

# Updated Vaccination Guidelines for Horses in North America

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**VETERINARY MEDICINE**

*Veterinary Medical Teaching Hospital*

**TABLE 1: Guidelines for Vaccination of Adult Horses Against Core and Non-Core Diseases (W.D. Wilson 4/2011)**

Disease/Vaccine*†	Adult Horses (>1 Year of Age) Previously Vaccinated Against the Disease Indicated	Adult Horses (>1 Year of Age) Not Previously Vaccinated Against the Disease Indicated or Lacking a Vaccination History	Comments
<b>CORE DISEASES</b>			
<b>Tetanus (toxoid)</b>	Annual	2-dose series: Second dose 4 to 6 weeks after the first dose	Booster at time of penetrating injury or surgery if last dose was administered more than 6 months previously
<b>Eastern and Western equine encephalomyelitis (EEE, WEE)</b>	Annual in spring, prior to onset of vector season	2-dose series: Second dose 4 weeks after the first dose; revaccinate prior to onset of the next vector season.	Consider 6-month revaccination interval for: Horses residing in endemic areas with a prolonged vector season. Immunocompromised horses.
<b>West Nile virus (WNV)</b>	Annual in spring, prior to onset of vector season	<b>Inactivated vaccine:</b> 2-dose series: Second dose: 4 to 6 weeks after the first dose; revaccinate prior to onset of the next vector season <b>Recombinant canarypox-vectored vaccine:</b> 2-dose series: Second dose: 4 to 6 weeks after the first dose; revaccinate prior to onset of the next vector season <b>Flavivirus chimera vaccine:</b> One dose; revaccinate prior to onset of the next vector season.	When using the inactivated or the recombinant product, consider a 6-month revaccination interval for: Horses residing in endemic areas with a prolonged vector season. Juvenile horses (<5 years of age) Geriatric horses (>15 years of age) Immunocompromised horses For naïve horses being imported into an endemic area during the vector season, the preferred approach is to complete the primary vaccination series prior to importation. If this approach is not feasible, protect them from being bitten by mosquitoes if possible, and vaccinate them with one of the vaccines (Flavivirus chimera or canarypox-vectored) that have the most rapid onset of immunity .
<b>Rabies</b>	Annual	One dose; annual revaccination	Because booster vaccination induces persistently elevated levels of antirabies antibody, this vaccine may be given postfoaling, but prior to breeding, in order to reduce the number of vaccines given to mares prepartum

**TABLE 1: (Continued) Adult Horse Recommendations (Page 2 of 3)**

<b>NON-CORE (RISK-BASED) VACCINES</b>			
<b>Anthrax</b>	Annual	2-dose series: Second dose 3 to 4 weeks after the first dose; annual revaccination.	Use only in endemic areas or in the face of an outbreak. Antimicrobial drugs must <b>not</b> be given concurrent with this vaccine. Administer subcutaneously in the neck. Use caution during storage, handling and administration. Consult a physician immediately if human exposure to anthrax vaccine occurs by accidental injection, ingestion, or otherwise through the conjunctiva or broken skin.
<b>Botulism</b>	Annual	3-dose series: Second dose 4 weeks after the first dose Third dose 4 weeks after the second dose	
<b>Equine herpesvirus (EHV)</b>	Annual (see comments)	3-dose series: Second dose: 4 to 6 weeks after the first dose Third dose: 4 to 6 weeks after the second dose	Consider 6-month revaccination interval for: Horses <5 years of age Horses on breeding farms in contact with pregnant mares Performance or show horses at high risk
<b>Equine influenza</b>	Semiannual for horses with ongoing risk of exposure Annual for horses at low risk for exposure	<b>Modified live intranasal vaccine:</b> One dose administered IN. Revaccinate semiannually to annually. <b>Inactivated vaccines:</b> 3-dose series: Second dose: 4 to 6 weeks after the first dose Third dose: 3 to 6 months after the second dose Revaccinate semiannually to annually. <b>Canarypox-vectored recombinant:</b> 2-dose series: Second dose 4 to 6 weeks after the first dose. Revaccinate semiannually.	The MLV intranasal vaccine can be used to protect pregnant mares against influenza, but its use for the prepartum booster is not recommended because it does not reliably stimulate high levels of circulating antibody
<b>Equine viral arteritis (EVA)</b>	Annual <i>Stallions and teasers:</i> Vaccinate 3-4 weeks before the start of the breeding season <i>Mares:</i> Vaccinate when open	Single dose (see comments)	Prior to initial vaccination, intact males and any horses potentially intended for export should undergo serologic testing and be confirmed negative for antibodies to EAV. Samples for testing should be collected shortly prior to, or preferably at, the time of vaccination.

