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Herpes zoster vaccination in people living with HIV: from evidence to implementation – A narrative review

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Abstract

Herpes zoster (HZ) remains a significant, preventable cause of morbidity among people living with HIV (PLWH), who face increased risks of HZ, recurrence, and complications despite effective antiretroviral therapy. The recombinant zoster vaccine (RZV), a non-live, adjuvanted vaccine, is currently the preferred strategy for HZ prevention in immunocompromised adults. This narrative review synthesizes the evidence on the burden and pathogenesis of HZ in PLWH, RZV immunogenicity and safety, present vaccination recommendations, clinical considerations, and implementation challenges, with particular emphasis on the Asia-Pacific region. Available evidence indicates that RZV induces robust humoral and cellular immune responses and has a favorable safety profile in PLWH; however, HIV-specific evidence regarding clinical effectiveness, long-term durability of protection, and optimal timing of vaccination in the setting of advanced immunosuppression remains limited. International guidelines consistently recommend a two-dose RZV series for adults with HIV, without requiring a specific CD4+ T-cell threshold or virological suppression. Nevertheless, vaccine uptake remains constrained by cost, limited availability, inadequate patient and healthcare-provider awareness, vaccine hesitancy, and fragmented vaccination services. Future research should prioritize real-world effectiveness, durability of protection, cost-effectiveness, and determinants of vaccine acceptance, including behavioral factors, such as perceived susceptibility, perceived benefits, and perceived barriers. Integrating RZV into routine HIV care and strengthening implementation strategies, particularly across the Asia-Pacific region and other resource-limited settings, will be critical to translating guideline recommendations into equitable vaccination coverage and reducing HZ-related morbidity among PLWH.

Keywords: *Herpes zoster. Recombinant zoster vaccine. People living with HIV. Immunocompromised. Vaccine uptake. Asia-Pacific.*

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Introduction

HIV infection remains a major global health challenge, with approximately 40.9 million people living with HIV (PLWH) worldwide at the end of 2025.[1] Although antiretroviral therapy (ART) has markedly improved survival and transformed HIV infection into a chronic, manageable condition, persistent immune dysfunction and age-related immunological changes continue to increase susceptibility to opportunistic and other infectious diseases.[2,3] Among these, herpes zoster (HZ) is of particular clinical importance because PLWH remain at increased risk of HZ and its complications, resulting in a substantial burden of morbidity.

HZ results from the reactivation of latent varicella-zoster virus (VZV), a process strongly associated with impaired cell-mediated immunity.[4,5] Compared with the general population, PLWH develop HZ more frequently and at a younger age, and are at greater risk of recurrent, severe, or disseminated disease, as well as complications, including post-herpetic neuralgia (PHN) and neurological involvement.[6-9] These complications can substantially impair quality of life and increase healthcare utilization, further underscoring the need for effective preventive strategies.

Two zoster vaccines have been used for the prevention of HZ: the live attenuated zoster vaccine (LZV) and the recombinant zoster vaccine (RZV). However, RZV, a non-live, adjuvanted vaccine with demonstrated efficacy in the general population and favorable immunogenicity and safety profiles in immunocompromised populations, is now the preferred option for HZ prevention in PLWH.[10-13] Following the US Food and Drug Administration (FDA) expansion of the RZV indication to immunocompromised adults aged ≥ 18 years in 2021,[14] an increasing number of international guidelines have recommended RZV vaccination for adults living with HIV.[12,13,15-18]

Despite these recommendations, important uncertainties remain regarding HZ vaccination in PLWH. Evidence specifically evaluating vaccine effectiveness, immunogenicity, durability of protection, safety, and the impact of immune status remains limited, particularly in individuals with advanced immunosuppression. Moreover, implementation may be hindered by vaccine availability and affordability, barriers to access, and limited awareness among both patients and healthcare providers.[19-21] A comprehensive synthesis of the available evidence is therefore warranted to inform clinical decision-making, optimize vaccination strategies, and support evidence-based vaccination policy.

This narrative review synthesizes the present evidence on HZ vaccination in PLWH, encompassing the burden and pathogenesis of HZ, vaccine immunogenicity, effectiveness and safety, present vaccination recommendations, clinical considerations, and implementation challenges. It further identifies key evidence gaps and priorities for future research to inform clinical practice and vaccination policy.

Methods

A targeted literature search was conducted in PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar using combinations of terms related to HZ, HZ vaccines, and HIV. Relevant peer-reviewed studies, clinical guidelines, and recommendations were considered, with additional references identified from key publications. The evidence was narratively synthesized, focusing on the burden of HZ, vaccine immunogenicity, efficacy, safety, and vaccination recommendations for PLWH.

