

Socio-economic determinants of vaccination and screening uptake

Paolo Giorgi Rossi
AUSL Reggio Emilia

Topics of the presentation

- Cervical cancer prevention and inequalities
- The existing inequities in Italy and how public health initiatives reduce them
 - About screening
 - About vaccine
- The problem of association between screening and vaccination:
 - a rapid review of the evidence
 - An Italian example

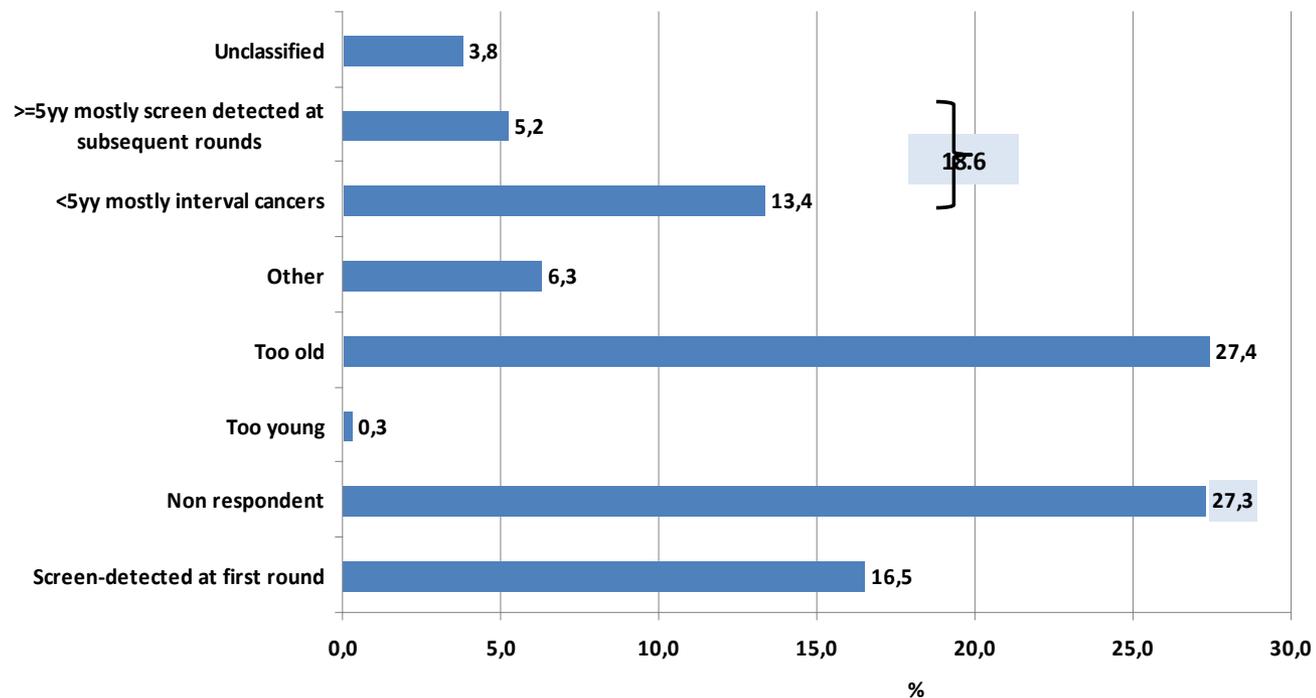
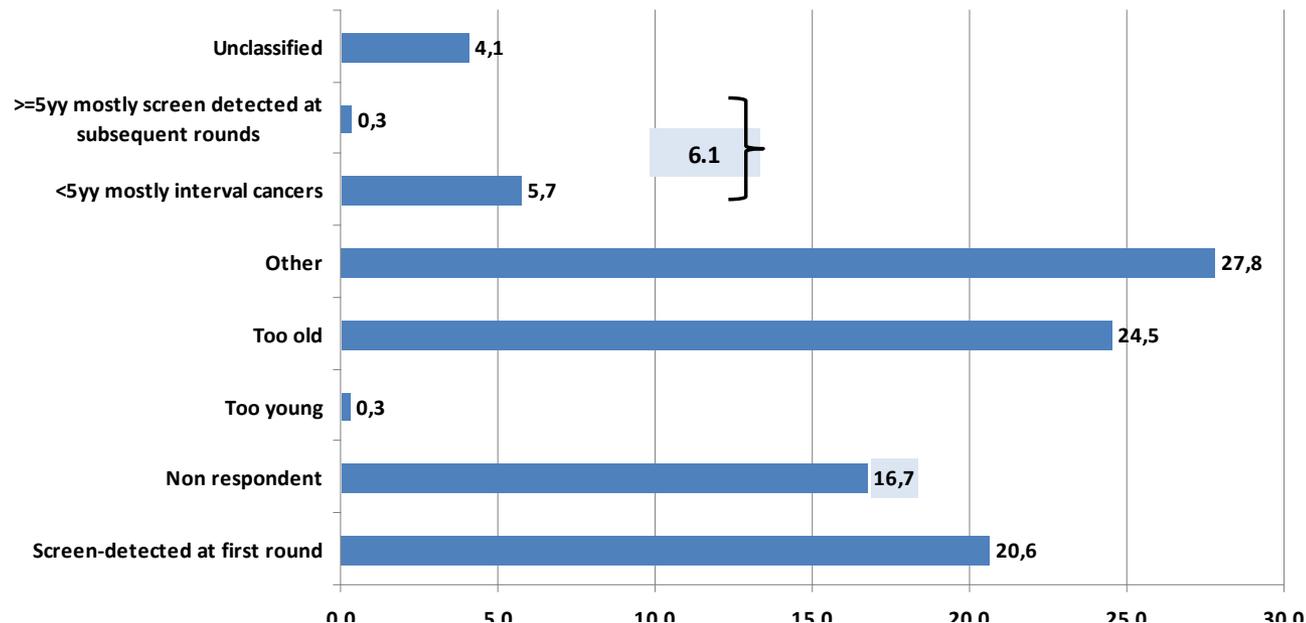
Health inequalities in cervical cancer prevention

- One of the aims of the NHS, and in particular of the screening programs, is to reduce inequalities in accessing health services and definitely in health
- Screening and vaccine uptake may share the same socioeconomic determinants
- Association between screening and vaccination may increase existing health inequalities

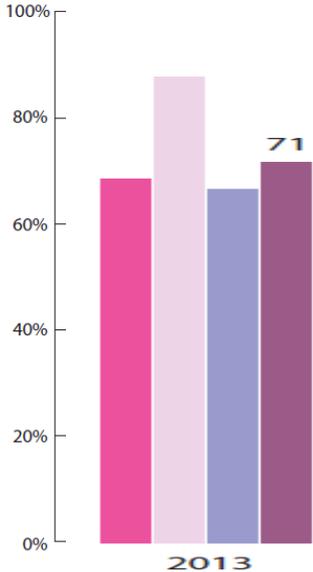
Association between vaccination and screening: what's the problem?

