Targeting FASTER to reduce HPV reproductive rates:

“Even Faster”

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I have no current conflicts of interest to declare

Some basic facts about HPV:

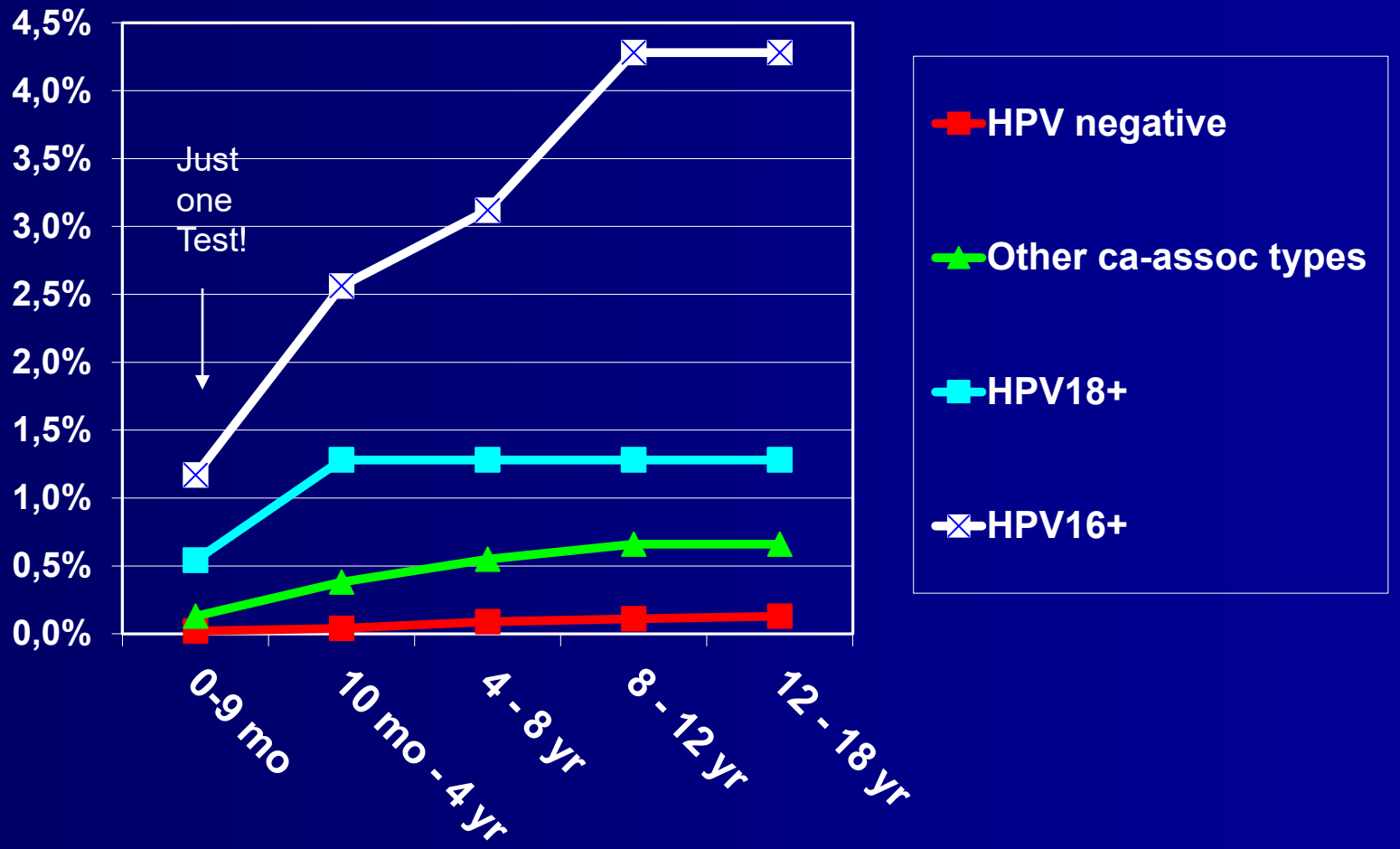
-Even a single HPV test will determine your cervical cancer risk for many years

-Vaccination works to prevent HPV, also for adult women that are HPV-negative at vaccination (per protocol population)

