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2016. 9. 20

The National Health Insurance Big Data in Korea

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Ⅰ. Background of KNHI Big Data

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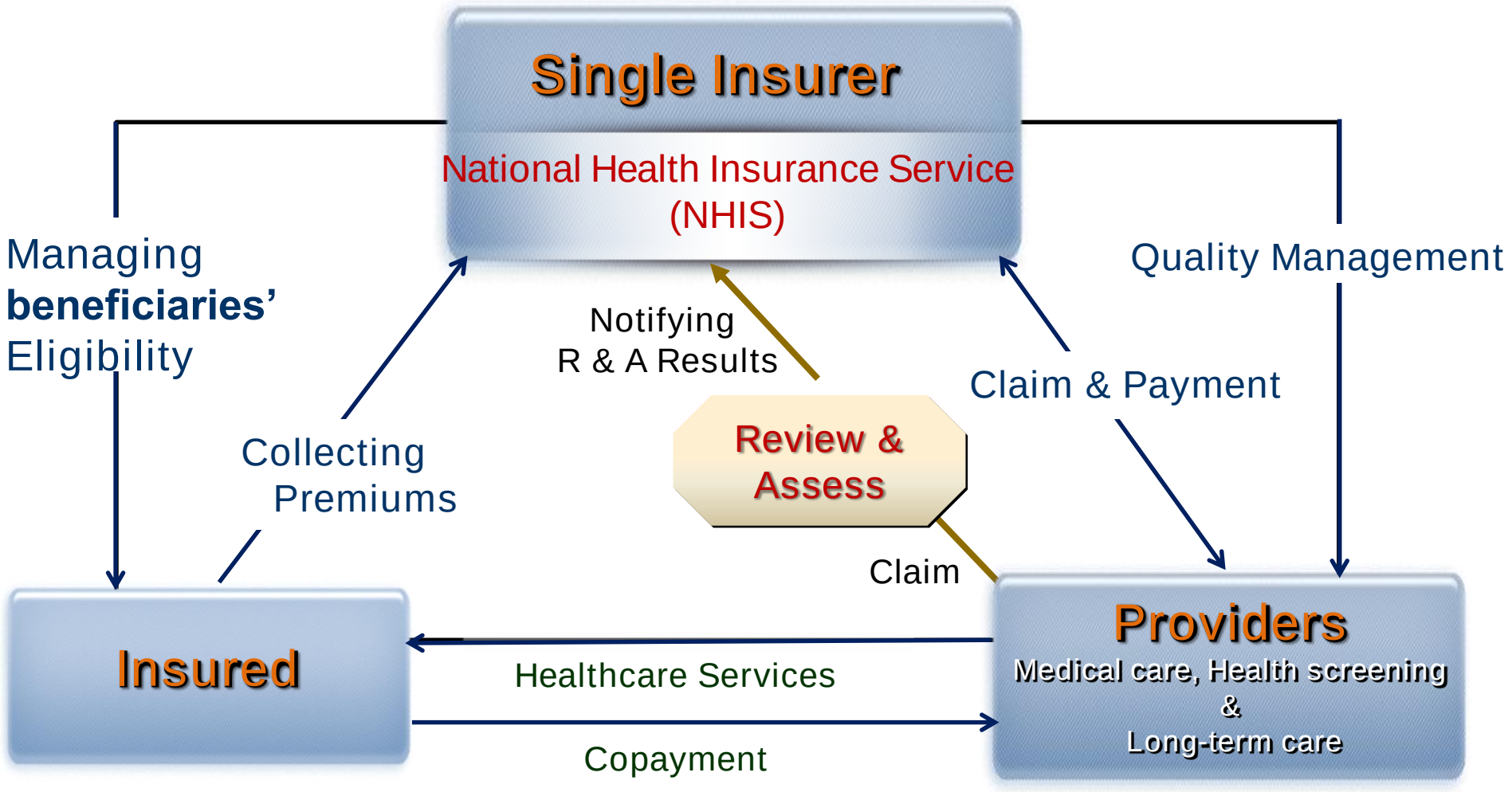
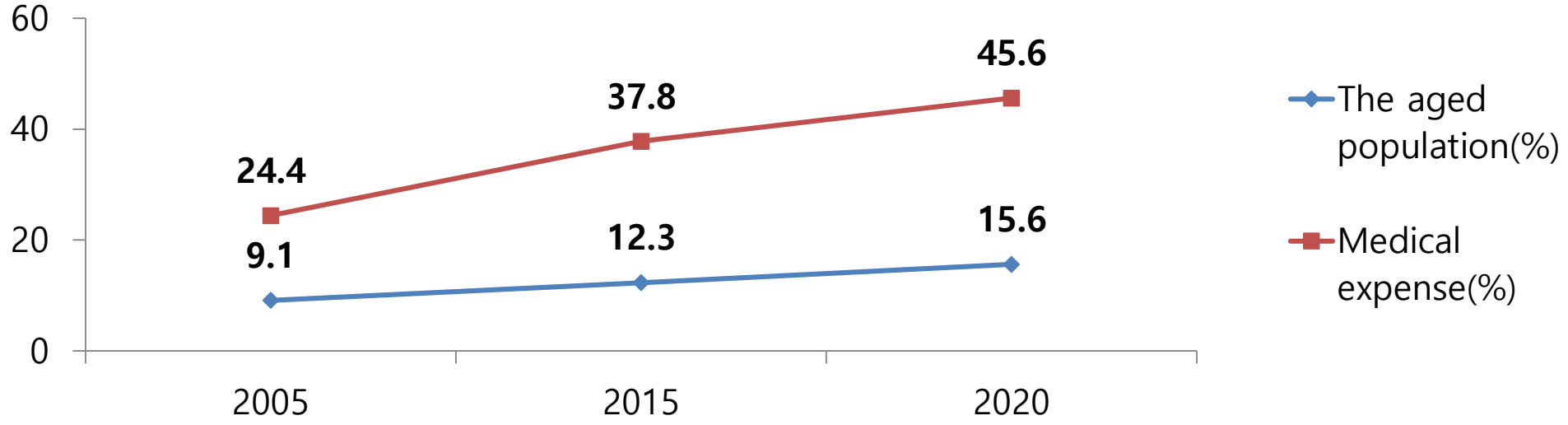
NHI Working Process

