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# “Healthcare Management” with AI technologies and Big data processing

Yoshito SAKURAI,
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1. SDGs and Society 5.0
2. Data Health in Japan
3. Hitachi’s experiences

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# “Society 5.0” as a tool for SDGs

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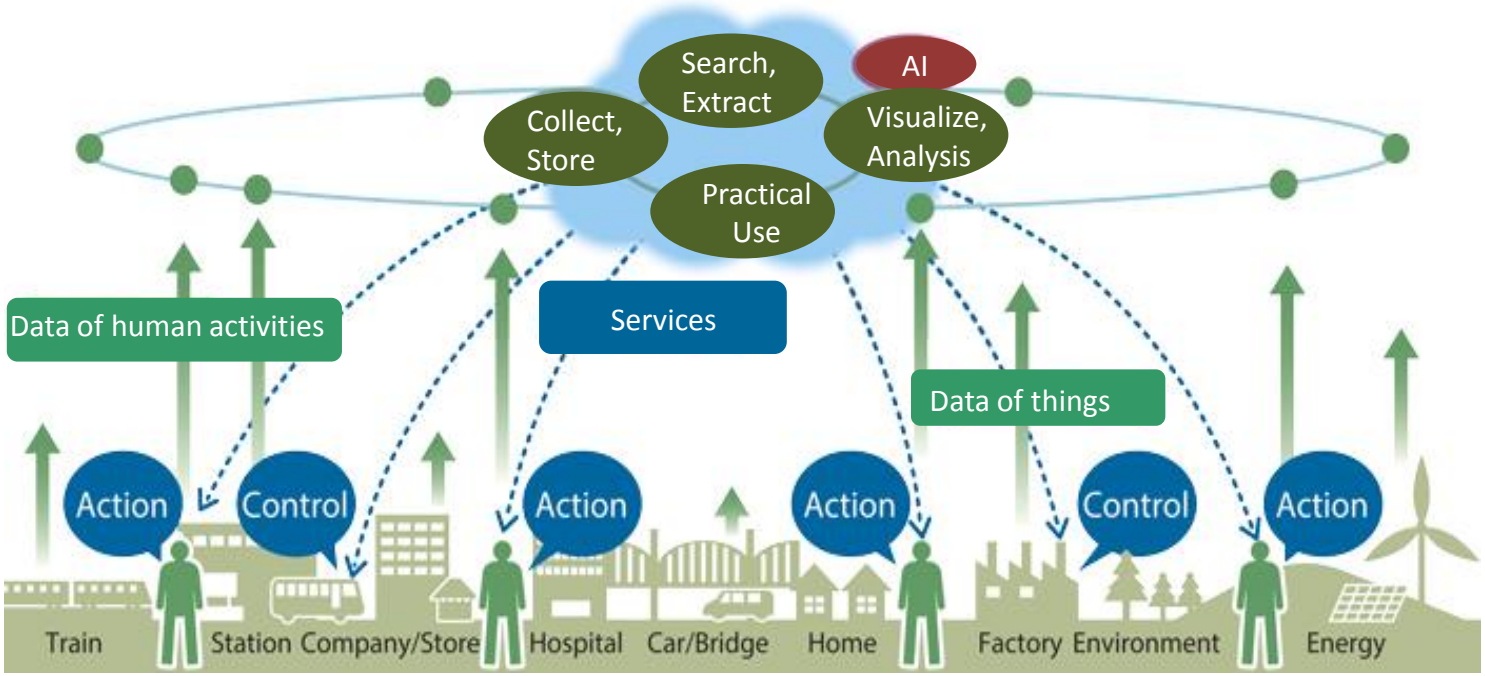


Efficiently achieve 17 SDGs

Aim at sustaining <u>symbiotic ecosystem</u> in which <u>everybody is equally happy</u>

symbiotic ecosystem

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# The Idea of Data Health in Japan

