7835

https://bit.ly/46TxdVi

Epidemiological Trends in HPV-related Cancers and Diseases in the United Kingdom

Olga Ovcinnikova-Hutchings[1]; Kayla Engelbrecht[1]; Dionysios Ntais[1]

[1] MSD (UK) Limited, London, UK

Background and objectives

- Human papillomavirus (HPV) is a causal factor for several cancer types, including cervical cancer, and other diseases like anogenital warts (AGW) and recurrent respiratory papillomatosis (RRP).
- In the UK, school-based national immunisation programme (NIP) for HPV vaccination was introduced in 2008, subsequently extended in 2019 to include adolescent boys as part of a gender-neutral vaccination strategy[1].
- Limited data is available on the changing epidemiological trends in other HPV-related cancers and diseases over time, the impact they have on the healthcare system, as well as the correlation between sociodemographic factors and deprivation with HPV-related cancer trends.
- The study objective was to identify UK incidence and mortality data and explore the epidemiological trends of all HPV-related, and attributed, cancers (cervical, vaginal, vulval, anal, penile, head and neck [HNC]) and diseases (AGW, RRP).
- The purpose of this study is to show the trends and burden of HPV-related cancers and diseases as a whole.

Methods

- A longitudinal, retrospective study aggregating the latest publicly available data on HPV-related cancers and diseases. Incidence and mortality data based on ICD-10 codes (**Table 1**) was extracted from national registries across the UK (NHS England, Public Health Scotland, Public Health Wales, Northern Ireland Cancer Registry and Department of Health and Social Care), at national and local level.[2-7]
- Data availability differed across nations, so for this publication, we included the last 10 years of available data from 2013 onwards.
- Results were stratified by disease type, location (England, Scotland, Wales and Norther Ireland), sex, and age.
- Population demographics and indices of deprivation (rank) at the local level in England were collected to support causal analysis where feasible.[8-9]
- For the purpose of this study "HPV-related cancers" refers to cancers that can be caused by HPV, and "HPV-attributable cancers" for the estimated cases caused by HPV infection based on attributable fractions (AF) from the published literature[10] (**Table 1**) AFs were applied to incidence data to estimate HPV-attributable disease burden.

Table 1. HPV-related disease ICD-10 codes and HPV attributable fractions

Disease		ICD-10	HPV Attributable Fraction[12]	
Anal cancer		C21	0.880	
Cervical cancer		C53	1.000	
Head and neck cancer	Oral cavity	C02-06	0.022	0.091[a]
	Oropharynx	C01, C09-10	0.380	
	Other pharynx	C12-14	0.000	
	Larynx	C32	0.024	
Penile cancer		C60	0.500	
Vaginal cancer		C52	0.780	
Vulval cancer		C51	0.249	
Anogenital warts		A63.0	-	
Recurrent respiratory papillomatosis		B97.7, D14.0, D14.1	-	

ICD-10, International Classification of Diseases-10; HPV, human papillomavirus
[a]The attributable fraction for head and neck cancer is calculated as the weighted average based on the AF and incidence per anatomical site

Discussion

- This is latest publication that summarises available HPV-related disease epidemiological trend data for all four UK devolved nations.
- Current public health measures mainly target cervical cancer and, to some extent, AGW—leading to declines in certain age groups; other HPV-related diseases lack preventive interventions.
- HPV-attributable fractions (AF) are not UK-specific and come from international sources. Limitations include a) dependence on data quality and completeness; b) possible over- or underestimation for rare cancers; c) variation across populations; historical AFs may not reflect current trends
- COVID-19 likely impacted disease diagnosis and mortality patterns, influencing observed trends. Further observation and research are needed to understand evolving trends.

Conclusions

- The epidemiological trends in the UK demonstrate the continued burden of HPV-related cancers and diseases, highlighting key similarities and differences by disease type.
- Ongoing surveillance and targeted public health measures are essential to address gaps in awareness and ensure equitable access to prevention strategies in order to reduce sociodemographic inequalities.
- Continued research and collaboration will be vital in making significant progress to address residual inequalities.

