QUADRIVALENT HPV VACCINATION IMPACT IN PORTUGAL: 2007-2010

Lisbon, May 2011

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This study was funded by Sanofi Pasteur MSD Portugal

Context of present analysis

- 2007: two vaccines against HPV were launched in Portugal for sale in pharmacies
  - ➔ Quadrivalent (types 6,11,16 ,18), January
  - ➔ Bivalent (types 16, 18), September
- Following official recommendation HPV vaccine was included in the National Immunization Program (NIP) in October 2008.
  - ➔ Quadrivalent HPV vaccine has been used
  - ➔ Routine vaccination of 13 years old girls (in 2008 to the girls born in 1995)
  - ➔ 3 years catch-up vaccination of 17 years old girls (in 2008 to the girls born in 1992)
- As Portugal it was one of the first countries to introduce the HPV vaccine in the NIP, it is very important to make an evaluation of the impact of this policy

Importance of assessing vaccination impact

- HPV disease represent a significant burden. Portugal 2009

  (source: DGS - mortality; ACSS, 2005 to 2009, Uniform Hospital Discharge Data Set – DRGs database)

  - ➔271 deaths by cervical cancer (circa 206 attributable to HPV 16 and 18)
  - ➔752 new cases of cervical cancer (HPV 16 and 18)
  - ➔1053 high-grade cervical displasia (HPV 16/18), 624 low-grade cervical displasia (HPV 6,11, 16 and 18); only hospital cases
  - ➔8,807 new cases of female genital warts (HPV 6 and 11)
  - ➔Circa 15 Million euro in diagnosis and treatment of diseases (HPV 6, 11, 16 and 18)

- Given the total costs involved in the NIP (circa 12 Million Euro for 2011) it is important to evaluate its impact, either in projected health outcomes gains or in estimated future costs potentially avoided

Objectives: To assess HPV vaccination impact in terms of future health gains and costs potentially avoided to the healthcare system

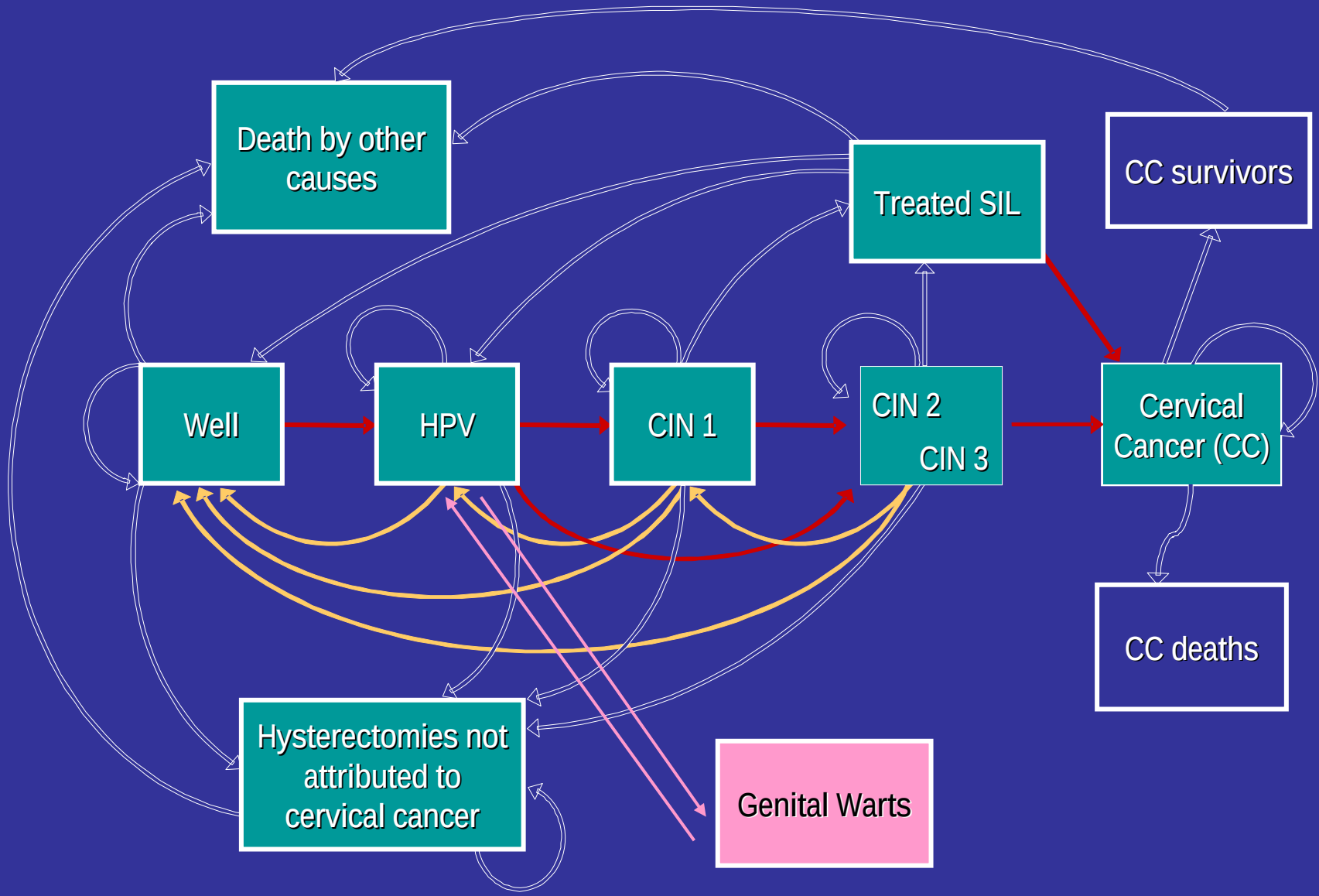
- To estimate the potential life time reduction in the number of deaths due to HPV quadrivalent vaccine administration for females 13-26 years old and in the period 2007 to 2010
- To estimate the potential life time burden of disease reduction after quadrivalent vaccine introduction (same ages and period)
- To estimate the potential life time reduction in costs for cervical cancer, cervical displasia and genital warts due to HPV quadrivalent vaccine introduction (same ages and period)
- To identify this quadrivalent vaccine impact, both for public (NIP) and private markets

