

CERPO

Centro de Referencia Perinatal Oriente
Facultad de Medicina, Universidad de Chile



Seminario n°136: Inmunizaciones en el embarazo

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MAPA DE LA RUTA:



INMUNIZACIONES EN EL EMBARAZO

- Objetivos de la vacunación
- Mecanismos de protección
- Vacunas indicadas a toda embarazada:
 - Influenza
 - DTP
- Vacunas según población de riesgo
 - Rabia
 - Neumococo
 - Meningococo
 - Hepatitis A y B
- Vacunas contraindicadas
- Esquemas de vacunación

Objetivos de la vacunación en la embarazada



- Cuando se propone vacunar a una embarazada o a una puérpera inmediata se está apuntando a uno o más de los siguientes objetivos:
 - Protección contra enfermedades especialmente graves en la embarazada.
 - Protección materna frente a exposiciones de riesgo.
 - Prevención de infecciones perinatales.
 - Prevención de enfermedades graves del recién nacido y lactante menor a través de anticuerpos maternos.

Mecanismos de protección



- Desarrollo de inmunidad humoral por inmunización activa.
 - Capacidad de respuesta a vacunas polisacáridas y conjugadas es equivalente a no gestantes
 - Antígenos proteicos estimulan IgG1 y 3, polisacáridos IgG2
- Inmunización pasiva frente a ciertos patógenos.
- Inmunización fetal vía IgG 1 y 3 (transplacentario)
 - Transporte activo: unión al receptor Fc gamma en endotelio vascular fetal
 - Tasa de transferencia aumenta desde las 13 semanas, siendo máxima las últimas 4 semanas del embarazo
 - Niveles de anticuerpos en feto alcanzan niveles maternos a la semana 33
- Inmunización del RN vía IgA (lactancia materna)

- Guía Perinatal. MINSAL. 2015

- Maternal Immunization. Helen Y, Janet A. Englund. s.l. : Birth defects research, 2017, Vol. 109.

- Maternal immunization: Optimizing protection for the mother and infant. Kachikis A, Englund JA,. s.l. : Journal of Infectology, 2016

Vacunas indicadas a toda embarazada

Influenza



- Mayor severidad del cuadro, mayor número de complicaciones cardiorrespiratoria, mayor riesgo de aborto, parto prematuro, bajo peso al nacer y óbito fetal.
- 20% de las embarazadas presenta síntomas flue-like, se logra confirmar en el 10% de los casos.
- Reducción del 36% de casos confirmados con la vacuna
- En pacientes VIH reducción del 57,7%
- En pandemia 70% de reducción

- Maternal benefits of immunization during pregnancy. Geeta K. Swamy, Richard H. Beigiba. 2015, Vaccine, págs. 6436-6440.

- Maternal Immunization. Helen Y, Janet A. Englund. s.l. : Birth defects research, 2017, Vol. 109.

- Safety of immunization during pregnancy: A review of the evidence of selected inactivated and live attenuated vaccines. Brigitte Keller-Stanislawskia, Janet A. Englundb. Vaccine, 2014.

Influenza



- 87% de los RN cuentan con niveles protectores de anticuerpos tras la vacunación de las madres.
- Este año MINSAL la incorpora a toda embarazada independiente de la edad gestacional durante el periodo de la campaña (se iniciará segunda quincena de marzo)
- Vacuna inactivada en temporada de influenza recomendada por CDC y ACOG.
- LAIV contraindicada en embarazo.

- Influenza immunization of pregnant women in resource-constrained countries: an update for funding and implementation decisions. Neuzil, Justin R. Ortiza and Kathleen M. 00, s.l. : Wolters Kluwer Health Inc, 2017, Vol. 30.

- Maternal Immunization. ACOG. 741, 2018.

Difteria-Tétanos-Pertussis



- La vacunación infantil junto a un refuerzo a los 10 años y el refuerzo ante exposición al tétanos y difteria ha mantenido cercana a la erradicación ambas enfermedades.
- Coqueluche: Población más afectada son los niños, contagio desde sus progenitores en el 47-60% de los casos. En adultos se presenta como rinofaringitis. Objetivo: inmunización pasiva.
- La vacunación ha logrado reducir la mortalidad neonatal por tétanos en un 90%.