**TABLE 1: (Continued) Adult Horse Recommendations (Page 3 of 3)**

<b>Potomac horse fever (PHF)</b>	Semiannual to annual	2-dose series: Second dose: 3 to 4 weeks after the first dose Revaccinate semi-annually to annually.	A revaccination interval of 3 to 4 months may be considered in endemic areas when disease risk is high; however, strategic revaccination to maximize immunity prior to expected peak challenge in the summer and fall is the preferred approach
<b>Rotavirus</b>	NA	NA	Check serum concentrations of immunoglobulins in the foal to verify adequate passive transfer
<b>Strangles</b>	Semiannual to annual	<b>Inactivated M-protein subunit vaccines:</b> 2 to 3-dose series: Second dose 2 to 4 weeks after the first dose Third dose (when recommended by manufacturer) 2 to 4 weeks after the second dose Revaccinate semiannually. <b>Modified live intranasal vaccine:</b> 2-dose series administered IN: Second dose 3 to 4 weeks after the first dose Revaccinate semiannually to annually.	Vaccination is not recommended as a strategy in outbreak mitigation

Modified, with permission, from recommendations developed by the AAEP Infectious Disease Committee and posted on the AAEP website (aaep.org) in January 2008.

\*Core vaccines protect against diseases that are endemic to a region, are virulent or highly contagious, pose a risk of severe or fatal disease, have potential public health significance, and/or are required by law. Core vaccines have clearly demonstrable efficacy, and have a sufficiently high level of patient benefit and low level of risk to justify their use in all equids in North America.

†Non-Core (risk-based) vaccines are selected for use based on assessment of risk performed by, or in consultation with, a licensed veterinarian. Use of non-core vaccines will vary between individuals, populations, and/or geographic regions.

**TABLE 2: Guidelines for Vaccination of Broodmares Against Core and Non-Core Diseases (W. D. Wilson 4/2011)**

Disease/Vaccine*†	Previously Vaccinated Broodmares	Broodmares Not Previously Vaccinated or Lacking a Vaccination History	Comments
<b>CORE DISEASES</b>			
<b>Tetanus (toxoid)</b>	Annual, 4 to 6 weeks prepartum	2-dose series: Second dose 4 to 6 weeks after the first dose Revaccinate 4 to 6 weeks prepartum, depending on timing of second dose	Booster at time of penetrating injury or surgery if last dose was administered more than 6 months previously
<b>Eastern and Western equine encephalomyelitis (EEE, WEE)</b>	Annual, 4 to 6 weeks prepartum	2-dose series: Second dose 4 weeks after the first dose Revaccinate 4 to 6 weeks prepartum, depending on timing of second dose	Consider 6-month revaccination interval for mares residing in endemic areas with a prolonged vector season.
<b>West Nile virus (WNV)</b>	Annual, 4 to 6 weeks prepartum	It is preferable to vaccinate naïve mares when open. When risk is high, initiate primary series as follows: <b>Inactivated or recombinant canarypox-vectored vaccine:</b> 2-dose series: Second dose: 4 to 6 weeks after the first dose Revaccinate 4 to 6 weeks pre-partum, depending on timing of second dose <b>Flavivirus chimera vaccine:</b> One dose Revaccinate 4 to 6 weeks pre-partum, depending on timing of first dose	When using the inactivated or the recombinant product, consider a 6-month revaccination interval for mares residing in endemic areas with a prolonged vector season.  For naïve mares being imported into an endemic area during the vector season, the preferred approach is to complete the primary vaccination series prior to importation. If this approach is not feasible, protect them from being bitten by mosquitoes if possible, and vaccinate them with one of the vaccines (Flavivirus chimera or canarypox-vectored) that have the most rapid onset of immunity.
<b>Rabies</b>	Annual, prior to breeding OR 4 to 6 weeks prepartum	One dose; annual revaccination prior to breeding OR 4 to 6 weeks prepartum	Because booster vaccination induces persistently elevated levels of antirabies antibody; therefore this vaccine may be given postfoaling, but prior to breeding, in order to reduce the number of vaccines given to mares prepartum
<b>Equine herpesvirus (EHV)</b>	3-dose series with product labeled for prevention against EHV abortion. Administer during the fifth, seventh, and ninth months of gestation.	3-dose series with product labeled for prevention against EHV abortion. Administer during the fifth, seventh, and ninth months of gestation.	

