Carlos Torres Martínez, MD, FRCPCH, MBA

- Infectólogo Pediatra, Hospital for Sick Children and St. Mary s Hospital, Londres
- Especialista en Epidemiología y Estadística Médicas, London School of Hygiene and Tropical Diseases.
- MBA, Universidad de los Andes, Bogotá
- Docente de Infectología Pediátrica, Universidad El Bosque, Bogotá
- Visiting Professor, Unidad de Inmunobiología, Institute of Child Health, Londres
- Miembro de la Academia Nacional de Medicina de Colombia
- Miembro de los comités de vacunas de SLIPE, SLV, IPA y Soc. Colombiana de Pediatría

“Fundamentos de la vacunación en el embarazo: avances e impacto como estrategia de salud pública

Carlos Torres Martínez, MD, FRCPCH, MBA

catorres@uniandes.edu.co

20º. Curso Latinoamericano de Actualización en Vacunas

Hospital de Niños Ricardo Gutiérrez

Buenos Aires, 14 Mayo 2026

UNIVERSIDAD EL BOSQUE

SLIPE Sociedad Latinoamericana de Infectología Pediátrica

SCP Sociedad Colombiana de Pediatría

ACIN Asociación Colombiana de Infectología

UCL GREAT ORMOND STREET INSTITUTE OF CHILD HEALTH

Conflictos de interés

He colaborado con instituciones en el sistema público, académico y de la industria en las áreas de vacunas, anticuerpos monoclonales, resistencia a los antimicrobianos y enfermedades infecciosas en general.

Estas relaciones han formado mi entendimiento de los desafíos de implementación en el mundo real, pero no han influido en el contenido ni las conclusiones de esta presentación.

Por qué confiar en esta presentación

El contenido está basado en la evidencia y interpretado de forma independiente.

No hay comparación de productos ni intención promocional.

Las estrategias de prevención están discutidas a nivel poblacional.

Las diapositivas, figuras y gráficas fueron desarrolladas exclusivamente por el autor y constituyen propiedad intelectual.

Racional y concepto de la inmunización materna

- La población pediátrica está expuesta a un riesgo mayor de morbimortalidad por infecciones en el periodo neonatal que en ningún otro momento de su vida.
- Los RN y lactantes dependen de los anticuerpos maternos para resistir las infecciones en sus primeros meses de vida.
- Los anticuerpos específicos pueden proteger madres e hijos contra enfermedades serias
  - Ejemplo: tétanos, GBS, pertussis, influenza, VRS
- Las mujeres gestantes tienen bajas concentraciones de algunos anticuerpos
  - Ejemplo: pertussis
- Los niveles y calidad de los anticuerpos maternos pueden ser optimizados durante el embarazo a través de la vacunación:
  - Respuestas humorales intactas,
  - transporte placentario activo,
  - numerosas oportunidades para vacunación

Elaboración personal del autor

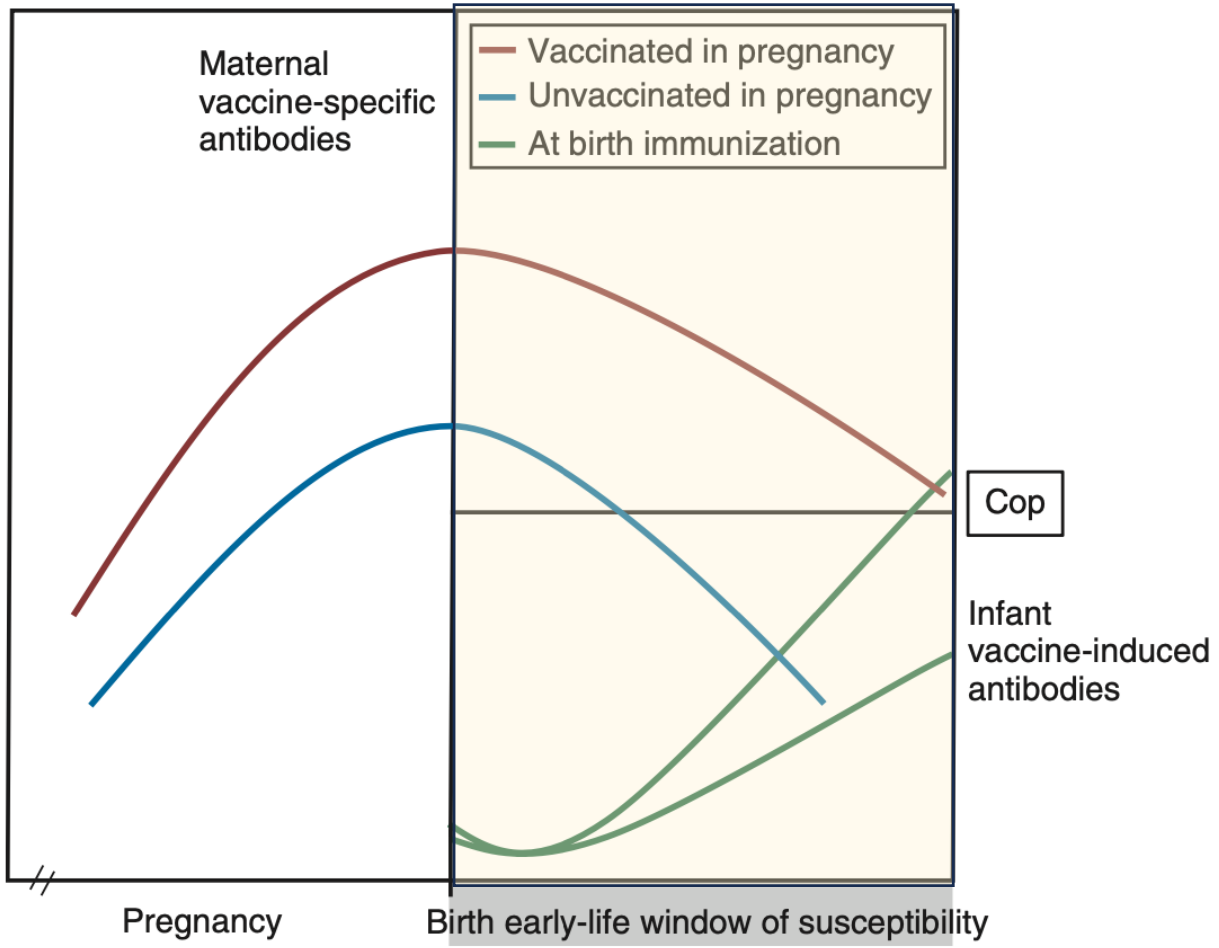
Propósito de la inmunización materna

El propósito es **reforzar** los niveles **maternos de anticuerpos patógeno-específicos** para proveer al neonato/lactante con concentraciones de anticuerpos suficientes (IgG) para **protegerlos contra infecciones** que ocurran durante un **periodo de vulnerabilidad aumentada** hasta que sea capaz de responder a la inmunización activa o a un desafío infeccioso.

Modificado por el autor a partir de: Abu-Raya B, Edwards KM. Prevention of fetal and early life infections through maternal-neonatal immunization. En: Remington and Klein's Infectious Diseases of the Fetus and Newborn Infant, 2025, p. 1105-1120.e6 https://doi.org/10.1016/b978-0-323-79525-8.00050-0

Inmunidad humoral inducida por vacunación en el embarazo y al nacimiento en madres y neonatos:

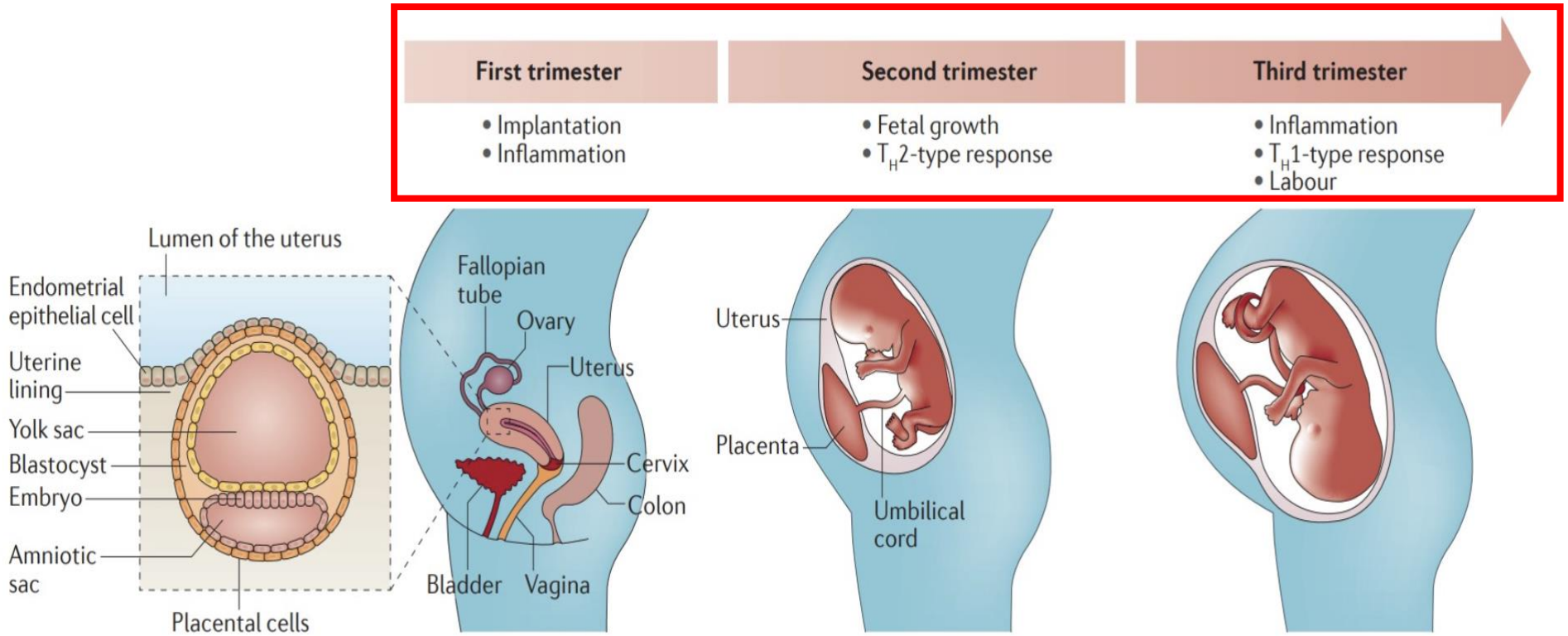
Relación con correlatos de protección y ventanas de susceptibilidad



Abu-Raya B, Edwards KM. Prevention of fetal and early life infections through maternal-neonatal immunization. En: Remington and Klein's Infectious Diseases of the Fetus and Newborn Infant, 2025, p. 1105-1120.e6 https://doi.org/10.1016/b978-0-323-79525-8.00050-0

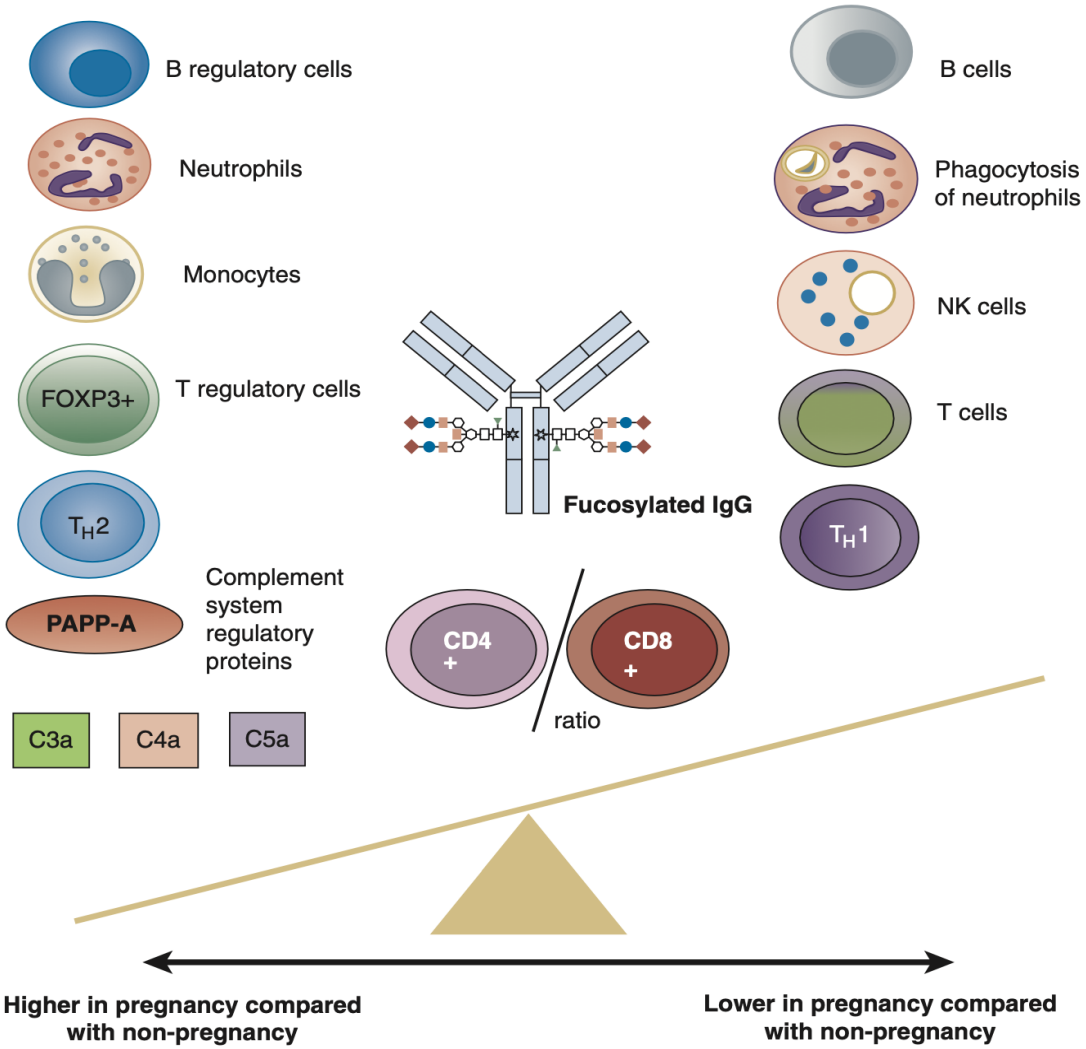
La mujer embarazada y la inmunología placentaria

- La mujer gestante **NO ES** inmunosuprimida
- La mujer gestante no tiene en general un mayor riesgo de adquirir infecciones comparada con la no gestante.
- Algunas enfermedades infecciosas pueden ser más severas en el embarazo (3er. trimestre)
- La inmunotolerancia del feto es necesaria para un embarazo exitoso.