HIV and HZ

Epidemiology and burden

PLWH have a substantially higher risk of HZ than the general population, largely attributable to impaired cell-mediated immunity and inadequate control of latent VZV.[6] A 2020 systematic review and meta-analysis estimated that HIV infection was associated with a 3.22-fold higher risk of HZ (relative risk, 3.22; 95% confidence interval, 2.40-4.33).[22] Consistent with this increased risk, a subsequent meta-analysis of 11 studies involving 195,190 PLWH reported a pooled HZ incidence of 2.30/100 person-years,[23] European cohort studies have reported incidence rates of 11.8-13.0/1,000 person-years, substantially higher than the approximately 3-5/1,000 person-years reported in the general population.[7,23,24] HZ also tends to occur at a younger age in PLWH, further distinguishing the epidemiological profile of this population and underscoring the need for targeted preventive strategies.[6,25]

The risk of HZ is closely associated with the extent of HIV-related immune dysfunction. Lower CD4+ T-cell counts, particularly < 200 cells/μL, a reduced CD4+/CD8+ T-cell ratio, and incomplete immune recovery have consistently been associated with a higher risk of HZ.[9,19,23,26] Conversely, uncontrolled HIV replication and higher plasma HIV RNA levels may further increase susceptibility by perpetuating immune dysfunction.[9,19,27] Thus, HZ risk appears to reflect not simply the presence of

HIV infection, but also the cumulative degree of immune impairment and the extent of virological control.

The introduction of effective ART has substantially reduced the incidence of HZ by suppressing HIV replication and promoting immune reconstitution. In a French cohort, HZ incidence declined from 2,955 to 628/100,000 person-years between the pre-ART and later ART eras,[28] while other studies have reported reductions of more than 40% following the widespread implementation of ART.[28-30] Nevertheless, ART does not fully restore HZ risk to that of the HIV-negative population. Even PLWH receiving long-term ART with sustained virological suppression and immune recovery may remain at increased risk of HZ, potentially reflecting persistent immune activation, chronic inflammation, and immunosenescence.[28,31-34]

Importantly, the burden of HZ in PLWH extends beyond incident disease. Recurrence is more frequent, while complications, such as PHN, HZ ophthalmicus, and neurological or cutaneous involvement can result in substantial morbidity. A recent systematic review reported PHN rates of up to 40.2% at 90 days among PLWH, although estimates varied considerably across studies.[8] HZ-related hospitalization has also been reported, further highlighting the clinical and healthcare burden associated with HZ in this population.[27]

Overall, HZ remains an important, preventable cause of morbidity among PLWH despite advances in ART. The persistent excess risk, particularly among individuals with impaired or incomplete immune recovery, together with the substantial risk of recurrence and long-term complications, provides a strong epidemiological rationale for targeted HZ prevention in this population. These findings underscore the need for effective vaccination strategies that can complement the benefits of ART and further reduce the burden of HZ among PLWH.

Pathogenesis

Following primary varicella infection, VZV establishes lifelong latency in sensory neurons, predominantly within the dorsal root and cranial nerve ganglia.[4,35] Viral latency is maintained primarily through VZV-specific cell-mediated immunity, particularly T-cell responses that provide ongoing immune surveillance and constrain viral replication.[36]

In PLWH, progressive impairment of cellular immunity can compromise VZV-specific T-cell surveillance and weaken control of latent virus.[4,37] As HIV-associated immune dysfunction worsens, particularly in the setting of inadequate immune recovery, diminished VZV-specific T-cell responses may allow viral reactivation. Reactivated VZV then travels anterogradely along sensory nerves to the skin, resulting in the characteristic dermatomal eruption of HZ.

Thus, the pathogenesis of HZ in PLWH can be conceptualized as a continuum: VZV latency in sensory ganglia → impaired cell-mediated and VZV-specific T-cell immunity → loss of viral control → VZV reactivation → anterograde neural spread → HZ.

HZ vaccines

Two vaccine platforms have been developed and used for the prevention of HZ and its complications: LZV and RZV. Their distinct vaccine platforms have important implications for immunogenicity, safety, efficacy, and suitability for use in immunocompromised populations.[11] This distinction is particularly relevant in PLWH, in whom the balance between vaccine-induced protection and safety must be considered in the context of underlying and potentially persistent immune dysfunction.

