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Artificial Intelligence Applications in Nursing Home Facilities: A Scoping Review

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Abstract

As the population ages, nursing home facilities are under increasing pressure to deliver high-quality, personalized care while managing limited resources and chronic staffing shortages. In recent years, Artificial Intelligence (AI) has emerged as a promising tool to help address these challenges. This narrative literature review explores how AI is being used across five major areas in nursing home settings: Clinical Decision Support Systems (CDSS), fall detection and prevention, cognitive and behavioral monitoring, resource optimization, and palliative and end-of-life care. For each area, this paper examines the core technologies, benefits, and real-world applications, as well as the barriers that stand in the way of broader adoption. I also highlight key trends shaping the future of AI in long-term care, including the rise of explainable AI, deeper integration with electronic health records, personalized care models, and expanded telehealth capabilities. While the potential of AI in nursing homes is clear, realizing that potential will depend on thoughtful implementation, investment in infrastructure, and ongoing collaboration between clinicians, technologists, and policymakers.

Aim:

This review explores how artificial intelligence (AI) technologies are being applied in nursing home facilities to enhance clinical care, optimize operations, and improve resident outcomes.

Design:

Narrative literature review of peer-reviewed research studies focused on AI applications in nursing homes.

Methods:

This study reviewed 34 articles published between 2018 and 2024, sourced from databases such as PubMed, CINAHL, and Scopus. The inclusion criteria focused on studies involving AI in long-term care, particularly those addressing clinical decision-making, monitoring, and automation.

Results:

The review identified five core areas of AI application in nursing homes: Clinical Decision Support Systems (CDSS), fall detection and prevention, cognitive and behavioral monitoring, resource optimization and workflow automation, and palliative and end-of-life care. AI technologies in these areas contribute to improved healthcare delivery, enhanced safety, and greater efficiency. However, challenges such as data privacy, staff resistance, infrastructure limitations, and ethical concerns remain significant. Future directions emphasize the importance of explainable AI, deeper integration with electronic health records, personalized care models, and expansion of telehealth services. Successful implementation will depend on interdisciplinary collaboration, user-centered design, and supportive policy frameworks.

Keywords: Artificial Intelligence, Nursing home facilities, Long-term Care, AI in Healthcare, CDSS in Nursing Homes, ensuring interoperability, natural language processing, Robotic Companions, , predictive analytics, End-of-Life Care, staff training, pilot programs, therapeutic interventions

Introduction

As a key component of the healthcare system, nursing home facilities have played a significant role in supporting long-term care solutions. Given the global demographic transition toward an increasingly aging population, the demand for effective, high-quality long-term care solutions has reached a historically unmatched degree. Nursing home facilities are experiencing with multifaceted challenges, including chronic staff shortages, escalating operational costs, and the need to provide individualized care tailored to complex health profiles [1,2]. In the past decade, Artificial Intelligence (AI) has emerged as a transformative enabler, offering a suite of tools to enhance clinical decision-making, automate routine tasks, and optimize resource allocation. Many recent studies highlight how AI applications are being leveraged to support healthcare professionals through intelligent monitoring, predictive analytics, and personalized interventions, thereby improving both care quality and operational efficiency in nursing home environments [3].

Table 1: Barriers to adopting AI in nursing homes.

Implementation Challenge	Solution/Strategy
Tech S Infrastructure Gaps (outdated systems, poor EHR integration)	Upgrade IT infrastructure; adopt interoperability standards (e.g. HL7/FHIR); integrate AI tools with EHRs and nurse-call.
Data Privacy S Security (HIPAA, sensitive resident data)	Implement robust encryption and access controls; follow health-data regulations; conduct regular audits. Ensure anonymization and secure cloud platforms.
Bias S Ethics (algorithmic bias, fairness)	Use diverse, representative datasets; incorporate Explainable AI (XAI) for transparency; maintain clinician oversight of AI recommendations to guard against unfair outcomes.
Staff Training S Acceptance (low digital literacy, change resistance)	Provide hands-on training and education; involve staff early in tool selection and design; establish change- management programs. Emphasize that AI augments rather than replaces caregivers.
Cost S Resource Constraints (high upfront costs, maintenance	Start with pilot projects to demonstrate ROI; seek grants or partnerships; scale gradually. Use scalable cloud services to lower hardware costs.
Regulatory S Reimbursement (uncertain policies)	Engage with policymakers; align solutions with emerging long-term care telehealth and AI regulations. Advocate for reimbursement models that incentivize AI-enabled preventive care and telemedicine.

