AMED 介護テクノロジー社会実装のためのエビデンス構築事業
海外展開を見据えた介護テクノロジーの研究開発に関するシンポジウム

東京理科大学

テクノロジーが支える高齢期ケアの未来

Technology and the Future of Long-Term Care

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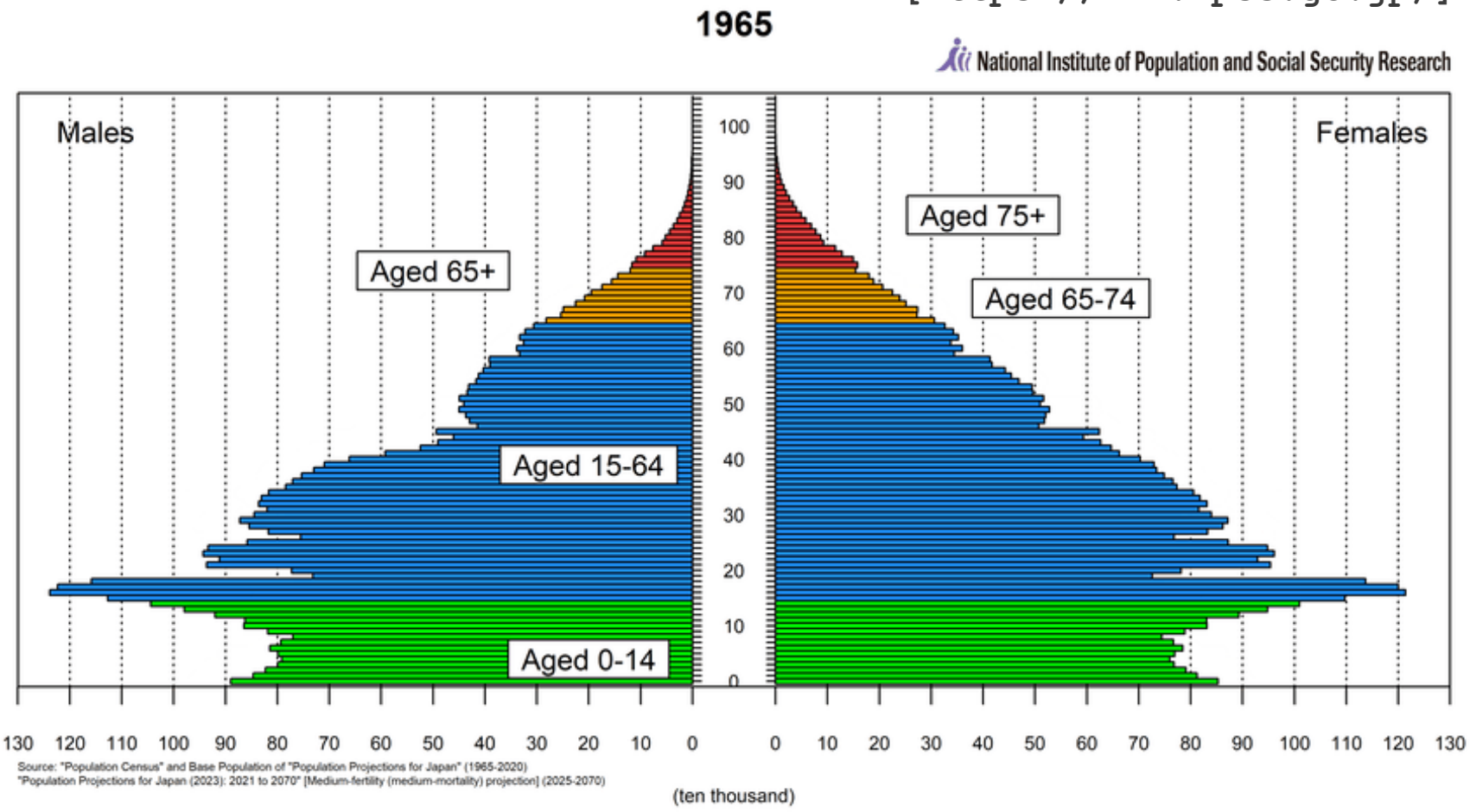
Population Pyramid of Japan

Structure of population pyramid of Japan is changing.

The population aged 75 and over is projected to peak in 2055 and then declines.

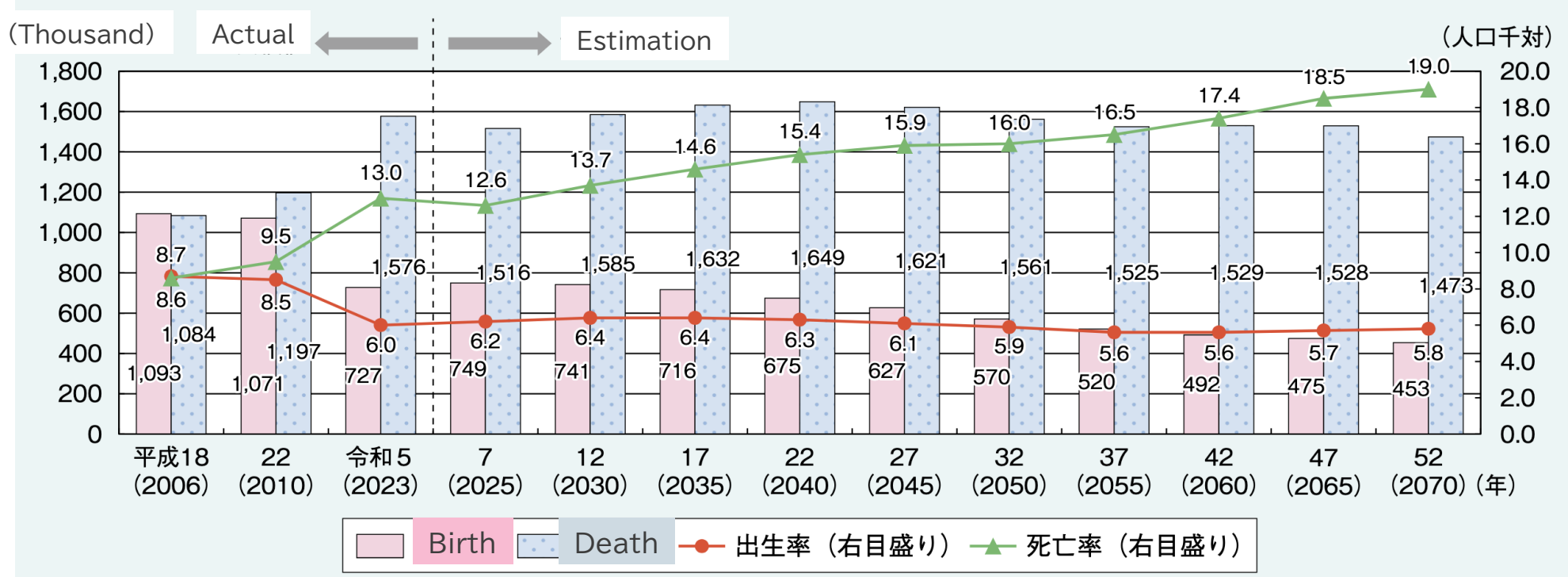
[https://www.ipss.go.jp/]



