AIGC in an Aging World: Rebuilding Health and Elderly Care from the Ground Up

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Abstract

Population aging and rising health expenditures are forcing health systems to search for new ways to deliver care with limited human and fiscal resources. The aim of this paper is to analyze how AI-generated content (AIGC), powered by large language and multimodal models, is moving from a "content toy" to a key layer of infrastructure across elderly care, clinical services, wellness consumption, and health policymaking. First, it outlines the basic features of AIGC and explains why it is well-suited to unstructured, multimodal health data. It then examines concrete applications in three front-end domains: smart companionship, remote monitoring, and operational support in elderly care; clinical documentation, chronic disease coaching, and hospital operations in healthcare; and personalized marketing, product strategy, and consumer insight in the dietary supplements sector. The paper further discusses how AIGC-driven analytics can translate fragmented health data into actionable insights for providers, insurers, companies, and regulators. The analysis indicates that AIGC can alleviate documentation burdens, enhance chronic disease self-management, and improve the efficiency of elderly-care operations under tight fiscal constraints. Finally, it highlights major risks—including privacy breaches, bias, hallucinations, deepfake-driven misinformation, unclear liability, and the digital divide for older adults—and argues that robust governance and inclusive design are essential. The conclusion suggests that AIGC can help aging societies keep their health and care systems sustainable, but only if technological innovation is matched by strong ethical and regulatory safeguards.

Keywords

AIGC, aging society, elderly care, healthcare AI, digital health

1. Introduction

Across the globe, societies are growing older while working-age populations shrink. China is one of the clearest examples: by the end of 2023, there were about 297 million people aged 60 and above, accounting for 21.1 percent of the population, and projections suggest that the number of older adults will surpass 400 million around 2035 (Xinhua News Agency, 2025). This demographic shift overlaps with rising public awareness of wellness, preventive care, and chronic disease management, leading to growing household spending on healthcare, insurance, and dietary supplements (Grand View Research, 2025, BCC Research, 2025).

At the same time, health systems face mounting fiscal and workforce pressure. Fewer workers are paying into social insurance, while more retirees require long-term management of hypertension, diabetes, dementia, and other chronic conditions. In this context, AI-generated content (AIGC)—built on large language models and multimodal generative systems—is no longer just an entertaining "content toy." It is emerging as a new

layer of decision and service infrastructure that can support elderly care, clinical services, and consumer health communication. By automating documentation, generating patient-friendly explanations, and transforming raw data into insights, AIGC has the potential to reduce bureaucratic burden and help limited human staff care for more patients.

This essay examines how AIGC is being applied in four interrelated domains: elderly care, healthcare services, dietary supplements and wellness marketing, and health data analytics. It also discusses the major risks and governance challenges associated with these tools, including privacy, bias, liability, and the digital divide. The central argument is that under growing medical insurance and fiscal pressure, AIGC should be understood not only as an experience-enhancing technology, but also as a tool to keep aging health systems functioning—provided that innovation is matched by strong ethical and regulatory frameworks.

2.   A Brief Overview of AIGC Technology

AIGC refers to generative AI systems—such as large language models (LLMs) and multimodal models—that can understand and produce text, images, audio, video, and mixed media based on large-scale datasets and deep neural networks. Unlike earlier waves of "traditional" AI that mainly focused on prediction tasks (for example, risk scores from structured data), AIGC moves further into generation: drafting reports, answering open-ended questions, simulating dialogues, and creating tailored educational materials (Tilton et al., 2025).

In healthcare, this shift aligns with the messy reality of medical information. Clinical practice generates vast amounts of unstructured data: free-text notes, discharge summaries, radiology narratives, voice recordings of consultations, images, and continuous sensor streams from wearables. AIGC models are specifically optimized to ingest such unstructured, multimodal data and produce coherent, human-readable outputs. Studies have shown that LLMs can summarize complex admission notes, rephrase discharge instructions into plain language, and align explanations with established clinical guidelines .

Key capabilities in health-related scenarios include:

Natural-language understanding of medical records and guidelines: AIGC can parse clinical documentation, highlight key problems, and map them to guideline-based recommendations.

Patient-friendly explanation and education: Models can rewrite dense medical text at different reading levels, generate tailored self-care instructions, or create FAQ-style content for common conditions (Tilton et al., 2025).

