

Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Variable Definitions of HPV-Associated Cancers and Cervical Cancer in This Study

Database	Year	Sex	Race/Ethnic	Region	Stage [†]	Age Group
USCS (Non-corrected)	2001-2017	Male Female	NHW, NHB, Hispanic, NHAPI, Other/Unknown	Northeast South Midwest West	Local Regional Distant Unknown	0-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80+
BRFSS	2001-2016	Female	NHW, NHB, Hispanic, NHAPI, Other/Unknown	Northeast South Midwest West	-	18-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80+
TeenVaxView	2008-2018	Male Female	NHW, NHB, Hispanic, NHAPI, NHAIAN	Northeast South Midwest West	-	13-17
USCS (Corrected by hysterectomy and pregnancy) [‡]	2001-2016	Female	NHW, NHB, Hispanic, NHAPI, Other/Unknown	-	-	0-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80+
NCDB	2001-2016	Female	NHW, NHB, Hispanic, NHAPI, Other/Unknown	-	-	0-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80+

eTable 2. Definitions of HPV-Associated Cancers and Cervical Cancer in USCS Public Use Databases from 2001 to 2017[†]

Cancer Type	Sex	ICD-O-3 Site Codes	ICD-O-3 Histology Codes
HPV-associated cancers			
Oropharyngeal SCC	Male, Female	C01.9, C02.4, C02.8, C05.1, C05.2, C09.0, C09.1, C09.8, C09.9, C10.0, C10.1, C10.2, C10.3, C10.4, C10.8, C10.9, C14.0, C14.2, C14.8	8050-8084, 8120-8131
Anal and rectal SCC	Male, Female	C20.9, C21.0, C21.1, C21.2, C21.8	8050-8084, 8120-8131
Vulvar SCC	Female	C51.0, C51.1, C51.2, C51.8, C51.9	8050-8084, 8120-8131
Vaginal SCC	Female	C52.9	8050-8084, 8120-8131
Penile SCC	Male	C60.0, C60.1, C60.2, C60.8, C60.9	8050-8084, 8120-8131
Cervical carcinoma	Female	C53.0, C53.1, C53.8, C53.9	8010-8671, 8940-8941
Cervical cancer	Female	C53.0, C53.1, C53.8, C53.9	8000-9992 (excluded 9050-9055, 9140, 9590-9992)*
Carcinoma	Female	C53.0, C53.1, C53.8, C53.9	8010-8671, 8940-8941
SCC	Female	C53.0, C53.1, C53.8, C53.9	8050-8084, 8120-8131
Adenocarcinoma	Female	C53.0, C53.1, C53.8, C53.9	8140-8147, 8160-8162, 8180-8221, 8250-8507, 8514, 8520-8551, 8571-8574, 8576, 8940-8941
Adeosquamous carcinoma	Female	C53.0, C53.1, C53.8, C53.9	8560, 8570
Other carcinoma	Female	C53.0, C53.1, C53.8, C53.9	8010-8049, 8085-8119, 8132-8139, 8148-8159, 8163-8179, 8222-8249, 8508-8513, 8515-8519, 8552-8559, 8561-8569, 8575, 8577-8671

Non-carcinoma	Female	C53.0, C53.1, C53.8, C53.9	8000-8009, 8672-8939, 8942-9992 (excluded 9050-9055, 9140, 9590-9992)*
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Abbreviations: SCC, squamous cell carcinoma; ICD-O-3, International Classification of Diseases for Oncology, the third edition .

† All cases were microscopically confirmed and malignant behavior. (Reference 1)

*These cell types, including Kaposi sarcoma, mesothelioma, lymphomas, leukemias, myelomas, lymphoreticular, and immunoproliferative diseases (ICD-O-3 histology codes 9050-9055, 9140, 9590-9992), were excluded from this study. (Reference 2)

References 1. <https://www.cdc.gov/cancer/uscs/public-use/predefined-seer-stat-variables.htm> 2. <https://seer.cancer.gov/data/>

eTable 3. Demographic and Clinical Characteristics of Cervical Cancer in USCS Public Use Databases from 2001 to 2017[†]

	Cervical Cancer	Carcinoma	SCC	Adenocarcinoma	Adenosquamous Carcinoma	Other Carcinoma	Non-Carcinoma
Case Number (%)	210776 (100)	206075 (97.8)	142390 (67.6)	47171 (22.4)	7013 (3.3)	9501 (4.5)	4701 (2.2)
Age Group	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
0-19	295 (0.1)	185 (0.1)	66 (0.0)	81 (0.2)	-	29 (0.3)	110 (2.3)
20-24	2130 (1.0)	2011 (1.0)	1427 (1.0)	327 (0.7)	64 (0.9)	193 (2.0)	119 (2.5)
25-29	9384 (4.5)	9201 (4.5)	6430 (4.5)	1928 (4.1)	296 (4.2)	547 (5.8)	183 (3.9)
30-34	18757 (8.9)	18513 (9.0)	12472 (8.8)	4579 (9.7)	682 (9.7)	780 (8.2)	244 (5.2)
35-39	24469 (11.6)	24158 (11.7)	16024 (11.3)	6336 (13.4)	950 (13.5)	848 (8.9)	311 (6.6)
40-44	27852 (13.2)	27447 (13.3)	18581 (13.0)	6806 (14.4)	1077 (15.4)	983 (10.3)	405 (8.6)
45-49	26149 (12.4)	25627 (12.4)	17695 (12.4)	6034 (12.8)	947 (13.5)	951 (10.0)	522 (11.1)
50-54	23188 (11.0)	22720 (11.0)	16223 (11.4)	4785 (10.1)	785 (11.2)	927 (9.8)	468 (10.0)
55-59	20708 (9.8)	20235 (9.8)	14512 (10.2)	4131 (8.8)	669 (9.5)	923 (9.7)	473 (10.1)
60-64	16850 (8.0)	16433 (8.0)	11536 (8.1)	3567 (7.6)	501 (7.1)	829 (8.7)	417 (8.9)
65-69	13489 (6.4)	13089 (6.4)	9134 (6.4)	2830 (6.0)	380 (5.4)	745 (7.8)	400 (8.5)
70-74	9833 (4.7)	9496 (4.6)	6554 (4.6)	2120 (4.5)	257 (3.7)	565 (5.9)	337 (7.2)
75-79	7484 (3.6)	7226 (3.5)	5048 (3.5)	1548 (3.3)	180 (2.6)	450 (4.7)	258 (5.5)
80+	10188 (4.8)	9734 (4.7)	6688 (4.7)	2099 (4.4)	216 (3.1)	731 (7.7)	454 (9.7)
Race/Ethnicity	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
NHW	130776 (62.0)	128024 (62.1)	84928 (59.6)	33017 (70.0)	4436 (63.3)	5643 (59.4)	2752 (58.5)

NHB	32389 (15.4)	34116 (15.3)	24733 (17.4)	4208 (8.9)	871 (12.4)	1634 (17.2)	943 (20.1)
Hispanic	34329 (16.3)	33605 (16.3)	23913 (16.8)	6874 (14.6)	1226 (17.5)	1592 (16.8)	724 (15.4)
NHAPI	9456 (4.5)	9305 (4.5)	6241 (4.4)	2229 (4.7)	369 (5.3)	466 (4.9)	151 (3.2)
Other/Unknown	3826 (1.8)	3695 (1.8)	2575 (1.8)	843 (1.8)	111 (1.6)	166 (1.7)	131 (2.8)
Region	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Northeast	38538 (18.3)	37627 (18.3)	25581 (18.0)	8914 (18.9)	1375 (19.6)	1757 (18.5)	911 (19.4)
Midwest	43526 (20.7)	42761 (20.8)	29656 (20.8)	9997 (21.2)	1458 (20.8)	1650 (17.4)	765 (16.3)
South	84446 (40.1)	82276 (39.9)	58484 (41.1)	17183 (36.4)	2501 (35.7)	4108 (43.2)	2170 (46.2)
West	44266 (21.0)	43411 (21.1)	28669 (20.1)	11077 (23.5)	1679 (23.9)	1986 (20.9)	855 (18.2)
Stage	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Local	96876 (46.0)	95496 (46.3)	61576 (43.2)	27801 (58.9)	3227 (46.0)	2892 (30.4)	1380 (29.4)
Regional	74711 (35.4)	73734 (35.8)	56959 (40.0)	11719 (24.8)	2595 (37.0)	2461 (25.9)	977 (20.8)
Distant	27102 (12.9)	26350 (12.8)	17867 (12.5)	4992 (10.6)	939 (13.4)	2552 (26.9)	752 (16.0)
Unknown	12087 (5.7)	10495 (5.1)	5988 (4.2)	2659 (5.6)	252 (3.6)	1596 (16.8)	1592 (33.9)

Abbreviations: SCC, squamous cell carcinoma; NHW, Non-Hispanic White; NHB, Non-Hispanic Black; NHAPI, Non-Hispanic Asians or Pacific Islander; Other/Unknown (included Non-Hispanic American Indian/Alaska Native, other unspecified, or Unknown); NOS, not otherwise specified.

† Percentages may not total 100 because of rounding.

