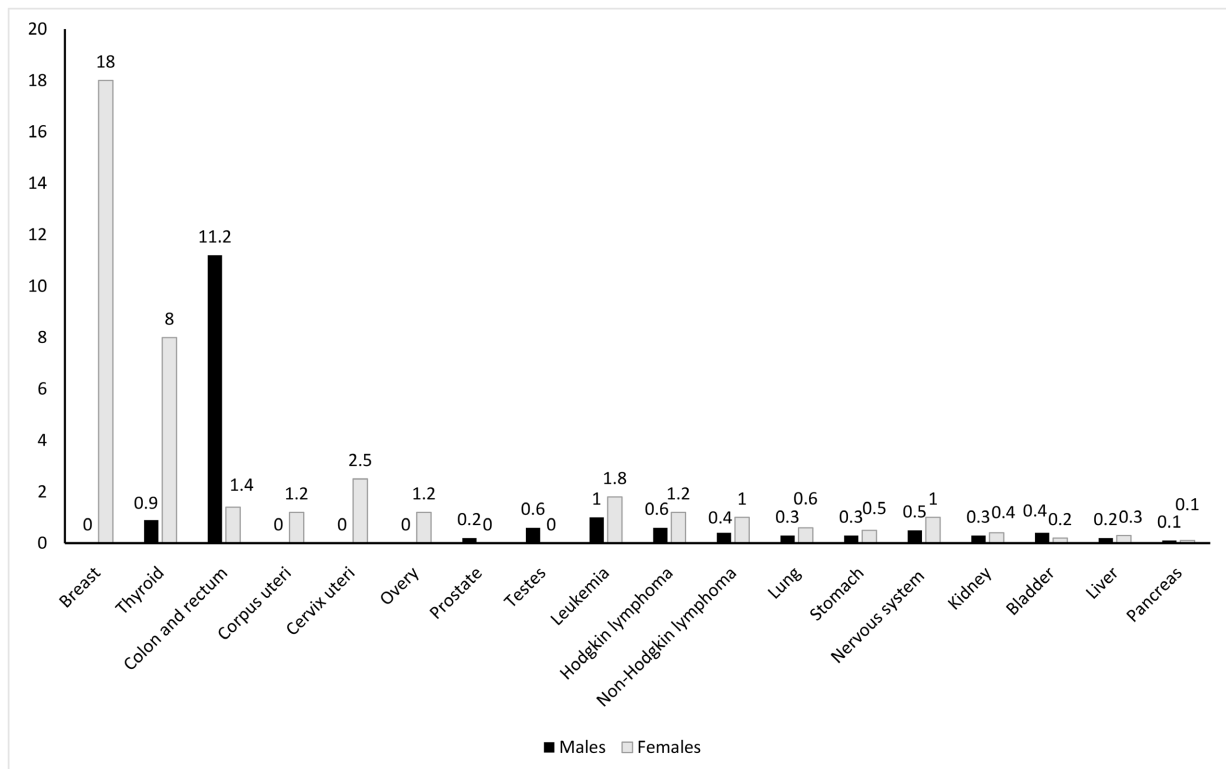


Figure 2. Profiling of the HPV-related cancers incidence in males and females of ages between 15 - 44 years old in the UAE.

3.3. Profiling of the HPV-Related Cancers Mortality in Males and Females of All Ages

The mortality profiling of the HPV-related cancers in males and females of all ages in UAE is given in **Figure 3**. The mortality profiling in males ranged from a minimum of 0.1% for Hodgkin lymphoma and testes cancer to a maximum of 4.5% for colon and rectum cancer, whilst in females it ranged from a minimum of 0.2% and a maximum of 4.5% for pancreas and breast cancer respectively.