Conversational interfaces: 24/7 chatbots can handle basic triage, medication reminders, lifestyle coaching, and follow-up questions. Systematic reviews of AI-powered conversational agents suggest they can improve self-management for chronic diseases when carefully designed and monitored (Kurniawan et al., 2024, Schachner et al., 2020).

These capabilities make AIGC a natural fit for aging and health systems that struggle to provide personalized communication and continuous support at scale.

3.   AIGC in Elderly Care: From Smart Companions to Care Operations

3.1   Emotional Support and Cognitive Engagement

Loneliness and cognitive decline are two of the most pressing issues in aging societies. In China and many other countries, older adults often live alone or apart from their children. AI-powered conversational agents and "digital humans" are being piloted to provide everyday companionship: chatting about news, reminding users of family events, or guiding them through simple memory and attention games. Research on social robots such as ElliQ shows that AI-driven companions can help alleviate loneliness and encourage healthy routines among older adults when integrated into broader care programs (IRJMETS, 2025).

Emotion-aware dialogue systems add another layer by analyzing tone, word choice, and conversation patterns. They can detect potential signs of sadness, anxiety, or confusion and respond with supportive language or recommend a check-in by family or caregivers. In China's fast-growing "silver economy,"

companies are increasingly offering elder-friendly smart speakers and robots that combine entertainment, reminders, and basic health management functions (Ashley Dudarenok, 2025). These tools do not replace human relationships, but they can make daily life less isolated, especially for seniors with limited mobility.

3.2   Remote Monitoring and Risk Alerts

Remote monitoring is another area where AIGC can play a supporting role. Wearables, smart home sensors, and cameras already collect data on steps, sleep, heart rate, and movement patterns. For care teams, the challenge is not just gathering data but making sense of it. AIGC systems can transform raw streams into simple, narrative reports for caregivers—for example: "This week Mrs. Li walked about 20 percent less than last week and woke up more frequently at night." These summaries can be generated automatically on a daily or weekly basis, with alerts triggered when patterns suggest elevated risk, such as prolonged inactivity, irregular gait, or deviations from medication routines(InsightAce Analytic, 2024).

Such tools address the reality of workforce shortages. As the number of older adults expands, there are fewer working-age caregivers to monitor them. AI-based monitoring and summarization can extend the reach of nurses and family caregivers, allowing them to focus on high-priority cases. Policymakers in China explicitly frame robotics and AI as part of the solution to labor shortages in elderly care and other sectors (Ashley Dudarenok, 2025, Master, 2025).

3.3   Smart Elderly-Care Facilities and Community Services

At the institutional level, AIGC can support both individualized care and day-to-day operations. In smart nursing homes or community-based care centers, AI tools can help generate personalized care plans that combine diet, rehabilitation exercises, and daily schedules based on each resident's health records, preferences, and functional status. Rather than filling out repetitive forms, staff can update a few key variables and let the system draft a detailed plan for review.

Similarly, AIGC can auto-generate nursing notes, shift-handover summaries, and monthly reports for families, dramatically reducing paperwork. Microsoft's Dragon Copilot for healthcare, for example, uses voice recognition and generative AI to produce clinical documentation and referral letters from ambient audio, freeing clinicians' time for patient interaction ("Microsoft's New Dragon Copilot"). Comparable tools are emerging for long-term care settings, where accurate, timely documentation is essential for safety and reimbursement but consumes a large share of staff hours.

These trends are supported by market forecasts. One industry report estimates that the global AI in aging and elderly care market was valued at about USD 47.4 billion in 2024 and is projected to reach roughly USD 322.4 billion by 2034, at a compound annual growth rate of about 21.2 percent (InsightAce Analytic, 2024). This rapid growth reflects both the scale of demographic aging and the hope that AI can help stretched care systems remain viable.

4.   AIGC in Healthcare and Medical Services

4.1   Clinical Decision Support and Medical Imaging

In hospital and clinic settings, AIGC is being layered on top of electronic health records (EHRs), imaging systems, and clinical workflows. One prominent application is automated documentation: LLM-based tools can listen to consultations and draft clinical notes, discharge summaries, and patient letters that physicians then review and sign. Early studies show that such systems can reduce documentation time while maintaining or improving quality, especially when tailored to specific specialties (Tilton et al., 2025).

