NEC Innovation Day 2023

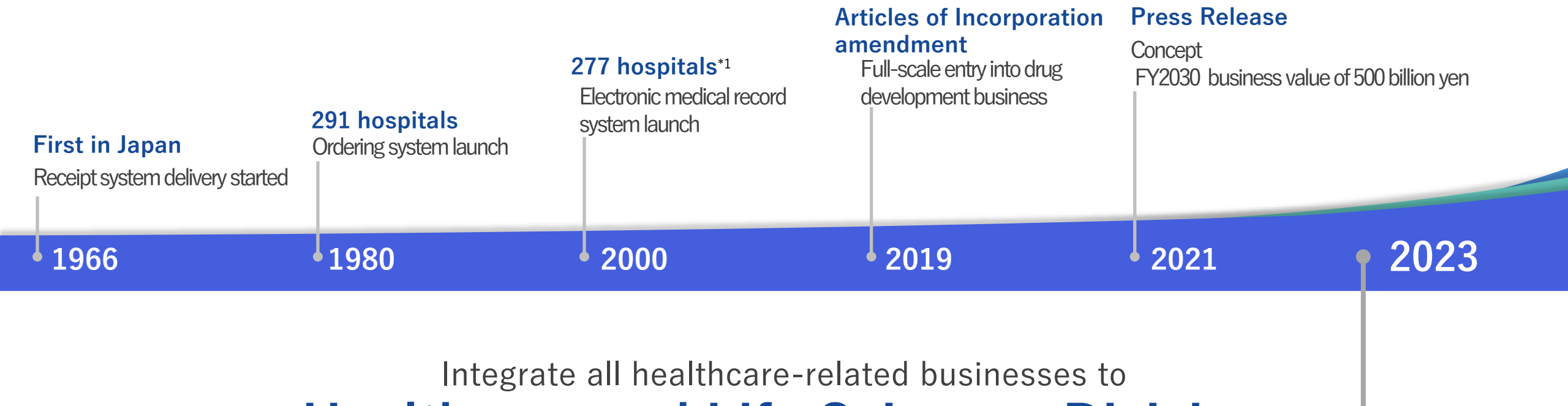# Healthcare and Life Sciences Business

December 15, 2023

Corporate SVP, Head of Healthcare and Life Science Division

Masamitsu Kitase

History of NEC's Healthcare and Life Sciences Business

Over 50 years of experience and results

Focusing on the development of technologies in the healthcare and life science fields,
we have contributed to people's secure lifestyles.

Articles of Incorporation amendment
Full-scale entry into drug development business

Press Release
Concept
FY2030 business value of 500 billion yen

277 hospitals[1]
Electronic medical record system launch

291 hospitals
Ordering system launch

First in Japan
Receipt system delivery started

| 1966 | 1980 | 2000 | 2019 | 2021 | 2023 |

Integrate all healthcare-related businesses to
Healthcare and Life Sciences Division

*1 List of facilities that introduced hospital information systems in FY2020 (according to a survey by "Gekkan Shin Iryou" [Monthly New Medical Care])

\Orchestrating a brighter world   NEC

NEC's Focus Areas and Marketability

In a wide range of fields such as treatment, drug development, and medical device development

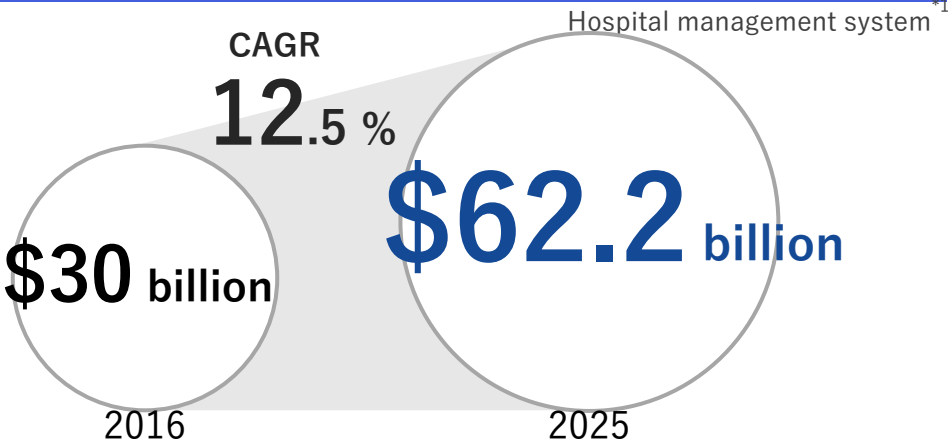**Analog / Wet** ▶ **Digital / Dry**

Market transformation is ongoing

Improvement of health care economics
through digitalization

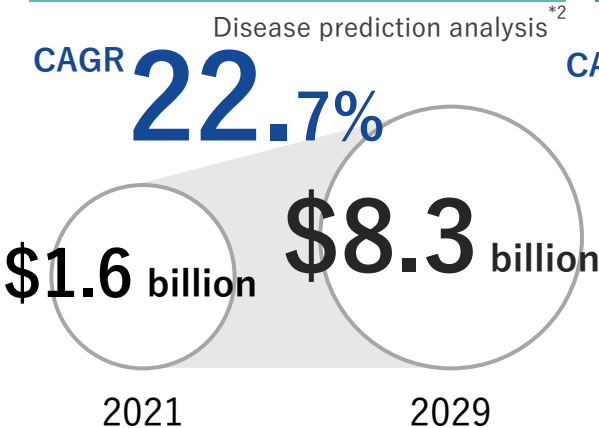Data-driven operational efficiency improvement and decision-making

Expand personalized medicine
with broad health data and AI

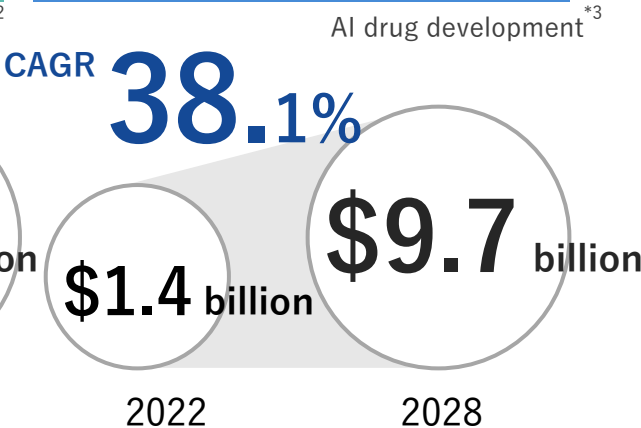Everyone is different, everyone's disease is different.