Model Overview (Vaccine + Screening vs. Screening)

Inputs	Outputs

• Health condition and transition probabilities
  • Not infected
  • HPV infected (detected and non detected)
  • Genital Warts (GW)
  • CIN 1 and CIN 2/3
  • Cervical Cancer (CC) Stages: FIGO I-IV
  • Hysterectomy for non-cervical disease
  • Death by CC and other causes
• Life expectancy per age group
• Vaccine efficacy
• Percentage of cases attributted to HPV types 6,11,16,18
• Screening Rate
• Disease Costs (CC by stage, CIN1, CIN2/3 and GW)
• Vaccinated Population by cohort 2007-2010 – estimated values
Source: Kulasingam et al, 2003 and 2005
	• Life time mortalility and morbidity reduction
	• Potential Life Years gained
	• Quality Adjusted Life Years
	• Life time financial impact from NHS prespective
	• Incremental cost-effectiveness ratios (comparing vaccine + screening strategy vs. screening only)
	• Sensitiviy analysis

Natural History of HPV related diseases



Source: Myers et al, 2000, Kulasingam et al, 2003 e 2005

HPV disease transition probability

Parameters	Age	Probability	Time Period
HPV infection to CIN 1 or CIN 2*	All	0,.959	12 months
% HPV infection progressing directly to CIN 2*	All	0.1350	-
CIN 1 to CIN 2*	16-34	0.297	12 months
	35+	0.1485	12 months
CIN 1 to CIN 3*	All	0.0301	12 months
CIN 1 to normal**	12-24	0.7000	18 months
	25-29	0.5000	18 months
	30-39	0.4000	18 months
	40-49	0.2700	18 months
	50+	0.1000	18 months
CIN 1 to HPV infection*	16-34	0.2248	12 months
	35+	0.1124	12 months
% CIN 1 regressing directly to no infection*	All	0.90	-
CIN 2 to CIN 3*	16-34	0.0389	12 months
	35-44	0.0797	12 months
	45+	0.1062	12 months
CIN 2 to CIN 1*	All	0.2430	12 months
CIN 2 to no infection or HPV infection*	All	0.1901	12 months
% CIN 2 regressing directly to no infection*	All	0.90	-
CIN 3 to CIN 1*	All	0.0000	12 months
CIN 3 to CIN 2*	All	0.0135	12 months
CIN 3 regressing directly to no infection*	16-44	0.0135	12 months
	45+	0.0100	12 months
% CIN 3 regressing directly to no infection*	All	0.50	-
CIN 3 to invasive cervical cancer***	All	0.014	-