**TABLE 2: (Continued) Broodmare Recommendations (Page 2 of 3)**

<b>NON-CORE (RISK-BASED) VACCINES</b>			
<b>Anthrax</b>	Not recommended for use during gestation.	Not recommended for use during gestation.	
<b>Botulism</b>	Annual, 4 to 6 weeks prepartum	3-dose series: First dose during eighth month of gestation Second dose 4 weeks after the first dose Third dose 4 weeks after the second dose	
<b>Equine influenza</b>	<b>Inactivated vaccines:</b> Semiannual with one dose administered 4 to 6 weeks prepartum  <b>Canarypox-vectored vaccine:</b> Semiannual with one dose administered 4 to 6 weeks prepartum	<b>Inactivated vaccine:</b> 3-dose series: Second dose 4 to 6 weeks after the first dose Third dose 4 to 6 weeks prepartum  <b>Canarypox-vectored vaccine:</b> 2-dose series: Second dose 4 to 6 weeks after first dose but no later than 4 weeks prepartum	The MLV intranasal influenza vaccine can be used to protect pregnant mares against influenza, but its use for the prepartum booster is not recommended because it does not reliably stimulate high levels of circulating antibody
<b>Equine viral arteritis (EVA)</b>	Not recommended unless risk of exposure is high	Not recommended unless risk of exposure is high	Mares potentially intended for export should undergo serologic testing immediately prior to initial vaccination and be confirmed negative for antibodies to EAV.
<b>Potomac horse fever (PHF)</b>	Semiannual with one dose administered 4 to 6 weeks prepartum	2-dose series: First dose 8 to 10 weeks prepartum Second dose 4 to 6 weeks prepartum	Strategic environmental control measures are important for effective control
<b>Rotavirus</b>	3-dose series: First dose at 8 months gestation Second dose 4 weeks after the first dose Third dose 4 weeks after the second dose	3-dose series: First dose at 8 months gestation Second dose 4 weeks after the first dose Third dose 4 weeks after the second dose	Check serum concentration of immunoglobulins in the foal to verify adequate passive transfer

**TABLE 2: (Continued) Broodmare Recommendations (Page 3 of 3)**

<b>Strangles</b>	<b>Inactivated M-protein subunit vaccines:</b> Semiannual with one dose given 4 to 6 weeks prepartum	<b>Inactivated M-protein subunit vaccines:</b> <b>3-dose series:</b> Second dose 2 to 4 weeks after the first dose Third dose 4 to 6 weeks prepartum	The MLV intranasal strangles vaccine can be used to protect pregnant mares, but its use for the prepartum booster is not recommended because it does not reliably stimulate high levels of circulating antibody
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†Non-Core (risk-based) vaccines are selected for use based on assessment of risk performed by, or in consultation with, a licensed veterinarian. Use of non-core vaccines will vary between individuals, populations, and/or geographic regions.

**TABLE 3: Guidelines for Vaccination of Foals, Weanlings and Yearlings Against Core\* and Non-Core\*\* Diseases (W.D. Wilson 4/2011)**

Disease/Vaccine	Foals And Weanlings (<12 Months of Age) of Mares Vaccinated in the Prepartum Period Against the Disease Indicated	Foals And Weanlings (<12 Months of Age) of Mares not Vaccinated in the Prepartum Period	Yearlings	Comments
<b>CORE DISEASES*</b>				
<b>Tetanus (toxoid)</b>	3-dose primary series: First dose at 4-6 months of age Second dose 4-6 weeks after the first dose Third dose at 3-5 months after the second dose (i.e.10-12 months of age)	3-dose primary series: First dose at 1-4 months of age Second dose 4-6 weeks after the first dose Third dose 3-5 months after the second dose	Annual	
<b>Eastern and Western equine encephalomyelitis (EEE, WEE)</b>	3-dose primary series: First dose at 4-6 months of age Second dose 4-6 weeks after the first dose Third dose at 10-12 months of age, prior to onset of next vector season. Foals in the Southeastern USA: The primary vaccination series should be initiated with an additional dose at 3 months of age due to early seasonal vector presence.	3-dose primary series: First dose at 3-4 months of age Second dose 4-6 weeks after the first dose Third dose 3-5 months after the second dose, prior to onset of next vector season. Foals in the Southeastern USA: The primary vaccination series should be initiated at 3 months of age or earlier due to early seasonal vector presence.	Annual in spring, prior to onset of vector season	Month of birth and geographic location influence the risk of exposure to insect vectors at specific foal ages; therefore, scheduling of the primary immunization series may be amended by administration of EEE/WEE vaccines to foals at an earlier age if vectors are present.
<b>West Nile virus (WNV)</b>	<b>Inactivated vaccine:</b> 3-dose primary series: First dose at 4-6 months of age Second dose 4-6 weeks after the first dose Third dose at 10-12 months of age, prior to the onset of the next vector season  <b>Recombinant canarypox-vectored vaccine:</b> 3-dose primary series: First dose at 4-6 months of age Second dose 4 –6 weeks after the first dose Third dose at 10-12 months of age, prior to the onset of the next vector season	<b>Inactivated vaccine:</b> 3-dose primary series: First dose at 3-4 months of age Second dose 4-6weeks after the first dose Third dose at 10-12 months of age, prior to the onset of the next vector season  <b>Recombinant canarypox-vectored vaccine:</b> 3-dose primary series: First dose at 3-4 months of age Second dose 4-6 weeks after the first dose Third dose at 10-12 months of age, prior to the onset of the next vector season	Annual in spring, prior to onset of vector season	Month of birth and geographic location influence the risk of exposure to insect vectors at specific foal ages; therefore, scheduling of the primary immunization series may be amended by administration of WNV vaccines to foals at an earlier age if vectors are present.

