










**ORIGINAL ARTICLE**

# Long-term success for people living with HIV: A framework to guide practice

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**Abstract**

**Objectives:** In recent decades, the needs of people living with HIV have evolved as life expectancy has greatly improved. Now, a new definition of long-term success (LTS) is necessary to help address the multifaceted needs of all people living with HIV.

**Methods:** We conducted a two-phase research programme to delineate the range of experiences of people living with HIV. The insights garnered from these research phases were explored in a series of expert-led workshops, which led to the development and refinement of the LTS framework.

**Results:** The insights generated from the research phases identified a series of themes that form a part of LTS. These themes were subsequently incorporated into the LTS framework, which includes five outcome pillars: sustained undetectable viral load, minimal impact of treatment and clinical monitoring, optimized health-related quality of life, lifelong integration of healthcare, and freedom from stigma and discrimination. A series of supporting statements were also developed by the expert panel to help in the achievement of each of the LTS pillars.

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**Conclusions:** The LTS framework offers a comprehensive and person-centric approach that, if achieved, could help improve the long-term well-being of people living with HIV and support the LTS vision of ‘every person living with HIV being able to live their best life’.

**KEYWORDS**

AIDS, antiretroviral therapy, health-related quality of life, HIV, person-centred health systems, stigma, well-being

## INTRODUCTION

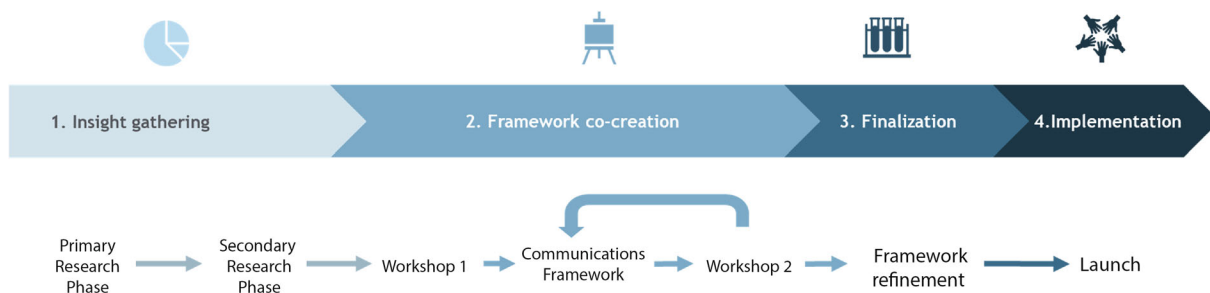
The ability to identify, diagnose, and treat HIV has markedly improved, enabling more people living with HIV to achieve life expectancy similar to that of the general population [1, 2]. However, as explored in our previous article, people living with HIV are exposed to an excess risk of age-related comorbidities [3], which can be exacerbated by late diagnoses [4] and can influence mental health [5] and physical functioning [6]. In addition, perennial societal and structural issues, including stigmatization [7], poverty [8], syndemics [9], and social isolation [10], continue to threaten the quality of life (QoL) of people living with HIV.

As such, there is a need for the HIV medical community to consider a broader vision of long-term success (LTS) that considers control of viraemia as one aspect of success for the long-term QoL of people living with HIV. Specifically, as the HIV management landscape has shifted, a new definition of LTS must consider other factors integral to meeting the evolving needs of people living with HIV.

To gain a deeper understanding of what LTS means to the HIV community, we undertook a comprehensive stepwise investigation, including a review of the HIV management landscape. Using the insights gained, we developed a framework for use by healthcare professionals (HCPs), policymakers, and others caring for people with HIV to support long-term healthy ageing.