§ Merged summary stage included local (localized only), regional (regional, direct extension only, regional lymph nodes only, direct extension and regional lymph nodes, or NOS), distant (distant site(s)/node(s) involved), and unknown (not applicable, unknown, unstaged, unspecified, or death certificate-only).

eTable 4. Age-Specified Incidences and Trends of Female Cervical Cancer by Age Group and Cell Type in USCS Public Use Databases from 2001 to 2017[†]

	ASI	Trend 1		Trend 2		Trend 3		Trend 4		2001-2017
Age Group	2001 to 2017	Years	APC (95% CI)	Year	APC (95% CI)	Year	APC (95% CI)	Year	APC (95% CI)	AAPC (95% CI)
Cervical Cancer										
20-24	1.37 to 0.68	2001-2011	-2.29* (-4.45 to -0.07)	2011-2017	-9.50* (-14.59 to -4.10)					-5.05* (-7.24 to -2.82)
25-29	6.79 to 4.47	2001-2017	-1.58* (-2.32 to -0.84)							-1.58* (-2.32 to -0.84)
30-34	12.26 to 11.01	2001-2012	-2.15* (-2.69 to -1.62)	2012-2017	2.53* (0.68 to 4.40)					-0.72* (-1.32 to -0.11)
35-39	14.34 to 13.49	2001-2017	-0.32 (-0.80 to -0.17)							-0.32 (-0.80 to -0.17)
40-44	16.43 to 14.84	2001-2017	-0.28 (-0.71 to 0.15)							-0.28 (-0.71 to 0.15)
45-49	15.09 to 13.02	2001-2017	-0.36 (-0.76 to 0.03)							-0.36 (-0.76 to 0.03)
50-54	14.38 to 12.44	2001-2006	-2.23* (-3.82 to -0.62)	2006-2017	0.01 (-0.48 to 0.49)					-0.70* (-1.24 to -0.16)
55-59	14.34 to 11.79	2001-2005	-3.85 (-7.24 to -0.34)	2005-2017	-0.29 (-0.91 to 0.32)					-1.20* (-2.09 to -0.30)
60-64	14.57 to 11.20	2001-2003	-6.40 (-14.4 to 2.29)	2003-2017	-0.98* (-1.36 to -0.61)					-1.68* (-2.69 to -0.65)
65-69	15.47 to 10.19	2001-2017	-2.38* (-2.85 to -1.92)							-2.38* (-2.85 to -1.92)
70-74	13.50 to 9.67	2001-2017	-2.14* (-2.56 to -1.72)							-2.14* (-2.56 to -1.72)
75-80	11.85 to 9.12	2001-2017	-1.96* (-2.45 to -1.47)							-1.96* (-2.45 to -1.47)
80+	11.10 to 7.27	2001-2013	-3.38* (-3.95 to -2.82)	2013-2017	0.03 (-3.28 to 3.46)					-2.54* (-3.37 to -1.71)
Cervical Carcinoma										
20-24	1.34 to 0.60	2001-2017	-4.63* (-5.90 to -3.35)							-4.63* (-5.90 to -3.35)

25-29	6.71 to 4.33	2001-2017	-1.63* (-2.40 to -0.90)							-1.63* (-2.40 to -0.90)
30-34	12.14 to 10.84	2001-2012	-2.23* (-2.73 to -1.72)	2012-2017	2.56* (0.82 to 4.34)					-0.75* (-1.33 to -0.18)
35-39	14.23 to 13.22	2001-2017	-0.35 (-0.83 to 0.13)							-0.35 (-0.83 to 0.13)
40-44	16.29 to 14.56	2001-2017	-0.34 (-0.77 to 0.09)							-0.34 (-0.77 to 0.09)
45-49	14.83 to 12.74	2001-2017	-0.39 (-0.79 to 0.01)							-0.39 (-0.79 to 0.01)
50-54	14.16 to 12.23	2001-2003	-5.55 (-12.69 to 2.18)	2003-2017	-0.29 (-0.65 to 0.07)					-0.96* (-1.88 to -0.04)
55-59	14.13 to 11.53	2001-2005	-3.90* (-7.22 to -0.46)	2005-2017	-0.33 (-0.93 to 0.28)					-1.23* (-2.11 to -0.35)
60-64	14.36 to 10.88	2001-2003	-6.54 (-14.97 to 2.73)	2003-2017	-1.10* (-1.50 to -0.70)					-1.79* (-2.88 to -0.70)
65-69	15.08 to 9.93	2001-2017	-2.44* (-2.92 to -1.96)							-2.44* (-2.92 to -1.96)
70-74	13.09 to 9.19	2001-2017	-2.27* (-2.70 to -1.84)							-2.27* (-2.70 to -1.84)
75-80	11.58 to 8.85	2001-2017	-2.07* (-2.57 to -1.56)							-2.07* (-2.57 to -1.56)
80+	10.70 to 6.95	2001-2012	-3.58* (-4.22 to -2.94)	2012-2017	-0.63 (-2.98 to 1.78)					-2.67* (-3.43 to -1.90)
Cervical SCC										
20-24	0.98 to 0.37	2001-2012	-3.03* (-4.90 to -1.14)	2012-2017	-11.72* (-18.89 to -3.92)					-5.84* (-8.32 to -3.29)
25-29	4.72 to 3.17	2001-2005	-6.81* (-12.73 to -0.50)	2005-2017	-0.28 (-1.52 to 0.97)					-1.96* (-3.61 to -0.28)
30-34	8.57 to 7.23	2001-2011	-3.31* (-4.00 to -2.62)	2011-2017	2.76* (1.19 to 4.37)					-1.08* (-1.73 to -0.43)
35-39	10.18 to 8.61	2001-2017	-1.15* (-1.68 to -0.62)							-1.15* (-1.68 to -0.62)
40-44	12.01 to 9.33	2001-2017	-1.44* (-1.93 to -0.94)							-1.44* (-1.93 to -0.94)
45-49	10.90 to 7.94	2001-2017	-1.21* (-1.69 to -0.73)							-1.21* (-1.69 to -0.73)

50-54	10.43 to 8.39	2001-2017	-0.91* (-1.31 to -0.51)							-0.91* (-1.31 to -0.51)
55-59	10.49 to 8.29	2001-2006	-3.78* (-5.90 to -1.61)	2006-2017	-0.38 (-1.00 to 0.25)					-1.45* (-2.18 to -0.72)
60-64	10.91 to 7.32	2001-2003	-8.45* (-14.92 to -1.50)	2003-2006	0.08 (-7.04 to 7.76)	2006-2011	-3.81* (-5.90 to -1.68)	2011-2017	-0.27 (-1.39 to 0.87)	-2.37* (-3.81 to -0.92)
65-69	10.73 to 6.52	2001-2017	-3.18* (-3.73 to -2.62)							-3.18* (-3.73 to -2.62)
70-74	9.43 to 5.88	2001-2003	-8.09* (-13.72 to -2.08)	2003-2010	-0.72 (-1.86 to 0.43)	2010-2013	-6.17 (-12.44 to 0.56)	2013-2017	-1.90 (-3.98 to 0.22)	-3.00* (-4.30 to -1.68)
75-80	8.05 to 5.91	2001-2017	-2.31* (-2.89 to -1.72)							-2.31* (-2.89 to -1.72)
80+	7.23 to 5.02	2001-2013	-3.51* (-4.18 to -2.83)	2013-2017	1.22 (-2.78 to 5.38)					-2.35* (-3.44 to -1.34)
Cervical Adenocarcinoma										
25-29	1.27 to 0.80	2001-2017	-1.25 (-2.48 to 0.00)							-1.25 (-2.48 to 0.00)
30-34	2.52 to 2.88	2001-2009	2.55* (0.82 to 4.31)	2009-2012	-6.33 (-19.76 to 9.35)	2012-2017	3.59* (0.21 to 7.09)			1.14 (-1.62 to 3.98)
35-39	2.79 to 3.82	2001-2007	6.48* (3.04 to 10.04)	2007-2017	0.47 (-0.90 to 1.87)					2.69* (1.31 to 4.08)
40-44	3.13 to 4.33	2001-2017	3.14* (2.52 to 3.77)							3.14* (2.52 to 3.77)
45-49	2.46 to 3.82	2001-2017	2.67* (2.07 to 3.28)							2.67* (2.07 to 3.28)
50-54	2.51 to 2.91	2001-2017	1.18* (0.63 to 1.73)							1.18* (0.63 to 1.73)
55-59	2.47 to 2.51	2001-2017	0.63 (-0.08 to 1.35)							0.63 (-0.08 to 1.35)
60-64	2.34 to 2.51	2001-2017	1.27* (0.53 to 2.01)							1.27* (0.53 to 2.01)
65-69	2.68 to 2.49	2001-2017	0.43 (-0.48 to 1.34)							0.43 (-0.48 to 1.34)
70-74	2.74 to 2.45	2001-2017	-0.95* (-1.67 to -0.21)							-0.95* (-1.67 to -0.21)
75-80	2.56 to 2.17	2001-2017	-1.11 (-2.26 to 0.06)							-1.11 (-2.26 to 0.06)

80+	2.12 to 1.34	2001-2017	-2.85* (-3.77 to -1.93)							-2.85* (-3.77 to -1.93)
Cervical Adenosquamous carcinoma										
30-34	0.53 to 0.30	2001-2017	-3.77* (-5.35 to -2.17)							-3.77* (-5.35 to -2.17)
35-39	0.66 to 0.42	2001-2007	5.28 (-0.67 to 11.59)	2007-2017	-6.33* (-9.01 to -3.57)					-2.13 (-4.60 to 0.40)
40-44	0.59 to 0.43	2001-2017	-1.87* (-3.32 to -0.39)							-1.87* (-3.32 to -0.39)
45-49	0.71 to 0.53	2001-2010	-5.26* (-7.60 to -2.86)	2010-2017	3.41 (-0.58 to 7.56)					-1.56 (-3.51 to 0.43)
50-54	0.66 to 0.35	2001-2017	-4.72* (-6.22 to -3.19)							-4.72* (-6.22 to -3.19)
55-59	0.50 to 0.32	2001-2017	-2.90* (-4.50 to -1.27)							-2.90* (-4.50 to -1.27)
60-64	0.47 to 0.23	2001-2017	-2.40* (-4.00 to -0.77)							-2.40* (-4.00 to -0.77)
Cervical Other Carcinoma										
25-29	0.40 to 0.30	2001-2017	-2.77* (-4.60 to -0.91)							-2.77* (-4.60 to -0.91)
30-34	0.52 to 0.42	2001-2017	-2.45* (-4.02 to -0.86)							-2.45* (-4.02 to -0.86)
35-39	0.60 to 0.36	2001-2017	-2.15* (-3.43 to -0.86)							-2.15* (-3.43 to -0.86)
40-44	0.55 to 0.48	2001-2017	-1.59* (-2.66 to -0.50)							-1.59* (-2.66 to -0.50)
45-49	0.76 to 0.45	2001-2017	-2.78* (-4.23 to -1.30)							-2.78* (-4.23 to -1.30)
50-54	0.56 to 0.57	2001-2017	-0.45 (-1.71 to 0.83)							-0.45 (-1.71 to 0.83)
55-59	0.67 to 0.42	2001-2017	-1.87* (-2.95 to -0.77)							-1.87* (-2.95 to -0.77)
60-64	0.64 to 0.51	2001-2017	-0.78 (-1.85 to 0.31)							-0.78 (-1.85 to 0.31)
65-69	1.14 to 0.68	2001-2006	-10.53* (-16.95 to -3.61)	2006-2017	-0.06 (-2.29 to 2.21)					-3.46* (-5.86 to -1.00)

70-74	0.58 to 0.62	2001-2017	-2.08* (-3.94 to -0.18)							-2.08* (-3.94 to -0.18)
75-80	0.58 to 0.66	2001-2017	-1.17 (-3.31 to 1.03)							-1.17 (-3.31 to 1.03)
80+	0.92 to 0.45	2001-2017	-3.65* (-5.23 to -2.04)							-3.65* (-5.23 to -2.04)
Cervical Non-Carcinoma										
40-44	0.14 to 0.28	2001-2017	3.76* (1.59 to 5.98)							3.76* (1.59 to 5.98)
45-49	0.26 to 0.28	2001-2017	1.05 (-0.53 to 2.65)							1.05 (-0.53 to 2.65)
80+	0.31 to 0.32	2001-2017	-1.52 (-4.14 to 1.18)							-1.52 (-4.14 to 1.18)

Abbreviations: SCC, squamous cell carcinoma, ASI, age-specified incidence; APC, annual percent change; AAPC, average annual percent change

† Trends based on incidence was analyzed using the Joinpoint Regression Program, version 4.8.0.1, allowing up to 3 joinpoints. AAPC is a summary measure of the trend over a pre-specified fixed interval. It was computed as a weighted average of the APC from the joinpoint model, with the weights equal to the length the APC interval.