- Screening is effective in preventing cervical cancer in women regularly attending
- The vast majority of cancers still occurs in women under or never screened
- Despite all the efforts a 30/15% of the women are still not covered by screening
- Vaccine will have a relevant impact on cancer incidence only if we are able to vaccinate those girls that will be under or never screened in the future.

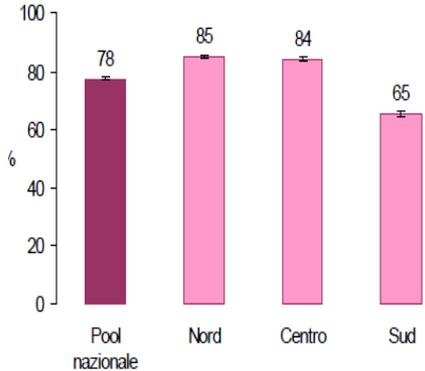
**The majority
(not the vast)
of invasive
cancers are
still due to non-
participation**



Existing socio-economic differences in screening coverage in Italy

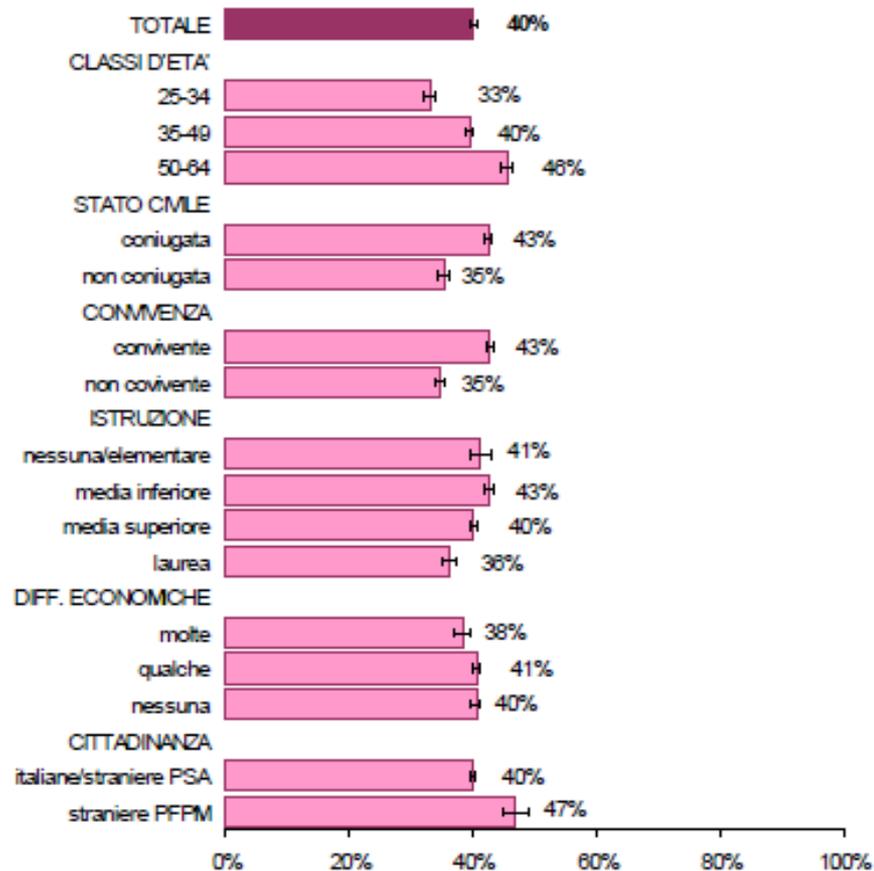


Screening programs extension

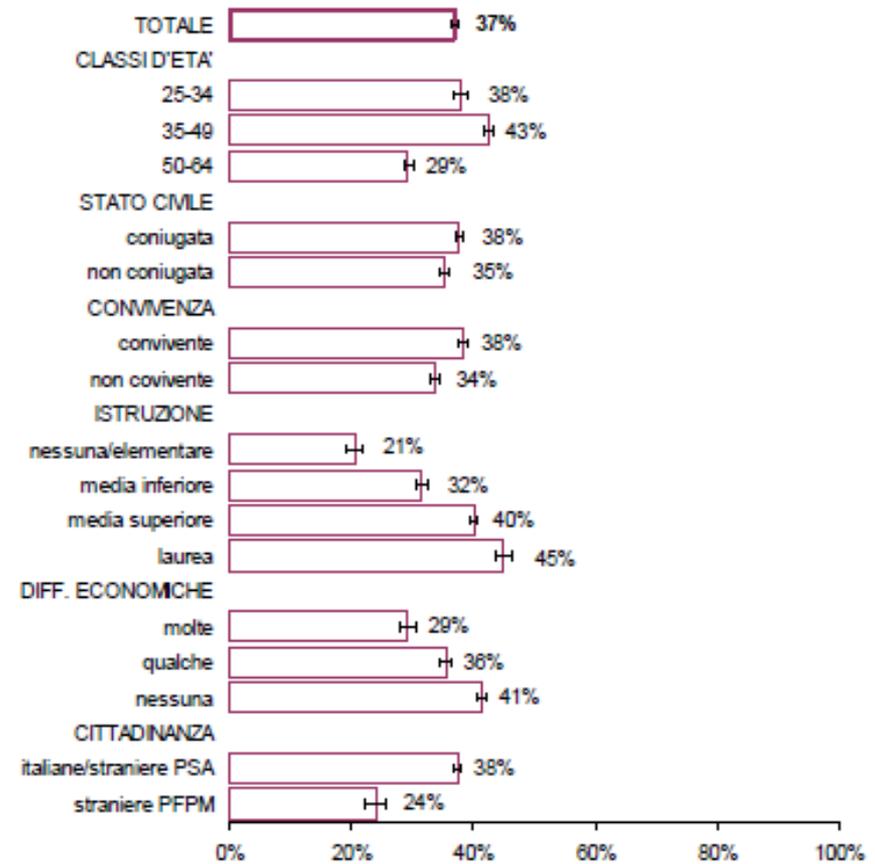


Overall uptake