Challenges of an Aging: Birth–Death Imbalance

In 2024, there're approximately 686,000 births and about 1,605,000 deaths in Japan, resulting in a decrease of roughly 920,000 people for the year (with about 950,000 among Japanese nationals).

[Annual Report on the Ageing FY2025, Cabinet Office JAPAN]



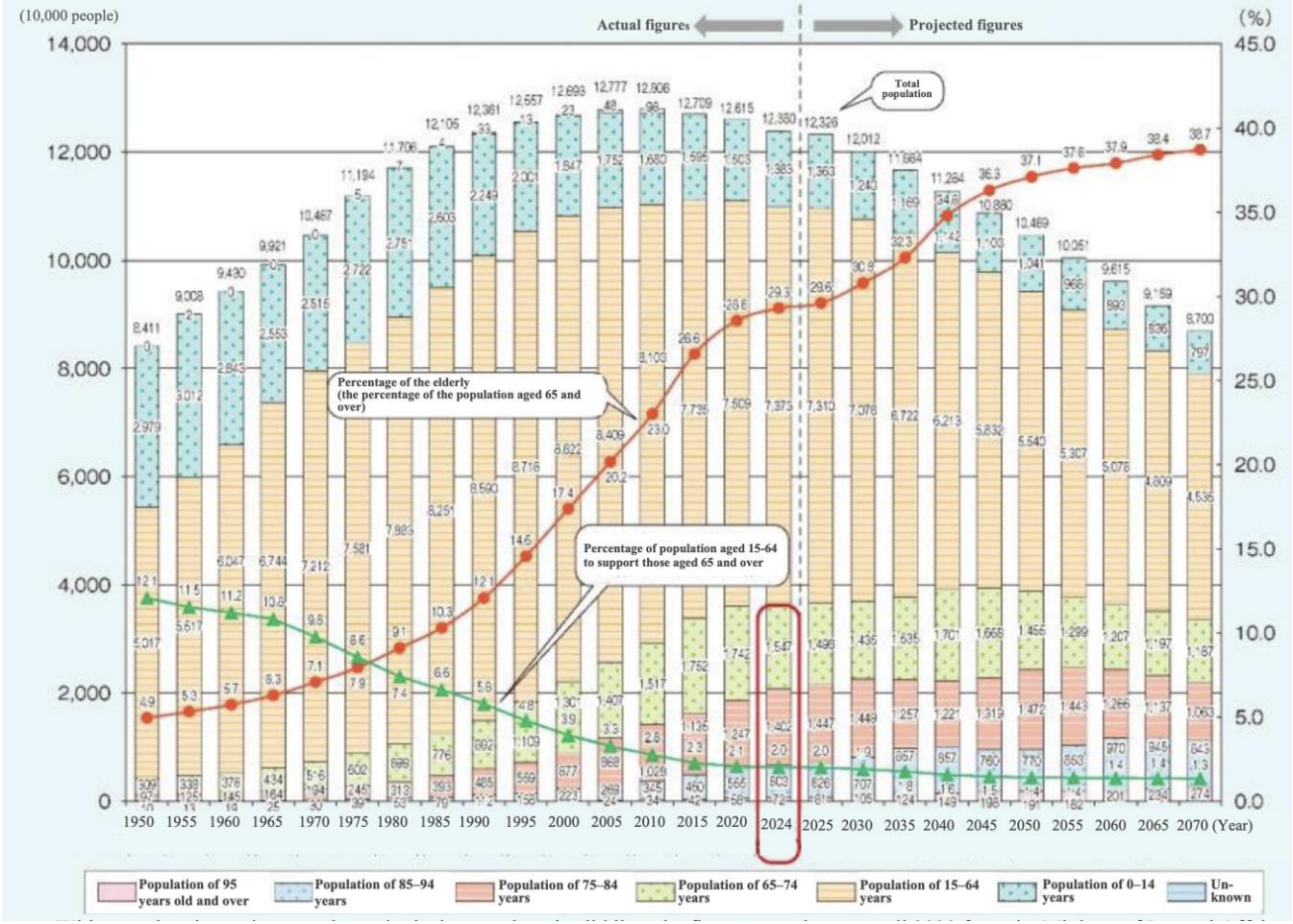
資料：2006年、2010年、2023年は厚生労働省「人口動態統計」による出生数及び死亡数。2025年以降は国立社会保障・人口問題研究所「日本の将来推計人口（令和５年推計）」の出生中位・死亡中位仮定による推計結果。いずれも日本における日本人について。

As of October 1, 2024, Japan's total population was 123.8 million.
The number of births is declining and projected to fall to approximately 450,000 by 2070.

Challenges of an Aging: Declining Population

After falling below 120 million in 2031, **the population will continue to decline,** dropping below 100 million in 2056 to reach 99.65 million.