Hospital DX

Hospital management system[1]

CAGR
12.5 %

$30 billion — 2016

$62.2 billion — 2025

Testing and Health Promotion Services

Disease prediction analysis[2]

CAGR
22.7%

$1.6 billion — 2021

$8.3 billion — 2029

AI Drug Development

AI drug development[3]

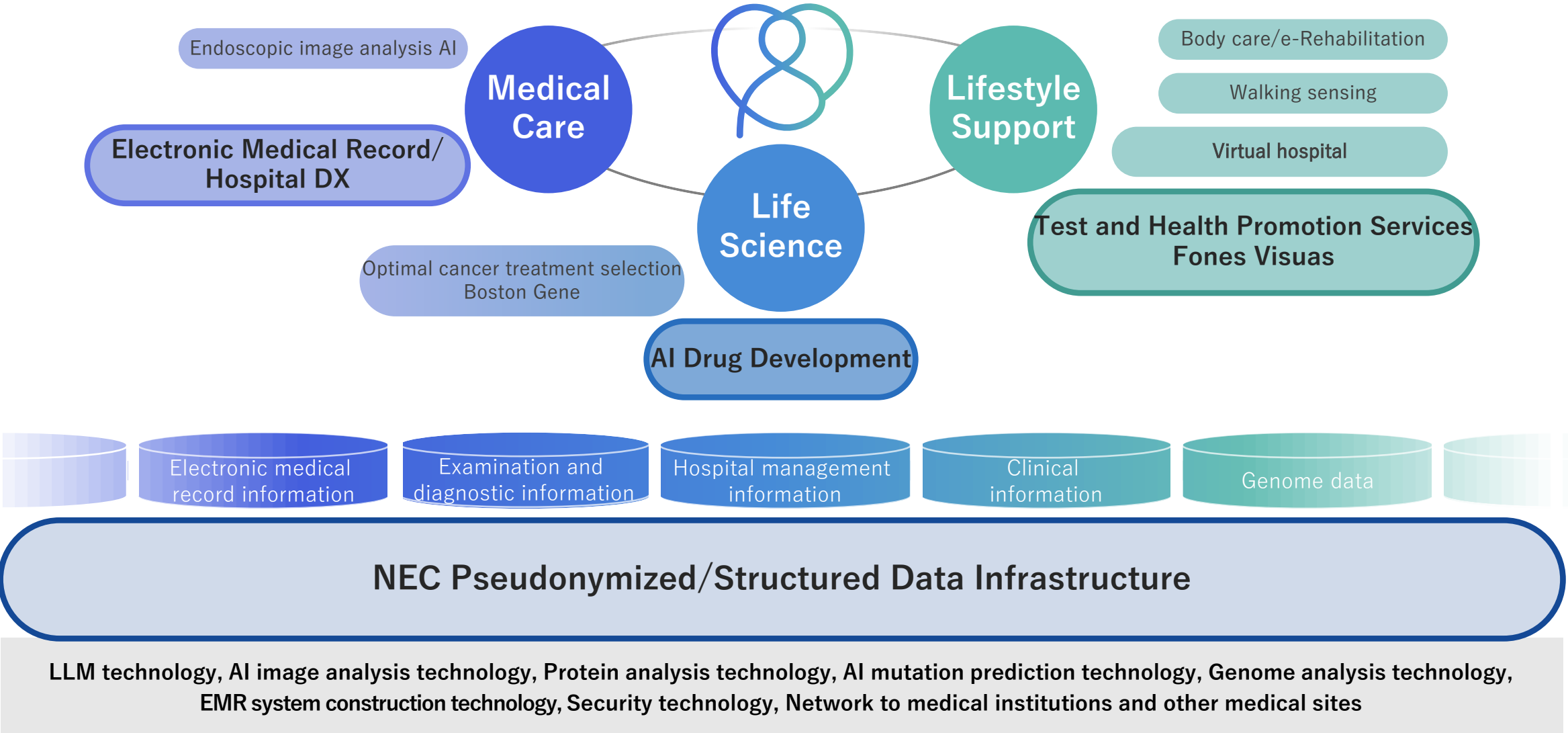CAGR
38.1%

$1.4 billion — 2022

$9.7 billion — 2028

*1 Arizton Advisory and Intelligence, Hospital Management Solutions Market - Global Outlook & Forecast 2022-2027
*2 Grand View Research, Global Predictive Disease Analytics Market Size study & Forecast, by Component by Deployment, by End User and Regional Analysis, 2022-2029   *3 BIS Research, Global Neoantigen Cancer Vaccine Market

\Orchestrating a brighter world   NEC

Overview of NEC's Healthcare and Life Sciences Business

Endoscopic image analysis AI

Medical Care

Lifestyle Support

Body care/e-Rehabilitation

Walking sensing

Virtual hospital

Electronic Medical Record/ Hospital DX

Life Science

Optimal cancer treatment selection Boston Gene

Test and Health Promotion Services Fones Visuas

AI Drug Development

Electronic medical record information

Examination and diagnostic information

Hospital management information

Clinical information

Genome data

NEC Pseudonymized/Structured Data Infrastructure

LLM technology, AI image analysis technology, Protein analysis technology, AI mutation prediction technology, Genome analysis technology, EMR system construction technology, Security technology, Network to medical institutions and other medical sites