How organised screening programs level inequalities



Screening programs



Spontaneous screening

The studies on socio-economic inequalities in vaccine in Italy

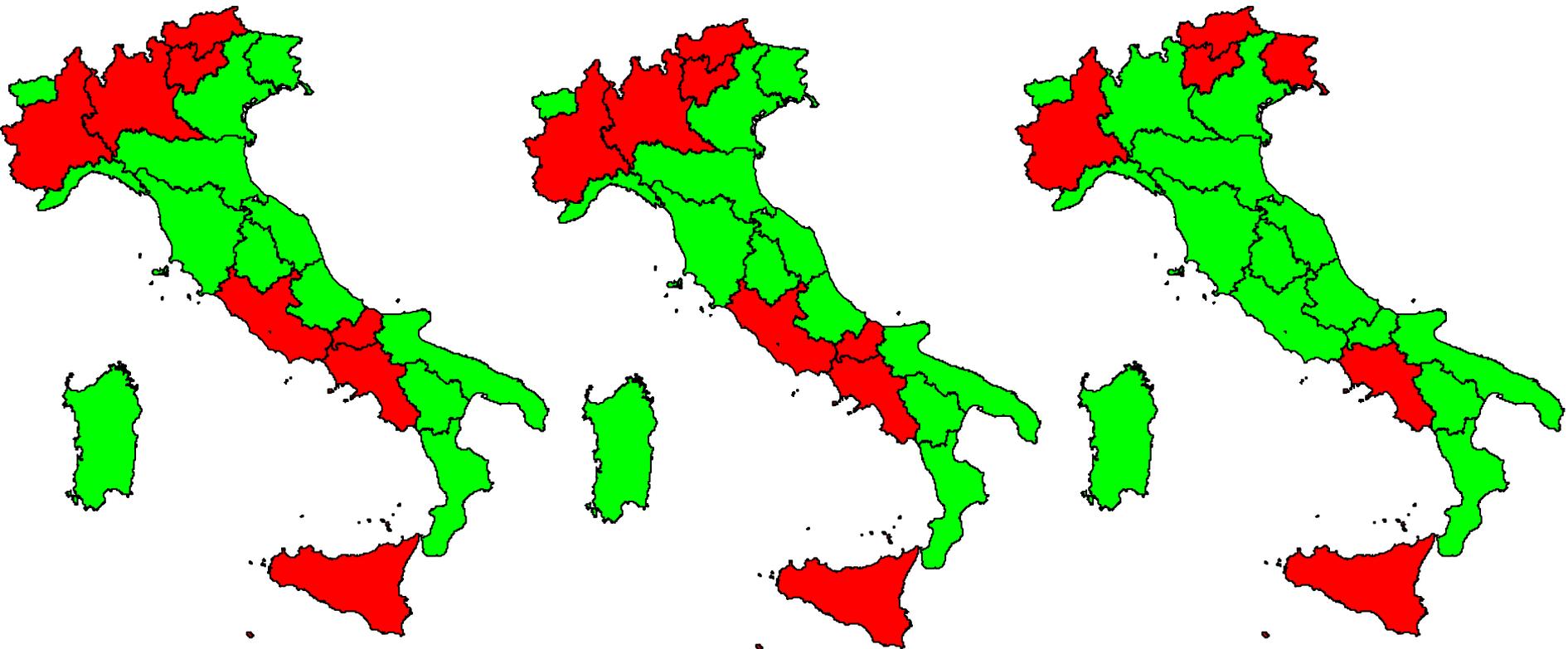
- There are many studies showing association between educational level and knowledge about HPV and cervical cancer (Capogrosso 2015; Giambi 2014; Bianco 2014; Napoli 2011)
- There are few studies (Giambi 2011) showing difference in vaccine uptake and educational level (in 18-26yo women).
- One study showed lower knowledge about HPV, but higher awareness of the need for screening in vaccinated than unvaccinated girls (14-18yo) (Sopracordevole 2013)

Vaccination coverage, cohorts 1997-1998-1999 (al 31/12/2014)