Mor G. Nature Reviews Immunol, Jun 2017

Comparación en componentes del sistema inmune en mujeres gestantes vs no gestantes



Abu-Raya B, Edwards KM. Prevention of fetal and early life infections through maternal-neonatal immunization. En: Remington and Klein's Infectious Diseases of the Fetus and Newborn Infant, 2025, p. 1105-1120.e6 https://doi.org/10.1016/b978-0-323-79525-8.00050-0

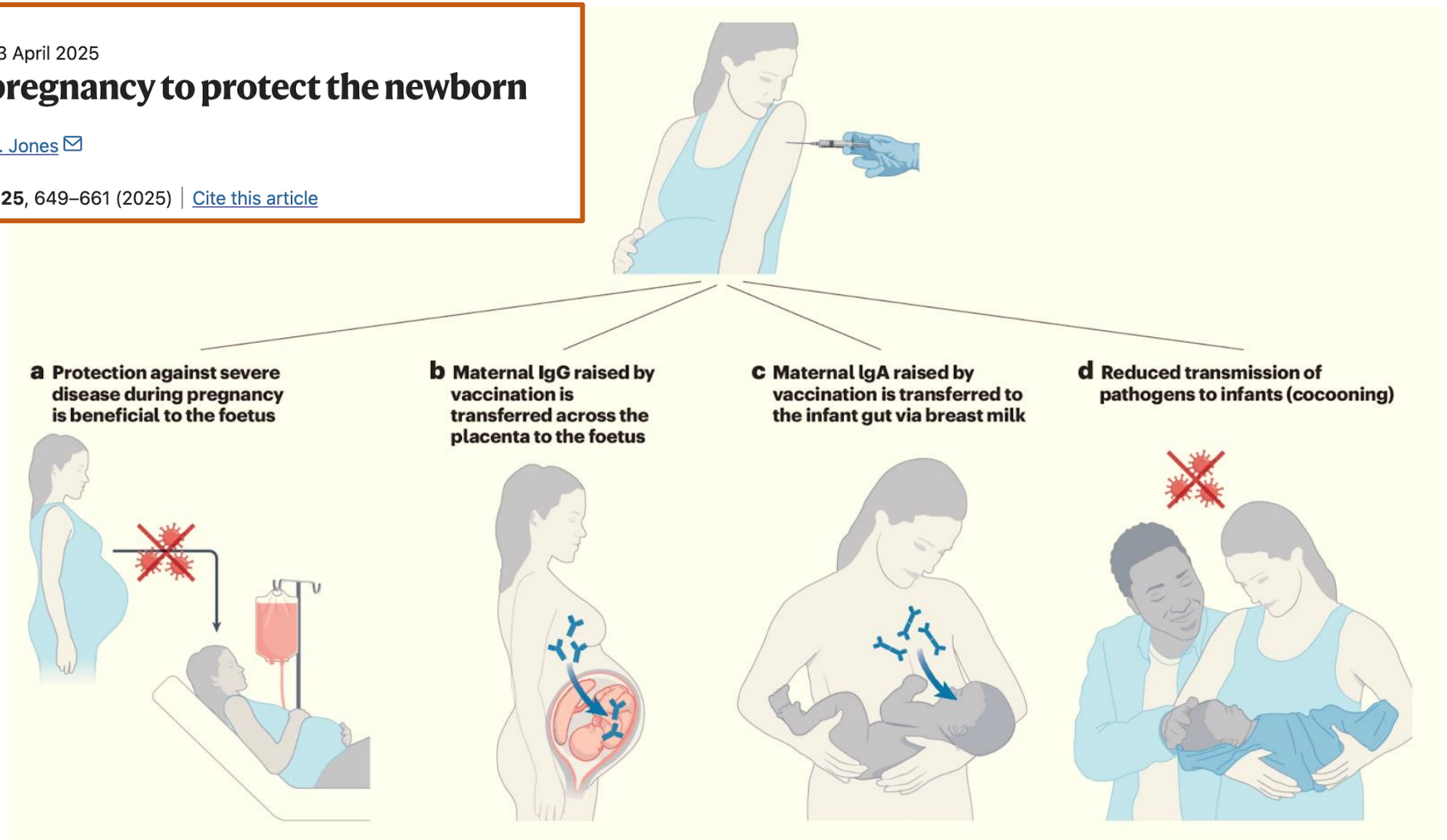
Inmunización materna: Mecanismos de protección neonatal

Review Article | Published: 23 April 2025

Vaccination in pregnancy to protect the newborn

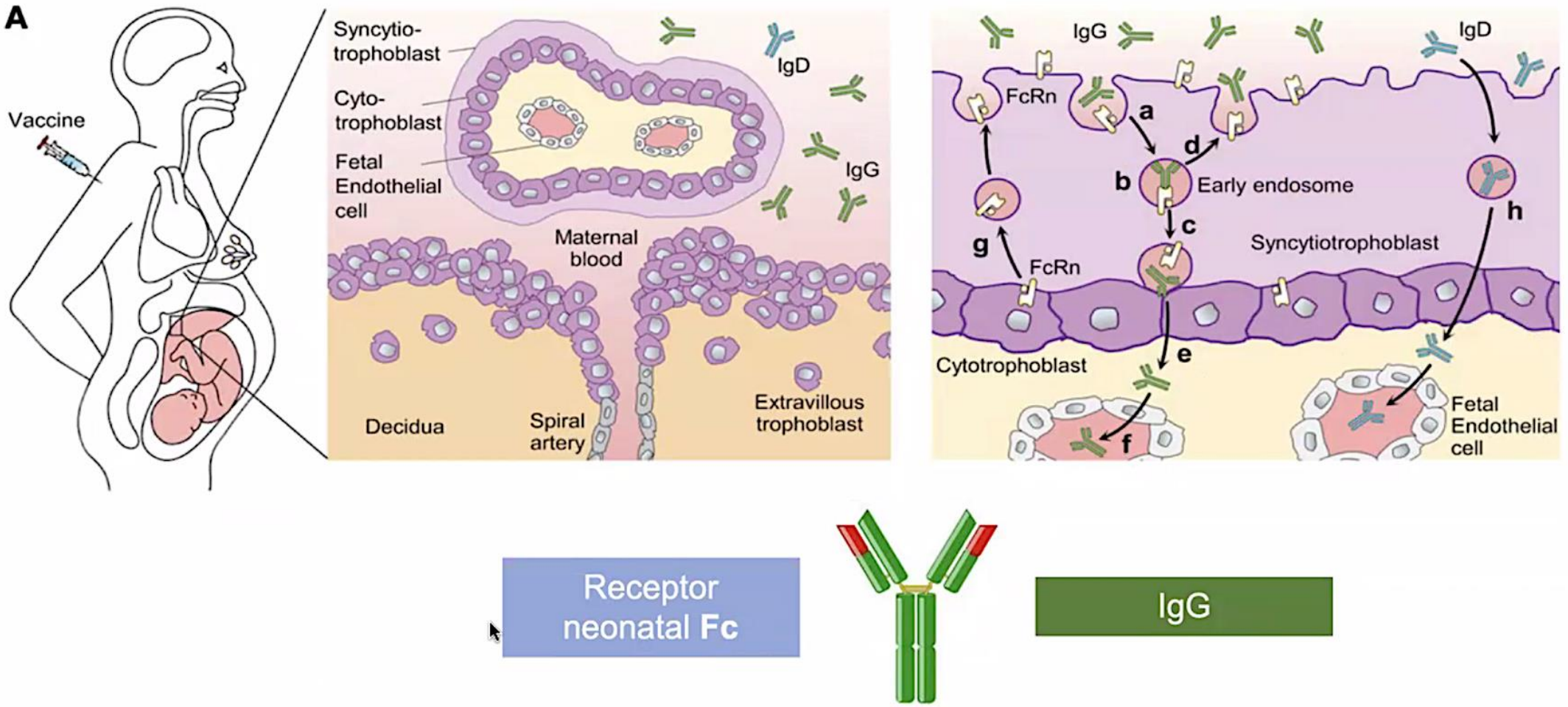
Victoria Male & Christine E. Jones

Nature Reviews Immunology **25**, 649–661 (2025) | Cite this article



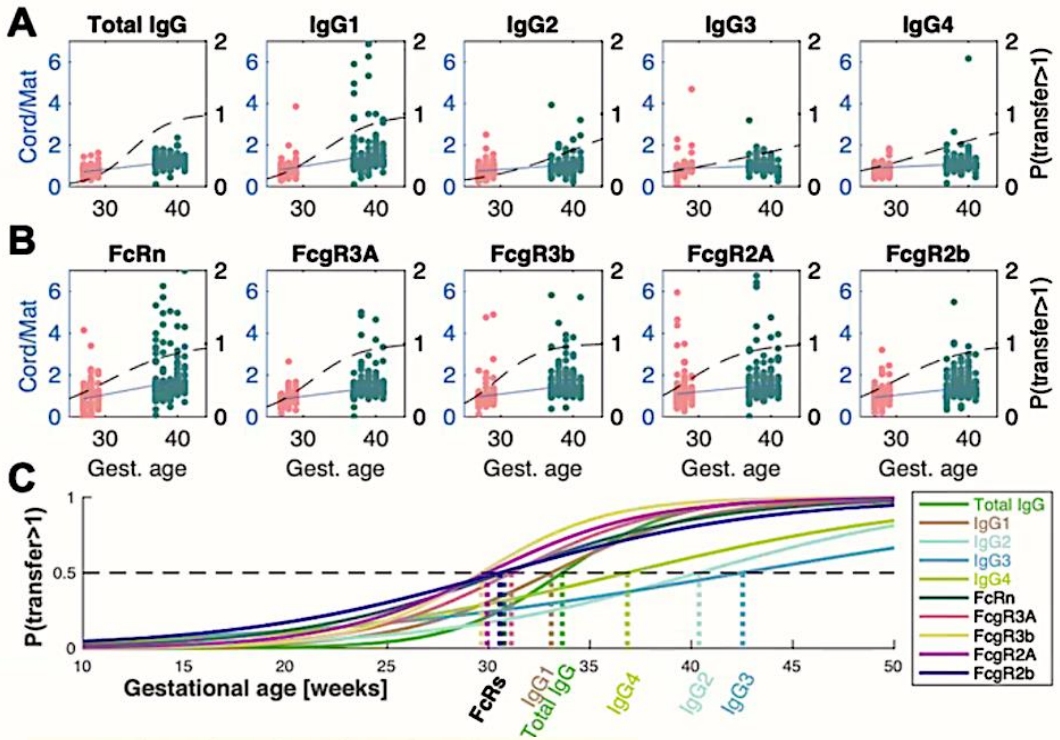
Male V, Jones C. Nature Rev Immunol 2025;25:649-661, https://www.nature.com/articles/s41577-025-01162-5

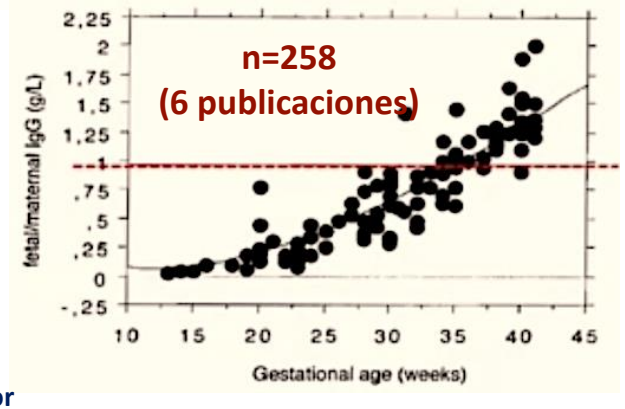
Respuesta inmunitaria materna a la vacunación durante el embarazo



Arora. Best Practice and Research Clinical Obstetric and Gynaecology 2021;76:23e40; Faucette et al. Human Reproduction Update 2015; 21 (1):119-135

Transferencia selectiva de anticuerpos maternos en niños pretérmino y a término





Scientific Reports 2022;12: 14937

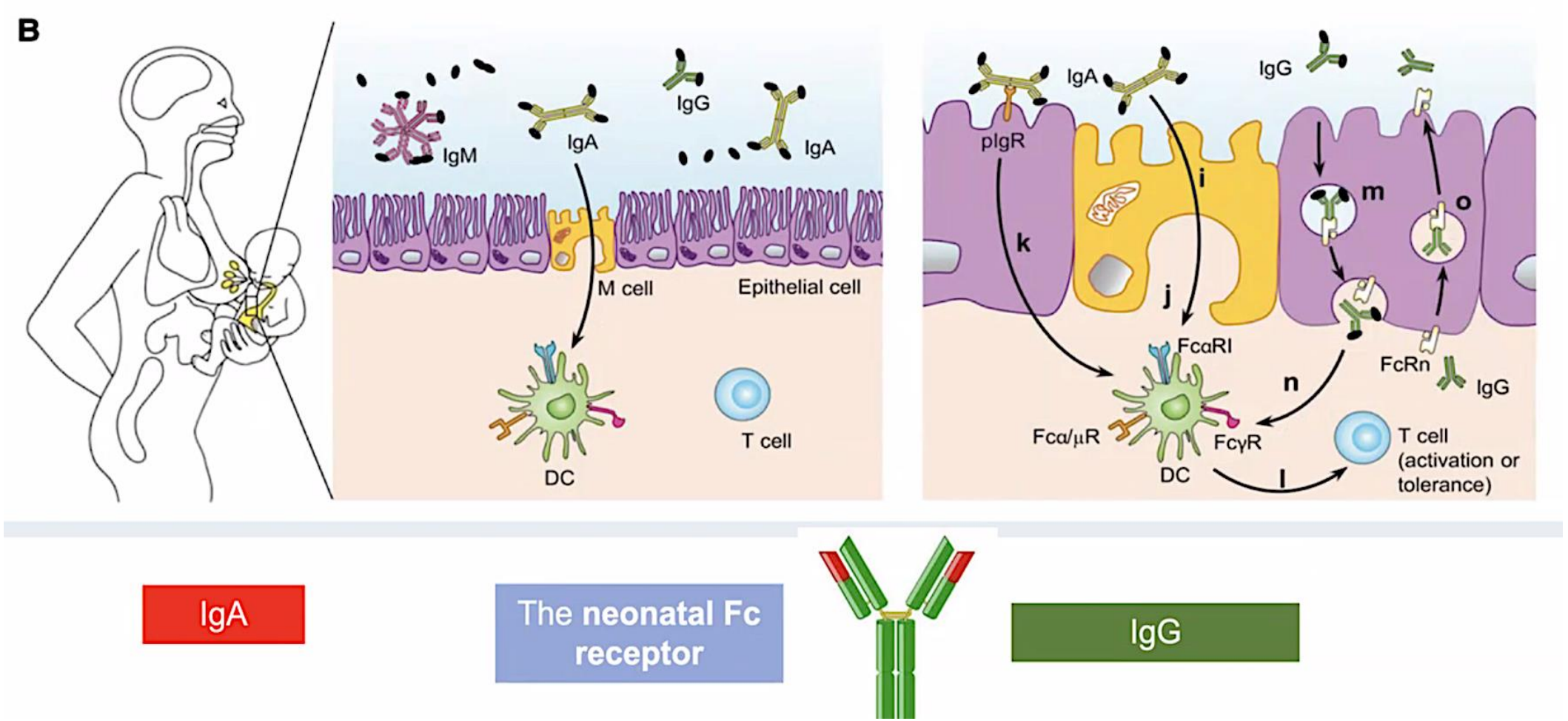
- Comienza Sem. 17, más intenso durante el 3er. Trimestre
- La IgG materna cruza la placenta por un transporte activo selectivo mediado por el receptor FcRn en cels trofoblásticas.
- La relación de anticuerpos cordón/madre >1 luego de sem. 35.
- Vida media IgG 30-40 días en el neonato.
- Disminuye notablemente 6 meses.

Factores asociados a niveles:

- Niveles IgG maternos
- Subclases de IgG (IgG1>>IgG4>IgG3>IgG2)
- Intervalo entre vacunación y el parto
- Edad gestacional al nacimiento
- Anormalidades placentarias, infección
- Nutrición, infecciones, estado de salud general, paridad

Palfi et al. AJRI 1198; Malek et al. AJRI 1996; Wang et al. PLoS One 2011;6:e25130; Elinger et al. WWW 2012;162

Respuesta inmunitaria materna durante la lactancia a la vacunación en el embarazo

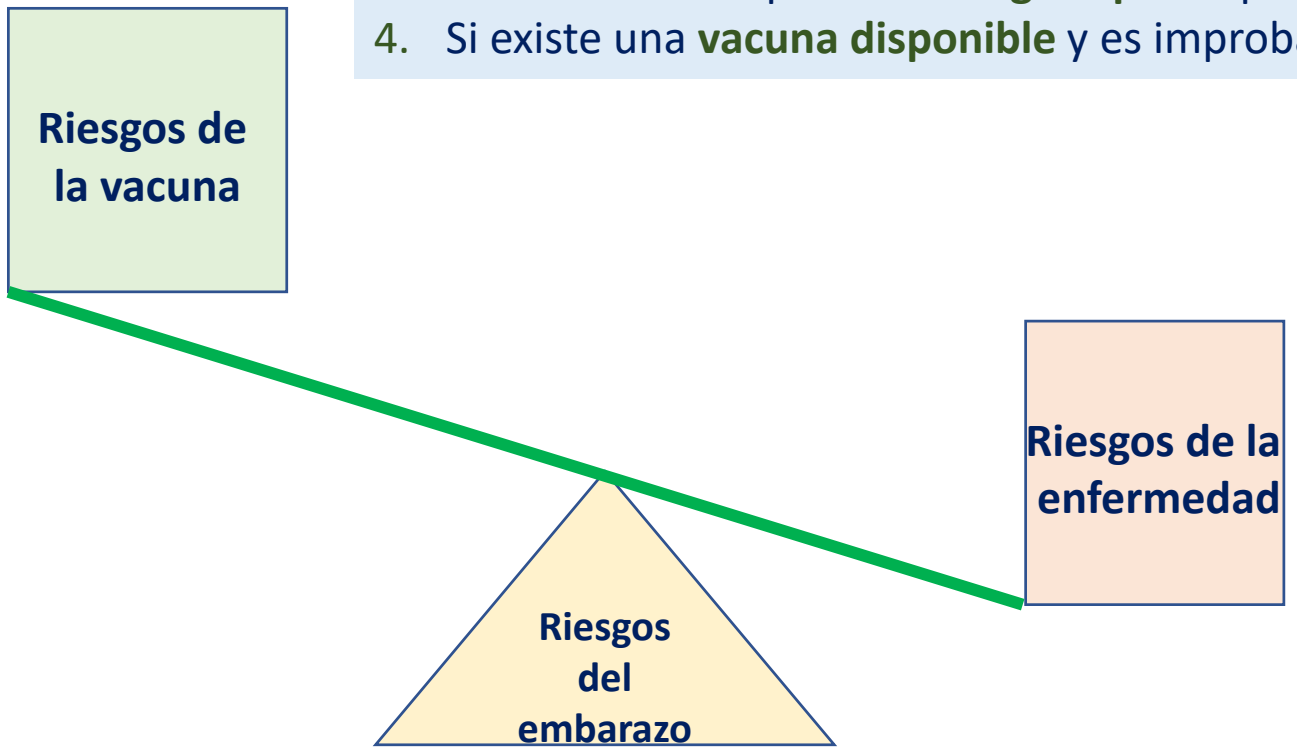


Arora. Best Practice and Research Clinical Obstetric and Gynaecology 2021;76:23e40; Faucette et al. Human Reproduction Update 2015; 21 (1):119-135

En general, ¿cuándo se debe vacunar una mujer embarazada?

