



Assessing Evidence and Proposing a Conceptual Framework to Enhance HIV Testing and Mental Health Awareness Among Middle-Aged and Older Men who have Sex with Men: Insights from Social Work Perspective on Practical Interventions

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Accepted: 4 August 2025
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Abstract

Introduction HIV testing rates among middle-aged and older men who have sex with men (MSM) in the broader Chinese population remain low, despite their heightened vulnerability to HIV and mental health challenges. This study proposes a conceptual framework that integrates the Social Ecological Model (SEM) and the Theory of Planned Behavior (TPB) to enhance HIV testing and mental health awareness among this population, while offering social work insights on effective interventions.

Methods The study applies SEM and TPB to examine the factors influencing HIV testing behaviors in older MSM. SEM highlights the need for multi-level interventions, including personalized health communication and social support networks, while TPB identifies psychological barriers such as stigma, attitudes, and perceived behavioral control.

Results Key barriers to HIV testing include lack of tailored healthcare services, fear, and stigma. These psychological and structural barriers contribute to persistently low testing rates in this group.

Conclusions Integrating mental health support into HIV testing services is essential for improving outcomes. Addressing stigma and creating a supportive environment for testing can improve well-being among middle-aged and older MSM. Social workers play a critical role in providing psychological support, advocating for inclusive healthcare, and promoting systemic changes.

Policy Implications Public health initiatives should leverage technology, such as social media, and invest in outreach programs while training healthcare providers on MSM-specific needs. Campaigns must normalize HIV testing, challenge stereotypes, and promote mental health support to increase testing rates and improve overall health outcomes.

Keywords HIV testing · Mental health · MSM · Middle-aged · Older adults · Social Ecological Model · Theory of Planned Behavior · Public health · Stigma · Tailored interventions

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Introduction

HIV testing and mental health are two major concerns for middle-aged and older men who have sex with men (MSM). This group faces unique challenges that are often overlooked in HIV prevention and mental health programs. Research shows that MSM, especially in places like Mainland China and Hong Kong, deal with mental health issues such as depression, suicidal thoughts, and stigma related to HIV (Fu, 2023). In health research, the categorization of age groups such as “middle age” and “older adults” can differ across studies and guidelines. Generally, Middle age is defined as individuals aged 40 to 65 years, as noted in

studies emphasizing cardiovascular disease risks among populations ranging from 40 to 69 years, which underlines this demographic's heightened health concerns (Yoo et al., 2023). Older adults are frequently classified as those aged 65 years and above, as established by various health initiatives and demographic analyses (Krist et al., 2021; Selvaraj et al., 2024).

Mental health struggles, including anxiety and depression, can make it harder for these men to engage in safe sexual practices and use HIV-related services (West et al., 2024; Torres et al., 2024; Parcesepe et al., 2023). Social workers play an important role in helping address these issues by recognizing how mental health and stigma affect HIV testing and care. Middle-aged and older MSM often carry additional burdens due to a lack of targeted healthcare services and culturally competent care. Many of these individuals grew up in a time when HIV was highly stigmatized, and as they age, they may feel isolated or disconnected from modern healthcare systems. This generational gap, along with the compounded stigma of aging and sexuality, can contribute to reluctance in seeking HIV testing. Additionally, older MSM often experience significant barriers to health education, primarily due to sociodemographic factors such as age, socioeconomic status, and the intersectionality of race and sexual orientation. Limited educational opportunities hinder their ability to access health resources effectively, contributing to health disparities that disproportionately affect this population (Dwyer-Lindgren et al., 2024). For example, structural racism and economic inequities are recurrent themes obstructing access to necessary health services, thereby exacerbating existing health disparities prevalent among older MSM (LaVeist et al., 2023).

Moreover, digital literacy issues are linked with low access to health education, as many healthcare interventions increasingly rely on technology (Lyles et al., 2021; Wang et al., 2024). Without proper support systems including technological access, health literacy, and culturally competent care older MSM may struggle to obtain relevant health information (Herzer & Pronovost, 2021). Hence, addressing educational and technological inequalities is crucial for ensuring that older MSM have equitable access to health education and resources, which in turn supports better health outcomes (Donohue et al., 2022).