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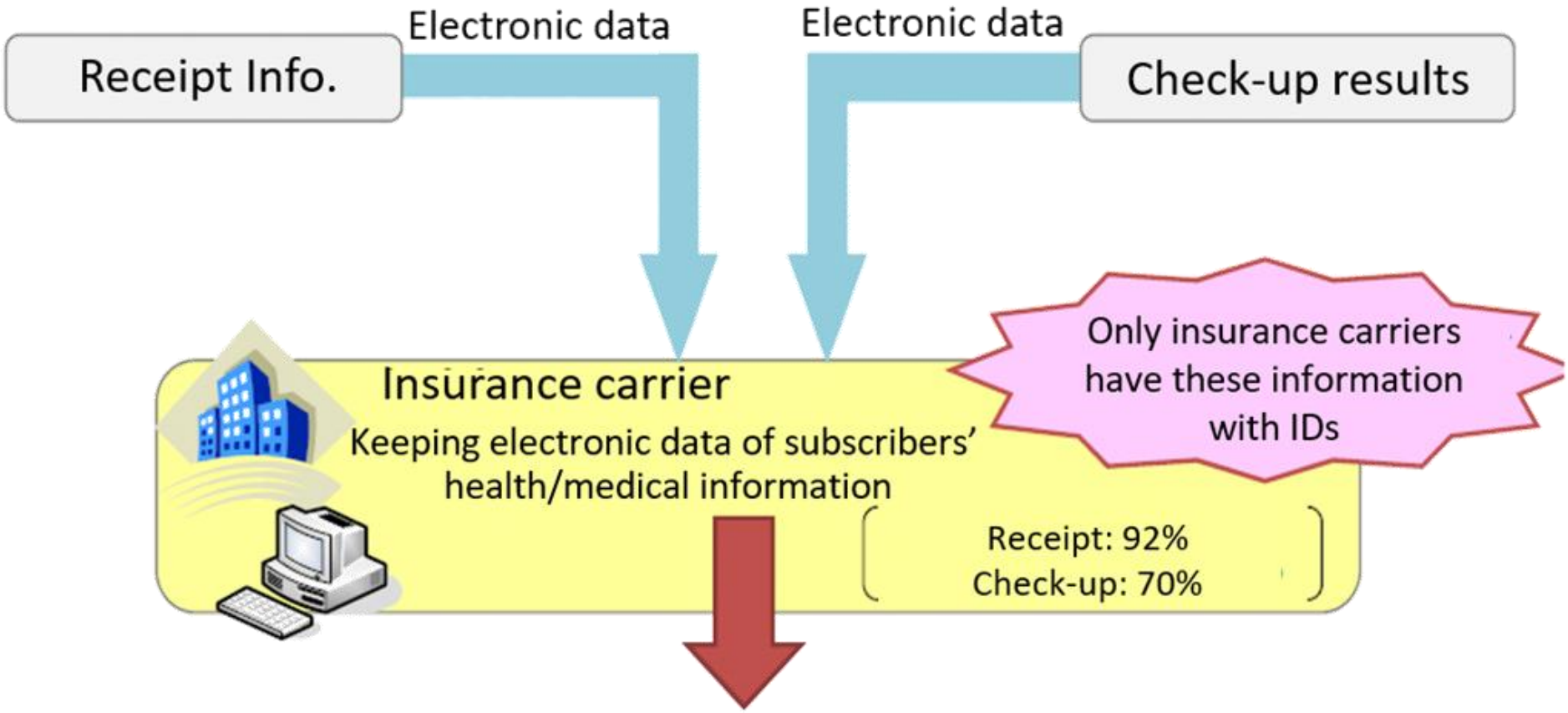


Analysis of health issues of subscribers enables

healthcare business based on data analysis (Data Health)

[Finding optimal health supports by measuring and verifying costs vs. performances using these data]

# The recorded items

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The recorded items into databases of check-up/guidance data are;

- Health check-up Info. (year, date, etc.)
- Personal ID
- Check-up agency number
- Part of personal info. (gender, zip-code)
- Check-up results
- Level of guidance
- Type of health support program , etc.

# Data Health Program

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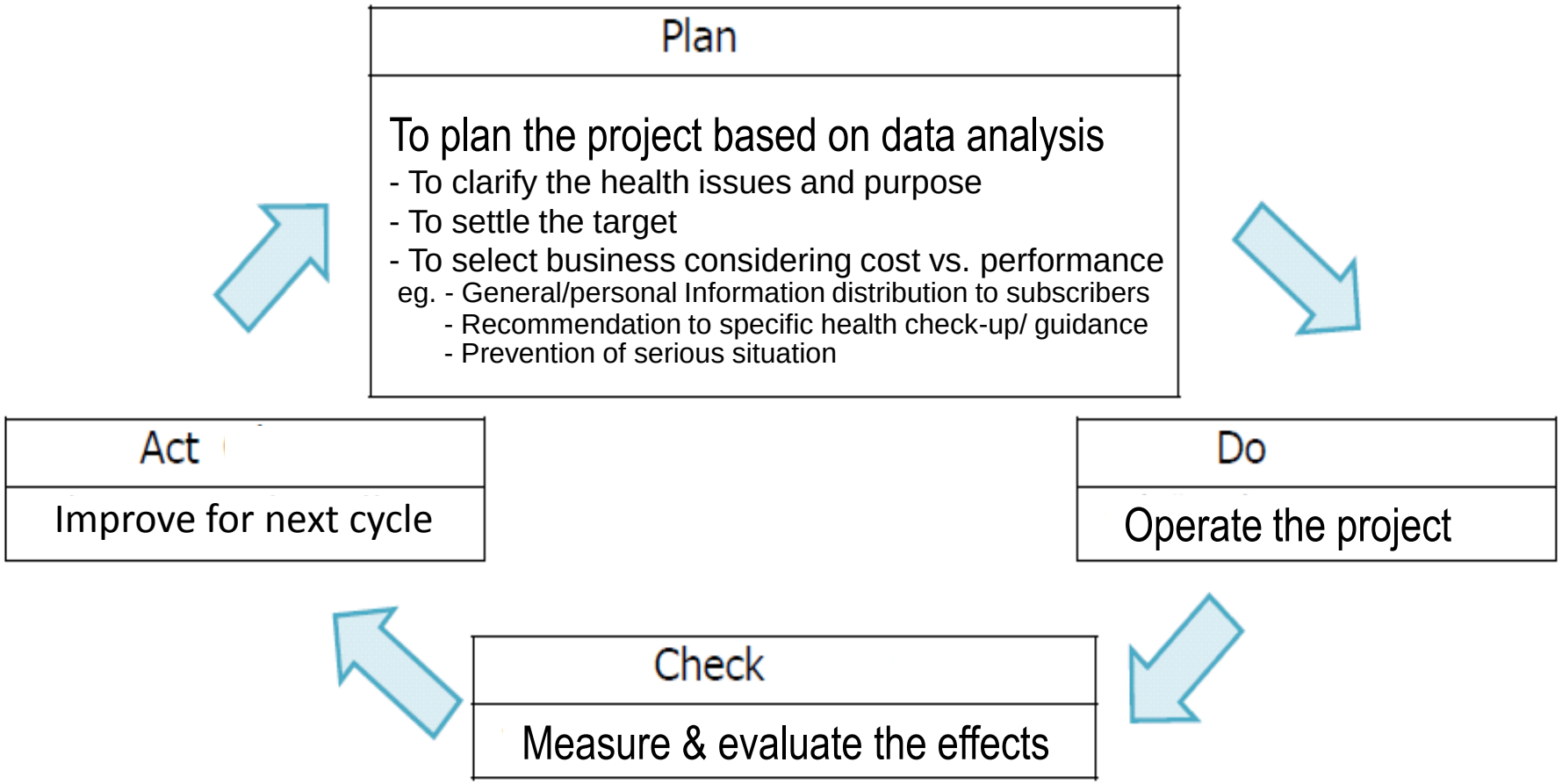
Program for efficient and effective healthcare PDCA
based on data analysis of receipt/health check-up information



