

# Bacillus Calmette-Guerin vaccine and bladder cancer incidence: Scoping literature review and preliminary analysis

Sabrina Trigo<sup>1</sup>, Kaitlin Gonzalez<sup>1</sup>, Livio Di Matteo<sup>2</sup>, Asmaa Ismail<sup>1</sup>, Hazem Elmansy<sup>1</sup>, Walid Shahrour<sup>1</sup>, Owen Prowse<sup>1</sup>, Ahmed Kotb<sup>1</sup>

<sup>1</sup> Northern Ontario School of Medicine, Thunder Bay, ON, Canada;

<sup>2</sup> Department of Economics, Lakehead University, Thunder Bay, ON, Canada.

## REGRESSION ANALYSIS - LINEAR MODELS (CRUDE AND AGE STANDARDIZED BC INCIDENCE RATES)

### SET I

```
. regress cruderate males currentbcgvacc medpercapgdp200307 medpercapgdp200307sq
```

Source	SS	df	MS	Number of obs	=	136
Model	21653.857	4	5413.46424	F(4, 131)	=	53.56
Residual	13240.7576	131	101.074486	Prob > F	=	0.0000
				R-squared	=	0.6206
				Adj R-squared	=	0.6090
Total	34894.6146	135	258.478626	Root MSE	=	10.054

  

cruderate	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
males	22.16632	1.724175	12.86	0.000	18.75549	25.57715
currentbcgvacc	-8.147097	2.284326	-3.57	0.001	-12.66604	-3.628156
medpercapgdp200307	.0003057	.0001258	2.43	0.016	.0000569	.0005546
medpercapgdp200307sq	-2.80e-09	1.16e-09	-2.42	0.017	-5.09e-09	-5.07e-10
_cons	.1890255	3.539143	0.05	0.957	-6.812243	7.190294

```
. regress asrw males currentbcgvacc medpercapgdp200307 medpercapgdp200307sq
```

Source	SS	df	MS	Number of obs	=	136
Model	8424.48766	4	2106.12192	F(4, 131)	=	90.67
Residual	3042.89606	131	23.2282142	Prob > F	=	0.0000
				R-squared	=	0.7346
				Adj R-squared	=	0.7265
Total	11467.3837	135	84.9435831	Root MSE	=	4.8196

  

asrw	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
males	14.93	.8265487	18.06	0.000	13.29489	16.56511
currentbcgvacc	-3.216383	1.095078	-2.94	0.004	-5.382709	-1.050057
medpercapgdp200307	.0001355	.0000603	2.25	0.026	.0000162	.0002548
medpercapgdp200307sq	-1.24e-09	5.56e-10	-2.23	0.028	-2.34e-09	-1.39e-10
_cons	-.1320516	1.696623	-0.08	0.938	-3.488376	3.224272

**SET II**

```
. regress cruderate males neverorpastbcg medpercagdp200307 medpercagdp200307sq
```

Source	SS	df	MS	Number of obs	=	134
Model	20838.819	4	5209.70475	F(4, 129)	=	49.53
Residual	13569.4382	129	105.189443	Prob > F	=	0.0000
				R-squared	=	0.6056
				Adj R-squared	=	0.5934
Total	34408.2572	133	258.708701	Root MSE	=	10.256

  

cruderate	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
males	22.04642	1.772	12.44	0.000	18.54047	25.55236
neverorpastbcg	6.921098	2.340877	2.96	0.004	2.289615	11.55258
medpercagdp200307	.0004132	.0001171	3.53	0.001	.0001815	.0006448
medpercagdp200307sq	-3.67e-09	1.10e-09	-3.33	0.001	-5.85e-09	-1.49e-09
_cons	-8.476489	2.234366	-3.79	0.000	-12.89724	-4.055741

```
. regress asrw males neverorpastbcg medpercagdp200307 medpercagdp200307sq
```

Source	SS	df	MS	Number of obs	=	134
Model	8170.44323	4	2042.61081	F(4, 129)	=	85.62
Residual	3077.58656	129	23.8572602	Prob > F	=	0.0000
				R-squared	=	0.7264
				Adj R-squared	=	0.7179
Total	11248.0298	133	84.5716525	Root MSE	=	4.8844

  

asrw	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
males	14.84985	.843894	17.60	0.000	13.18019	16.51952
neverorpastbcg	2.803421	1.114815	2.51	0.013	.5977316	5.00911
medpercagdp200307	.0001745	.0000558	3.13	0.002	.0000642	.0002848
medpercagdp200307sq	-1.55e-09	5.25e-10	-2.96	0.004	-2.59e-09	-5.15e-10
_cons	-3.506933	1.06409	-3.30	0.001	-5.612261	-1.401604