The Impact of Stigma and Social Isolation

Studies highlight the importance of addressing HIV-related stigma, sexual identity, and depression in MSM living with HIV, but there is less focus on older MSM, who face both ageism and sexual orientation-based discrimination. These men often experience higher levels of social isolation, which can contribute to poor mental health and lower rates of HIV testing (Chan, 2024). Social support is a critical factor in

improving mental health outcomes, and interventions aimed at building supportive networks are essential (Ikhile, 2024).

Mental Health and HIV Vulnerabilities in the COVID-19 Era

The COVID-19 pandemic has made the mental health challenges faced by MSM even more evident, increasing their vulnerability to HIV and mental health issues (Lin et al., 2023). Integrating mental health support into HIV care is important to improve overall health outcomes. Social workers can support this integration by offering counseling, reducing stigma, and advocating for services that address both mental health and HIV.

The Need for Tailored Theoretical Frameworks

Despite these needs, there is still a gap in how current frameworks address the specific challenges faced by older MSM. The SEM and the TPB are often not applied to this group in the context of HIV testing and mental health. These frameworks need to be adapted to better understand the multi-level factor personal, social, organizational, community, and policy—that impact HIV testing and mental health in older MSM. Social workers can use these models to design interventions that take into account the psychological barriers, stigma, and lack of tailored healthcare services that are barriers to testing and care.

Study Aim and Framework Development

This study aims to improve HIV testing and mental health awareness for middle-aged and older MSM in Hong Kong by developing a new framework based on SEM and TPB. This framework will help identify and address the psychological barriers such as fear, stigma, and negative attitudes that prevent HIV testing. It will also encourage multi-level interventions, such as better health communication, peer support, and policies that promote inclusive healthcare. The goal is to create practical interventions and policy recommendations that can improve health outcomes and address the specific needs of this group.

Methods

This study employs the SEM and the TPB to examine the influences on HIV testing behaviors and mental health awareness among middle-aged and older MSM. By integrating these frameworks, we aim to provide a comprehensive understanding of the multifaceted factors affecting HIV testing behaviors.

Conceptual Framework and Mechanisms

Applications

The methods employed in this study utilize the SEM to comprehensively examine the multi-level influences on HIV testing behaviors among middle-aged and MSM (Table 1). At the intrapersonal level, the study investigates individual factors such as knowledge, attitudes, and beliefs about HIV testing, noting that misconceptions and stigma-related fears can deter individuals from testing. The interpersonal level focuses on the impact of social support networks and stigma, highlighting how supportive relationships can encourage testing, while discrimination can serve as a significant deterrent. The organizational level assesses the role of healthcare organizations, emphasizing that a lack of culturally sensitive services for older MSM can hinder testing uptake. At the community level, the study evaluates norms and cultural attitudes towards HIV and MSM, finding that community stigma and a lack of resources negatively affect testing rates. Finally, at the policy level, the study examines healthcare policies and regulations, identifying that policy barriers, such as insufficient funding for targeted programs, can impede efforts to increase HIV testing rates among older MSM.

The TPB is applied to understand the psychological factors that influence HIV testing behaviors. Figure 1 and Table 2 employ the TPB to analyze the factors influencing HIV testing behaviors and mental health awareness among middle-aged and older MSM. These frameworks provide an understanding of the individual and contextual elements impacting HIV testing.

Results

Integration of SEM and TPB

By combining the SEM and the TPB, Table 3 offers a comprehensive framework for understanding the different factors that influence HIV testing behaviors among older MSM. The SEM identifies barriers and facilitators at multiple levels, while the TPB helps us understand the psychological aspects that drive these behaviors.

Multi-level analysis

The SEM framework looks at barriers and facilitators from different perspectives, ranging from individual fears and anxieties to larger social and policy challenges. This multi-level approach ensures that interventions can be

Table 1 Barriers and facilitators to HIV testing among middle-aged and older MSM at multiple SEM levels

