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Evaluation of a Surveillance Case Definition for Anogenital Warts

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Background

- Changes in the incidence of anogenital warts may be an early marker of HPV vaccine impact
- Population-based estimates of incidence and prevalence are limited because:
  - Genital warts are not reportable
  - ICD-9 diagnosis codes for warts are non-specific
  - Difficult to identify new-onset vs. recurrent warts
- Insinga et al., Koshiol et al., and Hoy et al. have used a combination of ICD-9 diagnosis codes and CPT procedure codes to identify genital warts in health plan data. Their case definition is limited because:
  - Not validated with medical record review
  - Procedure codes are not always specific for genital warts vs. warts in other locations
  - Treatments for warts may not always be coded, especially in managed care organizations

Study Aims

- To develop and validate an alternative case definition for anogenital warts for a Vaccine Safety Datalink (VSD) study monitoring the impact of HPV vaccine
- To describe the age- and gender-specific prevalence of genital warts in one managed care organization in the period before HPV vaccine licensure (2000-2005)

Methods

- We identified 11-30 year old members of Kaiser Permanente Northwest with membership in the health plan during the period 2000 through 2005
- We iteratively developed a case definition for anogenital warts based on ICD-9 codes and other information available in the electronic medical record (at the time of data collection, CPT procedure codes were not available in the VSD datasets)
- Case definition — encounter meeting any of the following criteria:
  - Diagnosis of 078.11 (condyloma accuminatum)
  - Diagnosis of 078.10 (viral warts unspecified) made by obstetrician/gynecologist or urologist
  - Diagnosis of 078.10 (viral warts unspecified) with STI test* ordered at same encounter
  - Diagnosis of 078.19 (other specified viral warts) made by OB/GYN or urologist
  - Diagnosis of 078.19 (other specified viral warts) with STI test* ordered at same encounter

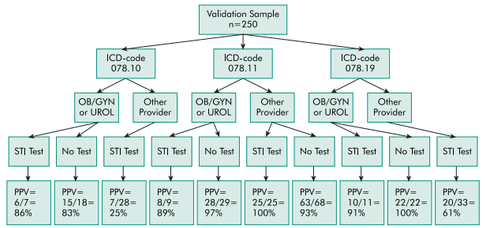
  * STI tests include: chlamydia, gonorrhea, HIV, trichomonas, and syphilis
- We randomly selected 250 people who met our case definition and manually reviewed their medical records to validate the presence or absence of diagnosed genital warts
- We calculated the positive predictive value of our case definition compared to the gold standard manual record review
- We also calculated crude genital wart prevalence rates by age and gender by dividing the number of people who met our case definition by the number of people in the health plan

Results

Validation of the VSD Case Definition

- The positive predictive value (PPV) of the VSD case definition was 82% (78% in females, 89% in males)

Figure 1. Validation of the VSD case definition for anogenital warts



- PPV of ICD-9 code 078.11 (condyloma accuminatum) was 95%
- Most false-positives were generated by encounters coded with a non-specific ICD-9 code and a STI test order. PPV improves to 94% if these encounters are excluded from the case definition.

Prevalence of Genital Warts in Kaiser Permanente Northwest

- In our study population and period (2000-2005), we observed 40,610 clinic and emergency room encounters coded with a wart ICD-9 code (078.1*)
  - 64% were coded 078.10 (viral warts unspecified, condyloma NOS, verruca NOS)
  - 8% were coded 078.11 (condyloma accuminatum)
  - 28% were coded 078.19 (other specified viral warts, genital warts NOS, verruca plantaris)
- 17,723 people were diagnosed with warts during this period (7% of population)
- During our study period, 2,706 people (5,577 encounters) met the VSD case definition for genital warts

Table 1. Characteristics of persons meeting the VSD genital wart case definition

AGE (YEARS)	FEMALE	MALE	TOTAL
11-14	30 (2%)	6 (0.6%)	36 (1%)
15-18	393 (22%)	66 (7%)	459 (17%)
19-22	609 (35%)	290 (30%)	899 (33%)
23-26	451 (26%)	304 (32%)	755 (28%)
27-30	261 (15%)	296 (31%)	557 (21%)
Total	1744 (64%)	962 (36%)	2706

Table 2. Medical specialties providing care for persons with genital warts

	# ENCOUNTERS, (%)
Dermatology	206 (4%)
Emergency room	38 (1%)
Family practice	1081 (19%)
Internal medicine	892 (16%)
Obstetrics/gynecology	2702 (48%)
Pediatrics	153 (3%)
Surgery	223 (4%)
Urgent care	182 (3%)
Urology	48 (1%)
Other provider type	52 (1%)

Table 3. Period Prevalence of Anogenital Warts* in 11-30 Year Olds, 2000-2005

	FEMALES	MALES	TOTAL
AGE (YEARS)	PREVALENCE PER 1,000 PERSONS		
11-14	1.4	0.3	0.8
15-18	17.4	2.8	10.0
19-22	26.0	12.4	19.2
23-26	14.8	11.1	13.1
27-30	8.7	11.1	9.9
Total	13.6	7.8	10.7

* defined as people meeting the VSD case definition during the study period

- Females had a higher prevalence of genital warts than males, except in the 27-30 year age group.
- In both females and males, the highest prevalence of genital warts was observed in the 19-22 year olds.
- If we adjust our prevalence estimates based on the PPV of our case definition, the total number of genital wart cases drops to 2,178 for an adjusted period prevalence of 8.6 per 1,000.

Table 4. Estimates of Anogenital Wart Incidence/Prevalence from other published studies

	INSINGA ET AL. 2003*		KOSHIOL ET AL. 2004†		HOY ET AL. 2009*	
	STUDY PERIOD: 2000		STUDY PERIOD: 1998-2001		STUDY PERIOD: 2004	
	PREVALENCE PER 1,000		INCIDENCE PER 1,000§		INCIDENCE PER 1,000§	
AGE (YEARS)	FEMALES	MALES	FEMALES	MALES	FEMALES	MALES
10-14	0.43	0.41			0.13	0.11
15-19	2.87	0.65	2.10	0.7	2.23	0.74
20-24	6.20	2.93	3.15‡	2.65‡	4.59	2.36
25-29	3.94	5.01			2.72	2.72

* Genital warts defined by insurance claims coded with 078.11 alone, or with 078.10 or 078.19 and a genital-specific CPT procedure code

† Genital warts defined by insurance claims coded with 078.11 alone, or with 078.10 or 078.19 and a genital-specific CPT procedure code or NDC drug code for 5-fluorouracil, imiquimod, podofilox, podophyllin resin, or trichloroacetic acid

§ Defined as first wart diagnosis in 12 months

‡ Age categories in the Koshiol et al paper are 15-19 years and 20-29 years

Conclusions

- The VSD case definition for genital warts performed well when compared to the gold standard manual medical record review with an overall PPV of 82%. We can improve the PPV of our case definition by excluding encounters coded with either 078.10 or 078.19 and an STI test order.
- The genital warts prevalence we observed using the VSD case definition is much higher than estimates from studies using a case definition based on ICD-9 diagnosis and CPT procedure codes. However, the trends we observed in genital wart prevalence — higher in females, peak in the early 20's — are consistent with findings from other studies.
- The case definition has only been validated at one VSD site with data from 11-30 years olds. The case definition may not be generalizable to other health plans or older age groups.

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