Consideraciones

1. Si la mujer tiene un **riesgo alto de exposición** a la enfermedad
2. Si la infección supone un **riesgo especial** para la mujer
3. Si la infección supone un **riesgo especial** para el feto/neonato/lactante
4. Si existe una **vacuna disponible** y es improbable que cause daño



CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™
Advisory Committee on Immunization Practices (ACIP)

World Health Organization

ACOG
The American College of Obstetricians and Gynecologists

CDC. MMWR 1994;43,RR1-28; ACOG Committee on Obstetric Practice. Obstet Gyncecol 2004;104:1125-6

Estrategias de vacunación durante el embarazo

WHO: Pregnancy should not deter a woman from receiving vaccines that are safe and will protect both her health and that of her unborn child.

Generally recommended	Recommended for disease prevention in specific situations	Contraindicated
Tetanus (Td, TT)	Cholera	BCG
	Yellow Fever	Measles
Acellular pertussis vaccine (Tdap) *in areas of burden*	Meningitis A (meningococcal)	Mumps
	Hepatitis A, B, E	Rubella
	Japanese Encephalitis	Varicella
Influenza inactivated (IIV)*	Polio (OPV, IPV)	Live Typhoid T21a
	Rabies	Live influenza
SARS-CoV-2		
RSV		

Recommended licensed vaccines are NOT contraindicated in pregnancy!

*2012 SAGE-WHO make Influenza vaccination of pregnant women a global priority for all countries were influenza vaccination is administered, incorporating it into ANC

IIV, Tdap, SARS-CoV2 - **Post-partum vaccination recommended** if unable to vaccinate in pregnancy
MMR - Also given post-partum in non-immune mothers (rubella); most vaccines can be given w/lactation

WHO's specific vaccine position papers: http://www.who.int/immunization/documents/positionpapers_intro/en/.
https://www.cdc.gov/vaccines/pregnancy/hcp-toolkit/guidelines.html

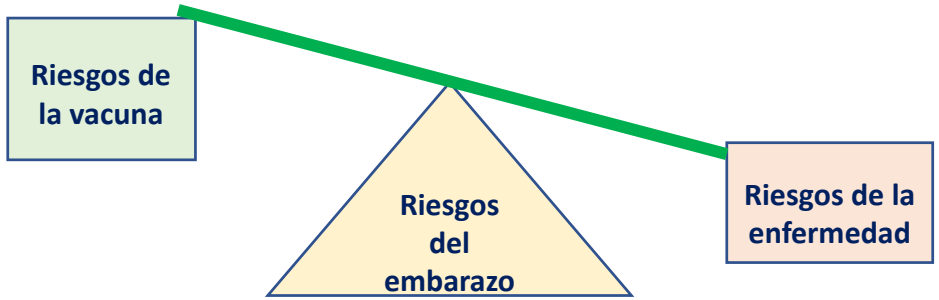
Resumen de recomendaciones de programas de inmunización materna: CDC/ACOG (Prepandemia COVID-19)

Vaccine (Type)	During Every Pregnancy	During Pregnancy in Specific Populations	Can Be Initiated Postpartum and/or When Breastfeeding?
Hepatitis A (inactivated)		Yes	Yes
Hepatitis B (subunit)		Yes	Yes
Pneumococcal vaccines		Yes	Yes
Meningococcal conjugate (MenACWY) and meningococcal serogroup B		Yes	Yes
Human papillomavirus (HPV, subunit)			Yes
Influenza (inactivated)	Yes		Yes
MMR (live attenuated)	Contraindicated		Yes
Tdap (toxoid, inactivated)	Yes, at 27 to 36 weeks, preferably as early in the period as possible		Yes
Varicella (live attenuated)	Contraindicated		Yes

CDC. Summary of maternal immunization recommendations, https://www.cdc.gov/vaccines/pregnancy/downloads/immunizations-preg-chart.pdf; ACOG Committee Opinion No. 741. American College of Obstetricians and Gynecologists. Obstet Gynecol. 2018;131:e214-e217

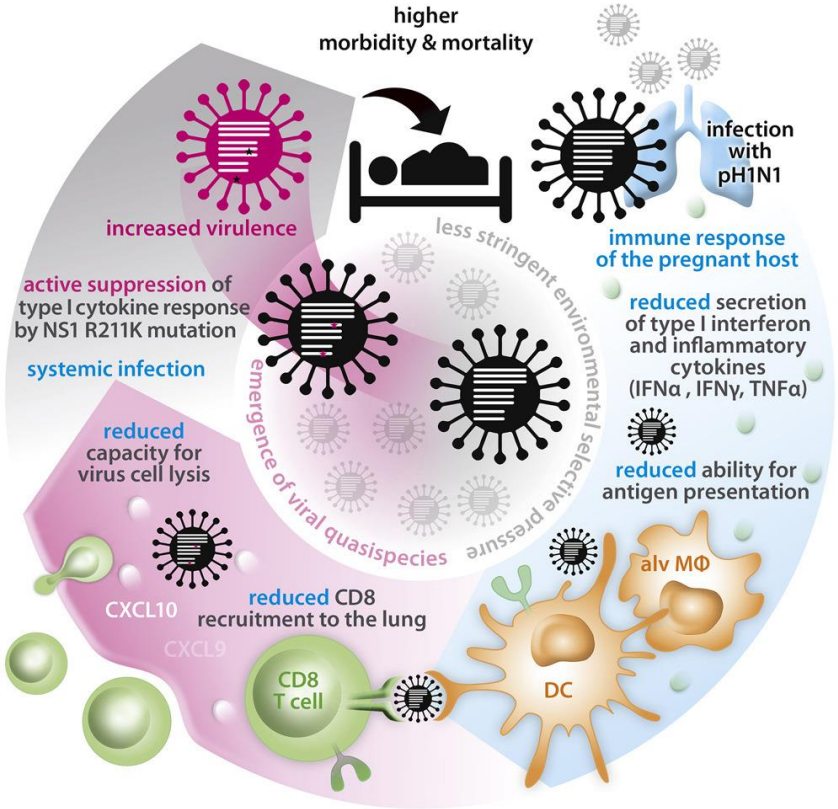
La inmunización contra la influenza en el embarazo

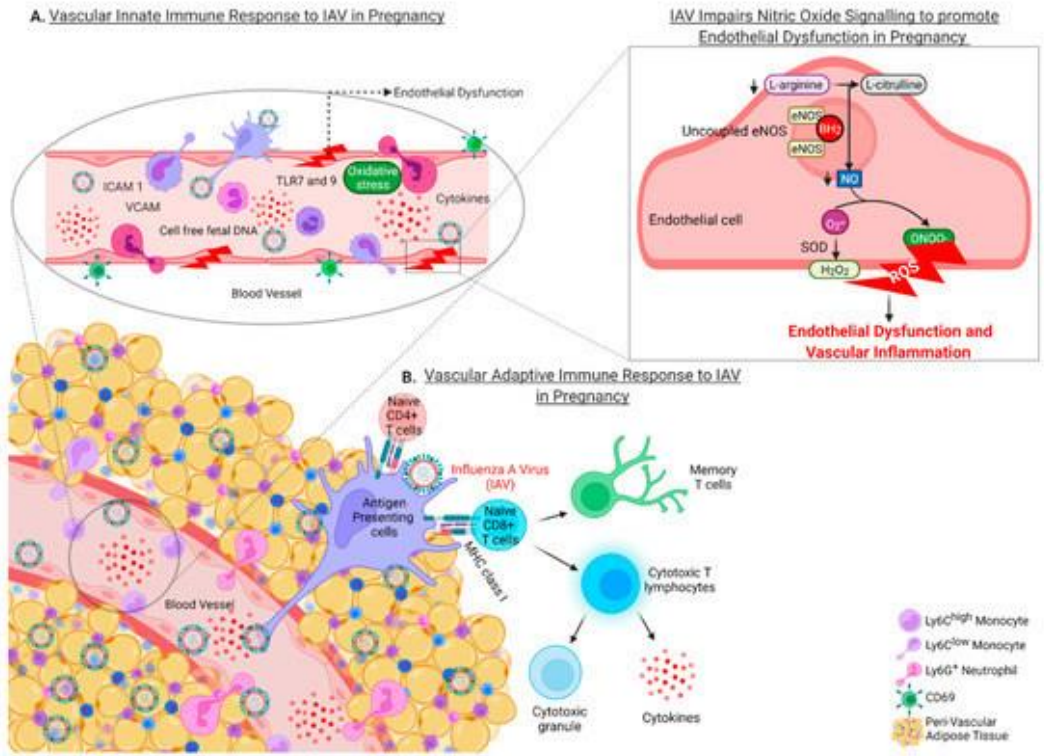
- Riesgo incrementado de morbilidad y mortalidad durante el embarazo.
- La vacuna inactivada se recomienda como un **aspecto esencial del control prenatal.**
- SAGE-OMS 2012 declara la vacunación de la gestante como un **prioridad global** para todos los países y debe ser incluida en los PNIs
- Estrategia adoptada por 34 países, 29 en OPS
- Se debe insistir en la vacunación post-parto si no fue ofrecida y aplicada en el embarazo.
- La lactancia materna no es contraindicación.



Muñoz et al. PEIVAP 2022

Infección por influenza en el embarazo: mecanismos patogénicos complejos





Engels et al. Cell Host & Microbe 2017; 21; 321-333,

Oseghale et al. Viruses 2022, 14(12), 2729; https://doi.org/10.3390/v14122729

Datos acumulados sobre protección sobre la mujer de la vacunación contra influenza en el embarazo

Efficacy of inactivated influenza vaccination in pregnancy on episodes of PCR-confirmed influenza infection

- Pooled analysis of 3 randomized controlled trials (in Nepal, Mali and South Africa) of vaccination in pregnancy with a trivalent inactivated influenza vaccine*

	Intervention			Control			Incidence rate ratio (95% CI)	Vaccine efficacy % (95% CI)	P-value
	Cases	Person-time	Incidence per 1000 person-years	Cases	Person-time	Incidence per 1000 person-years			
During pregnancy†	36	1104.2	32.6	61	1094.3	55.7	0.58 (0.39–0.88)	62 (12-61)	0.01
After pregnancy†	25	2374.9	10.5	62	2364.3	26.2	0.40 (0.25–0.64)	60 (36-75)	<0.001
During full study period	62	3438.3	18.0	123	3421.0	36.0	0.50 (0.37–0.68)	50 (32-63)	<0.001

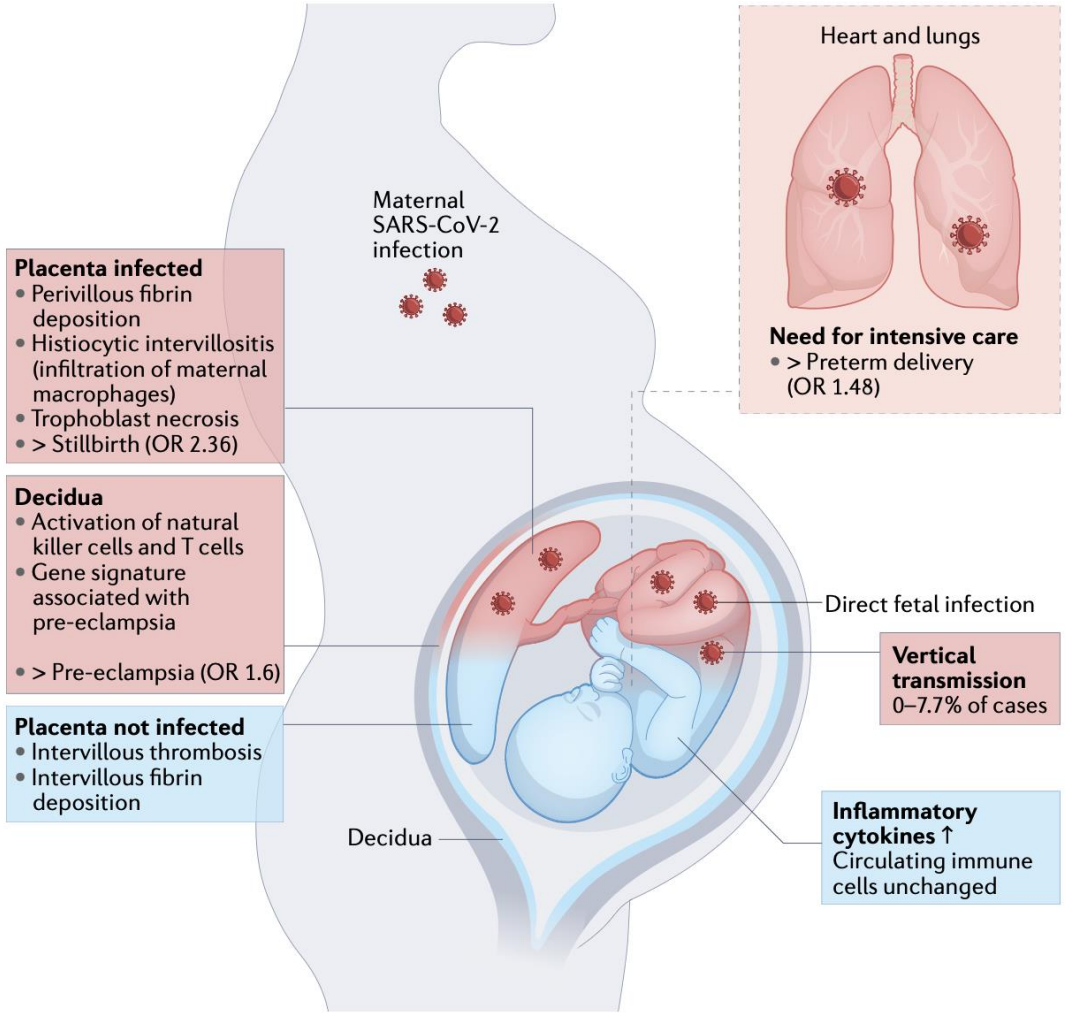
Muñoz et al. PEIVAP 2022

Efectividad de la vacunación contra influenza durante el embarazo en estudios de vida real

Study	Finding	Source
Norway - National registry study of 117,000 pregnancies during 2009–2010 A(H1N1) pandemic	**Reduction of influenza diagnosis during pregnancy by 70%**	Haberg et al, 2013
US case-control study using a seasonal TIV over 2 influenza seasons (2010–2011 and 2011–2012)	**~50% reduction in risk of acute respiratory illness** associated with lab-confirmed influenza among pregnant women	Thompson et al, 2014
Danish registry-based cohort study of seasonal trivalent inactivated influenza vaccine	Influenza **vaccine efficacy** against **lab-confirmed influenza** was **63.9% (95% CI: 29.1, 81.6) in pregnant women** and **56.8% (95% CI: 25.0, 75.1) in infants aged <6 months**	Molgaard-Nielsen et al, 2019
Retrospective PREVENT (Pregnancy Influenza Vaccine Effectiveness Network) study based on data from Australia, Canada, Israel and the US	**40% protection against lab-confirmed influenza-associated hospitalisation** during pregnancy between 2010 and 2016	Thompson et al, 2019