## METHODS

To delineate the experiences of people living with HIV, we devised a two-phase research programme of insight gathering, each with its own objectives (Figure 1). The objective of the primary research phase was to understand the beliefs and priorities of the HIV community around LTS for people living with HIV. To achieve this, we conducted 25 double-blind 60-min interviews with HCPs, people living with HIV, and payers across seven countries (Canada, France, Germany, Italy, Spain, the UK, and the USA). All interviewees were recruited through a professional recruitment agency. In total, there were six HIV payers, 12 HCPs with 16–26 years in practice seeing 80–160 patients every month, and seven people living with HIV aged 22–66 years with a diagnosis of 1–32 years (median 4 years). The interviews were semi-structured and explored topics such as treatment goals for people living with HIV, aspects of health and well-being that can impact outcomes, drivers and constraints in treatment decisions, and the barriers and opportunities to optimize long-term outcomes for all people living with HIV. All interviews were tailored to the role and experience of the interviewee. Insights from these interviews were aggregated into general trends per audience and presented in report format to an expert panel. It is important to note that these individuals were recruited from high-income countries, so some of the insights may not reflect the priorities of other populations.



**FIGURE 1** Roadmap to the long-term success (LTS) communications framework. To gain a deeper understanding of what LTS means to the HIV community, we conducted a two-phase research programme and a series of expert-led workshops.

The objective of the secondary research phase was to understand how LTS for people living with HIV is currently discussed in the scientific literature and community conversations. To achieve this, we performed a literature review and an advocacy audit and undertook social listening to support the insights gathered from interviews with the HIV community. The literature review involved a PubMed search of articles published in the English language between 1 January 2015 and 28 February 2021. Results were restricted to articles in English and excluded congress abstracts. Search terms included HIV, living well, wellness, quality of life, ageing, aging, patient-centered, patient satisfaction, fragile, frail, antiretroviral therapy, highly active, and inflammation. Articles were reviewed and selected for relevance, and key conclusions were extracted for the panel's consideration. The advocacy audit involved desk-based research in February 2021 to identify advocacy groups (Canada, France, Germany, Italy, Spain, the UK, the USA, and Global) with goals and objectives associated with LTS for people living with HIV. Finally, we performed the social listening research using an artificial intelligence platform between December 2019 and December 2020; it involved an analysis of conversations in the English language across Twitter and public forums such as Reddit. These conversations focused on treatment success, comorbidities, long-term health, and QoL.

An expert panel comprising five HCPs and six advocates/people living with HIV from institutions across Europe and the USA then took part in two workshops between April and June 2021. These experts were selected based on their clinical, research, and/or patient advocacy expertise within the HIV field. The expert panel reviewed the outputs from the previous research phases to seek a consensus on re-defining LTS for people living with HIV in order to achieve the vision of 'every person living with HIV being able to live their best life'. The panel identified key factors that impact LTS and incorporated them into a framework that defines a holistic strategy for the care of people living with HIV.

## RESULTS

### Primary research phase

Overall, HCPs regularly and consistently reported viral load, general health, drug tolerance, and co-infections as being monitored in healthcare settings, whereas mental health, QoL, and stigma were inconsistently monitored. They also noted viral suppression and immunological competence as the primary outcomes to achieve in HIV management, with broader health and well-being and mental health as secondary outcomes.

All people living with HIV highlighted that treatment decisions were primarily driven by HCPs. In addition, they also all noted that the need to take medication every day was the main aspect of having HIV that practically impacted their life. Despite progress in recent years, some people living with HIV also described varying degrees and types of stigma as ongoing.

HIV payers reported minimal restrictions on access to HIV drugs, with most respondents feeling that clinical goals in HIV have been achieved because of the availability of multiple effective drugs. It was expressed that the focus is now on normalizing life, for example, avoiding resistance and long-term health problems, long-term simplicity (i.e., reduced drug-drug interactions [DDIs]), and reduced frequency of healthcare interactions.

### Secondary research phase

The literature search garnered a total of 5608 hits, of which 38 were of high priority based on themes related to LTS for people living with HIV. Key findings were taken from these papers and summarized in a report. Overall, within the papers, HIV was universally recognized as a chronic condition that requires lifelong treatment. Premature ageing, inflammation, poor mental health, healthcare inequalities, and high rates of comorbidities were all found to contribute to poor QoL. We also found that, although the World Health Organization (WHO) does not provide targets for attainment of good QoL for people living with HIV, it is increasingly recognized that good health-related QoL (HRQoL) should be implemented. The literature also demonstrated that HIV healthcare providers should consider broader health and well-being factors when defining LTS, with management strategies evolving as patients' needs change.