\Orchestrating a brighter world **NEC**

HLS Business Sales and Operating Profit Growth Targets

FY2023→ FY2030

Sales CAGR

15 % or more

FY2030

OP Margin

20 % or more

Sales
¥64B

¥66B

OP
¥0.8B

¥2.4B

FY2023

FY2025

FY2030

Lifestyle Support

Life Science

Medical Care

\Orchestrating a brighter world **NEC**

Electronic Medical Record/Hospital DX
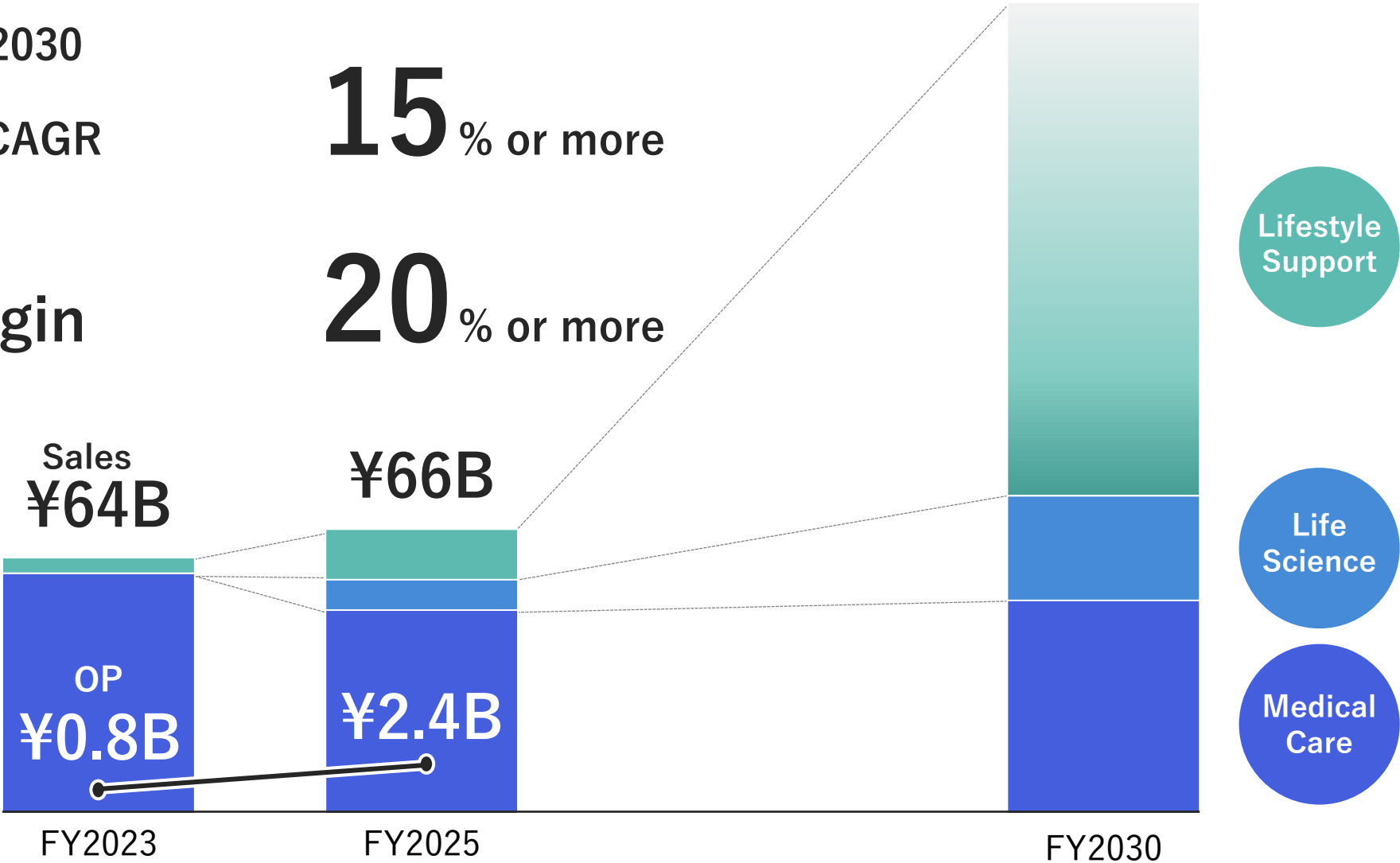
AI-driven hospital management and healthcare quality improvement

IT Services Achievements

Medical Accounting System	Electronic Medical Record (EMR)	DX Services
1,400 facilities	**1,000** facilities	**120** facilities • Online medical care and conference support • Voice support • Digital medical consultation • Cloud secure connectivity

2023 PoC for medical documentation support using generative AI

\Orchestrating a brighter world   **NEC**

Business Growth of EMR and Hospital DX

Aiming to improve the profitability of EMR and medical accounting systems,
as well as to expand earnings through the growth of the Hospital DX business

FY2023 to FY2030

Operating profit

x2

Hospital DX

Improvement of hospital management efficiency and advancement of medical service operations

- Develop strategies to enhance medical DX in Japan
- Improve the work style of medical professionals by leveraging generative AI
- Expand collaborative services with startups

EMR and Medical Accounting System

Safe and secure medical Infrastructure

**Standardization of EMR information**

- Enhance profitability through cloud integration and unified management of engineering department
- Improve service quality through a data-driven approach
- Monetize security business operations

Orchestrating a brighter world   NEC

By supporting the creation of electronic medical records and medical documents with LLM, the time required to create medical documents has been halved, and the possibility of improving operational efficiency has been confirmed.