* The APC or AAPC is significantly different from zero ($p < .05$).

eTable 5. Age-Adjusted Incidences and Trends of HPV-Associated Cancers and Cervical Cancer in USCS Public Use Databases from 2001 to 2017[†]

		AAI	Trend 1		Trend 2		2001-2017
Cancer and Cell Type	N	2001 to 2017	Years	APC (95% CI)	Year	APC (95% CI)	AAPC (95% CI)
Male HPV associated cancers	264019	7.71 to 11.00	2001-2017	2.36* (2.13 to 2.59)	-	-	2.36* (2.13 to 2.59)
Oropharyngeal SCC	211421	5.90 to 8.89	2001-2017	2.71* (2.48 to 2.93)	-	-	2.71* (2.48 to 2.93)
Anal and rectal SCC	32679	0.99 to 1.31	2001-2009	3.35* (2.13 to 4.59)	2009-2017	0.34 (-0.68 to 1.36)	1.83* (1.12 to 2.55)
Penile SCC	19919	0.82 to 0.80	2001-2017	0.13 (-0.30 to 0.56)	-	-	0.13 (-0.30 to 0.56)
Female HPV associated cancers	393298	13.96 to 13.68	2001-2017	0.09 (-0.05 to 0.24)			0.09 (-0.05 to 0.24)
Oropharyngeal SCC	51400	1.58 to 1.68	2001-2015	1.05* (0.72 to 1.37)	2015-2017	-3.30 (-9.13 to 29.2)	0.49 (-0.25 to 1.24)
Anal and rectal SCC	62721	1.53 to 2.37	2001-2009	3.71* (2.99 to 4.44)	2009-2017	1.96* (1.37 to 2.54)	2.83* (2.41 to 3.25)
Vulvar SCC	59559	1.72 to 2.09	2001-2012	1.73* (1.41 to 2.05)	2012-2017	0.01 (-0.92 to 0.94)	1.19* (0.86 to 1.52)
Vaginal SCC	13543	0.46 to 0.42	2001-2017	-0.30 (-0.72 to 0.12)			-0.30 (-0.72 to 0.12)
Cervical carcinoma	206075	8.68 to 7.12	2001-2012	-1.46* (-1.86 to -1.06)	2012-2017	0.34 (-1.05 to 1.74)	-0.90* (-1.36 to -0.44)
Cervical Cancer (Uncorrected)	210776	8.81 to 7.30	2001-2012	-1.40* (-1.79 to -1.00)	2012-2017	0.36 (-0.99 to 1.74)	-0.85* (-1.30 to -0.40)
Carcinoma	206075	8.68 to 7.12	2001-2012	-1.46* (-1.86 to -1.06)	2012-2017	0.34 (-1.05 to 1.74)	-0.90* (-1.36 to -0.44)
SCC	142390	6.28 to 4.73	2001-2012	-2.17* (-2.56 to -1.77)	2012-2017	0.19 (-1.21 to 1.61)	-1.44* (-1.90 to -0.98)
Adenocarcinoma	47171	1.62 to 1.89	2001-2017	1.28* (1.00 to 1.56)	-	-	1.28* (1.00 to 1.56)
Adenosquamous carcinoma	7013	0.35 to 0.21	2001-2017	-3.11* (-3.67 to -2.55)	-	-	-3.11* (-3.67 to -2.55)

Other carcinoma	9501	0.42 to 0.31	2001-2017	-2.15* (-2.73 to -1.57)	-	-	-2.15* (-2.73 to -1.57)
Non-Carcinoma	4701	0.14 to 0.18	2001-2017	1.54* (0.96 to 2.12)	-	-	1.54* (0.96 to 2.12)
		AAI	Trend 1		Trend 2		2001-2016
Cancer and Cell Type	N	2001 to 2016	Years	APC (95% CI)	Year	APC (95% CI)	AAPC (95% CI)
Cervical Cancer (Corrected)	201609	12.66 to 10.04	2001-2016	-1.48* (-1.76 to -1.20)			-1.48* (-1.76 to -1.20)
Carcinoma	199239	12.54 to 9.90	2001-2016	-1.50* (-1.78 to -1.22)			-1.50* (-1.78 to -1.22)
SCC	134582	8.91 to 6.45	2001-2016	-2.12* (-2.42 to -1.81)			-2.12* (-2.42 to -1.81)
Adenocarcinoma	36415	2.00 to 1.99	2001-2016	0.07 (-0.24 to 0.38)			0.07 (-0.24 to 0.38)
Adenosquamous carcinoma	6599	0.47 to 0.24	2001-2016	-3.88* (-4.96 to -2.79)			-3.88* (-4.96 to -2.79)

Abbreviations: SCC, squamous cell carcinoma, AAI, age-adjusted incidence (adjusted to the 2000 US standard population); APC, annual percent change; AAPC.

† Trends based on incidence was analyzed using the Joinpoint Regression Program, version 4.8.0.1, allowing up to 3 joinpoints. AAPC is a summary measure of the trend over a pre-specified fixed interval. It was computed as a weighted average of the APC from the joinpoint model, with the weights equal to the length the APC interval.

‡ The age-adjusted and age-specified incidence in USCS were corrected by hysterectomy (age ≥ 18), pregnancy (age 20-45), and cervical cancer who received hysterectomy. (Reference 1)

* The APC or AAPC is significantly different from zero ($p < .05$).

Reference

1. Mary Kathryn Abel, Racial disparities in high-risk uterine cancer histologic subtypes: A United States Cancer Statistics study. *Gynecol Oncol.* 2021 May;161(2):470-476

eTable 6. Age-Adjusted Incidences and Trends of Female HPV-Associated Cancers by Race and Ethnicity, Region, and Stage in USCS Public Use Databases from 2001 to 2017[†]

	AAI	Trend 1		Trend 2		Trend 3		Trend 4		2001-2017
	2001 to 2017	Years	APC (95% CI)	Year	APC (95% CI)	Year	APC (95% CI)	Year	APC (95% CI)	AAPC (95% CI)
Female HPV associated cancers	13.96 to 13.68	2001-2017	0.09 (-0.05 to 0.24)							0.09 (-0.05 to 0.24)
Race/Ethnicity										
NHW	13.19 to 14.31	2001-2017	0.78* (0.61 to 0.94)							0.78* (0.61 to 0.94)
NHB	17.26 to 13.27	2001-2017	-1.51* (-1.73 to -1.30)							-1.51* (-1.73 to -1.30)
Hispanic	18.37 to 12.49	2001-2010	-3.05* (-3.72 to -2.38)	2010-2017	-0.88 (-1.79 to 0.04)					-2.11* (-2.60 to -1.61)
NHAPI	11.06 to 7.57	2001-2003	-9.73* (-16.12 to -2.84)	2003-2006	0.53 (-6.47 to 8.06)	2006-2009	-4.59 (-10.98 to 2.26)	2009-2017	-0.44 (-1.13 to 0.26)	-2.25* (-3.90 to -0.58)
Other or Unknown	25.71 to 36.93	2001-2017	1.32* (0.44 to 2.20)							1.32* (0.44 to 2.20)
Region										
Northeast	13.57 to 13.54	2001-2017	0.07 (-0.07 to 0.22)							0.07 (-0.07 to 0.22)
Midwest	13.32 to 13.96	2001-2017	0.54* (0.32 to 0.76)							0.54* (0.32 to 0.76)
South	15.11 to 14.49	2001-2017	0.08 (-0.13 to 0.28)							0.08 (-0.13 to 0.28)
West	13.12 to 12.14	2001-2017	-0.38* (-0.56 to -0.20)							-0.38* (-0.56 to -0.20)
Stage										
Local	6.98 to 6.30	2001-2005	-3.35* (-5.34 to -1.31)	2005-2017	0.22 (-0.17 to 0.60)					-0.69* (-1.22 to -0.15)
Regional	4.75 to 5.08	2001-2006	2.05* (0.41 to 3.72)	2006-2017	-0.08 (-0.53 to 0.37)					0.58* (0.04 to 1.12)
Distant	1.13 to 1.51	2001-2005	7.17* (3.12 to 11.38)	2005-2015	2.57* (1.62 to 3.52)	2015-2017	-10.59* (-19.13 to -1.15)			1.94* (0.46 to 3.43)