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# Based on personal health condition and lifestyle

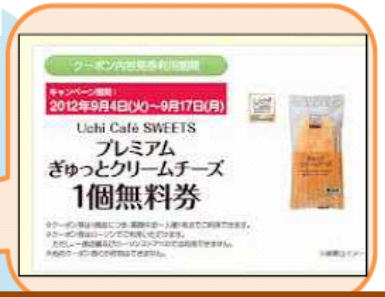
Target values according to personal check-up

[ (1) Calorie ( + (2) walk steps + (3) Weight ) ]

Business entity

Health insurance union

Enable to check

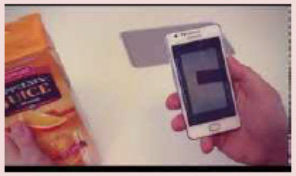



To present recommended goods according to risk types

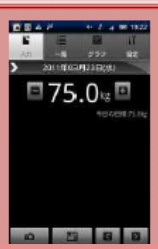
Healthcare database

Incentives
Getting coupon by achieving the target for certain duration

Everyday recordings



Recording foods by smart device





[ Calorie (foods) Weight (body fat ratio ) Steps ]

Pedometer

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   - Healthcare Data Analytics
   - HALSMA Diet
   - Happiness and life
     (Mental Aspect on Productivities)

# Healthcare Data Analytics

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There are many reports such as nurse notes that are written in freely entered texts.

These unstructured data account for 60 to 80% of hospital data and, having found through conversations with customers and analytical case studies that these kind of data are extremely important.

Hitachi used a natural language processing technology to extract information from the text data

We also select the items to use as variables with an artificial intelligence (AI) technology such as machine learning, etc. from the hundreds of thousands to millions of data items about the patients in the dataset, and finally, to create a model.

# Healthcare Data Analytics

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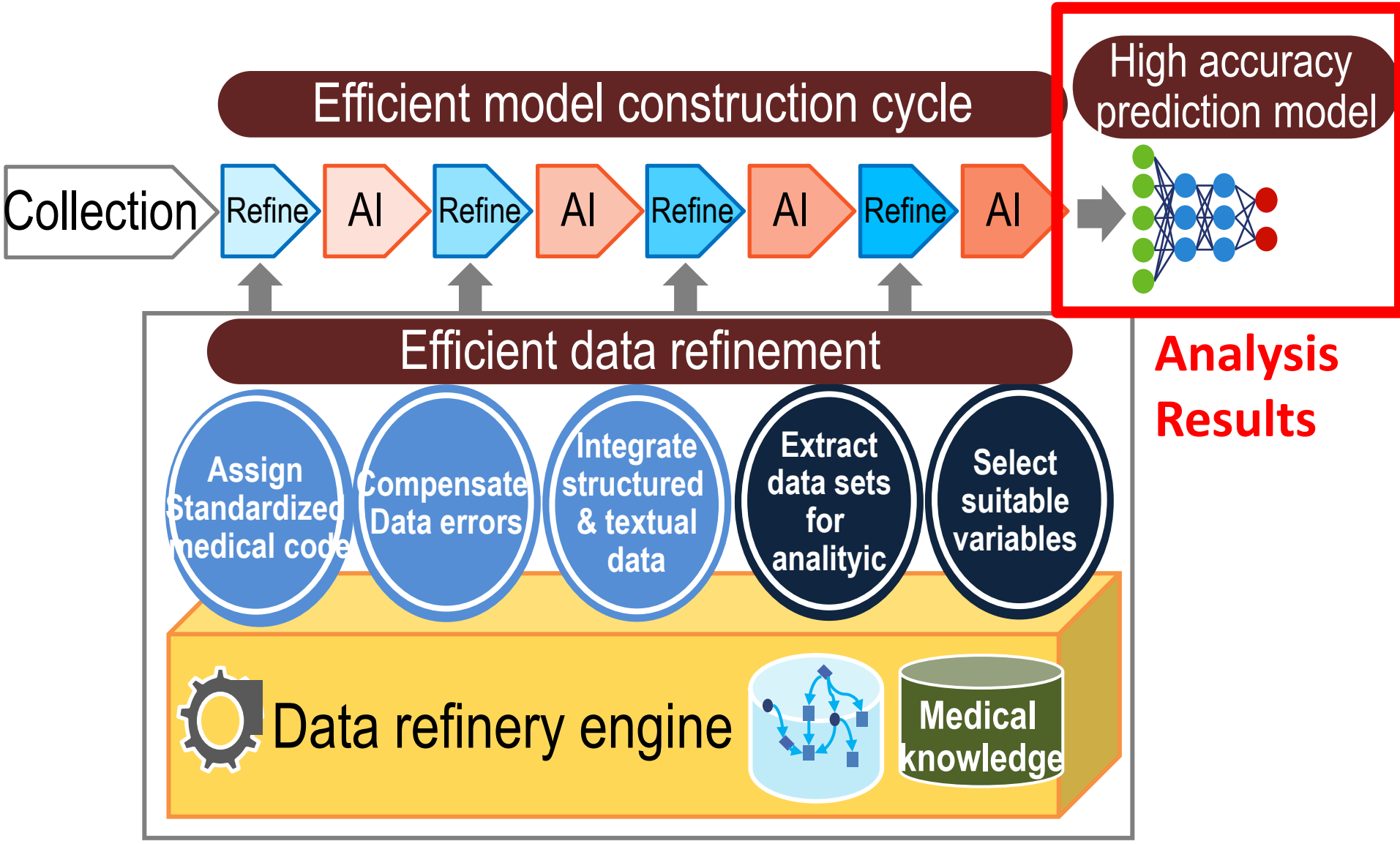