In radiology, generative models are being combined with image-recognition AI to produce structured reports and highlight suspected lesions. AI tools already assist with screening for tuberculosis, lung nodules, and stroke risk; AIGC extends this by translating findings into standardized, readable narratives.

Beyond individual hospitals, experimental projects hint at more radical possibilities. In 2024, Chinese researchers unveiled "Agent Hospital," a virtual AI hospital town where large language model–powered doctor

agents treat simulated patients and continuously improve their diagnostic skills (Taştan, 2024). While still at the research stage, such projects show how generative agents might eventually support real-world clinicians in managing high-volume, routine cases.

4.2 Chronic Disease Management and Digital Health Coaches

Chronic diseases such as hypertension, diabetes, and cardiovascular conditions account for a large share of health-system costs, especially in aging populations. AIGC-enabled digital health coaches can turn daily blood pressure or blood glucose logs into personalized feedback: flagging patterns, suggesting adjustments to diet or activity, and reminding patients about medications or follow-up visits.

Systematic reviews of AI-powered chatbot interventions for chronic illness find that well-designed conversational agents can improve self-management, adherence, and patient engagement, although evidence quality and study designs vary (Kurniawan et al., 2024, Schachner et al., 2020, Dong, 2025). In many implementations, simple queries and routine triage are handled by the bot, while more complex or ambiguous cases are escalated to human clinicians. This hybrid model can increase efficiency without abandoning safety or human judgment.

4.3 Hospital and Clinic Operations

Hospitals are not only clinical organizations; they are large, complex service systems. AIGC can help forecast outpatient volume, optimize scheduling, and generate management dashboards in natural language. For example, a manager might ask: "Which departments will face capacity constraints next Monday?" and receive a narrative explanation derived from historical patterns and upcoming appointments.

In addition, AIGC tools can auto-generate quality-control reports, insurance audit documentation, and training materials for staff. These back-office functions are crucial in systems where reimbursement depends on detailed evidence of service quality and compliance. Unsurprisingly, the AI in healthcare market is expanding rapidly: one industry analysis estimates it was worth about USD 29.01 billion in 2024 and could reach over USD 504 billion by 2032, growing at roughly 44 percent annually (Fortune Business Insights, 2025). This growth signals not only technological enthusiasm but also structural demand for tools that can help health systems do more with fewer human resources.

5. AIGC in Dietary Supplements and Wellness Products

The same generative capabilities that support medical communication also transform how dietary supplements and wellness products are marketed and developed. China's supplement market is particularly dynamic: Grand View Research estimates that the China dietary supplements market generated about USD 27.48 billion in revenue in 2024 and is expected to reach around USD 55.16 billion by 2030, with a projected compound annual growth rate of 12.5 percent from 2025 to 2030 (Grand View Research, 2025).

5.1 Personalized Marketing and Content Generation

AIGC can analyze browsing history, purchase records, and basic health information to create personalized supplement recommendations—for example, joint health packages for seniors, sleep-support bundles for stressed professionals, or immunity boosters for frequent travelers. It can instantly draft product descriptions, Q&A sections, blog posts, video scripts, and even live-stream talking points in different "voices," such as a doctor, nutritionist, or fitness coach. This dramatically lowers the content-production barrier for both large and small brands (Tilton et al., 2025).

5.2 Product Development and Consumer Insight

On the back end, AIGC can scan scientific literature, patents, and social media conversations to identify emerging ingredients and concerns—such as NMN, probiotics, collagen, or "brain health" formulas. Models can summarize user reviews and complaints into structured insights, helping companies refine formulas, dosage forms, and messaging. Global market analyses suggest that aging populations and the trend toward

self-care are major drivers of both OTC drugs and supplements (BCC Research).

5.3 Risk of Over-Marketing and Misinformation

However, the same tools that enable efficient content generation also make it easier to spread misleading or exaggerated claims, especially when targeting older adults with lower digital literacy. Investigations in 2024–2025 documented the rise of AI-generated "doctors" and deepfake videos on platforms such as TikTok and Instagram, where real physicians' identities or synthetic avatars are used to promote unverified supplements and "miracle cures"(BCC Research, 2025, eWEEK Staff, 2025). These deepfakes blur the line between credible health advice and commercial hype, eroding trust in expert voices and potentially leading patients to abandon evidence-based treatment.