For the advocacy audit, we conducted desk research to determine the key advocacy groups with goals and objectives most closely aligned with the LTS ambition. The research focused on two key areas: HIV-focused groups and comorbidity-focused groups. As multiple groups were found, criteria were created to select the most relevant: size of organization, length of service, level of current activity, alignment with LTS priorities, and social media reach. While there was variation between groups, the majority concentrated their efforts on advocating for treatment access, prevention, and education around stigma, with a key focus on 'undetectable equals untransmittable' (U=U). Many global groups and non-governmental organizations focused on diagnosis, treatment, and prevention in the priority geographies of sub-Saharan Africa and Asia. Living and ageing well with HIV was not a key focus for many groups, with groups in

the USA, UK, and Europe being most likely to feature these topics as part of the information they provide or activities they undertake. Groups that did discuss living and ageing well with HIV mainly focused on socioeconomic factors, physical health, and mental health and wellness.

The social listening phase was used to gain qualitative insights from people living with HIV and patient advocacy groups on key themes that support LTS. It was found that HIV treatment conversations made up around 10% of overall HIV mentions worldwide (736 000 conversations). The majority of conversations were on Twitter. However, there was still a substantial number of conversations on forums, particularly Reddit. Our sub-themes included the following.

- **Treatment success (69 000 conversations):** Posts demonstrated that being undetectable was considered the main treatment success factor. Advances in treatments and newer therapies were also considered more 'successful'.
- **Comorbidities (76 000 conversations):** COVID-19 sparked many discussions related to HIV and comorbidities. Patients were also aware that HIV was well controlled by modern medications.
- **Long-term health (511 conversations):** Concerns for long-term health were mostly in relation to high viral load and poor control of the virus. COVID-19 prompted more conversations in this area, relating to the similarity between the two conditions.
- **QoL (70 conversations):** QoL in relation to HIV was referred to in the majority of posts but in general terms without discussion of what it means or looks like. Patients were also aware that better QoL can now be achieved because of the evolution of treatment.

## Expert panel workshops

In the first workshop, the expert panel discussed and aligned on what constitutes a successful outcome for people living with HIV and what key factors can contribute to this success. They agreed that, to achieve the vision of 'every person living with HIV being able to live their best life', the following focus areas of HIV care were important:

- effective, well-tolerated, convenient medication
- effective healthcare provision and support for holistic well-being, including healthy ageing and mental health support
- reduced internal and external stigma and discrimination

- continuity and equity of care
- collaborative decision-making and community support
- empowerment and dignity for people living with HIV.

Key insights from these discussions were then used to develop a communications framework with components that supported the LTS vision.

In the second workshop, the expert panel reviewed, simplified, and refined the communications framework and identified potential initiatives to implement the LTS components. The panel identified further clarifications of the framework, for example, changing holistic health to QoL. They also highlighted U=U as an important consideration across the framework, not just in relation to internalized stigma.

The expert panel noted that HCP communication and empathy training/support were imperative to facilitate improved interactions with people living with HIV. They felt that public health campaigns around U=U and stigma and discrimination would help enhance disease awareness. Optimizing educational resources and information to empower people living with HIV was also reported to help facilitate engagement (and reengagement) with healthcare. Finally, clarity and consensus around appropriate patient-reported outcome measures (PROMs) was noted as key to support the implementation and uptake of these person-centred tools.



**FIGURE 2** The long-term success (LTS) framework. The LTS framework was co-developed by an expert panel and defines a holistic strategy for the care of people living with HIV.

## The LTS framework

The insights generated from these research phases consistently identified a series of themes that aligned with the desired outcomes to support LTS. These themes were used to develop a communications framework that, after the final workshop, the expert panel further consolidated and refined to form the basis of the LTS framework (Figure 2).

This framework includes the following five key outcome pillars that, if achieved, would support the LTS vision:



**Pillar 1. Sustained undetectable viral load:** Achieving and maintaining an undetectable viral load was identified as a primary treatment goal. This will require universal access to antiretroviral therapy (ART) regimens that are recommended by internationally recognized guidelines.



**Pillar 2. Minimal impact of treatment and clinical monitoring:** Treatment-related factors and numerous clinic visits were among



the most notable burden of living with HIV. This will entail simpler and convenient care based on the individual needs of the patient.



