

## SUPPLEMENTARY APPENDIX

### *Expanded description of model specifications*

This supplemental section contains the full specification of each of the two propensity models and the four outcomes models. All variables are defined in Table 1 of the main text. In the basic propensity model, the covariate vector  $X_i$  (equation 3) contains: *black*, *hispanic*, *other*, *age*, *gradHighSchool*, *married*, *eqOrAbPovLine*, *anyInsurance*, *birthControlPills*, *havVax*, *anyHbv*, *hivTest*, *smoked100Cigarettes*, *everDrinkAlc*, *ageFirstSex*, and *biannualTrend*, with *white* as the referent category for race/ethnicity. The full specification of the expanded propensity model includes the following covariates: *black*, *hispanic*, *other*, *age*, *gradHighSchool*, *gradCollege*, *married*, *partnered*, *eqOrAbPovLine*, *eqOrAb2xPovLine*, *eqOrAb3xPovLine*, *anyInsurance*, *medicaid*, *birthControlPills*, *havVax*, *anyHbv*, *allHbv*, *hivTest*, *everDrinkAlc*, *drinksPerDay*, *smoked100Cigarettes*, *smokesEveryDay*, *everMarijuana*, *ageFirstSex*, *year0708*, *year0910*, and *year1112*, with referent categories of *white* for race/ethnicity and *year1314* for the time fixed effects.

The four specifications of the outcomes model are named “basic”, “expanded”, “basic with sex frequency”, and “basic with age fixed effects”. The full specification of the basic outcomes model includes the following covariates: *hpvVax*, *black*, *hispanic*, *other*, *age*, *gradHighSchool*, *married*, *eqOrAbPovLine*, *anyInsurance*, *birthControlPills*, *everDrinkAlc*, *drinksPerDay*, *smoked100Cigarettes*, *smokesEveryDay*, *ageFirstSex*, and *biannualTrend*, with *white* as the referent category for race/ethnicity. The full specification of the expanded outcomes model includes: *hpvVax*, *black*, *hispanic*, *other*, *age*, *gradHighSchool*, *gradCollege*, *married*, *partnered*, *eqOrAbPovLine*, *eqOrAb2xPovLine*, *eqOrAb3xPovLine*, *anyInsurance*, *routineHealth*, *birthControlPills*, *everDrinkAlc*, *drinksPerDay*, *smoked100Cigarettes*, *smokesEveryDay*, *everMarijuana*, *ageFirstSex*, *year0708*, *year0910*, and *year1112*, with referent categories of *white* for race/ethnicity and *year1314* for the time fixed effects. The basic model with sex frequency includes all the covariates from the basic outcomes model with the addition of *sexTimesAtLeast12*, *sexTimesAtLeast52* and *sexTimesAtLeast104*. The basic model with age fixed effects includes indicator variables for every age level.

This supplemental section contains three sensitivity analyses, a reduced form specification (Table A1), two groups of fully specified models that utilized a restricted sample size to investigate the potential endogeneity issue characterized by a respondent receiving an HPV vaccine during the 12 months preceding the survey (Table A2 and Table A3), and a group of fully specified models that restrict the maximum age to one year lower than the ages used in the main model (Table A4).

**Table A1. Sensitivity analyses of reduced-form survey-weighted regressions<sup>a</sup> of sexual-behavior-**

**related outcomes on HPV vaccination status.**

Propensity model	Outcome: Outcome model	everUseCondom				halfUseCondom		
		OR	SE	p value		OR	SE	p value
None	Univariate	1.796	0.194	0.003	***	1.036	0.172	0.836
None	Basic	1.014	0.241	0.953		1.129	0.232	0.601
None	Expanded	0.995	0.237	0.983		1.123	0.238	0.627
None	Basic w sex times	1.016	0.247	0.949		1.132	0.245	0.614
None	Basic w age FEs	1.039	0.239	0.872		1.103	0.229	0.670

  

Propensity model	Outcome: Outcome model	mostUseCondom				alwaysUseCondom			
		OR	SE	p value		OR	SE	p value	
None	Univariate	0.664	0.196	0.037	**	0.184	0.303	0.000	***
None	Basic	1.060	0.235	0.805		0.930	0.305	0.811	
None	Expanded	1.059	0.247	0.816		0.919	0.296	0.774	
None	Basic w sex times	1.069	0.239	0.782		0.928	0.300	0.802	
None	Basic w age FEs	1.071	0.229	0.765		0.882	0.306	0.683	