[Annual Report on the Ageing FY2025, Cabinet Office JAPAN]

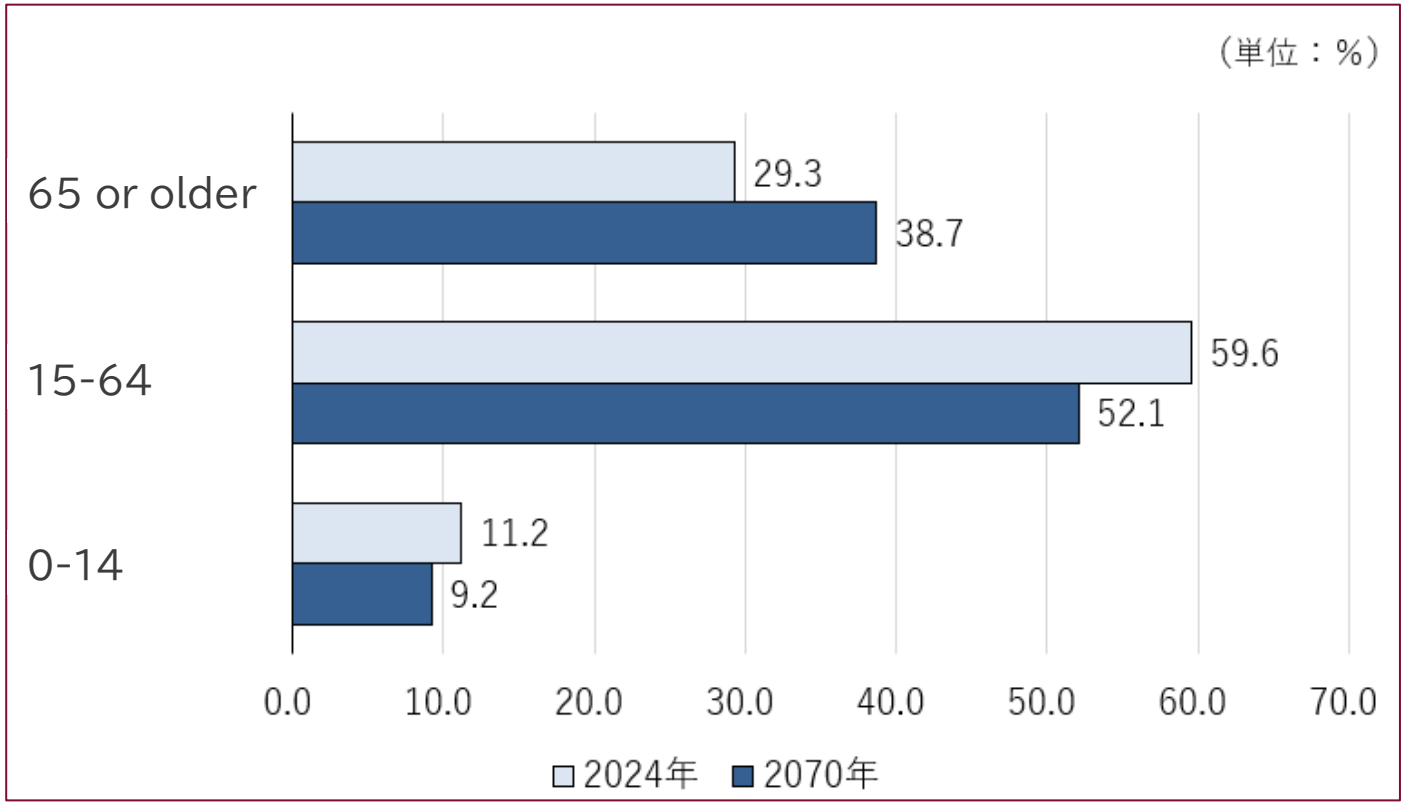


Life expectancy is projected to continue increasing, reaching 85.9 yrs for men and 91.9 yrs for women by 2070.

Challenges of an Aging: Japan as an Ultra-Aged Society Approaching a 40% Elderly Population

In 2070 (Reiwa 52), individuals aged 65 years and above are projected to account for **roughly 40% of the total population.**

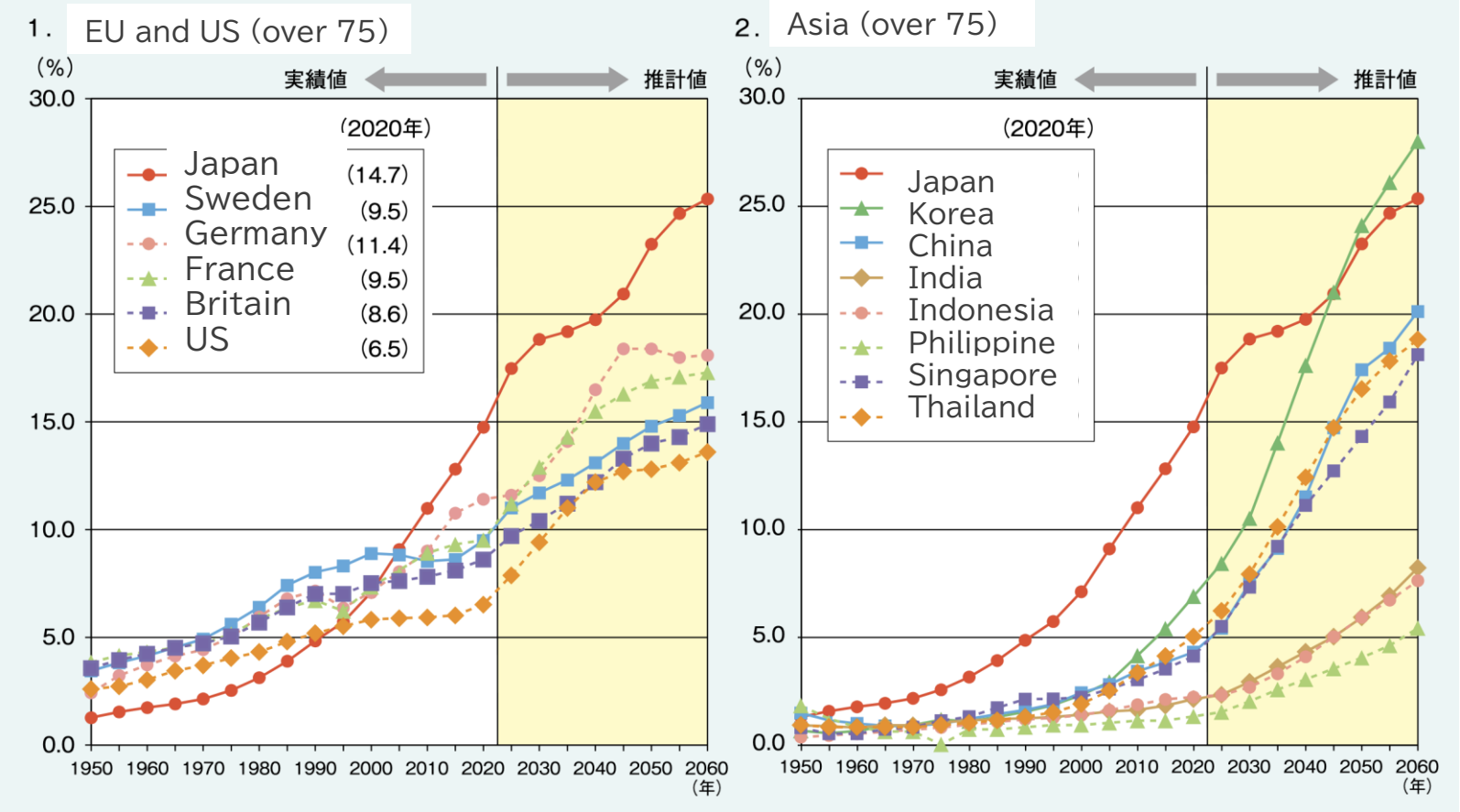
[Annual Report on the Ageing Society [Summary] FY2025, Cabinet Office JAPAN]