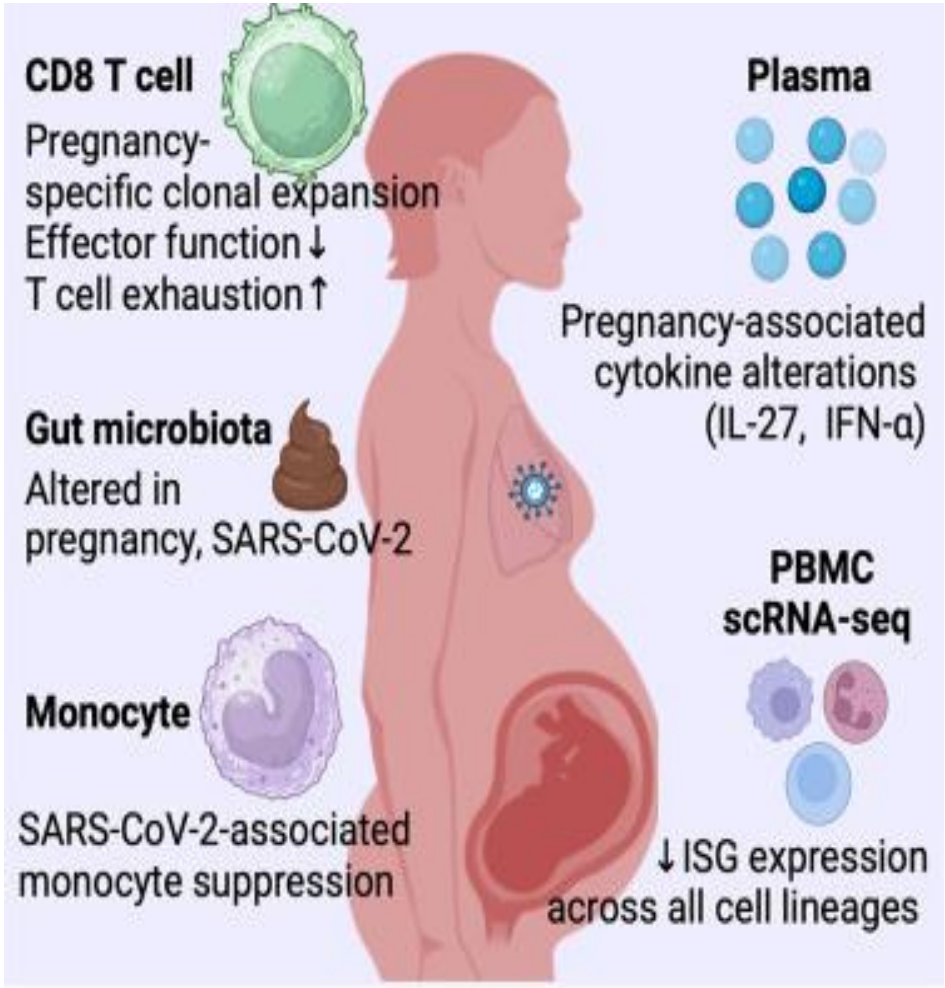
Muñoz et al. PEIVAP 2022

Efectos directos e indirectos de la infección por SARS-CoV-2 en el feto y la placenta



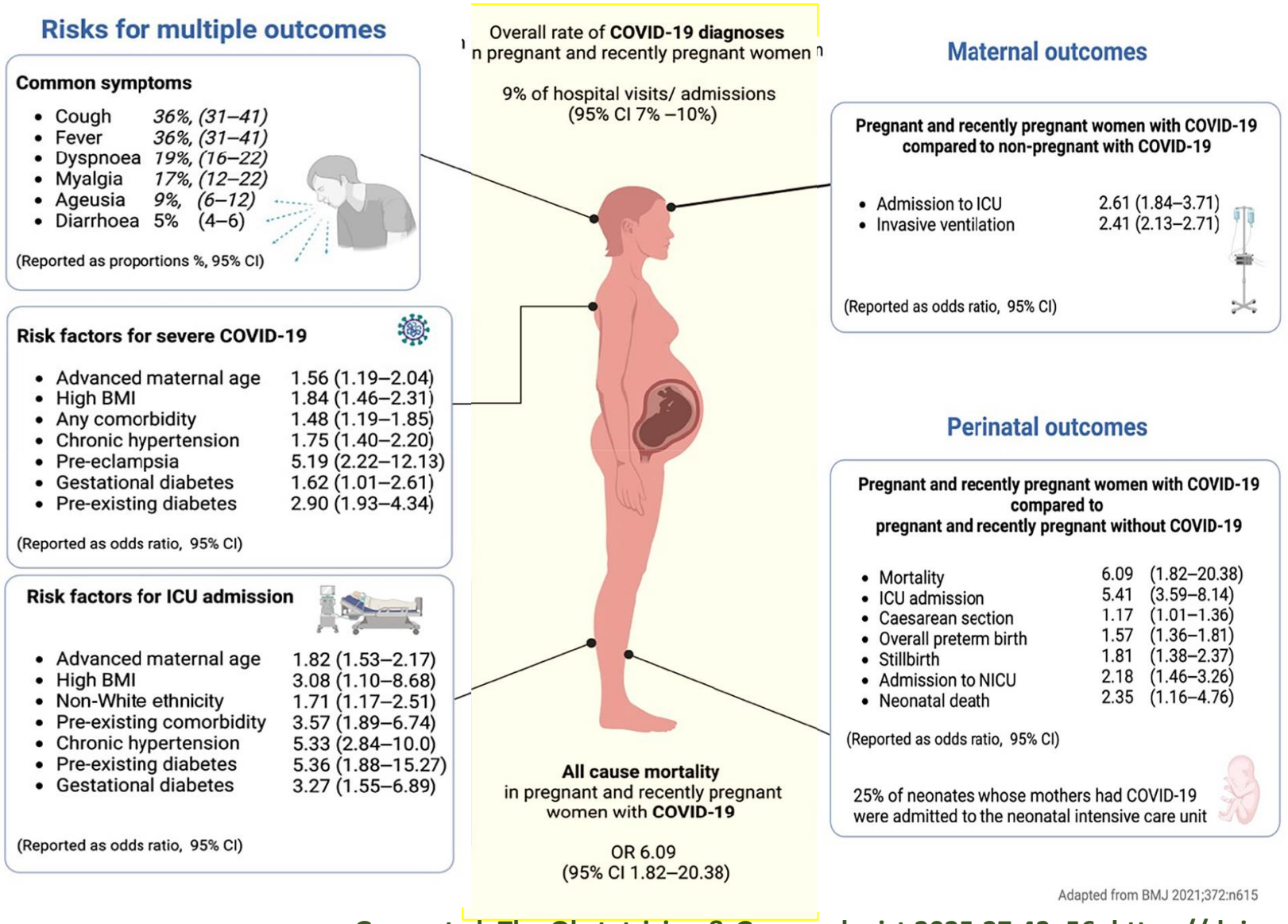
Male V. Nature Reviews Immunol 2022; https://doi.org/10.1038/s41577-022-00703-6

Características de la inmunidad específica al SARS-CoV-2 durante el embarazo



Oh et al. Cell Reports 2024; 43, 114933

Un vistazo general de las manifestaciones clínicas de la infección por SARS-CoV-2/COVID-19 en la mujer embarazada



Greer et al. The Obstetrician & Gynaecologist 2025;27:43–56; https://doi.org/10.1111/tog.12960

Impacto del COVID-19 en el embarazo y riesgo de enfermedad severa: meta-análisis EEUU

Outcome	Pregnant women (n=8,207) No. (%)	Nonpregnant women (n=83,205) No. (%)	Crude risk ratio (95% CI)	Adjusted risk ratio (95% CI)
Hospita-lization	2,587 (31.5)	4,840 (5.8)	5.4 (5.2-5.7)	**5.4** (5.1-5.6)
ICU admission	120 (1.5)	757 (0.9)	1.6 (1.3- 1.9)	**1.5** (1.2-1.8)
Mechanical ventilation	42 (0.5)	225 (0.3)	1.9 (1.4 – 2.6)	**1.7** (1.2 – 2.4)

Source: https://www.cdc.gov/mmwr/volumes/69/wr/mm6925a1.htm?s_cid=mm6925a1_w#T2_down

Key findings from living systematic review

- Pre-existing **comorbidities, advanced maternal age, high BMI and non-white ethnicity** are risk factors for severe COVID-19 in pregnancy
- Pregnant women vs reproductive aged women with COVID-19
  - **Higher ICU admissions, need of mechanical ventilation, ECMO**
  - No differences in mortality
- Pregnant women with COVID-19 vs pregnant women without COVID-19
  - Higher rates of **preterm births** (induced or spontaneous)
  - Higher admission to **neonatal unit or ICU**
  - No differences in rates of Caesarean sections
- COVID-19 may be associated with increased maternal death, but more data needed

Source: Allotey et al, Clinical manifestations, risk factors, and maternal and perinatal outcomes of COVID-19 in pregnancy: living systematic review and meta-analysis https://www.bmj.com/content/372/bmj.n615 (Updated 10 Mar 2021)

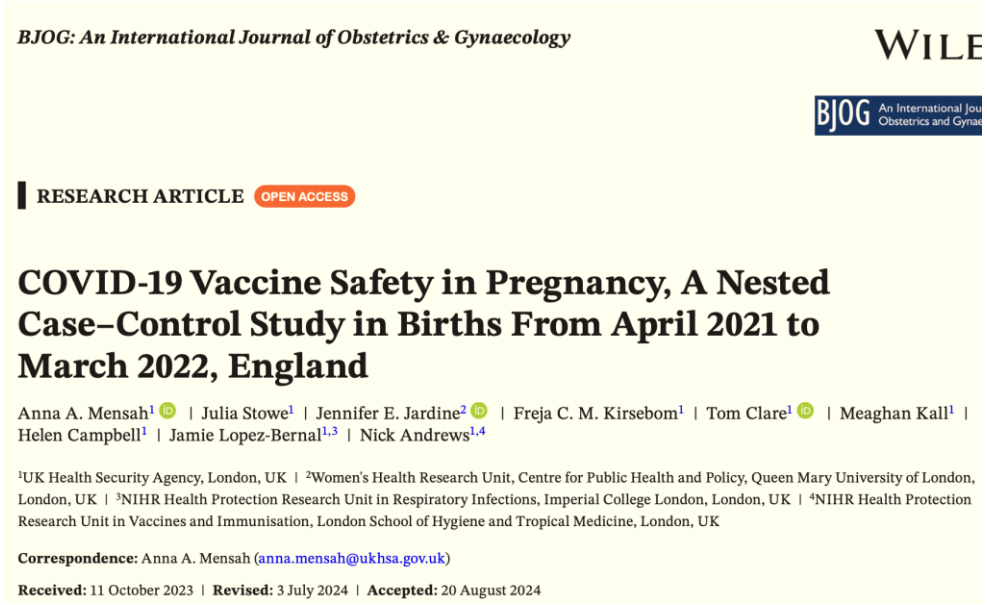
Resultados de estudios sobre desenlaces claves de seguridad con vacuna COVID-19 en el embarazo, 2024-2025

Safety Outcome and Vaccine†	No. of Studies with Comparator Group‡	Study	Effect Estimate (95% CI)
Covid-19			
Miscarriage			
BNT162b2	1	Sheth 2025[82]	aOR, 0.97 (0.57–1.66)
mRNA-1273	1	Sheth 2025[82]	aOR, 0.59 (0.29–1.19)
Stillbirth			
BNT162b2	3	Denoble 2024[83] Mensah 2024[84] Suseeladevi 2024[85]	aOR, 1.00 (0.69–1.43) aOR, 0.85 (0.69–1.05) aHR, 0.72 (0.52–1.00)
mRNA-1273	2	Denoble 2024[83] Mensah 2024[84]	aOR, 1.00 (0.62–1.62) aOR, 0.97 (0.71–1.32)
Congenital anomalies			
BNT162b2	2	Jorgensen 2024[86] Kim 2025[87]	aPR, 0.91 (0.80–1.04) OR, 0.98 (0.88–1.09)
mRNA-1273	2	Jorgensen 2024[86] Kim 2025[87]	aPR, 0.88 (0.65–1.21) OR, 0.90 (0.74–1.10)
Preterm birth			
BNT162b2	4	Hall 2025[88] Kim 2025[87] Mensah 2024[84] Suseeladevi 2024,[85] 24–<32 wk of gestation Suseeladevi 2024,[85] 32–36 wk of gestation	aHR, 1.12 (0.88–1.42) OR, 0.72 (0.63–0.82) aOR, 0.86 (0.83–0.90) aHR, 0.79 (0.65–0.97) aHR, 0.93 (0.87–0.99)
mRNA-1273	3	Hall 2025[88] Kim 2025[87] Mensah 2024[84]	aHR, 0.84 (0.60–1.16) OR, 0.82 (0.66–1.03) aOR, 0.86 (0.81–0.93)

- 7 estudios observacionales:
- **No asociación significativa con riesgo de aborto espontáneo, muerte fetal, anomalías congénitas o peso bajo para la edad gestacional**
- BNT162b2 se asoció a menor riesgo de **parto pretérmino** en 3 de 4 estudios: OR, 0.72 (IC 95%,0.63-0.82), aOR, 0.86 (IC95%,0.83-0.90),84 y aHR, 0.79-0.93)
- Un estudio no mostró asociación significativo (aHR 1.12; IC95%, 0.88-1.42).
- mRNA-1273 asociada con riesgo significativamente menor de **parto pretérmino** en 1 estudio (aOR 0.86; IC95% 0.81-0.93) y no asociación en otros 2 estudios (OR 0.82; IC95% 0.66-1.03, aHR 0.84;IC 95% 0.60-1.16)

Scott et al. N Eng J Med 2025 (Oct 29, 2025) DOI: 10.1056/NEJMsa2514268

La vacunación COVID-19 NO está asociada a ningún desenlace adverso en el embarazo POR EL CONTRARIO es protectora contra desenlaces perinatales ominosos



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RESEARCH ARTICLE OPEN ACCESS

COVID-19 Vaccine Safety in Pregnancy, A Nested Case–Control Study in Births From April 2021 to March 2022, England

Anna A. Mensah[1] | Julia Stowe[1] | Jennifer E. Jardine[2] | Freja C. M. Kirsebom[1] | Tom Clare[1] | Meaghan Kall[1] | Helen Campbell[1] | Jamie Lopez-Bernal[1,3] | Nick Andrews[1,4]

[1]UK Health Security Agency, London, UK | [2]Women's Health Research Unit, Centre for Public Health and Policy, Queen Mary University of London, London, UK | [3]NIHR Health Protection Research Unit in Respiratory Infections, Imperial College London, London, UK | [4]NIHR Health Protection Research Unit in Vaccines and Immunisation, London School of Hygiene and Tropical Medicine, London, UK

Correspondence: Anna A. Mensah (anna.mensah@ukhsa.gov.uk)

Received: 11 October 2023 | **Revised:** 3 July 2024 | **Accepted:** 20 August 2024