Level	Key factors	Impact of the barriers
Interpersonal level	At this level, the focus is on social support networks and stigma. Supportive relationships with friends, family, and partners can encourage HIV testing, while experiences of stigma and discrimination can act as significant deterrents (Chambers et al., 2015; Kalichman et al., 2003; Sayles et al., 2007; Williams et al., 2019)	The presence or absence of supportive relationships plays a crucial role. Supportive friends, family, and partners can encourage HIV testing, while stigma and discrimination from these social circles can discourage individuals from seeking help, thus reinforcing avoidance behavior and limiting testing uptake
Organizational level	This level considers the role of healthcare organizations and their capacity to provide culturally sensitive services. Lack of tailored HIV testing services for older MSM within healthcare settings can hinder testing uptake (Hogan, 2019; Kumar, 2023; Panos & Panos, 2000)	Healthcare organizations that lack culturally sensitive services, particularly those tailored to older MSM, create significant barriers to testing. When healthcare settings fail to provide services that resonate with the specific needs and experiences of older MSM, it reduces their willingness to access testing, exacerbating health disparities
Community level	Community norms and cultural attitudes towards HIV and MSM are evaluated here. Community-level stigma and lack of resources can negatively impact HIV testing rates (Liang & Huang, 2022; Brennan-Ing, 2019)	Community attitudes towards HIV and MSM directly influence testing rates. In communities where stigma around HIV and MSM is prevalent, individuals are less likely to seek testing due to fears of judgment or exclusion. Additionally, a lack of resources and support from the broader community further discourages testing behaviors
Policy level	At this level, healthcare policies and regulations that influence access to HIV testing services are examined. Policy barriers, such as lack of funding for targeted programs, can impede efforts to increase testing rates among older MSM (Armoon et al., 2021; Hogan, 2019)	Inadequate healthcare policies and lack of funding for targeted HIV testing programs hinder efforts to increase testing rates. Without sufficient investment in programs tailored to the needs of older MSM, access to HIV testing services remains limited, perpetuating the cycle of under-testing in this demographic

Fig. 1 The conceptual framework of psychological factors influencing HIV testing behaviors according to the TPB

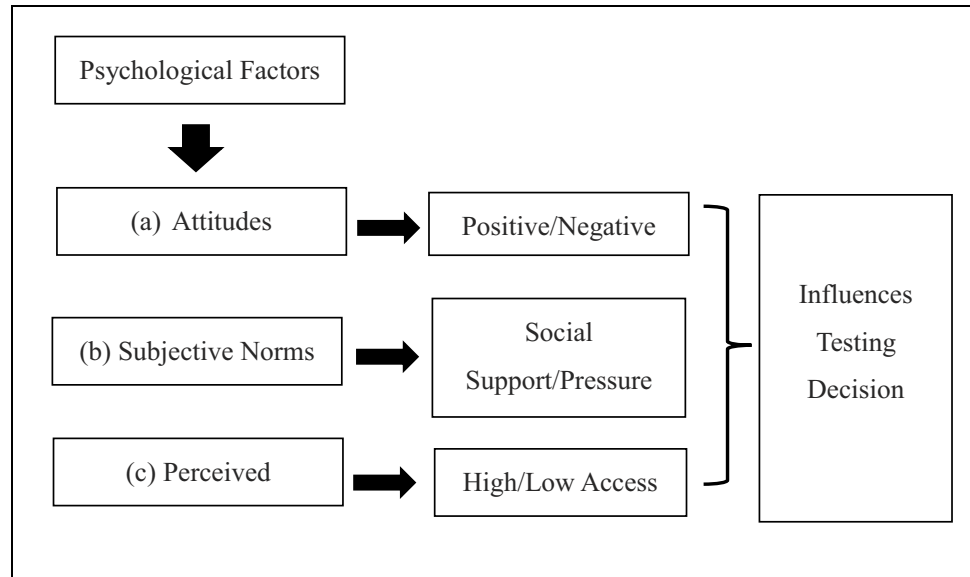


Table 2 Factors analyzed of psychological factors influencing HIV testing behaviors based on the theory of planned behavior

Component	Factors analyzed
Attitudes	The TPB assesses individual attitudes towards HIV testing, including fears, misconceptions, and perceived benefits. Negative attitudes towards testing, driven by fear of a positive result or stigma, can deter individuals from seeking testing
Subjective norms	This component evaluates perceived social pressures and norms related to HIV testing. If older MSM perceive that their social circle does not support HIV testing, they may be less likely to get tested
Perceived behavioral control	The TPB examines individuals' perceptions of their ability to access and undergo HIV testing. Factors such as availability of testing services and ease of access play a crucial role in shaping these perceptions

developed to target problems at each level, making them more effective.