  

Propensity model	Outcome: Outcome model	sexTimesAtLeast12				sexTimesAtLeast52		
		OR	SE	p value		OR	SE	p value
None	Univariate	3.884	0.212	0.000	***	0.796	0.177	0.198
None	Basic	1.109	0.214	0.630		1.005	0.219	0.983
None	Expanded	1.104	0.209	0.635		1.013	0.218	0.954
None	Basic w age FEs	1.246	0.227	0.333		1.058	0.228	0.806

  

Propensity model	Outcome: Outcome model	sexTimesAtLeast104			
		OR	SE	p value	
None	Univariate	0.256	0.246	0.000	***
None	Basic	0.874	0.281	0.631	
None	Expanded	0.872	0.289	0.636	
None	Basic w age FEs	0.907	0.291	0.738	

<sup>a</sup> These regression results are reduced form specifications, and so did not utilize a propensity-score approach or the doubly-robust estimation procedure.

OR refers to odds-ratio; SE refers to standard error; FEs refers to fixed effects.

1 **Table A2. Sensitivity analyses of reduced-form survey-weighted regressions<sup>a</sup> of condom usage on HPV vaccination status, investigating**  
 2 **interaction effects between vaccination status and respondent education.**

Propensity model	Outcome model	Term	Outcome: everUseCondom				halfUseCondom		
			OR	SE	p value		OR	SE	p value
None	Basic	hpvVax	0.266	0.703	0.060	*	0.374	0.671	0.142
None	Basic	hpvVax*gradHighSchool	3.306	0.694	0.085	*	2.472	0.675	0.180
None	Expanded	hpvVax	0.235	0.704	0.040	**	0.336	0.726	0.133
None	Expanded	hpvVax*gradHighSchool	5.165	0.750	0.029	**	3.054	0.727	0.125
None	Expanded	hpvVax*gradCollege	0.364	0.544	0.063	*	0.710	0.540	0.526
None	Basic w sex times	hpvVax	0.303	0.679	0.079	*	0.481	0.654	0.264
None	Basic w sex times	hpvVax*gradHighSchool	2.846	0.666	0.117		1.813	0.655	0.364
None	Basic w age FEs	hpvVax	0.237	0.750	0.055	*	0.357	0.746	0.168
None	Basic w age FEs	hpvVax*gradHighSchool	4.083	0.749	0.060	*	2.690	0.756	0.190

  

Propensity model	Outcome model	Term	Outcome: mostUseCondom				alwaysUseCondom		
			OR	SE	p value		OR	SE	p value
None	Basic	hpvVax	0.257	0.755	0.072	*	0.213	-1.497	0.134
None	Basic	hpvVax*gradHighSchool	3.609	0.751	0.087	*	4.266	1.372	0.170
None	Expanded	hpvVax	0.234	0.812	0.073	*	0.183	-1.866	0.062 *
None	Expanded	hpvVax*gradHighSchool	4.204	0.799	0.072	*	4.002	1.447	0.148
None	Expanded	hpvVax*gradCollege	0.873	0.527	0.797		1.822	1.246	0.213
None	Basic w sex times	hpvVax	0.328	0.732	0.128		0.255	-1.428	0.153
None	Basic w sex times	hpvVax*gradHighSchool	2.720	0.724	0.167		3.446	1.259	0.208
None	Basic w age FEs	hpvVax	0.248	0.817	0.088	*	0.193	-1.594	0.111
None	Basic w age FEs	hpvVax*gradHighSchool	4.008	0.814	0.088	*	4.703	1.464	0.143

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 4 <sup>a</sup>. These regression results are reduced form specifications, and so did not utilize a propensity-score approach or the doubly-robust estimation  
 5 procedure.