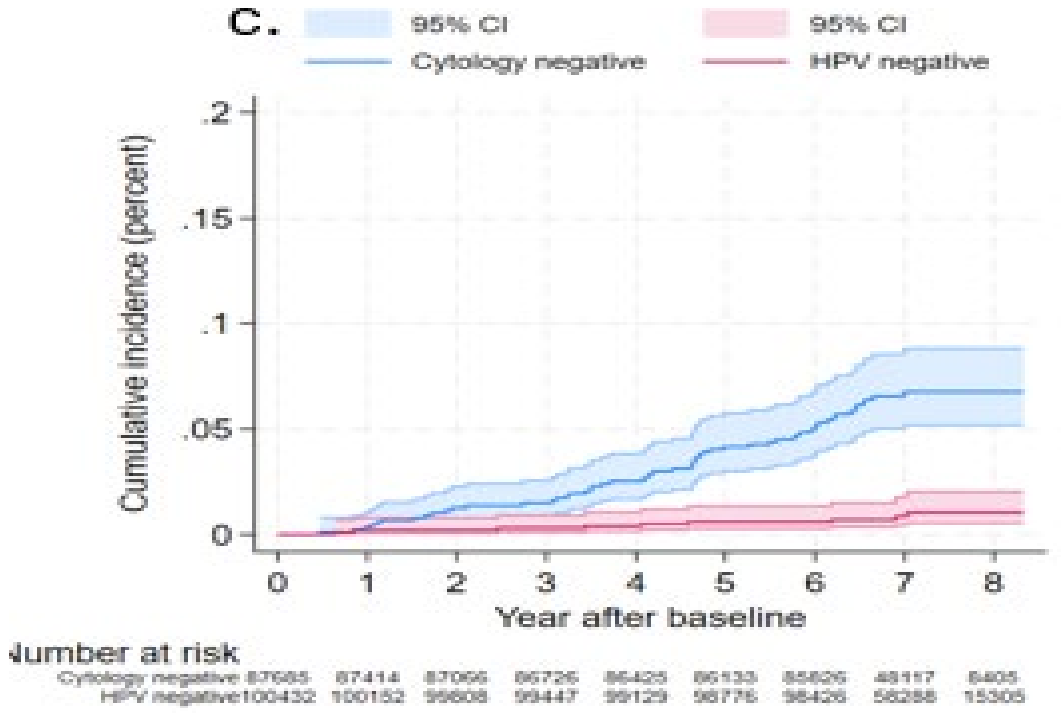
Even a single HPV test will determine your cervical cancer risk for many years:

Known for decades – Slide by Mark Schiffman from 2009

Kaiser Portland HPV Study (32,000 Women)



Series of very large randomized trials also find very long-lasting low cancer risk after a single negative HPV test.



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A 30-year quest to increase reproducibility of HPV testing.

Results of the Global HPV LabNet Proficiency panels 2008-2023.

Year	Number of data sets	No. of false positive samples per data set				
		0 samples	1 sample	2 samples	3 samples	> 3 samples
2008	81	35	16	9	9	12
2010	132	70	12	19	4	27
2011	134	84	17	13	3	17
2013	136	95	16	9	5	11
2014	148	101	16	10	6	15
2017	141	99	22	5	5	10
2019	110	67	19	6	9	9
2021	211	174	19	7	1	10
2022	154	132	15	4	0	3
2023	141	123	10	1	2	5

Apter et al, 2015: Final results of the PATRICIA trial:
Among women ages 18-25 no significant effect of vaccination if no HPV test when vaccinated.

In the per protocol population (HPV-negative when vaccinated) : VE against CIN1+, CIN2+, and CIN3+ associated with HPV-16/18 was 96.5% (89.0, 99.4), 98.4% (90.4, 100), and 100% (64.7, 100), and irrespective of HPV DNA it was 50.1% (35.9, 61.4), 70.2% (54.7, 80.9), and 87.0% (54.9, 97.7). VE against 12-month persistent infection with HPV-16/18 was 89.9% (84.0, 94.0).