The proportion of people aged 65 and over is expected to continue rising, reaching 33.3% in 2037, at which point *one in every three people in Japan will be aged 65 or older.*

Challenges of an Aging: Internationally Ahead

The aging rate increased from 5.1% in 1950 to 9.3% in 2020. It is projected to **rise to 18.5% by 2060,** meaning that **global population aging** is expected to accelerate rapidly over the next 40 years.

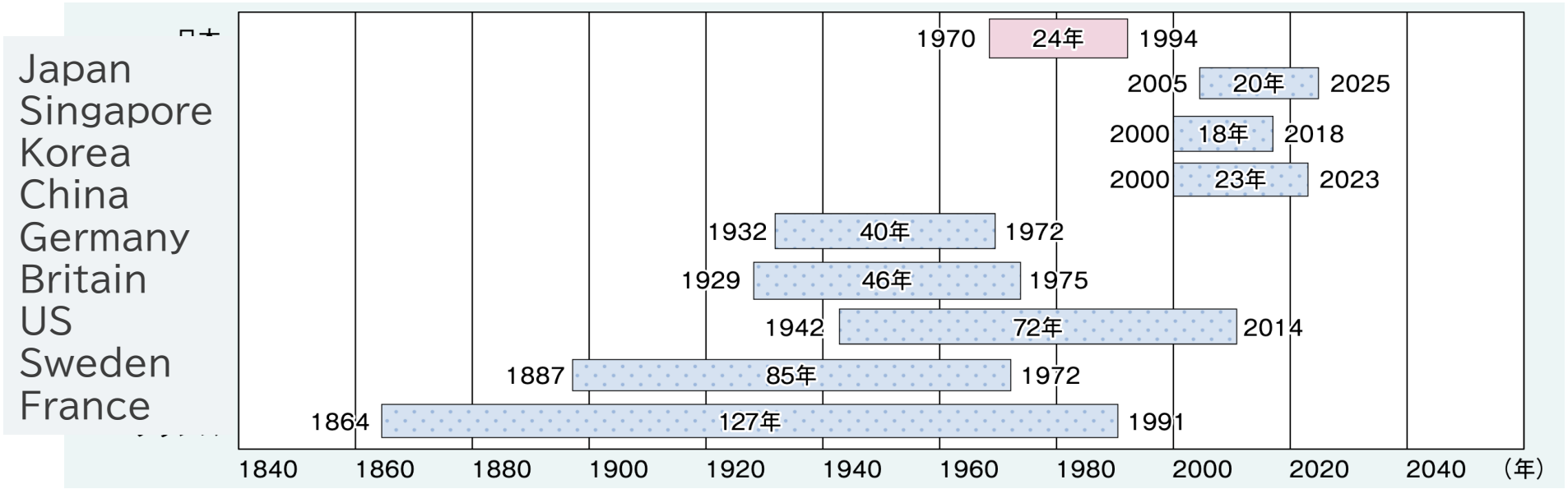


A comparison of aging rates between Japan and other countries and regions shows that **Japan's proportion of people aged 65 and over** was relatively low until 1990, but **became the highest among them in 2005** and is projected to remain at a high level in the years ahead.

Challenges of an Aging: Rapid Overtaking

France took 127 years, measured by the number of years required for the proportion of people aged 65 and over to increase from 7% to 14% (the doubling period).

[National Institute of Population and Social Security Research (2025)]



The United States took 72 years, while Japan reached the doubling point in just 24 years.

Looking at Asian countries, South Korea took 18 years and Singapore 20 years, indicating that in some countries population aging may proceed at an even faster pace than in Japan.

Older Adults Requiring Care in Japan: Support & Care Levels

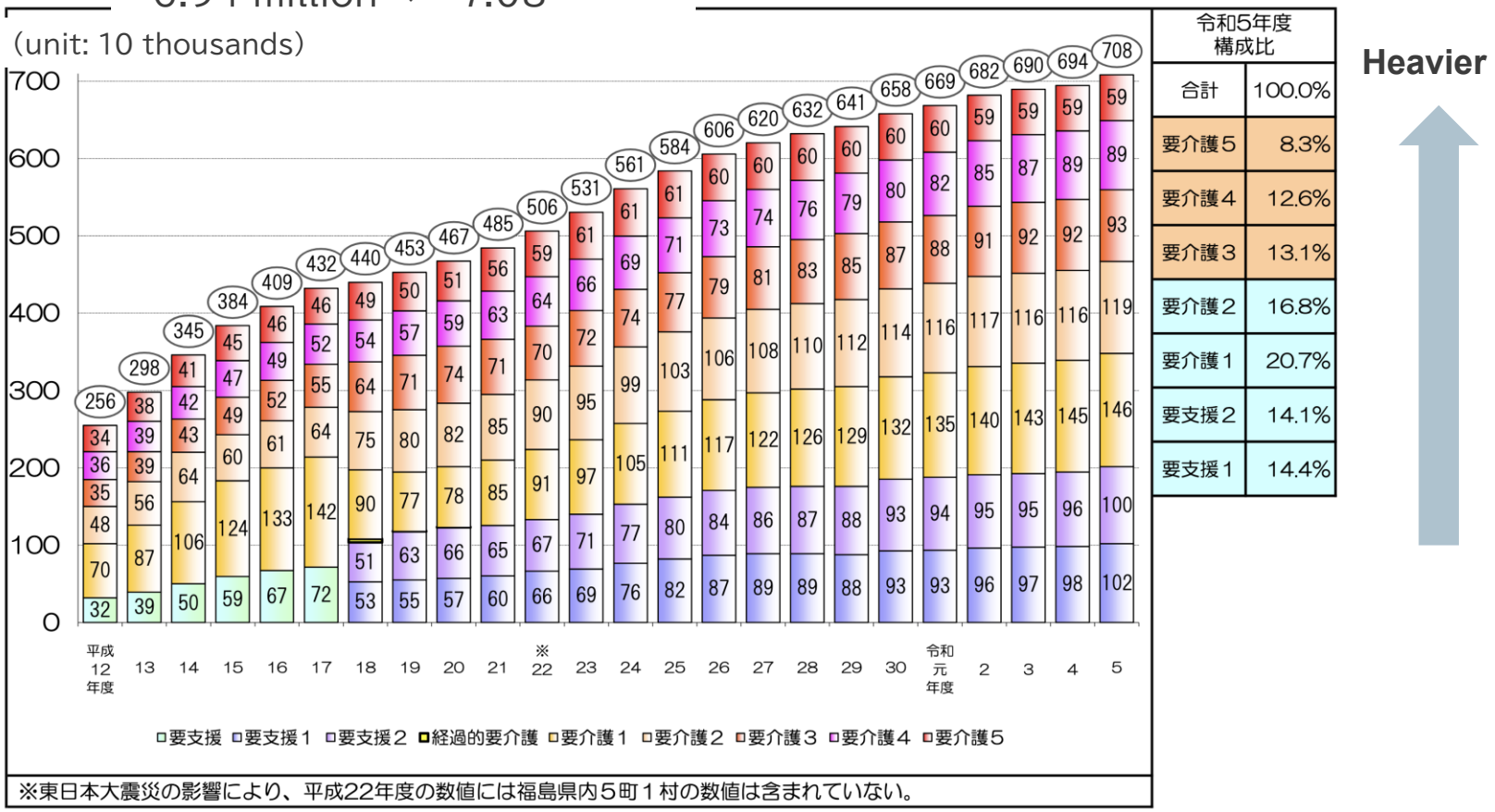
Number of persons certified as Requiring Long-Term Care (LTC) or Support in Japan is increasing.