**SET III**

```
. regress cruderate males percentbcglyroid198550 medpercagdp200307 medpercagdp200307sq
```

Source	SS	df	MS	Number of obs	=	136
Model	21001.0089	4	5250.25222	F(4, 131)	=	49.50
Residual	13893.6057	131	106.058059	Prob > F	=	0.0000
				R-squared	=	0.6018
				Adj R-squared	=	0.5897
Total	34894.6146	135	258.478626	Root MSE	=	10.298

  

cruderate	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
males	22.16632	1.766169	12.55	0.000	18.67242	25.66023
percentbcglyroid198550	-4.616727	1.890007	-2.44	0.016	-8.355612	-.8778421
medpercagdp200307	.0004983	.0001067	4.67	0.000	.0002872	.0007094
medpercagdp200307sq	-4.32e-09	1.04e-09	-4.15	0.000	-6.38e-09	-2.26e-09
_cons	-5.753659	2.763206	-2.08	0.039	-11.21994	-.2873782

```
. regress asrw males percentbcglyroid198550 medpercagdp200307 medpercagdp200307sq
```

Source	SS	df	MS	Number of obs	=	136
Model	8289.83756	4	2072.45939	F(4, 131)	=	85.44
Residual	3177.54616	131	24.2560776	Prob > F	=	0.0000
				R-squared	=	0.7229
				Adj R-squared	=	0.7144
Total	11467.3837	135	84.9435831	Root MSE	=	4.925

  

asrw	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
males	14.93	.8446384	17.68	0.000	13.2591	16.6009
percentbcglyroid198550	-1.407932	.9038616	-1.65	0.102	-3.275986	.3001217
medpercagdp200307	.0002179	.000051	4.27	0.000	.000117	.0003189
medpercagdp200307sq	-1.89e-09	4.97e-10	-3.80	0.000	-2.87e-09	-9.07e-10
_cons	-2.776757	1.321453	-2.10	0.038	-5.390907	-.1626079

**REGRESSION ANALYSIS - LOG-LINEAR MODELS  
(AGE STANDARDIZED BC INCIDENCE RATES)**

```
. regress lasrw males currentbcgvacc medpercapgdp200307 medpercapgdp200307sq
```

Source	SS	df	MS	Number of obs	=	128
Model	571.526963	4	142.881741	F(4, 123)	=	265.38
Residual	66.2233999	123	.538401625	Prob > F	=	0.0000
				R-squared	=	0.8962
				Adj R-squared	=	0.8928
Total	637.750363	127	5.0216564	Root MSE	=	.73376

  

lasrw	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
males	4.242838	.1306753	32.47	0.000	3.984175	4.501502
currentbcgvacc	-.3450771	.1718709	-2.01	0.047	-.6852851	-.0048692
medpercapgdp200307	.0000116	.0000102	1.14	0.259	-8.63e-06	.0000318
medpercapgdp2003~q	-1.21e-10	1.03e-10	-1.17	0.245	-3.26e-10	8.40e-11
_cons	-1.673662	.276532	-6.05	0.000	-2.22104	-1.126284

```
. regress lasrw males neverorpastbcg medpercapgdp200307 medpercapgdp200307sq
```

Source	SS	df	MS	Number of obs	=	126
Model	556.655058	4	139.163764	F(4, 121)	=	251.84
Residual	66.8627992	121	.552585117	Prob > F	=	0.0000
				R-squared	=	0.8928
				Adj R-squared	=	0.8892
Total	623.517857	125	4.98814286	Root MSE	=	.74336

  

lasrw	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
males	4.22217	.1334316	31.64	0.000	3.958007	4.486333
neverorpastbcg	.2043955	.1723566	1.19	0.238	-.1368299	.545621
medpercapgdp200307	.0000192	9.45e-06	2.03	0.045	4.47e-07	.0000379
medpercapgdp200307sq	-1.82e-10	9.88e-11	-1.84	0.068	-3.78e-10	1.35e-11
_cons	-2.057587	.1796681	-11.45	0.000	-2.413287	-1.701886

```
. regress lasrw males percentbcglyrold198550 medpercapgdp200307 medpercapgdp200307sq
```

Source	SS	df	MS	Number of obs	=	128
Model	573.116072	4	143.279018	F(4, 123)	=	272.66
Residual	64.6342913	123	.525482043	Prob > F	=	0.0000
				R-squared	=	0.8987
				Adj R-squared	=	0.8954
Total	637.750363	127	5.0216564	Root MSE	=	.7249

  

lasrw	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
males	4.240762	.1290803	32.85	0.000	3.985255	4.496268
percentbcglyrold198550	-.3669765	.1371998	-2.67	0.008	-.638555	-.095398
medpercapgdp200307	.000017	8.38e-06	2.03	0.045	4.15e-07	.0000336
medpercapgdp200307sq	-1.67e-10	9.11e-11	-1.83	0.069	-3.47e-10	1.32e-11
_cons	-1.775129	.2110969	-8.41	0.000	-2.192983	-1.357276