

ความท้าทายที่สำคัญและการประยุกต์ใช้แอปพลิเคชัน ในนวัตกรรมการดูแลผู้สูงอายุในประเทศไทย

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บทคัดย่อ

ประเทศไทยกำลังก้าวเข้าสู่สังคมผู้สูงอายุระดับสุดยอดอย่างรวดเร็ว โดยมีการคาดการณ์ว่าภายในปี 2574 ประชากรมากกว่า 28% จะมีอายุ 60 ปีขึ้นไป ปัจจุบันประเทศไทยจัดอยู่ในกลุ่มประเทศที่มีประชากรสูงอายุเพิ่มขึ้นรวดเร็วที่สุดในโลก จากประชากรทั้งหมดประมาณ 67 ล้านคน มีผู้สูงอายุ (อายุ 60 ปีขึ้นไป) ประมาณ 12 ล้านคน การเปลี่ยนแปลงเชิงประชากรนี้ก่อให้เกิดความท้าทายอย่างมากต่อระบบสาธารณสุข ระบบสังคมและเศรษฐกิจของประเทศ เพื่อตอบสนองต่อสถานการณ์ดังกล่าวได้มีการพัฒนา “นวัตกรรมการดูแลผู้สูงอายุ” หลากหลายรูปแบบ ตั้งแต่เทคโนโลยีสุขภาพดิจิทัลไปจนถึงโครงการดูแลแบบชุมชนเพื่อรองรับการดูแลประชากรสูงอายุที่เพิ่มขึ้นอย่างต่อเนื่อง การศึกษานี้มีวัตถุประสงค์เพื่อระบุความท้าทายหลักในระบบการดูแลผู้สูงอายุของประเทศไทย ทบทวนแนวทางนวัตกรรมที่มีอยู่ในปัจจุบัน และเสนอแนวทางเชิงกลยุทธ์สำหรับการประยุกต์ใช้นวัตกรรมด้านผู้สูงอายุให้เหมาะสมกับบริบททางเศรษฐกิจและวัฒนธรรมของประเทศ การศึกษานี้เป็นการทบทวนวรรณกรรมเชิงพรรณนา (Narrative Review) โดยรวบรวมข้อมูลจากฐานข้อมูล Google Scholar, PubMed และ ThaiJo ระหว่างปี 2553-2566 ครอบคลุมทั้งวรรณกรรมภาษาอังกฤษและภาษาไทย บทความวิชาการ รายงานเชิงนโยบาย และงานวิจัยที่คัดเลือกมาได้รับการวิเคราะห์และสังเคราะห์เชิงประเด็นให้สอดคล้องกับวัตถุประสงค์ของการศึกษา ผลการศึกษาพบว่า ระบบการดูแลผู้สูงอายุของประเทศไทยยังคงเผชิญกับปัญหาหลัก ได้แก่ การขาดแคลนผู้ดูแล ความไม่มั่นคงทางการเงินของผู้สูงอายุ และทักษะการใช้เทคโนโลยีดิจิทัลที่อยู่ในระดับต่ำ แม้จะมีการพัฒนานวัตกรรม เช่น ระบบการแพทย์ทางไกล (Telehealth) บ้านอัจฉริยะ และรูปแบบการดูแลแบบชุมชน แต่การดำเนินงานยังขาดความเชื่อมโยงและไม่ทั่วถึงทั่วประเทศ อุปสรรคสำคัญ ได้แก่ โครงสร้างพื้นฐานด้านดิจิทัลที่ยังไม่เพียงพอ ค่านิยมทางวัฒนธรรมที่ยังยึดโยงกับการดูแลแบบครอบครัว และการขาดระบบเชื่อมต่อข้อมูลสุขภาพระหว่างหน่วยงานต่างๆ ประสพการณ์จากประเทศญี่ปุ่น เกาหลีใต้ และสิงคโปร์ ชี้ให้เห็นถึงความสำคัญของระบบการเงินที่มีโครงสร้างชัดเจน การฝึกอบรมผู้ดูแล และการออกแบบที่เน้นผู้ใช้เป็นศูนย์กลาง เพื่อส่งเสริมการขยายผลนวัตกรรมอย่างยั่งยืน สรุปได้ว่าการส่งเสริมการนำนวัตกรรมด้านการดูแลผู้สูงอายุมาใช้ในประเทศไทยจำเป็นต้องอาศัยแนวทางที่เหมาะสมกับบริบทมีความครอบคลุม และมุ่งเน้นการมีส่วนร่วมของชุมชน โดยผสมผสานเทคโนโลยีเข้ากับการบริการที่เน้นมนุษย์เป็นศูนย์กลาง ควรให้ความสำคัญกับการพัฒนาทักษะดิจิทัล การเข้าถึงบริการอย่างเท่าเทียม และระบบติดตามประเมินผลอย่างต่อเนื่อง เพื่อให้เกิดการดูแลผู้สูงอายุที่มีคุณภาพและยั่งยืนในสังคมไทยที่กำลังสูงวัยอย่างรวดเร็ว