Similar conclusions in formal meta-analyses

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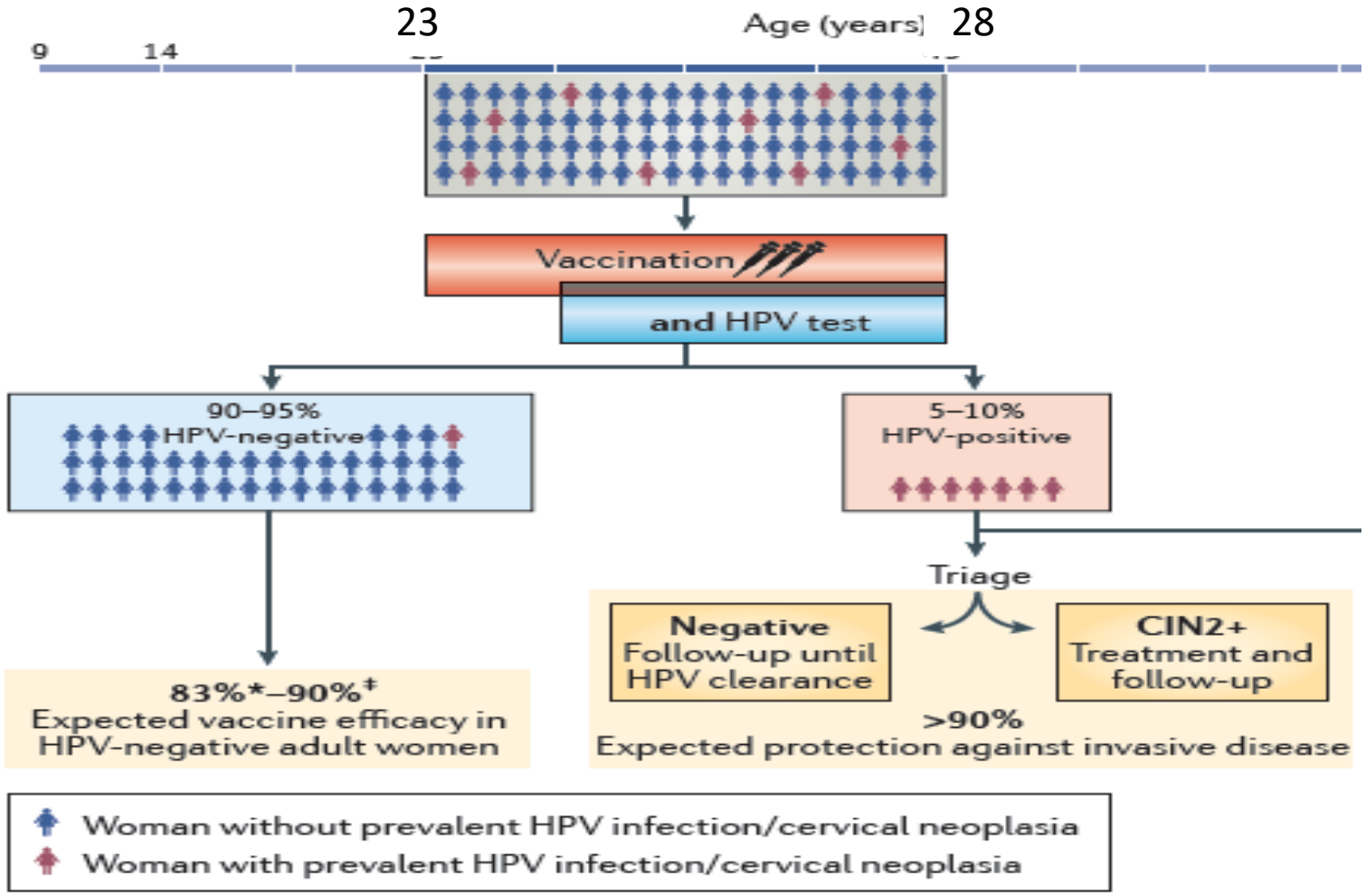
One-time effort with combined HPV vaccination and HPV screening for rapid cervical cancer control (The FASTER concept: Nature Reviews in Clinical Oncology 2015)



Eradication of human papillomavirus and elimination of HPV-related diseases – scientific basis for global public health policies

Matti Lehtinen[a,b], Iacopo Baussano[c], Jorma Paavonen[d], Simopekka Vänskä[e] and Joakim Dillner[a]