This literature review aims to synthesize current research on AI applications in nursing homes, exploring their benefits, challenges, and future prospects. A purposive, knowledge-driven search strategy was employed to identify recently published peer-reviewed articles that aligned closely with the thematic focus of each section in the review. For each key domain of artificial intelligence application in nursing home settings, this study selects literature based on its relevance, recency, and contribution to the conceptual or practical understanding of the topic. Searches were conducted primarily through databases including PubMed, CINAHL, and Scopus, with a focus on studies published between 2018 and 2024. Priority was given to empirical studies, case reports, and reviews that provided clear examples, technological descriptions, or evaluation outcomes related to the use of AI in long-term care environments.

The rest of the paper is organized as follows. We will review the five most important function categories in the setting of nursing home facilities: Clinical Decision Support Systems (CDSS), Fall Detection and Prevention, Cognitive and Behavioral Monitoring, Resource Optimization and Workflow Automation, and Palliative and End-of-Life Care. At the end, I will discuss the future directions of integration of Artificial Intelligence (AI) in nursing home facilities.

Clinical Decision Support Systems (CDSS)

Clinical Decision Support Systems (CDSS) are pivotal in enhancing healthcare outcomes by providing evidence-based support to clinical decision-making processes. In the nursing home facilities, residents often present with more complicated medical conditions. CDSS can significantly aid in diagnosis, treatment, and patient monitoring. In this review session, I will explore the CDSS from the following perspectives: historical development, types, technological foundations, benefits, implementation challenges, ethical and legal considerations, and its effectiveness in nursing home facilities.

Historical Background and Evolution

CDSS is first originated in the 1970s with rule-based systems like MYCIN and INTERNIST-I. In this version, the system provided diagnostic support in clinical settings [4]. The design of these early systems was shaped by the limited computational power and the integration with clinical workflows at the time, which is significantly different from current practice in the healthcare system. Things changed significantly in the 1990s and early 2000s when the Electronic Health Records (EHRs) were widely adopted, which enabled the development of more advanced CDSS. Those newer versions of the systems incorporated real-time alerts and evidence-based clinical guidelines. In nursing home facilities, CDSS adoption has been slower due to limited resources and infrastructure. However, increasing regulatory demands and patient safety concerns are driving more facilities to adopt these systems.

Types of CDSS

CDSS in nursing homes generally fall into several categories. They are rule-based systems, expert systems, and machine learning-based systems. Rule-based systems apply predefined IF-THEN rules to offer alerts or recommendations tailored to patient data [5]. Expert systems mimic the decision-making capabilities of human experts by leveraging comprehensive knowledge bases and inference engines. More recently, machine learning-based systems utilize large clinical datasets to develop predictive models for disease progression and intervention planning. Integrated systems, often embedded within EHRs, provide real-time decision support at the point of care, enhancing their usability and clinical impact.

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Technological Foundations

The underlying architecture of CDSS typically includes databases for storing patient records, clinical guidelines, and historical data. Knowledge engines interpret clinical data through rule-based logic or machine learning algorithms. These systems are accessed via user interfaces designed for clinicians and are supported by interoperability frameworks that allow integration with EHRs, lab results, and pharmacy databases [6]. Advanced technologies such as cloud computing, natural language processing (NLP), and big data analytics are increasingly being incorporated to enhance functionality and scalability.

Benefits of CDSS in Nursing Homes

CDSS offers numerous advantages in nursing home environments. For example, it helps reduce medication errors by alerting clinicians to drug interactions and contraindications [7]. It also supports the management of chronic diseases by providing evidence-based recommendations and reminders for conditions such as diabetes, hypertension, and heart failure. Preventive care is enhanced through tools that support routine screenings, vaccination schedules, and fall risk assessments. Additionally, CDSS reinforces staff training and adherence to best practices, which would benefit patients and ensure consistent and high-quality care.

Implementation Challenges

Despite their potential, CDSS implementation in nursing homes faces multiple challenges, such as technical limitations, organizational barriers, the needs of training, and so on. Technical limitations, such as outdated infrastructure and a lack of interoperability, can hinder integration and data flow. Organizational barriers, including tight budgets, high staff turnover, and resistance to technological change, also play a significant role [8]. Training is that staff may not have the necessary digital literacy or time to engage with new tools effectively. Addressing these challenges requires careful planning, adequate funding, and ongoing staff support. Table 1 highlights barriers to adopting AI in nursing homes. Key issues include technical/infrastructure limitations, data privacy and bias, staff resistance, costs, and regulatory factors. Corresponding strategies involve upgrading systems, ensuring interoperability, strong data governance, staff training, pilot programs, and policy.