Maternal benefits of immunization during pregnancy. Geeta K. Swamy, Richard H. Beigiba. 2015, Vaccine, págs. 6436-6440.

Difteria-Tétanos-Pertussis



- La inmunización materna entre las semanas 27 y 30 de gestación se asoció con un mayor nivel de toxoide pertussis en la sangre del cordón umbilical y hemaglutinina filamentosa IgG cuando se compara con inmunización posterior a las 31 semanas
- Boostrix y Adacel
- 2017: tasa de incidencia de coqueluche de entre 4,1-33,1 por 100.000 habitantes, con una tasa de letalidad del 0,02-0,09 por 100.000 habitantes
- Se recomienda una dosis en cada gestación de Tdap al inicio del periodo entre las 27-36 semanas.

- Vacunación con pertussis en el embarazo: una estrategia segura y efectiva para proteger al lactante menor. Rodolfo Villena, Pamela Vidal, Felipe Carrillo, Mónica Salinas. 3, s.l. : Revista Chilena de Pediatría, 2017, Vol. 88

Vacunas según población de riesgo

Neumococo



- Mayor incidencia de bajo peso de nacimiento, parto prematuro y SDR.
- Estrategia de vacunación similar a la de B. pertussis.
- Una revisión reciente de Cochrane encontró evidencia insuficiente a favor de que la vacuna reduzca la infección neumocócica por inmunización pasiva. No obstante, las guías de la CDC siguen recomendando la vacunación en los grupos de riesgo.
- 13 Valente/ 23 Valente
- Sin problemas de seguridad de 23 Valente en embarazadas
- La administración de la vacuna 23 valente brinda niveles de anticuerpos de protección al menos por un año tras el parto y niveles más altos en el recién nacido.

Neumococo



- Grupos de riesgo:

- Niños y adultos con morbilidades como insuficiencia cardiaca, enfermedad pulmonar obstructiva crónica, asma, diabetes.
- Tabaquismo
- Alcoholismo
- Enfermedad hepática crónica
- Implantes cocleares
- Inmunodeficiencias congénitas o adquiridas
- Enfermedades que requieran terapia inmunosupresora
- Enfermedad de células falciformes y otras hemoglobinopatías
- Asplenia funcional o anatómica.

Meningococo



- La enfermedad meningocócica presenta un 10-15% de mortalidad y un 20% de morbilidad severa en los sobrevivientes, a pesar de ser susceptible a antibióticos.
- Se reporta un traspaso placentario del 30-44%, logrando una reducción del 94% en la incidencia de meningitis.
- La tetravalente con polisacárido no demostró conllevar riesgo materno ni fetal y se demostró una respuesta adecuada de anticuerpos tras la utilización en el tercer trimestre del embarazo. No existen estudios suficientes para demostrar la seguridad de la vacuna conjugada, aunque en la teoría, al ser inactivada, no debería presentar complicaciones.

Meningococo



- Grupos de riesgo de infección:
- Personas bajo hacinamiento
- Alteraciones del complemento
- Asplenia funcional o anatómica
- Residentes de zonas endémicas
- Personas que trabajan manipulando la bacteria.

Pregnancy: Delay MenB until after pregnancy unless at increased risk and vaccination benefits outweigh potential risks

Hepatitis A y B



- Vacuna combinada VHA y VHB se puede usar en el embarazo. Es parte del PNI.
- Heplisav-B no se recomienda porque carece de seguridad documentada en el embarazo.
- Hepatitis B: Se puede indicar en grupos de riesgo: personas con más de una pareja sexual los últimos 6 meses, convivir o contacto sexual de un individuo infectado, o uso de drogas endovenosas
- De todas maneras a los RN de madres con VHB se les administra inmunoglobulina y se inicia vacunación anti VHB las primeras 12 hrs postparto.

Maternal benefits of immunization during pregnancy. Geeta K. Swamy, Richard H. Beigiba. 2015, Vaccine, págs. 6436-6440.

Haemophilus influenzae



- Está demostrada su utilidad con buena respuesta antigénica y con seguridad en el tercer trimestre.
- Al comparar la vacuna conjugada y la polisacárida, se observó mayores títulos de anticuerpos a los dos meses de vida tras la administración de la vacuna conjugada
- Se debe recomendar a personas sin antecedente de vacunación, en Chile incluida en PNI.