Results

- Most of HPV-related cancers demonstrated varying degrees of trend increases the last decade (**Figure 1**). Figure legends provide rate change for each trend in the last decade to the latest available date (2013-2021/22) with arrows showing the overall numerical increase or decrease of incidence and mortality trends.
  - The head and neck incidence is 2.5 times higher in males compared to females (**Figure 3**)
  - Anal cancer is twice as common in women.
- Only HPV related cancer that has some decreasing incidence trends are for cervical cancer age 20-29 (England and Wales) and 20-34 (Scotland) (**Figure 2**).
- Incidence rates of AGW have decreased by 65-70% since 2015 in England and Wales. Data for the Northern Ireland and Scotland were not available. (**Figure 4**).
- 40.13% of all reported HPV-related cancer incidence in the UK is attributed to HPV infection (**Table 2**).
- Mortality rates for most HPV-related cancers show an upward trend over the last decade (**Figure 5**).
  - The head and neck cancer mortality is 1.8-2.8 times higher in males vs females across devolved nations for the latest reported year (2021/2022)
  - The anal cancer mortality is 1.3-1.5 times higher in females
- HPV-related cancer incidence had a greater positive correlation in areas with higher deprivation rank and a greater proportion white compared to other ethnic groups.
- No data was available for RRP from public national databases.

Note: dotted lines on figures represent the directional trend line

Figure 1. HPV related cancer incidence rate per 100,000 population

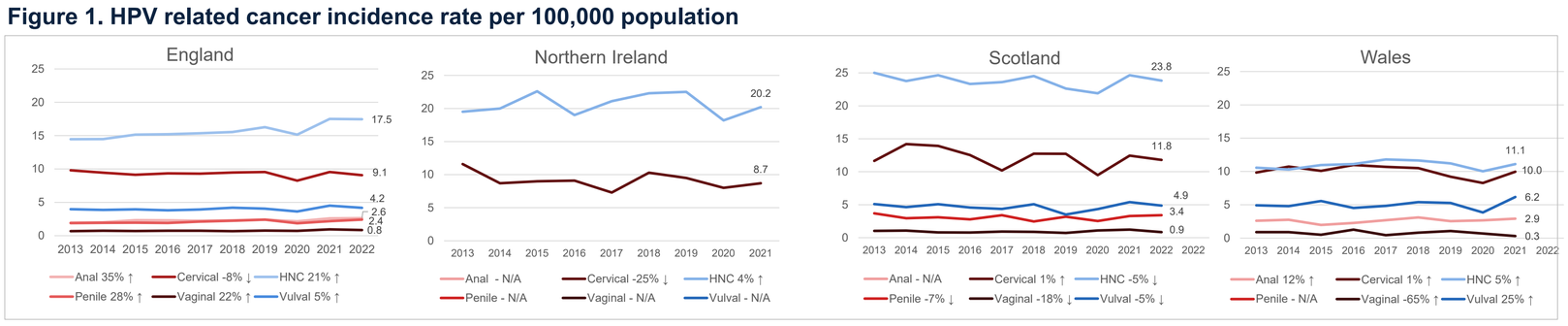


Figure 2. HPV related cervical cancer incidence rate by age group per 100,000 population