Unknown	1.11 to 0.78	2001-2006	-7.23* (-12.08 to -2.11)	2006-2017	-0.44 (-2.14 to 1.28)					-2.62* (-4.40 to -0.80)
Female Oropharyngeal SCC	1.58 to 1.68	2001-2015	1.05* (0.72 to 1.37)	2015-2017	-3.30 (-9.13 to 29.2)					0.49 (-0.25 to 1.24)
Race/Ethnicity										
NHW	1.64 to 1.96	2001-2015	1.72* (1.40 to 2.05)	2015-2017	-2.71 (-8.64 to 3.60)					1.16* (0.40 to 1.92)
NHB	1.88 to 1.26	2001-2017	-1.86* (-2.31 to -1.40)							-1.86* (-2.31 to -1.40)
Hispanic	0.89 to 0.89	2001-2017	0.61 (-0.32 to 1.54)							0.61 (-0.32 to 1.54)
NHAPI	0.56 to 0.50	2001-2017	1.07 (-0.63 to 2.79)							1.07 (-0.63 to 2.79)
Region										
Northeast	1.58 to 1.78	2001-2017	1.04* (0.54 to 1.54)							1.04* (0.54 to 1.54)
Midwest	1.45 to 1.71	2001-2017	1.19* (0.61 to 1.77)							1.19* (0.61 to 1.77)
South	1.71 to 1.77	2001-2017	0.83* (0.44 to 1.23)							0.83* (0.44 to 1.23)
West	1.48 to 1.39	2001-2017	-0.14 (-0.45 to 0.16)							-0.14 (-0.45 to 0.16)
Stage										
Local	0.39 to 0.32	2001-2017	-0.89* (-1.39 to -0.39)							-0.89* (-1.39 to -0.39)
Regional	0.92 to 1.11	2001-2004	-2.82 (-6.49 to 1.00)	2004-2017	1.92* (1.55 to 2.29)					1.02* (0.31 to 1.73)
Distant	0.14 to 0.15	2001-2005	23.98* (10.42 to 39.20)	2005-2015	0.37 (-2.11 to 2.91)	2015-2017	-29.98* (-49.94 to -2.06)			1.15 (-3.41 to 5.94)
Unknown	0.13 to 0.10	2001-2013	-3.76* (-5.73 to -1.76)	2013-2017	9.97 (-1.03 to 22.19)					-0.50 (-3.20 to 2.27)
Female Anal and Rectal SCC	1.53 to 2.37	2001-2009	3.71* (2.99 to 4.44)	2009-2017	1.96* (1.37 to 2.54)					2.83* (2.41 to 3.25)
Race/Ethnicity										
NHW	1.63 to 2.77	2001-2008	4.52* (3.42 to 5.63)	2008-2017	2.68* (2.07 to 3.29)					3.48* (2.95 to 4.01)

NHB	1.28 to 1.73	2001-2017	1.88* (1.38 to 2.38)							1.88* (1.38 to 2.38)
Hispanic	1.49 to 1.56	2001-2017	0.42 (-0.17 to 1.01)							0.42 (-0.17 to 1.01)
NHAPI	0.40 to 0.38	2001-2017	-1.30 (-3.80 to 1.28)							-1.30 (-3.80 to 1.28)
Region										
Northeast	1.49 to 2.38	2001-2017	3.06* (2.69 to 3.44)							3.06* (2.68 to 3.44)
Midwest	1.32 to 2.46	2001-2017	3.43* (2.93 to 3.94)							3.43* (2.93 to 3.94)
South	1.65 to 2.48	2001-2017	2.58* (2.15 to 3.01)							2.58* (2.15 to 3.01)
West	1.57 to 2.09	2001-2010	3.09* (2.11 to 4.08)	2010-2017	0.75 (-0.41 to 1.92)					2.06* (1.38 to 2.74)
Stage										
Local	0.80 to 1.03	2001-2017	1.79* (1.42 to 2.17)							1.79* (1.42 to 2.17)
Regional	0.39 to 0.90	2001-2009	7.02* (6.19 to 7.86)	2009-2012	-1.09 (-6.77 to 4.93)	2012-2017	6.93* (5.71 to 8.16)			5.42* (4.31 to 6.55)
Distant	0.12 to 0.24	2001-2004	17.94* (4.63 to 32.95)	2004-2015	4.86* (3.50 to 6.23)	2015-2017	-12.98 (-25.37 to 1.46)			4.72* (1.96 to 7.56)
Unknown	0.22 to 0.20	2001-2017	-0.54 (-1.08 to 0.01)							-0.54 (-1.08 to 0.01)
Female Vulvar SCC	1.72 to 2.09	2001-2012	1.73* (1.41 to 2.05)	2012-2017	0.01 (-0.92 to 0.94)					1.19* (0.86 to 1.52)
Race/Ethnicity										
NHW	1.87 to 2.40	2001-2014	2.12* (1.91 to 2.33)	2014-2017	-0.81 (-2.56 to 0.97)					1.56* (1.22 to 1.90)
NHB	1.37 to 1.75	2001-2017	1.07* (0.35 to 1.80)							1.07* (0.35 to 1.80)
Hispanic	1.27 to 1.16	2001-2017	-0.49 (-1.09 to 0.11)							-0.49 (-1.09 to 0.11)
NHAPI	0.39 to 0.48	2001-2017	1.14 (-0.52 to 2.83)							1.14 (-0.52 to 2.83)
Other or Unknown	3.06 to 4.46	2001-2017	0.88 (-1.02 to 2.81)							0.88 (-1.02 to 2.81)
Region										

Northeast	1.84 to 2.26	2001-2017	1.36* (0.91 to 1.82)							1.36* (0.91 to 1.82)
Midwest	1.85 to 2.40	2001-2012	2.66* (2.08 to 3.25)	2012-2017	0.36 (-1.33 to 2.08)					1.94* (1.34 to 2.55)
South	1.74 to 2.09	2001-2017	1.22* (0.86 to 1.58)							1.22* (0.86 to 1.58)
West	1.41 to 1.62	2001-2017	0.45 (-0.13 to 1.04)							0.45 (-0.13 to 1.04)
Stage										
Local	1.09 to 1.35	2001-2005	-1.86 (-5.17 to 1.57)	2005-2017	2.34* (1.76 to 2.93)					1.27* (0.40 to 2.15)
Regional	0.49 to 0.54	2001-2006	9.43* (3.63 to 15.55)	2006-2017	-2.25* (-3.67 to -0.80)					1.26 (-0.52 to 3.08)
Distant	0.05 to 0.10	2001-2014	7.32* (5.26 to 9.43)	2014-2017	-9.20 (-21.51 to 5.04)					4.01* (1.10 to 7.00)
Unknown	0.10 to 0.09	2001-2017	-0.68 (-2.46 to 1.13)							-0.68 (-2.46 to 1.13)
Female Vaginal SCC	0.46 to 0.42	2001-2017	-0.30 (-0.72 to 0.12)							-0.30 (-0.72 to 0.12)
Race/Ethnicity										
NHW	0.43 to 0.40	2001-2017	0.01 (-0.62 to 0.64)							0.01 (-0.62 to 0.64)
NHB	0.73 to 0.62	2001-2017	-1.14* (-1.74 to -0.53)							-1.14* (-1.74 to -0.53)
Hispanic	0.60 to 0.44	2001-2017	-1.72* (-2.78 to 0.64)							-1.72* (-2.78 to -0.64)
Region										
Northeast	0.44 to 0.38	2001-2017	-0.50 (-1.50 to 0.52)							-0.50 (-1.50 to 0.52)
Midwest	0.41 to 0.38	2001-2017	0.07 (-1.02 to 1.17)							0.07 (-1.02 to 1.17)
South	0.53 to 0.48	2001-2017	-0.39 (-1.04 to 0.27)							-0.39 (-1.04 to 0.27)
West	0.40 to 0.40	2001-2017	-0.39 (-1.19 to 0.42)							-0.39 (-1.19 to 0.42)
Stage										

Local	0.20 to 0.17	2001-2005	-8.03* (-14.42 to -1.16)	2005-2017	-0.07 (-1.43 to 1.31)					-2.12* (-3.93 to -0.28)
Regional	0.14 to 0.15	2001-2017	0.49 (-0.49 to 1.48)							0.49 (-0.49 to 1.48)
Distant	0.04 to 0.06	2001-2012	3.93* (1.31 to 6.61)	2012-2017	-5.19 (-12.06 to 2.22)					0.99 (-1.64 to 3.69)
Unknown	0.07 to 0.05	2001-2004	-16.04* (-24.19 to -7.01)	2004-2010	4.18 (-0.85 to 9.46)	2010-2013	-8.72 (-26.73 to 13.72)	2013-2017	5.31 (-1.55 to 12.65)	-2.14 (-6.12 to 2.02)
Female Cervical Carcinoma	8.68 to 7.12	2001-2012	-1.46* (-1.86 to -1.06)	2012-2017	0.34 (-1.05 to 1.74)					-0.90* (-1.36 to 0.44)
Race/Ethnicity										
NHW	7.63 to 6.79	2001-2017	-0.49* (-0.78 to -0.20)							-0.49* (-0.78 to -0.20)
NHB	12.01 to 7.90	2001-2017	-2.41* (-2.72 to -2.11)							-2.41* (-2.72 to -2.11)
Hispanic	14.13 to 8.44	2001-2011	-4.04* (-4.77 to -3.30)	2011-2017	-0.73 (-2.27 to 0.83)					-2.81* (-3.47 to -2.15)
NHAPI	9.36 to 5.91	2001-2003	-11.88* (-19.27 to -3.81)	2003-2006	1.39 (-7.04 to 10.59)	2006-2009	-6.10 (-13.73 to 2.20)	2009-2017	-0.71 (-1.56 to 0.16)	-2.82* (-4.79 to -0.80)
Other or Unknown	17.64 to 23.60	2001-2017	0.69 (-0.27 to 1.66)							0.69 (-0.27 to 1.66)
Region										
Northeast	8.21 to 6.74	2001-2017	-1.26* (-1.50 to -1.02)							-1.26* (-1.50 to -1.02)
Midwest	8.28 to 7.01	2001-2012	-1.43* (-2.00 to -0.85)	2012-2017	1.19 (-0.86 to 3.27)					-0.62 (-1.29 to 0.06)
South	9.47 to 7.65	2001-2004	-3.56* (-6.64 to -0.38)	2004-2017	-0.65* (-0.99 to -0.31)					-1.20* (-1.80 to -0.61)
West	8.24 to 6.63	2001-2013	-1.66* (-2.15 to -1.16)	2013-2017	0.74 (-1.95 to 3.49)					-1.06* (-1.75 to -0.37)
Stage										
Local	4.50 to 3.43	2001-2004	-4.98* (-8.16 to -1.70)	2004-2013	-1.78* (-2.57 to -0.98)	2013-2017	1.99 (-0.40 to 4.44)			-1.47* (-2.30 to -0.62)
Regional	2.81 to 2.38	2001-2017	-0.92* (-1.29 to -0.55)							-0.92* (-1.29 to -0.55)

Distant	0.78 to 0.96	2001-2015	2.37* (2.04 to 2.69)	2015-2017	-4.82 (-10.52 to 1.26)					1.44* (0.69 to 2.19)
Unknown	0.60 to 0.34	2001-2006	-9.98* (-14.74 to -4.95)	2006-2017	-1.38 (-3.25 to 0.53)					-4.15* (-5.99 to -2.28)

Abbreviations: SCC, squamous cell carcinoma, AAI, age-adjusted incidence (adjusted to the 2000 US standard population); APC, annual percent change; AAPC, average annual percent change; NHW, Non-Hispanic White; NHB, Non-Hispanic Black; NHAPI, Non-Hispanic Asians or Pacific Islander; Other/Unknown (included Non-Hispanic American Indian/Alaska Native, Other unspecified, or Unknown).