For China, which has already faced health product scandals, this raises the stakes for regulation and platform governance. Transparent labeling of AI-generated content, strict review mechanisms for health claims, and clear separation between education and advertising will be crucial to protect vulnerable consumers.

6. AIGC-Driven Health Data Analytics and Decision Support

So far, the discussion has focused on front-end services—companions, chatbots, and content. Equally important is AIGC's role in back-end analytics and decision support. Modern health systems generate massive, fragmented datasets: electronic health records, prescriptions, lab results, imaging archives, nursing notes, wearable data, pharmacy sales, online consultations, and supplement purchases.

AIGC models can help translate these complex data streams into human-readable, actionable insights. For example, hospital administrators might receive a quarterly summary stating: "The top three reasons for readmission in the past three months were heart failure, COPD, and uncontrolled diabetes, concentrated among patients over 70 living alone." Policymakers could request scenario-based projections—such as the expected impact of expanding community rehabilitation services on fall-related hospitalizations among older adults (Dong, 2025).

From a governance perspective, governments can rely on AIGC-generated reports for long-term resource planning: adjusting insurance reimbursement rules, designing chronic disease prevention programs, or assessing the impact of elder-care reforms. Companies, meanwhile, can use these tools to build disease-burden models, health-economics analyses, and market-entry strategies for digital therapeutics or senior-focused products (Fortune Business Insights, 2025, InsightAce Analytic, 2024).

The booming AI-in-healthcare ecosystem—spanning startups, established tech firms, and new IPO candidates—illustrates how data-driven health services are moving from experimentation to commercialization (Tilton et al., 2025). The key challenge is ensuring that analytic power serves public health goals rather than just short-term profit.

7. Risks, Challenges, and Governance

While AIGC opens new possibilities for aging and health, it also introduces significant risks that require dedicated governance.

7.1 Privacy and Data Protection

Health and elderly-care data are among the most sensitive categories of personal information. AIGC systems that ingest EHRs, sensor readings, and voice recordings must comply with strict data-protection laws, encryption standards, and access controls. Cloud-based models and cross-border data flows add further complexity, especially when training data are stored or processed in multiple jurisdictions (Tilton et al., 2025). Robust anonymization, data minimization, and audit trails are essential to prevent misuse.

7.2 Bias, Reliability, and Explainability

AI models are only as fair as their training data. If AIGC systems are trained mainly on data from large

urban hospitals, they may perform poorly for rural patients, minority groups, or people with atypical disease presentations. Research on AI in chronic disease management stresses the need to monitor performance across demographics and avoid reinforcing existing inequities.

Reliability is another concern. Studies of LLMs show that models can oversimplify or misrepresent scientific studies, sometimes producing confident but inaccurate conclusions, especially in medical contexts ("AI Chatbots Oversimplify Scientific Studies"). Clinicians and patients therefore need interpretable outputs and clear ways to see how recommendations are generated. Without transparency, accountability remains weak.

7.3   Liability and Professional Ethics

A practical question is: when AI-generated suggestions are wrong, who is responsible—the doctor, the hospital, or the AI vendor? Legal frameworks are still evolving, but many experts argue that clinicians must remain the final decision-makers, with AI framed explicitly as a support tool rather than an autonomous authority.

Ethical challenges are particularly acute in elderly care and supplement marketing. Overly persuasive chatbots or deepfake "doctors" can exploit fear of illness, grief, or loneliness to sell unnecessary products or services (eWEEK Staff; "Global OTC Drug and Dietary Supplements Market"). Over-medicalizing normal aging—treating every discomfort as a disease to be medicated—risks undermining autonomy and dignity.

7.4   Digital Divide for Older Adults

Finally, many older adults struggle with complex apps, small screens, and text-heavy interfaces. If AIGC systems are not designed with accessibility in mind—using voice interaction, large fonts, simple flows, and culturally appropriate language—they may widen the digital divide instead of bridging it (Dudarenok). Inclusive design is therefore a governance issue, not just a usability detail.

8.   Outlook and Conclusion

AIGC is becoming a key infrastructure layer connecting elderly care, clinical medicine, wellness consumption, and data-driven policymaking. It can power social robots in nursing homes, virtual health coaches for chronic disease, smart dashboards for hospital managers, and personalized education for patients and consumers. The most promising opportunities are likely to emerge in deeply vertical solutions—such as diabetes management for seniors or community-based rehabilitation—combined with high-quality, trustworthy content and careful integration into existing care pathways.