# Analysis results with 110,000 samples

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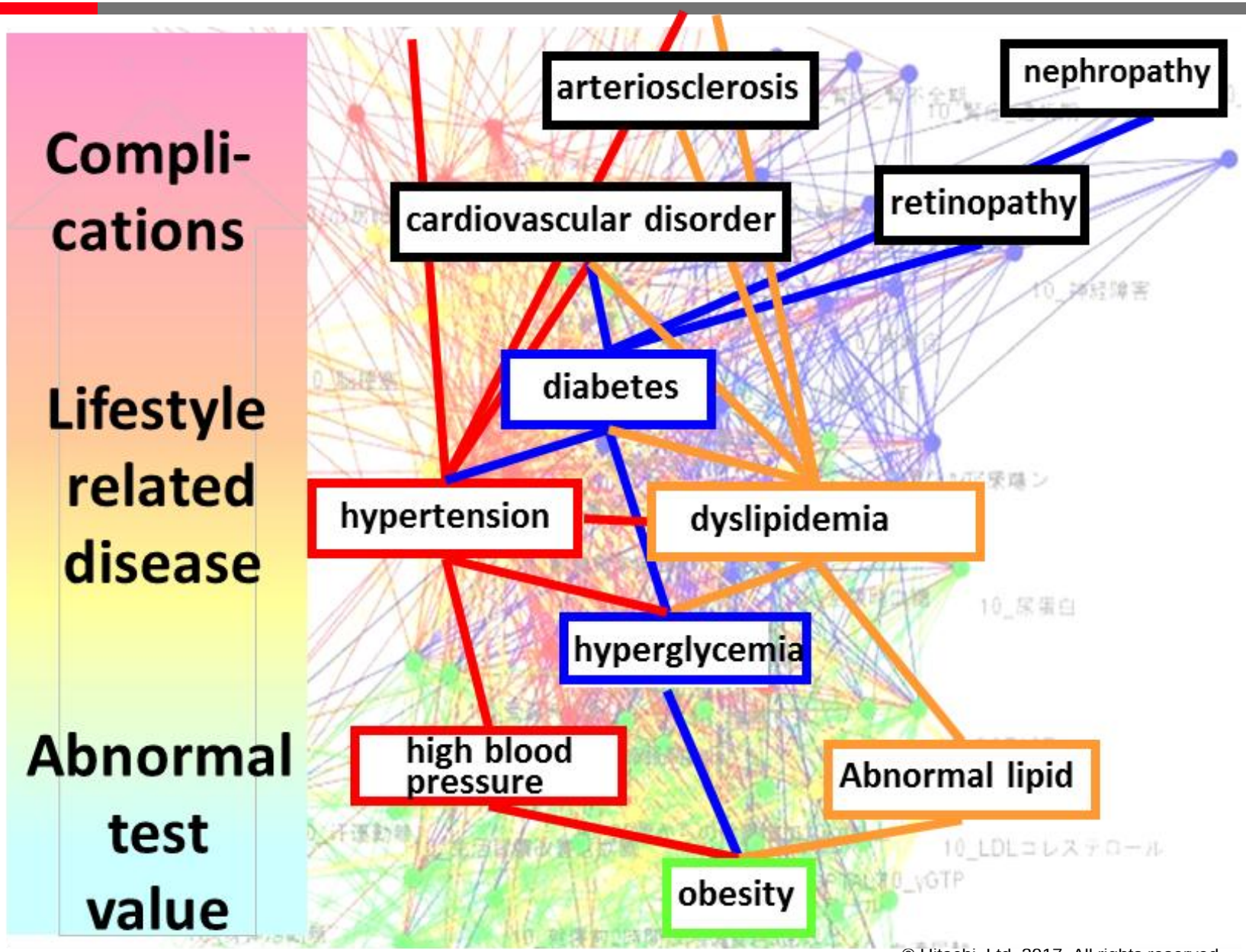