Psychological insights

The TPB focuses on how attitudes, social pressures, and perceived control affect HIV testing behaviors. By understanding these psychological factors, social workers can create interventions that directly address these areas such as improving attitudes towards testing, changing social norms, and building confidence in the ability to get tested.

Tailored interventions

Together, the SEM and TPB provide a foundation for creating interventions that target specific barriers and strengths. For example, interventions might aim to improve people's attitudes towards HIV testing, strengthen their social support systems, and remove perceived barriers to accessing testing services. These tailored approaches ensure that interventions meet the unique needs of individuals and communities.

Discussion

Integrating theory-based frameworks such as the SEM and the TPB helps us understand the factors influencing HIV testing and mental health awareness among middle-aged and older MSM. These frameworks offer a foundation for designing public health interventions that consider the unique needs of this demographic (Booton et al., 2021). Middle-aged and older MSM face distinct challenges that often get overlooked in public health strategies. Many of these individuals may have grown up during times of heightened stigma surrounding HIV, leading to ingrained fears and misconceptions. As they age, they may experience a sense of isolation and a lack of tailored healthcare services. Social workers play a critical role in addressing these specific barriers by creating an environment where middle-aged and older MSM feel comfortable discussing HIV testing and mental health. Health communications should consider the history of this group, recognizing the trauma that many have experienced and focusing on building trust and reducing stigma.

The SEM is a framework that allows for understanding the multifaceted influences on HIV testing behaviors

Table 3 Integrating SEM and TPB for HIV testing behaviors for social work perspective on practical interventions

Level	SEM components	TPB components	Factors and interventions
Individual	Knowledge, attitudes, beliefs	Attitudes towards HIV testing	Social work interventions: educational programs to increase knowledge, reduce fear, and promote positive attitudes through clinical counseling, focusing on personal empowerment and psychoeducation
Interpersonal	Social support, stigma	Subjective norms	Social work practice: peer support groups to reduce stigma, foster social support, and encourage testing within a social work context that emphasizes empathy, empowerment, and strengthening relationships
Organizational	Access to services, healthcare provider attitudes	Perceived behavioral control	Clinical social work intervention: training for healthcare providers on MSM-specific needs, fostering a more inclusive, culturally competent healthcare environment, and ensuring social work advocacy for better patient engagement
Community	Cultural norms, community resources	N/A	Community-based social work interventions: community outreach programs, psychoeducation, and social work interventions to change harmful norms, reduce stigma, and provide accessible resources
Policy	Policy barriers, facilitators	N/A	Social work advocacy: policy reforms to improve access to HIV testing, mental health services, and MSM-specific programs, with a focus on systemic change and reducing barriers for marginalized groups

among MSM, particularly middle-aged and older individuals. This model outlines the interaction between personal knowledge, beliefs, community norms, and public health policies, suggesting that effective interventions should simultaneously address multiple levels of influence. Evidence supports that individual-level factors, such as personal fears and beliefs about HIV testing, significantly impact testing behaviors. For instance, misconceptions regarding HIV transmission and testing processes can deter individuals from seeking testing services (Abu-Ba'are et al., 2022; Ferreira et al., 2022). Factors such as stigma and fear of discrimination, which are often rooted in social and cultural norms, can further exacerbate reluctance towards testing (Alvey et al., 2023; Ortiz et al., 2022).

At the same time, TPB provides psychological insights into HIV testing behavior. For middle-aged and older MSM, attitudes towards HIV testing are often shaped by long-standing fears, social isolation, and the trauma of living through the AIDS crisis. Shifting negative attitudes towards testing requires addressing these deep-rooted emotional responses and creating safer spaces for these individuals to engage with HIV-related issues. For example, normalizing HIV testing in social and sexual networks can help reduce the stigma. Simplifying the testing process and addressing barriers like access and perceived control

are also critical. However, focusing too much on individual behaviors may ignore the larger structural factors such as discrimination, lack of resources, and stigmatizing policies that prevent this group from seeking care. Social workers must ensure interventions address these systemic barriers as well.