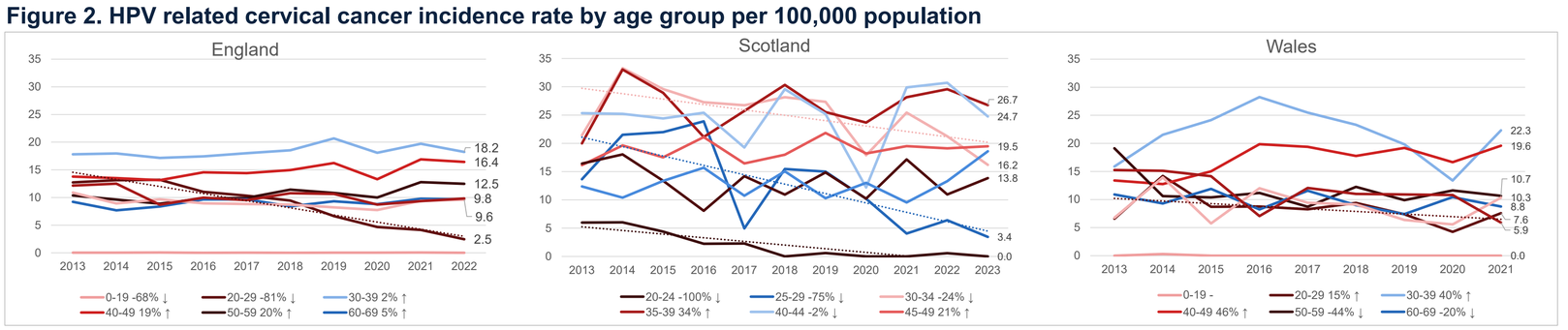


Figure 3. HPV related head and neck cancer incidence rate by gender per 100,000 population

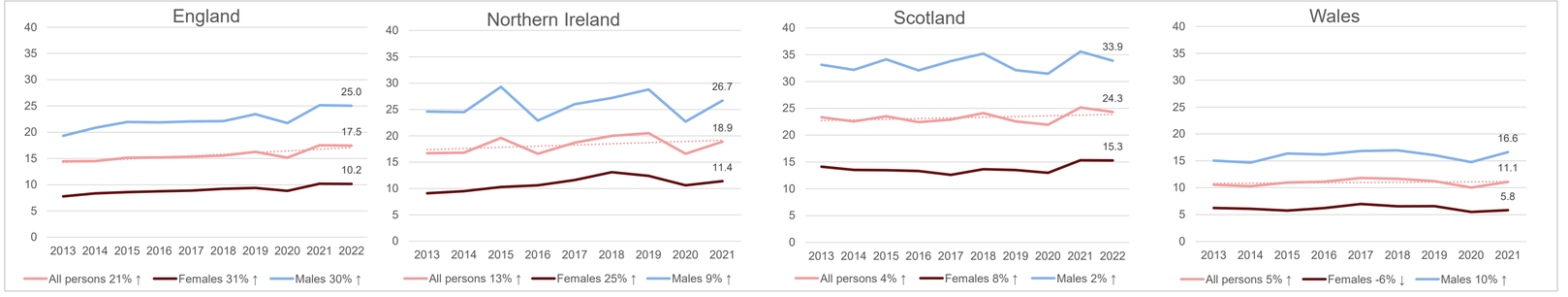


Table 2. HPV-related and estimated HPV-attributable disease incidence in the UK (2021)

Disease	England		Northern Ireland		Scotland		Wales	
	HPV-related	HPV-attributable	HPV-related	HPV-attributable	HPV-related	HPV-attributable	HPV-related	HPV-attributable
Anal cancer	1,466	1,290	NR	NR	NR	NR	91	80
Cervical cancer	2,760	2,760	82	82	343	343	158	158
Head and neck cancer	9,902	1,587	360	33	NR[a]	NR[a]	690	54
Penile cancer	605	302	NR	NR	86	43	NR	NR
Vaginal cancer	275	215	NR	NR	37	29	5	4
Vulval cancer	1,302	304	NR	NR	162	40	98	24
Total	**16,256**	**6,438**	**442**	**115**	**595**	**431**	**1,042**	**320**

NA, not reported in the published data to protect patient anonymity
[a] Incidence for Scotland was not available for all ICD-10 codes attributable to HPV head and neck cancer