# Hitachi Healthcare Program Overview

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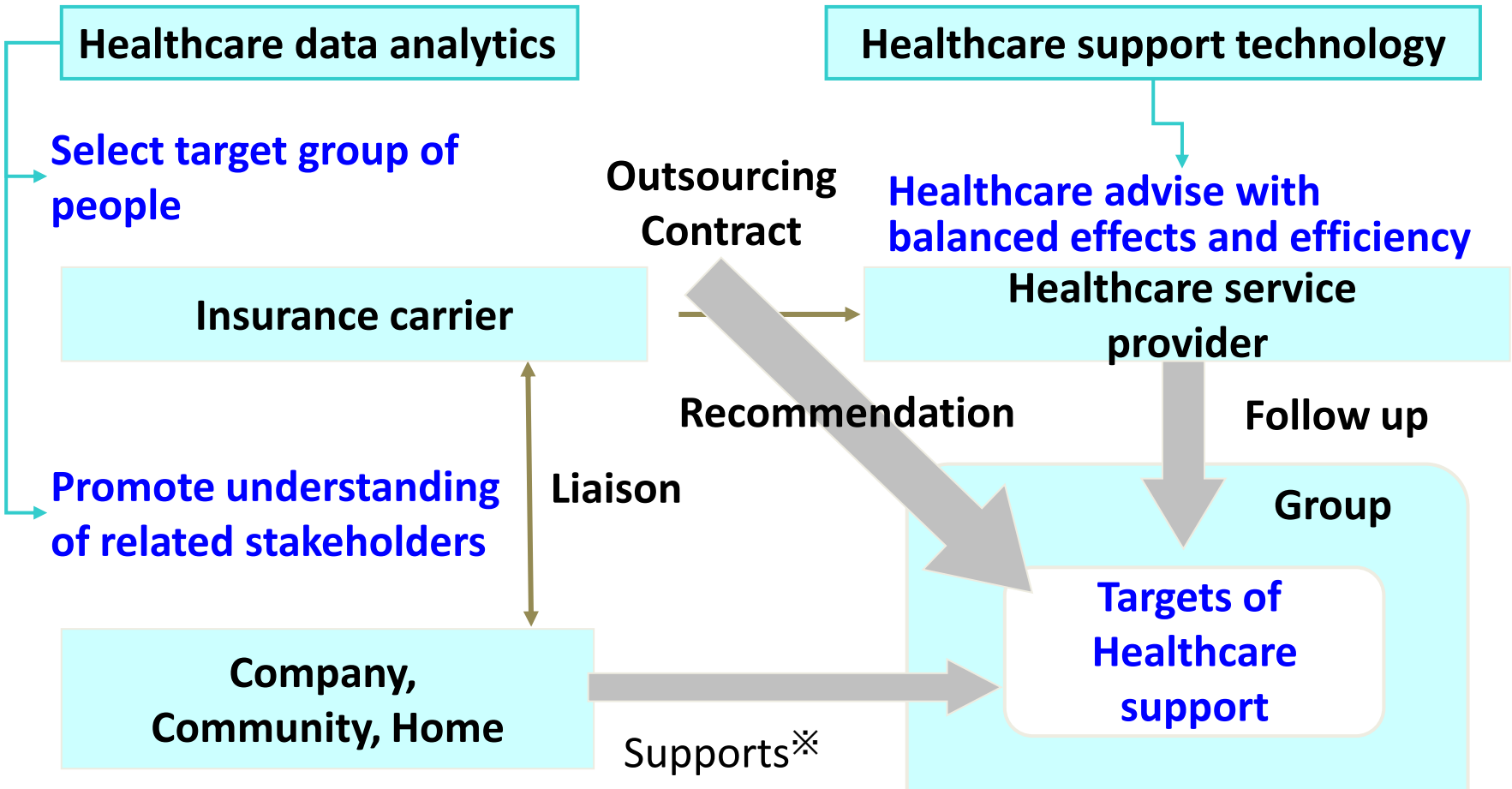


※ Welfare program, Company cafeteria foods menu improvement at home, etc.

# Harasuma (HALSMA) Diet

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## Lifestyle disease improvement program “Harasuma Diet”

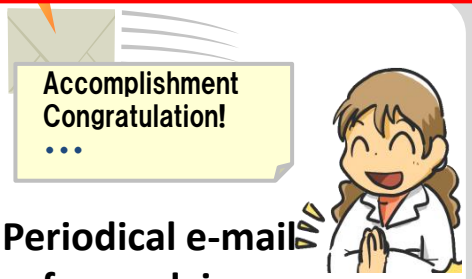
(HALSMA: Hitachi Associates Life Style Modification & Action)

