Japan’s Innovations for an Aging Society

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Chief Medical Officer, MedVenture Partners, Inc
Disclosure related to this presentation

- I am a co-founder of the Advanced Gerontology in Next Generation Japan Association (AGING Japan) which organizes the AGING 2.0 Tokyo Chapter.
- I am a council leader of (NPO) U.S.-JAPAN Council.
Today’s Agenda

1. Introduction
2. Advanced Aging Society: Japan
4. Current Issue in Japan
5. Innovation for the advanced aging society
6. COVID-19
7. Global Collaboration
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10 hours flight
17 hours time difference

- **Population:** 127M
- **GDP:** $4.9 (x10^3 Trillion)
- **GDP Growth rate:** 1.0% (2016)
- **GDP per Capita:** $38,582
- **Healthcare Relative Cost (/GDP):** 10.9%
- **Absolute Expenditure:** $597,708M
- **Expenditure/capita:** $4,727
- **Life Expectancy:** 83.8y.o

- **Population:** 326M
- **GDP:** $19.4 (x10^3 Trillion)
- **GDP Growth rate:** 1.6% (2016)
- **GDP per Capita:** $59,509
- **Healthcare Relative Cost (/GDP):** 17.2%
- **Absolute Expenditure:** $3,325,400M
- **Expenditure/capita:** $10,279
- **Life Expectancy:** 78.7y.o
Attractive Market with Unprecedented Aging Population

- Third largest GDP (1. US, 2. China, 3. Japan)
- Third largest medtech market (1. US, 2. EU, 3. Japan)
- Highest per capita healthcare cost in Asia (US: $9,000, Japan: $3,000, China: $90)
- Growth rate of healthcare cost: Geriatrics: 8.4%/y, Total: 3.6%/y
- Universal healthcare system since 1961
- Country with largest proportion of elderly
  - 28.7% > 65 years of age (2040: 40% > 65 y.o.)
    (US: Current 16.2%, 2040: 21%)
  - Factors: low fertility (fertility rate: 1.36)
    (US: 1.88)
  - High life expectancy (♀:87, ♂:81)
    (US: ♀:81, ♂:76)
  - Few immigrants (1.9%)
    (US: 11.0%)
Life Expectancy at Birth, Total Years

2019

- Norway: 84.12
- Japan: 84.1
- Iceland: 83.71
- Netherlands: 83.5
- Denmark: 83.47
- Sweden: 83.42
- Spain: 83.33
- France: 83.31
- Italy: 83.24
- Luxembourg: 83.15
LIFE EXPECTANCY AT BIRTH in JAPAN

- **Female**: 87.32 years
- **Male**: 81.25 years

WHAT IS THE AVERAGE LIFE EXPECTANCY AT BIRTH IN THE US?

The average lifespan at birth figures in the US, these are the most up to date available from the OECD, CIA, and CDC.

- **78.5** Years is the US life expectancy according to the OECD
- **78.6** Years is the US life expectancy according to the CDC
- **80.0** Years is the US life expectancy according to the CIA
WHAT IS THE AVERAGE AMERICANS LIFESPAN OVER TIME? (1960-2017)

Using data from the World Bank and Organization for Economic Co-operation and Development (OECD), we've mapped the United States average life expectancy at birth from 1960 to 2017 (being the latest date published).

United States life expectancy at birth
(1960-2017) Average age for male and female

Source: OECD / World Bank Data
WHICH U.S. ETHNIC GROUP HAS THE LONGEST LIFE EXPECTANCY?

74.6
African-American
US life expectancy

76.9
Native American
US life expectancy

78.9
White-American
US life expectancy

82.8
Latino-American
US life expectancy

86.5
Asian-American
US life expectancy
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Sugamo, Tokyo, Japan in 2015
2020

Aging Population 28.7%
1980 (40 years ago)

Aging Population 9.6%
2050 (30 years later)

Aging Population ▲▲ 40%

Working age Population ▼▼
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1997-2001: Worked as a family doctor at the small hospital in the mountains of Japan
Even 20 years ago, aging Rate had been already more than 40% in rural area

A town where I used to work as a family doctor
Unsolved Problem in Aging Society

Elder to elder Nursing

Single-living Elder

Shortage of caregivers, Social workers, nursing home, and family support

Bedridden Elder

Dementia
Experimental Interventional Cardiology Laboratory
Experimental Interventional Cardiology Laboratory