Antirrábica



- Vacuna segura durante el embarazo.
- Tanto la inmunización activa como la pasiva tiene indicación en el embarazo según el riesgo de la exposición, con seguridad demostrada en el embarazo.

5dosis
PROTÉGETE CONTRA LA RABIA

SI ES MORDIDO O ARAÑADO POR UN PERRO, GATO O MURCIÉLAGO DEBE:

- Lavar bien la herida con agua y abundante jabón
- Concurrir de inmediato a un centro asistencial
- Vacunarse con las 5 dosis antirrábicas indicadas. La vacunación es obligatoria y gratuita

- Días 0, 3, 7, 14 y 28, desde el día de administración de la primera dosis.
- Si previamente recibió esquema completo, requiere dos refuerzos a los días 0 y 3.

Chutivongse S, Wilde H, Benjavongkulchai M, Chomchey P, Punthawong S. Postexposure rabies vaccination during pregnancy: effect on 202 women and their infants. Clin Infect Dis 1995;20:818–20.

Varner MW, McGuinness GA, Galask RP. Rabies vaccination in pregnancy. Am J Obstet Gynecol 1982;143:717–8.

Vacunas contraindicadas en el embarazo

VPH



- **Pregnancy through age 26 years: HPV vaccination is not recommended until after pregnancy; no intervention needed if vaccinated while pregnant; pregnancy testing not needed before vaccination**

Recommended adult Immunization Schedule for ages 19 years or older. US 2020. US Department of Health and Human Services. Center for disease control and prevention.

Sarampión-Parotiditis-Rubéola



- La vacuna MMR (sarampión, parotiditis, rubéola) ha demostrado el traspaso de los virus inactivados al feto en casos de vacunación de embarazadas que desconocían su condición.
- No obstante, el caso teórico de un síndrome de rubeola congénita no ha sido observado.
- Asimismo, no hay suficiente información respecto a la seguridad de esta vacuna

Pregnancy with no evidence of immunity to rubella: MMR contraindicated during pregnancy; after pregnancy (before discharge from health care facility), 1 dose

Nonpregnant women of childbearing age with no evidence of immunity to rubella: 1 dose

Recommended adult Immunization Schedule for ages 19 years or older. US 2020. US Department of Health and Human Services. Center for disease control and prevention.

Varicela



- **Pregnancy with no evidence of immunity to varicella:** VAR contraindicated during pregnancy; after pregnancy (before discharge from health care facility) 1 dose if previously received 1 dose varicella-containing vaccine or dose 1 of 2-dose series (dose 2: 4–8 weeks later) if previously did not receive any varicella-containing vaccine, regardless of whether U.S.-born before 1980

Pregnancy: ZVL contraindicated; consider delaying RZV until after pregnancy if RZV is otherwise indicated

Fiebre amarilla



- La vacuna contra la fiebre amarilla no se recomienda a las embarazadas, salvo que tengan que viajar inevitablemente a una zona endémica como el África subsahariana o zonas tropicales de Sudamérica.
- Se observó un mayor número de casos de síndrome de Down y dismorfismos menores como nevos en hijos de embarazadas con su condición desconocida al momento de ser vacunadas.

Polio oral



- La vacuna contra polio oral, al observarse viremia tras la administración y algunos casos con malformaciones del tubo neural está contraindicada en el embarazo.
- Aunque los estudios actuales no logran asociar estas malformaciones a la vacunación, se desaconseja su uso.

Recommended adult Immunization Schedule for ages 19 years or older. US 2020. US Department of Health and Human Services. Center for disease control and prevention.

Vacunas en fase de prueba



- Streptococo agalactiae
- VRS

Calendario de Vacunación 2020



VACUNACIÓN DEL LACTANTE		
EDAD	VACUNA	PROTEGE CONTRA
Recién Nacido	BCG	Enfermedades invasoras por <i>M. tuberculosis</i>
	Hepatitis B	Hepatitis B
2, 4 y 6* meses	Hexavalente	Hepatitis B, Difteria, Tétanos, Tos Convulsiva Enfermedades invasoras por <i>H. influenzae</i> tipo b (Hib) Poliomielitis
	Neumocócica conjugada * Sólo prematuros	Enfermedades invasoras por <i>S. pneumoniae</i>
12 meses	Tres vírica	Sarampión, Rubéola y Parotiditis
	Meningocócica conjugada	Enfermedades invasoras por <i>N. meningitidis</i>
	Neumocócica conjugada	Enfermedades invasoras por <i>S. pneumoniae</i>
18 meses	Hexavalente	Hepatitis B, Difteria, Tétanos, Tos Convulsiva Enfermedades invasoras por <i>H. influenzae</i> tipo b (Hib) Poliomielitis
	Hepatitis A	Hepatitis A
	Varicela	Varicela
	Fiebre Amarilla**	Fiebre Amarilla