### 1. First interview


**Select 100 kcal cards for actions**

### 2. Weight loss actions with 100 kcal cards

90 days actions
90 days maintenance




Periodical e-mail from advisor

**Technology**

### 3. Final evaluation (6 months after)

**Dissolution of metabolic syndrome**

# Trial for Automated Advise

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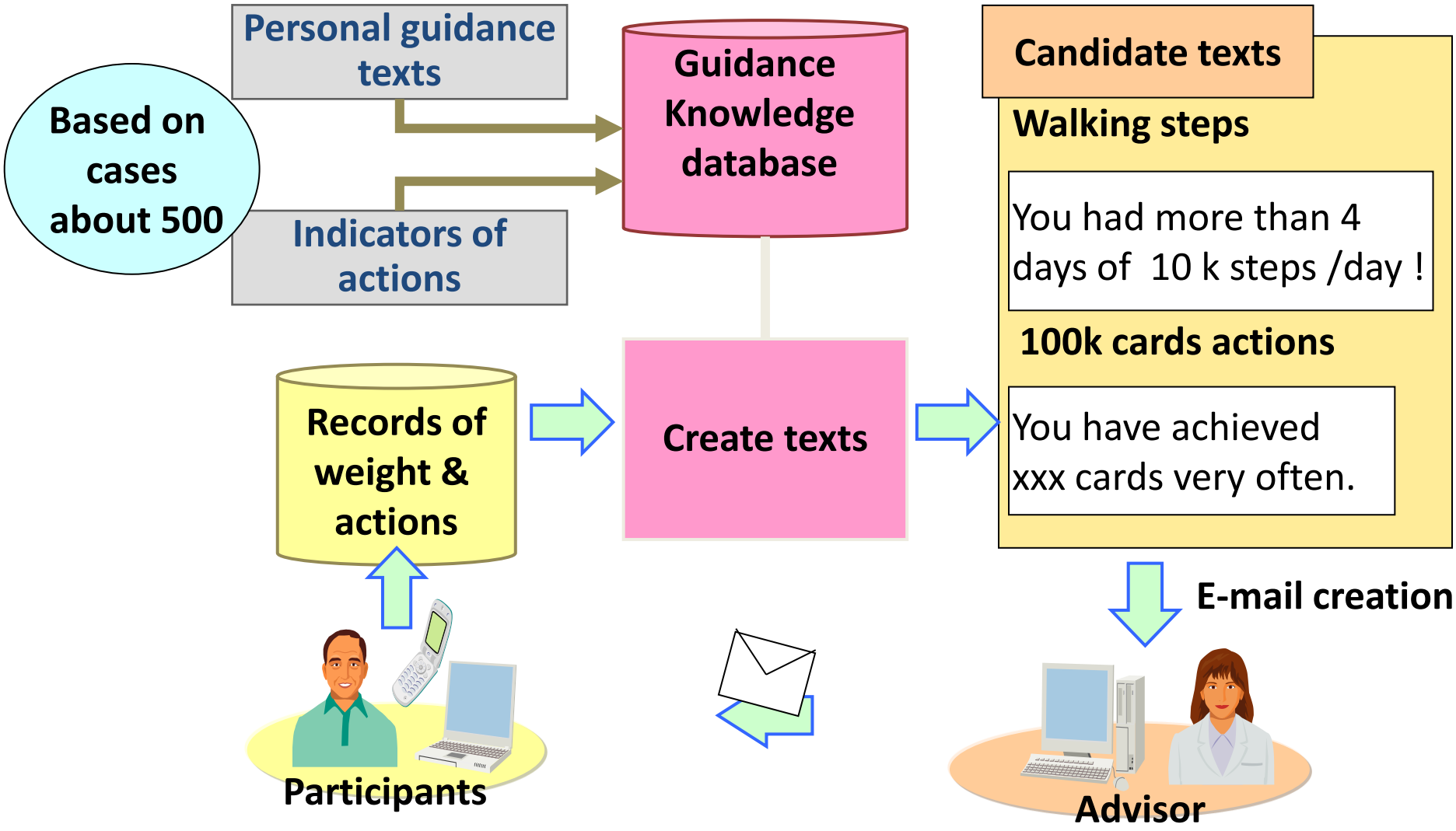

# Financial Effect

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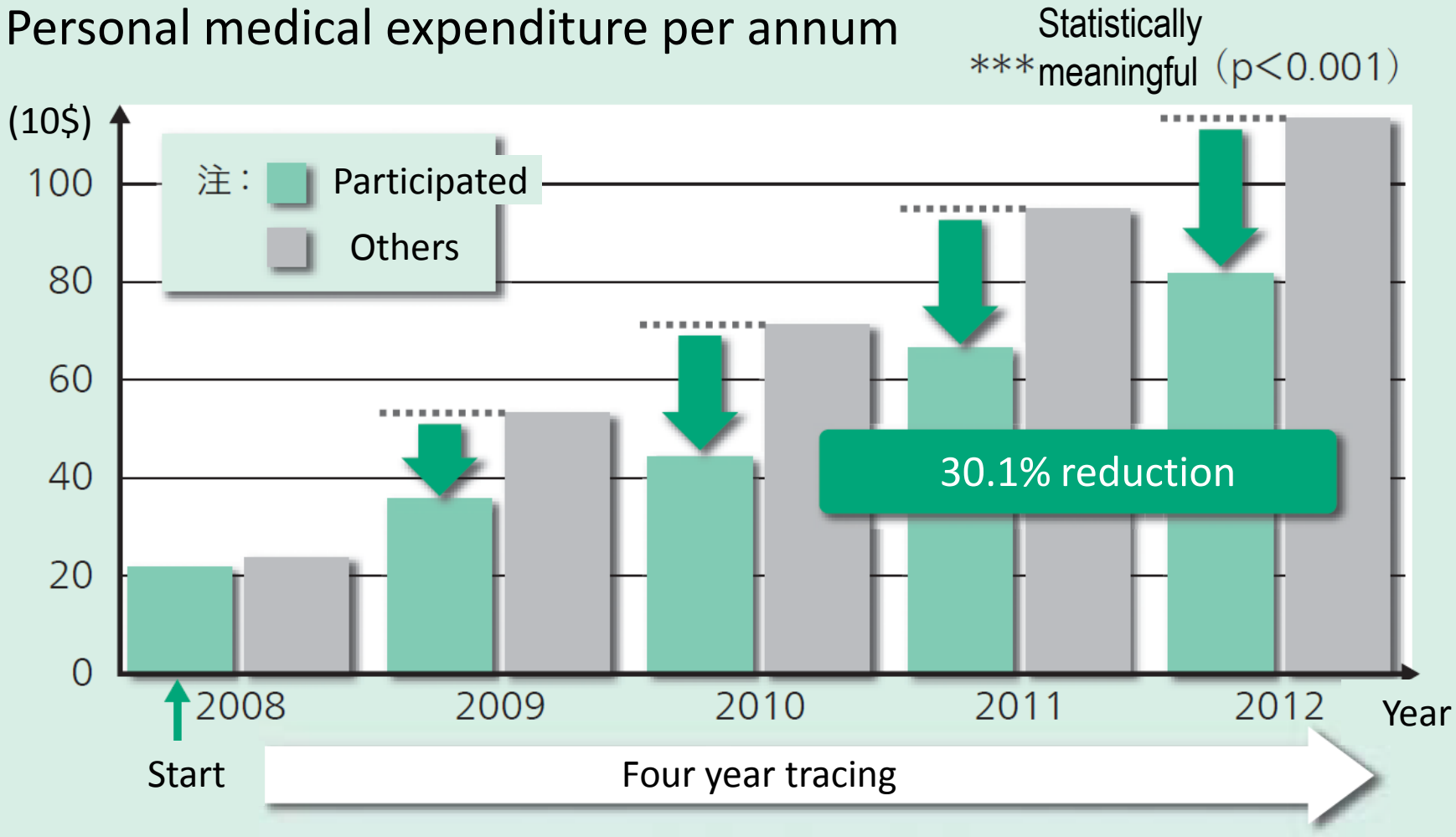
## Personal medical expenditure per annum