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Key Challenges and Strategic Applications of Elderly Care Innovation in Thailand

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Abstract

Thailand is rapidly transitioning into a super-aged society, with projections indicating that more than 28% of the population will be aged 60 or older by 2031. Currently, the country ranks among the fastest-aging nations in the world. Of its approximately 67 million people, about 12 million are aged 60 and older. This demographic shift poses significant challenges for the country's healthcare, social, and economic systems. In response, various innovations in elderly care, from digital health solutions to community-based interventions, are being developed to support the aging population. This study aims to identify the key challenges in Thailand's elderly care system, review current innovations, and propose strategies for implementing elderly care innovations tailored to the country's socio-economic and cultural context. A narrative review was conducted using sources from Google Scholar, PubMed, and ThaiJo between 2010 and 2023, including both English and Thai literature. The selected academic articles and policy reports and research studies were thematically analyzed and synthesized in line with the study's objectives.

Thailand's elderly care system faces persistent challenges, including caregiver shortages, financial insecurity, and low digital literacy among older adults. Although innovations such as telehealth platforms, smart home systems, and community-based care models have been developed, their implementation remains fragmented. Key barriers include insufficient digital infrastructure, cultural preferences for family-based care, and the lack of interoperability across health systems. Lessons from Japan, South Korea, and Singapore highlight the importance of structured financing, comprehensive caregiver training, and user-centered design in scaling innovation sustainably.

In conclusion, strengthening elderly care innovation in Thailand requires a context-sensitive and inclusive approach that integrates technology with human-centered services, community participation, and intersectoral collaboration. Priority should be given to digital literacy enhancement, equitable access, and continuous monitoring to ensure sustainable, high-quality care for Thailand's rapidly aging population.

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Introduction

Thailand is undergoing a profound demographic transition, with the proportion of its population aged 60 years and older projected to exceed 28% by 2031, officially entering the stage of a super-aged society. Currently, the country ranks among the fastest-aging nations in the world. Of its approximately 67 million people, about 12 million are aged 60 and older, according to the latest national statistics report⁽¹⁾. This rapid aging trend, driven by increased life expectancy and declining fertility rates, presents significant challenges to the nation's

healthcare system, economy, and social support structures. Older adults in Thailand are increasingly affected by chronic diseases, physical and cognitive decline, and a growing dependency on long-term care services. Traditional family-based care models are becoming less sustainable due to urbanization, labor migration, and smaller household sizes.

In response to these challenges, both the public and private sectors have introduced innovations aimed at improving elderly care. These include digital health platforms, telemedicine services, smart home technologies, caregiving robotics, and mobile care units program such as “CloudNurse” provide digital health record systems for elderly patients, while the MEDEE initiative provides digital literacy training for seniors to support their engagement with technology^(2,3). Additionally, university-led projects, such as Chulalongkorn University’s “Chula Ari,” have pioneered the development of assistive robotics for elderly care. However, the application and adoption of these innovations remain limited in scope and uneven across regions.

Despite these promising developments, the widespread implementation of elderly care innovations in Thailand has lagged behind the growing needs of its aging population. Many innovations remain confined to urban pilot projects or academic institutions, with limited integration into community-based health systems. The urgency to scale up effective models, enhance accessibility, and adapt solutions to the diverse needs of elderly Thais is now greater than ever.