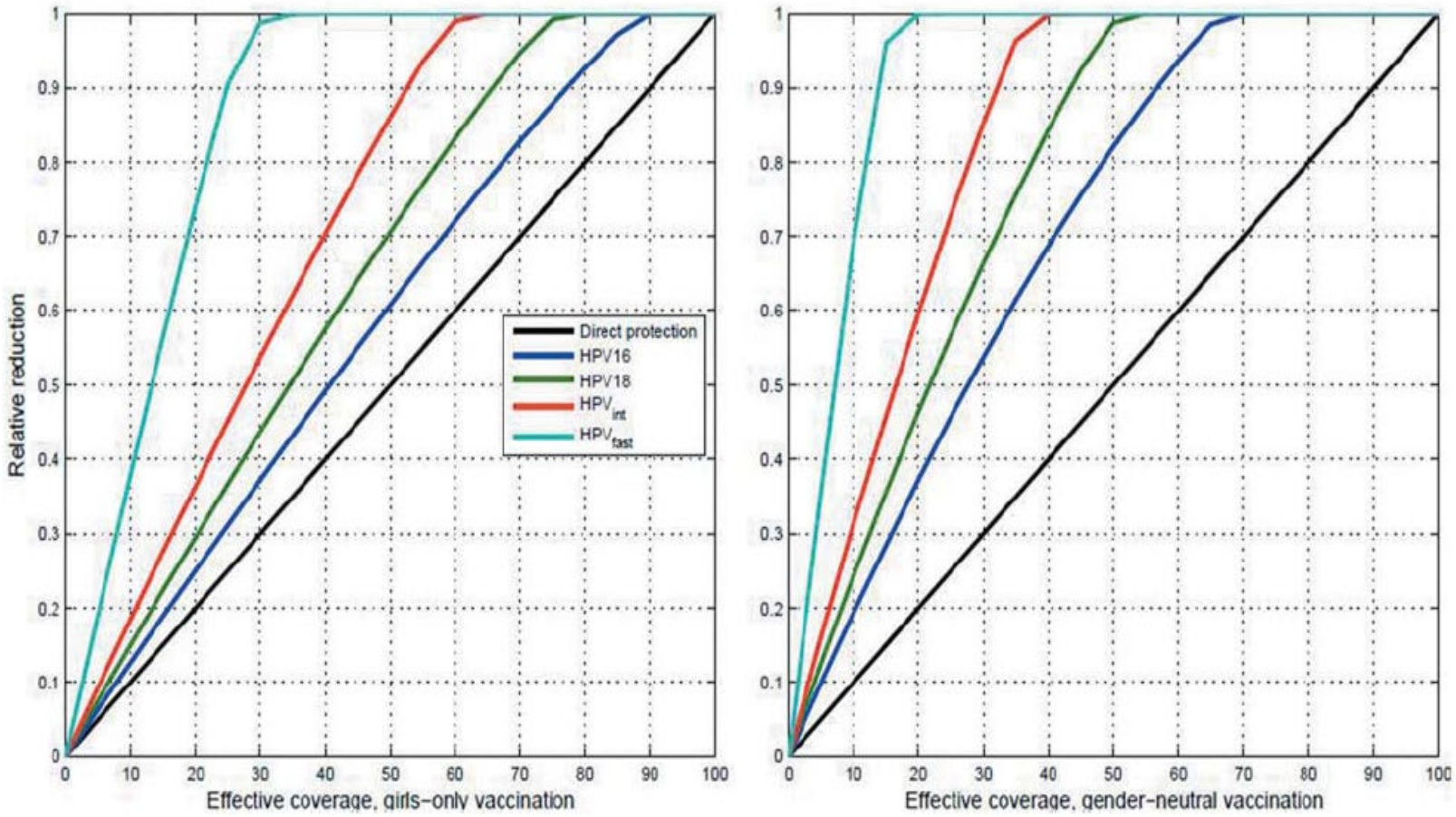
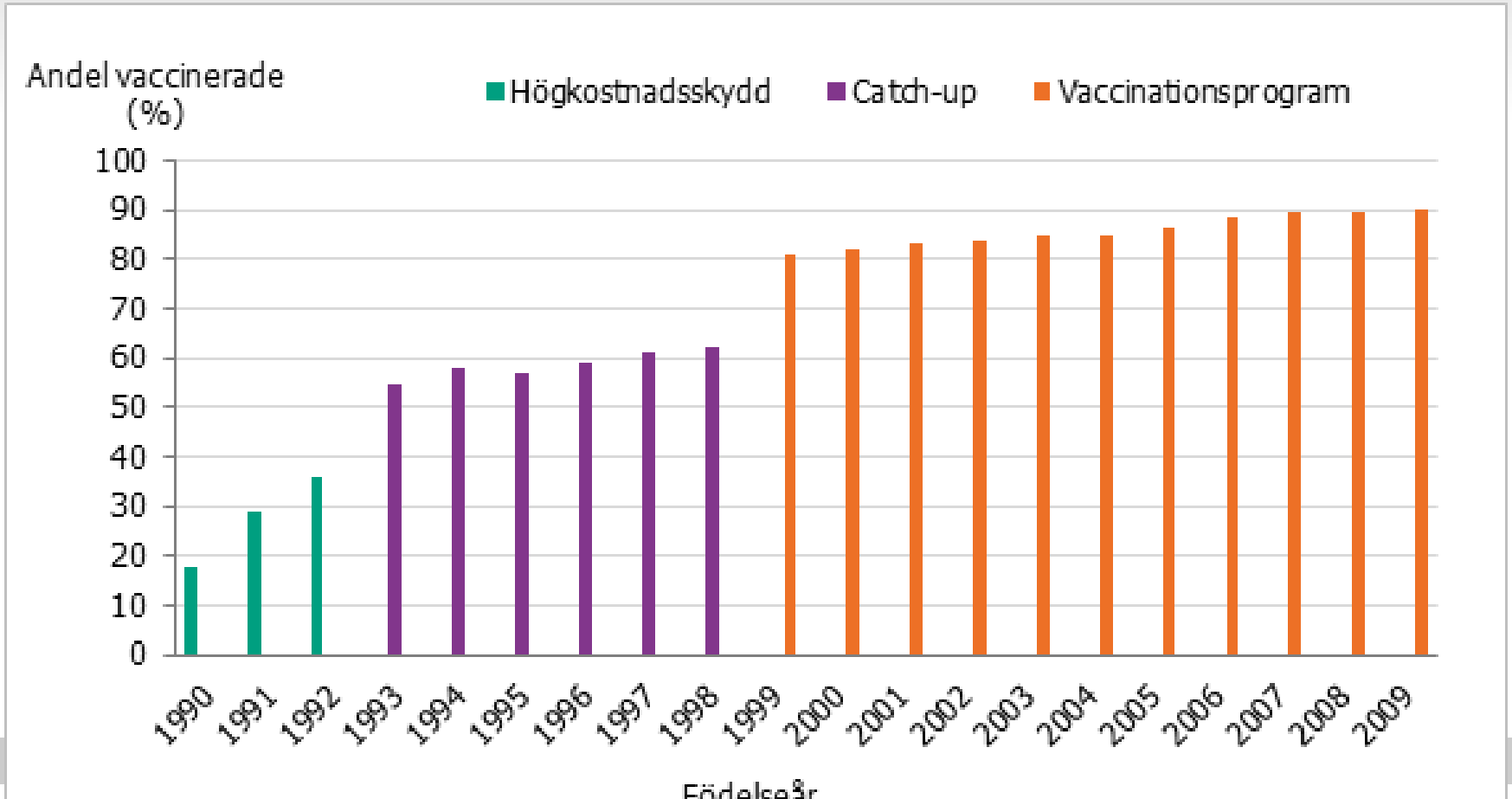


Figure 4. Modeled 49 eradication of high-risk human papillomavirus (HPV) types by effective vaccination coverage gained from girls-only (left) or gender-neutral vaccination strategy (right).