## Automatic creation of electronic medical records

LLMs that have learned medical terminology automate the creation of medical records

Estimated reduction of **116** hours per year *1
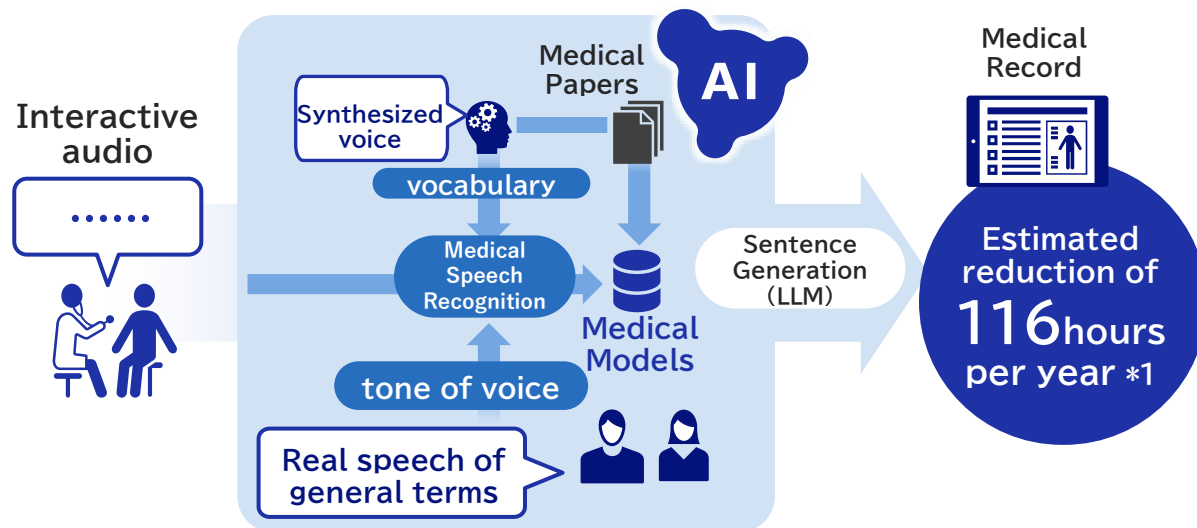
*1 Inference values based on on-site observations

Automatic creation of medical documents

Understand medical terminology and treatment progress, and summarize medical records
Eliminates the need for doctors to re-read medical records

Estimated reduction of **63** hours per year *2
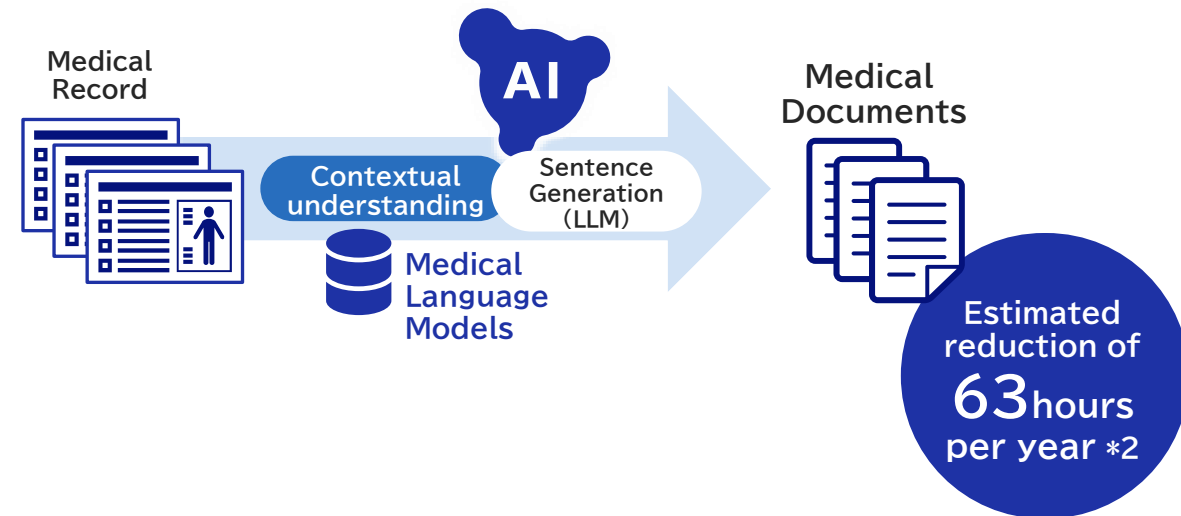
*2 Evaluation results by 10 physicians at Tohoku University Hospital

Point Reducing the workload of physicians with records. Aiming to create an environment where doctors can concentrate on their medical practice

\Orchestrating a brighter world NEC

Commercialization Roadmap of Generative AI Utilization

Medical Care

**Provide sustainable medical services
by utilizing NEC's technology and business know-how**

**Generative AI will be implemented
through EMR in FY2024!**

Step 2 **Support management**

Visualization of business conditions,
Support hospitals to improve profitability

Step 1 **Reduce workload**

Pursuing efficiency
Contributing to work style reform of medical professionals

\Orchestrating a brighter world **NEC**

Health Promotion and Testing Services

Fones Visuas

Services provided by NEC Group
Measure various proteins from a small amount of blood and visualize health status and future disease risk