Fear and stigma surrounding HIV testing particularly impact middle-aged and older MSM. These individuals may face social isolation and discrimination, leading to self-stigmatization and reluctance to engage with healthcare services. For instance, research highlights that many MSM avoid public health clinics for HIV testing due to fears of judgment or breaches of confidentiality, which are compounded by broader societal attitudes towards homosexuality and HIV (Viswanathan et al., 2022; Saddawi-Konefka et al., 2021; Peck et al., 2024).

Interventions to enhance HIV awareness can include community outreach programs tailored to engage this population in a non-threatening manner. Such programs have demonstrated effectiveness in improving testing rates by employing peer educators who understand the unique challenges faced by older MSM (Peck et al., 2024; Barry et al., 2023). Additionally, addressing mental health issues through integrated services can encourage these individuals to seek both HIV testing and mental health support simultaneously (Gandhi et al., 2023). Promoting a culture of acceptance in

healthcare settings is crucial for dismantling barriers and fostering trust (Peck et al., 2024).

Integrating SEM and TPB into public health interventions does present challenges. Focusing on individual attitudes and behaviors can inadvertently place blame on individuals who do not seek testing, without acknowledging the systemic barriers they face. Furthermore, efforts to change community norms or address subjective pressures may face resistance from middle-aged and older MSM who view these interventions as intruding on their privacy or cultural beliefs. Social work interventions should carefully navigate these concerns, ensuring they respect the autonomy of individuals while advocating for policy reforms that improve healthcare access.

The intersection of HIV testing and mental health is particularly relevant for middle-aged and older MSM. Many of these individuals carry psychological burdens related to both HIV stigma and aging. The fear of a positive diagnosis, compounded by the stigma surrounding HIV, can exacerbate mental health challenges like anxiety and depression. These mental health challenges, combined with isolation, contribute to avoidance behaviors that prevent individuals from getting tested (Chambers et al., 2015). Internalized stigma manifests through psychological responses like shame, guilt, and social withdrawal, significantly contributing to mental health deterioration (Zimmermann et al., 2021). Zimmerman et al. (2021) assert that individuals often overestimate the social consequences of disclosing their HIV status, resulting in increased depressive symptoms and social isolation among MSM. Negative familial interactions, as highlighted by Bhutada et al., indicate that familial rejection can exacerbate internalized stigma, amplifying depressive symptoms in MSM (Bhutada et al., 2023).

Social workers need to understand that HIV testing can have profound emotional effects, whether the result is positive or negative. For those who test negative, the experience may bring relief, but for those who test positive, the stress and anxiety can be overwhelming. Immediate psychological support and counseling are essential to help individuals process their diagnosis and provide the necessary support for mental health (Molina et al., 2018). Social workers can offer crucial support through counseling, peer networks, and connecting individuals with mental health services to cope with the emotional burden.

Public health interventions must also address the unique relationship between HIV testing and mental health for middle-aged and older MSM. These interventions must include mental health services integrated into HIV testing programs, ensuring access to counseling both before and after testing. Pre-test counseling can help mitigate fears and anxieties, while post-test counseling, especially following a positive diagnosis, can reduce emotional distress and provide a framework for coping (Naidoo et al., 2021; Safren et al.,

2021). Social workers can facilitate access to these services and offer a safe space for individuals to talk about their concerns, ensuring they receive both physical and emotional care. Technology, including social media and mobile apps, can be a valuable tool in reaching middle-aged and older MSM who may be disconnected from traditional healthcare systems. Virtual consultations and online resources can reduce barriers to accessing testing and mental health services (Nielsen et al., 2017). Social workers can advocate for these services to ensure they are accessible, confidential, and culturally sensitive to the needs of older MSM.

Finally, policies must be created to ensure accessible, affordable HIV testing and mental health services for middle-aged and older MSM. There is a critical need for funding mental health programs that address the stigma, ageism, and social isolation often experienced by this group. Supporting community-led initiatives that foster peer support networks and providing resources to reduce social isolation are essential. Public health campaigns should aim to normalize HIV testing as a routine part of healthcare while also addressing stereotypes surrounding aging, HIV, and sexuality.

Successful policy interventions addressing HIV testing and mental health challenges often hinge on integrated care models and community outreach, particularly for underserved populations such as older adults and marginalized groups. Programs that utilize community health workers to provide education about HIV and facilitate access to testing are essential, especially in socioeconomically disadvantaged neighborhoods where stigma affects service uptake (Donohue et al., 2022). Similarly, initiatives like Medicaid health homes have demonstrated improved coordination of care for individuals with serious mental illness, effectively linking mental health services with medical care, thus enhancing overall health outcomes (Donohue et al., 2022).