# Happiness and life

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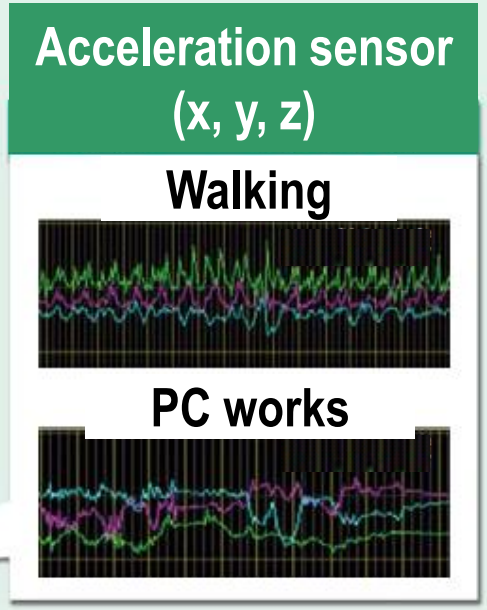
Compared to unhappy people, happy people has a 35% larger productivity, 300% larger creativity.

They have higher salaries, quicker promotion, and higher success rate of marriage.

Moreover they have more friends and longer life expectancy.

# Mental Aspect on Productivities


注：略語説明　PC (Personal Computer)

**We found correlation of group-happiness and physical activity patterns measured by wearable sensors (three-dimensional acceleration data)**

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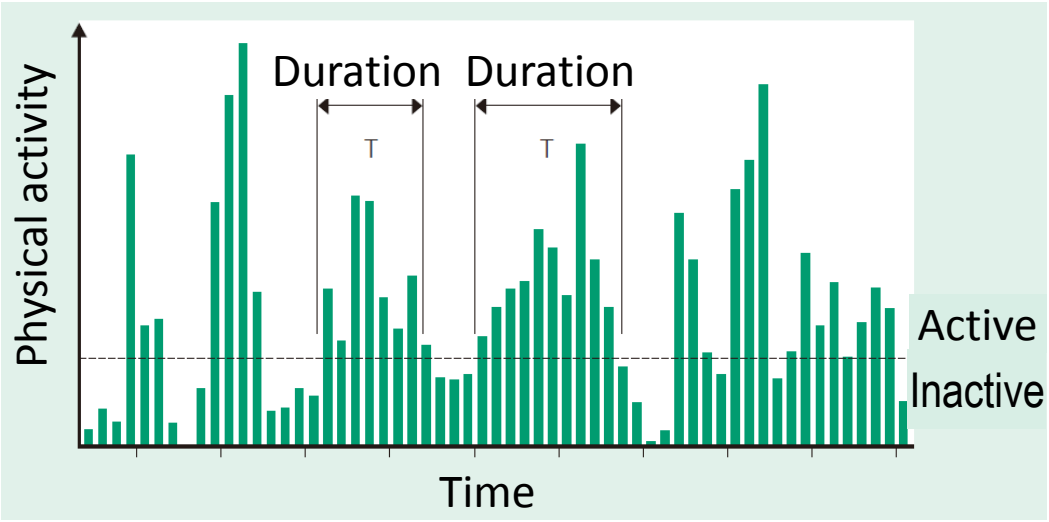
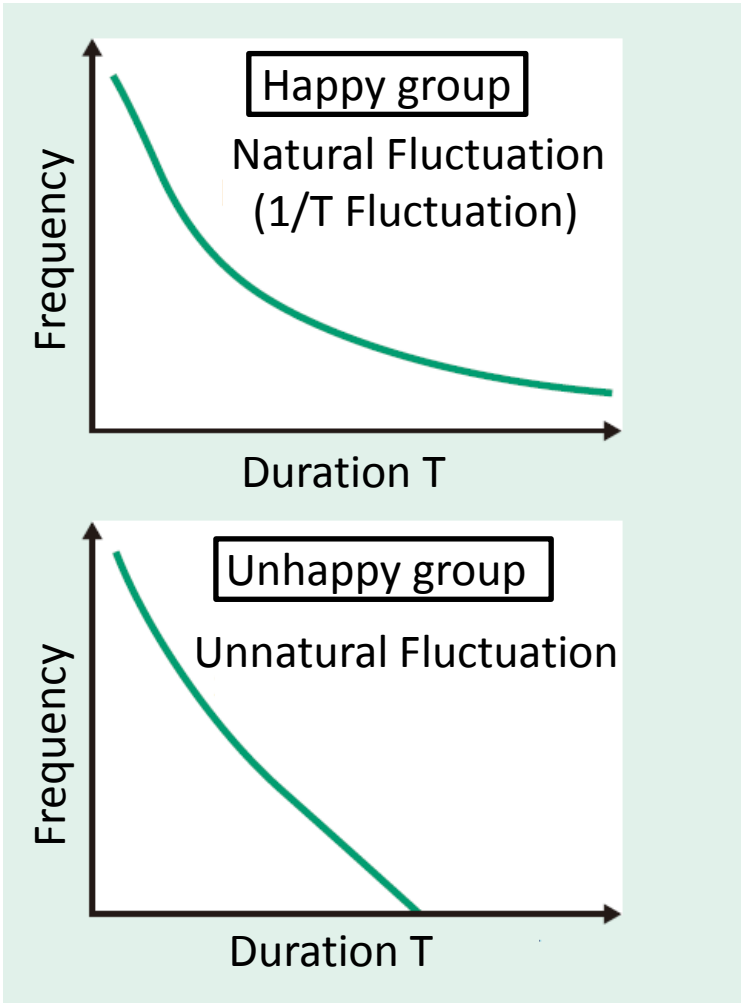
# How can we measure?