Visualizing disease risk and health status with AI to improve lifestyle

2020   Commencement of operations

2023   Additional test items:
Prediction of the risk of developing dementia within 5 years

Achievements

Measurement Services

Orders from major
9
Japanese pharmaceutical companies
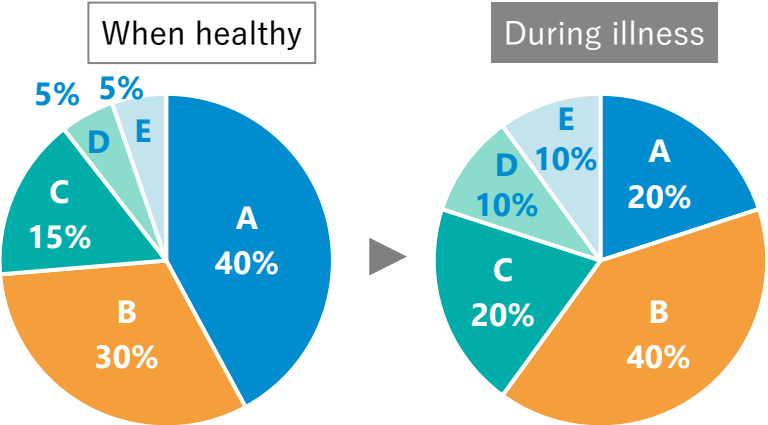
Test and Intervention Services

Domestic	Overseas
Arao City	**Order received in Hong Kong**
Cooperation with local governments	Expanding to Middle East and ASEAN

\Orchestrating a brighter world   **NEC**

Strengths of Fones Visuas

When healthy | During illness

**Genes may not change,
but proteins change from day to day.**

Fones Visuas

SomaLogic

Blood Proteins Measurement Technology

Measurement of
7,000 different proteins
（Plans to increase to 11,000）

NEC Group

DX & AI Technology

Social implementation

Present	From FY2023 onward（under development）	Prospects
Visualization of future disease risk • Developing risk within 4 years: Stroke, cerebral infarction, chronic renal failure, myocardial infarction, heart failure • Developing risk within 5 years: Lung cancer • Developing risk within 20 and 5 years: Dementia	**The following types of cancers; Breast, esophageal, stomach, pancreatic, colorectal, prostate, etc.**	**More than** **50** **diseases**

\Orchestrating a brighter world **NEC**

Customer Issues and Provided Services

Lifestyle Support

Overseas（Middle East・ASEAN）

Assessing future risk of disease by using cutting-edge technology

Visualize own condition clearly

- **Lifestyle related disease** increased

- Focus on **medical tourism** as an economic measure
  - Singapore, Thailand

- **Provide comprehensive welfare services**
  to global companies' local employees

Domestic Municipalities

Concentrate follow up on those at high risk

Improve lifestyle

- Difference between life expectancy and healthy life expectancy is roughly 10 years

- 50% of nursing-care insurance cost is covered by public funds

- The number of individuals with **severe dementia and stroke** who require a high level of care is increasing.

Dementia
Medical and nursing expenses[1]
Annual cost: **7.6**million per person

Stroke, cerebral infarction
Medical and nursing expenses[1]
Annual cost: **8.8**million per person

[1] Estimated by a research company from the 2017 Health, Labor and Welfare Publication Report, 2019

Orchestrating a brighter world **NEC**
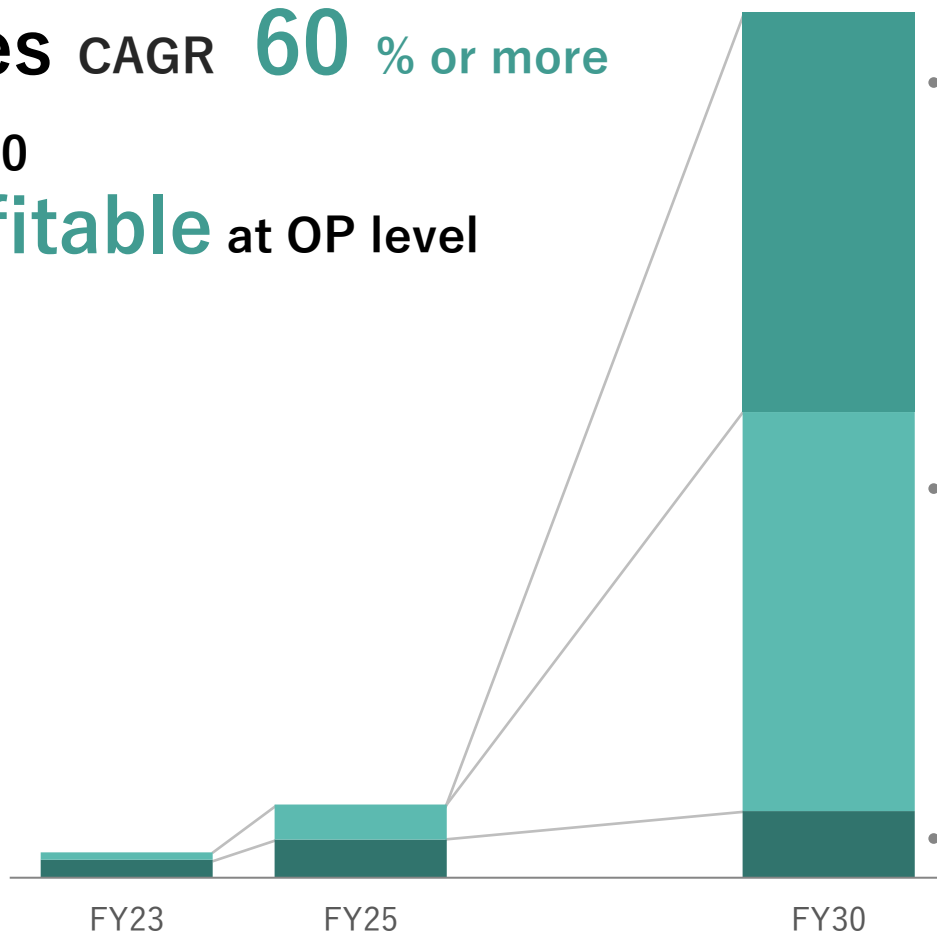
Growth of Fones Visuas Business

FY2023 to FY2030

Sales CAGR **60** **% or more**

FY2030

Profitable at OP level

FY23   FY25   FY30

Test and Intervention Services in Overseas Market

Alliance with local medical institutions, etc., with a focus on Middle East and ASEAN

- Capture demand from health-conscious affluent overseas consumers

Test and Intervention Services for Domestic Municipalities

Providing test and lifestyle improvement services to municipalities

- Extending the healthy life expectancy of residents and curbing the cost of medical and long-term care benefits for local governments
- Realizing a sustainable society

Currently working with Arao City, Kumamoto Prefecture, and discussions are underway with several municipalities.