VACUNACIÓN ESCOLAR		
1° Básico	Tres vírica	Sarampión, Rubéola y Parotiditis
	dT _p (acelular)	Difteria, Tétanos, Tos Convulsiva
4° Básico	VPH - 1ª dosis	Infecciones por Virus Papiloma Humano
5° Básico	VPH - 2ª dosis	Infecciones por Virus Papiloma Humano
8° Básico	dT _p (acelular)	Difteria, Tétanos, Tos Convulsiva

VACUNACIÓN DEL ADULTO		
Embarazadas desde las 28 semanas de gestación	dT _p (acelular)	Difteria, Tétanos, Tos Convulsiva
Personas mayores de 65 años y más	Neumocócica polisacárida	Enfermedades invasoras por <i>S. pneumoniae</i>

** Esta vacuna se administra exclusivamente en Isla de Pascua

vacunas.minsal.cl



Table 2 Recommended Adult Immunization Schedule by Medical Condition and Other Indications, United States, 2020



Vaccine	Pregnancy	Immuno-compromised (excluding HIV infection)	HIV Infection CD4 count		Asplenia, complement deficiencies	End-stage renal disease; or on hemodialysis	Heart or lung disease, alcoholism ¹	Chronic liver disease	Diabetes	Health care personnel ²	Men who have sex with men
			<200	≥200							
IIV or RIV or LAIV	1 dose annually										
Tdap or Td	1 dose Tdap each pregnancy	1 dose Tdap, then									
MMR	NOT RECOMMENDED										
VAR	NOT RECOMMENDED										
RZV (preferred) or ZVL	DELAY										
HPV	DELAY	3 doses through age 26 years									
PCV13											
PPSV23											
HepA											
HepB											
MenACWY	1 or 2 doses depending on indication, see notes for										
MenB	PRECAUTION	2 or 3 doses depending on vaccine									
Hib		3 doses HSCT ³ recipients only									1 dose

Vaccines	Abbreviations	Trade names
<i>Haemophilus influenzae</i> type b vaccine	Hib	ActHIB* Hiberix* PedvaxHIB*
Hepatitis A vaccine	HepA	Havrix* Vaqta*
Hepatitis A and hepatitis B vaccine	HepA-HepB	Twinrix*
Hepatitis B vaccine	HepB	Engerix-B* Recombivax HB* Hepilisav-B*
Human papillomavirus vaccine	HPV vaccine	Gardasil 9*
Influenza vaccine (inactivated)	IIV	Many brands
Influenza vaccine (live, attenuated)	LAIV	FluMist* Quadrivalent
Influenza vaccine (recombinant)	RIV	Flublok* Quadrivalent
Measles, mumps, and rubella vaccine	MMR	M-M-R* II
Meningococcal serogroups A, C, W, Y vaccine	MenACWY	Menactra* Menveo*
Meningococcal serogroup B vaccine	MenB-4C MenB-FHbp	Bexsero* Trumenba*
Pneumococcal 13-valent conjugate vaccine	PCV13	Prenvax 13*
Pneumococcal 23-valent polysaccharide vaccine	PPSV23	Pneumovax* 23
Tetanus and diphtheria toxoids	Td	Tenivac* Tdvax™
Tetanus and diphtheria toxoids and acellular pertussis vaccine	Tdap	Adacel* Boostrix*
Varicella vaccine	VAR	Varivax*
Zoster vaccine, recombinant	RZV	Shingrix
Zoster vaccine live	ZVL	Zostavax*

*Administer recommended vaccines if vaccination history is incomplete or unknown. Do not restart or add doses to vaccine series if there are extended intervals between doses. The use of trade names is for identification purposes only and does not imply endorsement by the ACIP or CDC.

 Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection
 Recommended vaccination for adults with an additional risk factor or another indication
 Precaution—vaccination might be indicated if benefit of protection outweighs risk of adverse reaction
 Delay vaccination until after pregnancy if vaccine is indicated
 Not recommended/contraindicated—vaccine should not be administered
 No recommendation/Not applicable

1. Precaution for LAIV does not apply to alcoholism. 2. See notes for influenza; hepatitis B; measles, mumps, and rubella; and varicella vaccinations. 3. Hematopoietic stem cell transplant.

Recommended adult Immunization Schedule for ages 19 years or older. US 2020. US Department of Health and Human Services. Center for disease control and prevention.

Vaccinations for Pregnant Women

The table below shows which vaccinations you may or may not need during your pregnancy.

Vaccine	Do you need it during your pregnancy?
Influenza	Yes! You need a flu shot every fall (or even as late as winter or spring) for your protection and for the protection of your baby and others around you. It's safe to get the vaccine at any time during your pregnancy.
Tetanus, diphtheria, whooping cough (pertussis) Tdap, Td	Yes! Women who are pregnant need a dose of Tdap vaccine (the adult whooping cough vaccine) during each pregnancy, preferably in the early part of the third trimester. It's safe to be given during pregnancy and will help protect your baby from whooping cough in the first few months after birth when he or she is most vulnerable. After Tdap, you need a Td booster dose every 10 years. Consult your healthcare provider if you haven't had at least 3 tetanus and diphtheria toxoid-containing shots some-time in your life or if you have a deep or dirty wound.
Human papillomavirus HPV	No. This vaccine is not recommended to be given during pregnancy, but if you inadvertently receive it, this is not a cause for concern. HPV vaccine is recommended for all people age 26 or younger, so if you are in this age group, make sure you are vaccinated before or after your pregnancy. People age 27 through 45 may also be vaccinated against HPV after discussion with their healthcare provider. The vaccine is given in 2 or 3 doses (depending on the age at which the first dose is given) over a 6-month period.
Measles, mumps, rubella MMR	No. MMR vaccine is not recommended to be given during pregnancy, but if you somehow do receive it, this is not a cause for concern. At least 1 dose of MMR is recommended for you if you were born in 1957 or later. (And you may need a second dose.*) During your prenatal care, your healthcare provider will test your blood to assess your need for MMR following your delivery. It's best for you (and any future baby) to receive the protection vaccination provides before trying to become pregnant.
Varicella (Chickenpox) Var	No. Varicella vaccine is not recommended to be given during pregnancy, but if you inadvertently receive it, this is not a cause for concern. If you've never had chickenpox, never were vaccinated, or were vaccinated but received only 1 dose, it's best for you (and any future baby) to be protected with the vaccine before trying to become pregnant, or after you've completed your pregnancy. The vaccine is given in 2 doses 4–8 weeks apart.
Zoster	No. If you are age 50 or older, you are recommended to get the 2-dose series of the Shingrix brand of shingles vaccine. But



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Zoster (shingles)	No. If you are age 50 or older, you are recommended to get the 2-dose series of the Shingrix brand of shingles vaccine. But, since the safety of Shingrix vaccine during pregnancy is unknown, wait until after your pregnancy to get Shingrix.
Hepatitis A HepA	Maybe. You need this vaccine if you have a specific risk factor for hepatitis A,* for example, chronic liver disease, or live with someone who has hepatitis A infection. The vaccine is usually given in 2 doses, 6–12 months apart. If you need to get or continue the HepA vaccine series, it's safe to do so during pregnancy.
Hepatitis B HepB	Maybe. You need this vaccine if you have a specific risk factor for hepatitis B,* for example, if you are a healthcare worker. The vaccine is given in 3 doses and all brands are recommended for use in pregnant women, except Heplisav-B. If you need to start or continue the HepB vaccine series, it's safe to do so during pregnancy. It's important, too, that your newborn baby gets started on his or her HepB vaccination series within 24 hours of birth.
Hib (<i>Haemophilus influenzae</i> type b)	Maybe. Some adults with certain high-risk conditions,* for example, lack of a functioning spleen, need vaccination with Hib. If you need to get Hib vaccine, it's safe to receive it at any time during your pregnancy.
Meningococcal ACWY MenACWY	Maybe. You need MenACWY if you are a first-year college student living in a residence facility and you either have never been vaccinated or were vaccinated before age 16. You may need MenACWY vaccine if you have one of several health conditions,* for example, if you don't have a functioning spleen. During pregnancy, if you need MenACWY, it is safe to receive it.
Meningococcal B MenB	Maybe. You should consider MenB vaccine if you are age 23 or younger (even if you don't have a high-risk medical condition). You need MenB if you have one of several health conditions,* for example, if you do not have a functioning spleen. Because no studies have been conducted on MenB vaccine in pregnant women, your healthcare provider will need to determine if the benefits of vaccination are considered to outweigh the potential risks.
Pneumococcal Pneumovax, PPSV; Prevnar, PCV	Maybe. You need 1 or both of these vaccines if you have a certain risk factor* for pneumococcal disease, for example, diabetes (but not gestational diabetes). If you're unsure of your risk, talk to your healthcare provider to find out if you need either of these vaccines. If you are a candidate for either pneumococcal vaccine, it's safe to get them during pregnancy.

