Viral infections are common and are potentially life-threatening in patients with immune system disorders. Because T-cell immunity contributes to the control of many viral pathogens, adoptive immunotherapy with virus-specific T cells (VSTs) has been a logical and effective way of combating severe viral disease in immunocompromised patients in multiple phase 1 and 2 clinical trials. Common viral targets include cytomegalovirus, Epstein-Barr virus, and adenovirus, though recent published studies have successfully targeted additional pathogens, including HHV6, BK virus, and JC virus. Though most studies have used VSTs derived from allogeneic stem cell donors, the use of banked VSTs derived from partially HLA-matched donors has shown efficacy in multicenter settings. Hence, this approach could shorten the time for patients to receive VST therapy thus improving accessibility. In this review, we discuss the usage of VSTs for patients with primary immunodeficiency disorders in clinical trials, as well as future potential targets and methods to broaden the applicability of virus-directed T-cell immunotherapy for this vulnerable patient population.