However, technology alone cannot guarantee better outcomes. To ensure that AIGC truly improves the lives of older adults and patients, innovation must move in step with ethical principles and regulatory safeguards. That means strong privacy protections, active monitoring for bias and misinformation, clear liability rules, and inclusive design that keeps digitally vulnerable groups in mind. If these elements come together, AIGC can help aging societies manage rising healthcare demands under tight fiscal constraints. If they do not, the same tools risk amplifying inequalities, spreading health scams, and generating more noise than value.

References

Ashley Dudarenok, (2025). *Technology for Seniors and the Silver Economy in China* [Online]. AshleyDudarenok.com. Available: https://ashleydudarenok.com/technology-for-seniors/ [Accessed December 10, 2025].

BCC Research, (2025). *Global OTC Drug and Dietary Supplements Market Forecasts Indicate Significant Growth* [Online]. BCC Research. Available: www.bccresearch.com/pressroom/phm/global-otc-drug-and-dietary-supplements-market [Accessed December 10, 2025].

eWEEK Staff, (2025). *AI Deepfakes of Real Doctors Flood Social Media With Health Misinformation* [Online]. eWEEK. Available: www.eweek.com/news/ai-deepfakes-real-doctors/ [Accessed December 8, 2025].

Fortune Business Insights, (2025). *Artificial Intelligence in Healthcare Market Size, Share & Industry Analysis, 2025–2032* [Online]. Available: www.fortunebusinessinsights.com/industry-reports/artificial-intelligence-in-healthcare-market-100534 [Accessed December 8, 2025].

Grand View Research, (2025). *China Dietary Supplements Market Size & Outlook, 2030* [Online]. Available: www.grandviewresearch.com/horizon/outlook/dietary-supplements-market/china [Accessed December 8, 2025].

InsightAce Analytic, (2024). *AI in Aging and Elderly Care Market Size, Share & Trends Analysis Report, 2025–2034* [Online]. Available: www.insightaceanalytic.com/report/ai-in-aging-and-elderly-care-market/2696 [Accessed December 8, 2025].

IRJMETS, (2025). AI-powered solutions in elderly care. *International Research Journal of Modernization in Engineering, Technology and Science,* vol. 7**,** no. 2, pp. 1-8.

Kurniawan, M. H., Handiyani, H., Nuraini, T., Hariyati, R. T. S. and Sutrisno, S., (2024). A systematic review of artificial intelligence-powered (AI-powered) chatbot intervention for managing chronic illness. *Annals of Medicine,* vol. 56**,** no. 1, p. 2302980.

Master, F., (2025). *China's Population Falls for a Third Consecutive Year* [Online]. Reuters. Available: www.reuters.com/world/china/chinas-population-falls-third-consecutive-year-2025-01-17/ [Accessed December 8, 2025].

Schachner, T., Keller, R. and v Wangenheim, F., (2020). Artificial intelligence-based conversational agents for chronic conditions: systematic literature review. *Journal of medical Internet research,* vol. 22**,** no. 9, p. e20701.

Sparks, L. D., (2025). *AI chatbots oversimplify scientific studies and gloss over critical details -the newest models are especially guilty* [Online]. LiveScience. Available: https://www.livescience.com/technology/artificial-intelligence/ai-chatbots-oversimplify-scientific-studies-and-gloss-over-critical-details-the-newest-models-are-especially-guilty [Accessed December 8, 2025].

Taştan, N., (2024). *China Opens 1st AI Hospital Town to Treat Patients in Virtual World* [Online]. Anadolu Agency. Available: www.aa.com.tr/en/artificial-intelligence/china-opens-1st-ai-hospital-town-to-treat-patients-in-virtual-world/3234256 [Accessed December 8, 2025].

Tilton, A., Caplan, B. and Cole, B. J., (2025). Generative AI in consumer health: leveraging large language models for health literacy and clinical safety with a digital health framework. *Frontiers in digital health,* vol. 7, p. 1616488.

Xinhua News Agency, (2025). *China Implements Gradual Retirement Age Increase to Address Population Aging* [Online]. Beijing Review. Available: www.bjreview.com/Latest_Headlines/202501/t20250102_800388719.html [Accessed December 8, 2025].

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