Ethical and Legal Considerations

The use of CDSS in nursing homes brings several ethical and legal concerns. For example, algorithmic bias, which refers to stemming from incomplete or non-representative training data, can lead to inaccurate or discriminatory recommendations. This requires a high level of transparency in decision-making and maintaining clinician autonomy. Data privacy is another major concern, like HIPAA. Moreover, liability issues surrounding CDSS recommendations raise questions about who is responsible when system-generated advice leads to adverse outcomes [4].

Effectiveness and Impact Studies

Several studies demonstrate the effectiveness of CDSS in nursing homes. For example, [9] reported a 19% reduction in inappropriate medication use following the implementation of a CDSS system. [5] found significant improvements in the clinical management of chronic diseases due to the use of decision support tools [10] observed improved care quality over time with consistent CDSS use. A case study from a long-term care facility in Pennsylvania showed that integrating CDSS with medication administration led to a marked decline in adverse drug events over six months [11]. Similarly, a pilot program in a Canadian nursing home employed a CDSS for fall prevention and reported a 25% reduction in fall incidents over a year.

As I mentioned before, CDSS has the potential to significantly enhance clinical decision-making and patient outcomes in nursing home settings. The systems provide timely, evidence-based recommendations that support staff in managing complex patient populations. However, for CDSS to reach its full potential, nursing homes must overcome substantial implementation barriers and address ethical and legal concerns.

Fall Detection and Prevention

Falls are a significant concern in nursing homes. The incidents that involved with falls often lead to serious injuries and increased healthcare costs. Traditional methods relying on manual observation and self-reporting are often inadequate. Advances in sensing technologies offer promising alternatives to monitor, detect, and prevent falls in a timely manner. There are AI technologies that have been developed to detect and prevent falls through various means, such as:

Sensor-Based Systems: Wearable devices equipped with accelerometers and gyroscopes can monitor residents' movements and detect anomalies indicative of falls.

Vision-Based Systems: Computer vision techniques, utilizing cameras and AI algorithms, can monitor residents' activities and identify fall incidents in real-time.

Bed-Attached Sensors: Innovative approaches involve embedding sensors in beds to detect vibrations associated with movements, enabling early detection of potential falls.

Sensor-Based Systems

Sensor-based fall detection systems typically use wearable or ambient sensors, including accelerometers, gyroscopes, and pressure sensors. Wearable sensors are often embedded in belts, wristbands, or shoe insoles, enabling real-time monitoring of gait, balance, and movement patterns [12] Ambient sensors, such as floor pressure sensors or motion detectors, are installed in the environment and offer non-intrusive monitoring [13]. Studies such as those by Kangas et al. (2008) show that accelerometer-based

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wearable systems can distinguish between falls and normal activities with high sensitivity. However, user compliance and sensor displacement remain challenges, especially among elderly individuals with cognitive impairments.

Vision-Based Systems

Another type of system is the vision-based system, which is frequently discussed alongside sensor-based systems. These include depth cameras and infrared video systems to detect falls through posture and motion analysis [14]. While effective in providing detailed data, the privacy-related concerns may limit the application.

Bed-Attached Sensors

Bed-attached sensors-based systems are specifically designed to monitor patient movements in bed, for example, alerting caregivers to unusual motion patterns that may indicate a fall risk. These systems use load cells, piezoelectric sensors, and pressure mats to detect bed exits or restless movements [15]. Some are integrated with alert systems to notify staff in real-time. Research shows that bed-attached sensors are particularly effective in nursing homes, where many falls occur during bed transfers [16].

Integrating sensor-based and bed-attached systems with nurse call systems or electronic health records enhances their effectiveness. Machine learning algorithms can further refine detection by analyzing long-term behavioral patterns [17]. The existing literature identified various implementation challenges, including high initial costs, maintenance requirements, and the need for personalized calibration. Future research and development should focus on hybrid systems combining wearable, ambient, and bed-attached sensors to improve detection accuracy and reliability. In addition, increasing the use of AI and deep learning models may reduce false alarms and improve real-time decision-making. While current technologies monstrate effectiveness, further innovation is necessary to address usability, accuracy, and ethical concerns.