- Catheter-Based Mitral valve implantation
- Auto Pulse Chest Compression Device
- The 1st DES
- Drug Coated Balloon
- Pioneer Plus Re-entry Catheter
- TurboHawk Atheterotomy Catheter
- Trellis Thrombectomy Catheter
- ENDEAVOR® Drug-Eluting Coronary Stent System
- HD-IVUS
Experimental Interventional Cardiology Laboratory

Lumend™
CTO Device

Phoenix™
Atherectomy Catheter

Mercator
Drug Injection Device

Sadra™
Transcatheter Aortic Valve

Osclet™
Peripheral CTO device

Pantheris™
Peripheral Atherectomy Device
Experimental Interventional Cardiology Laboratory

- Sensei™ Robotic Catheterization
- Boston SR Pro IVUS Cather
- CenterCross CTO Devices
- Micro 14 Microcatheter
- MultiCross Multilumen Atherectomy Catheter
- OCT, Lightlab
- Alchole RDN
Experimental Interventional Cardiology Laboratory

- Bioccardia Helix Catheter
- Morph Deflectable Guiding Catheter
- Kerberos Rinspirator Catheter
- AST Petal Bifurcation Catheter
- Chocolate Peripheral Catheter
- Boston OptiCross IVUS Catheter
- EndoTex Carotid Stent
- The GuardWire® Protection System
- PercuSurge Distal Protection Device
- TriReme Bifurcation Stent
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There has been a major shift in the population structure in 19th-21st century. It is impossible to maintain the social security systems established in 1960-80s.

Demographic transition <250 years trend>:

- **Meiji Restoration**
- **19th century model**
- **Bubble economy**
- **Working/Aging Population=2.03**
- **Age 50**
- **Age 50-64**
- **Age 15-49**
- **Under 14**
- **Over 65**

The current social security systems developed.


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Trends in Social Security Expenditure of Japan

- Social security expenditure is continuously increasing. In 2014, the total expenditure reached around US$1 trillion, 2.4 times of 1990.
- Rapid increase in “medical care for the elderly” and “long-term care (for the elderly)” contributes to the whole expenditure expansion.

Source: Ministry of Economy, Trade and Industry. 2017
Medical expenses per person by age group (2013) (For medical insurance system)

- Medical expenses per capita increase with age except for infancy, but increase rapidly after the age of 65. After the age of 80, the ratio of hospitalization costs (hospitalization + meals / living treatment) increases.
- Most of the medical expenses are spent in the final stages of life.

【Medical expenses total】

【Medical treatment fee】
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Innovation
Japan: Innovating the future.
Shinzo Abe at Stanford: Innovation will spur Japan's future

Japanese prime minister touts innovation links to Stanford, Silicon Valley. He also hailed a new partnership with the Stanford Biodesign program that will train the next generation of Japanese biomedical experts.
PAIN POINT

Necessity is the mother of Innovation!
Male

<table>
<thead>
<tr>
<th>Life Expectancy</th>
<th>Healthy Life Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>80.21</td>
<td>71.19</td>
</tr>
</tbody>
</table>

Female

<table>
<thead>
<tr>
<th>Life Expectancy</th>
<th>Healthy Life Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>86.61</td>
<td>74.21</td>
</tr>
</tbody>
</table>

出典：厚生労働省「健康日本21（第二次）各目標項目の進捗状況について」を参考に作成
Male
- Life Expectancy: 76.1 years
- Healthy Life Years: 66.9 years
- Difference: 9.8 years

Female
- Life Expectancy: 81.1 years
- Healthy Life Years: 70.1 years
- Difference: 11.0 years

2016 CDC & WHO
Unhealthy life years

Male

Female

Male

Female

Unmet Needs

- How to manage unhealthy life years?
- How to extend the health life years without shortening the life expectancy?
How to manage unhealthy life years?

Necessity is the mother of innovation!
The estimated supply of professional caregivers is no enough for the estimated demand calculated by the government based on the regulations on providing care services.

Demand and Supply of Professional Caregivers

- **Demand**
  - 2015: 1.92 million
  - 2025: 2.47 million
  - 2035: 2.97 million

- **Supply**
  - 2015: 1.87 million
  - 2025: 2.15 million
  - 2035: 2.28 million

- **Shortage**
  - 2015: 50 thousand
  - 2025: 320 thousand
  - 2035: 690 thousand

Source: Ministry of Economy, Trade and Industry of Japan
Nursing robot in Japan

Long-term care support type
Transfer, bathing, excretion, etc. It is a robot that supports "nursing care".