**Pillar 3. Optimized HRQoL:** Maintaining an optimal HRQoL was recognized as an important goal for people living with HIV. This will warrant person-centred healthcare that addresses the physical, psychological, and social well-being of the individual.



**Pillar 4. Lifelong integration of healthcare:** Consistency of care among multidisciplinary HCPs was considered a key factor in improving healthcare outcomes. This will necessitate better integration of healthcare services as well as improved access to education and information that supports shared decision-making.

**Pillar 5. Freedom from stigma and discrimination:** Stigma and discrimination were identified as key barriers to achieving optimal

**TABLE 1** The five pillars of the long-term success (LTS) framework and associated supporting statements.

Framework pillar	Supporting statements
1. Sustained undetectable viral load	<ul style="list-style-type: none"> <li>• There should be fair and barrier-free access to antiretroviral therapy (ART) that is recommended by internationally recognized guidelines</li> <li>• ART should provide rapid, durable viral suppression</li> <li>• ART should be robust with a high barrier to resistance</li> </ul>
2. Minimal impact of treatment and clinical monitoring	<ul style="list-style-type: none"> <li>• Clinic visits and regular monitoring, where possible, should be flexible and accommodate the preferences of the individual</li> <li>• An ART regimen should be well-tolerated with a low potential for drug–drug interactions (DDIs) to reduce the risk of associated adverse effects</li> <li>• There should be low potential for ART to cause or worsen other comorbid conditions</li> </ul>
3. Optimized health-related quality of life	<ul style="list-style-type: none"> <li>• Patient-reported outcome measures can help identify and address the individual's needs, empowering people living with HIV to contribute more actively to their healthcare plan</li> <li>• ART should minimize the potential for DDIs, to support long-term healthy ageing</li> <li>• Increasing awareness of undetectable equals untransmissible (U=U) should empower people living with HIV to pursue intimate relationships without fear of transmission</li> <li>• Mental health support should be sensitive to the cultural and socio-economic needs of people living with HIV</li> </ul>
4. Lifelong integration of healthcare	<ul style="list-style-type: none"> <li>• HIV management should be multidisciplinary, with an integrated and consistent approach that is responsive to the diverse needs of the individual</li> <li>• Enhancing health literacy should empower people living with HIV to make informed choices about their HIV care with support of their healthcare team</li> <li>• There should be consistent access to and sharing of patient information across the multidisciplinary healthcare team by informed consent</li> </ul>
5. Freedom from stigma and discrimination	<ul style="list-style-type: none"> <li>• Societal stigma, interpersonal stigma, and discrimination must be reduced through education, public health campaigns, awareness of U=U, and prevention initiatives</li> <li>• Stigma and discrimination must be eliminated within all healthcare settings to provide inclusive health and social care policies that support access to services</li> <li>• Societal and peer support should focus on reducing self-stigmatization and build confidence, resilience, and coping strategies</li> <li>• Structural barriers and punitive healthcare policies that allow discrimination need to be removed</li> </ul>

healthcare outcomes for people living with HIV. This will require the implementation of appropriate social and structural interventions to eliminate the discriminatory policies and negative conversations surrounding HIV.

The expert panel developed a series of supporting statements to further support the achievement of each of the LTS pillars (Table 1). These supporting statements summarize the elements needed to support each essential outcome in order to achieve the LTS vision. In summary, this framework and its supporting statements offer healthcare systems and society an approach that supports efforts to meet the needs of people living with and at risk of HIV. Effective and proactive communication and implementation of this framework could help to improve the clinical outcomes, QoL, and well-being of people living with HIV across the continuum of care and support the prevention of new HIV infections.

## DISCUSSION

To achieve LTS for people living with HIV, a person-centred approach that incorporates treatment decision-making and encompasses all aspects of HIV management and HRQoL is essential. This can be achieved by implementing change across the five LTS framework pillars. Below, we delve further into each of the pillars, exploring how they can address some of the unmet needs within HIV management and support the long-term well-being of people living with HIV.