[https://www.e-stat.go.jp/stat-search/files?page=1&toukei=00450351&tstat=000001031648]

FY2023 ⇒ FY2024

6.94 million ⇒ 7.08

2.0 % increase.



令和5年度 構成比	
合計	100.0%
要介護５	8.3%
要介護４	12.6%
要介護３	13.1%
要介護２	16.8%
要介護１	20.7%
要支援２	14.1%
要支援１	14.4%

Heavier

7.08 million in 2024 (LTC Insurance administrative count); +0.51 million over 5 years.

Care Technologies Supported at the National Level in Japan

Source [METI and MHLW]

Market Growth Potential
市場成長性・大
（海外市場獲得の可能性・大）

Innovativeness
先進性・大

Universal Design Products
共用品

点字、凸文字、音声、光などの機能を有した障害に関わらず使える製品

シャンプーの凹凸


電動歯ブラシ


温水洗浄便座

牛乳パックの切れ込み

Assistive Products (Welfare Equipment)
福祉用具


スズキ、WHILL等

パラマウントベッド、フランスベッド等

- 車いす
- 杖・歩行器
- ポータブルトイレ
- 義肢・装具
- 特殊寝台　等

カワムラサイクル、松永製作所等

Robotic Care Devices
ロボット介護機器

経済産業省・厚生労働省
開発・導入支援


三菱DCS（コミュニケーション）


コニカミノルタ（見守り）

トリプルW（排泄支援）


R.Tワークス（移動支援）


パナソニック（見守り）

“Assistive products” are a designated category eligible for public subsidies for rental or purchase.

Source [METI]

Items Covered by the Long-Term Care Insurance System

90% covered by LTCI for certified care recipients (10% co-payment).

13 Categories Eligible for Rental


車いす


車いす付属品


特殊寝台


体位変換器

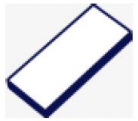

手すり


スロープ


認知症老人徘徊感知器


移動用リフト
（吊り具部分を除く）


自動排泄処理装置


床ずれ防止用具


特殊寝台付属品


歩行器


歩行補助つえ

6 Categories of Designated Assistive Products for Purchase


腰掛便座


自動排泄処理装置
の交換可能部品


入浴補助用具


簡易浴槽


移動用リフトの
吊り具部分


排泄予測支援機器
R4.4～

Since 2022, toileting prediction support devices have also been included (e.g., DFree, Lilium).

Home modifications (e.g., step removal, handrail) are also covered under LTCI.

Typical flow: (Private-Sector R&D and validation → TAIS code assignment → LTCI coverage)

MEXT/JSPS/JST basic research → METI/AMED/NEDO pre-commercial R&D →
→ MHLW validation studies → TAIS code assignment → LTCI coverage

Source [METI and MHLW]

Japanese Government Support for Robotics and AI in Elderly Care and Healthcare

Robotics for Elderly Care: The AMED Program

Beyond addressing labor shortages and workforce aging: enabling objective assessment, real-time capabilities, and task shifting.

Target Care Tasks:

- Transfer
- Toileting
- Bathing
- Monitoring
- Communication
- Mobility / walking
- Back-end operations

METI (Japan Revitalization Strategy)
Robot Care Project (2013–)
AMED
Development and Standardization of Robotic Care Devices (2015–)

Priority Areas for the Use of Robotic Technology in Long-Term Care (6 Fields, 13 Items) 2012, rev. 2014

Source [METI and MHLW]

What is currently being promoted by the Cabinet Office, METI, MHLW, and AMED

From 2025, the priority areas were expanded and reinterpreted, and the term “robot care” was replaced with “care technology.”

In 2025, METI and MHLW revised the “Priority Areas for the Use of Robotic Technology in Long-Term Care” to further promote technologies such as care robots and ICT, and renamed them “Priority Areas for the Use of Care Technology.”