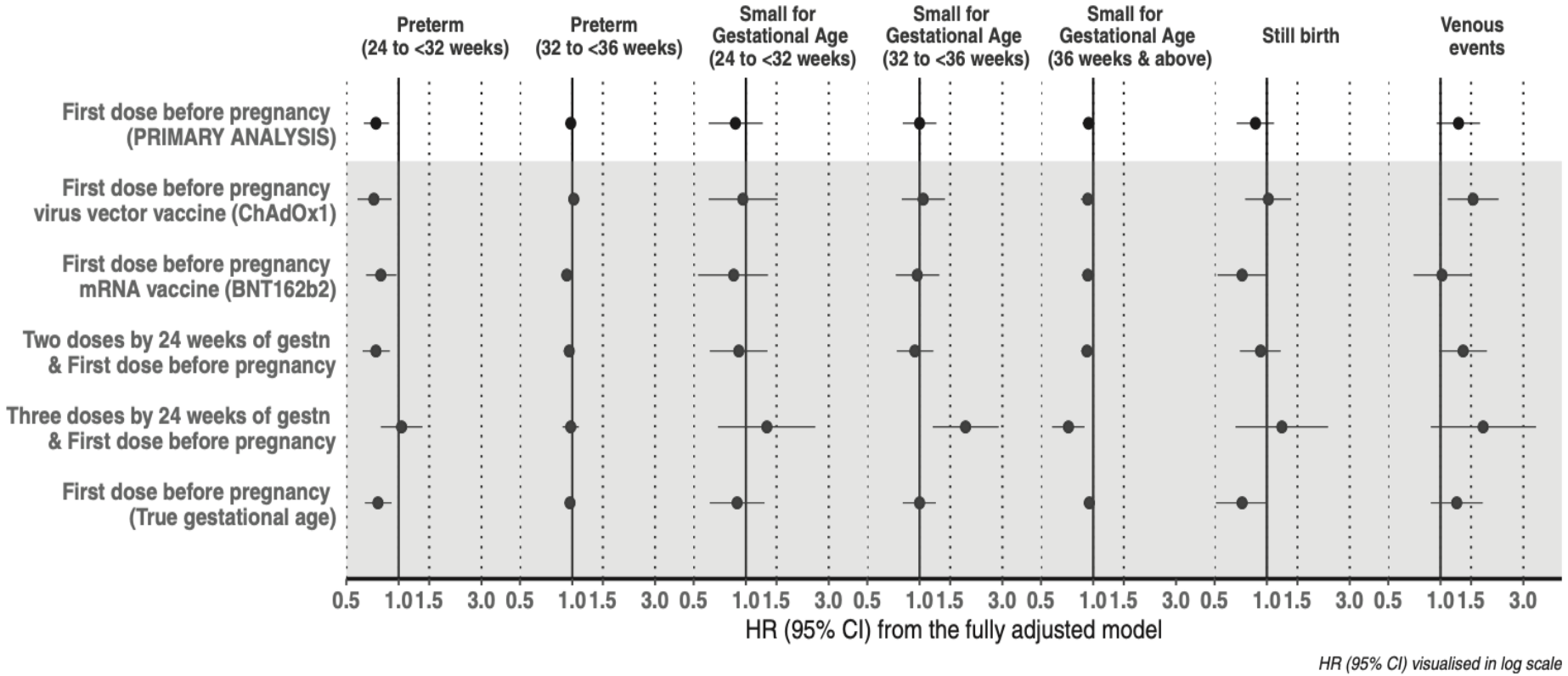
- Estudio anidado de seguridad vacunal en el embarazo, Abril 2021-Mar 2022, Inglaterra
- N=514 013
- Si ≥ 1 dosis de vacuna: Menor probabilidad de recién nacidos con **peso bajo al nacer** (aOR=0.86, IC 95%: 0.79–0.93), **pretérmino** (aOR=0.89, IC 95%: 0.85–0.92) o con **Apgar < 7 a los 5 min**. (aOR=0.89, IC95%: 0.80–0.98)
- Menor probabilidad de ingreso a UCI durante el embarazo (aOR=0.85, IC95%: 0.76–0.95). No asociación entre embarazo, aborto espontáneo, muerte neonatal, muerte perinatal ni TEV en el embarazo.

Mensah et al. Brit J Obst Gynecol 2024

Vacunación COVID-19 pre-embarazo y desenlaces al nacer

COVID-19 vaccination and birth outcomes of 186,990 women vaccinated before pregnancy: an England-wide cohort study

Arun K. Suseeladevi,[a,b,c,p] Rachel Denholm,[a,b,d,p,**] Matthew Retford,[e] Elena Raffetti,[f,g,h] Christy Burden,[i,k] Katherine Birchenall,[i,k] Victoria Male,[j] Venetia Walker,[a,c] Christopher Tomlinson,[e,l,m] Angela M. Wood,[f,g,n] and Luisa Zuccolo,[a,c,o,*] on behalf of the CVD-COVID-UK/COVID-IMPACT Consortium



HR (95% CI) visualised in log scale

Suseeladevi et al. Lancet Regional Health – Europe 2024; 45: doi.org/10.1016/j.lanepe.2024.101025

La realidad basada en la evidencia

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News Releases | Aug 22, 2025

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ACOG Releases Updated Maternal Immunization Guidance for COVID-19, Influenza, and RSV

Washington, D.C.—Today, the American College of Obstetricians and Gynecologists (ACOG) released updated clinical guidance regarding vaccination during pregnancy against COVID-19, influenza, and RSV. The three guidance documents, all of which recommend maternal immunization, lay out the full body of current scientific evidence that underscores the safety and benefits of choosing to be vaccinated against these respiratory conditions during pregnancy.

@cafettor https://www.acog.org/news/news-releases/2025/08/acog-releases-updated-maternal-immunization-guidance-covid-influenza-rsv, August 22, 2025

CTM slide

ACOG
The American College of Obstetricians and Gynecologists

ACOG and SMFM Recommend COVID-19 Vaccination for Pregnant Individuals

- The American College of Obstetricians and Gynecologists (ACOG) and the Society for Maternal-Fetal Medicine (SMFM), the two leading organizations representing specialists in obstetric care, **recommend that all pregnant individuals be vaccinated against COVID-19.** The organizations' recommendations in support of vaccination during pregnancy **reflect evidence demonstrating the safe use of the COVID-19 vaccines during pregnancy from tens of thousands of reporting individuals over the last several months, as well as the current low vaccination rates and concerning increase in cases.**
- only about 22% of pregnant individuals have received one or more doses of the COVID-19 vaccine, according to the **CDC**

ACOG
The American College of Obstetricians and Gynecologists

Vaccinating Pregnant Individuals:

Eight Key Recommendations for COVID-19 Vaccination Sites

The American College of Obstetricians and Gynecologists (ACOG) recommends that all eligible persons, including pregnant and lactating individuals, receive a COVID-19 vaccine or vaccine series. While pregnant individuals are encouraged to discuss vaccination considerations with their clinical care team when feasible, documentation of such a discussion should not be required prior to receiving a COVID-19 vaccine. Further, pregnant individuals should not be denied COVID-19 vaccine(s) because of their pregnancy status alone. COVID-19 vaccination sites should consider the recommendations below and in ACOG's clinical guidance regarding vaccinating pregnant individuals.

1 Pregnant individuals should be vaccinated against COVID-19.

2 While pregnant individuals are encouraged to discuss vaccination considerations with their clinical care team when feasible, documentation of such a discussion should not be required prior to receiving a COVID-19 vaccine.

3 Pregnancy testing should not be a requirement prior to receiving any EUA-approved COVID-19 vaccine.

4 Similar to their non-pregnant peers, pregnant individuals can receive a COVID-19 vaccine in any setting authorized to administer these vaccines. This includes any clinical setting and nonclinical community-based vaccination sites such as schools, community centers, and other mass vaccination locations.

5 Precautions should be discussed with any individual who reports a history of any immediate allergic reaction to any other vaccine or injectable therapy (i.e., intramuscular, intravenous, or subcutaneous vaccines or therapies not related to a component of COVID-19 vaccines or polysorbate).

6 If anaphylaxis is suspected in a pregnant individual after receiving a COVID-19 vaccination, anaphylaxis should be managed the same as in non-pregnant individuals (CDC).

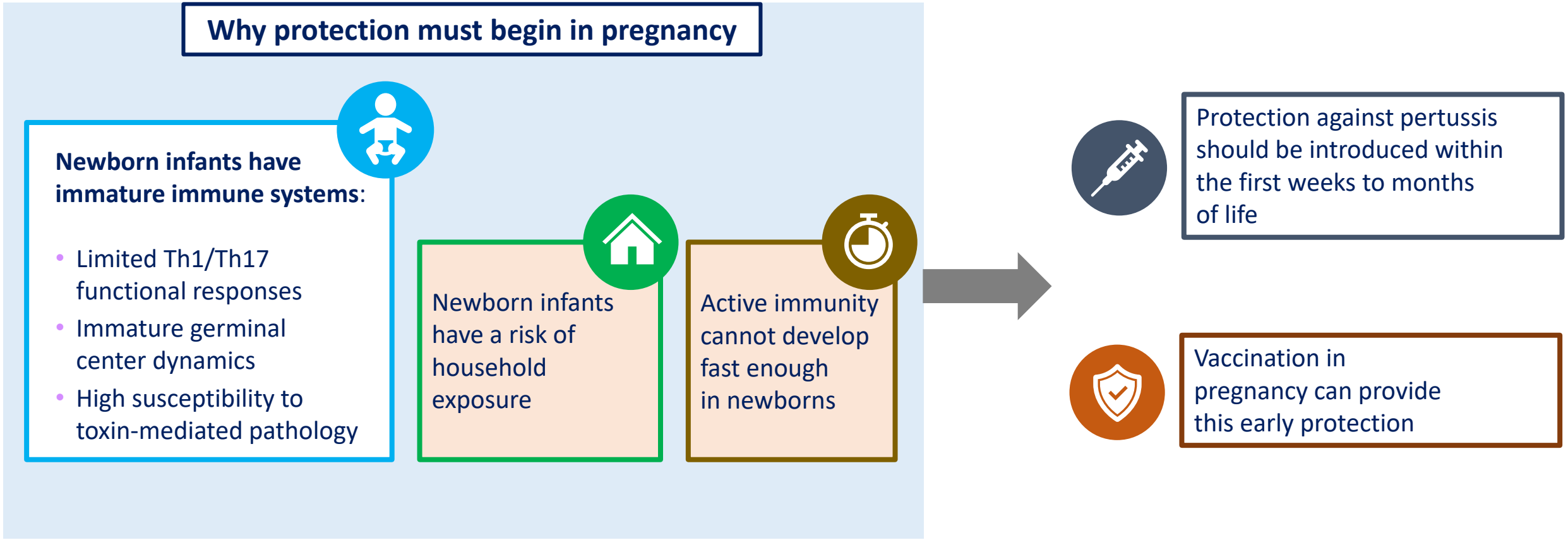
7 Pregnant individuals who experience fever following vaccination should be counseled to take acetaminophen. Acetaminophen has been proven to be safe for use in pregnancy and does not appear to impact antibody response to COVID-19 vaccines.

8 Pregnant individuals who receive a COVID-19 vaccine should be educated about and encouraged to participate in CDC's V-SAFE program (see below for more information on CDC's V-SAFE program).

For more information, please visit ACOG's Practice Advisory on COVID-19 Vaccination Considerations for Obstetric–Gynecologic Care and CDC's Clinical Considerations.

http://acog.org/covid-19/covid-19-vaccines-and-pregnancy-conversation-guide-for-clinicians

The critical vulnerability window of severe pertussis disease in early infancy

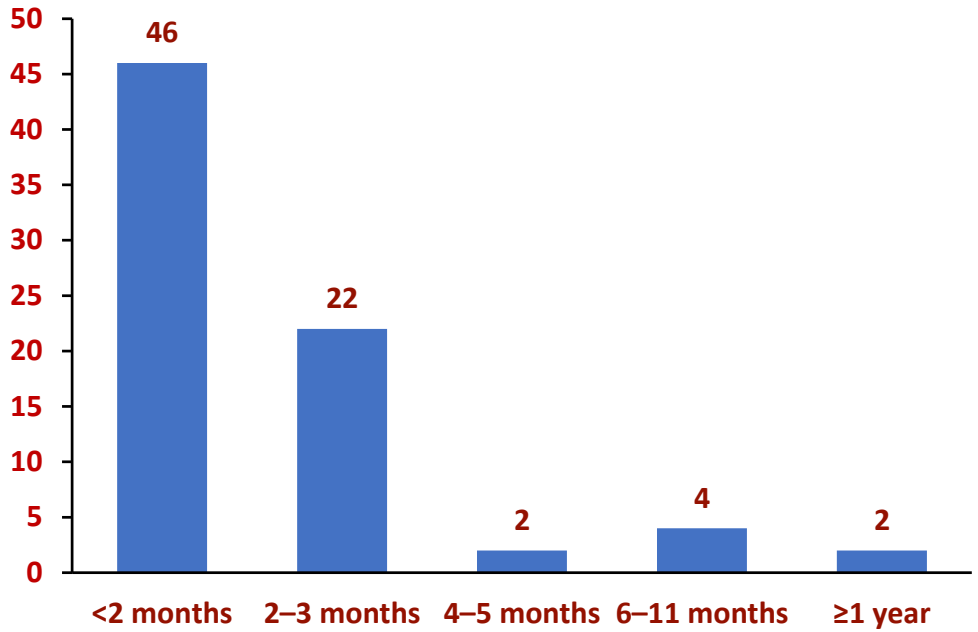


Torres-Martínez, C. Challenges and successes in pediatric pertussis immunization: Protecting from womb to school age.ESCMID Global, Munich, 19 April 2026; Clemens EA, Alexander-Miller MA. Viruses. 2021;13:1392;CDC. Pertussis surveillance and trends.https://www.cdc.gov/pertussis/php/surveillance /index.html; Vizzotti C, et al. Vaccine. 2015;33:6413–9.

The younger the infant, the greater their risk of severe pertussis disease and death

- **Higher incidence of pertussis** during the **first 4–5 months**, followed by a steep decline after 6 months[1]
- The risk of severe pertussis disease and death is related to the age of the infant[2,3]
  - **Infants <6 months:** 23% of all pertussis-related hospitalizations in the US in 2021[2]
  - Most deaths occur in **infants <3 months both in Europe and Latin America**[3,4]

Increased risk of death in younger infants in Argentina (n=76, 89.5% ≤3 months ,92.1% <6 months)[3]



1. Carlsson RM, et al. Euro Surveill 2015;20:21032; 2. CDC. 2021 final pertussis surveillance report. https://www.cdc.gov/pertussis/downloads/pertuss-surv-report-2021.pdf (Accessed September 2023); 3. Vizzotti C, et al. Vaccine 2015;33:6413–9; 4. Lobzin YV, et al. Infect Dis Ther 2015;4:113–23.

Pertussis in Colombia, 2016-2021: Incidence and lethality

	2016	2017	2018	2019	2020	2021
% < 5 years	91,4%	92,9%	91,6%	81,9%	95%	97,7%
% < 4 months	54,4%	54,2%	47,2%	37,1%	78%	75%
Incidence GP	1,2	0,8	0,8	0,68	0,11	ND
Incidence < 5 y.	11,3	8,5	7,73	6,1	1,21	ND
Incidence < 1 y.	34,2	31,6	30,8	23,67	5,67	ND
Lethality	2,1%	1,4%	2,1%	3,7%	3,3%	ND

Incidence: cases /100.000

Torres-Martínez C, Gentile A, Falleiros LH. Pertussis vaccination in pandemic era, 2021.Based in: Informes de evento, Tosferina, Instituto Nacional de Salud, Ministerio de Salud y Protección Social, Colombia. https://www.ins.gov.co/buscador-eventos/Paginas/Info-Evento.aspx

Pertussis situation in the Americas, 2025 (EW46-48)

Country	Cases confirmed	Deaths/ CFR	Incidence	<1y	1-4 y	Other ages	DTP1	DTP3	Vaccine
Argentina	688	7 / 1%	1.45	36.7%	16.9%		80%	75%	wP
Brazil	2,485	11 / 0.44%		29.5% < 6: 18.3%	23.6%		90%	91%	wP
Chile	2,424	NR	12	NR	32%	5-9 y. 31%	98%	95%	aP
Colombia	919	16 / 1.74%	1.73	37.5%	17.6%		88%	89%	wP
Ecuador	2,715	48 / 1.76%	NR	33.5%	19.3%		87%	87%	wP
Mexico	1,561	71 / 4.54%	1.17	32.5%	9%		83%	78%	aP
Panama	30	1 / 3.3%	0.6	16.7%	33.3%	>15y. 26.7%	91%	72%	aP
Paraguay	70	6 / 9%	NR	44%	21%		82%	80%	aP
Peru	9,200	49 / 0.53%	9.41	15%	31%	5-11y. 28%	100%	99%	wP
USA	25,057*	13	NR	NR	26%**	11-19y. 27%	97%	95%	aP

*** Confirmed-probable cases; **1-6 y.**
222 Deaths/17,668 cases confirmed, CFR in 8 countries 1.25%

Prepared by the author based on: Pan American Health Organization/World Health Organization. Epidemiological Update:Pertussis (Whooping Cough) in the Americas Region. 8 December 2025. Washington, D.C.: PAHO/WHO; 2025

Tdap vaccination in pregnancy (ViP) reduces the incidence of pertussis and improves pertussis-related outcomes in infants

- There is a breadth of evidence to support the impact of Tdap ViP in reducing incidence, pertussis-related hospitalizations, and deaths
- Consistent findings across high-coverage settings