LZV

LZV contains a live attenuated strain of VZV and induces both humoral and cell-mediated immune responses. In immunocompetent adults, LZV has demonstrated efficacy in preventing HZ and PHN; however, its protective effect decreases with advancing age and wanes over time.[11,38,39] Among PLWH receiving ART, with controlled HIV replication and CD4+ T-cell counts ≥ 200 cells/μL, a randomized, placebo-controlled trial found an acceptable safety profile and enhanced VZV-specific antibody responses, with greater immunogenicity observed among individuals with CD4+ T-cell counts ≥ 350 cells/μL.[40] These findings suggest that LZV can be immunogenic in selected, clinically stable PLWH, although its use is constrained by the administration of a live vaccine in an immunocompromised population.

The principal limitation of LZV is its live-virus platform. Because replication of the vaccine virus may pose safety concerns in individuals with substantial immunosuppression, LZV is contraindicated in certain immunocompromised populations and may be unsuitable for others depending on the degree of immune dysfunction.[41,42] Its declining effectiveness with advancing age and waning protection over time further limit its role in contemporary HZ prevention. Collectively,

these limitations have driven a shift toward non-live vaccine platforms, particularly RZV, for HZ prevention in immunocompromised and other high-risk populations.

RZV

RZV (Shingrix) is a non-live, adjuvanted recombinant subunit vaccine containing VZV glycoprotein E combined with an adjuvant system that enhances both humoral and cell-mediated immune responses.[11] Unlike LZV, RZV contains no live or replicating virus and therefore avoids the safety concerns associated with administration of live vaccines in individuals with immunosuppression. This non-live platform makes RZV particularly relevant to PLWH.

The efficacy of RZV was established in large phase III trials, with vaccine efficacy against HZ of 97.2% among adults aged ≥ 50 years and 91.3% among those aged ≥ 70 years.[43,44] Subsequent real-world studies have demonstrated substantial protection across a range of populations, including older adults and immunocompromised individuals, with protection persisting over several years.[10,45,46] Importantly, completion of the recommended two-dose series provides greater and more sustained protection than a single dose.[10,45]

RZV is administered as a two-dose series, with the second dose generally given 2-6 months after the first. In 2021, the FDA expanded the indication for RZV to adults aged ≥ 18 years who are or will be at increased risk of HZ because of immunodeficiency or immunosuppression related to disease or therapy.[14] Taken together, its non-live platform, high efficacy, favorable safety profile, and broad applicability to immunocompromised populations have established RZV as the preferred strategy for HZ prevention in high-risk adults, including PLWH.

Evidence of RZV in PLWH

Evidence specifically evaluating RZV in PLWH has primarily focused on immunogenicity and safety, whereas direct evidence of clinical efficacy and real-world effectiveness remains limited. HIV-specific evidence on RZV, including findings on immunogenicity, immune status, safety, and reactogenicity, is summarized in table 1. This distinction is important when interpreting the available evidence: immunogenicity reflects the magnitude and quality of the immune response induced by vaccination; efficacy refers to vaccine-mediated protection demonstrated under controlled trial conditions; and effectiveness reflects protection achieved under routine, real-world conditions. Thus, robust immunogenicity data in PLWH provide important evidence of biological plausibility and vaccine responsiveness, but they do not by themselves establish the magnitude or durability of clinical protection against HZ.

Taken together, the available evidence and principal areas of uncertainty are summarized in table 2, highlighting the distinction between established immunogenicity and the still limited evidence for clinical efficacy, real-world effectiveness, and long-term durability in PLWH.

Present vaccination recommendations

Present international guidelines are broadly consistent in recommending RZV for adults living with HIV. A comparison of present recommendations from major international and national guidelines is presented in table 3. A major departure from earlier zoster vaccination strategies is the use of a non-live recombinant vaccine, which can be administered to immunocompromised individuals without the safety concerns associated with live attenuated vaccination. Most guidelines recommend a two-dose RZV series for adults with HIV aged ≥ 18 years, without requiring a specific CD4+ T-cell threshold or virological suppression, while recognizing that the optimal timing of vaccination in individuals with advanced immunosuppression or uncontrolled HIV replication remains uncertain.[12,13,15,18]

Overall, the recommendations summarized in table 3 support RZV as the preferred zoster vaccine for adults living with HIV, although differences remain in the wording and level of guidance regarding immune status, the timing of vaccination, and previous zoster vaccination.

International recommendations

Major international guidelines are broadly concordant in recommending RZV for PLWH, reflecting its non-live formulation and suitability for immunocompromised populations.[12,13,15-18] Across guidelines, the standard approach is a two-dose series, whereas the principal area of uncertainty concerns the optimal timing of vaccination in individuals with advanced immunosuppression or uncontrolled HIV replication (Table 3).