Independence support type
Walking, rehabilitation, eating, reading, etc. It is a robot that supports "independence of the caregiver".

Communication・Security type
Healing and watching. A robot that communicates and watches over.
※出所：「日本における認知症の高齢者人口の将来推計に関する研究」（平成26年度厚生労働科学研究費補助金特別研究事業 九州大学 二宮教授）による速報値
厚生労働省認知症施策の現状について
※2015年以降のMCIの推計値は2012年の推計値を元に認知症の人数の86%として編集部が計算

≥65 years old

Number of dementia patients (10k) % of dementia patients (%)
How to extend the health life years without shortening the life expectancy?

PAIN POINT

Necessity is the mother of Innovation!
As the Financial Times reported this week, Japan is now providing a model. With the world’s highest life expectancy and, at more than 67,000, the highest ratio of centenarians per capita, that is perhaps no surprise. But Japan is the only large country to have formally adopted the idea of century-long living as a national project.”
As everyone hopes to live long, society will inevitably age.→ ‘Aging society’ is the ideal society of mankind.

After the World War II, affluent economic society was realized, the average life expectancy increased from about 50 years to about 80 years.

Based on the aging of society, it is required to restructure the socioeconomic system.

Establishment of ‘Lifelong Active Society’

- Economic activities
  - Re-employment (short time work)
  - Volunteer activities (social contribution)
  - Agricultural/gardening activities
  - Maintenance of physical functions (rehabilitation, etc.)
  - Utilization of home care services

Employers expect employees to be healthy and work hard during this period: Health investment

→ Significant influence on subsequent healthy life expectancy

Less active participation in the economic activities

Social contribution (volunteer activities, etc.):

Necessity for new business creation

Examination of ways of working and social contribution with due consideration of the characteristics of local community.

Establishment of the care system that meets the needs

Home care services can be utilized continuously

Utilization of nursing care facilities

Establishment of ‘Lifelong Active Society’

Special efforts should be made to prolong this period (healthy life expectancy)
As everyone hopes to live long, society will inevitably age. → ‘Aging society’ is the ideal society of mankind. After the World War II, affluent economic society was realized, the average life expectancy increased from about 50 years to about 80 years. Based on the aging of society, it is required to restructure the socioeconomic system.

Employers expect employees to be healthy and work hard during this period: Health investment → Significant influence on subsequent healthy life expectancy.

Less active participation in the economic activities
Social contribution (volunteer activities, etc.): Necessity for new business creation
Examination of ways of working and social contribution with due consideration of the characteristics of local community.

Establishment of the care system that meets the needs
Utilization of home care services
Utilization of nursing care facilities
Establishment of the flexible system that enables people to live in ways they like for a lifetime and meets various needs that they recognize in their lives.

Special efforts should be made to prolong this period (healthy life expectancy)
Trends in Employment of the Elderly

one in four

(万人)
1000
800
600
400
200
0

892万人
Establishment of ‘Lifelong Active Society’

- As everyone hopes to live long, society will inevitably age. → ‘Aging society’ is the ideal society of mankind.
- After the World War II, affluent economic society was realized, the average life expectancy increased from about 50 years to about 80 years.
- Based on the aging of society, it is required to restructure the socioeconomic system.

<table>
<thead>
<tr>
<th>Economic activities</th>
<th>Re-employment (short time work)</th>
<th>Volunteer activities (social contribution)</th>
<th>Agricultural/gardening activities</th>
<th>Maintenance of physical functions (rehabilitation, etc.)</th>
<th>Utilization of home care services</th>
<th>Utilization of nursing care facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employers expect employees to be healthy and work hard during this period: <strong>Health investment</strong> → Significant influence on subsequent healthy life expectancy.</td>
<td>Less active participation in the economic activities Social contribution (volunteer activities, etc.): <strong>Necessity for new business creation</strong> Examination of ways of working and social contribution with due consideration of the characteristics of local community.</td>
<td></td>
<td></td>
<td></td>
<td>Establishment of the care system that meets the needs.</td>
<td>Special efforts should be made to prolong this period (healthy life expectancy)</td>
</tr>
</tbody>
</table>
7.62 million by 2035.