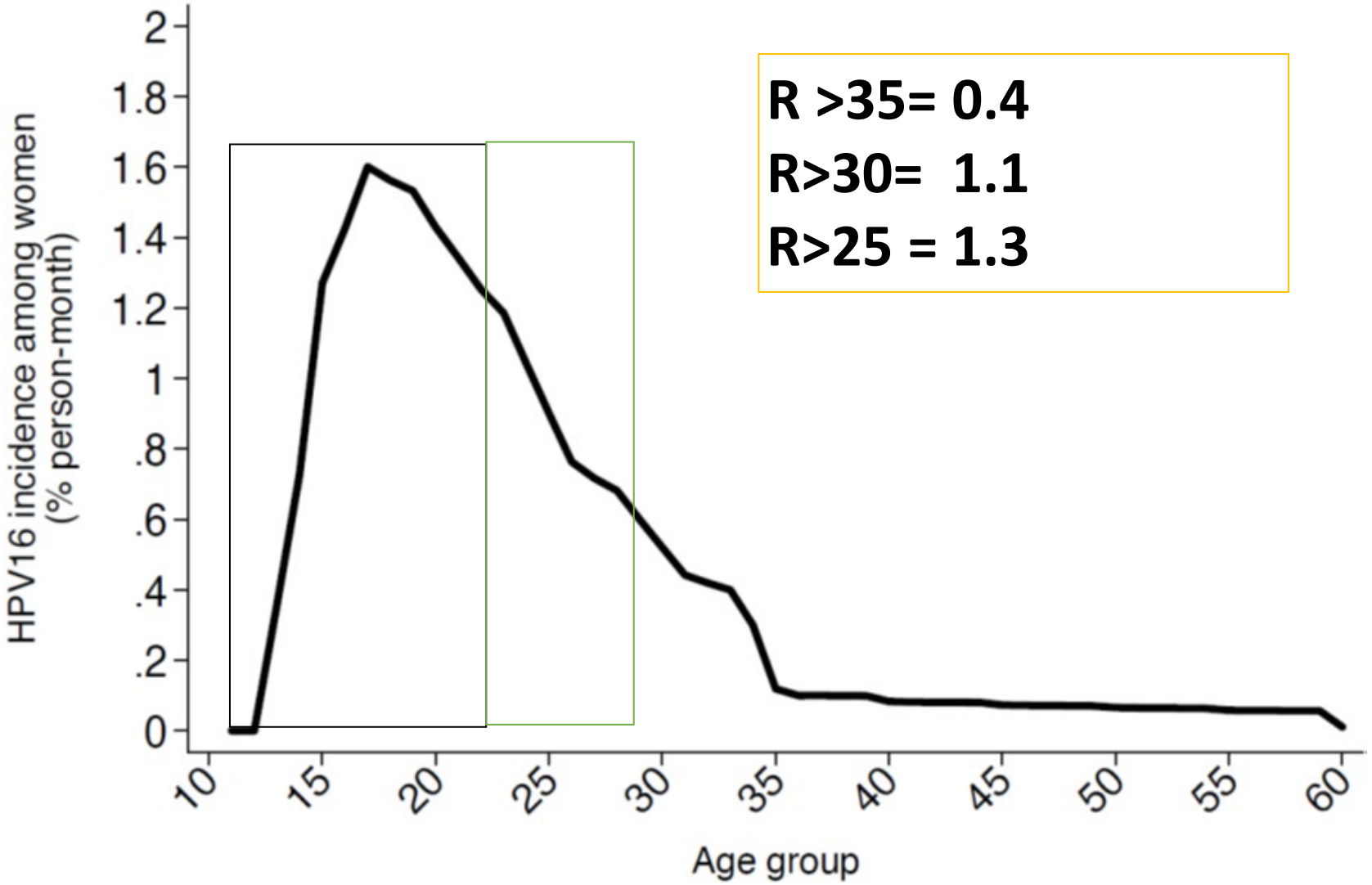
Dark Blue: HPV16 . Green: HPV18. Red: Other oncogenic vaccine types

Population coverage of HPV vaccination in Sweden by birth cohort (females; males slighly lower- current is about 85,4%)

Orange: Organised in schools. Purple: Organised, elsewhere. Green: Non-organised (but recommended and subsidized)



Incidence of HPV16 in Sweden (before vaccination).