1997- 71%

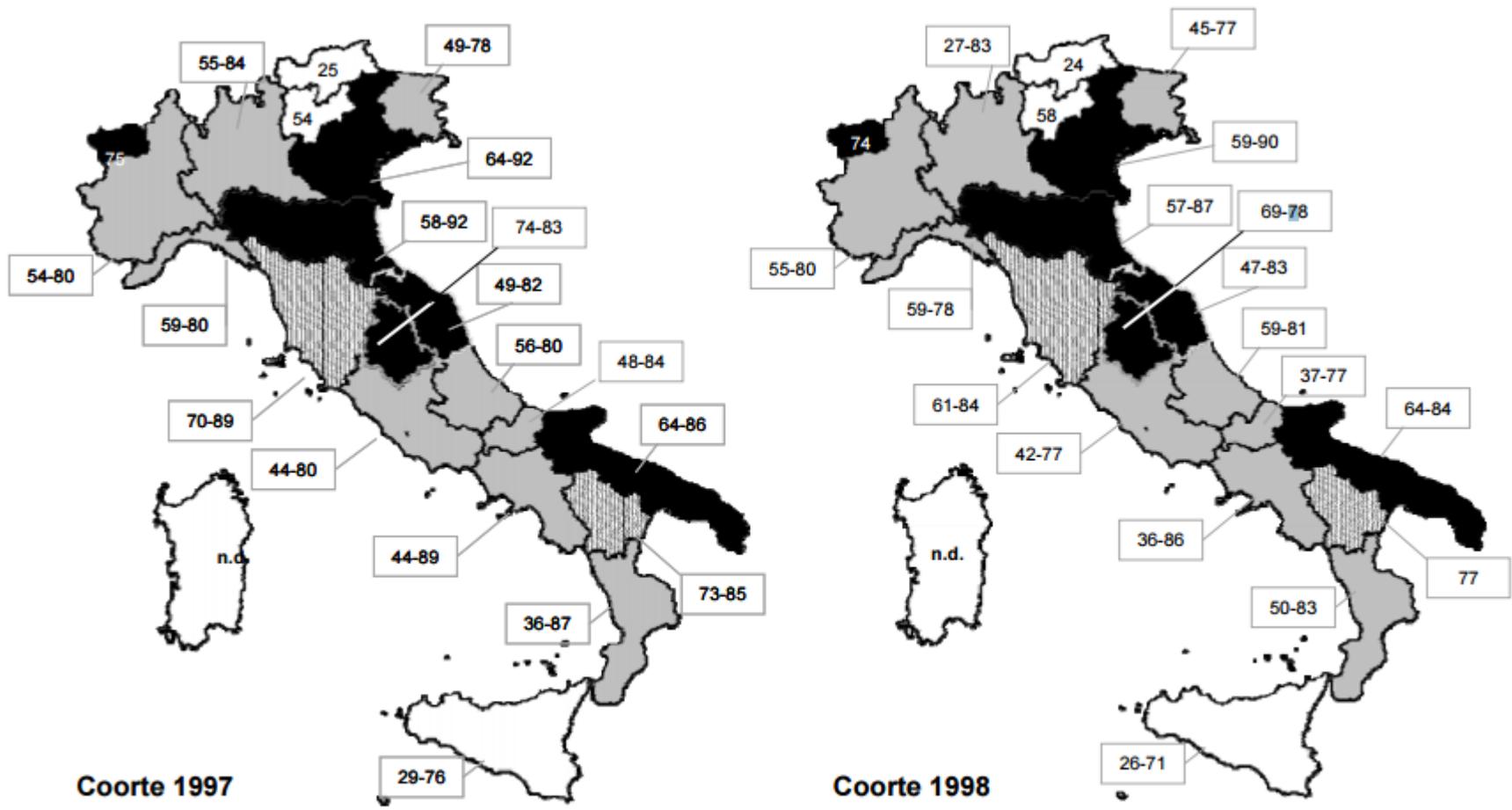
1998 - 71%

1999 - 72%



■ CV \geq 70% ■ CV < 70%

Vaccination coverage: variability between ASL, cohort 1997-98



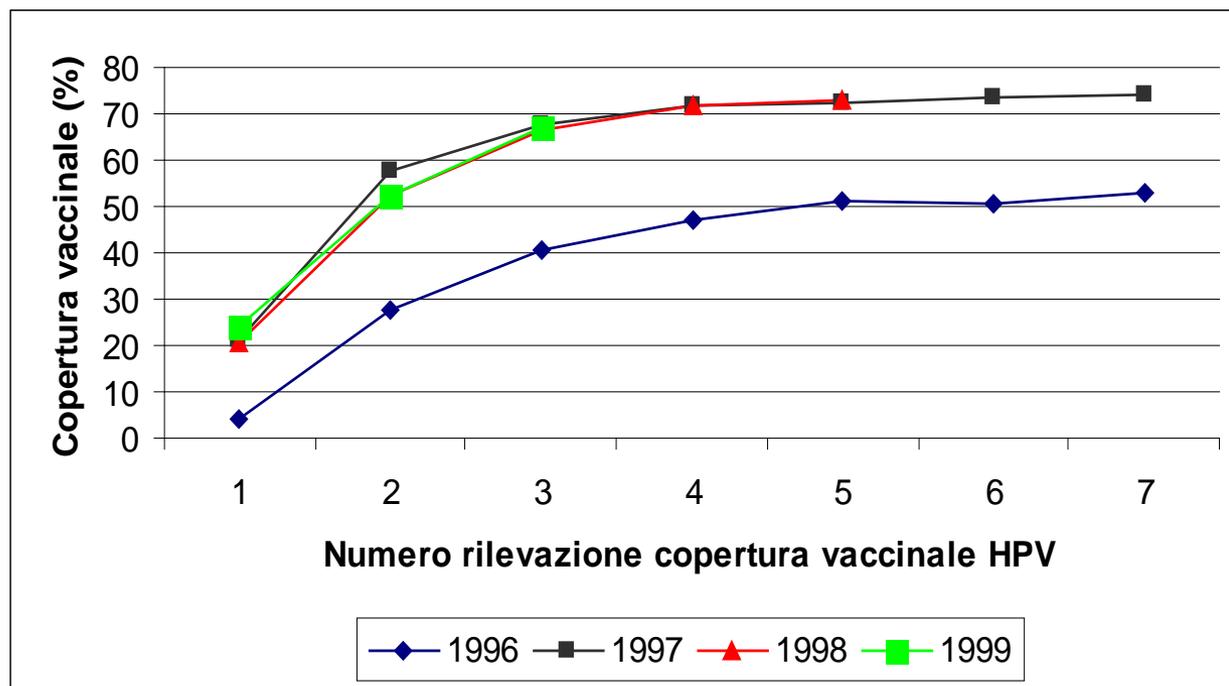
In Regione Emilia-Romagna, 2008

Coorte nate nel 1996 →

offerta gratuita su richiesta dei genitori

Coorte nate nel 1997 →

offerta gratuita a invito attivo



Andamento temporale delle coperture in Regione E-R contro l'HPV nelle corti 1996, 1997, 1998 e 1999.