Importantly, present recommendations generally do not regard a low CD4+ T-cell count or detectable HIV RNA as an absolute contraindication to RZV. Nevertheless, immune status may influence the magnitude of the vaccine-induced immune response, and vaccination timing may be individualized to maximize

Table 1. HIV-specific evidence for RZV

Study	Population	RZV regimen	Immunogenicity	Immune status	Safety/ Reactogenicity	Key implication
Immunogenicity study[47]	207 PLWH receiving ART	2 doses	VZV-specific IgG GMFR: 16.7; seroresponse: 71%; substantial VZV-specific T-cell responses	Responses observed across the studied immune-status groups; humoral and cellular responses were correlated	Acceptable overall safety profile	RZV elicits strong humoral and cellular immune responses in PLWH receiving ART
Immunogenicity studies[47,48]	PLWH, including individuals with advanced immunosuppression	2 doses	Significant increases in VZV-specific humoral and cell-mediated immune responses	Responses observed even among individuals with CD4+ T-cell counts < 200 cells/μL	No major safety signals identified	RZV remains immunogenic despite substantial HIV-associated immune dysfunction
Moreno et al., 2026[49]	237 PLWH receiving routine HIV care in Spain	2 doses	Not primarily designed to assess immunogenicity	Routine clinical population	82.7% reported ≥ 1 adverse reaction; most were mild; grade 3 events were uncommon; 99.6% completed the two-dose series	High series completion and generally acceptable tolerability support the feasibility of RZV vaccination in PLWH
Reactogenicity studies[42,50]	PLWH	2 doses	Not reported	Not reported	Injection-site pain: ~78%; myalgia: ~45%; fatigue: ~45%; grade 3 reactions uncommon; systemic reactions were more frequent after dose 2	Reactogenicity is common but generally transient and manageable

ART: antiretroviral therapy; CD4: CD4+ T-cell count; PLWH: people living with HIV; RZV: recombinant zoster vaccine; VZV: varicella-zoster virus.

immunogenicity when clinically feasible.[13,18] This distinction between eligibility for vaccination and optimization of vaccination timing is particularly relevant for PLWH with advanced HIV disease.

Previous HZ and previous LZV

A previous episode of HZ does not eliminate the indication for RZV, as recurrence remains possible in PLWH. Vaccination should be administered after resolution of the acute episode rather than during active HZ. Similarly, previous receipt of LZV does not obviate the need for RZV, which is the preferred zoster vaccine for immunocompromised adults.[12,13,17]

Thus, vaccination history should primarily inform the timing and scheduling of RZV rather than determine eligibility for vaccination. Individuals with a history of HZ or previous LZV should therefore be assessed for RZV according to present recommendations and the interval since their previous zoster vaccination.

Recommendations in Vietnam

RZV is licensed in Vietnam for adults aged ≥ 50 years and for adults aged ≥ 18 years who are at increased risk of HZ because of immunosuppression or other qualifying conditions.[52,53] This regulatory framework is broadly consistent with international recommendations supporting the use of RZV in immunocompromised populations.

However, HIV-specific guidance on the optimal timing of RZV vaccination according to CD4+ T-cell count,

Table 2. Interpretation and evidence gaps for RZV in PLWH

Domain	Present evidence in PLWH	Clinical interpretation	Key evidence gap
Immunogenicity	RZV induces substantial VZV-specific antibody and T-cell responses after two doses[47,48]	Strong evidence of immunogenicity in PLWH	Long-term persistence and correlates of protection remain incompletely characterized
CD4+ T-cell count	Immune responses have been observed across CD4+ T-cell strata, including CD4+ counts < 200 cells/μL[47,48]	A low CD4+ T-cell count does not necessarily preclude an immune response	Optimal timing according to immune recovery remains uncertain
ART/virological suppression	Most HIV-specific evidence involves PLWH receiving ART[47,48]	Evidence is most applicable to patients receiving contemporary HIV care	Evidence remains limited in those with uncontrolled HIV replication
Safety	No consistent HIV-specific safety signal has been identified[47-49]	Overall safety profile is reassuring in PLWH	Larger studies are needed to characterize rare adverse events
Reactogenicity	Local and systemic reactions are common but predominantly mild and transient[42,49,50]	Expected reactogenicity should be incorporated into vaccination counseling	Predictors of severe or prolonged reactogenicity remain unclear
Serious adverse events	No clear increase in serious adverse events attributable to RZV has been identified[49]	Available evidence is reassuring	HIV-specific studies remain underpowered to detect rare events
Clinical efficacy	Direct HIV-specific efficacy data remain limited	Immunogenicity should not be interpreted as evidence of clinical protection	Prospective studies with laboratory-confirmed HZ endpoints are needed
Real-world effectiveness	Strong evidence exists in older adults and other immunocompromised populations[10,45,46]	These data provide supportive evidence but require cautious extrapolation to PLWH	HIV-specific effectiveness estimates remain scarce
Durability	Sustained protection has been demonstrated in broader population[10,45]	Findings support the potential for prolonged protection	Long-term durability specifically in PLWH remains uncertain
Booster doses	No HIV-specific evidence currently establishes a routine need for additional doses	The two-dose primary series remains the evidence-based foundation	Longitudinal studies should determine whether selected PLWH may benefit from additional doses