Current research has explored individual innovations and demographic challenges; however, it lacks a comprehensive synthesis that connects elderly care challenges, innovation applications, and actionable strategies for effective implementation. Moreover, there has been limited evaluation of how these innovations can be sustainably adopted, especially in rural or low-income settings where elderly support systems are weakest. Furthermore, digital literacy remains a major barrier, and little is known about how older adults perceive and interact with new technologies.

This review aims to address these gaps by (1) identifying and analyzing the key challenges in Thailand’s elderly care system; (2) reviewing current innovative practices and technologies implemented in elderly care; and (3) proposing strategies for how elderly innovation should be effectively applied in Thailand, considering its socio-economic and cultural context. The goal is to inform future policy development, research, and investment toward elderly care systems that are both innovative and inclusive.

Methodology

This study employed a narrative review design to synthesize evidence on elderly care challenges and innovation strategies in Thailand. A systematic literature search was conducted across PubMed, ThaiJo, and Google Scholar for studies published between January 2010 and December 2023, using combinations of English and Thai keywords such as “elderly care,” “aging population,” “innovation,” “digital health,” “telemedicine,” “assistive technology,” and “community-based care.” Additional grey literature, including national policy documents and program reports from the Ministry of Public Health, National Innovation Agency (NIA), World Health Organization (WHO), and United Nations Population Fund (UNFPA), was retrieved through manual reference checks to ensure comprehensive coverage. Articles were included

if they focused on Thailand's elderly care systems, innovations, or health interventions, and provided empirical findings, program evaluations, or policy analysis. Commentaries lacking empirical data, studies unrelated to Thailand, or purely clinical trials without system-level relevance were excluded. Findings were synthesized thematically under three analytic domains: (1) key challenges in elderly care, including caregiver shortages, financial insecurity, and low digital literacy; (2) current innovative practices, such as telehealth platforms, smart home technologies, Village Health Volunteer programs, and digital literacy initiatives; and (3) strategies for effective application tailored to Thailand's socio-economic and cultural context.

Literature Review

Demographic and Systemic Context

Thailand's transition into a super-aged society where more than 28% of the population will be aged 60 years or older by 2031 has created profound challenges for healthcare, social welfare, and economic systems^(1,2). Traditional family-based care models, once the backbone of elderly support, are increasingly strained by urban migration, declining fertility rates, and shrinking household sizes, resulting in rising a growing numbers of elderly living alone or relying on limited community resources⁽⁴⁾. Approximately 34% of Thai seniors live below the poverty line, and many retiree possess savings far below the threshold required for sustainable long-term care, thereby heightening dependence on public assistance⁽⁵⁾.

Medical and Functional Challenges

Chronic diseases, multimorbidity, and functional decline are major drivers of care dependency. Dementia affects an estimated 2-10% of Thai older adults⁽⁶⁾, while more than 360,000 individuals are bedridden or homebound due to stroke, cardiovascular disease, or diabetes-related complications^(7,8). These conditions require intensive and continuous care; however, caregiver shortages particularly in rural provinces remain severe, resulting in unmet care needs, caregiver burnout, and increased hospitalization rates⁽⁹⁾.

Current Innovative Practices

Innovations in elderly care are emerging across Thailand, encompassing both digital health technologies and community-based models. Digital health and telemedicine programs, initiatives, such as *CloudNurse* and various telemedicine platforms developed during the COVID-19 pandemic, have facilitated remote consultations, follow-up care, and medication management, thereby reducing travel burdens and wait times for older adults⁽¹⁰⁾. Assistive technologies are also gaining momentum, with smart home systems featuring motion sensors, AI-assisted rehabilitation devices, and fall detection technologies being piloted in Bangkok and other urbanized provinces to enhance safety and promote independence among older adults⁽¹¹⁾. Beyond high-tech solutions, community-based innovations play a vital role, particularly in rural settings. Village Health Volunteers (VHVs) equipped with digital tablets for health monitoring, mobile elderly care units, and intergenerational activity centers have been shown to foster social participation and improve continuity of care⁽¹²⁾. Complementing these initiatives are digital literacy programs, such as the MEDEE initiative, which have

significantly strengthened older adults' ability to use smartphones and e-health applications, thereby facilitating the boarder adoption of telehealth and online healthcare services⁽³⁾.