- **Improving the quality of care services**
- **Reducing staff workload**
- **Supporting the independence of older adults**

MHLW web page
[https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/0000209634_00013.html]

Overview of Priority Areas for Care Technology Use and Adoption Rates

Care Technology 2025 by AMED

V. 3.0 min.

Care Technology Video by
Japan Agency for Medical Research and Development (AMED)

https://youtu.be/7kUe1xY4A1c?si=MoSzUiZ7ww6gekwv

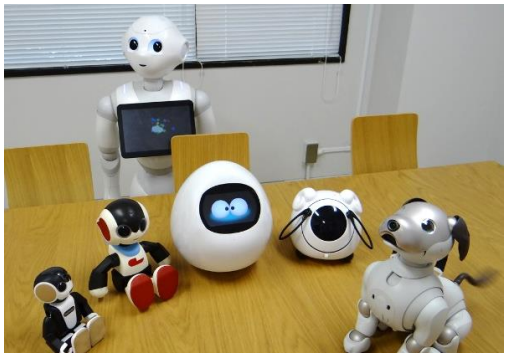
As a researcher, I have had experience exploring approaches for introducing robots to older patients with mild cognitive impairment

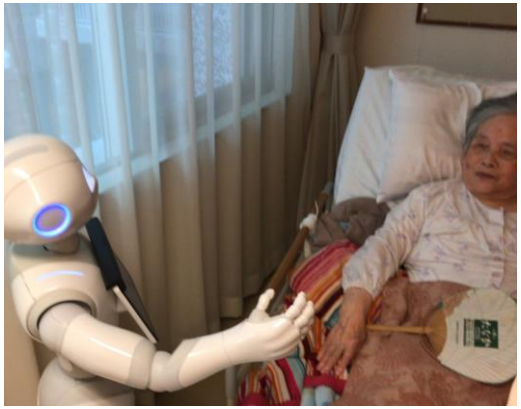
～ With older care nurses ～

We have conducted pilot trials introducing communication robots for hospitalized patients with mild cognitive impairment in acute-care hospitals.
We have also conducted pilot trials of robots, including AIBO, for older adults with dementia in long-term care hospitals.

Across all settings, two factors were associated with outcomes such as improved patient mood and sustained use:

- proactive engagement of the entire ward staff, including the head nurse
- selection of robot types and applications tailored to each patient

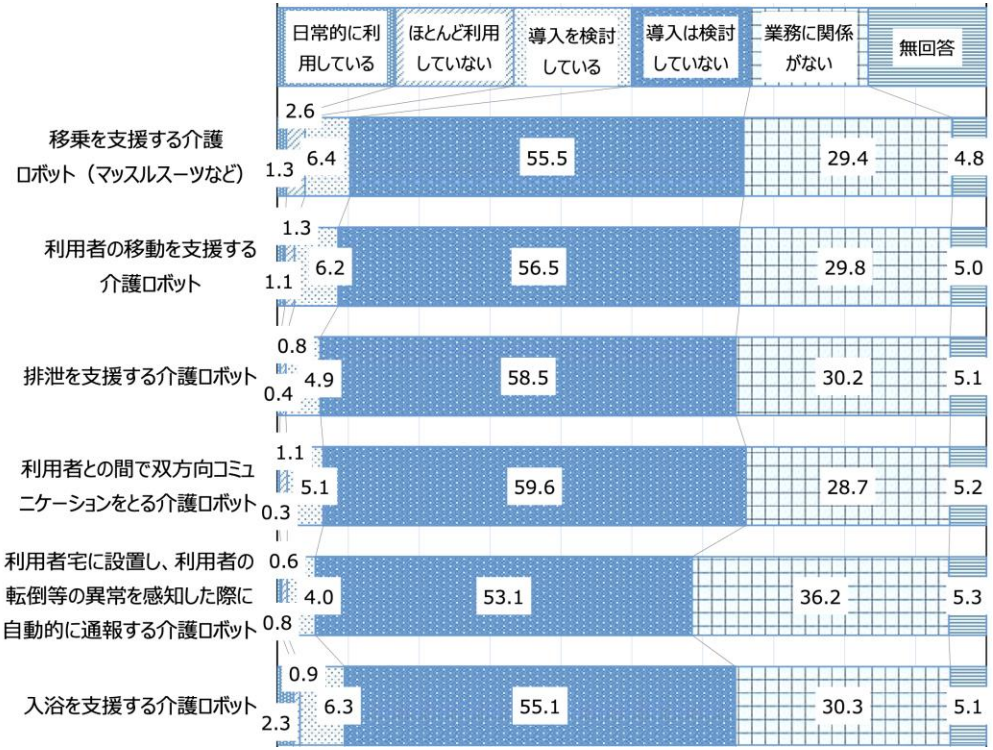




[https://www.kaigo-center.or.jp/report/jittai/, 2025]

Current Use and Future Adoption of Care Robots

Utilization of care robots remains below 10% across all categories;
the highest rate is bathing-support robots in residential facilities (8.4%).

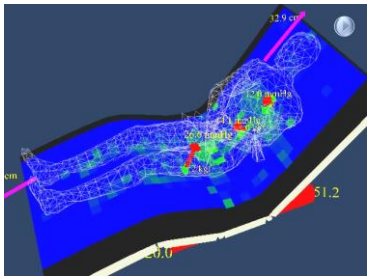


Results of the FY2024 Survey on Care Work Conditions, July 2024, Care Work Foundation (Japan)

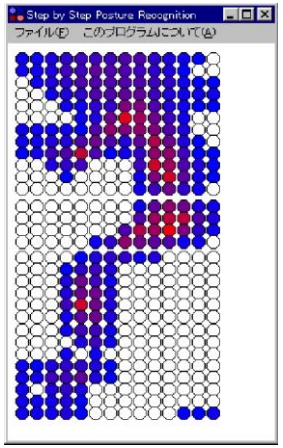
Daily use of care robots is very limited: bathing-support robots (2.3%) and meal/nutrition management systems (2.2%) are the most common, while other categories remain below 2%.

Bed sensor technologies have a long research history

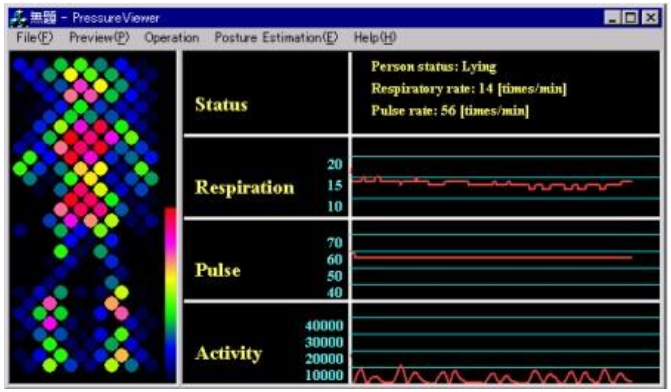
Using pressure distribution sensors with AI:
→ posture estimation, joint estimation, vital sign monitoring



V. 1.0 min.



(Mori et.al., 1996-2002)