Construction of the two cohorts: girls born in 1996 and 1997 in Reggio Emilia



	Coorte di nascita			
	1997		1996	
	N	%	N	%
Totale nate	2.307		2.260	
Totale vaccinate con almeno una dose	1.896		1.087	
Linkate	1.798	77,9	1.046	46,3

Nazionalità	1996				1997			
	Adesione alla vaccinazione				Adesione alla vaccinazione			
	Sì		No		Sì		No	
	N	%	N	%	N	%	N	%
Italiana	976	50,0	977	50,0	1.534	77,7	441	22,3
Straniera	70	22,8	237	77,2	264	79,5	68	20,5

Distretto di residenza	1996				1997			
	Adesione alla vaccinazione				Adesione alla vaccinazione			
	Sì		No		Sì		No	
	N	%	N	%	N	%	N	%
Correggio	84	37,8	138	62,2	188	74,3	65	25,7
Montecchio	135	50,2	134	49,8	227	82,8	47	17,2
Reggio Emilia	520	52,1	479	47,9	809	81,8	180	18,2
Scandiano	98	27,8	254	72,2	202	56,7	154	43,3
Castelnuovo Monti	70	55,1	57	44,9	109	91,6	10	8,4
Guastalla	139	47,8	152	52,2	263	83,2	53	16,8

Association between mother's educational level and vaccine uptake

Titolo di studio	1996				1997			
	Adesione alla vaccinazione				Adesione alla vaccinazione			
	Sì		No		Sì		No	
	N	%	N	%	N	%	N	%
Laurea	42	61.76	26	38.24	15	18.29	67	81.71
Superiori	119	44.4	149	55.6	56	19.86	226	80.14
Medie	163	48.08	176	51.92	54	16.07	282	83.93
Elementari	39	68.42	18	31.58	18	35.29	33	64.71
Analfabeta	5	55.56	4	44.44	1	20	4	80
Totale	368	49.66	373	50.34	144	19.05	612	80.95

No Active invitation

Active invitation

Pearson $\chi^2(4) = 15.4364$ Pr = 0.004

Pearson $\chi^2(4) = 10.8137$ Pr = 0.029

Association between mother's marital status and vaccination

Stato Civile	1996				1997			
	Adesione alla vaccinazione				Adesione alla vaccinazione			
	Sì		No		Sì		No	
	N	%	N	%	N	%	N	%
Coniugata o convivente	327	50	327	50	127	19.13	537	80.87
Non convivente	36	45	44	55	16	17.78	74	82.22
Totale	363	49.46	371	50.54	143	18.97	611	81.03

Pearson $\chi^2(1) = 0.7129$ Pr = 0.398 Pearson $\chi^2(1) = 0.0938$ Pr = 0.759

Association between maternal age and vaccination

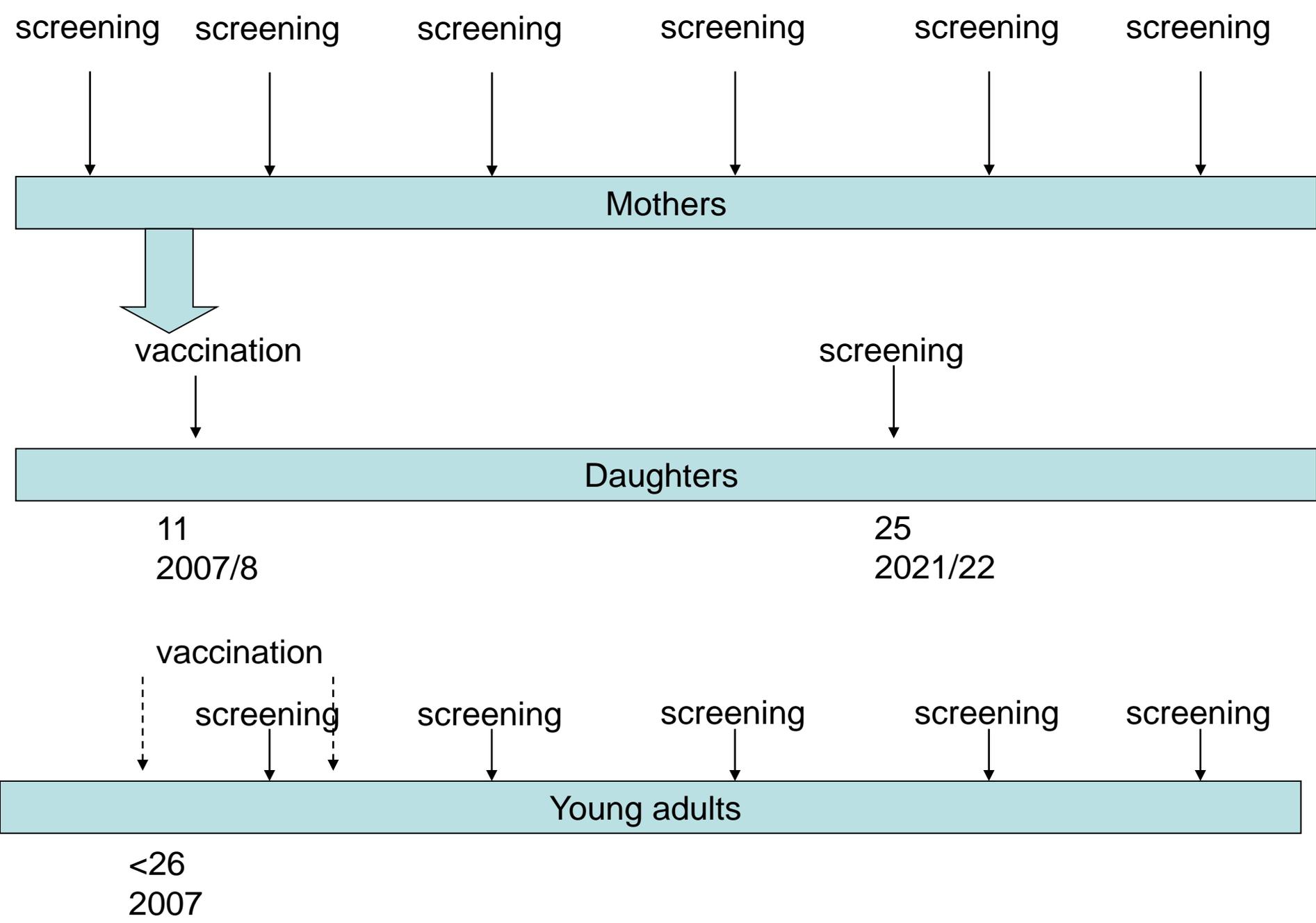
Età al parto	1996				1997			
	Adesione alla vaccinazione				Adesione alla vaccinazione			
	Sì		No		Sì		No	
	N	%	N	%	N	%	N	%
<20	15	71.43	6	28.57	5	19.23	21	80.77
20-34	307	49.2	317	50.8	111	18.35	494	81.65
35-40	47	48.96	49	51.04	27	22.5	93	77.5
>40	2	66.67	1	33.33	1	14.29	6	85.71
Totale	371	49.87	373	50.13	144	19	614	81