† Trends based on incidence was analyzed using the Joinpoint Regression Program, version 4.8.0.1, allowing up to 3 joinpoints. AAPC is a summary measure of the trend over a pre-specified fixed interval. It was computed as a weighted average of the APC from the joinpoint model, with the weights equal to the length the APC interval.

§ Merged summary stage included local (localized only), regional (regional, direct extension only, regional lymph nodes only, direct extension and regional lymph nodes, or NOS), distant (distant site(s)/node(s) involved), and unknown (not applicable, unknown, unstaged, unspecified, or death certificate-only).

* The APC or AAPC is significantly different from zero ($p < .05$).

eTable 7. Age-Specified Incidences and Trends of Female HPV-Associated Cancers by Age Group in USCS Public Use Databases from 2001 to 2017[†]

	ASI	Trend 1		Trend 2		Trend 3		Trend 4		2001-2017
Age Group	2001 to 2017	Years	APC (95% CI)	Year	APC (95% CI)	Year	APC (95% CI)	Year	APC (95% CI)	AAPC (95% CI)
Female HPV associated cancer										
20-24	1.40 to 0.62	2001- 2012	-2.46* (-4.15 to -0.74)	2012- 2017	-11.20* (- 17.53 -4.38)					-5.28* (-7.48 to -3.03)
25-29	6.99 to 4.59	2001- 2017	-1.58* (-2.29 to -0.86)							-1.58* (-2.29 to -0.86)
30-34	13.10 to 11.67	2001- 2011	-2.33* (-2.91 to -1.75)	2011- 2017	1.72* (0.41 to 3.05)					-0.83* (-1.38 to -0.28)
35-39	16.34 to 15.20	2001- 2017	-0.40 (-0.82 to 0.02)							-0.40 (-0.82 to 0.02)
40-44	20.80 to 18.18	2001- 2017	-0.57* (-0.88 to -0.25)							-0.57* (-0.88 to -0.25)
45-49	21.59 to 20.31	2001- 2017	-0.10 (-0.45 to 0.26)							-0.10 (-0.45 to 0.26)
50-54	23.53 to 24.75	2001- 2012	1.19* (0.71 to 1.66)	2012- 2017	-0.71 (-2.16 to 0.76)					0.59* (0.09 to 1.10)
55-59	24.99 to 28.73	2001- 2017	1.37* (1.06 to 1.68)							1.37* (1.06 to 1.68)
60-64	27.30 to 32.37	2001- 2004	-0.85 (-2.83 to 1.17)	2004- 2007	2.14 (-1.59 to 6.01)	2007- 2010	0.00 (-3.32 to 3.44)	2010- 2017	1.84* (1.43 to 2.24)	1.04* (0.21 to 1.88)
65-69	30.96 to 32.57	2001- 2017	0.50* (0.18 to 0.82)							0.50* (0.18 to 0.82)
70-74	32.42 to 32.79	2001- 2017	0.23 (-0.04 to 0.51)							0.23 (-0.04 to 0.51)
75-80	34.01 to 33.38	2001- 2017	0.09 (-0.25 to 0.44)							0.09 (-0.25 to 0.44)
80+	34.21 to 31.93	2001- 2017	-0.22* (-0.43 to -0.01)							-0.22* (-0.43 to -0.01)
Female Oropharyngeal SCC										
35-39	0.34 to 0.44	2001- 2017	1.03 (-1.14 to 3.25)							1.03 (-1.14 to 3.25)

40-44	1.03 to 0.60	2001-2017	-1.63* (-3.05 to -0.19)							-1.63* (-3.05 to -0.19)
45-49	1.75 to 1.78	2001-2004	8.49 (-3.33 to 21.74)	2004-2017	-0.92 (-2.05 to 0.22)					0.78 (-1.33 to 2.94)
50-54	3.02 to 3.38	2001-2013	3.17* (1.95 to 4.41)	2013-2017	-4.95 (-10.37 to 0.80)					1.08 (-0.47 to 2.66)
55-59	4.20 to 5.39	2001-2017	2.35* (1.76 to 2.94)							2.35* (1.76 to 2.94)
60-64	5.02 to 6.38	2001-2017	0.92* (0.35 to 1.49)							0.92* (0.35 to 1.49)
65-69	5.57 to 6.36	2001-2017	0.54 (-0.15 to 1.23)							0.54 (-0.15 to 1.23)
70-74	7.04 to 6.30	2001-2017	0.10 (-0.47 to 0.67)							0.10 (-0.47 to 0.67)
75-80	6.46 to 6.06	2001-2017	0.40 (-0.36 to 1.17)							0.40 (-0.36 to 1.17)
80+	4.31 to 4.30	2001-2017	0.94* (0.22 to 1.66)							0.94* (0.22 to 1.66)
Female Anal and Rectal SCC										
35-39	0.63 to 0.64	2001-2017	-0.73 (-2.49 to 1.06)							-0.73 (-2.49 to 1.06)
40-44	1.55 to 1.32	2001-2017	-1.33* (-2.06 to -0.59)							-1.33* (-2.06 to -0.59)
45-49	2.49 to 2.83	2001-2007	5.40* (2.75 to 8.12)	2007-2017	-2.03* (-3.12 to -0.92)					0.69 (-0.38 to 1.77)
50-54	3.23 to 4.73	2001-2009	6.41* (4.27 to 8.60)	2009-2017	-0.66 (-2.35 to 1.06)					2.82* (1.59 to 4.05)
55-59	3.11 to 7.34	2001-2009	7.17* (4.85 to 9.55)	2009-2017	2.87* (1.29 to 4.47)					5.00* (3.74 to 6.27)
60-64	4.16 to 8.95	2001-2017	5.15* (4.66 to 5.64)							5.15* (4.66 to 5.64)
65-69	4.37 to 8.97	2001-2017	5.02* (4.48 to 5.57)							5.02* (4.48 to 5.57)
70-74	4.61 to 8.42	2001-2017	3.27* (2.66 to 3.89)							3.27* (2.66 to 3.89)
75-80	5.33 to 7.57	2001-2017	2.47* (1.86 to 3.08)							2.47* (1.86 to 3.08)

80+	5.53 to 6.36	2001-2017	1.23* (0.69 to 1.77)							1.23* (0.69 to 1.77)
Female Vulvar SCC										
30-34	0.40 to 0.43	2001-2017	0.05 (-1.54 to 1.67)							0.05 (-1.54 to 1.67)
35-39	0.96 to 0.81	2001-2017	-0.81* (-1.59 to -0.02)							-0.81* (-1.59 to -0.02)
40-44	1.72 to 1.36	2001-2017	-1.28* (-2.06 to -0.50)							-1.28* (-2.06 to -0.50)
45-49	2.06 to 2.56	2001-2007	4.46* (1.74 to 7.24)	2007-2017	-0.67 (-1.79 to 0.48)					1.23* (0.12 to 2.34)
50-54	2.44 to 3.82	2001-2017	2.46* (1.70 to 3.22)							2.46* (1.70 to 3.22)
55-59	2.70 to 3.62	2001-2017	3.00* (2.25 to 3.75)							3.00* (2.25 to 3.75)
60-64	2.84 to 5.07	2001-2017	3.06* (2.22 to 3.90)							3.06* (2.22 to 3.90)
65-69	4.37 to 5.88	2001-2017	1.88* (1.43 to 2.33)							1.88* (1.43 to 2.33)
70-74	5.80 to 7.33	2001-2017	1.51* (0.97 to 2.06)							1.51* (0.97 to 2.06)
75-80	8.49 to 8.58	2001-2017	0.73* (0.10 to 1.37)							0.73* (0.10 to 1.37)
80+	10.82 to 12.19	2001-2017	0.76* (0.41 to 1.11)							0.76* (0.41 to 1.11)
Female Vaginal SCC										
40-44	0.21 to 0.34	2001-2017	-0.66 (-2.55 to 1.26)							-0.66 (-2.55 to 1.26)
45-49	0.46 to 0.40	2001-2017	0.94 (-0.55 to 2.45)							0.94 (-0.55 to 2.45)
50-54	0.68 to 0.59	2001-2017	-0.94 (-2.01 to 0.14)							-0.94 (-2.01 to 0.14)
55-59	0.84 to 0.86	2001-2017	0.60 (-0.41 to 1.63)							0.60 (-0.41 to 1.63)
60-64	0.92 to 1.10	2001-2017	0.99 (-0.45 to 2.45)							0.99 (-0.45 to 2.45)