Cognitive and Behavioral Monitoring

Cognitive and behavioral health monitoring can provide significant assistance in nursing home environments, where a high percentage of residents suffer from dementia, depression, or other neurodegenerative conditions. In the U.S., over 70% of nursing home residents live with some form of cognitive impairment [18]. Effective and scalable monitoring of their mental health status and emotional well-being is a major challenge. AI technologies, such as Natural Language Processing (NLP), Emotion Recognition, and Robotic Companions, have demonstrated potential to enhance the quality of care and personalize therapeutic interventions.

Natural Language Processing (NLP)

NLP is a type of technology that can help computers understand, interpret, and generate human language. In nursing homes, NLP has been integrated into applications that analyze resident speech to detect signs of cognitive decline. For example, [19] demonstrated that linguistic features such as speech rate, pause duration, and syntactic complexity can distinguish individuals with Alzheimer's disease from healthy controls. This type of conversational agent system can track changes in communication patterns over time, offering passive, non-invasive monitoring. However, implementation in nursing homes faces challenges such as noisy environments, accents, and the need for large, domain-specific datasets.

Emotion Recognition

Emotion recognition is a type of technology that use facial expressions, speech patterns, and physiological data to detect emotional states. In nursing homes, emotion recognition has been applied to assess resident mood, detect distress, and personalize care interventions. For example, [20] employed multimodal emotion detection systems combining audio and video to evaluate agitation levels in dementia patients. Such systems can alert staff to changes in emotional states in real time, improving response to unmet needs. Privacy concerns and the potential for misinterpretation of affective cues, especially in neurodegenerative diseases, are important limitations.

Robotic Companions

Robotic companions are another newer instrument that was introduced to the nursing home facilities. For example, Paro (the robotic seal) and Pepper provide social interaction, stimulation, and companionship. Numerous studies, including [21], found that interaction with Paro reduced stress, improved mood, and increased socialization in residents with dementia. More recent robotic systems integrate AI to enable conversations, track user emotions, and learn user preferences. In nursing home environments, these robots can serve dual roles: emotional support and real-time monitoring platforms. While the high costs can be a barrier to widespread adoption.

It can be quite challenging to integrate these technologies in nursing homes. It requires addressing technical, ethical, and organizational issues while maintaining transparency, explainable, and cultural sensitivity. For example, Interoperability with existing health records, staff training, and ensuring privacy and informed consent are critical factors [22]. The future research and development should emphasize multi-modal systems combining NLP, emotion recognition, and robotics into a unified platform. Longitudinal studies are needed to validate clinical benefits and refine predictive algorithms. While evidence supports their potential, ethical deployment, user-centered design, and robust clinical validation remain essential.

Resource Optimization and Workflow Automation

Another application of AI has increasingly been integrated into healthcare systems to address chronic inefficiencies, particularly in resource-constrained settings such as nursing homes. The

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following session of this literature review examines the use of AI in optimizing staff scheduling, documentation automation, and other workflow enhancements and challenges specific to nursing home environments.

Staff Scheduling Optimization

AI-based tools for staff scheduling leverage machine learning algorithms to predict staffing needs, optimize shift allocations, and accommodate staff preferences. These systems improve workforce utilization and reduce overtime and burnout. For instance, the use of AI in workforce management platforms like Kronos and Shift Wizard has shown promising results in healthcare facilities [23]. Predictive models analyze patient acuity, historical staffing levels, and seasonal trends to ensure optimal staff distribution. In nursing homes, where staff-to-patient ratios significantly affect care quality, such systems are instrumental in maintaining compliance with regulations and improving patient outcomes.

Documentation Automation

Documentation is a critical and time-consuming task in nursing home care. AI technologies, for example, NLP-based tools, can transcribe and summarize clinician-patient interactions, enabling automated charting and compliance documentation. A study conducted by [24] showed that an NLP-based solution reduced documentation time by 30% in long-term care facilities. Additionally, AI can label missing or inconsistent documentation, improving data quality and audit readiness.

Workflow Automation and Integration

Beyond individual tasks mentioned above, AI contributes to broader workflow automation by integrating various operational functions. For example, AI-powered dashboards can develop real-time data from EHRs, staffing software, and monitoring devices to improve decision-making. Robotic Process Automation (RPA) is another solution that is used to automate routine administrative tasks such as billing, admissions processing, and inventory management. According to a case study by [25], one long-term care facility reduced administrative workload by 40% using AI-based RPA solutions. These systems promote operational efficiency and enable facilities to allocate resources more strategically. Similarly, A notable implementation is the use of Care Predict, an AI-based wearable and analytics system, in a Florida-based nursing home. The system improved workflow by identifying resident behavior patterns and alerting staff to potential care needs, resulting in a 37% reduction in hospitalizations [26]. Another case from Canada highlighted the successful deployment of AI in predictive scheduling, where staff satisfaction and retention improved due to more equitable and transparent shift allocations [27].