ART: antiretroviral therapy; CD4: CD4+ T-cell count; HZ: herpes zoster; PLWH: people living with HIV; RZV: recombinant zoster vaccine; VZV: varicella-zoster virus.

virological suppression, and ART status remains limited in Vietnam. This represents an important implementation gap, particularly in the context of limited HIV-specific evidence on vaccine effectiveness from Vietnam and other Asian settings. Future national guidance and prospective studies should therefore address not only vaccine uptake, but also the optimal timing, effectiveness, durability of protection, and cost-effectiveness of RZV across clinically relevant levels of immune restoration.

Special considerations in PLWH

Although present guidelines broadly recommend RZV for PLWH, several clinical factors may influence the timing of vaccination, the magnitude of the vaccine-induced immune response, and the practical delivery of vaccination. These include the degree of immune restoration, virological control, ART status, age, and history of HZ. Importantly, these factors generally inform the timing and clinical management of vaccination rather than constitute absolute contraindications to RZV.

CD4+ T-cell count

A low CD4+ T-cell count is not an absolute contraindication to RZV. Available immunogenicity data indicate that RZV can induce both humoral and cellular immune responses in PLWH with substantial immunosuppression,

Table 3. Comparison of recommendations for recombinant zoster vaccination in people living with HIV

Guideline/ authority	PLWH eligible	Age	Vaccine and schedule	CD4+ T-cell count/ HIV RNA considerations	Previous HZ/LZV	Key recommendation
CDC/ACIP, 2025-2026[12,17]	Yes	≥ 18 years if immunocompromised	RZV; 2 doses, 2-6 months apart	Timing may be individualised according to immune status	Recommended regardless of previous HZ; recommended after LZV	RZV is the preferred zoster vaccine for immunocompromised adults, including PLWH
NIH HIV Guidelines, 2026[13]	Yes	≥ 18 years	RZV; 2 doses, 2-6 months apart*	Vaccination should not be withheld solely because of a low CD4+ count or detectable HIV RNA; optimal timing with CD4+ < 200 cells/μL or uncontrolled HIV replication remains uncertain	Recommended after previous HZ and LZV	RZV is recommended for all adults with HIV aged ≥ 18 years
IDSA/HIVMA, 2024[15]	Yes	≥ 18 years	RZV; 2 doses	No specific CD4+ threshold; vaccination should be integrated into comprehensive HIV preventive care	Recommended for prevention of HZ and recurrent HZ	Supports routine RZV vaccination as part of preventive care in PLWH
National HIV Curriculum, 2026[16]	Yes	≥ 18 years	RZV; 2 doses, 2-6 months apart	Recommendation does not depend on CD4+ T-cell count	Applicable after previous HZ	Supports RZV vaccination regardless of CD4+ T-cell count
IAS-USA, 2024[18]	Yes	Adults with HIV	RZV; 2 doses	Recommended irrespective of CD4+ T-cell count; timing may be considered in relation to virological suppression and immune recovery	RZV remains preferred	Supports RZV vaccination while recognizing potentially reduced immune responses with advanced immunosuppression
WHO, 2025[51]	Yes	Adults ≥ 18 years with immunocompromising conditions, including PLWH	RZV; 2 doses, 2-6 months apart*	No specific CD4+ T-cell count or HIV RNA threshold established	No specific WHO recommendation regarding previous LZV identified	Supports use of RZV for HZ prevention in immunocompromised adults, including PLWH
Vietnam[52,53]	Yes	≥ 18 years at increased risk; ≥ 50 years generally	RZV (Shingrix); 2 doses, 2-6 months apart	No HIV-specific CD4+ T-cell threshold established	Applicable for prevention of HZ and its complications	RZV is licensed in Vietnam for adults ≥ 50 years and adults ≥ 18 years at increased risk of HZ

*The interval between doses may be shortened to 1-2 months in selected immunocompromised individuals when more rapid completion is desirable.
ACIP: Advisory Committee on Immunization Practices; CD4: CD4+ T-cell count; HZ: herpes zoster; IDSA: Infectious Diseases Society of America; IAS-USA: International Antiviral Society-USA; LZV: live zoster vaccine; PLWH: people living with HIV; RZV: recombinant zoster vaccine; WHO: World Health Organization.

including individuals with CD4+ T-cell counts < 200 cells/μL.[47,48] However, the magnitude and durability of vaccine-induced immune responses may be influenced by the degree of underlying immune dysfunction.