* Consult your healthcare provider to determine your level of risk for infection and your need for this vaccine.

Are you planning to travel outside the United States? Visit the Centers for Disease Control and Prevention's (CDC) website at wwwnc.cdc.gov/travel/destinations/list for travel information, or consult a travel clinic.



Saint Paul, Minnesota 55104 • 651-647-9009
www.immunize.org • www.vaccineinformation.org
www.immunize.org/catg.d/p4040.pdf • Item #P4040 (8/19)



**The American College of
Obstetricians and Gynecologists**
 WOMEN'S HEALTH CARE PHYSICIANS

TABLE 1. SUMMARY OF VACCINES REVIEWED AND LEVEL OF EVIDENCE CONCERNING VACCINE SAFETY

Vaccine	Increased risk or severity of disease in pregnant women	Risk of disease to fetus or young infant	WHO recommendation on vaccination during pregnancy	Vaccine safety concerns	Level of evidence on vaccine safety
<i>Inactivated vaccines</i>					
Seasonal TIV or H1N1 2009–2010 monovalent, non-adjuvanted vaccines	More severe disease especially in second and third trimester and increased risk of death in a pandemic	Possible increased spontaneous abortion rate and increased preterm delivery. No malformations confirmed.	Yes	No safety concern identified	++++
Oil-in-water adjuvanted, monovalent H1N1 vaccines			Yes	No safety concern identified	+++
Tetanus toxoid vaccines	Incidence depends on region; unaltered by pregnancy	Neonatal tetanus mortality 60%	Yes	No safety concern identified	++
Meningococcal polysaccharide vaccines	Incidence not altered by pregnancy	Unknown for fetus; infants may develop significant morbidity and mortality.	No	No safety concern identified	++
Meningococcal conjugate vaccines			As part of mass campaigns.	No safety concern identified	+
<i>Live attenuated vaccines</i>					
Rubella vaccine	Incidence not altered by pregnancy	Abortion and congenital rubella syndrome (CRS)	No	No CRS identified in children born to inadvertently vaccinated susceptible pregnant women	+++
Measles vaccines	More severe disease; low mortality	Possible higher abortion rate, infrequently congenital measles and if premature possible high case fatality rate	No	No safety concern identified	Indirect data from combined MR vaccines
Mumps vaccine	Incidence not altered by pregnancy	Probable increased rate of abortion in the first trimester	No	No safety concern identified	Indirect data from combined MMR vaccines
Oral poliovirus vaccine	Increased risk of paralytic disease	Anoxic fetal damage reported; 50% mortality in neonatal disease	No	No safety concern identified	+++
Yellow fever	Incidence not altered by pregnancy	Unknown	During epidemics and when travel to endemic areas cannot be avoided	No safety concern identified	+++

++++ Substantial evidence from RCTs, large observational studies or registries with pregnancy follow-up and passive surveillance.

+++ Evidence from observational studies or registries with pregnancy follow-up and passive surveillance.

++ Some evidence from studies with lower power, lack of information on some relevant pregnancy outcomes, short follow-up of offspring or other limitations of study design and passive surveillance.

+ Passive surveillance data.

- No data.

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