### Sustained undetectable viral load

Without barrier-free access to ART, achieving and maintaining an undetectable viral load cannot become a reality for the majority of people living with HIV. It is therefore essential to address the structural and societal barriers that exist across HIV care to increase uptake and maintenance of ART [11]. In addition, there is a requirement for differentiated and integrated models of care to ensure that the unique needs of key populations are addressed [11]. A person-centred care model with a focus on retention and re-engagement will help address barriers to care [11] and enable the updated Joint United Nations Programme on HIV/AIDS (UNAIDS) 95-95-95 targets and the WHO's new 2022–2030 global health sector strategy for HIV to be achieved [12, 13].

Another critical component to achieving sustained undetectable viral load is ensuring that ART regimens can provide rapid and durable viral suppression. Since

the US Food and Drug Administration approved the first antiretroviral drug in 1987, improvements in ART have resulted in fewer side effects and greater reductions in HIV viral load [2]. Newer ART regimens, such as integrase strand transfer inhibitor-based regimens, have been shown to reach viral suppression more rapidly than boosted protease inhibitor regimens [14]. Consequently, early viral suppression through such ART regimens can help reduce transmission [15] and inflammatory markers [16]. Recommendations have suggested that initiating these therapies immediately after diagnosis may increase ART uptake and linkage to care, reduce the time to viral suppression, improve the rate of suppression among people living with HIV, and reduce the risk of HIV transmission [17, 18]. The durability and tolerability of first-line regimens are other important factors to consider for the management of HIV infection [19]. Research has found that a substantial proportion of individuals who start ART and achieve viral suppression will not experience viral rebound on their first-line regimen over their lifetime [20]. In particular, modern regimens can achieve lifelong suppression of HIV viral load because of their improved durability compared with earlier ART regimens [21]. Therefore, it is important to rapidly diagnose HIV and initiate ART as soon as possible to maximize the benefits of these therapies during this critical period. However, it is also essential to consider a person's readiness to start and adhere to the regimen as ART is lifelong treatment [18]. Finally, it is vital to implement strategies to optimize care engagement, retention, and treatment adherence, particularly for those who face barriers to starting or remaining on treatment [17].

Drug adherence is important to the outcomes of therapy, yet – in the real world – people living with HIV face many barriers to consistent adherence, such as treatment fatigue, stigma, and comorbid conditions (e.g., mental health disorders) [22, 23]. Therefore, an effective ART regimen should be able to accommodate the various challenges and lifestyles of people living with HIV. For example, long-acting ART represents a promising approach to overcome adherence challenges associated with treatment fatigue, improve patient privacy, and reduce social stigmas associated with HIV [24]. In recent years, it has also become clear that the relationship between ART adherence and resistance is more complex than simply 'non-adherence leads to drug-resistant HIV' [25]. Estimates indicate that HIV viral suppression can be achieved with an ART adherence level of 82% and even lower with newer ART regimens [22]. The ability of a regimen to achieve and sustain viral suppression, despite adherence below 100%, is influenced by factors that include pharmacological, viral, biological, adherence-resistance relationship, and regimen type [26]. Newer and more robust ART

regimens with higher genetic barriers to resistance have been found to be more 'forgiving' of imperfect adherence than were older regimens [27–29]. As a result, it is important to consider these factors when selecting regimens in order to support those who struggle to achieve high levels of adherence.

### Minimal impact of treatment and clinical monitoring

Numerous clinic visits can be burdensome for people living with HIV and can, in turn, lead to reduced adherence and engagement with care [30]. Guidelines suggest that adapting HIV services to better accommodate the needs and preferences of people living with HIV can reduce unnecessary burden on both patients and healthcare systems [17, 31]. For example, some people living with HIV have reported that more flexible methods for monitoring, such as telehealth, fit in better with their schedule and reduce travel time [32]. In addition, a consultation schedule with longer intervals between clinic visits and drug refills has been shown to result in 86–93% retention for clinically stable patients enrolled, compared with 47% retention for those not enrolled [33]. This aligns with guidelines that support extending the visit interval to 6 months for stable, adherent patients whose viral load has been suppressed for over 2 years [17]. If effectively implemented, these approaches could help remove existing barriers and improve patient retention in care [32, 33]. Strategies that also consider the social and financial barriers to care will be important to keep people living with HIV engaged with their care long term [34].