6 OR refers to odds-ratio; SE refers to standard error; FEs refers to fixed effects.

1 **Table A3. Sensitivity analyses of reduced-form survey-weighted regressions<sup>a</sup> of frequency of sex on HPV vaccination status, investigating**  
 2 **interaction effects between vaccination status and respondent education.**

Propensity model	Outcome model	Outcome:	sexTimesMoreThan12			sexTimesMoreThan52			
			OR	SE	p value	OR	SE	p value	
None	Basic	hpvVax	3.567	1.496	0.135	3.886	1.928	0.054	*
None	Basic	hpvVax*gradHighSchool	0.260	-1.472	0.141	0.188	-2.045	0.041	**
None	Expanded	hpvVax	2.967	1.349	0.177	3.648	1.822	0.068	*
None	Expanded	hpvVax*gradHighSchool	0.338	-1.246	0.213	0.210	-1.924	0.054	*
None	Expanded	hpvVax*gradCollege	0.731	-0.533	0.594	0.878	-0.255	0.799	
None	Basic w age FEs	hpvVax	2.819	1.333	0.183	3.661	1.745	0.081	*
None	Basic w age FEs	hpvVax*gradHighSchool	0.372	-1.151	0.250	0.211	-1.795	0.073	*

  

Propensity model	Outcome model	Outcome:	sexTimesMoreThan104		
			OR	SE	p value
None	Basic	hpvVax	2.306	1.177	0.239
None	Basic	hpvVax*gradHighSchool	0.291	-1.443	0.149
None	Expanded	hpvVax	2.196	1.153	0.249
None	Expanded	hpvVax*gradHighSchool	0.375	-1.183	0.237
None	Expanded	hpvVax*gradCollege	0.500	-1.156	0.248
None	Basic w age FEs	hpvVax	1.946	0.897	0.370
None	Basic w age FEs	hpvVax*gradHighSchool	0.368	-1.117	0.264

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 4 <sup>a</sup>. These regression results are reduced form specifications, and so did not utilize a propensity-score approach or the doubly-robust estimation  
 5 procedure.

6 OR refers to odds-ratio; SE refers to standard error; FEs refers to fixed effects.

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1 **Table A4. Sensitivity analyses of reduced-form survey-weighted regressions<sup>a</sup> of condom usage on HPV vaccination status, investigating**  
 2 **interaction effects between vaccination status and respondent income relative to poverty line.**

Propensity model	Outcome model	Term	Outcome: everUseCondom			halfUseCondom		
			OR	SE	p value	OR	SE	p value
None	Basic	hpvVax	0.957	0.427	0.919	1.269	0.391	0.542
None	Basic	hpvVax*eqOrAbPovLine	0.750	0.523	0.583	0.571	0.491	0.253
None	Expanded	hpvVax	0.769	0.439	0.548	1.196	0.402	0.656
None	Expanded	hpvVax*eqOrAbPovLine	0.876	0.743	0.859	0.496	0.724	0.332
None	Expanded	hpvVax*eqOrAb2xPovLine	1.192	0.655	0.789	1.490	0.656	0.543
None	Expanded	hpvVax*eqOrAb3xPovLine	0.975	0.758	0.973	0.861	0.745	0.840
None	Basic w sex times	hpvVax	1.034	0.429	0.939	1.506	0.384	0.286
None	Basic w sex times	hpvVax*eqOrAbPovLine	0.672	0.527	0.451	0.438	0.481	0.086 *
None	Basic w age FEs	hpvVax	0.900	0.432	0.808	1.250	0.400	0.578
None	Basic w age FEs	hpvVax*eqOrAbPovLine	0.887	0.532	0.822	0.607	0.501	0.319

  

Propensity model	Outcome model	Term	Outcome: mostUseCondom			alwaysUseCondom		
			OR	SE	p value	OR	SE	p value
None	Basic	hpvVax	1.227	0.394	0.603	1.287	0.486	0.603
None	Basic	hpvVax*eqOrAbPovLine	0.577	0.506	0.277	0.504	0.574	0.233
None	Expanded	hpvVax	1.159	0.387	0.703	1.262	0.491	0.636
None	Expanded	hpvVax*eqOrAbPovLine	0.741	0.671	0.655	0.450	0.823	0.332
None	Expanded	hpvVax*eqOrAb2xPovLine	1.246	0.624	0.724	1.622	0.902	0.592
None	Expanded	hpvVax*eqOrAb3xPovLine	0.512	0.702	0.340	0.660	0.856	0.627
None	Basic w sex times	hpvVax	1.458	0.392	0.336	1.466	0.466	0.412
None	Basic w sex times	hpvVax*eqOrAbPovLine	0.448	0.507	0.113	0.414	0.564	0.118
None	Basic w age FEs	hpvVax	1.238	0.395	0.590	1.333	0.479	0.548
None	Basic w age FEs	hpvVax*eqOrAbPovLine	0.614	0.516	0.345	0.469	0.565	0.180

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 4 <sup>a</sup> These regression results are reduced form specifications, and so did not utilize a propensity-score approach or the doubly-robust estimation  
 5 procedure.