Challenges and Limitations

Although there are many promising outcomes, challenges still exist while adopting AI in nursing homes. Similar to the previous applications, data privacy and security remain critical concerns, especially given the vulnerability of elderly populations. Additionally, there is often a gap between the staff and the technologies. For example, staff are not familiar with the emerging AI technologies and fear job displacement. So, to implement successfully, training, change management, and stakeholder engagement are essential and critical. Although AI can make a measurable impact, continued research, investment, and policy support are necessary to scale these technologies and ensure ethical, equitable adoption across the sector.

Palliative and End-of-Life Care

Palliative and end-of-life (EOL) care in nursing facilities becomes increasingly important as it aims to provide comfort and maintain quality of life for patients with serious illnesses. Nursing facilities are central to this care delivery, yet they often face limitations such as workforce shortages, delayed symptom recognition, and inconsistent care planning. AI tools can address these gaps by enabling continuous monitoring, timely interventions, and data-driven decision-making.

Symptom Monitoring

Both physical and emotional symptoms can be detected by AI-based systems that employ wearable sensors, natural language processing, and machine learning. These technologies enable real-time pain assessment, agitation detection, and monitoring of vital signs. For example, the use of AI-integrated biosensors has demonstrated success in early detection of symptoms such as shortness of breath or increased agitation in patients with dementia [28]. These systems support staff by providing alerts and actionable insights, improving the responsiveness and accuracy of symptom management.

Individualized Care Planning

Similar to AI's applications in workflow automation and integration, AI enhances care planning by analyzing large volumes of patient data to identify trends and suggest personalized care interventions. Systems like IBM Watson have been used to tailor care recommendations based on prior health conditions, symptom progression, and patient preferences [3]. These models consider clinical guidelines with patient-specific data, supporting nursing home teams in crafting more targeted and compassionate care strategies. Also, NLP-based tools can extract relevant information from unstructured clinical data to inform care plans more efficiently [29].

Predictive Analytics

Predictive models, which is one of the most common and important roles of AI applications, play a crucial role in anticipating clinical deterioration, estimating time to death, and guiding hospice transitions. AI tolls can predict mortality risk and the need for palliative care services by analyzing EHR data, incorporating demographic information, and clinical indicators. One example is the Stanford University "Surprise Question" model, which uses AI

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to predict six-month mortality with considerable accuracy, assisting care teams in initiating timely palliative interventions [30].

There are many other notable cases that AI applications in Palliative and EOL. For example, a case study from the UK highlighted the deployment of an AI-driven decision support tool in a network of nursing homes. This system improved early detection of symptom changes and increased documentation compliance, leading to a 25% reduction in emergency hospitalizations [31]. In the U.S., a trial using the CareAngel platform demonstrated improved family satisfaction and reduced caregiver burden by offering AI-assisted voice check-ins and symptom tracking [32]. Those cases showed that AI holds transformative potential for palliative and end-of-life care in nursing facilities by enabling proactive symptom management, data-driven care planning, and predictive insight. While there are challenges regarding implementation and ethical use, the evidence suggests that when applied appropriately, AI can significantly improve the quality and efficiency of EOL care. A summary of the five key AI application areas in nursing home facilities(CDSS, Fall Detection, Cognitive/Behavioral Monitoring, Resource Optimization, Palliative/EOL care) can be found in the Table 2.

Table 2: Major AI Application Categories.