65-69	1.57 to 1.43	2001-2017	-0.37 (-1.57 to 0.84)							-0.37 (-1.57 to 0.84)
70-74	1.87 to 1.55	2001-2017	0.30 (-0.79 to 1.40)							0.30 (-0.79 to 1.40)
75-80	2.17 to 2.32	2001-2017	-0.26 (-1.21 to 0.70)							-0.26 (-1.21 to 0.70)
80+	2.86 to 2.14	2001-2017	-1.11* (-1.66 to -0.57)							-1.11* (-1.66 to -0.57)
Female Cervical Carcinoma										
20-24	1.34 to 0.60	2001-2017	-4.63* (-5.90 to -3.35)							-4.63* (-5.90 to -3.35)
25-29	6.71 to 4.33	2001-2017	-1.63* (-2.40 to -0.90)							-1.63* (-2.40 to -0.90)
30-34	12.14 to 10.84	2001-2012	-2.23* (-2.73 to -1.72)	2012-2017	2.56* (0.82 to 4.34)					-0.75* (-1.33 to -0.18)
35-39	14.23 to 13.22	2001-2017	-0.35 (-0.83 to 0.13)							-0.35 (-0.83 to 0.13)
40-44	16.29 to 14.56	2001-2017	-0.34 (-0.77 to 0.09)							-0.34 (-0.77 to 0.09)
45-49	14.83 to 12.74	2001-2017	-0.39 (-0.79 to 0.01)							-0.39 (-0.79 to 0.01)
50-54	14.16 to 12.23	2001-2003	-5.55 (-12.69 to 2.18)	2003-2017	-0.29 (-0.65 to 0.07)					-0.96* (-1.88 to -0.04)
55-59	14.13 to 11.53	2001-2005	-3.90* (-7.22 to -0.46)	2005-2017	-0.33 (-0.93 to 0.28)					-1.23* (-2.11 to -0.35)
60-64	14.36 to 10.88	2001-2003	-6.54 (-14.97 to 2.73)	2003-2017	-1.10* (-1.50 to -0.70)					-1.79* (-2.88 to -0.70)
65-69	15.08 to 9.93	2001-2017	-2.44* (-2.92 to -1.96)							-2.44* (-2.92 to -1.96)
70-74	13.09 to 9.19	2001-2017	-2.27* (-2.70 to -1.84)							-2.27* (-2.70 to -1.84)
75-80	11.58 to 8.85	2001-2017	-2.07* (-2.57 to -1.56)							-2.07* (-2.57 to -1.56)
80+	10.70 to 6.95	2001-2012	-3.58* (-4.22 to -2.94)	2012-2017	-0.63 (-2.98 to 1.78)					-2.67* (-3.43 to -1.90)

Abbreviations: SCC, squamous cell carcinoma, ASI, age-specified incidence; APC, annual percent change; AAPC, average annual percent change

† Trends based on incidence was analyzed using the Joinpoint Regression Program, version 4.8.0.1, allowing up to 3 joinpoints. AAPC is a summary measure of the trend over a pre-specified fixed interval. It was computed as a weighted average of the APC from the joinpoint model, with the weights equal to the length the APC interval.

* The APC or AAPC is significantly different from zero ($p < .05$).

eTable 8. Age-Adjusted Incidences and Trends of Male HPV-Associated Cancers by Race and Ethnicity, Region, and Stage in USCS Public Use Databases from 2001 to 2017[†]

	AAI	Trend 1		Trend 2		Trend 3		2001-2017
	2001 to 2017	Years	APC (95% CI)	Year	APC (95% CI)	Year	APC (95% CI)	AAPC (95% CI)
Male HPV associated cancers	7.71 to 11.00	2001-2017	2.36* (2.13 to 2.59)					2.36* (2.13 to 2.59)
Race								
NHW	7.80 to 12.50	2001-2014	3.42* (3.13 to 3.72)	2014-2017	1.17 (-1.08 to 3.48)			3.00* (2.55 to 3.44)
NHB	10.09 to 9.15	2001-2017	-0.70* (-1.05 to -0.34)					-0.70* (-1.05 to -0.34)
Hispanic	6.42 to 6.86	2001-2017	0.46 (-0.08 to 1.00)					0.46 (-0.08 to 1.00)
NHAPI	2.51 to 2.92	2001-2017	0.90* (0.15 to 1.65)					0.90* (0.15 to 1.65)
Other or Unknown	8.43 to 20.90	2001-2017	4.57* (3.55 to 5.61)					4.57* (3.55 to 5.61)
Region								
Northeast	7.53 to 10.62	2001-2017	2.24* (2.02 to 2.47)					2.24* (2.02 to 2.47)
Midwest	7.06 to 11.49	2001-2017	3.00* (2.70 to 3.30)					3.00* (2.70 to 3.30)
South	8.61 to 11.95	2001-2017	2.22* (1.96 to 2.49)					2.22* (1.96 to 2.49)
West	7.10 to 9.32	2001-2017	1.99* (1.65 to 2.34)					1.99* (1.65 to 2.34)
Stage								
Local	2.16 to 2.10	2001-2017	0.13 (-0.15 to 0.40)					0.13 (-0.15 to 0.40)
Regional	4.29 to 7.23	2001-2017	3.38* (3.06 to 3.71)					3.38* (3.06 to 3.71)
Distant	0.64 to 1.06	2001-2005	24.79* (11.42 to 39.75)	2005-2015	2.00 (-0.28 to 4.34)	2015-2017	-24.25 (-42.61 to -0.01)	3.36 (-0.76 to 7.65)
Unknown	0.62 to 0.60	2001-2015	-1.90* (-2.98 to -0.81)	2015-2017	23.08* (1.16 to 49.76)			0.92 (-1.45 to 3.34)

Male Oropharyngeal SCC	5.90 to 8.89	2001-2017	2.71* (2.48 to 2.93)					2.71* (2.48 to 2.93)
Race								
NHW	6.00 to 10.44	2001-2014	3.89* (3.59 to 4.19)	2014-2017	1.73 (-0.54 to 4.06)			3.48* (3.03 to 3.93)
NHB	8.14 to 6.52	2001-2017	-1.35* (-1.72 to -0.98)					-1.35* (-1.72 to -0.98)
Hispanic	4.32 to 4.51	2001-2017	0.62 (-0.01 to 1.26)					0.62 (-0.01 to 1.26)
NHAPI	1.90 to 2.18	2001-2017	1.19* (0.23 to 2.15)					1.19* (0.23 to 2.15)
Other or Unknown	5.87 to 16.44	2001-2017	5.48* (4.49 to 6.48)					5.48* (4.49 to 6.48)
Region								
Northeast	5.64 to 8.41	2001-2017	2.57* (2.34 to 2.79)					2.57* (2.34 to 2.79)
Midwest	5.50 to 9.47	2001-2017	3.41* (3.10 to 3.72)					3.41* (3.10 to 3.72)
South	6.70 to 9.71	2001-2017	2.47* (2.20 to 2.85)					2.47* (2.20 to 2.75)
West	5.26 to 7.42	2001-2017	2.48* (2.11 to 2.85)					2.48* (2.11 to 2.85)
Stage								
Local	1.12 to 1.04	2001-2005	-2.66 (-5.57 to 0.35)	2005-2017	0.51 (-0.01 to 1.04)			-0.29 (-1.05 to 0.48)
Regional	3.82 to 6.52	2001-2005	0.53 (-2.33 to 3.48)	2005-2017	3.97* (3.53 to 4.42)			3.10* (2.37 to 3.84)
Distant	0.55 to 0.90	2001-2004	37.60* (22.93 to 54.02)	2004-2015	2.51* (1.45 to 3.57)	2015-2017	-27.20* (-37.38 to -15.37)	3.79* (1.20 to 6.45)
Unknown	0.40 to 0.43	2001-2014	-2.43* (-4.18 to -0.12)	2014-2017	18.70 (-3.41 to 45.88)			1.23 (-2.62 to 5.22)
Male Anal and Rectal SCC	0.99 to 1.31	2001-2009	3.35* (2.13 to 4.59)	2009-2017	0.34 (-0.68 to 1.36)			1.83* (1.12 to 2.55)
Race								
NHW	1.02 to 1.34	2001-2017	1.85* (1.30 to 4.59)					1.85* (1.30 to 2.40)
NHB	1.16 to 1.82	2001-2005	11.28* (2.06 to 21.34)	2005-2017	0.90 (-0.39 to 2.22)			3.40* (1.22 to 5.63)

Hispanic	0.68 to 0.94	2001-2017	0.98* (0.05 to 1.92)					0.98* (0.05 to 1.92)
Region								
Northeast	1.04 to 1.36	2001-2017	1.94* (1.23 to 2.65)					1.94* (1.23 to 2.65)
Midwest	0.77 to 1.22	2001-2004	9.78* (0.66 to 19.73)	2004-2017	1.56* (0.80 to 2.33)			3.05* (1.46 to 4.68)
South	1.03 to 1.42	2001-2005	7.20* (1.33 to 13.40)	2005-2017	1.20* (0.34 to 2.08)			2.67* (1.25 to 4.11)
West	1.10 to 1.19	2001-2017	0.37 (-0.38 to 1.13)					0.37 (-0.38 to 1.13)
Stage								
Local	0.53 to 0.61	2001-2009	2.35* (0.96 to 3.75)	2009-2017	-0.41 (-1.60 to 0.80)			0.96* (0.14 to 1.79)
Regional	0.24 to 0.46	2001-2017	3.50* (2.53 to 4.48)					3.50* (2.53 to 4.48)
Distant	0.06 to 0.13	2001-2004	17.65* (0.50 to 37.71)	2004-2014	4.73* (2.61 to 6.89)	2014-2017	-6.61 (-15.24 to 2.89)	4.76* (1.46 to 8.17)
Unknown	0.15 to 0.11	2001-2017	-1.38* (-2.03 to -0.71)					-1.38* (-2.03 to -0.71)
Male Penile SCC	0.82 to 0.80	2001-2017	0.13 (-0.30 to 0.56)					0.13 (-0.30 to 0.56)
Race								
NHW	0.79 to 0.72	2001-2017	0.10 (-0.48 to 0.69)					0.10 (-0.48 to 0.69)
NHB	0.80 to 0.80	2001-2017	-0.71 (-1.63 to 0.22)					-0.71 (-1.63 to 0.22)
Hispanic	1.42 to 1.40	2001-2017	-0.42 (-1.54 to 0.71)					-0.42 (-1.54 to 0.71)
Region								
Northeast	0.84 to 0.85	2001-2017	0.02 (-0.90 to 0.95)					0.02 (-0.90 to 0.95)
Midwest	0.80 to 0.81	2001-2017	0.31 (-0.18 to 0.80)					0.31 (-0.18 to 0.80)
South	0.88 to 0.82	2001-2017	0.04 (-0.42 to 0.51)					0.41 (-0.42 to 0.51)
West	0.74 to 0.71	2001-2017	0.22 (-0.47 to 0.92)					0.22 (-0.47 to 0.92)

Stage								
Local	0.51 to 0.45	2001-2017	-0.53* (-1.05 to -0.01)					-0.53* (-1.05 to -0.01)
Regional	0.23 to 0.25	2001-2017	1.33* (0.58 to 2.10)					1.33* (0.58 to 2.10)
Distant	0.02 to 0.03	2001-2017	2.03* (0.54 to 3.53)					2.03* (0.54 to 3.53)
Unknown	0.06 to 0.06	2001-2015	-3.18* (-5.17 to -1.13)	2015-2017	41.56 (-0.83 to 102.07)			1.53 (-2.77 to 6.02)

Abbreviations: SCC, squamous cell carcinoma; AAI, age-adjusted incidence (adjusted to the 2000 US standard population); APC, annual percent change; AAPC, average annual percent change; NHW, Non-Hispanic White; NHB, Non-Hispanic Black; NHAPI, Non-Hispanic Asians or Pacific Islander; Other/Unknown (included Non-Hispanic American Indian/Alaska Native, Other unspecified, or Unknown).