6 OR refers to odds-ratio; SE refers to standard error; FEs refers to fixed effects.

1 **Table A5. Sensitivity analyses of reduced-form survey-weighted regressions<sup>a</sup> of frequency of sex on HPV vaccination status, investigating**  
 2 **interaction effects between vaccination status and respondent income relative to poverty line.**

Propensity model	Outcome model	Term	Outcome: sexTimesMoreThan12			sexTimesMoreThan52			
			OR	SE	p value	OR	SE	p value	
None	Basic	hpvVax	1.996	0.447	0.122	1.819	0.335	0.074	*
None	Basic	hpvVax*eqOrAbPovLine	0.417	0.563	0.120	0.364	0.452	0.025	**
None	Expanded	hpvVax	2.105	0.461	0.106	1.813	0.346	0.086	*
None	Expanded	hpvVax*eqOrAbPovLine	0.197	0.751	0.031	0.399	0.583	0.115	**
None	Expanded	hpvVax*eqOrAb2xPovLine	3.717	0.784	0.094	1.206	0.662	0.777	*
None	Expanded	hpvVax*eqOrAb3xPovLine	0.625	0.696	0.499	0.642	0.773	0.566	
None	Basic w age FEs	hpvVax	2.280	0.434	0.057	1.670	0.335	0.126	*
None	Basic w age FEs	hpvVax*eqOrAbPovLine	0.389	0.569	0.097	0.437	0.438	0.059	*

  

Propensity model	Outcome model	Term	Outcome: sexTimesMoreThan52			
			OR	SE	p value	
None	Basic	hpvVax	1.497	0.416	0.332	
None	Basic	hpvVax*eqOrAbPovLine	0.406	0.588	0.125	
None	Expanded	hpvVax	1.523	0.397	0.290	
None	Expanded	hpvVax*eqOrAbPovLine	0.832	0.691	0.790	
None	Expanded	hpvVax*eqOrAb2xPovLine	1.251	0.783	0.775	
None	Expanded	hpvVax*eqOrAb3xPovLine	0.153	0.859	0.029	**
None	Basic w age FEs	hpvVax	1.290	0.411	0.535	
None	Basic w age FEs	hpvVax*eqOrAbPovLine	0.533	0.563	0.264	

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 4 <sup>a</sup>. These regression results are reduced form specifications, and so did not utilize a propensity-score approach or the doubly-robust estimation  
 5 procedure.

6 OR refers to odds-ratio; SE refers to standard error; FEs refers to fixed effects.

1 **Table A6. Sensitivity analyses, estimated effects on HPV vaccination status with respect to sexual-**  
 2 **behavior-related outcomes from a doubly-robust estimation procedure with NHANES cycles 2009-2010, 2011-**  
 3 **2012, and 2013-2014.**