Figure 4. Anogenital warts incidence per 100,000 in England and Wales 2015-2024

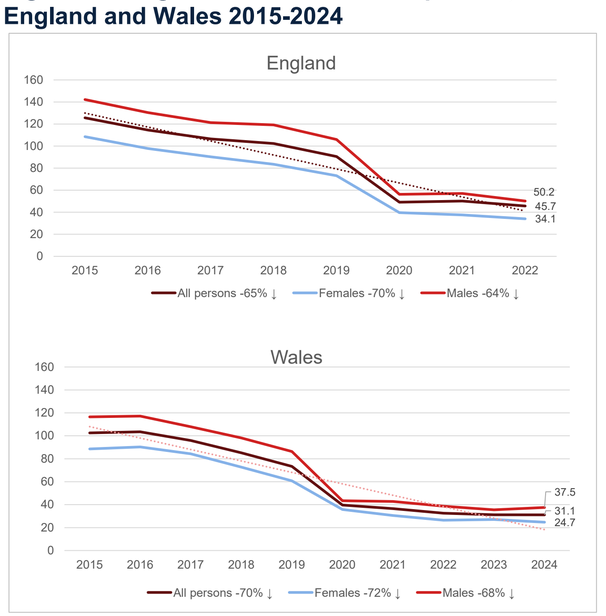
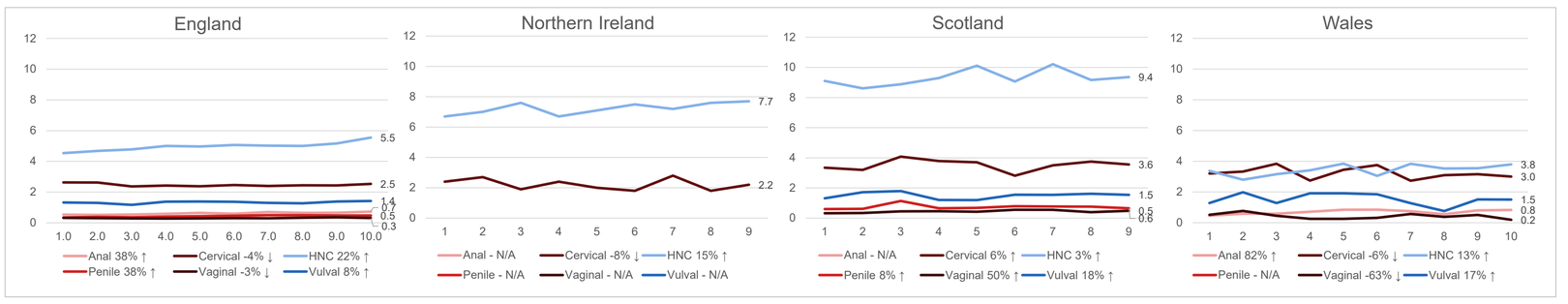


Figure 5. HPV related cancer mortality rate per 100,000 population



References

1. UK Health Security Agency Human papillomavirus (HPV) immunisation information for public health professionals, including updates. 2013 [updated 20 June 2023. Available from: https://www.gov.uk/government/publications/human-papillomavirus-hpv-the-green-book-chapter-18a.
2. National Disease Registration Statistics. Cancer Incidence and Mortality. [Available from: https://nhsd-ndrs.shinyapps.io/incidence_and_mortality/]
3. NHS England. Cancer registration statistics, England, 2022. [Available from: https://digital.nhs.uk/data-and-information/publications/statistical/cancer-registration-statistics]
4. Public Health Scotland. Scottish Cancer Registry – Annual Cancer Incidence. [Available from: https://www.opendata.nhs.scot/dataset/annual-cancer-incidence]
5. Public Health of Scotland. Scottish Cancer Registry – Annual Cancer Mortality. [Available from: https://www.opendata.nhs.scot/dataset/cancer-mortality]
6. Public Health Wales. Welsh Cancer Intelligence and Surveillance Unit: Cancer Reporting Tool – Official Statistics. [Available from: https://phw.nhs.wales/services-and-teams/welsh-cancer-intelligence-and-surveillance-unit-wcisu/cancer-reporting-tool-official-statistics/]
7. Queen's University Belfast. Northern Ireland Cancer Registry. [Available from: https://www.qub.ac.uk/research-centres/nicr/CancerInformation/official-statistics/BySite/]
8. GOV.UK. English Indices of Deprivation, 2019. [Available from: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019]
9. Office for National Statistics. Ethnicity. [Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/culturalidentity/ethnicity]
10. de Martel et al. (2017). Worldwide burden of cancer attributable to HPV by site, country and HPV type. International journal of cancer, 141(4), 664-670.

Disclosures

OOH, KE and DN are employees of MSD (UK) Limited, London, United Kingdom and may own stock and/or hold stock options in Merck & Co., Inc., Rahway, NJ, ASA.

Presented at ISPOR Europe 2025 ; Glasgow, UK; 10th November 2025.

Contact information

Olga Ovcinnikova-Hutchings – olga.ovcinnikova@msd.com Kayla Engelbrecht – kayla.engelbrecht@msd.com