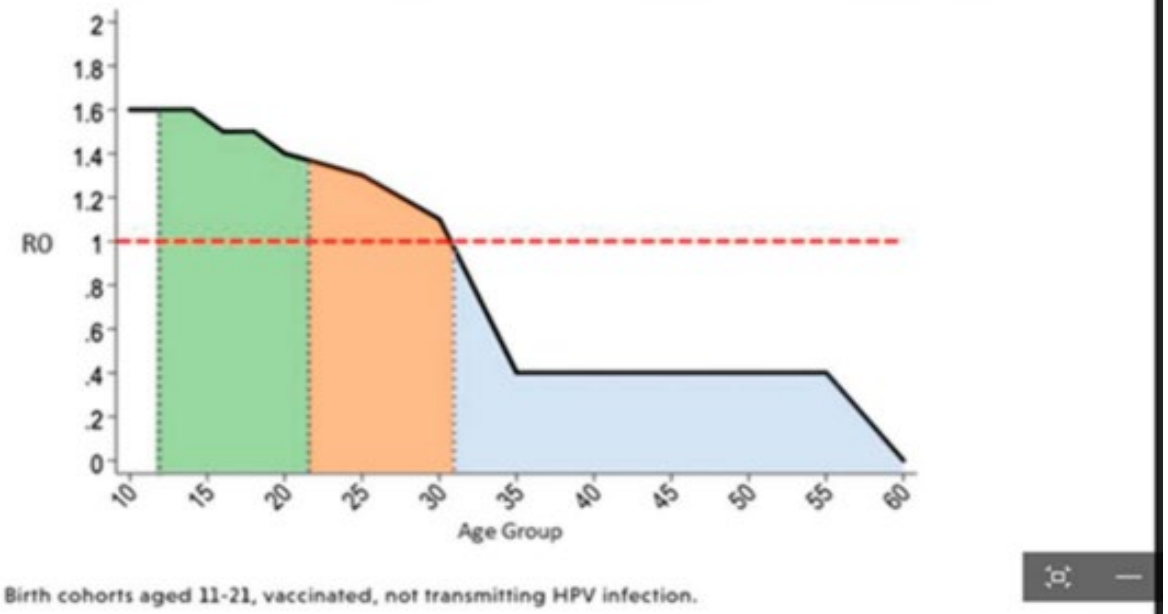
R >35= 0.4

R>30= 1.1

R>25 = 1.3

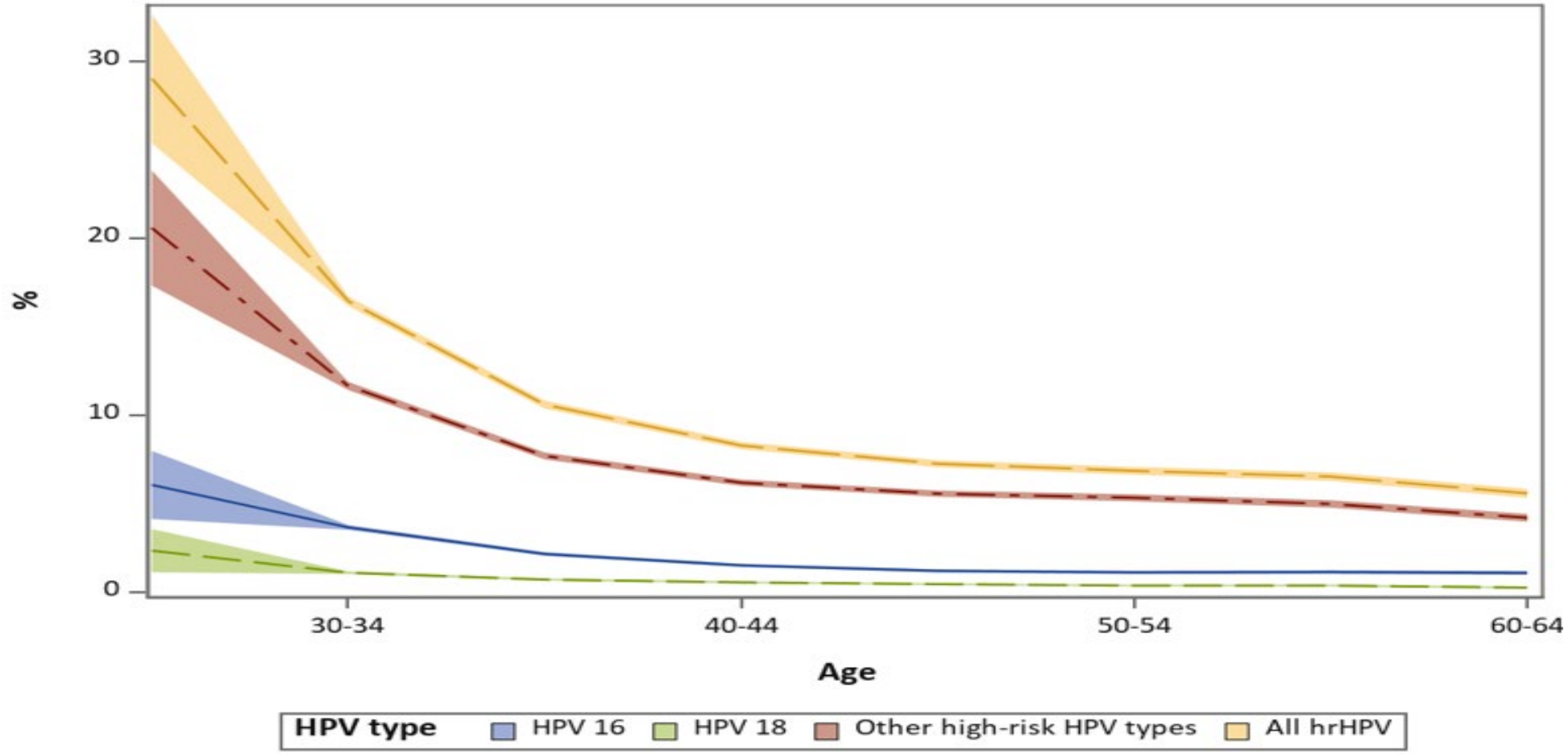
Green = Adequate protection against HPV16/18 (school-based vaccination)
Blue = Were never at high risk for HPV. Elimination predicted if the younger birth cohorts no longer transmit the infection..
Orange = Inadequate immunity (catch-up with <60% coverage). If this group can have better vaccination coverage, HPV elimination will be faster.