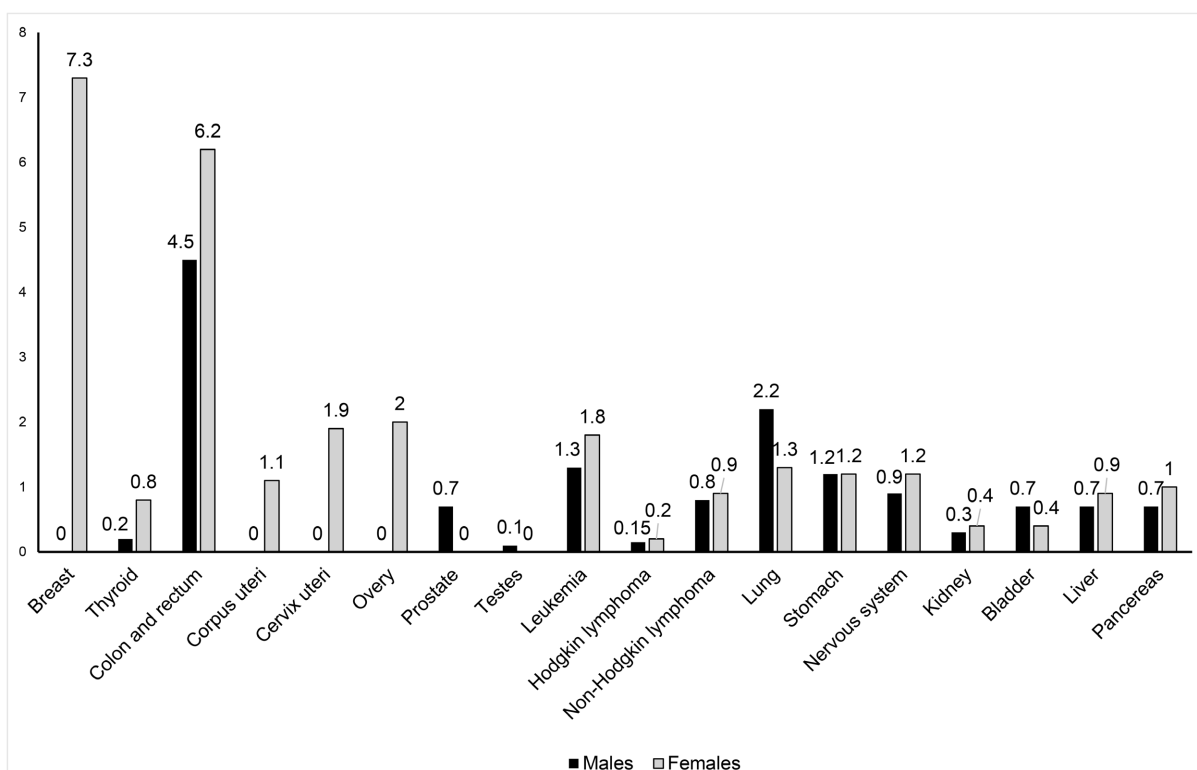


Figure 3. Profiling of the HPV-related cancers mortality in males and females of all ages in the UAE.

3.4. Profiling of the HPV-Related Cancers Mortality in Males and Females of Ages between 15 and 44 Years Old

The mortality profiling of the HPV-related cancers in males and females of ages between 15 - 44 years old in UAE is given in **Figure 4**. The mortality profiling in males ranged from a minimum of 0.2% to a maximum of 4.3% for testes cancer and colon and rectum cancer, respectively; whilst in females it ranged from a minimum of 0.2% and a maximum of 7.2% for bladder and breast cancer respectively in female. The Profiling of the cervical cancer incidence and mortality rates in the UAE ranged for both profiling's between a minimum of 1.0 to a maximum of 40 for the age group of 20 - 24 and the age group of 75 - 79 years old, respectively.

4. Discussion

The profiling of the retrospective epidemiology of HPV-related cancers in the UAE has been studied (**Figures 1-4**). The most common HPV-associated cancer

for women was breast cancer with a frequency of 34% among all ages and 18% among the 15 - 44 years old cohort; whereas the highest frequency of the cervical cancer incidence and mortality rates in UAE reached a maximum of 40%. In contrast with the males, the most common HPV-associated cancer was the colon and rectum cancer with a frequency of 11.2% for the 15 - 44 years old cohort and 4.5% for all ages. In comparison with neighboring countries, the profiling of the HPV in the UAE is similar to that of Saudi Arabia, where the HPV prevalence ranges from 9.8% to 43% predominantly involving HR strains like genotypes 16, 18, and 45 [6] [7], indicating a significant risk of HPV-related cancers among the UAE.