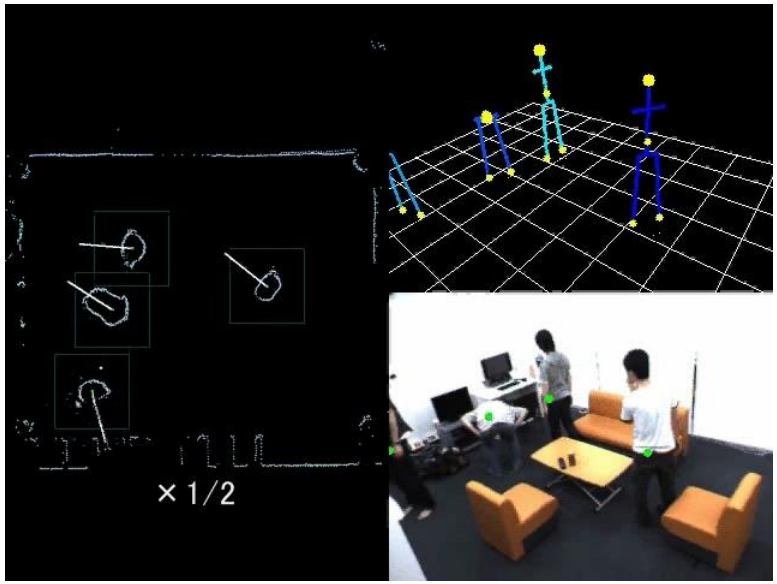
Sensing of body movement and pressure enable pressure ulcer prevention and unobtrusive monitoring of respiration, cardiac activity, and sleep state.

Automated Measurement and Prediction of Human Activity

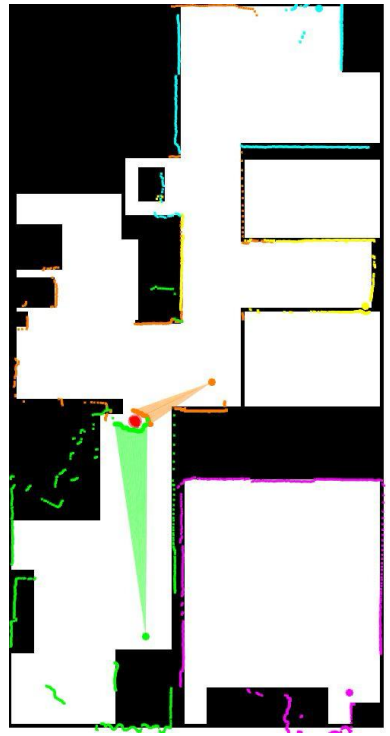
The development of technologies for measuring and predicting indoor activities and behaviors has also long been active.

3D voxel image　　Estimated pose

So-called marker-less
Motion Capture System



2D LIDAR-based
Pose / Position Capture System



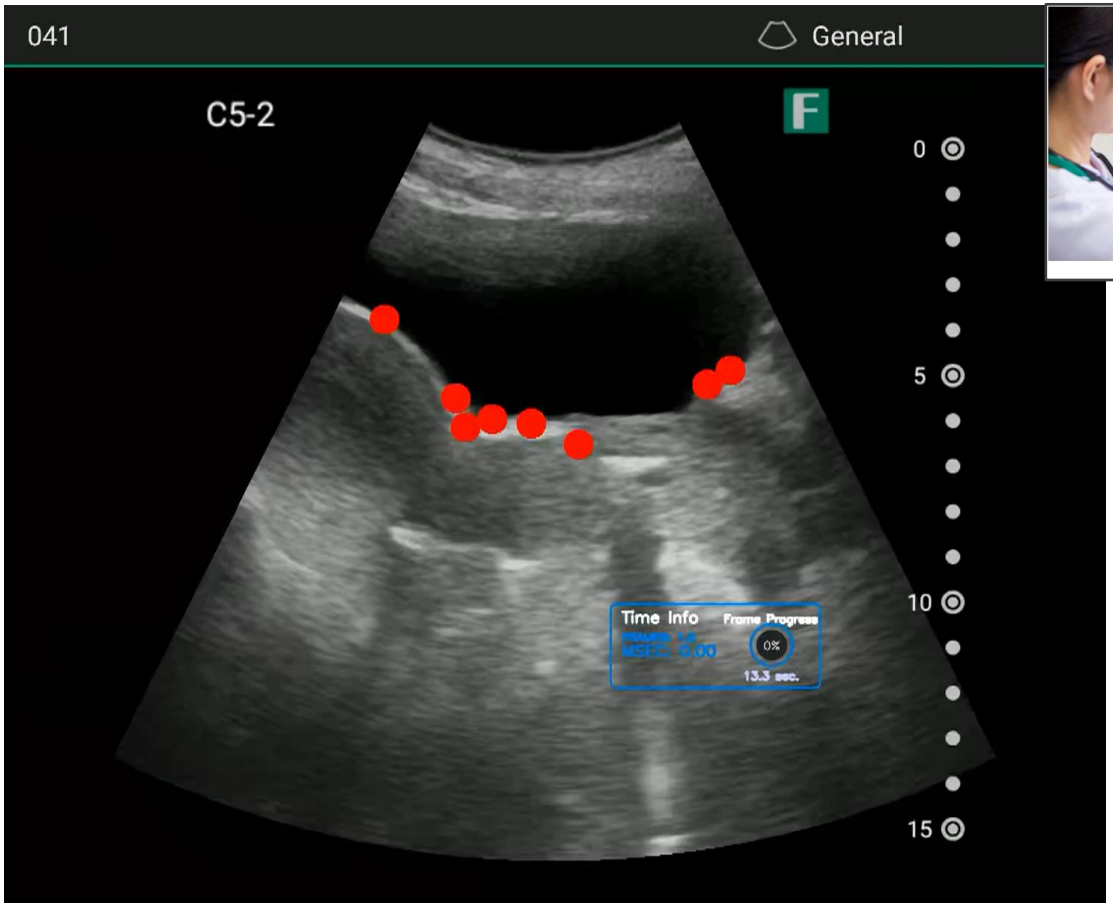
Trajectory tracking in
a one-bed residence

Camera- and ranging sensor–based behavior sensing has advanced and is moving toward practical deployment with privacy considerations.

Image processing to support care professionals have been actively developed in Japan

Ultrasound evaluation of post-void residual volume and/or pelvic floor

The size and shape of the bladder (pink) enable estimation of residual urine volume.