Another major impact of HIV care on daily life is the risk of DDIs. Given the need for lifelong ART and additional medications for comorbidities, people living with HIV can be at greater risk of DDIs than those without HIV, making it critical for clinicians to consider the potential DDIs that may arise from ART and other concomitant drugs [35]. Although predicting the significance of such interactions is challenging, guidelines suggest that clinicians should be vigilant in monitoring therapeutic efficacy and toxicities when such prescriptions are necessary [17].

It is well established that people living with HIV have a higher prevalence of comorbidities than those without HIV and often experience them at a younger age [36, 37]. Therefore, it is important to ensure that ART does not cause or exacerbate other comorbid conditions. Assessing whether other equally effective treatment options (including non-pharmacological treatments) can be used to avoid interactions and treat symptoms is important to reduce the impact of these conditions on people living with HIV [17, 38].

### Optimized health-related quality of life

Alongside the WHO's initial 90-90-90 targets, a fourth goal was proposed to improve HRQoL for people living with HIV [39]. This target aims to expand HIV care beyond the current endpoint of achieving viral suppression to ensure that the complete needs of all people living with HIV are met. HRQoL is an important aspect of care and can be assessed by PROMs [40, 41]. The use of PROMs in clinical care has been shown to empower patients, drive person-centric HIV care, help HCPs identify patients' concerns, and encourage patient engagement with services [10]. This dual HCP–patient benefit garnered from PROMs can facilitate priority setting and shared decision-making and, if effectively implemented, could enhance the HCP's ability to gain valuable insights into the HRQoL of people living with HIV [42].

Since ART is lifelong, minimizing the potential for DDIs is essential to improve the HRQoL of people ageing with HIV. This is particularly important as older people living with HIV are at increased risk of experiencing comorbidities and poorer organ function than are younger people living with HIV and those without HIV [43–45]. Close attention to the selected ART regimen and any other medications for non-HIV conditions to avoid DDIs is required [44]. This necessitates an individualized and multifaceted approach to ensure appropriate ART selection and dose adjustments that will prevent adverse drug effects. Newer ART regimens have been shown to have substantially fewer DDIs than boosted regimens [46]. The management of polypharmacy, which increases in prevalence in people living with HIV aged  $\geq 65$  years, requires particular attention to reduce the risk of DDIs [47]. In this context, de-prescribing strategies may help reduce medication-related burden and support a patient-centred precision medicine approach [47].

Another approach to optimizing HRQoL is empowering people living with HIV to take an active role in their care. The U=U global campaign was developed by the Prevention Access Campaign to build a consensus on the science underpinning U=U [48, 49]. This provides a health target that motivates and incentivises people living with HIV to take personal responsibility in reaching and maintaining undetectability [48, 49]. The campaign also helps adjust the narrative surrounding transmission, which is a major source of fear and stigma for people living with HIV [48]. Communication of U=U has been associated with greater adherence, improved mental health, better social interactions, greater viral suppression, and greater willingness to share HIV status [48]. Nonetheless, the association between exposure to the U=U campaign and health outcomes varies by several factors, including age and gender [48]. This shows that more robust outreach

and tailored communication on the benefits of U=U could improve its acceptability and, ultimately, benefit individual and public health [48]. Moreover, while U=U is based on data on sexual transmission, there are now efforts to consider this paradigm within the context of vertical transmission (during pregnancy, childbirth, or breastfeeding), where the implications of transmission are entangled with major social, cultural, ethnic, religious, and financial challenges [50].

The burden of mental health problems among people living with HIV has a substantial impact on HRQoL and is one of the most challenging barriers to achieving LTS. Compared with people without HIV, people living with HIV are at a greater risk of mental health conditions, which can often affect linkage to care and retention [17, 51, 52]. Evidence suggests that, for people living with HIV, impairment in mental health leads to negative health outcomes throughout their life, including behaviours associated with poor health outcomes and suboptimal treatment adherence and, consequently, the ability to achieve viral suppression [51]. In addition, those who are vulnerable to mental health conditions often face social and economic challenges, including poverty, unstable housing, and food insecurity [51]. However, substantial challenges are associated with the provision and scale-up of mental health services, especially within resource-constrained settings [51]. Addressing the existing disparities and insufficiencies within current mental health services, particularly for minority populations that experience intersectional stigma and structural inequities, is essential to improve global access and strengthen care outcomes [23, 51, 52]. Strategies to improve the provision of mental health care for people living with HIV include improving HCP education, expanding care delivery systems (e.g., telemedicine), and optimizing treatment approaches [17]. It will also require integrating mental health services into existing HIV programmes to provide comprehensive, person-centred HIV care that would help improve global access to mental health services [1, 51, 53].