† Trends based on incidence was analyzed using the Joinpoint Regression Program, version 4.8.0.1, allowing up to 3 joinpoints. AAPC is a summary measure of the trend over a pre-specified fixed interval. It was computed as a weighted average of the APC from the joinpoint model, with the weights equal to the length the APC interval.

§ Merged summary stage included local (localized only), regional (regional, direct extension only, regional lymph nodes only, direct extension and regional lymph nodes, or NOS), distant (distant site(s)/node(s) involved), and unknown (not applicable, unknown, unstaged, unspecified, or death certificate-only).

* The APC or AAPC is significantly different from zero ($p < .05$).

eTable 9. Age-Specified Incidences and Trends of Male HPV-Associated Cancers by Age Group in USCS Public Use Databases from 2001 to 2017[†]

	ASI	Trend 1		Trend 2		2001-2017
Age Group	2001 to 2017	Years	APC (95% CI)	Year	APC (95% CI)	AAPC (95% CI)
Male HPV associated cancer						
25-29	0.22 to 0.21	2001-2017	0.20 (-1.36 to 1.78)			0.20 (-1.36 to 1.78)
30-34	0.65 to 0.60	2001-2017	-0.88 (-1.90 to 0.14)			-0.88 (-1.90 to 0.14)
35-39	2.34 to 1.90	2001-2017	-2.21* (-3.16 to -1.25)			-2.21* (-3.16 to -1.25)
40-44	5.54 to 5.02	2001-2007	2.81* (1.46 to 4.17)	2007-2017	-2.75* (-3.39 to -2.12)	-0.71* (-1.28 to -0.13)
45-49	11.40 to 12.49	2001-2013	1.30* (0.80 to 1.81)	2013-2017	-3.09* (-5.66 to -0.45)	0.18 (-0.51 to 0.88)
50-54	17.86 to 24.31	2001-2009	2.89* (1.90 to 3.89)	2009-2017	0.73 (-0.12 to 1.59)	1.80* (1.22 to 2.39)
55-59	22.14 to 34.08	2001-2009	4.18* (3.04 to 5.33)	2009-2017	1.53* (0.66 to 2.41)	2.85* (2.20 to 3.49)
60-64	25.78 to 41.91	2001-2017	3.43* (3.05 to 3.80)			3.43* (3.05 to 3.80)
65-69	26.37 to 42.57	2001-2017	3.52* (3.11 to 3.93)			3.52* (3.11 to 3.93)
70-74	26.47 to 41.59	2001-2017	3.35* (2.92 to 3.77)			3.35* (2.92 to 3.77)
75-79	22.46 to 35.79	2001-2017	3.31* (2.88 to 3.74)			3.31* (2.88 to 3.74)
80+	18.95 to 27.79	2001-2017	2.67* (2.32 to 3.03)			2.67* (2.32 to 3.03)
Male Oropharyngeal SCC						
30-34	0.34 to 0.30	2001-2017	-1.06 (-2.64 to 0.55)			-1.06 (-2.64 to 0.55)
35-39	1.08 to 1.10	2001-2017	-1.23 (-2.47 to 0.02)			-1.23 (-2.47 to 0.02)
40-44	3.73 to 3.77	2001-2007	2.38* (0.50 to 4.29)	2007-2017	-1.60* (-2.47 to -0.72)	-0.13 (-0.92 to 0.68)

45-49	9.44 to 9.99	2001-2017	0.30 (-0.08 to 0.67)			0.30 (-0.08 to 0.67)
50-54	15.68 to 20.35	2001-2009	2.51* (1.50 to 3.54)	2009-2017	0.63 (-0.25 to 1.52)	1.57* (0.97 to 2.18)
55-59	18.66 to 29.66	2001-2008	4.75* (3.33 to 6.18)	2008-2017	1.75* (1.03 to 2.48)	3.05* (2.39 to 3.72)
60-64	20.73 to 36.63	2001-2017	3.83* (3.48 to 4.18)			3.83* (3.48 to 4.18)
65-69	20.33 to 36.48	2001-2017	4.24* (3.76 to 4.73)			4.24* (3.76 to 4.73)
70-74	19.89 to 33.35	2001-2017	3.91* (3.45 to 4.37)			3.91* (3.45 to 4.37)
75-79	15.21 to 26.88	2001-2017	3.90* (3.37 to 4.43)			3.90* (3.37 to 4.43)
80+	10.67 to 17.28	2001-2017	3.41* (2.92 to 3.89)			3.41* (2.92 to 3.89)
Male Anal and Rectal SCC						
30-34	0.17 to 0.23	2001-2017	-0.14 (-2.96 to 2.77)			-0.14 (-2.96 to 2.77)
35-39	1.01 to 0.57	2001-2017	-4.27 (-5.63 to -2.89)			-4.27 (-5.63 to -2.89)
40-44	1.38 to 0.90	2001-2007	5.14* (1.38 to 9.04)	2007-2017	-6.86* (-8.66 to -5.03)	-2.53* (-4.12 to -0.92)
45-49	1.48 to 1.87	2001-2010	6.75* (4.67 to 8.88)	2010-2017	-5.47* (-8.06 to -2.80)	1.22 (-0.27 to 2.73)
50-54	1.52 to 3.00	2001-2009	7.20* (4.14 to 10.35)	2009-2017	0.93 (-1.39 to 3.31)	4.02* (2.29 to 5.77)
55-59	2.27 to 3.26	2001-2017	3.30* (2.32 to 4.28)			3.30* (2.32 to 4.28)
60-64	2.63 to 3.69	2001-2017	2.79* (1.90 to 3.68)			2.79* (1.90 to 3.68)
65-69	2.85 to 3.83	2001-2017	1.71* (0.90 to 2.52)			1.71* (0.90 to 2.52)
70-74	3.10 to 4.78	2001-2015	1.30* (0.39 to 2.22)	2015-2017	13.28 (-2.26 to 31.29)	2.73* (0.89 to 4.60)
75-79	2.72 to 4.49	2001-2017	2.75* (1.91 to 3.59)			2.75* (1.91 to 3.59)
80+	2.73 to 4.09	2001-2017	2.89* (1.66 to 4.14)			2.89* (1.66 to 4.14)

Male Penile SCC						
40-44	0.44 to 0.34	2001-2017	-0.58 (-1.78 to 0.64)			-0.58 (-1.78 to 0.64)
45-49	0.49 to 0.63	2001-2017	1.64* (0.21 to 3.09)			1.64* (0.21 to 3.09)
50-54	0.66 to 0.95	2001-2017	0.59 (-0.64 to 1.83)			0.59 (-0.64 to 1.83)
55-59	1.21 to 1.16	2001-2017	-1.05* (-1.82 to -0.28)			-1.05* (-1.82 to -0.28)
60-64	2.42 to 1.58	2001-2017	-1.59* (-2.48 to -0.68)			-1.59* (-2.48 to -0.68)
65-69	3.19 to 2.26	2001-2017	-1.68* (-2.31 to -1.04)			-1.68* (-2.31 to -1.04)
70-74	3.48 to 3.45	2001-2017	0.65 (-0.39 to 1.70)			0.65 (-0.39 to 1.70)
75-79	4.52 to 4.42	2001-2017	1.13* (0.45 to 1.82)			1.13* (0.45 to 1.82)
80+	5.55 to 6.42	2001-2017	0.86* (0.02 to 1.72)			0.86* (0.02 to 1.72)

Abbreviations: SCC, squamous cell carcinoma, ASI, age-specified incidence; APC, annual percent change; AAPC, average annual percent change

† Trends based on incidence was analyzed using the Joinpoint Regression Program, version 4.8.0.1, allowing up to 3 joinpoints. AAPC is a summary measure of the trend over a pre-specified fixed interval. It was computed as a weighted average of the APC from the joinpoint model, with the weights equal to the length the APC interval.

* The APC or AAPC is significantly different from zero ($p < .05$).

eTable 10. Age-Specified Incidences and Trends of Oropharyngeal SCC by Sex and Race and Ethnicity in USCS Public Use Databases from 2001 to 2017[†]