HPV16 age-specific Basic Reproductive Number (R0) among unvaccinated women (% person-month) as estimated using a population-based, single-type, HPV transmission model fitted to Swedish data.[3] The curve represents the mean of the results when running the model 10,000 times. Note that R0 is calculated using a "cut-off age" with no spread among women younger than the cut-off age. Adapted from Dillner et al 2021.[4]



HPV prevalences in Sweden before vaccination

(national screening registry data, www.nkcx.se; PLoS Med 2023)



Even FASTER elimination of HPV

- On top of the routine (HPV screening + organised vaccination) a one-time campaign that:
- Invites women 23-30 years old to concomitant HPV vaccination and HPV screening. Only HPV-positive women need follow-up.

Article https://doi.org/10.1038/s41467-024-47909-

Concomitant human papillomavirus (HPV) vaccination and screening for elimination of HPV and cervical cancer

nature communications

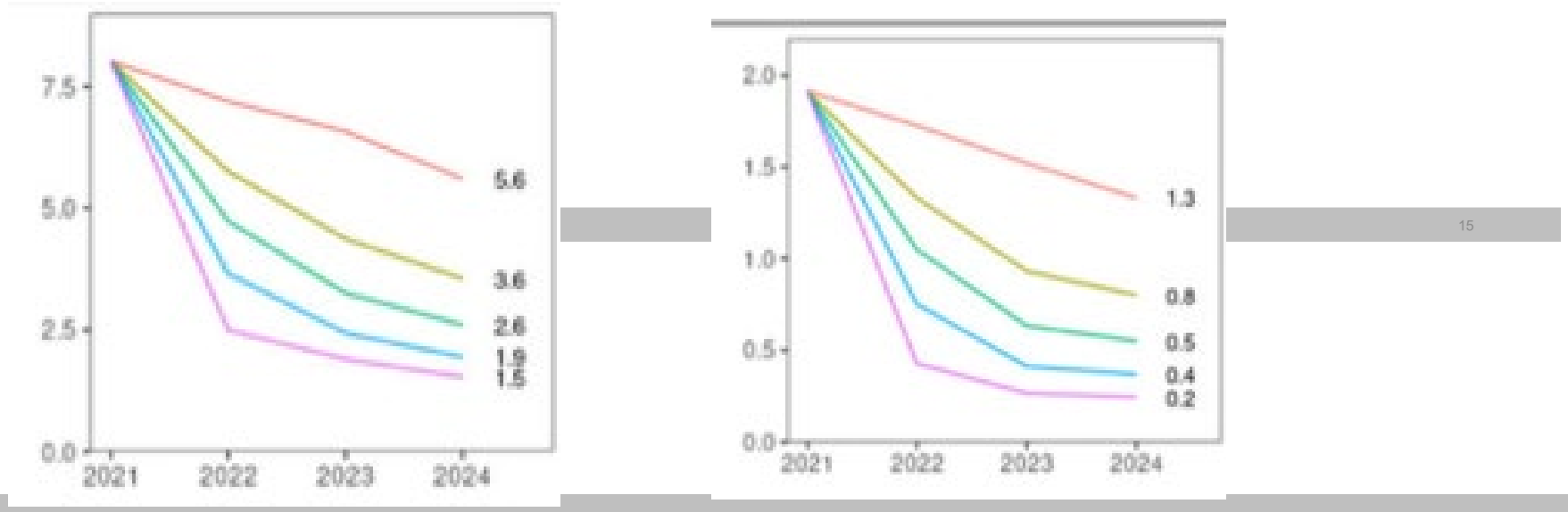
Received: 26 February 2024

Accepted: 16 April 2024

Published online: 01 May 2024

Laila Sara Arroyo Mühr[1], Andrea Gini[2], Emel Yilmaz[1], Sadaf S. Hassan[1], Camilla Lagheden[1], Emilie Hultin[1], Ainhoa Garcia Serrano[1], Agustin E. Ure[1], Helena Andersson[1], Roxana Merino[1], K. Miriam Elfström[1], Iacopo Baussano[2] & Joakim Dillner[1]

Projected decline in incidence of HPV16 (left) and HPV18 (right), with and without the Even Faster intervention



Even Faster elimination project – baseline data
(Arroyo Muhr et al, Nature Communications, 2024)

HPV16 & 18 increasingly rare – already at enrolment: Elimination should not be difficult!