## Lifelong integration of healthcare

Care for long-term conditions, including HIV, can be siloed, which acts as a barrier to the provision of holistic care. Ensuring that healthcare is interconnected to meet the needs of the individual patient is essential for a person-centred approach. With an increased burden of comorbidities and mental health issues, people living with HIV face more complex treatment plans. To support adherence and maintain viral suppression, a multidisciplinary approach is considered the ideal management strategy for HIV care [54]. There is some evidence that

introduction of an integrated multidisciplinary team HIV care model can increase the rates of undetectable viral load [54]. People enrolled in such programmes have been over three times more likely to achieve viral suppression than those receiving only primary care [55]. Other integrated approaches, such as a speciality HIV pharmacy, also increased adherence among those who opted into the service compared with those who opted out [56]. These observations demonstrate the value of developing and implementing such models to help improve treatment outcomes.

Within these multidisciplinary teams, it is important to ensure consistent access to and safe sharing of patient information. With the ever-growing availability of patient data and the increasing value of data sharing in research and care, it is essential that information-sharing technology is compliant with privacy regulations. It must uphold the consent and confidentiality of the patient and support the interoperability and reuse of such data for scientific advancement [57, 58]. An effective sharing system can enhance collaboration among researchers and the care team, avoid uncertainty and delays in decision-making, and instil confidence in treatment and care choices [58]. Nonetheless, people living with HIV must have confidence in the safety and security of such systems and feel comfortable with sharing their data [59].

Alongside HCP support, empowering people living with HIV to make informed decisions about their care is vital to improve health-related outcomes. For example, HIV-specific knowledge has been associated with 2.8 times greater odds of appointment adherence [60]. In addition, knowledge of CD4 cell count and viral load has been associated with 4.9 times greater odds of undetectable viral load [60]. It is therefore important for clinicians to assess patients' health literacy and tailor both education and adherence counselling efforts accordingly. Alongside education to improve health literacy, education on self-management is an essential aspect of managing HIV and empowering people living with HIV. Self-management can improve health status, reduce hospital visits, improve clinical care and outcomes, and reduce the burden of comorbidities [61]. Identifying interventions that will help improve self-management is critical for maximizing the benefits of treatment for people living with HIV on ART [61].

## Freedom from stigma and discrimination

HIV-associated stigma and discrimination are key contributors to the HIV epidemic [62, 63]. They have a significant impact on the QoL of people living with HIV and thus require proactive efforts, such as education, public



health campaigns, awareness of U=U, and prevention initiatives to reduce their impact and enhance knowledge of HIV. Interventions that have aimed to educate and train HCPs about HIV and HIV-related stigma and discrimination have shown promising results with reducing stigmatizing attitudes and behaviours and increasing knowledge among HCPs [64, 65]. Ultimately, these interventions can help enhance conversations between HCPs and people living with HIV and improve HIV services. Over the past few decades, the forms of stigma experienced by people living with HIV have evolved. The success of treatment and improvements in prognosis for those with HIV infection have been accompanied by changes in the way stigma manifests and is perceived by people living with HIV [63]. For example, before the availability of effective ART, people living with HIV experienced alarming instances of stigma, discrimination, and violence associated with a lack of public understanding of HIV and how it could be transmitted [63]. Contemporary experiences of HIV stigma are underpinned by the continued anticipation of discrimination and internalized stigma [63]. Research has shown that involving stigmatized individuals in HCP training may help to breakdown stereotypes and reduce stigma [63, 66]. It is clear that further research into stigma and its intersectionality, as well as the development of interventions alongside community groups, is needed to help improve knowledge and raise awareness of HIV.