Measurement Services

Contracted by pharmaceutical companies and academia for clinical trials and research purposes

- Measures about 7,000 protein types at once without the need to install equipment (to be increased to 11,000 types)
- Streamlining biomarkers search

\Orchestrating a brighter world **NEC**

AI Drug Development

Personalize/Universalize Vaccines with AI

2022 First Japanese group company to receive a grant from CEPI[*1]

2023 First IT company to be selected by SCARDA's[*2] call for applications

2023 Achievements

Universal Infectious Disease Vaccine

SCARDA
Development of design technology for influenza was selected

Nagasaki University
Launch of joint research on tropical infectious diseases

Personalized Cancer Vaccine

AACR2023[*3]/ASCO2023[*4]

Promising clinical efficacy and immune response data were presented at prestigious conferences

*1 CEPI: Coalition for Epidemic Preparedness Innovations *2 SCARDA: Strategic Center of Biomedical Advanced Vaccine Research and Development for Preparedness and Response *3 AACR: American Association for Cancer Research *4 ASCO: American Society of Clinical Oncology
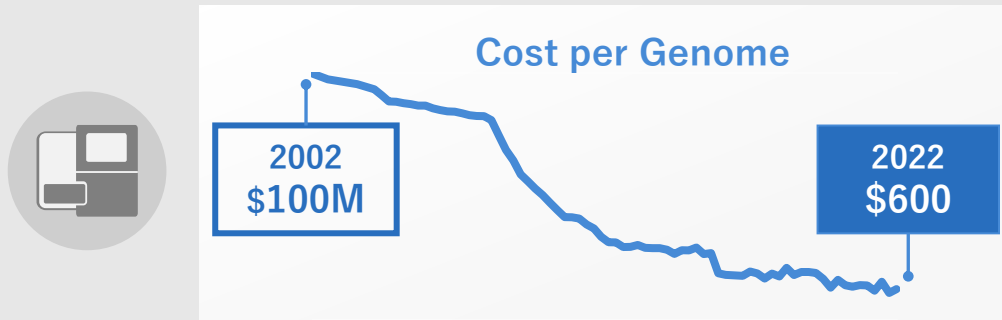
\Orchestrating a brighter world　NEC

Utilization of Digital Technology for Drug Development

Life Science

Genomic information has become easier to obtain

Introduction of next generation sequencer

- Lower costs

Cost per Genome

2002
$100M

2022
$600

- Gene analysis has become more popular at many sites

Evolution of digital information analysis technology

Advancement of AI technology

2012　Google uses deep learning to help computers recognize cats

2015　TensorFlow release

2017　AlphaGo defeats a professional Go player
⋮

NEC's advanced AI technologies

AI

Machine learning
Papers accepted by prestigious international academic conferences[1]

10th place
in the world

Video/image processing
Papers accepted by prestigious international academic conferences[2]

1st place among
Japanese companies

NEC is one of the top runners working on developing personalized cancer vaccines
Utilizing AI which was developed for cancer vaccine design in the field of infectious diseases

Number of papers accepted by prestigious international conferences : *1 NeurIPS、ICML、KDD、ECML-PKDD、ICDM ：*2 CVPR、ICCV、ECCV、ACCV、ICPR

Orchestrating a brighter world　NEC

Status of AI Drug Development

Life Science

Infectious Disease

CEPI

Universal Vaccine
Beta Coronavirus
First Japanese group company to win a grant

SHIONOGI
Hepatitis B

NEW

SCARDA Nagasaki University

Universal vaccine
Dengue fever (and many others)

NEW

SCARDA

Universal vaccine
Influenza

Only IT company to receive a grant

Oncology

Transgene

TG4050
Personalized Cancer Vaccine
Favorable interim data presented at ASCO

NEC OncoImmunity AS

NECVAX NEO 1
Personalized Cancer Vaccine
Clinical trial is ongoing

Orchestrating a brighter world **NEC**

Life Science

Immunity

NEC's AI platform

Wide variety of viruses and pathogens

SCARDA
Influenza
Dengue fever

SHIONOGI
Hepatitis B

Infectious disease

CEPI
Beta coronavirus

Oncology

Transgene
Ovarian cancer (P-I)
Head and neck cancer (P-I)

Transgene
Head and neck cancer (P-II)