Pearson $\chi^2(3) = 4.3871$ Pr = 0.223

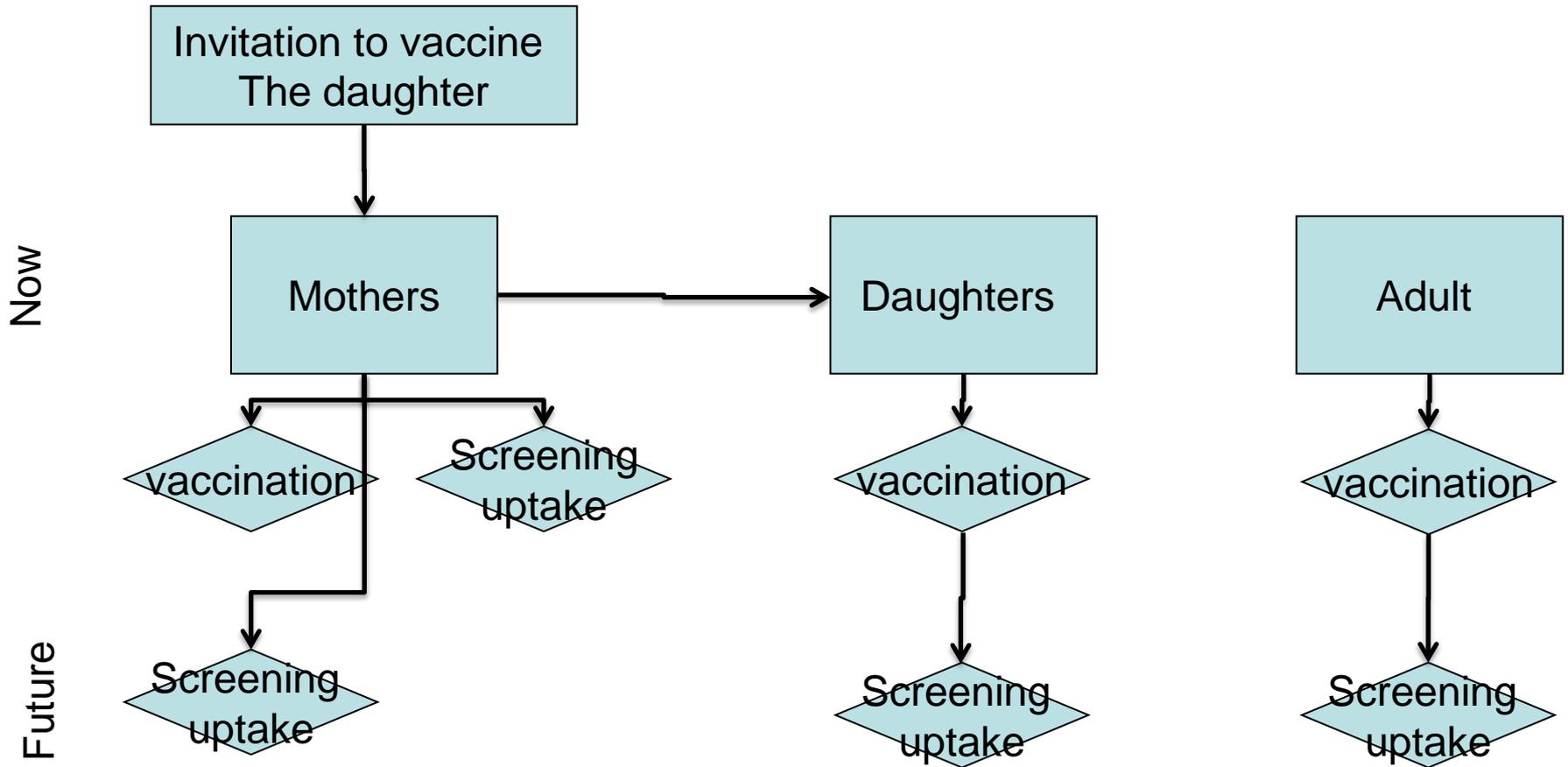
Pearson $\chi^2(3) = 1.2248$ Pr = 0.747

	OR aggiustato	95%IC
COORTE 1996		
Nazionalità		
Straniere	1 (RIF.)	
Italiane	3,58	(2,69-4,76)
Distretto di residenza		
Correggio	1 (RIF.)	
Montecchio	1,57	(1,09-2,27)
Reggio Emilia	1,79	(1,33-2,43)
Scandiano	0,59	(0,41-0,85)
Castelnuovo Monti	1,96	(1,25-3,09)
Guastalla	1,50	(1,05-2,16)
COORTE 1997		
Nazionalità		
Straniere	1 (RIF.)	
Italiane	0,99	(0,74-1,33)
Distretto di residenza		
Correggio	1 (RIF.)	
Montecchio	1,67	(1,10-2,55)
Reggio Emilia	1,55	(1,12-2,15)
Scandiano	0,45	(0,32-0,65)
Castelnuovo Monti	3,77	(1,86-7,64)
Guastalla	1,72	(1,14-2,58)