* Source: Canfell et al, 2004; ** Source: calibrated from Myers et al, 2000 e Canfell et al, 2004 ; *** Source: calibrated from Canfell et al, 2004

Input data – some examples

- Deaths by cervical cancer (2004, DGS) – 207

- Incidence (2005, ACSS 2001 to 2005 DRGs database)

  - ➔Genital warts – 9.049 (adapted from France, Germany and UK)
  - ➔CIN1 – 4,957 (ACSS with adpatation from France and UK)
  - ➔CIN2/3 – 2,073 (ACSS with adaptaion from France and UK)
  - ➔Cervical Cancer – 1,090 (ACSS and Portuguese hospitals)

- Screening rate – Theoretical, corresponding to the highest value by age (groups of 5 years) of European Union (2005, EU15, some countries)

% of cases attributed to HPV types 6,11,16,18

Disease	HPV 6,11	HPV 16, 18
Cervical Cancer	___	75%
CIN 2/3	___	60%
CIN 1	30%	
Genital Warts	90%	___

Sources: Feoli Fonseca et, al 2001, Von Krogh, 2001; Clifford et al, 2003; Munoz et al, 2003; Clifford et al, 2005; Pista, 2006; Villa et al, 2006 and Pista 2007

Cost data – 2005 (Euro)

OFFICIAL TARIFFS, PORTARIA Nº132/2003, FEBRUARY 5

- Pap smear – 28.1
- Colposcopy – 38.9
- Colposcopy with biopsy – 59.3
- HPV Test – 85.3
- Genital Warts – 593.8
- CIN 1 – 1,207.3
- CIN 2/3 – 2,460.3
- Cervical Cancer
  - ➔FIGO I – 10,553.0
  - ➔FIGO II – 18,116.2
  - ➔FIGO III – 15,888.5
  - ➔FIGO IV – 18,577.8
- Vaccines (3 doses) – 165 Euro (1 cohort) and 123 Euro (4 cohorts)

Vaccinated Population 2007-2010 (estimation)

Age	Number of vaccinated women
13 – routine cohort	115,780
17 – catch-up cohort	78,496
18-26	48,856
TOTAL	243,070

Estimative – SPMSD, Portugal

Summary of Health Gains

	Life Time Number of Cases
Deaths	464
Cervical cancer	2,225
CIN 2/3	24,082
CIN 1	10,618
Genital Warts	19,352

Summary of Health Gains

	Life Time Number of Cases		
	NIP (circa 80% of total)	Private Market	TOTAL
Deaths	373	91	464
Cervical cancer	1,805	420	2,225
CIN 2/3	19,448	4,634	24,082
CIN 1	8,609	2,009	10,618
Genital Warts	15,905	3,447	19,352

Summary of costs reduction

	Life Time Costs Reduction (€ Million)
Cervical cancer	30.3
CIN 2/3	59.3
CIN 1	12.8
Genital Warts	11.5
Total	113.8

Summary of costs reduction

	Life Time Costs Reduction (€ Million)		
	NIP (circa 80 % of Total)	Private Market	TOTAL
Cervical cancer	24.6	5.7	30.3
CIN 2/3	47.8	11.4	59.3
CIN 1	10.4	2.4	12.8
Genital Warts	9.4	2.1	11.5
Total	92.2	21.6	113.8

Costs of vaccination = 22.8 Million Euro
Financial Impact = 91.0 Million Euro

Conclusions

- The success of the implementation of HPV vaccination in Portugal is expected to have generated significant health and economic gains that will occur in the long term, which points out to effectiveness and efficiency improvements

- In the short term vaccine coverage could be improved together with health promotion actions (healthy sexual behaviour) and systematic screening implementation and assessment in order to optimize the value for money

Thank you
Questions?

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