Almost all cancer types

NEC proprietary
Skin cancer and other 5 types (P-I)
Rare cancer

Huge market

Autoimmune disorder

\Orchestrating a brighter world **NEC**

Towards Sustainable Business Growth

\Orchestrating a brighter world NEC

Start of Data Utilization Business

**Pseudonymize and structure the data collected from users,
enhance convenience and value, provide to pharmaceutical companies, and more**
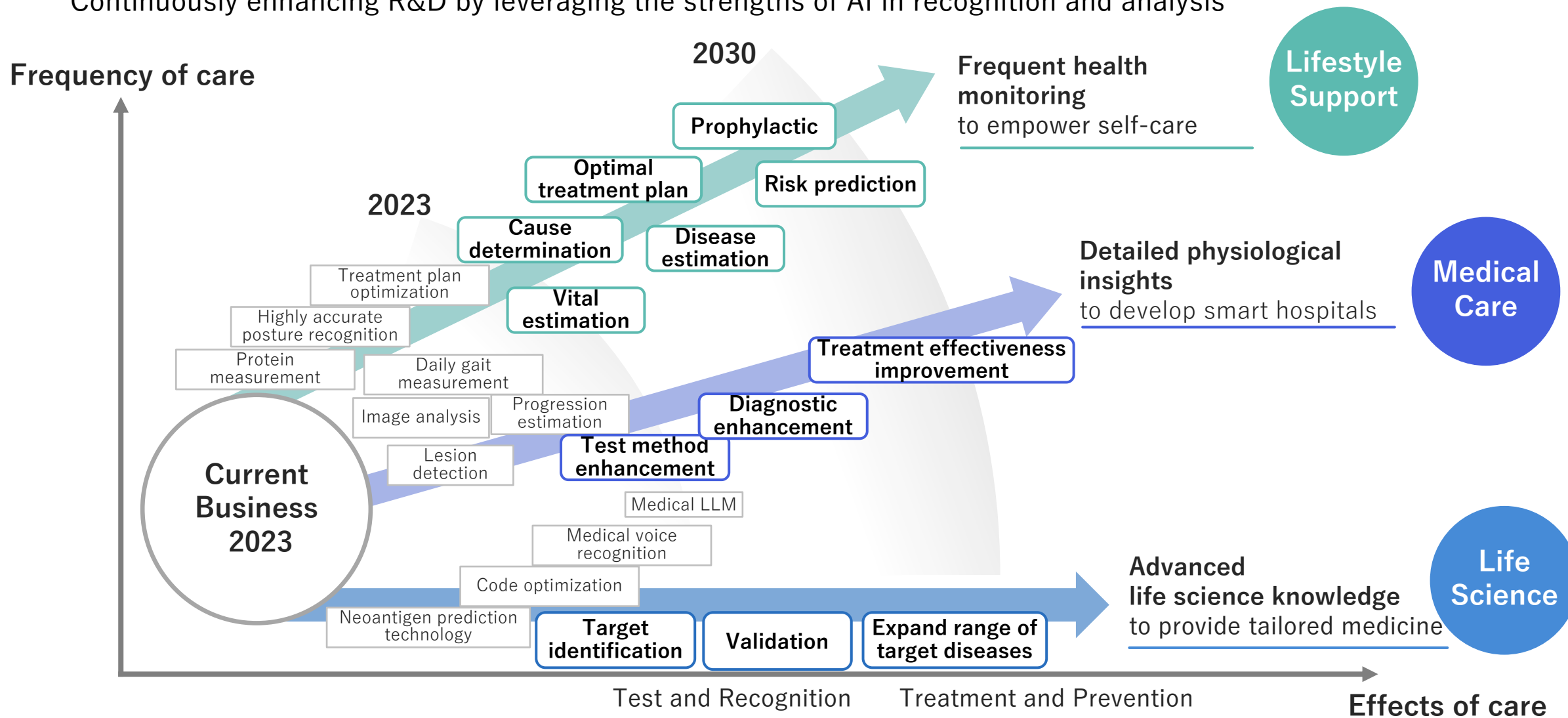
Data business owned by NEC

NEC client hospitals
EMR medical data

Obtain consent

Pseudonymize and structure data

NEC
Pseudonymization/structuring and data aggregation infrastructure

Cloud Secure Connection Service
MegaOak Cloud Gateway

▲ Secure and seamless service use ▼

Large hospitals　　**Small and medium-sized hospitals**　　**Clinics**

Achievement of system development for multicenter clinical research by participating in OCR-net[*1] project from 2013

▶

Starting with handling the data of about 500,000 patients

*1 Osaka Clinical Research Network

\Orchestrating a brighter world　NEC
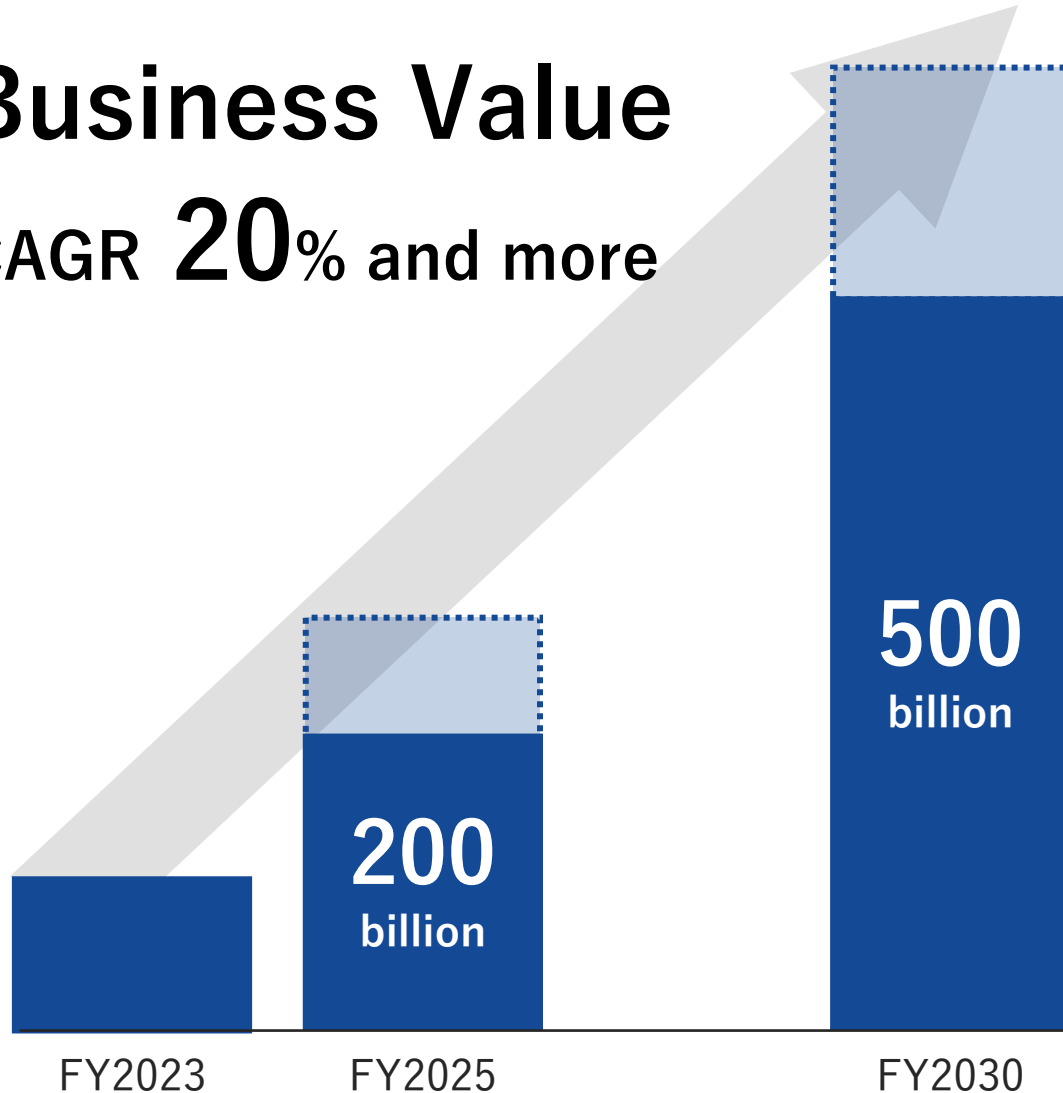
Technology Roadmap