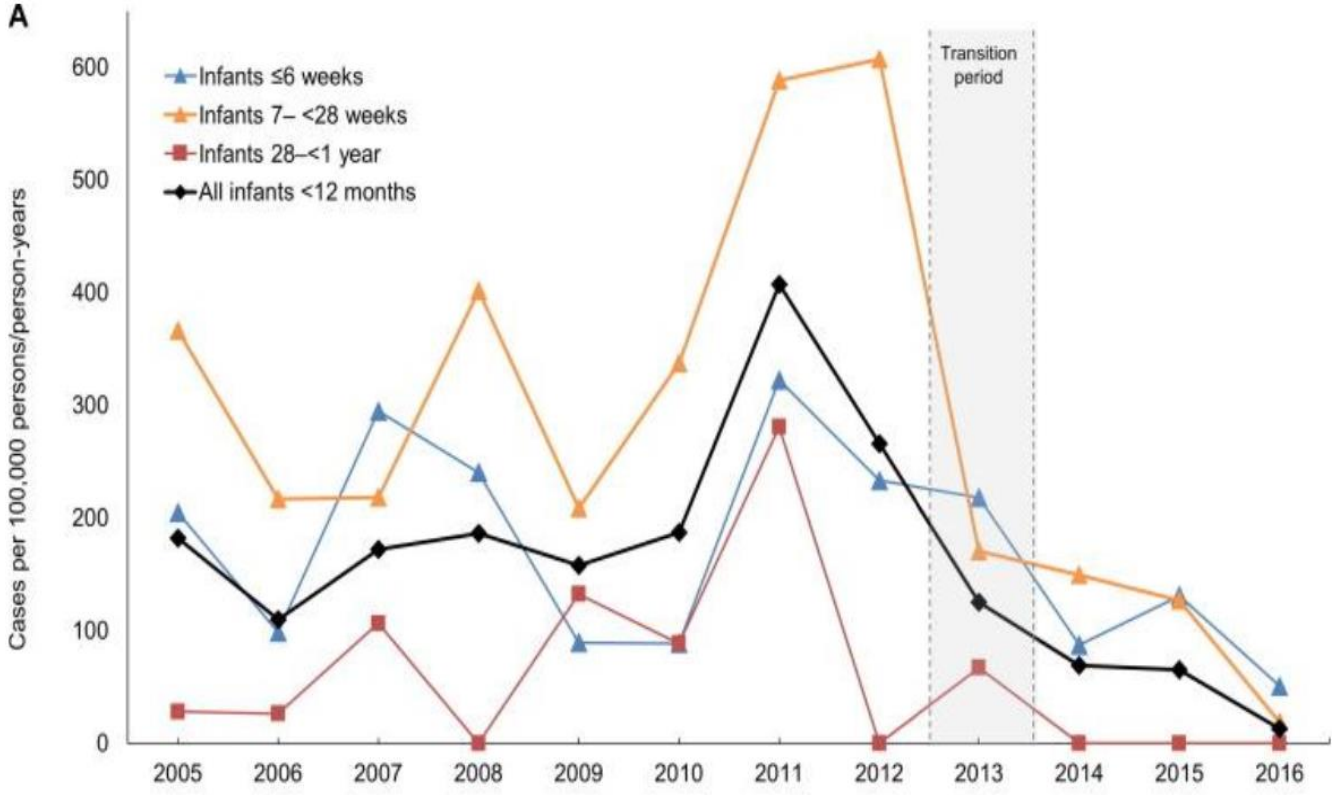
Incidence of pertussis	
Age	**Vaccine effectiveness**
Infants <2 months[1–4]	77.7–96.0%
Infants in first year of life[1,2]	55.8–69.0%

Pertussis-related hospitalizations	
Age	**Vaccine effectiveness**
Infants <2 months[4,5]	75.0–90.5%
Infants <3 months[6]	94.0%

Pertussis-related deaths	
Age	**Vaccine effectiveness**
Infants <2 months[7]	83.7%
Infants <3 months[8]	95.0%

1. Baxter R, et al. Pediatrics. 2017;139:e20164091. 2. Hsiao A, et al. Am J Obstet Gynecol. 2026;234:1172–82. 3. Vargas-Zambrano JC, et al. Vaccine2023;41: 2968–75. 4. Skoff TH, et al. Clin Infect Dis. 2017;65:1977–83. 5. Merdrignac L, et al. Vaccine. 2022;40:6374–82. 6. Saul N, et al. Vaccine. 2018;36:1887–92. 7. Vizzotti C, et al. Vaccine. 2015;47:6413–9. 8. Amirthalingam G, et al. Clin Infect Dis. 2016;63(Suppl 4):S236–43.

Impact of Tdap maternal vaccination in Colombia

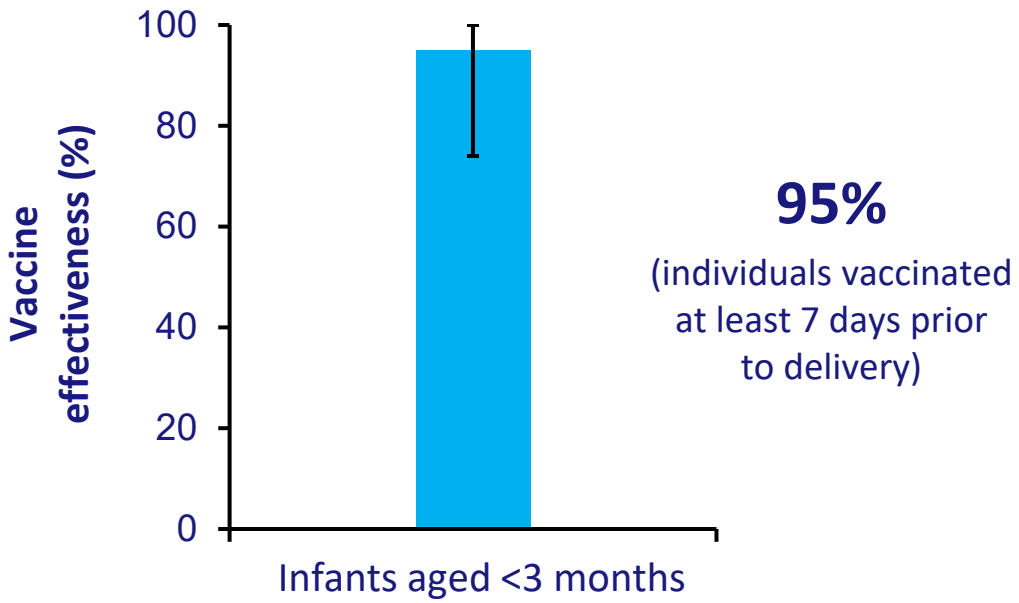


- Incidence decreased from 209.4/100,000 (2005-2012) to 49.1/100 000 (2014-2016) in infants <12 months:
  - **Reduction 87.5% (IC 95%: 77.2-93.2%).**
- Incidence in infants ≤6 wk decreased from 196.7 a 89.6/100 000 person-years :
  - **Reduction 54.4 % (35,4–67,9 %).**
- Higher incidence reduction in infants 7-28 weeks: **73.4 % (68.4–77.6 %) and 100 %** in those 28-52 weeks.
- **100% reducción in deaths in infants** <12 months.

Carrasquilla et al.. Vaccine 2020 Oct 27;38(46):7384-7392. doi: 10.1016/j.vaccine.2020.07.046. Epub 2020 Oct 2. PMID: 33012607.

Pertussis (Tdap) vaccination in pregnancy reduces pertussis-related deaths in infants

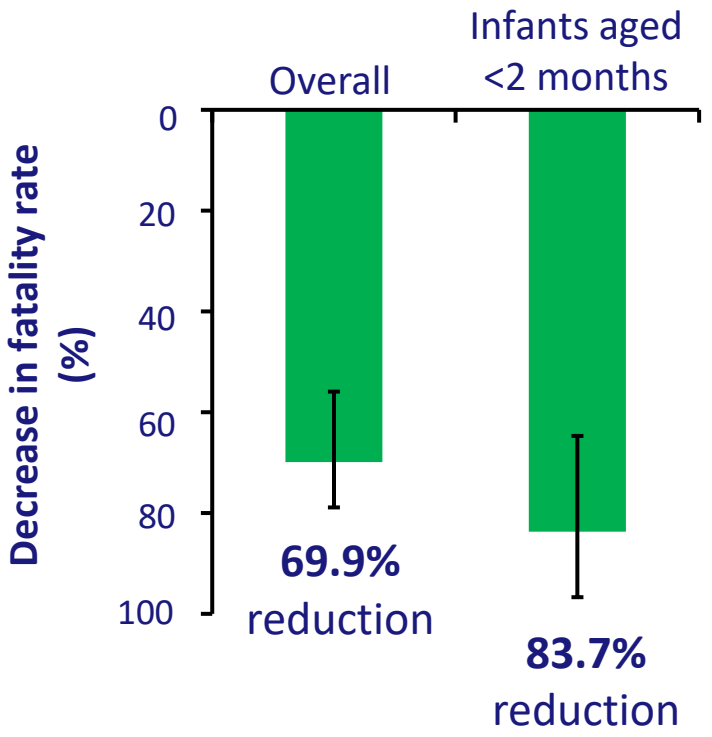
Vaccine effectiveness against infant death (N=243 cases; England)[1]



95%

(individuals vaccinated at least 7 days prior to delivery)

Vaccine effectiveness against infant death (Argentina)[2]



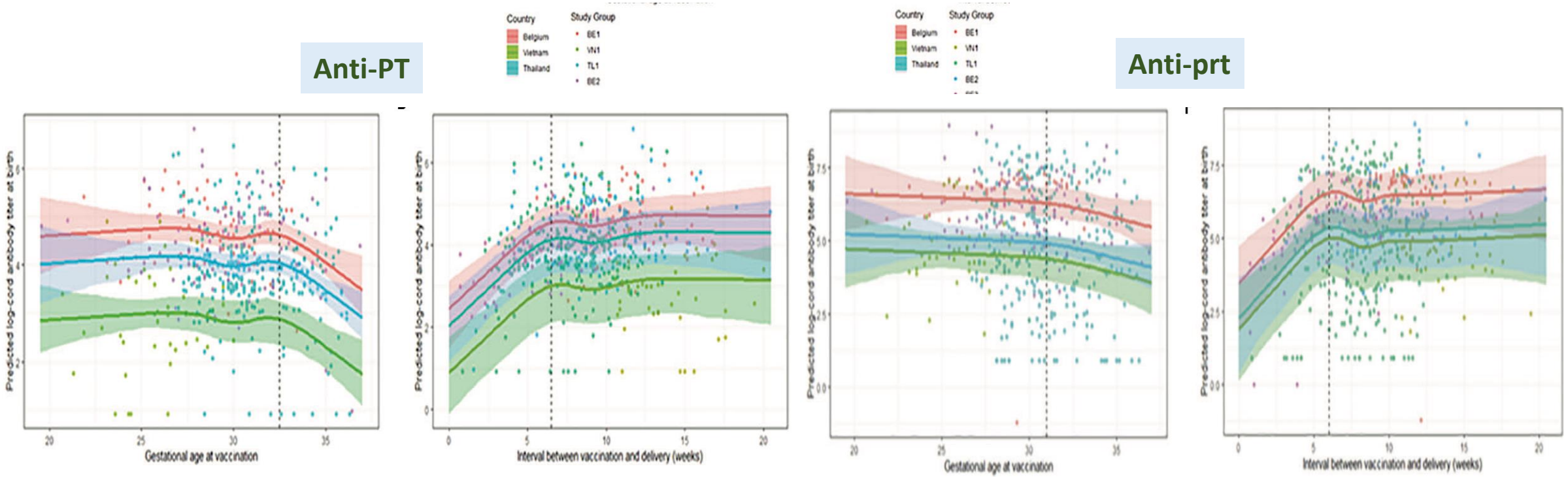
1. Amirthalingam G, et al. Clin Infect Dis 2016;63(Suppl 4):S236–S243; 2. Vizzotti C, et al. Vaccine 2015;47:6413–9.

Clinical impact of immune interference (blunting) in pertussis

- The exact impact of immune interference deserves ongoing evaluation.
- There is no correlate of protection for pertussis **BUT** there has been no evidence of an increase of the disease in countries with universal maternal immunization.
- In other diseases with known correlates of protection, the effect of interference is not a concern once antibodies reach seroprotective levels.
- Surveillance of pertussis epidemiology is necessary to assess the clinical impact of blunting.
- Special attention should be given to evaluating countries using wP in their vaccination programs.
- **The benefits of protecting newborns and infants during the most susceptible months far outweight the potential risks of later interference**

Kandell et al. Exper Rev Vacc 2020; Maertens K. Oral presentation, 41st ESPID, Lisboa, 10 may 2023

Influencia del tiempo de vacunación en el embarazo en la respuesta inmune neonatal a pertussis



Análisis de cohorte multipaís de pares madre-neonato (n=698)

Niños a término: Títulos de Ab más altos al nacimiento si vacunados antes de la semana 31.

Lactantes a término y pretérmino: un intervalo de al menos 7,5 sems entre vacunación y parto indujo mayores niveles de Ab en sangre de cordón

La vacunación entre el 2º. y el 3er. Trimestre tempranos induce mayores niveles de Ab al nacimiento

Gomme et al. Front. Immunol. 13:913922. doi: 10.3389/fimmu.2022.913922

Seguridad de vacunación TdaP en el embarazo

- Safety data
  - Randomized controlled trials and observational studies
    - No safety signals
  - Pregnancy registries
    - No safety signals
  - VAERS database
    - No safety signals
  - Vaccine safety datalink
    - No safety signals

Estrategia segura

Vaccine

Enhanced surveillance of tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis (Tdap) vaccines in pregnancy in the Vaccine Adverse Event Reporting System (VAERS), 2011–2015

Conclusions
No new or unexpected vaccine AEs were noted among pregnant women who received Tdap after routine recommendations for maternal Tdap vaccination. Changes in reporting patterns would be expected, given the broader use of Tdap in pregnant women in the third trimester.

Pediatrics
March 2018, VOLUME 141 / ISSUE 3
Article

Infant Hospitalizations and Mortality After Maternal Vaccination

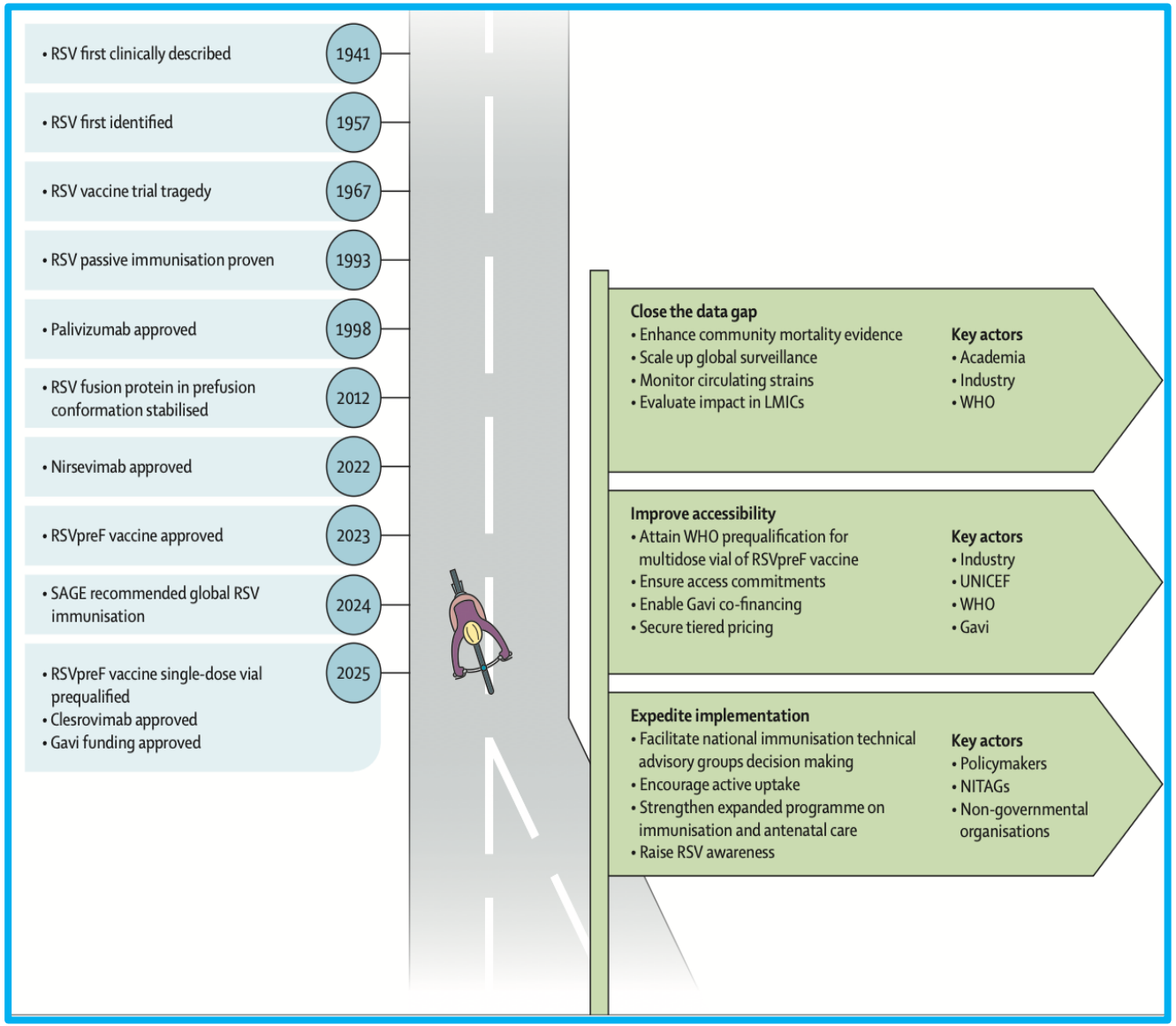
Lakshmi Sukumaran, Natalie L. McCarthy, Elyse O. Kharbanda, Gabriela Vazquez-Benitez, Heather S. Lipkind, Lisa Jackson, Nicola P. Klein, Allison L. Naleway, David L. McClure, Rulin C. Hechter, Alison T. Kawai, Jason M. Glanz, Eric S. Weintraub