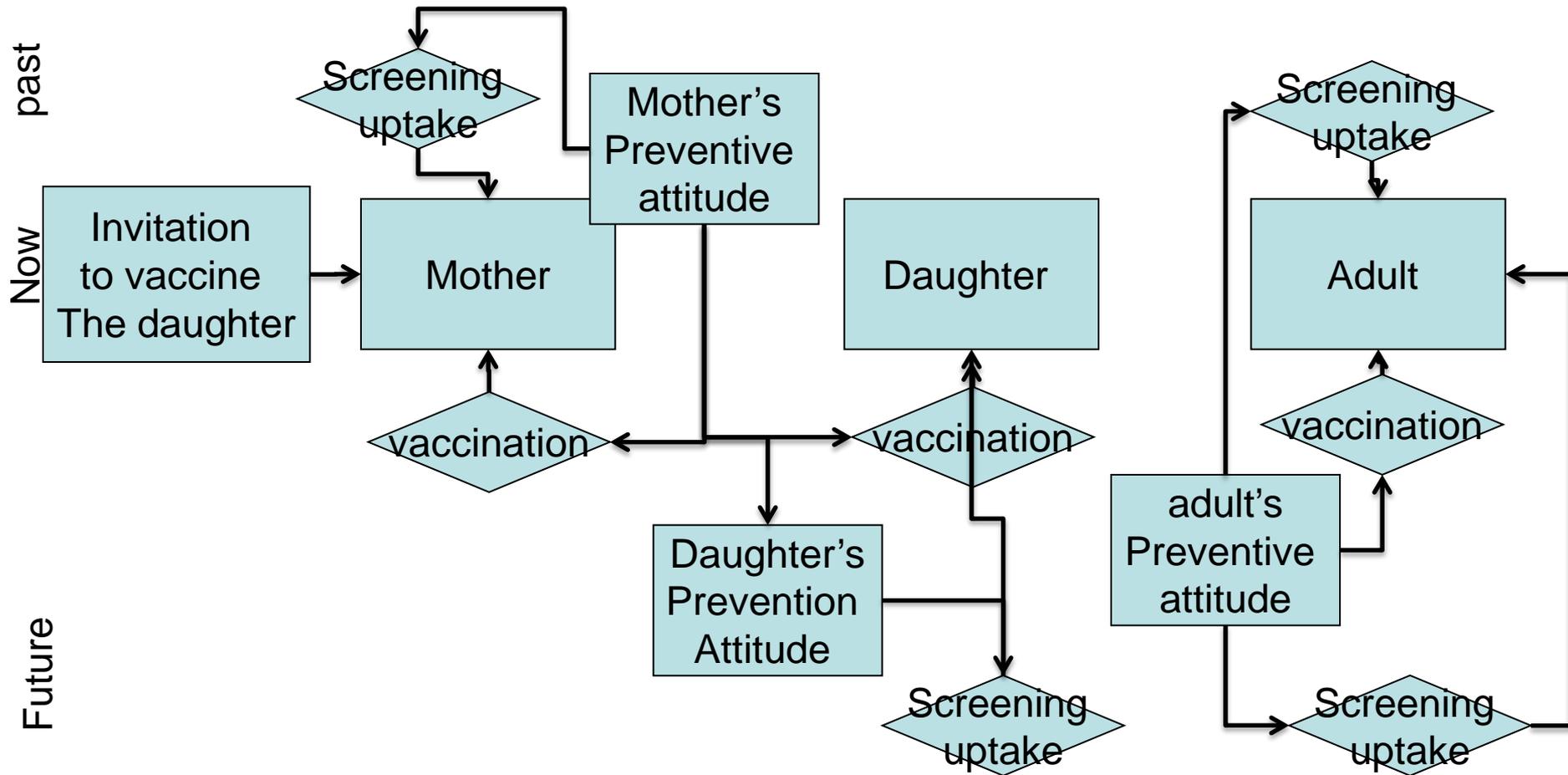
The problem of association between screening and vaccination



Possible effects of vaccination campaign on screening uptake



Possible association between vaccination and screening uptake



A rapid review on the association between vaccination and screening

- Pubmed search: HPV & screening & vaccine* & (uptake OR participation)
- 18 relevant studies (one systematic review), no in Italy
- Only one study assessing population impact

Adult on adult

FIRST AUTHOR; YEAR	COUNTRY	study design	Population	Results: RR/HR of screening in Vaccinated vs. Unvaccinated
Palmer TJ 2016	Scotland	cohort	201 023	RR=1.54, 95% CI 1.54-1.56.
Boone SD 2016	USA	case control	1123 cases; 1123 ctls	HR=2.98 95% CI:2.45-3.61
Paynter CA 2015	USA	cohort	27786	OR= 1.36 (1.16, 1.61) (più forte se vaccinate vicino ai 21 anni); adjOR=0.82 (0.67, 1.02)
Herweijer E 2015	Sweden	cohort	629,703	in the first round. HR=1.31 (95% CI 1.27-1.35) HRadj=1.09, 95% CI 1.05-1.13). In the second round HR=1.26, 95% CI 1.21-1.32; HRadj=1.15, 95% CI 1.10-1.20)
Budd AC 2014	Australia	cross-sectional	2.7 million	PR= 0.79 [95% CI, 0.78-0.80]; 20-24 yo PR= 0.77 [95% CI, 0.76-0.78]; 25-29yo
Sauer AG 2015	USA	cross-sectional	7095	aPR=1.08, 95% CI: 1.04-1.11.

Mother on daughter

FIRST AUTHOR; YEAR	COUNTRY	study design	Population	Results: RR/OR of daughter's vaccination by mothers' screening participation
Spencer Nee Pilkington AM 2013	England	cohort	about 42000	Routine vaccination never= ref; screen>5aa=1.6 (95%CI 1.2-2.1); recent screen= 2.2 (95%CI 1.6-2.9); catch up vaccination never= ref; screen>5aa=1.1 (95%CI 0.8-1.4); recent screen= 1.5 (95%CI 1.2-2.0)
Steens A 2013	The Netherlands	cross- sectional	337368	OR: 1.54 [95% confidence interval: 1.51-1.57]).
Lefevere E 2011	Belgium	cohort	127,854	OR=4.5; 95% CI=3.5-5.9.
Hansen BT 2015	Norway	cohort	90,842	OR = 1.16 (95%CI 1.1-1.23);
Markovitz AR 2014	USA	cross- sectional	38,604 pairs	OR = 1.07, 95% CI = 1.06-1.08
Lutringer-Magnin D 2013	France	cross- sectional	502	OR= 6.2, 95%CI 1.5-25.8
Chao C 2009	USA	cross- sectional	148 350 pairs	OR = 1.47; 95%[CI] = 1.43, 1.52.
Hechter RC 2013	USA	cohort	254 489 boys	RR = 1.13; 95% CI = 1.01, 1.26