Propensity model	Outcome: Outcome model <sup>a</sup>	everUseCondom			halfUseCondom		
		ATE <sup>b</sup>	SE	p value	ATE	SE	p value
Basic	Basic	-0.001	0.048	0.991	0.004	0.049	0.939
Basic	Expanded	-0.018	0.046	0.709	0.000	0.048	0.999
Basic	Basic w sex times	0.003	0.047	0.956	0.015	0.046	0.759
Basic	Basic w age FEs	-0.001	0.046	0.983	-0.005	0.044	0.926
Expanded	Basic	-0.046	0.041	0.259	-0.039	0.043	0.372
Expanded	Expanded	-0.051	0.041	0.218	-0.045	0.044	0.313
Expanded	Basic w sex times	-0.041	0.041	0.329	-0.029	0.042	0.504
Expanded	Basic w age FEs	-0.044	0.041	0.288	-0.039	0.038	0.316
Propensity model	Outcome: Outcome model	mostUseCondom			alwaysUseCondom		
		ATE	SE	p value	ATE	SE	p value
Basic	Basic	-0.019	0.052	0.730	0.024	0.040	0.552
Basic	Expanded	-0.021	0.052	0.701	0.021	0.036	0.575
Basic	Basic w sex times	-0.007	0.050	0.895	0.026	0.039	0.517
Basic	Basic w age FEs	-0.019	0.050	0.722	0.016	0.037	0.680
Expanded	Basic	-0.079	0.043	0.065	* -0.020	0.031	0.528
Expanded	Expanded	-0.082	0.044	0.062	* -0.019	0.031	0.544
Expanded	Basic w sex times	-0.069	0.042	0.098	* -0.021	0.031	0.501
Expanded	Basic w age FEs	-0.071	0.042	0.087	* -0.021	0.032	0.515
Propensity model	Outcome: Outcome model	sexTimesAtLeast12			sexTimesAtLeast52		
		ATE	SE	p value	ATE	SE	p value
Basic	Basic	0.055	0.032	0.091	* 0.002	0.050	0.967
Basic	Expanded	0.055	0.032	0.087	* 0.010	0.048	0.853
Basic	Basic w age FEs	0.055	0.031	0.076	* 0.010	0.050	0.852
Expanded	Basic	0.045	0.038	0.243	0.024	0.055	0.675
Expanded	Expanded	0.055	0.036	0.125	0.029	0.054	0.607
Expanded	Basic w age FEs	0.053	0.037	0.150	0.024	0.054	0.665
Propensity model	Outcome: Outcome model	sexTimesAtLeast104					
		ATE	SE	p value			
Basic	Basic	-0.017	0.041	0.685			
Basic	Expanded	-0.012	0.040	0.770			
Basic	Basic w age FEs	-0.028	0.036	0.458			
Expanded	Basic	-0.024	0.042	0.585			
Expanded	Expanded	-0.020	0.042	0.643			
Expanded	Basic w age FEs	-0.030	0.039	0.447			

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5 <sup>a</sup> The basic (outcome) model includes as covariates: *black, hispanic, other, age, gradHighSchool, married,*  
 6 *eqOrAbPovLine, anyInsurance, birthControlPills, hivTest, everDrinkAlc, drinksPerDay, smoked100Cigarettes,*



1 *smokesEveryDay, ageFirstSex, biannualTrend*. The expanded outcome model includes as covariates: *black,*  
2 *hispanic, other, age, gradHighSchool, gradCollege, married, partnered, eqOrAbPovLine, eqOrAb2xPovLine,*  
3 *eqOrAb3xPovLine, anyInsurance, routineHealth, birthControlPills, hivTest, everDrinkAlc, drinksPerDay,*  
4 *smoked100Cigarettes, smokesEveryDay, everMarijuana, ageFirstSex, year0708, year0910*. The basic w sex times  
5 outcome model includes all the covariates of the basic model and the following: *sexTimesAtLeast12,*  
6 *sexTimesAtLeast52, sexTimesAtLeast104*. The basic w age FE (fixed effects) outcome model includes all the  
7 covariates of the basic model and indicator variables for each age level in years.

8 <sup>b</sup>. The average treatment effects were calculated using double-robust estimator.

9 ATE refers average treatment effect; SE refers to standard error; FEs refers to fixed effects.

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1 **Table A7. Sensitivity analyses, estimated effects on HPV vaccination status with respect to sexual-**  
2 **behavior-related outcomes from a doubly-robust estimation procedure with NHANES cycles 2011-2012, and**  
3 **2013-2014.**