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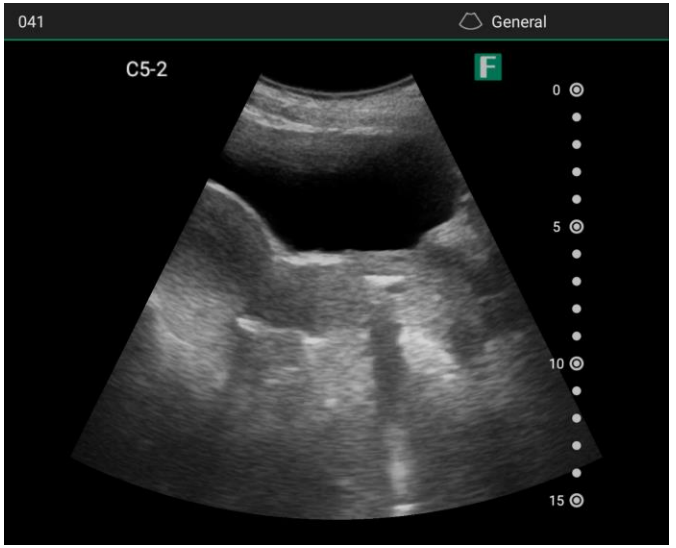
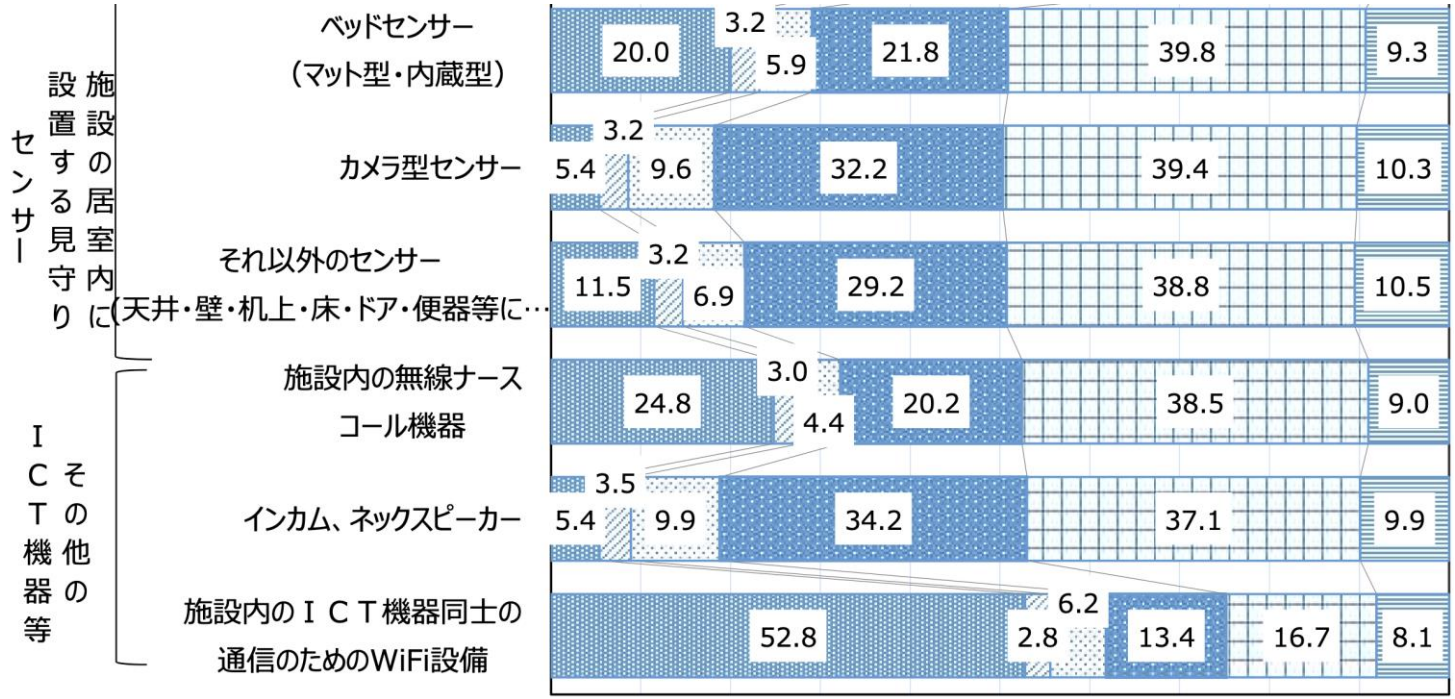


Visual feedback of internal body conditions using ultrasound video and animation.

[https://www.kaigo-center.or.jp/report/jittai/, 2025]

Current Use and Future Adoption of ICT / DX Devices

About half of facilities report positive effects:
49.4% indicate reduced daytime workload, and
44.6% report reduced nighttime workload (excluding facilities without night shifts).



Results of the FY2024 Survey on Care Work Conditions, July 2024, Care Work Foundation (Japan)

Bed sensor is the top monitoring sensor (20.0% overall, 70.1% in facilities),followed by **camera sensor** (5.5% overall, 13.1% in facilities),while **in-facility** Wi-Fi is widely installed (52.8%).

Health Beyond Disease and Decline

Show value to build acceptance and expand adoption

- We should actively promote standardization, data use, digitalization, and mechanization in everyday clinical planning and practice.
- However, radical change is difficult in real wards, care facilities, and home care settings.
  We should therefore maintain core operations while demonstrating the benefits of digitalization and robotics to expand adoption.

- **Continuous sensing and long-term data accumulation could enable intelligent monitoring of daily conditions and the prediction and prevention of critical changes.**
- **Medicine mainly sees disease states.**
  Long-term care mainly addresses aging and frailty.
  → Future systems should support healthy living based on a person's everyday baseline.
- **Self-care supported by machines and AI will expand beyond patients to families and communities.**

In Closing

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Technology and future of long-term nursing care

1. Japan as a Front-Runner in Addressing Societal Challenges

- Japan's nursing and long-term care systems are supported by highly skilled professionals and well-developed institutions.
- As one of the first societies to experience rapid population aging, Japan can serve as a valuable model for countries that will face similar challenges in the near future.

2. Japan: Advancing Collaboration Between Care and Medicine

- In Japan, many care technologies can be developed and implemented without necessarily requiring full medical device certification.
- This regulatory flexibility creates fertile ground for innovation and offers an inviting environment for active international participation.

3. Toward a Society of Wisdom and Well-Being

- Innovations in care technology will be essential for enabling people around the world to live healthier lives with a high quality of life.
- Continued collaboration between frontline practitioners and international partners will be key to realizing this shared future.

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