		United States			NHW			NHB			Hispanic	
Male		ASI	2001-2017		ASI	2001-2017		ASI	2001-2017		ASI	2001-2017
Age Group	N	2001 to 2017	AAPC (95% CI)	N	2001 to 2017	AAPC (95% CI)	N	2001 to 2017	AAPC (95% CI)	N	2001 to 2017	AAPC (95% CI)
30-34	520	0.34 to 0.30	-1.06 (-2.64 to 0.55)	-	-	-	-	-	-	-	-	-
35-39	2019	1.08 to 1.10	-1.23 (-2.47 to 0.02)	1525	1.26 to 1.34	-0.48 (-1.80 to 0.87)	-	-	-	-	-	-
40-44	7338	3.73 to 3.77	-0.13 (-0.92 to 0.68)	5940	4.17 to 4.92	0.86* (0.17 to 1.55)	759	3.54 to 3.18	-1.60 (-3.22 to 0.05)	454	1.82 to 1.61	-0.71 (-2.28 to 0.90)
45-49	18921	9.44 to 9.99	0.30 (-0.08 to 0.67)	15629	9.94 to 13.06	1.32* (0.47 to 2.18)	1871	12.47 to 7.38	-3.83* (-5.06 to -2.59)	1005	5.02 to 3.34	-1.67* (-3.12 to -0.21)
50-54	33050	15.68 to 20.35	1.57* (0.97 to 2.18)	27661	15.93 to 25.76	2.96* (2.38 to 3.55)	3187	22.31 to 12.90	-3.39* (-4.29 to -2.48)	1558	10.87 to 7.82	-1.44* (-2.44 to -0.43)
55-59	41228	18.66 to 29.66	3.05* (2.39 to 3.72)	34677	18.72 to 35.29	4.10* (3.37 to 4.83)	3853	28.83 to 20.46	-2.38* (-2.85 to -1.91)	1868	11.92 to 13.18	0.68 (-0.47 to 1.84)
60-64	38371	20.73 to 36.63	3.83* (3.48 to 4.18)	32383	20.86 to 42.87	4.59* (3.92 to 5.27)	3468	28.88 to 23.70	-0.73 (-1.71 to 0.26)	1752	15.54 to 15.56	0.56 (-0.48 to 1.61)
65-69	29704	20.33 to 36.48	4.24* (3.76 to 4.73)	25091	20.30 to 41.58	5.13* (4.67 to 5.60)	2630	31.72 to 24.08	-0.58 (-1.65 to 0.51)	1389	13.55 to 18.26	1.27 (-0.17 to 2.73)
70-74	19207	19.89 to 33.35	3.91* (3.45 to 4.37)	16158	19.42 to 36.85	4.63* (4.15 to 5.11)	1669	33.37 to 26.20	-0.18 (-1.12 to 0.76)	970	17.48 to 19.22	1.27 (-0.16 to 2.72)
75-80	11610	15.21 to 26.88	3.90* (3.37 to 4.43)	9886	15.17 to 28.65	4.45* (3.80 to 5.11)	880	15.45 to 23.84	1.02 (-0.53 to 2.59)	569	17.82 to 20.21	0.89 (-4.97 to 7.12)
80+	9201	10.67 to 17.28	3.41* (2.92 to 3.89)	7871	10.69 to 17.90	3.90* (3.37 to 4.43)	629	10.73 to 17.59	0.79 (-1.39 to 3.01)	-	-	-
		United States			NHW			NHB			Hispanic	
Female		ASI	2001-2017		ASI	2001-2017		ASI	2001-2017		ASI	2001-2017
Age Group	N	2001-2017	AAPC (95% CI)	N	2001-2017	AAPC (95% CI)	N	2001-2017	AAPC (95% CI)	N	2001-2017	AAPC (95% CI)
35-39	696	0.34 to 0.44	1.03 (-1.14 to 3.25)	537	0.44 to 0.61	2.14 (-0.45 to 4.80)	-	-	-	-	-	-

40-44	167 5	1.03 to 0.60	-1.63* (-3.05 to -0.19)	124 4	0.97 to 0.78	0.06 (-1.44 to 1.58)	-	-	-	-	-	-
45-49	379 0	1.75 to 1.78	0.78 (-1.33 to 2.94)	290 2	1.75 to 2.35	1.17* (0.16 to 2.20)	-	-	-	-	-	-
50-54	644 8	3.02 to 3.38	1.08 (-0.47 to 2.66)	511 0	3.16 to 4.12	2.03* (0.36 to 3.73)	86 4	4.14 to 2.87	-0.89 (-2.68 to 0.93)	-	-	-
55-59	798 4	4.20 to 5.39	2.35* (1.76 to 2.94)	645 4	4.51 to 6.16	3.06* (2.42 to 3.70)	98 3	5.21 to 4.86	-0.78 (-2.10 to 0.56)	-	-	-
60-64	788 7	5.02 to 6.38	0.92* (0.35 to 1.49)	656 5	5.15 to 7.34	1.40* (0.79 to 2.01)	81 9	7.23 to 5.26	-1.41 (-2.96 to 0.17)	-	-	-
65-69	719 3	5.57 to 6.36	0.54 (-0.15 to 1.23)	611 2	5.64 to 7.24	0.99* (0.19 to 1.81)	63 9	6.69 to 4.61	-2.09* (-3.46 to -0.70)	-	-	-
70-74	584 8	7.04 to 6.30	0.10 (-0.47 to 0.67)	504 0	7.41 to 6.99	0.48 (-0.19 to 1.15)	46 6	6.31 to 4.95	-1.98* (-3.45 to -0.48)	-	-	-
75-80	440 8	6.46 to 6.06	0.40 (-0.36 to 1.17)	382 9	6.73 to 6.81	1.00* (0.10 to 1.92)	-	-	-	-	-	-
80+	499 3	4.31 to 4.30	0.94* (0.22 to 1.66)	439 7	4.46 to 4.64	1.25* (0.55 to 1.96)	-	-	-	-	-	-

Abbreviations: SCC, squamous cell carcinoma; ASI, age-specified incidence; APC, annual percent change; AAPC, average annual percent change; NHW, Non-Hispanic White; NHB, Non-Hispanic Black; N, case number

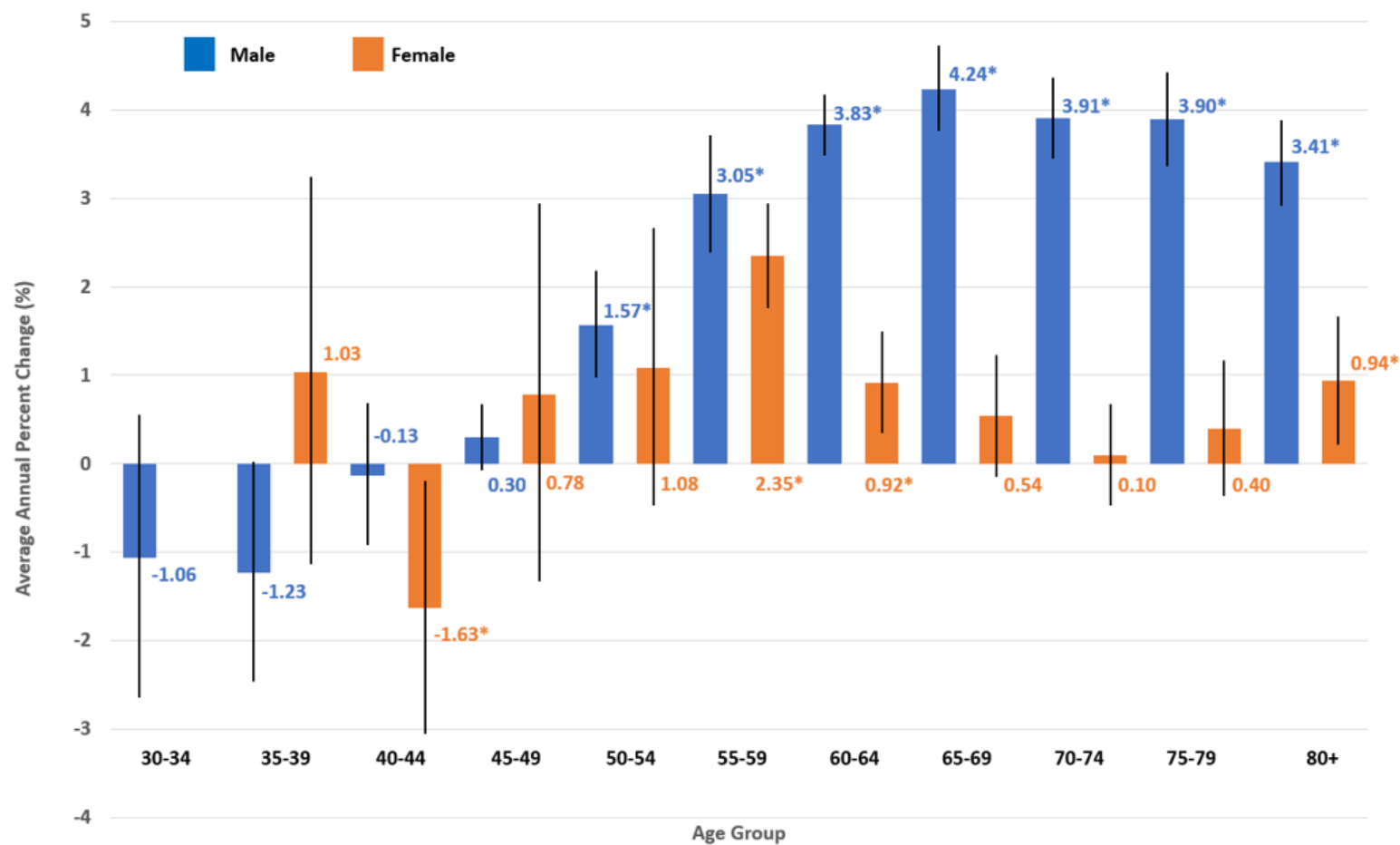
† Trends based on incidence was analyzed using the Joinpoint Regression Program, version 4.8.0.1, allowing up to 3 joinpoints. AAPC is a summary measure of the trend over a pre-specified fixed interval. It was computed as a weighted average of the APC from the joinpoint model, with the weights equal to the length the APC interval. When case number was less than 16, SEER*Stat would hide statistic result and Joinpoint Regression Program could not analyze the incidences or trends.

* The APC or AAPC is significantly different from zero ($p < .05$).

eTable 11. Cervical Cancer Screening Trends in BRFSS (Ever Received any Cervical Cancer Screening)

BRFSS	Yes (%)		Trend 1		Trend 2		2001-2016
Age Group (Female)	2001 to 2016		Years	APC (95% CI)	Year	APC (95% CI)	AAPC (95% CI)
18-24	87.0 to 51.4		2001-2011	-2.20* (-2.76 to -1.63)	2011-2016	-6.36* (-7.91 to -4.79)	-3.61* (-4.19 to -3.02)
25-29	96.2 to 90.6		2001-2009	-0.18 (-0.41 to 0.06)	2009-2016	-0.76* (-1.05 to -0.48)	-0.45* (-0.61 to -0.29)
30-34	97.2 to 94.5		2001-2016	-0.21* (-0.30 to -0.13)	-	-	-0.21* (-0.30 to -0.13)

eFigure. Average Annual Percent Change in Oropharyngeal SCC by Sex in USCS Public Use Databases from 2001 to 2017



Abbreviations: SCC, squamous cell carcinoma; APC, annual percent change; AAPC, average annual percent change.

Trends based on incidence was analyzed using the Joinpoint Regression Program, version 4.8.0.1, allowing up to 3 joinpoints. AAPC is a summary measure of the trend over a pre-specified fixed interval. It was computed as a weighted average of the APC from the joinpoint model, with the weights equal to the length the APC interval. Vertical lines indicate the associated 95% confidence intervals.

* The APC or AAPC is significantly different from zero ($p < .05$).