Barriers to Adoption

Despite these promising developments, the adoption of elderly care innovations in Thailand remains uneven. Digital literacy continues to be a critical bottleneck, particularly in rural areas where many older adults lack basic smartphone and internet skills⁽³⁾. Financial and infrastructure constraints further limit implementation in low-resource settings, while cultural preferences for family-based caregiving sometimes create resistance to technology-assisted care⁽⁴⁾. Furthermore, the lack of interoperability across digital health platforms leads to fragmented health data and hinders the continuity of care⁽¹⁰⁾.

Global Lessons and Benchmarking

Lessons from other aging societies highlight potential pathways for Thailand. Japan's Long-Term Care Insurance (LTCI) model demonstrates how structured financing mechanisms can expand access to home- and community-based care, while South Korea's telehealth reimbursement policies have accelerated digital health adoption⁽¹³⁾. Singapore's Smart Nation Health initiatives emphasize the importance of user-centered design, caregiver training, and robust data governance key elements that could inform the development of Thailand's elderly care innovation strategies⁽¹⁾. Most Thai studies have examined individual pilot projects or isolated innovations, with limited system level evaluation of scalability, cost-effectiveness, and long-term outcomes^(9,12). Research on cultural perceptions of digital health and mechanisms for building trust between users and technology remains limited. Moreover, longitudinal studies assessing caregiver burden reduction, hospital utilization, and quality-of-life outcomes are needed to inform evidence-based policymaking.

Key challenges in Thailand's elderly care system

Thailand is currently facing a multifaceted elderly care crisis driven by rapid demographic shifts, increasing health burdens, and systemic inadequacies in long-term care. One of the most pressing medical challenges is dementia, a neurodegenerative disorder affecting memory, cognition, and behavior. Estimates suggest that 2–10% of the elderly population in Thailand potentially more than one million individuals are living with dementia⁽⁴⁾. The condition manifests in stages, progressing from mild forgetfulness to severe disorientation, aggressive behavior, and complete dependence. The primary causes include brain atrophy, stroke, and infections, with current management strategies encompassing cognitive training, emotional therapy, pharmacological treatments (e.g., Donepezil and Rivastigmine), and caregiver support services.

Alongside cognitive decline, physical disability and functional dependency are becoming increasingly prevalent. As of 2025, approximately 236,000 older adults in Thailand are classified as bedridden, while an additional 126,000 are considered homebound⁽¹⁵⁾. The most common underlying causes are stroke-related complications including ischemic and hemorrhagic strokes as well as chronic illnesses such as diabetes and cardiovascular

diseases⁽⁷⁾. These conditions frequently result in long-term physical, sensory, and cognitive impairments that require intensive and continuous care.

However, many older adults do not receive adequate support due to a shortage of caregivers, particularly in rural and low-income areas. A study by Phetsitong and Vapattanawong⁽⁹⁾ revealed that the northeastern region of Thailand has the highest unmet caregiver needs, whereas Bangkok exhibits the highest demand for care services. Several factors contribute to this disparity, including the out-migration of working-age family members, declining family size, and limited financial capacity to hire formal caregivers. In many cases, elderly individuals are left without adequate supervision or rely on underfunded community-based volunteer programs for essential services such as food preparation, medication reminders, and personal hygiene⁽⁸⁾. These programs frequently face budgetary constraints and lack trained personnel, limiting their effectiveness and long-term sustainability.

The issue is further compounded by economic vulnerability among the elderly. Approximately 34% of older adults in Thailand live below the poverty line, and many retirees possess savings of less than \$1,300 USD well below the estimated \$100,000 USD required for a secure retirement in Bangkok⁽⁶⁾. This financial strain prevents access to healthcare services, assistive devices, and age-friendly housing. According to Paek and Zhang⁽³⁾, Thailand's situation is particularly precarious because it is becoming an aged society before achieving high-income status a phenomenon often described as "getting old before getting rich." This demographic transition highlights the development of robust social safety nets and long-term care systems, further intensifying the strain on public health infrastructure and the national healthcare system.

Overall, Thailand's elderly care system is under severe pressure from rising medical needs, insufficient caregiving infrastructure, and increasing economic inequality. Without coordinated national strategies that expand home- and community-based care and establish financial protection mechanisms, Thailand's aging crisis is expected to worsen as the population continues to age rapidly.