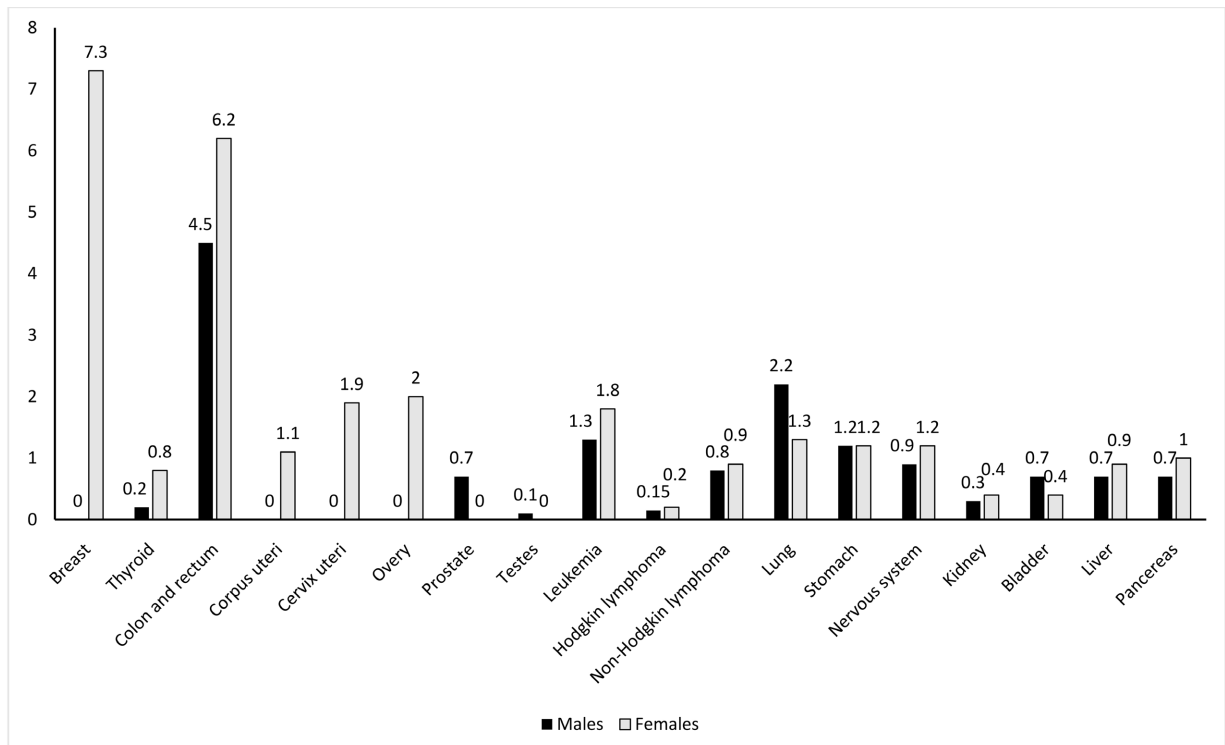


Figure 4. Profiling the HPV-related cancers mortality in males and females of ages between 15 - 44 years old in the UAE.

In comparison with global level, recent examples on the roles of HPV infections in prostate tumor development were recently documented and confirmed by sequencing and genotyping in eight infection cases of HPV18 among 50 men in Morocco [9]. According to the latest reports, these HPV genotypes are further classified into low-risk HPV (LR-HPV) and HR-HPV based on their carcinogenicity [10]. For instance, HR-HPVs including HPV-16, -18, -31, -33, -35, -39, -45, -51, -52, -56, -58, -59, are mainly responsible for the development of cervical cancer [10] [11], of which, HPV-16 and HPV-18 are the primary HR-HPV genotypes related to 71% cervical cancer worldwide [12].

In comparison with the global statistics as given recently by the WHO, the frequency of HPV-related cancers in UAE for both males and females in all ages are similar to that HPV frequency in other parts of the world; for instance in sub-Saharan Africa (24%), Eastern Europe (21.4%), Latin America (16.1%),

Northern America (4.7%) and Western Asia (1.7%) that include HPV 16 (23.9%), 18 (11.0%), 58 (9.4%), 56 (6.3%) and 52 (5.3%). As for South-East Asia, the region includes HPV 52 (12.9%), 16 (8.5%), 58 (5.2%), 18 (5.0%) and 66 (4.9%) [1] [13]-[16].

Moreover, the governments introduced a national screening program for the HPV profiling on all ages and also implemented parallel HPV vaccination [1] [17], which will reduce and eventually limit the prevalence of the HPV-related cancers in the coming decades in the UAE. According to the WHO report 2024, the prevention of HPV-associated pre-cancer and cancer was among the WHO global health strategy (2022-2023) under resolution WHA74.5 [1] [13] [14]. Additionally, HPV-screening and treatment of pre-cancer lesions is an effective way to prevent cervical cancer.

5. Conclusion

In conclusion, the HPV-related cancers in UAE for both males and females of all ages are similar to the HPV frequency in other parts of the world, particularly the neighboring gulf countries.

Acknowledgments

The authors would like to thank the Ministry of Health of UAE for the use of data on HPV-related cancer in association with the Center the Institut Català d'Oncologia (ICO) HPV Center [15], L'Hospitalet del Llobregat (Barcelona) Spain (E-mail: hpvcentre@iconcologia.net) and the International Agency for Research on Cancer (IARC), World Health Organization (WHO): (<https://www.who.int>).

Contributions

IM: Conceptualization and design; Project administration and supervision; Investigation and methodology; Definition of intellectual content; Manuscript writing, reviewing and editing. **BA, ME, IT:** Project administration; Investigation and methodology; Definition of intellectual content; Manuscript writing, reviewing and editing. **FE:** Definition of intellectual content; Manuscript writing, reviewing and editing. The authors have read and approved the final manuscript.

Availability of Data and Materials

The data is available on the public Open Data site of the the International Agency for Research on Cancer (IARC), WHO and by Ministry of Health of the UAE in association with the Center the Institut Català d'Oncologia (ICO) HPV Center, L'Hospitalet del Llobregat (Barcelona) Spain (E-mail: hpvcentre@iconcologia.net).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Abbreviations

CDC	Centers for Disease Control
LW	Low-Risk
HR	High-Risk
HPV	Human Papillomavirus
UAE	United Arab Emirates
WHO	World Health Organization