Frequency of conversations among single male seniors

- About 30% Conversations
  Less than once a week

2025 One on Five elder people are dementia
Local community for the advanced Aging Society

**LOCAL GOVERNMENT**
- Train the leaders for the Health promotion

**CLINIC • HOSPITAL**
- Use the Public hall
- Community Center
- Unoccupied house
- For the community activities

**INDUSTRY**
- Move the body
- Enjoy exercise

**SCHOOL • ACADEMIA**
- Health consultation
- Health check

- Participate in recreation in the local community
- Enjoy the food
- Watch over

https://japaneseclass.jp/trends/about/地域コミュニティ
I want to know my condition before it gets worse.
I want to live independently.

Clinical Information
- Medical information
- Environmental information

Real-time automatic health checkups and early detection of diseases
Optimal treatment through the sharing of physiological and medical data
Robotic support in medical and nursing care settings

Life support
- Daily life support and conversation with a robot

Health promotion
- Real-time automatic health checkups and early detection of diseases

Optimal Treatment
- Optimal treatment through the sharing of physiological and medical data
- Robotic support in medical and nursing care settings

Problem
I want to know my condition before it gets worse.
I want to live independently.
Japan Aims to Create Digital Agency in 2021
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Global Cases: 10,110,552
Global Deaths: 238,251
Physical activity of the elderly is reduced by 30% due to the influence of COVID-19.
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The world’s ageing population

United States of America - 2019
Population: 329,064,916

Japan - 2019
Population: 126,860,299
Current Situation of Aging
< 2015 >
(201 countries)

<table>
<thead>
<tr>
<th>Country</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>26.0</td>
</tr>
<tr>
<td>Italy</td>
<td>22.4</td>
</tr>
<tr>
<td>Germany</td>
<td>21.1</td>
</tr>
<tr>
<td>Portugal</td>
<td>20.7</td>
</tr>
<tr>
<td>Finland</td>
<td>20.3</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>20.1</td>
</tr>
<tr>
<td>Greece</td>
<td>19.9</td>
</tr>
<tr>
<td>Sweden</td>
<td>19.6</td>
</tr>
<tr>
<td>Latvia</td>
<td>19.3</td>
</tr>
<tr>
<td>Denmark</td>
<td>19.0</td>
</tr>
</tbody>
</table>

Progress of aging
< 2060 prediction >

<table>
<thead>
<tr>
<th>Countries &amp; Regions</th>
<th>2060</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>38.1</td>
</tr>
<tr>
<td>Korea</td>
<td>37.1</td>
</tr>
<tr>
<td>Taiwan</td>
<td>36.8</td>
</tr>
<tr>
<td>Singapore</td>
<td>35.8</td>
</tr>
<tr>
<td>Portugal</td>
<td>35.8</td>
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<tr>
<td>Poland</td>
<td>35.6</td>
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<tr>
<td>Greece</td>
<td>35.5</td>
</tr>
<tr>
<td>Spain</td>
<td>35.3</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>35.0</td>
</tr>
<tr>
<td>Italy</td>
<td>33.4</td>
</tr>
</tbody>
</table>

Aged Society
Aging rate > 7%

Super Aged Society
Aging rate > 14%

Super Ultra-Aged Society
Aging rate > 21%

Ultra-Aged Society
Aging rate > 28%

© T Hasegawa RIFH.Japan
UN Estimate 2017
THE NEED FOR INNOVATION IN AGING HAS NEVER BEEN GREATER

**Unprecedented global aging**
- 1.4B: Global Population over 60 by 2030, from 936M in 2014
- 40%: Increase in the US 65+ population from 2014-2030
- 85+: Fastest growing age cohort in the US in this decade

**Pressure accelerated by Covid-19**
- 40%: Nursing homes in US represent 1% of population yet 40% of deaths (NYT)
- 43%: Of older adults in residential care report feeling lonely (National Academy of Sciences)
- 50%: Of care homes are running at a loss unprofitable (Guardian)

**Need for innovation across all sectors**
- 57%: Of family caregivers suffer clinical levels of stress (CNN)
- $400tn: Pensions gap in 8 countries by 2050 (WEF)
- 0: Number of ‘unicorns’ in aging and senior care

Sources: Aging2.0 / team research, WEF, AARP, Citibank, BCG, Westpac
The advanced aging society is not only Japan issue, but also global issue!

Necessity is the mother of innovation!
Global Collaboration for our aging society

Japan is the most advanced aging society in the world.
The best way to predict your future is to create it.

Peter Drucker
Thank you for your attention!

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