Daughter on Mother

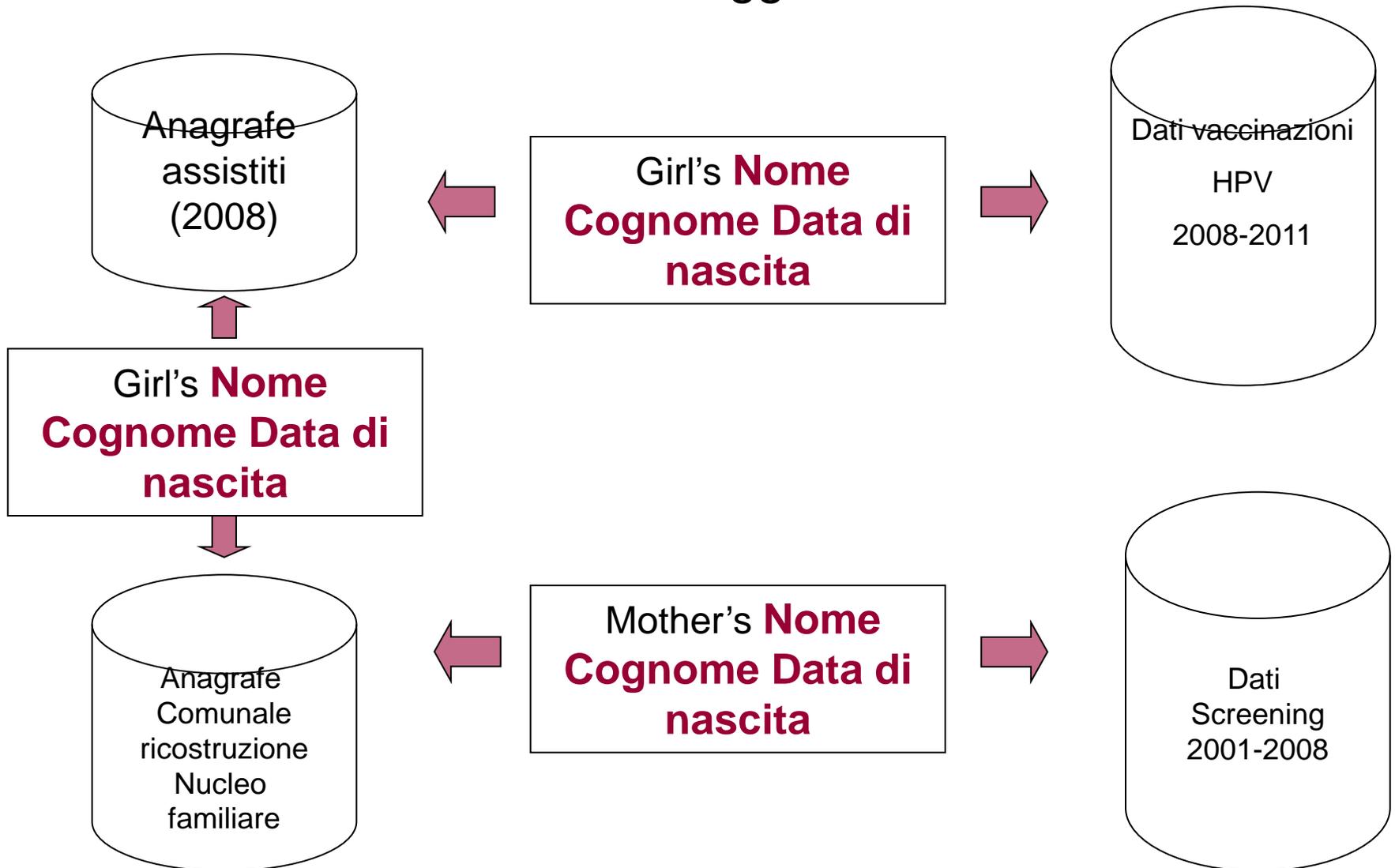
FIRST AUTHOR; YEAR	COUNTRY	study design	Population	Results: Mothers returning to screening
Spencer AM 2015	UK	cohort	112,451	OR 1.04 (95% confidence intervals 1.02-1.07) for lapsed and 1.57 (1.48-1.67) for never screened.

Daughter on daughter

FIRST AUTHOR; YEAR	COUNTRY	study design	Population	Results
Bowyer HL 2014	UK	cross-sectional	1912	Those with low intentions to attend cervical screening were less likely to be fully vaccinated than those with high intentions.
Mather T 2012	Australia	cross-sectional	193	no association
Paynter CA 2015	USA	case control	27,786	1.55 (1.11, 2.16) 1.00 (0.62, 1.63)

Construction of the two cohorts: girls born in 1996 and 1997 in Reggio Emilia

METHODS



Association between previous mother's participation in screening and daughter's vaccination

Adesione	1996 Vaccinazione				1997 Vaccinazione			
	Sì		No		Sì		No	
	N	%	N	%	N	%	N	%
Mai aderenti	60	67.42	29	32.58	31	34.44	59	65.56
Almeno una volta aderenti	184	54.93	151	45.07	70	20.53	271	79.47
Aderenti	127	44.56	158	55.44	55	18.64	240	81.36
Totale	371	52.33	338	47.67	156	21.49	570	78.51

Pearson chi2(2) = 15.9189 Pr = 0.000

Pearson chi2(2) = 10.5561 Pr = 0.005

Association between previous mother's participation in screening and daughter's vaccination

	OR aggiustato	95% IC
1996		
Adesione		
Mai aderenti	1 (RIF)	
Almeno una volta aderenti	1.47	(0.88 - 2.47)
Aderenti	2.24	(1.33 - 3.77)
1997		
Adesione		
Mai aderenti	1 (RIF)	
Almeno una volta aderenti	1.86	(1.10 - 3.15)
Aderenti	2.15	(1.25 - 3.67)

Aggiustato per età al parto, nazionalità e numero di inviti ricevuti dal programma

Conclusions

- Screening and vaccine uptake present some inequalities in Italy
- Active invitation campaigns are effective in reducing inequalities
- Vaccination does not reduce intention to undergo screening and screening uptake
- Women's preventive attitude influence both screening and vaccine uptake, this association is not reduced by active invitation.