**TABLE 3: (Continued) Foal, Weanling & Yearling Recommendations (Page 2 of 4)**

<p><b>West Nile virus (WNV) (continued)</b></p>	<p><b>Flavivirus chimera vaccine:</b> 2-dose primary series: First dose at 5-6 months of age Second dose at 10-12 months of age, prior to the onset of the next vector season Foals in the Southeastern USA: The primary vaccination series should be initiated at 3 months of age due to early seasonal vector presence.</p>	<p><b>Flavivirus chimera vaccine:</b> 2-dose primary series: First dose at 5-6 months of age Second dose at 10-12 months of age prior to the onset of the next vector season. Foals in the Southeastern USA: The primary vaccination series should be initiated at 3 months of age due to early seasonal vector presence.</p>		<p>There is no published data regarding use of the Flavivirus chimera product in foals &lt;5 months of age. If administered to foals &lt;5 months of age, the recommended schedule for primary vaccination should be completed by administration of a dose of vaccine at 5 months of age or older.</p>
<p><b>Rabies</b></p>	<p>2-dose primary series: First dose at 6 months of age Second dose 4-6 weeks after the first dose Next dose at 10-12 months of age</p>	<p>1 or 2-dose primary series: First dose at 3-4 months of age Second dose 4-6 weeks after the first dose (not necessary if dam is seronegative) Next dose at 10-12 months of age</p>	<p>Annual</p>	<p>For foals of mares with an unknown vaccination history, either follow the approach outlined for foals of vaccinated mares, or determine the serostatus of the foal (or mare) and use the results to classify the foal as either being from a vaccinated or unvaccinated mare.</p>
<p><b>NON-CORE (RISK-BASED) VACCINES**</b></p>				
<p><b>Anthrax</b></p>	<p>Not applicable because vaccination of pregnant mares is not recommended.</p>	<p>No age-specific guidelines are available for this vaccine. Manufacturer's recommendation is for primary series of 2 doses administered subcutaneously (in the neck) at a 2-3 week interval.</p>	<p>Annual, spring</p>	<p>Anthrax vaccination is rarely indicated – only in focal endemic areas.  Antimicrobial drugs must not be given concurrently with this vaccine.  Exercise caution during storage, handling and administration of this live bacterial product. Consult a physician immediately should accidental human exposure (via mucous membranes, conjunctiva or broken skin) occur.</p>
<p><b>Botulism (type B toxoid)</b></p>	<p>3-dose primary series: First dose as early as 2-3 months of age Second dose 4 weeks after the first dose Third dose 4 weeks after the second dose</p>	<p>3-dose primary series: First dose as early as 1-3 months of age Second dose 4 weeks after the first dose Third dose 4 weeks after the second dose</p>	<p>Annual</p>	<p>Limited information suggests that maternal antibody does not interfere with vaccination; therefore, foals at high risk may be vaccinated as early as 2 weeks of age.</p>