Current innovative practices

As Thailand transitions into a super-aged society, with more than 20% of the population expected to be aged 60 and above by 2035, the country is facing growing challenges in elderly care⁽¹⁾. In response, there has been increasing interest in applying innovative technologies and practices to support the aging population. Technological innovations currently implemented in Thailand include telehealth platforms for remote consultations, wearable health monitoring devices, AI-assisted rehabilitation tools, and smart home modifications designed to enhance safety and independence⁽¹⁰⁾. Similarly, smart home systems equipped with motion sensors and emergency alerts have been integrated into some community elderly homes to reduce risks and improve monitoring⁽²⁾.

In addition to high-tech solutions, community-based and service-driven innovations play a crucial role, particularly in rural areas. Mobile elderly care units, trained village health volunteers (VHVs) utilizing digital health records, and intergenerational activity centers are examples of non-digital innovations that promote holistic well-being and social inclusion

among elderly Thais⁽⁸⁾. Government-led initiatives, such as the Ministry of Public Health's long-term care program and the support of the National Innovation Agency (NIA), have further stimulated public-private collaborations.

However, the adoption of elderly care innovations in Thailand continues to face significant barriers. Digital literacy among the elderly population remains limited, particularly in rural and low-income areas, which affects the usability of high-tech tools⁽⁹⁾. Financial and infrastructural limitations further impede large-scale implementation, while cultural values emphasizing family-based caregiving often result in resistance to technology-assisted care⁽⁴⁾. Moreover, the absence of system-wide standardization, resulting in has resulted in fragmented data and limited interoperability across digital health platforms⁽¹²⁾.

Although progress is evident, current innovation efforts are often concentrated in urban centers and lack rigorous, long-term evaluation. Empirical studies assessing the cost-effectiveness, satisfaction levels, and health outcomes associated with elderly care innovation are still limited. Therefore, this study aims to review and synthesize existing elderly care innovation practices across Thailand, with the goal of identifying promising models, highlighting implementation gaps, and informing future policy and research directions to enhance elderly care through innovation.

Proposing strategies for how elderly innovation should be effectively applied

As Thailand faces a demographic shift toward becoming a super-aged society, the application of innovation in elderly care is no longer optional it is a necessity. While various technologies and service models have been piloted nationwide, the question of how innovation should be applied remains central to ensuring effectiveness, equity, and sustainability. A growing body of literature emphasizes that elderly care innovation in Thailand must be context-sensitive, affordable, and accessible to older adults across diverse settings urban, rural, and remote⁽⁴⁾. Experts recommend that technological solutions such as telehealth, smart homes, and wearable monitoring devices should be designed with usability in mind, considering the limited digital literacy of many older Thai adults who are unfamiliar with smartphones or internet-based systems⁽⁹⁾. Moreover, innovation should not be limited to high-tech applications; low-cost, community-based solutions such as mobile clinics, trained village health volunteers, and AI-assisted screening kiosks have shown promise in bridging gaps in care⁽⁸⁾.

To apply elderly innovation effectively, integrated care models that combine technology with human-centered services are crucial. For example, the implementation of smart home devices should be complemented by regular home visits and caregiver support to promote sustained use and build trust among older adults. The Ministry of Public Health and National Innovation Agency (NIA) have emphasized the importance of public-private partnerships and regional pilot programs to evaluate feasibility before national scale-up⁽¹¹⁾. Furthermore, equity must be prioritized, as many innovations are concentrated in Bangkok and other developed provinces, leaving rural elders with limited access. Government support should focus on inclusive policies, subsidized technologies, and digital literacy training for

both the elderly and caregivers. Universities and research centers can play a critical role by engaging the elderly in co-designing products and services that reflect their actual needs⁽¹⁰⁾.

Finally, continuous monitoring and evaluation are essential to ensure that innovation achieves its intended impact. These assessments should encompass user satisfaction, reductions in caregiver burden, improvements in health outcomes, and overall cost-effectiveness. Without such feedback mechanisms, innovations risk remaining underused or abandoned. In conclusion, elderly innovation in Thailand should be applied through a holistic, inclusive, and scalable approach one that integrates technology with cultural relevance, caregiver support, and strong policy frameworks.