Propensity model	Outcome: Outcome model <sup>a</sup>	everUseCondom			halfUseCondom			
		ATE <sup>b</sup>	SE	p value	ATE	SE	p value	
Basic	Basic	-0.002	0.045	0.972	-0.014	0.050	0.799	
Basic	Expanded	-0.010	0.048	0.844	-0.005	0.050	0.933	
Basic	Basic w sex times	0.005	0.045	0.919	0.005	0.049	0.921	
Basic	Basic w age FEs	0.002	0.043	0.971	-0.032	0.038	0.410	
Expanded	Basic	-0.015	0.040	0.711	-0.026	0.047	0.592	
Expanded	Expanded	-0.034	0.041	0.413	-0.026	0.047	0.598	
Expanded	Basic w sex times	-0.008	0.040	0.854	-0.008	0.045	0.873	
Expanded	Basic w age FEs	-0.010	0.038	0.804	-0.037	0.039	0.358	
Propensity model	Outcome: Outcome model	mostUseCondom			alwaysUseCondom			
		ATE	SE	p value	ATE	SE	p value	
Basic	Basic	-0.035	0.054	0.530	0.014	0.041	0.748	
Basic	Expanded	-0.030	0.053	0.576	0.013	0.037	0.732	
Basic	Basic w sex times	-0.019	0.053	0.738	0.017	0.041	0.694	
Basic	Basic w age FEs	-0.042	0.045	0.355	0.001	0.037	0.978	
Expanded	Basic	-0.061	0.045	0.184	-0.031	0.032	0.344	
Expanded	Expanded	-0.059	0.044	0.186	-0.025	0.028	0.389	
Expanded	Basic w sex times	-0.046	0.045	0.309	-0.028	0.031	0.372	
Expanded	Basic w age FEs	-0.057	0.042	0.172	-0.027	0.032	0.416	
Propensity model	Outcome: Outcome model	sexTimesAtLeast12			sexTimesAtLeast52			
		ATE	SE	p value	ATE	SE	p value	
Basic	Basic	0.082	0.040	0.043	**	-0.013	0.058	0.840
Basic	Expanded	0.087	0.038	0.022	**	-0.010	0.056	0.874
Basic	Basic w age FEs	0.082	0.035	0.020	**	-0.009	0.054	0.878
Expanded	Basic	0.053	0.042	0.209		-0.011	0.059	0.857
Expanded	Expanded	0.063	0.040	0.115		-0.002	0.059	0.972
Expanded	Basic w age FEs	0.048	0.035	0.171		-0.006	0.058	0.927
Propensity model	Outcome: Outcome model	sexTimesAtLeast104						
		ATE	SE	p value				
Basic	Basic	0.002	0.047	0.976				
Basic	Expanded	0.000	0.044	0.996				
Basic	Basic w age FEs	-0.006	0.043	0.901				
Expanded	Basic	0.008	0.046	0.864				
Expanded	Expanded	0.004	0.046	0.942				
Expanded	Basic w age FEs	-0.008	0.044	0.871				

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1 <sup>a</sup>. The basic (outcome) model includes as covariates: *black, hispanic, other, age, gradHighSchool, married,*  
2 *eqOrAbPovLine, anyInsurance, birthControlPills, hivTest, everDrinkAlc, drinksPerDay, smoked100Cigarettes,*  
3 *smokesEveryDay, ageFirstSex, biannualTrend*. The expanded outcome model includes as covariates: *black,*  
4 *hispanic, other, age, gradHighSchool, gradCollege, married, partnered, eqOrAbPovLine, eqOrAb2xPovLine,*  
5 *eqOrAb3xPovLine, anyInsurance, routineHealth, birthControlPills, hivTest, everDrinkAlc, drinksPerDay,*  
6 *smoked100Cigarettes, smokesEveryDay, everMarijuana, ageFirstSex, year0708, year0910*. The basic w sex times  
7 outcome model includes all the covariates of the basic model and the following: *sexTimesAtLeast12,*  
8 *sexTimesAtLeast52, sexTimesAtLeast104*. The basic w age FE (fixed effects) outcome model includes all the  
9 covariates of the basic model and indicator variables for each age level in years.

10 <sup>b</sup>. The average treatment effects were calculated using double-robust estimator.

11 ATE refers average treatment effect; SE refers to standard error; FEs refers to fixed effects.

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1 **Table A8. Sensitivity analyses, estimated effects on HPV vaccination status with respect to sexual-**  
2 **behavior-related outcomes from a doubly-robust estimation procedure with NHANES cycles 2007-2014 with**  
3 **the maximum age from each NHANES cycle was reduced by one year<sup>a</sup>.**