Accordingly, RZV vaccination should not routinely be withheld solely on the basis of a low CD4+ T-cell count when the individual remains at clinically relevant risk of HZ. When vaccination can be safely deferred, administration after some degree of immune restoration may

be considered to potentially enhance immunogenicity. Importantly, this represents a consideration for optimising vaccination timing rather than a minimum CD4+ T-cell threshold for vaccination. Prospective studies are needed to determine whether vaccination at different stages of immune recovery translates into clinically meaningful differences in protection against HZ.

Viral suppression

Present evidence does not support requiring an undetectable HIV viral load before administration of RZV. Present guidelines generally recommend vaccination irrespective of HIV RNA status, while acknowledging limited evidence regarding vaccine immunogenicity in individuals with uncontrolled HIV replication.[13,18]

In clinically stable patients with detectable HIV RNA, the decision to vaccinate should therefore be individualized according to the immediate risk of HZ and the potential benefit of delaying vaccination to achieve better virological control. When vaccination can be safely deferred, achieving virological suppression with ART may provide a more favorable immunological context for vaccine responsiveness. Nevertheless, virological suppression should be regarded as an opportunity to optimize vaccine responses rather than a prerequisite for vaccination.

ART

RZV is a non-live vaccine and can be administered to individuals receiving ART. No specific duration of ART before vaccination is currently required.[13,18] Accordingly, for newly diagnosed PLWH, RZV vaccination should be incorporated into routine preventive care rather than routinely deferred until complete immune recovery.

When clinically appropriate, vaccination can be initiated during ART, particularly in individuals at substantial risk of HZ. In patients with profound immunosuppression, a short delay may be considered when immune restoration is expected within a reasonable timeframe, and the risk associated with postponing vaccination is low. However, present evidence does not establish a definitive optimal interval between ART initiation and RZV administration.

Previous HZ

A previous episode of HZ does not eliminate the indication for RZV. PLWH remain at increased risk of recurrent HZ, reflecting persistent impairment of VZV-specific cell-mediated immunity.[12,13,17] RZV should therefore be offered to individuals with a history of HZ once the acute episode has resolved.

This recommendation is clinically important because a history of HZ may be mistakenly interpreted as providing sufficient or durable immunity. In immunocompromised individuals, however, previous infection does not reliably protect against subsequent reactivation. RZV should therefore be considered for the prevention of recurrent HZ as well as for primary prevention in individuals without a history of HZ.

Age

Age-based recommendations for RZV present a particular consideration in PLWH. Although the incidence of HZ increases substantially with age, HIV infection independently increases HZ risk and may shift a greater proportion of the disease burden toward younger adults. Consequently, age thresholds derived primarily from immunocompetent populations may not fully capture the risk profile of PLWH.

This consideration underpins recommendations for RZV vaccination in adults with HIV rather than restricting vaccination solely to the conventional age thresholds used for immunocompetent populations.[12,13,17] Nevertheless, direct evidence of clinical efficacy and cost-effectiveness among younger PLWH remains limited. Future studies should determine the clinical and economic value of earlier vaccination, particularly among younger individuals with additional risk factors, such as low CD4+ T-cell counts, previous HZ, or other causes of immunosuppression.

Co-administration with other vaccines

PLWH frequently require multiple vaccines because of their increased susceptibility to vaccine-preventable infections. RZV can generally be co-administered with other indicated vaccines during the same visit, provided that vaccines are administered at separate injection sites. Available evidence and present recommendations do not indicate clinically meaningful interference with vaccine responses when RZV is co-administered with other vaccines.[12,17]

Co-administration may be particularly relevant for influenza, pneumococcal, and COVID-19 vaccines, which are commonly indicated in PLWH. From an implementation perspective, administering multiple vaccines during the same encounter may improve

vaccination completion and reduce missed opportunities for immunization, although it may also increase the short-term burden of local or systemic reactogenicity.

Accordingly, co-administration should be considered primarily from a pragmatic and patient-centered perspective rather than as a reason to delay RZV vaccination. When multiple vaccines are indicated, clinicians should aim to optimize completion of recommended vaccination schedules while counseling patients about the possibility of transient post-vaccination symptoms. Vaccine-specific product information and local recommendations should be considered when determining the appropriate timing and co-administration of vaccines.