We have researched human behavior data measured by wearable technology for more than one million days in nine years.

Using data from wearable sensors (50 times a second), we found correlation of group happiness and body motion patterns.

We discover a basic theory related body motions from these data, called "1/T theorem".

This 1/T fluctuation (the extent to which the data fits the 1/T rule) is adopted as a numerical indicator.

# Happiness and1/T fluctuation indicator

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20 questions on precious work (CED-D)

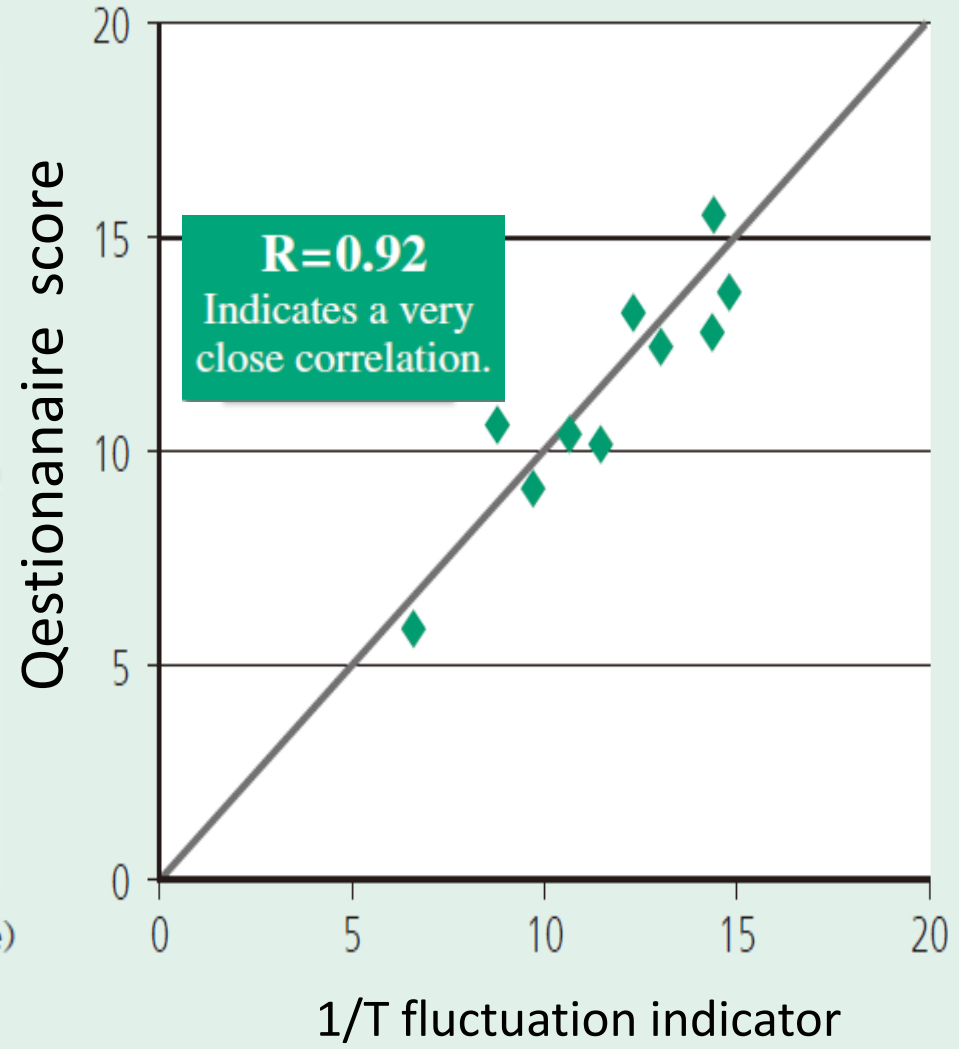
Happiness, concentration, success, enjoyment, desires, sleep, conversation, restriction, appetite, depression, anxiety, loneliness, sadness, etc.

Questions are grouped according to those that have

a positive influence on happiness and those that

have a negative influence, and totaled accordingly

CES-D (Center for Epidemiologic Studies Depression Scale)



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# Thank you very much

June 15th, 2017

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