Propensity model	Outcome: Outcome model <sup>b</sup>	everUseCondom			halfUseCondom			
		ATE <sup>c</sup>	SE	p value	ATE	SE	p value	
Basic	Basic	-0.017	0.043	0.702	-0.015	0.042	0.728	
Basic	Expanded	-0.022	0.042	0.615	-0.008	0.041	0.850	
Basic	Basic w sex times	-0.007	0.043	0.881	0.001	0.040	0.989	
Basic	Basic w age FEs	-0.009	0.043	0.841	-0.013	0.039	0.750	
Expanded	Basic	-0.013	0.044	0.787	0.000	0.046	0.995	
Expanded	Expanded	-0.024	0.043	0.591	-0.012	0.045	0.806	
Expanded	Basic w sex times	-0.005	0.044	0.914	0.010	0.043	0.822	
Expanded	Basic w age FEs	-0.011	0.044	0.816	-0.002	0.044	0.966	
Propensity model	Outcome: Outcome model	mostUseCondom			alwaysUseCondom			
		ATE	SE	p value	ATE	SE	p value	
Basic	Basic	-0.034	0.042	0.430	-0.030	0.031	0.335	
Basic	Expanded	-0.027	0.042	0.540	-0.030	0.028	0.285	
Basic	Basic w sex times	-0.020	0.041	0.640	-0.025	0.030	0.406	
Basic	Basic w age FEs	-0.022	0.040	0.588	-0.031	0.029	0.287	
Expanded	Basic	-0.057	0.044	0.193	-0.012	0.031	0.699	
Expanded	Expanded	-0.061	0.044	0.169	-0.017	0.030	0.586	
Expanded	Basic w sex times	-0.046	0.041	0.261	-0.010	0.029	0.750	
Expanded	Basic w age FEs	-0.050	0.041	0.233	-0.019	0.030	0.542	
Propensity model	Outcome: Outcome model	sexTimesAtLeast12			sexTimesAtLeast52			
		ATE	SE	p value	ATE	SE	p value	
Basic	Basic	0.066	0.032	0.042	**	0.031	0.047	0.524
Basic	Expanded	0.068	0.030	0.024	**	0.034	0.046	0.465
Basic	Basic w age FEs	0.066	0.032	0.039	**	0.034	0.046	0.474
Expanded	Basic	0.059	0.038	0.124		0.002	0.051	0.974
Expanded	Expanded	0.058	0.036	0.101		0.004	0.051	0.947
Expanded	Basic w age FEs	0.058	0.036	0.107		0.003	0.050	0.957
Propensity model	Outcome: Outcome model	sexTimesAtLeast104						
		ATE	SE	p value				
Basic	Basic	0.003	0.041	0.940				
Basic	Expanded	0.004	0.041	0.927				
Basic	Basic w age FEs	-0.003	0.040	0.946				
Expanded	Basic	-0.022	0.041	0.601				
Expanded	Expanded	-0.015	0.040	0.723				
Expanded	Basic w age FEs	-0.029	0.038	0.449				

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5 <sup>a</sup>. Reducing the maximum age by one year, relative to the baseline, corresponds to the following maximum ages  
6 for each NHANES cycle: 26 in 2007-2008, 28 in 2009-2010, 30 in 2011-2012, and 32 in 2013-2014.

1 <sup>b</sup>. The basic (outcome) model includes as covariates: *black, hispanic, other, age, gradHighSchool, married,*  
2 *eqOrAbPovLine, anyInsurance, birthControlPills, hivTest, everDrinkAlc, drinksPerDay, smoked100Cigarettes,*  
3 *smokesEveryDay, ageFirstSex, biannualTrend*. The expanded outcome model includes as covariates: *black,*  
4 *hispanic, other, age, gradHighSchool, gradCollege, married, partnered, eqOrAbPovLine, eqOrAb2xPovLine,*  
5 *eqOrAb3xPovLine, anyInsurance, routineHealth, birthControlPills, hivTest, everDrinkAlc, drinksPerDay,*  
6 *smoked100Cigarettes, smokesEveryDay, everMarijuana, ageFirstSex, year0708, year0910*. The basic w sex times  
7 outcome model includes all the covariates of the basic model and the following: *sexTimesAtLeast12,*  
8 *sexTimesAtLeast52, sexTimesAtLeast104*. The basic w age FE (fixed effects) outcome model includes all the  
9 covariates of the basic model and indicator variables for each age level in years.

10 <sup>c</sup>. The average treatment effects were calculated using double-robust estimator.

11 ATE refers average treatment effect; SE refers to standard error; FEs refers to fixed effects.

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