Guiding Technology for Good: Enhancing Health in an Aging Population

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China has entered the era of longevity

In 2020, there were 119,000 centenarians; Life expectancy reached 78.2 years in 2021; The population aged 80 and above is projected to quadruple by 2050.
Population aging is an inevitable outcome of societal development, economic growth, improved living standards, and advanced healthcare services. As these factors enhance human health and extend life spans, the degree of population aging becomes more pronounced. Key challenges include:

1. **Health Issues Among Seniors**: In China, 71.8% of individuals aged 60 and over suffer from chronic diseases. Ensuring good health is crucial for seniors to enjoy their golden years.

2. **Provision of Health and Elderly Care Services**: The combination of increasing age and smaller family sizes generates significant demand for health and elderly care services. Establishing a comprehensive health and elderly care service system is imperative.

3. **The Digital Divide**: Amidst the digital revolution, a notable digital divide has emerged among seniors in areas such as medical consultations, medication management, and overall health management.
Two National Strategies: Healthy China and Proactive Response to Population Aging

In 2016, the "Outline of Healthy China 2030 Plan" was introduced, outlining five core tasks:

- Promote healthy lifestyles
- Optimize health services
- Improve health security
- Create a healthy environment
- Foster the health industry
The "Medium and Long-term Plan for Proactive National Response to Population Aging" encompasses five key objectives:

1. **Financial Preparedness**
   - Build up social wealth reserves to cope with population aging.

2. **Labor Force**
   - Enhance effective labor supply under the backdrop of an aging population.

3. **Service and Product Supply**
   - Develop high-quality elderly care services and products.

4. **Technological Innovation**
   - Strengthen technological innovation to address the challenges of an aging society.

5. **Social Environment**
   - Cultivate a supportive, respectful, and caring social environment for the elderly.
Digital Applications Enhancing Elderly Health Services

Screening and Assessment

Integrated Medical and Elderly Care

Care and Rehabilitation

Medication Management

Digital Therapeutics
I. Smart Senior Health Screening and Assessment

A key aspect of elderly health services is the emphasis on prevention, moving the focus upstream to bolster proactive health management.

Convenient screening and assessment tools can effectively identify latent health issues, enabling healthcare professionals to develop treatment plans aimed at preserving the health and functional status of older adults, thereby maximizing their quality of life.

However, traditional screening methods, often paper-based or using electronic forms, are not user-friendly for either seniors or staff and tend to be inefficient.
Case Study 1: Intelligent Comprehensive Geriatric Assessment

The Jingyi Comprehensive Assessment System developed by the Department of Geriatric Medicine at Beijing Hospital features a comprehensive set of assessment scales, clear assessment scenarios, and customizable settings to meet individual needs. It generates assessment results in real time, highlights abnormal values, and provides personalized recommendations. Using an intrinsic strength model, it continuously records and interprets the results of comprehensive geriatric assessments.

— 近3次老年综合能力评估结果雷达图 —

2023-05-30
2023-01-10
2022-09-06
Case Study 2: Smart Dementia Assessment

The Brain Cognitive Health Management Platform, co-developed by Xuanwu Hospital of Capital Medical University and Beijing Smart Spirit Technology Co., Ltd., offers an AI-powered virtual assistant that facilitates barrier-free dialogue and an immersive interactive experience.

Automatic conversational interactions based on patient responses.

No need for interface interaction during the assessment, except for drawing tests and alertness tests (button questions).
Case Study 2: Smart Dementia Assessment

Facial and Limb Recognition

Limb Recognition
The system accurately identifies key skeletal points to discern patients’ intentions and actions.

Facial Recognition
The system precisely extracts facial landmarks to monitor patients’ behavior in real time.

MMSE Origami Test

MMSE "Close Your Eyes" Test
II. Smart Elderly Healthcare Services and Medication Management

Research has shown that creating a more senior-friendly healthcare environment is a priority for both society and policy makers.

1. Seniors predominantly use hospitals' WeChat official accounts for online medical services.
2. Prioritizing practicality: simple and secure functionalities such as appointment booking, insurance management, and access to medical records.
3. Tertiary hospitals generally offer resources tailored to the elderly.
4. 26% of these hospitals allocate separate appointment slots for seniors.
5. 46% express interest in streamlining the registration process.
6. 40% are willing to adapt their facilities for the elderly, with 45% willing to do so without additional charges.
7. 55% are interested in innovative practices.
8. While 70% of seniors are aware of online services, less than 30% have used them at least once.
Case Study 3: Senior-Friendly Healthcare Services

Tencent's Senior Healthcare initiative automatically adapts interfaces to **larger font sizes**, **fewer steps**, and **voice support**, making it easier for seniors to navigate processes like appointment booking, payment, insurance transactions, and report retrieval.

WeChat chat screen

Hospital’s WeChat official account

Hospital’s mini-program

One-click registration, eliminating the need for manual input

Simplified procedures

Larger font sizes and fewer steps

Voice guidance
Case Study 4: Age-Appropriate Medication Instructions

To address the difficulties seniors face when reading medication instructions, AliHealth initiated a non-profit project leveraging its core capabilities in product traceability codes and mature text-to-speech technology. This initiative aims to provide accessible solutions without increasing production costs for pharmaceutical companies, offering voice narration and large-font options to consumers.
III. Digital Therapeutics

Digital therapeutics, as a key driver in reshaping healthcare economics, plays a crucial role in modern healthcare. Specifically, this subset of digital medicine shows significant promise in treating conditions that are not adequately managed by conventional drugs, particularly those influenced by behavioral factors. Recent advancements have led to several breakthroughs in this field.