Implementation challenges in the Asia-Pacific Region

Despite the elevated burden of HZ among PLWH and the availability of an effective, non-live vaccine, uptake of RZV remains suboptimal. Evidence from diverse healthcare settings suggests that this implementation gap is multifactorial, reflecting interacting patient-, healthcare provider-, and health-system-level barriers rather than limitations in vaccine efficacy alone.[19-21,26,54-56] In the Asia-Pacific region, these challenges may be further amplified by differences in vaccine availability, affordability, healthcare infrastructure, and access to preventive services.

Vaccine cost and availability

The cost of RZV remains an important barrier to uptake, particularly in settings where adult vaccination is largely financed through out-of-pocket payment and reimbursement is limited. Unlike childhood vaccines included in national immunization programs, adult zoster vaccination is often delivered through private or specialized healthcare services, potentially creating additional financial and access barriers. Limited vaccine availability and the need to obtain vaccination outside routine HIV care may further reduce uptake. These challenges are particularly relevant in middle-income settings, where out-of-pocket costs can substantially influence decisions regarding adult vaccination.

Awareness and vaccine hesitancy

Limited awareness of HZ and RZV among PLWH may hinder vaccine acceptance. In a Belgian study, although 61.7% of PLWH reported willingness to receive RZV if indicated, only 12.8% were aware of the zoster vaccine, and knowledge of the relationship between HIV and VZV reactivation was limited.[54] Notably, general willingness to receive vaccination was more strongly associated with RZV acceptance than disease-specific knowledge, suggesting that vaccine confidence and general attitudes toward vaccination may play an important role alongside factual knowledge.

Healthcare provider recommendation

Healthcare provider recommendation is a potentially modifiable determinant of RZV uptake. Studies have identified substantial gaps in provider knowledge and vaccine recommendation, including concerns about vaccine safety and effectiveness and uncertainty about the appropriateness of RZV vaccination in PLWH.[21,56] In Korea, only 27.1% of healthcare professionals routinely recommended zoster vaccination to PLWH, despite higher recommendation rates for other vaccines.[21] These findings suggest that inconsistent provider recommendation may represent an important missed opportunity to improve RZV uptake, particularly within routine HIV care.

Competing priorities in HIV care

Routine HIV care is often centered on ART adherence, virological suppression, prevention of opportunistic infections, and management of comorbidities. Consequently, preventive adult vaccination may receive less attention, particularly when patients require multiple concurrent clinical interventions. This competing-priority problem may be mitigated by integrating vaccination assessment and delivery into routine HIV care rather than relying on separate vaccination encounters.

Evidence from quality-improvement interventions supports this approach. In a US study, vaccination coverage increased substantially following the implementation of provider reminders and pre-populated vaccine orders, demonstrating that system-level interventions can help translate clinical recommendations into actual vaccination uptake.[20] These findings suggest that embedding vaccination into existing HIV care workflows may be more effective than relying solely on patient- or provider-initiated vaccination.

Access to vaccination services

Fragmentation between HIV care and adult vaccination services may further limit RZV uptake. PLWH may

receive HIV care in specialized clinics where RZV is not routinely stocked or administered, necessitating additional appointments, travel, and out-of-pocket expenditure. These logistical and financial barriers may create missed opportunities for vaccination and reduce completion of the recommended two-dose series. Integrating vaccine assessment, recommendation, and administration into routine HIV care could help minimize these barriers and improve timely completion of the RZV series.

Differences in national immunization policies

Variation in national vaccine recommendations, reimbursement mechanisms, age-based eligibility criteria, and RZV availability creates substantial heterogeneity across the Asia-Pacific region. Although international guidelines increasingly support RZV for immunocompromised adults, national policies and implementation may lag behind evolving clinical recommendations, particularly in settings where adult immunization programs remain less established.

This heterogeneity is particularly relevant across the Asia-Pacific region, where healthcare systems, financing mechanisms, HIV service delivery models, and access to adult vaccination vary considerably between countries. Evidence from Korea indicates that provider recommendation for zoster vaccination among PLWH remains suboptimal,[21] whereas HIV-specific evidence from other Asian countries is comparatively limited. Consequently, the extent to which evidence generated in North American and European settings can be directly generalized to diverse Asia-Pacific healthcare systems remains uncertain.

Priorities for implementation in the Asia-Pacific region

Available evidence suggests that improving RZV uptake among PLWH will require a multilevel implementation strategy rather than education alone. Key priorities include: (1) increasing patient and healthcare provider awareness; (2) strengthening provider recommendation through clinical prompts and standardized vaccination protocols; (3) integrating RZV assessment and delivery into routine HIV care; (4) reducing financial and logistical barriers to vaccination; and (5) developing national recommendations and sustainable reimbursement mechanisms for adult immunization.