Birth cohort	Women in population	Women Vaccinated	Women with HPV genotyping	HPV 16	HPV18	HPV45	HPV33 & HPV58	HPV 31	HPV 52	Low Oncogenicity= HPV35,39,51,56,59,66,68	HPV Negative
1994 Catch-up	18436	5687 30.8%	4941 87%	122 2.5%	26 0.5%	118 2.4%	191 3.9%	106 2.2%	117 2.4%	475 9.6%	3609 73.0%
1995 Catch-up	16761	5120 30.6%	4428 86%	98 2.2%	24 0.5%	148 3.3%	170 3.8%	98 2.2%	126 2.8%	456 10.3%	3175 71.7%
1996 Catch-up	15619	4788 30.6%	4176 87%	72 1.7%	18 0.4%	118 2.8%	138 3.3%	74 1.8%	131 3.1%	421 10.1%	3012 72.1%
1997 Catch-up	13971	4108 29.4%	3465 84%	73 2.1%	26 0.8%	93 2.7%	143 4.1%	65 1.9%	97 2.8%	372 10.7%	2405 69.4%
1998 Catch-up	12802	4020 31.4%	3419 85%	73 2.1%	16 0.5%	67 2.0%	125 3.7%	41 1.2%	77 2.2%	270 7.9%	2303 67.4%
1999 School	11801	2382 20.2%	2128 89%	15 0.7%	1 <0.05%	34 1.6%	92 4.3%	22 1.0%	81 3.8%	246 11.6%	1584 74.4%
TOTAL %	89390	26105 29.2%	22557 86%	453 2.0%	111 0.5%	575% 2.6%	859 3.8%	406 1.8%	629 2.8%	2240 9.93	16088 71.3%

Even Faster – a snapshot from Sweden 2024-06-06

Concomitant HPV vaccination and HPV screening in ages 23- 30.

36,1% national coverage (136,759 women)

633 enrolling sites – population coverage increasing by about 1%/week.

Screening stations also do vaccinations.
Vaccination stations also do screening.

After vaccination, women are handed an HPV self-sampling kit.
National HPV testing at Karolinska.

The 2 major parts of Even Faster cervical cancer elimination

1. Primary: HPV vaccination
   - Stop the circulation of HPV, as soon as possible.
2. Secondary: HPV screening
   - Offer HPV screening to those who may have been infected and developed a cancer precursor before HPV circulation was stopped

1+2=0

Risk-based screening (Sweden)

- 2019: 531 women with very high risk (>5%/5 years) sent link to order selfsampling kit.
- 2020: 6000 women with high risk (>1%/5 years) all over Sweden sent link to order selfsampling kits.
- 2021: 20,000 women with risk >0.2%/5years all over Sweden sent link to order selfsampling kits.
- 2022: All women with risk >0.1%/5years in all of Sweden (93000 women) sent either kit (>1%- 5000 women) or link to order kit (0.1% to 1% - 88000 women).
- 2023: All women with risk >0.1%/5years in all of Sweden (91000 women) sent either kit (>1%- 4000 women) or link to order kit (0.1% to 1% - 87000 women).

Some results

- Very high PPV for CIN2+ in histopathology among high risk HPV+ women (23%) (with no triaging)
- Low HPV prevalence among never-attenders, but high PPV for CIN2+ if HPV-positive.

- Ambitious HPV vaccination (including national even faster campaign) + population-based HPV screening program (768,000 HPV tests/year) + risk-based HPV screening = Cervical cancer elimination by 2027

The timepoint of cervical cancer elimination is a choice: The cancer can be eliminated either:

1. **ASAP:** Catch-up vaccination up to age 30 to reduce R <1, inducing accelerated elimination of vaccine HPV types. If followed by a one-time HPV screening reaching non-attenders = permanent elimination of cervical cancer in the near future (2027 set as goal).

2. **No hurry.** Effective vaccination, but only in children + Screening as usual = Spreading of oncogenic HPVs eliminated approximately 2039. Cervical cancer eliminated a lifetime later.

3. **Not a priority.** Disorganized vaccination - HPV and cervical cancer are never eliminated.

PV
ENESS
AY
R 2022

Hjälp oss att utrota livmoderhalscancer
Vaccinera och testa dig för HPV

ONE LESS WORRY

Alla kvinnor födda 1994-1999 erbjuds
kostnadsfri HPV test + vaccination
https://www.hpvcenter.se/utrotning/