In the future, prescriptions may include not just medications but also APPs or integrated software and hardware solutions, such as artificial intelligence diagnostic systems, remote patient monitoring systems, and digital biomarker devices.

Digital therapeutics can help reduce healthcare costs for seniors while providing personalized treatments and improving patient adherence.
Case Study 5: Multi-Dimensional Precision Digital Therapeutics

鲤鱼戏水——范式名称：可用视野范围（The useful field of view task）

反映老年人视觉处理能力下降问题
训练可有效保持老年人的驾驶能力

Woutersen K. Invest Ophthalmol Vis Sci. 2020
Hardcastle C. Geroscience. 2022

激活凸面网络，训练注意力_注意力分配脑能力
IV. Digitalized Elderly Care

As of 2023, there were 297 million individuals aged 60 years or older, constituting 19.8% of the national population.

As of the end of 2022, the number of empty-nest seniors had reached 118 million, with projections indicating it will surpass 200 million by 2030.

**Elderly individuals living alone**, often because their children have moved away for work or passed away, face significant challenges in receiving timely assistance during emergencies, such as getting lost or experiencing critical health incidents.

Many have chronic conditions requiring regular medication but lack reminders.

Those with limited mobility may require help with daily activities.

They may experience falls or heart attacks without immediate assistance.

There is a risk of becoming disoriented and lost without prompt recovery efforts.
Case Study 6: Silver Guardian SIM Card

Emergency Button
A dedicated SOS button allows for immediate alerting in case of urgent situations.

Digital Boundaries
Triggers alerts upon entry or exit, keeping track of the senior's movements.

Real-Time Tracking
Provides continuous location updates.

Historical Path
Tracks the movement history of seniors.

Tiered Alerts
Notifications cascade through a sequence of contacts, including children/caregivers, community platforms, and monitoring centers.

Swift Assistance
Coordinates with nearby medical resources to facilitate prompt rescue operations.

Map + Digital Boundaries
Helps in locating seniors with mild cognitive impairment if they wander off.

WeChat Payment
Enables the elderly to benefit from digital payments even without a smartphone.

WeChat Voice Call
Facilitates seamless communication between seniors and their children.

Reduced Barrier
QR code-based payments make it easier for seniors to engage with digital technologies.

Transaction Notifications
Informs family members about spending details, ensuring financial security.

Spending Limits
Allows children to set spending caps, protecting against potential scams.

Ease of Use
Reduces seniors’ concerns over phone bills as voice calls only involve data usage.

User-Friendly
Aligns with the preferences of younger family members, enhancing communication.

This SIM card incorporates age-appropriate design elements, precise location tracking, and multi-platform alerts to safeguard the elderly and connect them to various supportive services, enabling them to enjoy a more connected and digitally enriched lifestyle.
V. Integrated Medical and Elderly Care Services

Integrated medical and elderly care services involve the merging of medical services with traditional elderly care, providing services such as home-based medical beds and domiciliary consultations. This model transcends the conventional approach to elderly care, which primarily focused on basic sustenance, by emphasizing the integration of medical and care services to ensure comprehensive support for the elderly.

However, previous models of integrated medical and elderly care services suffered from fragmented institutional management, outdated operational modes, and unprofessional service teams, leading to suboptimal experiences for the elderly. Therefore, the transformation driven by digitization is crucial.
Case Study 7: Digitally-Driven Governance Model for Integrated Medical and Elderly Care Services

Jiashan County in Zhejiang Province leverages the six core components of "Zhejiang Health and Wellbeing" to achieve unified user systems, standardized data fields, algorithmic and computational support, and real-time data exchange.

This center provides dynamic supervision of various services, including home-based care, long-term care insurance, meal assistance, care for the empty-nesters, and rehabilitation care, ensuring the implementation of systematic and standardized smart elder care services.

Six dedicated staff members are available around the clock to ensure prompt responses, accessibility of services, and sustainable service provision.
Case Study 7: Digitally-Driven Governance Model for Integrated Medical and Elderly Care Services

**Enjoy Benefits**

1. Precise profiling of the elderly population.
2. Automatic identification of different types of elderly individuals.
3. Proactive notification of relevant welfare policies.
4. Distribution of "Yiyang Voucher" electronic subsidies to targeted groups.

**Detailed profiling of the elderly**
Case Study 7: Digitally-Driven Governance Model for Integrated Medical and Elderly Care Services

Arrange Services

1. High-quality nursing services extended to rural areas for home-based elderly care.
2. Mobile rehabilitation vehicles reaching remote villages.
3. All urban and rural elders and their families can schedule 11 frequent services online, such as assistive device rentals and domiciliary care.

Operation of an elderly care big data center

Supervision of rural elderly care service orders

Deployment of mobile rehabilitation service vehicles in all towns and sub-districts

Support from a 24-hour service hotline
Case Study 7: Digitally-Driven Governance Model for Integrated Medical and Elderly Care Services

Select Institutions

1. A comprehensive map of elderly care resources.
2. Online access to information about elderly care institutions, including pricing and services.
3. Intelligent recommendations of elderly care institutions based on detailed profiling.
4. One-click virtual reality (VR) tours and booking of accommodations.

A map of elderly care institutions

Real-time access to institution details

VR tours of facilities
Thank You for Your Attention!

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