To adapt these initiatives across diverse cultural contexts, it is imperative to incorporate local cultural values and specific community needs into program design and implementation (Lyles et al., 2021). This could involve training local health workers to understand unique cultural factors influencing health behaviors, thereby fostering trust and increasing community engagement (Lyles et al., 2021). Additionally, utilizing technology, such as telehealth services, could help bridge gaps in care delivery, especially in rural or underserved locations where traditional services may be limited (Talal et al., 2024).

By integrating HIV testing and mental health services into a cohesive framework, public health initiatives can be more effective at supporting middle-aged and older MSM. These initiatives will encourage HIV testing, reduce stigma, and provide mental health support. Social workers can be central in implementing these strategies, ensuring that individuals receive care that is inclusive, compassionate, and empowering. Ultimately, this comprehensive approach

will improve health outcomes for middle-aged and older MSM, creating a more inclusive and effective public health response.

Limitations

While the integration of the SEM and the TPB provides an innovative and structured approach to understanding HIV testing and mental health among older MSM, it may inadvertently oversimplify the complex, multifaceted nature of the behaviors and social dynamics influencing this population. SEM emphasizes the multiple levels of influence: individual, interpersonal, community, and societal, while TPB focuses on individual attitudes, subjective norms, and perceived behavioral control. While these frameworks are effective for organizing key factors affecting health behavior, they may not fully capture the intricacies of mental health challenges, cultural barriers, or the stigma that older MSM face regarding HIV testing.

The combination of SEM and TPB, while useful for conceptual clarity and intervention development, may not account for all the contextual and relational factors impacting this group's decision-making. For example, the emotional, social, and economic pressures on older MSM, including historical experiences of discrimination or marginalization, may not be adequately reflected in the framework. Additionally, the interplay between mental health issues and HIV testing behaviors may be more complex than what SEM and TPB can explain on their own.

The integration of the SEM and the TPB in healthcare settings for HIV testing and mental health interventions reflects the complexity of addressing health-related behaviors. However, these models may inadequately account for structural constraints and systemic barriers such as resource limitations and socioeconomic disparities. For instance, limited access to healthcare facilities often prevents individuals from utilizing HIV testing services effectively, especially among marginalized populations experiencing socioeconomic disadvantages (Wadhera & Dahabreh, 2023).

Moreover, the SEM emphasizes multi-level influences on health behavior but may overlook how systemic barriers—like insurance coverage discrepancies—restrict access to necessary care, further exacerbating inequalities (Neill, 2023; Peck et al., 2024). These limitations highlight the potential disconnect between theoretical models and real-world applications, suggesting a need for frameworks that incorporate broader socio-environmental factors to enhance intervention effectiveness (Kola et al., 2022; Lyles et al., 2021). Therefore, while SEM and TPB provide valuable insights into individual and contextual factors influencing health behavior, they require adaptations to effectively address systemic barriers in healthcare delivery systems.

As such, this limitation should be acknowledged, and future research could benefit from exploring complementary models or incorporating additional qualitative data to provide a more comprehensive understanding of the factors influencing HIV testing and mental health among older MSM.

Conclusion

Integrating mental health services into HIV testing initiatives is essential. Creating a supportive environment that encourages regular testing and addresses the psychological effects of HIV is vital for enhancing health outcomes among middle-aged and older MSM.

Author Contribution A.S.W.C. and L.M.L. were mainly writing this manuscript. F.K.C.W., A.G.E., and H.L.T. gave professional advice and suggestions during the discussion. A.S.W.C. helped to supervise the whole manuscript. All authors contributed to the article and approved the submitted version. All authors have read and agreed to the published version of the manuscript.

Funding Open access funding provided by Hong Kong Baptist University Library. The preparation of this manuscript was partially supported by funding from the Department of Social Work, Faculty of Arts and Social Sciences, Hong Kong Baptist University, Hong Kong.

Data Availability Not applicable.

Declarations

Consent for Publication Not applicable.

Competing interests The authors declare no competing interests.

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