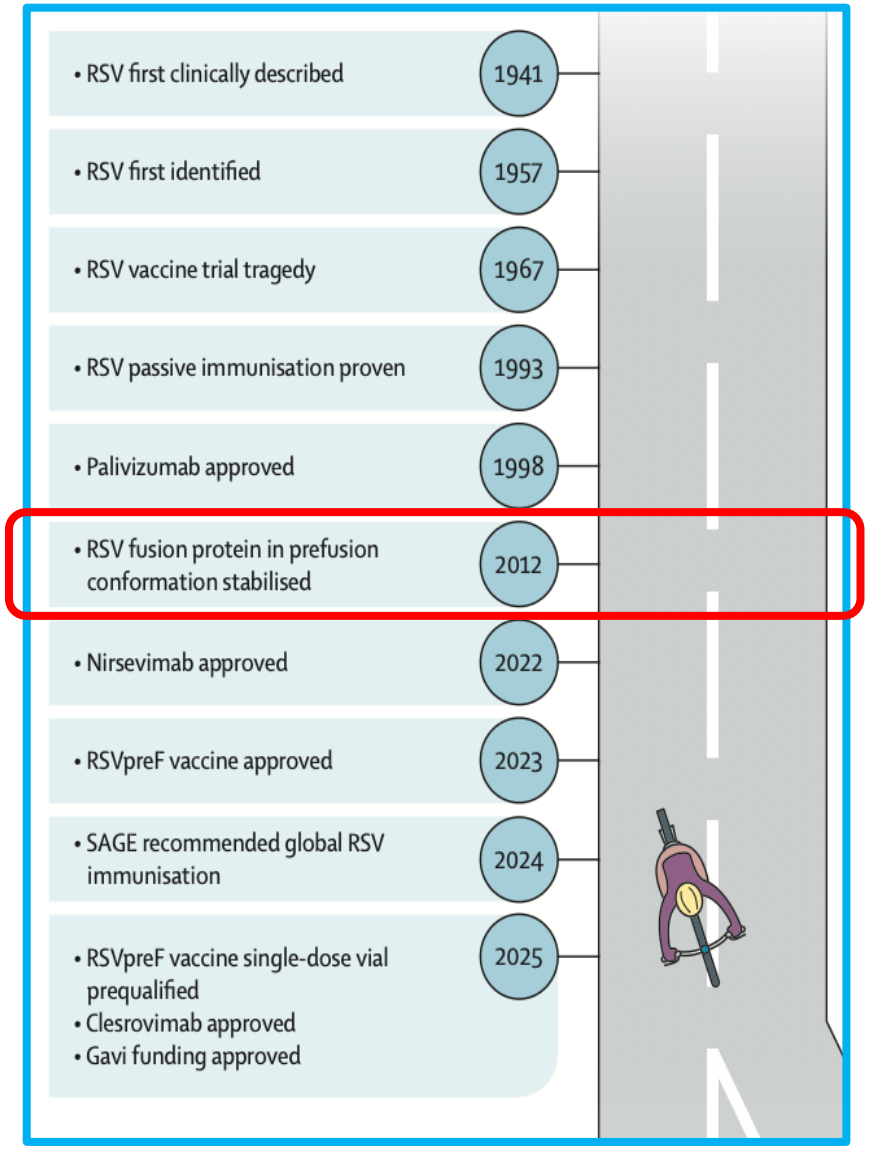
CONCLUSIONS: We found no association between vaccination during pregnancy and risk of infant hospitalization or death in the first 6 months of life. These findings support the safety of current recommendations for influenza and Tdap vaccination during pregnancy.

Canadian Center for Vaccinology

CTM slide

Línea del tiempo en progresos de la inmunización contra VRS y el futuro hacia una prevención oportuna y equitativa





Shaaban et al. Lancet Glob Health 2025 (Nov 3) ; 13: e2165–74; https://doi.org/10.1016/S2214-109X(25)00379-1

Efectividad vacunal actualizada del programa de vacunación materna en Inglaterra: poblaciones y desenlaces

289 399 lactantes experimentaron 4.594 eventos

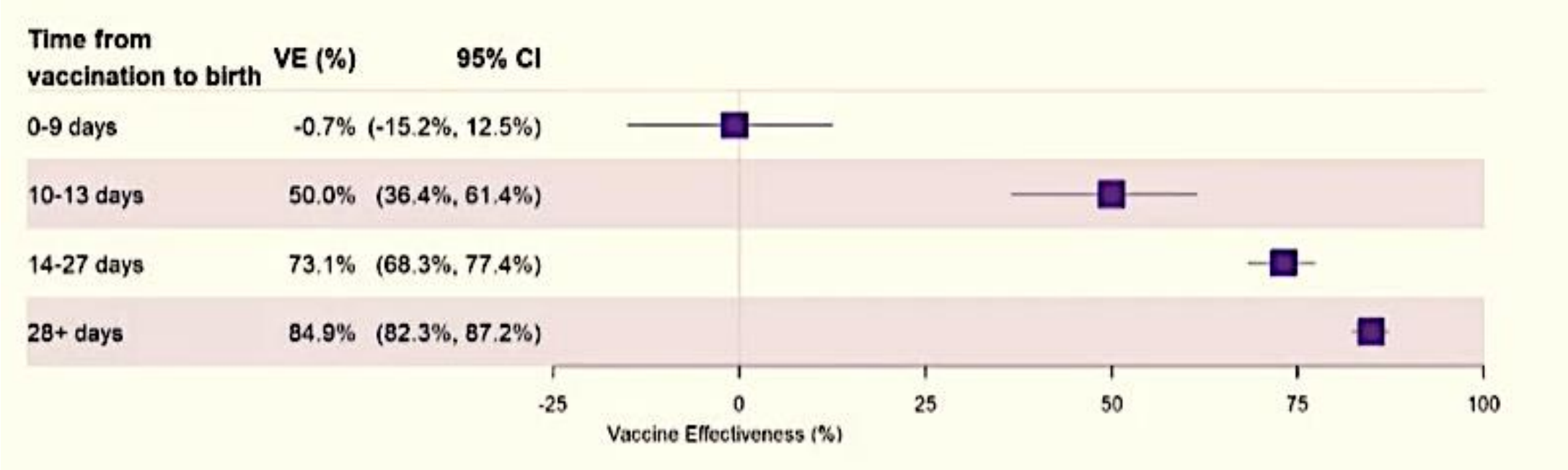
	Lactantes n (%)	Persona-tiempo meses (%)	Eventos n (%)	Tasa cruda/100 personas-año
Total	289.399 (100)	965.469 (100)	4.594 (100)	
Vacunación completa	120.232 (41,5)	319.011 (33,0)	302 (6,6%)	1,1
No vacunado	159.266 (55,0)	603.109 (62,5)	4.005 (87,2%)	8,0
Parcialmente vacunado	9.901 (3.4)	43.349 (4,5)	287 (6.2%)	7,9

Eficacia vacunal 81,3% (IC95% 78,9-83,4%, p <0,0001) en vacunados vs no vacunados

Wilson M et al. UKHSA Maternal RSV vaccination and reduced risk of hospitalisation for babies in England, 2024-25. ESCMID Global, Munich, 18 abril 2026 (presentación oral)

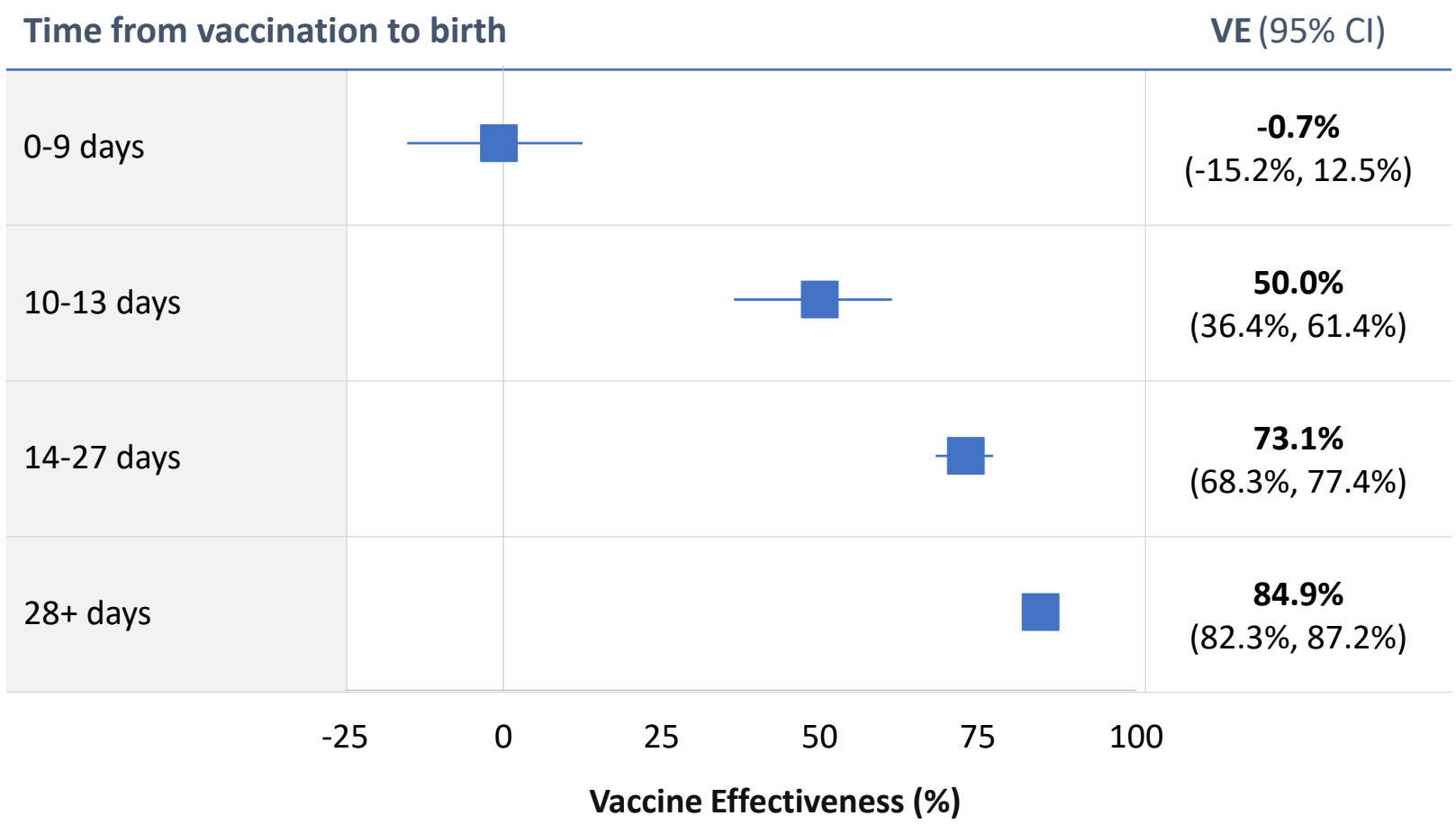
La efectividad vacunal incrementa con el intervalo de vacunación al parto

- La vacuna preF es más efectiva cuando se aplica **AL MENOS 28 días** antes del parto.
  - Existe cierta eficacia en el intervalo **10- a 13- días** antes del parto



Wilson M et al. UKHSA Maternal RSV vaccination and reduced risk of hospitalisation for babies in England, 2024-25. ESCMID Global, Munich, 18 abril 2026 (presentación oral)

UKHSA cohort study: Efectividad Vacunal estratificada por tiempo transcurrido desde la vacunación



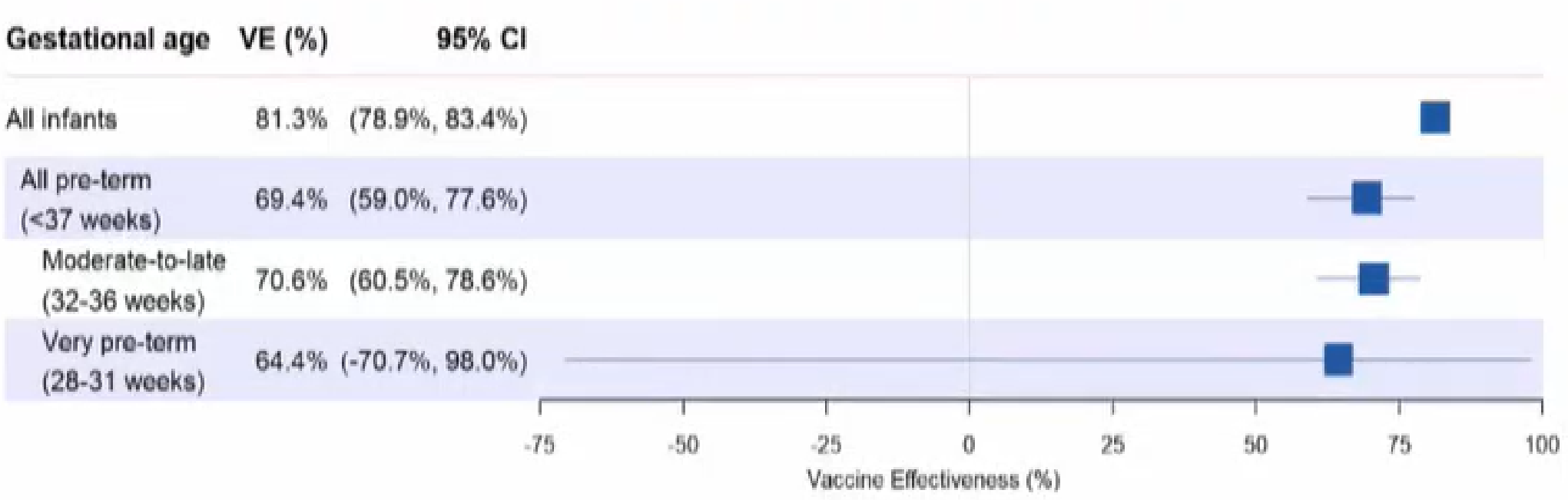
No se observó ningún efecto entre 0 y 9 días desde la vacunación hasta el nacimiento

La EV fue mayor en quienes tenían **al menos 28 días** desde la vacunación hasta el nacimiento, en comparación con aquellos con 14-27 días

Wilson M et al. Poster P487. Presented at RESVINET, Rome February 17–20, 2026.