Importantly, evidence from the Asia-Pacific region remains limited, particularly regarding RZV awareness, acceptance, provider recommendation, vaccination coverage, and cost-related barriers among PLWH. This represents a substantial implementation research gap. Future studies should move beyond assessing vaccination intention alone and evaluate the full vaccination care cascade, from eligibility assessment and provider recommendation to vaccine initiation and completion. Such studies should also examine how patient-, provider-, and health-system-level factors interact across different healthcare settings and health-system contexts.

Ultimately, the central challenge is no longer simply determining whether RZV is appropriate for PLWH, but ensuring that eligible individuals can access, accept, initiate, and complete vaccination. Closing this implementation gap will be essential to translating the demonstrated immunogenicity and broader clinical benefits of RZV into meaningful reductions in HZ-related morbidity among PLWH across the Asia-Pacific region.

Future perspectives

Despite growing evidence supporting the use of RZV in PLWH, important gaps remain between immunogenicity, clinical protection, and successful implementation. Future research should therefore focus on several interconnected priorities.

First, real-world effectiveness and durability of protection. Prospective and longitudinal studies should evaluate laboratory-confirmed HZ, recurrent HZ, PHN, and HZ-related hospitalization, with sufficiently long follow-up to characterize the durability of protection across different levels of immune restoration. HIV-specific effectiveness estimates are particularly needed to determine the extent to which immunogenic responses translate into clinically meaningful protection.

Second, vaccination in advanced HIV disease. Further research is needed to clarify the optimal timing of RZV in individuals with CD4+ T-cell counts < 200 cells/μL or uncontrolled HIV replication. Studies should determine whether vaccination after immune restoration results in superior and clinically meaningful protection compared with vaccination earlier in the course of immune recovery.

Third, vaccine acceptance and behavioral determinants. Research should move beyond vaccination coverage and intention to examine the determinants of vaccine acceptance among PLWH. Behavioral frameworks, such as the Health Belief Model may provide a structured approach to assessing perceived susceptibility to HZ,

perceived severity, perceived benefits and barriers, self-efficacy, and cues to action. Identifying modifiable behavioral determinants could inform targeted communication, shared decision-making, and patient-centered vaccination strategies.

Fourth, implementation and health economics. Implementation research should evaluate provider recommendation, vaccine initiation and completion, financial and logistical barriers, and the integration of RZV into routine HIV care. Cost-effectiveness analyses are also needed to determine the value of different delivery and financing strategies, particularly in resource-constrained settings.

Finally, Asia-Pacific and low- and middle-income country-specific evidence should be prioritized. Region-specific studies are needed because vaccine availability, affordability, healthcare infrastructure, financing mechanisms, and models of HIV care vary substantially across countries. Generating local evidence will be essential for developing context-appropriate vaccination policies and implementation strategies rather than relying predominantly on evidence from high-income settings.

Overall, future research should move beyond the question of whether RZV elicits an immune response toward a broader set of questions: who should be vaccinated, when should vaccination occur, how can vaccination be effectively delivered, and why do eligible PLWH accept or decline vaccination? Integrating clinical, behavioral, implementation, and health-system evidence will be essential to translate RZV immunogenicity and established protection in broader populations into equitable vaccine uptake and meaningful reductions in HZ-related morbidity among PLWH.

Conclusion

PLWH remain at increased risk of HZ and its complications because of persistent impairment of VZV-specific cellular immunity. As a non-live vaccine, RZV represents an important preventive strategy for this population, with available evidence demonstrating robust immunogenicity and a generally favorable safety profile. Major international guidelines consistently recommend RZV for adults with HIV; however, HIV-specific evidence regarding long-term effectiveness, durability of protection, and optimal vaccination timing in individuals with advanced immunosuppression remains limited.

The key challenge is therefore no longer simply establishing the rationale for RZV vaccination, but translating recommendations into effective and equitable delivery. Financial and access barriers, inconsistent provider recommendations, vaccine confidence, and fragmentation of vaccination services within HIV care may continue to limit uptake, particularly in resource-constrained settings. Future research should prioritize real-world effectiveness, long-term protection, cost-effectiveness, vaccine acceptance and behavioral determinants, and implementation strategies, with greater emphasis on the Asia-Pacific region and other low- and middle-income settings. Closing this evidence-to-implementation gap will be essential to ensuring that eligible PLWH can access, accept, and complete RZV vaccination and, ultimately, to reducing the burden of HZ-related morbidity.

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Conflict of interest

The authors declare that they have no conflicts of interest related to this work.

Ethical considerations

Protection of human subjects and animals. The authors declare that no experiments on humans or animals were performed for this research.

Confidentiality, informed consent, and ethical approval. This study does not involve personal patient data, medical records, or biological samples, and does not require ethical approval. SAGER guidelines do not apply.

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