Category	Key Functions	Benefits	Examples (Tech/Studies)
CDSS (Decision Support)	Provides evidence-based alerts, reminders, and risk assessments (e.g. via EHR data).	Reduces medication errors; improves chronic disease management; enforces best practices.	Rule-based CDSS (e.g. MYCIN); study: 19% drop in inappropriate medications after CDSS use [9].
Fall Detection & Prevention	Monitors movement via wearable/ambient sensors, vision systems, and bed sensors.	Provides real-time fall alerts; prevents injuries; lowers hospitalization risk.	Accelerometer wearables (high sensitivity to falls); bed-exit sensors [16].
Cognitive & Behavioral Monitoring	Analyzes resident speech (NLP) and facial/emotion cues; uses social robots (e.g. Paro).	Detects cognitive decline and mood changes; provides social engagement; alerts to agitation.	Speech analysis to flag Alzheimer's [19], companion Paro reducing stress in dementia [21].
Resource Optimization & Workflow	AI-based staff scheduling, documentation automation (NLP/RPA), and integrated dashboards.	Cuts administrative workload; optimizes staffing; improves efficiency and staff retention.	NLP charting [24]: –30% documentation time); AI-driven RPA (IBM Watson: –40% admin tasks).
Palliative & EOL Car	Continuous symptom monitoring (sensors, NLP), personalized care plans, predictive models.	Wearable biosensors detect agitation [28]; AI mortality predictor (Stanford "Surprise Question", [30].	Wearable biosensors detect agitation [28]; AI mortality predictor (Stanford "Surprise Question", [30].

Future Directions

The integration of AI in nursing home facilities has evolved rapidly, addressing critical challenges in clinical care, administrative efficiency, and resident well-being. Four promising areas—Explainable AI, integration with Electronic Health Records (EHRs), personalized care models, and telehealth expansion—are expected to shape the future landscape of AI in long-term care environments.

Explainable AI: Enhancing Transparency and Trust

Explainable AI (XAI) seeks to make AI decision-making processes interpretable and transparent to human users. In nursing homes, where AI systems may recommend care plans, predict health deterioration, or automate risk assessments, explainability is crucial for gaining clinician trust and ensuring ethical care. Studies have shown that when healthcare providers understand how AI arrives at specific decisions, they are more likely to accept and effectively use these tools [33]. XAI can also enhance accountability and enable better communication with residents and families by providing clear rationales for automated decisions.

Integration with Electronic Health Records (EHRs)

Integrating AI with EHRs remains both a technical challenge and a vital opportunity. This type of integration allows AI tools to access comprehensive longitudinal patient data and enable more accurate predictive analytics for more personalized recommendations. For example, AI systems embedded within EHR platforms can monitor for early signs of sepsis or cognitive decline using real-time data streams [34]. In nursing home facilities, this integration could also streamline documentation, reduce redundant data entry, and enhance communication between care teams.

Personalized Care Models

AI has shown strong potential in supporting personalized care models by analyzing data with clinical indicators, behavioral patterns, preferences, and even genetic profiles. Personalized care in nursing home facilities can improve outcomes, particularly for residents with complex chronic conditions or cognitive impairments such as dementia. The AI algorithms can identify the best approach and interventions for a specific patient, facilitate customized care plans taking account of changing health conditions.

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For example, predictive models that adjust medication regimens or therapy intensity based on real-time feedback have been explored in geriatric care settings [3]. As these models mature, they are likely to shift nursing home care from a reactive to a truly proactive and personalized paradigm.

Telehealth Expansion

The COVID-19 pandemic significantly accelerated the adoption of telehealth in nursing homes, highlighting its potential to enhance access to care while minimizing exposure risks. Tools like chatbots and voice-based assistants are being integrated into virtual care settings to manage routine inquiries, screen for depression, or track medication adherence [35]. Moreover, AI-powered remote monitoring systems using wearable devices can continuously collect and analyze health data, alerting clinicians to potential issues without the need for in-person visits. As regulatory and reimbursement frameworks evolve, AI will likely play a pivotal role in establishing robust and sustainable telehealth infrastructures in long-term care.

The future of AI in nursing homes is beyond automation. It should enhance the capacity of caregivers, improve resident outcomes, and transform care delivery models. Explainable AI promises ethical and trustworthy decision support; EHR integration unlocks data-rich, real-time interventions; personalized models tailor care with unprecedented precision; and telehealth expansion ensures continuity and accessibility. As technology advances, interdisciplinary collaboration, regulatory oversight, and continued investment in infrastructure will be critical to realizing the full promise of AI in long-term care [36].

Conclusion

Artificial Intelligence holds significant promise in transforming nursing home care by enhancing clinical decision-making, improving resident safety, and optimizing operational efficiency. While challenges exist, particularly concerning ethical considerations and implementation barriers, strategic approaches and stakeholder engagement can facilitate the responsible integration of AI technologies. As the aging population continues to grow, embracing AI innovations will be crucial in meeting the evolving needs of nursing home residents and ensuring high-quality, person-centered care [37].

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