Efectividad vacunal de vacuna PreF en niños pretérmino

La efectividad vacunal es 84,2% (IC95% 79,9-84,6) en bebés a término comparado con 69,4% (59,0%-77,6%) en pretérmino

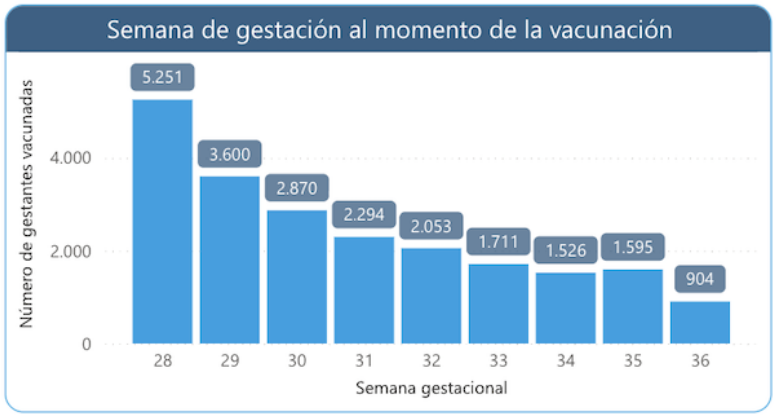


Wilson M et al. UKHSA Maternal RSV vaccination and reduced risk of hospitalisation for babies in England, 2024-25. ESCMID Global, Munich, 18 abril 2026 (presentación oral)

Estrategia de vacunación contra VRS en el embarazo, Bogotá, Noviembre 2025-Mayo 2026

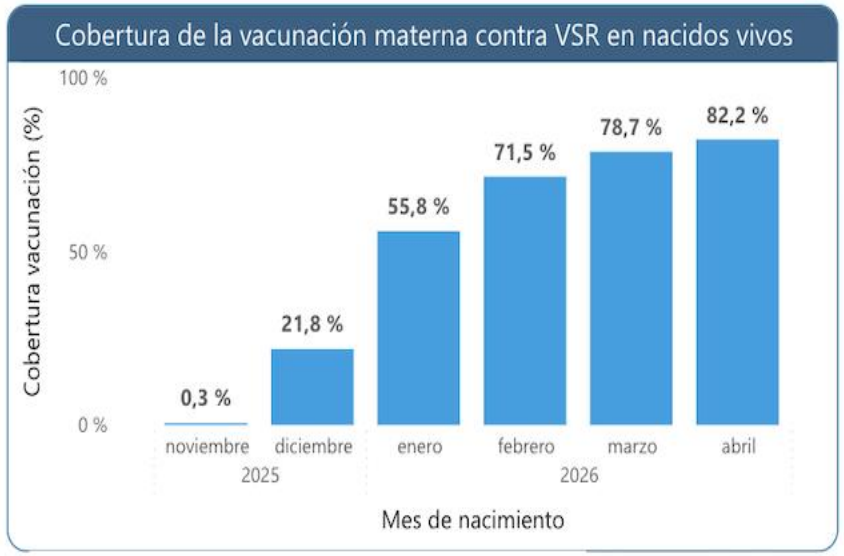
Gestantes vacunadas contra VSR

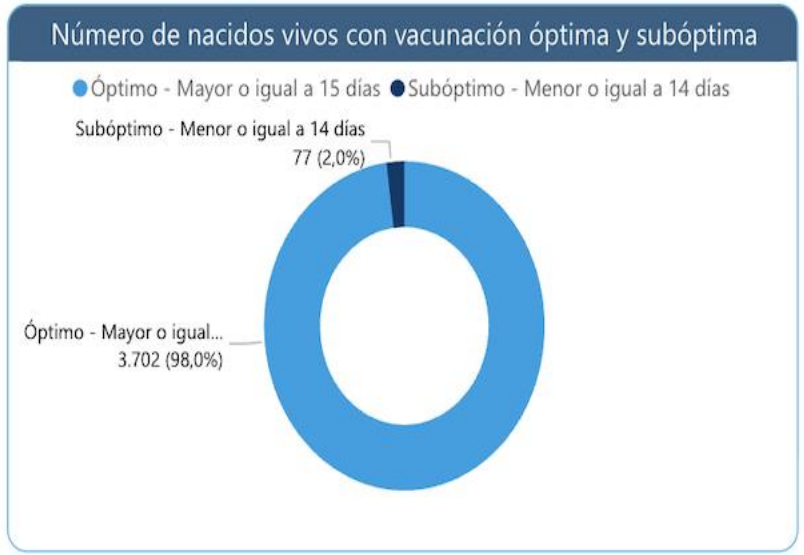
26.988



Cobertura de vacunación en menores de tres meses

77,6 %



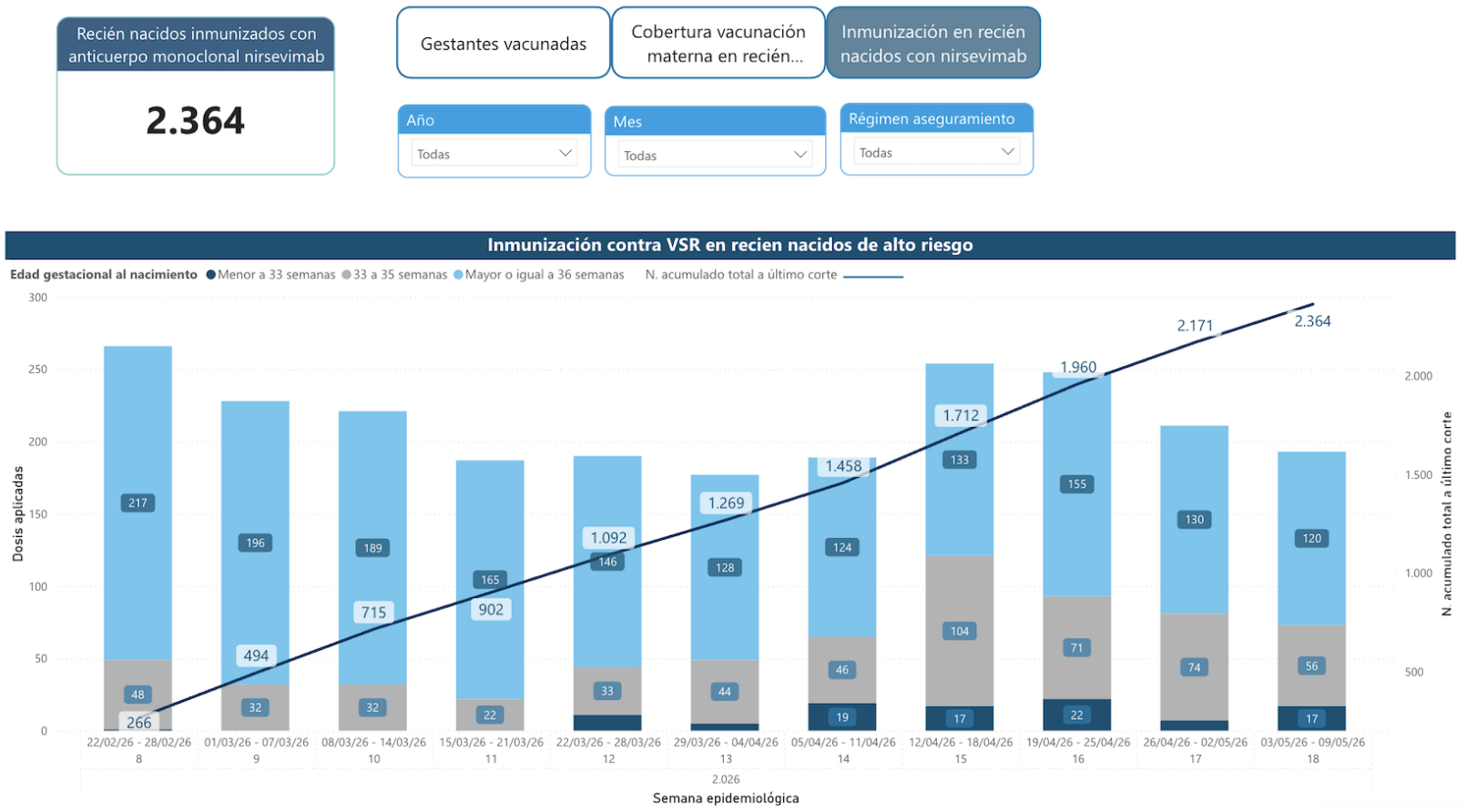


VSR: Virus Sincitial Respiratorio

ıra Nacidos vivos (%) = Número de nacidos vivos con madre vacunada / Total de nacidos vivos en el mismo

https://saludata.saludcapital.gov.co/osb/indicadores/vacunacion-gestantes-contra-bronquiolitis-vsr/actualizado **11 mayo**

Inmunizados con nirsevimab, Bogotá, Febrero-Mayo 2026

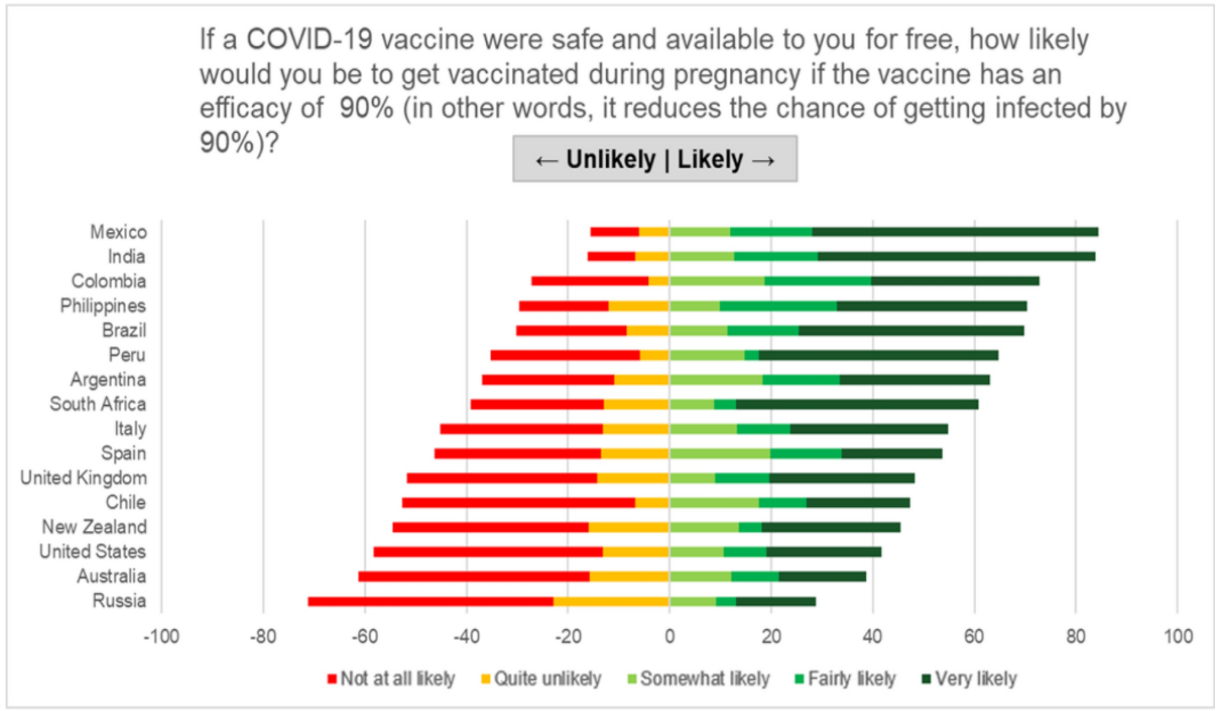


https://saludata.saludcapital.gov.co/osb/indicadores/vacunacion-gestantes-contra-bronquiolitis-vsr/actualizado 11 mayo

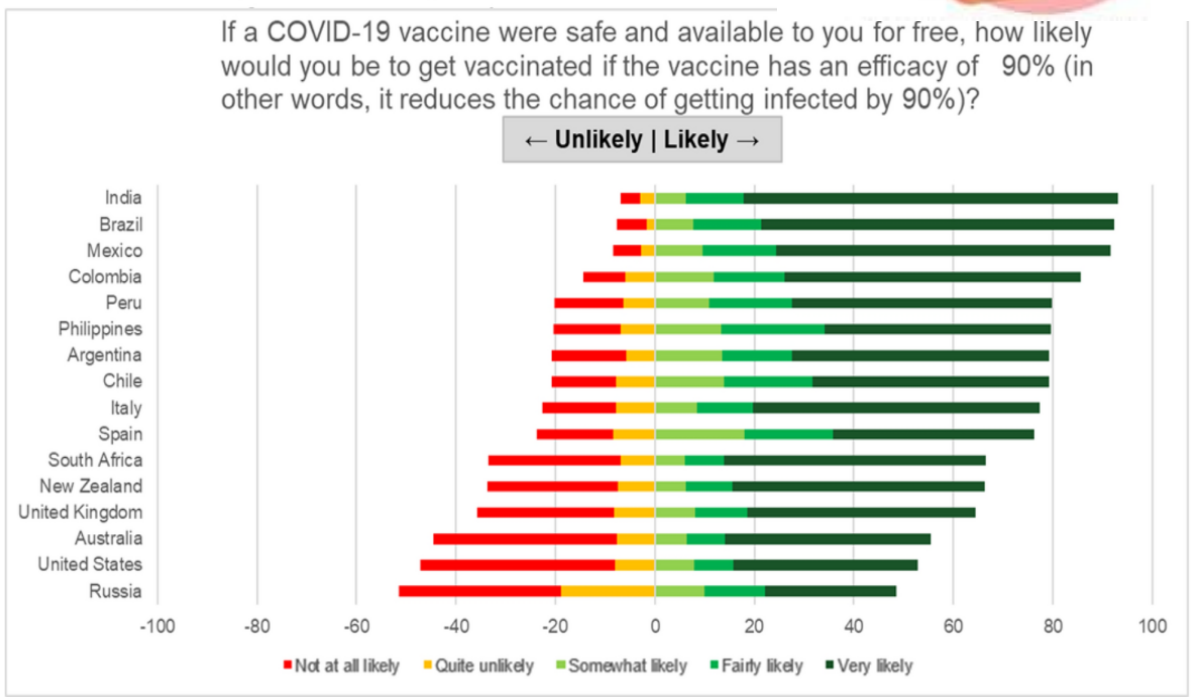
CTM slide

Tasas de aceptación de vacuna COVID-19 en mujeres embarazadas (n=5294) vs no-embarazadas (n=12.562) asumiendo VE 90%

(a) COVID-19 vaccine acceptance among pregnant women (n=5294) for themselves, assuming a vaccine efficacy of 90%



(b) COVID-19 vaccine acceptance among non-pregnant mothers (n=12 themselves, assuming a vaccine efficacy of 90%



Skjefte et al. *Eur J Epidemiol* 2021; 36, 197–211, https://doi.org/10.1007/s10654-021-00728-6

@cafettor

Cambio de paradigma: la inclusión presuntiva de mujeres gestantes en estudios de investigación en vacunas

Vaccine 39 (2021) 85–120

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Review

Pregnant women & vaccines against emerging epidemic threats: Ethics guidance for preparedness, research, and response ☆

Carleigh B. Krubiner [a,1,*], Ruth R. Faden [a,b], Ruth A. Karron [b], Margaret O. Little [c], Anne D. Lyerly [d], Jon S. Abramson [e], Richard H. Beigi [f], Alejandro R. Cravioto [g], Anna P. Durbin [b], Bruce G. Gellin [h], Swati B. Gupta [i], David C. Kaslow [j], Sonali Kochhar [k], Florencia Luna [l], Carla Saenz [m], Jeanne S. Sheffield [n], Paulina O. Tindana [o,2], The PREVENT Working Group

- Normalizes the position that **pregnant women are to be included in vaccine R&D and deployment**
- Pregnant women of legal standing to consent **have the ability to give voluntary and informed consent** and should be given the opportunity to enroll in trials (They are NOT a "vulnerable" population)
- **Exclusion of pregnant women** from clinical trials **should be justified**
- Vaccine studies that include **women of childbearing age** should have plans to systematically **collect data on pregnancies**

Krubiner et al. Vaccine 2021;39:85-120; https://doi.org/10.1016/j.vaccine.2019.01.011

Algunos pensamientos finales

- La vacunación materna es una estrategia de comprobada utilidad y es una intervención efectiva de salud pública para mejorar desenlaces materno-fetales.
- La vacunación en cada embarazo es necesaria para lograr altos niveles de concentraciones de anticuerpos y protección óptima para cada neonato.
- El momento óptimo de vacunación y otros factores que influyan en las respuestas materno-infantiles debe ser entendido para cada patógeno
- La protección a través de lactancia materna es un bonus adicional.
- Siempre se debe considerar el efecto de los Ac maternos en las respuestas inmunes infantiles
- La vacunación materna debe estar integrada con la vacunación infantil.
- La vigilancia de la seguridad materno-infantil y la evaluación de la eficacia son elementos críticos.
- La implementación incluye educación y creación de conciencia en el público y en el personal de la salud, recursos y soporte financiero, políticas y guías, liderazgo y estrategias de comunicación

Mil gracias

catorres@uniandes.edu.co, @cafettor, catorres1805