Discussion

As Thailand approaches super-aged society status, the application of innovation in elderly care has become an urgent national priority. The findings of this review indicate that although technological and community-based innovations are emerging nationwide, the effectiveness of application remains limited due to a combination of socioeconomic, cultural, infrastructural, and policy-related barriers. Therefore, understanding how elderly innovation should be applied in Thailand requires a nuanced approach that balances technological advancement with accessibility, equity, and integration into existing care systems.

Firstly, the study highlights the importance of context-sensitive application. Innovations in elderly care such as telemedicine platforms, smart home sensors, robotic assistants, and digital health records must be developed and implemented in ways that reflect Thailand's diverse regional contexts. While Bangkok and other major urban centers have piloted smart elderly homes and AI-assisted tools⁽²⁾, rural provinces continue to experience limited access to these technologies due to infrastructure gaps, financial constraints, and low levels of digital readiness⁽⁴⁾.

Secondly, digital literacy among the elderly remains a critical barrier. Many older adults lack the necessary skills to operate even basic mobile applications, reducing the potential impact of digital health innovations⁽⁹⁾. Programs such as MEDEE, which provide digital skills training for older adults, demonstrate that with appropriate educational support, older adults can adopt and benefit from technology⁽³⁾. Therefore, any application of elderly care innovation should be accompanied by comprehensively training, ongoing technical support, and family or community-based digital mediation.

Moreover, community integration and low-cost solutions are essential for the scalable implementation of elderly care innovations. These initiatives should not be viewed only through a high-tech lens but should also encompass human-centered and affordable models, such as community health volunteer programs, mobile care units, and intergenerational day centers⁽⁸⁾. The inclusion of village health volunteers (VHVs) equipped with digital tablets for elderly health tracking is serve as a prime example of how grassroots approaches can bridge technology and trust.

Policy alignment and inter-sectoral coordination also play a pivotal role. Although various government agencies and research institutions have developed innovations, their

deployment remains fragmented. To ensure nationwide success, Thailand must strengthen public-private partnerships, promote the standardization of data systems, and improve regulatory frameworks for elderly care technology and telehealth⁽¹¹⁾. Pilots must be followed by systematic evaluations, that assess usability, reduction in caregiver burden, and measurable improvements in health outcomes.

Finally, cultural relevance and social acceptance must not be overlooked. Many Thai elders prefer personal interactions and traditional care methods. Therefore, technological solutions should be designed to complement rather than replace human caregiving, integrating caregivers into innovation ecosystems. Furthermore, involving older adults in co-design processes ensures that the innovations reflect their preferences, needs, and lived experiences⁽¹⁰⁾.

The application of elderly care innovation in Thailand should follow a holistic, inclusive, and scalable approach. Innovations must be embedded within supportive policy frameworks, equipped with user training, and developed through collaboration among public agencies, research institutions, and community stakeholders. Only through such an integrated model can elderly care innovation in Thailand achieve meaningful, equitable and sustainable impact.

Conclusion

This review examined the landscape of elderly care in Thailand, highlighting major challenges, current innovations, and strategies for their effective application. Key issues include caregiver shortages, financial insecurity, and low digital literacy among older adults. Although innovations such as telehealth, smart home systems, and community-based programs demonstrate significant potential, their adoption remains limited by infrastructure, cost, and usability barriers.

To apply elderly innovations effectively, solutions must be affordable, inclusive, and tailored to local contexts. Successful implementation requires the integration of technology with human-centered care, the provision of digital literacy support, and strengthening intersectoral collaboration. Ultimately, innovations must align with the actual needs of Thailand's aging population to ensure sustainable impact and equity in elderly care.

Recommendation

To strengthen the application of elderly care innovation in Thailand, several key strategies are recommended. First, innovations should be adapted to local contexts, especially in rural and underserved areas, to ensure accessibility and relevance. Digital literacy among older adults and caregivers should be improved through nationwide training programs such as MEDEE. Technology must be integrated with human-centered care, complementing rather than replacing personal interaction. Public-private partnerships should be expanded to mobilize resources and scale successful models. To promote equity, the government should subsidize essential technologies for low-income older adults. Additionally, national monitoring systems should be established to track outcomes and inform policy decisions. Finally, investment in caregiver training and support is vital to address workforce shortages and enhance the quality of care.

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