

Tenofovir disoproxil fumarate (*Viread*)

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Drug Summary

Tenofovir disoproxil fumarate (DF) has been a cornerstone of initial and salvage antiretroviral regimens for more than a decade, based on its excellent virologic efficacy and a better safety profile than older nucleoside reverse transcriptase inhibitors (NRTIs). Tenofovir DF is a component of recommended regimens for treatment of HIV, for treatment of hepatitis B virus in persons coinfecting with HIV, and for postexposure prophylaxis (PEP). The fixed-dose combination tenofovir DF-emtricitabine is the first and only FDA-approved medication for HIV preexposure prophylaxis (PrEP). Tenofovir DF is generally well tolerated, has few drug-drug interactions, and is included in several single-tablet combinations. Its principal limitations are potential nephrotoxicity, including a proximal tubule-wasting syndrome, and amplified bone mineral density loss. The future use of tenofovir DF may diminish with the availability of tenofovir alafenamide, a medication with similar virologic efficacy but less potential for long-term adverse renal and bone effects. Dosage of tenofovir DF must be adjusted in the setting of impaired renal function. Tenofovir DF has a favorable mild lipid-lowering effect.

Key Clinical Trials

Initial approval of tenofovir DF was based on a study of treatment-experienced individuals in which the addition of tenofovir DF to the current regimen led to a decrease in viral load and increase in CD4 count as compared to placebo [[GS-99-907](#)]. Tenofovir DF has been a part of numerous studies for treatment-naïve and treatment-experienced persons. In a trial that randomized treatment-naïve participants to abacavir-lamivudine or tenofovir DF-emtricitabine, combined with efavirenz or ritonavir-boosted atazanavir, use of tenofovir DF-emtricitabine resulted in fewer virologic failures than abacavir-lamivudine in the subset of participants with baseline HIV RNA greater than 100,000 copies/mL [[ACTG 5202](#)]. Tenofovir DF, in combination with emtricitabine, has been studied for treatment-naïve individuals as a part of combination therapy with anchor drugs from multiple classes; it has proven effective when combined with dolutegravir [[SPRING-2](#)], elvitegravir-cobicistat (Studies 102/103), raltegravir [[STARTMRK](#)], boosted darunavir [[ARTEMIS](#)], efavirenz [[GS-934](#)], and rilpivirine [[ECHO \(C209\)](#)]. Tenofovir DF, either alone or in combination with emtricitabine, has also shown to be effective in several preexposure prophylaxis trials, including those with serodiscordant heterosexual men and women [[Partners PrEP](#)], men who have sex with men and transgender women

[[iPrEx](#)], and injection drug users [[Bangkok Tenofovir](#)].

Adverse Effects

Tenofovir DF can cause renal and bone adverse effects, including renal proximal tubule injury and reduction in bone mineral density. For example, some patients have developed the proximal tubular disorder Fanconi's syndrome, characterized by renal loss of phosphate, bicarbonate, and glucose. Tenofovir DF can also cause fatigue, malaise, nausea, diarrhea and other gastrointestinal complaints.

Use In Pregnancy

In the HHS Perinatal Guidelines section Recommendations for Use of Antiretroviral Drugs During Pregnancy (last updated October 19, 2017), **tenofovir DF**-emtricitabine and **tenofovir DF** plus emtricitabine are designated as a Preferred Two-NRTI Backbone in the category Preferred Initial Regimens in Pregnancy.

- For additional information regarding the safety and toxicity of tenofovir DF in pregnancy see the HHS Perinatal Guidelines summary on [Tenofovir DF](#).
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Resistance

For a listing of the most common clinically significant mutations associated with tenofovir disoproxil fumarate (TDF, tenofovir DF) resistance, see the [NRTI Resistance Notes on the Stanford University HIV Drug Resistance Database](#).

Key Drug Interactions

For complete information on tenofovir disoproxil fumarate-related drug interactions, see the [Drug Interactions section in the Tenofovir disoproxil fumarate \(Viread\) Prescribing Information](#).

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<https://www.hiv.uw.edu/page/treatment/drugs/tenofovir-disoproxil-fumarate>