Transitioning from testing and recognition to treatment and prevention through the implementation of digital twins
Continuously enhancing R&D by leveraging the strengths of AI in recognition and analysis

Frequency of care

2030

Lifestyle Support

Prophylactic

Frequent health monitoring
to empower self-care

Optimal treatment plan

Risk prediction

2023

Cause determination

Disease estimation

Treatment plan optimization

Vital estimation

Highly accurate posture recognition

Detailed physiological insights
to develop smart hospitals

Medical Care

Protein measurement

Daily gait measurement

Treatment effectiveness improvement

Image analysis

Progression estimation

Diagnostic enhancement

Lesion detection

Test method enhancement

Current Business 2023

Medical LLM

Medical voice recognition

Code optimization

Advanced life science knowledge
to provide tailored medicine

Life Science

Neoantigen prediction technology

Target identification

Validation

Expand range of target diseases

Test and Recognition   Treatment and Prevention

Effects of care

\Orchestrating a brighter world   **NEC**

FY2023 to FY2030
Business Value

CAGR 20% and more

500 billion

200 billion

FY2023   FY2025   FY2030

Be an Essential Company

We are committed to becoming an essential force
in promoting the health of individuals, communities, and industries
by continuously driving innovation in impactful technologies and services

\Orchestrating a brighter world **NEC**

\Orchestrating a brighter world

NEC

Cautionary Statement with Respect to Forward-Looking Statements

This material contains forward-looking statements regarding estimations, forecasts, targets and plans in relation to the results of operations, financial conditions and other overall management of the NEC Group (the "forward-looking statements"). The forward-looking statements are made based on information currently available to the Company and certain assumptions considered reasonable as of the date of this material. These determinations and assumptions are inherently subjective and uncertain. These forward-looking statements are not guarantees of future performance, and actual operating results may differ substantially due to a number of factors.

The factors that may influence the operating results include, but are not limited to, the following:

- adverse economic conditions in Japan or internationally;
- foreign currency exchange and interest rate risks;
- changes in the markets in which the NEC Group operates;
- the recent outbreak of the novel coronavirus;
- potential inability to achieve the goals in the NEC Group's medium-term management plan;
- fluctuations in the NEC Group's revenue and profitability from period to period;
- difficulty achieving the benefits expected from acquisitions, business combinations and reorganizations and business withdrawals;
- potential deterioration in the NEC Group's relationships with strategic partners or problems relating to their products or services;
- difficulty achieving the NEC Group's growth strategies outside Japan;
- potential inability to keep pace with rapid technological advancements in the NEC Group's industry and to commercialize new technologies;
- intense competition in the markets in which the NEC Group operates;
- risks relating to the NEC Group's concentrated customer base;
- difficulties with respect to new businesses;
- potential failures in the products and services the NEC Group provides;
- potential failure to procure components, equipment or other supplies;
- difficulties protecting the NEC Group's intellectual property rights;
- potential inability to obtain certain intellectual property licenses;
- the NEC Group's customers may encounter financial difficulties;
- difficulty attracting, hiring and retaining skilled personnel;
- difficulty obtaining additional financing to meet the NEC Group's funding needs;
- potential failure of internal controls;
- potentially costly and time-consuming legal proceedings;
- risks related to regulatory change and uncertainty;
- risks related to environmental laws and regulations;
- information security and data protection concerns and restrictions;
- potential changes in effective tax rates or deferred tax assets, or adverse tax examinations;
- risks related to corporate governance and social responsibility requirements;
- risks related to natural disasters, public health issues, armed hostilities and terrorism;
- risks related to the NEC Group's pension assets and defined benefit obligations; and
- risks related to impairment losses with regard to goodwill.

The forward-looking statements contained in this material are based on information that NEC possesses as of the date hereof. New risks and uncertainties come up from time to time, and it is impossible for NEC to predict these events or how they may affect the NEC Group. NEC does not intend to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.

Note: In this presentation, the accounting periods of the fiscal years for March 31,2022, 2023, and 2024 were referred as FY22/3, FY23/3, and FY24/3 respectively. Any other fiscal years would be referred similarly.

\Orchestrating a brighter world   **NEC**