**TABLE 3: (Continued) Foal, Weanling & Yearling Recommendations (Page 3 of 4)**

<p><b>Equine herpesvirus (EHV)</b></p>	<p><b>Inactivated EHV-1, EHV-1/4, or modified live EHV-1 vaccine:</b>          3-dose primary series:          First dose at 4-6 months of age          Second dose 4-6 weeks after the first dose          Third dose 3-4 months after the second dose          Revaccinate at 6-month intervals</p>	<p><b>Inactivated EHV-1, EHV-1/4, or modified live EHV-1 vaccine:</b>          3-dose primary series:          First dose at 4-6 months of age          Second dose 4-6 weeks after first dose          Third dose 3-4 months after the second dose          Revaccinate at 6-month intervals</p>	<p>Semi-annual (6-month interval)</p>	
<p><b>Equine influenza</b></p>	<p><b>Inactivated vaccine:</b>          3-dose primary series:          First dose at 6 months of age          Second dose 3-4 weeks after the first dose          Third dose at 10-12 months of age          Revaccinate at 6-month intervals</p> <p><b>Modified live intranasal vaccine:</b>          2-dose primary series administered intranasally:          First dose at 6-7 months of age          Second dose at 11-12 months of age          Revaccinate at 6-month intervals</p> <p><b>Canarypox-vectored recombinant vaccine:</b>          3-dose primary series:          First dose at 5 months of age          Second dose 5 weeks after the first dose          Third dose at 10-12 months of age          Revaccinate at 12-month intervals</p>	<p><b>Inactivated vaccine:</b>          3-dose primary series:          First dose at 6 months of age          Second dose 3-4 weeks after the first dose          Third dose at 10-12 months of age          Revaccinate at 6-month intervals</p> <p><b>Modified live intranasal vaccine:</b>          2-dose primary series administered intranasally:          First dose at 6-7 months of age          Second dose at 11-12 months of age          Revaccinate at 6-month intervals</p> <p><b>Canarypox-vectored recombinant vaccine:</b>          3-dose primary series:          First dose at 5 months of age          Second dose 5 weeks after the first dose          Third dose at 10-12 months of age          Revaccinate at 12-month intervals</p>	<p>Semi-annual (6-month interval)</p>	<p>An increased risk of disease may warrant vaccination of younger foals. Because potentially interfering maternal anti-influenza antibody is likely to be present, a complete primary vaccination series should be given after 6 months of age.</p> <p>The modified live intranasal vaccine is licensed for administration to horses 11 months of age or older with a label recommendation of 1 dose for primary immunization. If the vaccine is given before 11 months of age, a second dose should be administered at 11 months or older.</p>

**TABLE 3: (Continued) Foal, Weanling & Yearling Recommendations (Page 4 of 4)**

<b>Equine viral arteritis (EVA)</b>	<i>Colt (male) foals:</i> Single dose at 6-12 months of age (see comments)	<i>Colt (male) foals:</i> Single dose at 6-12 months of age (see comments)	Annual for colts intended for use as breeding stallions	<i>Prior to initial vaccination, colt (male) foals should undergo serologic testing and be confirmed negative for antibodies to EAV. Testing should be performed shortly prior to, or preferably at, the time of vaccination. Maternally-derived anti-EAV colostrum antibodies can persist in the foal for up to 6 months; therefore, testing and vaccination should not be performed prior to 6 months of age.</i>
<b>Potomac horse fever (PHF)</b>	3-dose primary series: First dose at 5-6 months of age Second dose 3-4 weeks after the first dose Third dose at 10-12 months of age	3-dose primary series: First dose at 5-6 months of age Second dose 3-4 weeks after the first dose Third dose at 10-12 months of age	Semi-annual to annual	If risk warrants, vaccine may be administered to younger foals, in which case subsequent doses should be administered at 4-week intervals until 6 months of age.
<b>Rotavirus</b>	Not recommended in foals	Not recommended in foals	NA	
<b>Strangles</b>	<b>Inactivated M-protein subunit vaccines:</b> 3-dose primary series: First dose at 4-6 months of age Second dose 4-6 weeks after the first dose Third dose 4-6 weeks after the second dose	<b>Inactivated M-protein subunit vaccines:</b> <b>3-dose primary series:</b> First dose at 4-6 months of age Second dose 4-6 weeks after the first dose Third dose 4-6 weeks after the second dose	Semiannual	Vaccination is <b>not</b> routinely recommended as a strategy in outbreak mitigation; however, vaccination may be warranted on farms with endemic strangles.
<b>Strangles (continued)</b>	<b>Modified live intranasal vaccine:</b> 3-dose primary series administered intranasally: First dose at 6-9 months of age Second dose 3-4 weeks after the first dose Third dose at 11-12 months of age	<b>Modified live intranasal vaccine:</b> 3-dose primary series administered intranasally: First dose at 6-9 months of age Second dose 3-4 weeks after the first dose Third dose at 11-12 months of age		If warranted by risk, the modified live vaccine (MLV) may be safely administered to foals as young as 6 weeks of age. However, vaccine efficacy in this age group has not been determined. If the MLV product is administered to foals less than 6 months of age, a third dose of vaccine should then be administered 2- 4 weeks prior to weaning.

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