Self-stigmatization is a continued challenge for people living with HIV and is significantly related to QoL outcomes such as depression, self-esteem, and general health [7]. Promising approaches to help reduce self-stigmatization and build confidence for people living with HIV are interventions involving social and peer support. Peer support among people living with HIV has a long history and grew out of activists' reactions to combat stigma and discrimination and advocate for better care in the 1980s [67]. Since then, peer support has continued to help people experiencing stigma and has become recognized as an important aspect of HIV care. Peer support can improve mental health and well-being, promote adherence and self-management, and reduce perceived and internalized stigma for people living with HIV [68, 69]. Additionally, as public stigma influences self-stigma, social support can also help to prevent people living with HIV from internalizing negative beliefs [61]. Evidence has shown that receiving social support can positively impact QoL outcomes, including rates of depression and anxiety, and general health [7]. Therefore, integrating societal and peer-support interventions, alongside existing services, could help reduce stigma and improve health and QoL outcomes for people living with HIV [7, 67, 70].

Stigma and discrimination within the healthcare setting still exists, particularly in African countries [71]. As people living with HIV require ongoing medical care throughout their lives, the healthcare setting is a critical place to eliminate such issues. To address the structural- and individual-level factors that contribute to this type of stigma and discrimination, skills-building and structural interventions, such as non-discriminatory policies, must be implemented to support access to services for people living with HIV [63]. Stigma within a healthcare context can also impede HCPs' delivery of important educational campaigns, such as U=U [72]. Establishing universal U=U patient education guidelines and incorporating such education into HIV services could help facilitate HCP-patient conversations and promote a positive change against stigma and discrimination.

One of the most effective approaches to reducing stigma and discrimination is the removal of structural barriers and healthcare policies that allow such narratives to exist. The law is often viewed as a reflection of public attitudes; therefore, altering laws that contribute to stigma may be an effective strategy to reduce it [73]. In addition, implementing policies that ensure high-quality information regarding HIV in school curricula will be important to alter these negative narratives early [73]. Increasing access to justice for people living with HIV through increased funding for legal aid and specialized HIV services will also be essential to enable people to challenge discrimination more easily [73].

## CONCLUSION

Collectively, the five pillars of the LTS framework offer a comprehensive, consistent, and person-centric approach to achieving shared treatment and care objectives that will support LTS. This approach underpins a vision of living well with HIV, and it is paramount that LTS continues to evolve in conjunction with developments in HIV treatment, prevention, and cure research and knowledge. Future work on expanding and adapting LTS needs to go beyond resource-rich countries to ensure that, globally, every person living with HIV is able to live their best life.

## AUTHOR CONTRIBUTIONS

All authors were part of the expert panel mentioned in this supplement. All authors contributed to the concept of this supplement and to drafting and revising the text. All authors read and approved the final version for publication.

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## CONFLICT OF INTEREST

JVL has received speaker fees from AbbVie, Gilead Sciences, Janssen, MSD, Novo Nordisk, and ViiV Healthcare and grants to his institution from AbbVie, Gilead Sciences, MSD, and ViiV Healthcare. DW has received research grants and fees for advisory boards and lectures from Gilead Sciences, MSD, Janssen, ViiV Healthcare, and Theratechnologies. MC has received consultancy fees from Gilead Sciences and ViiV Healthcare. GG has received study grants and attended advisory boards for ViiV Healthcare, Gilead Sciences, Janssen, and Merck. JR has received honoraria for participating on advisory boards and speaking at educational events from Gilead Sciences, Janssen, Merck, Theratechnologies, and ViiV Healthcare. MH has received consultancy and speaker fees from Gilead Sciences and ViiV Healthcare. BR has received grant income from and has served as an advisory consultant for Gilead Sciences and ViiV Healthcare and has received grants and fee-for-service income from Janssen and Merck. GB has received payments from Gilead Sciences as a speaker, advisory board member and as an educational grant, and has also received compensation from ViiV Healthcare as part of a working group. JA has received consultancy and speaker fees from Gilead Sciences, ViiV Healthcare, and MSD. MJF has received consultancy fees from Gilead Sciences, Janssen, MSD, ViiV Healthcare, GSK, and Theratechnologies and has received payments for lectures or educational presentations from Gilead Sciences, Janssen, MSD, and ViiV Healthcare.

## DATA AVAILABILITY STATEMENT


Data sharing is not applicable to this article as no new data were created or analysed in this study.


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