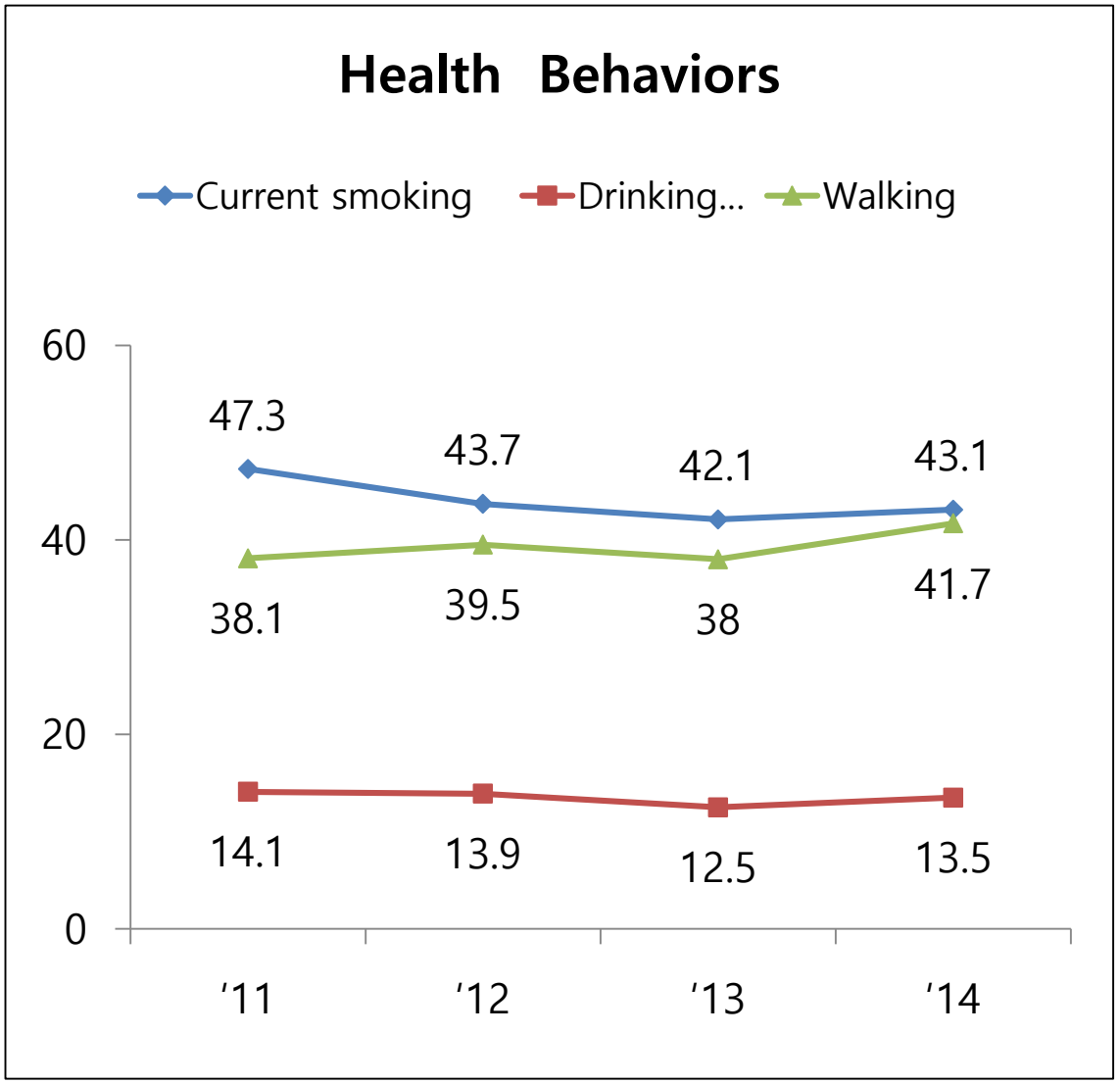


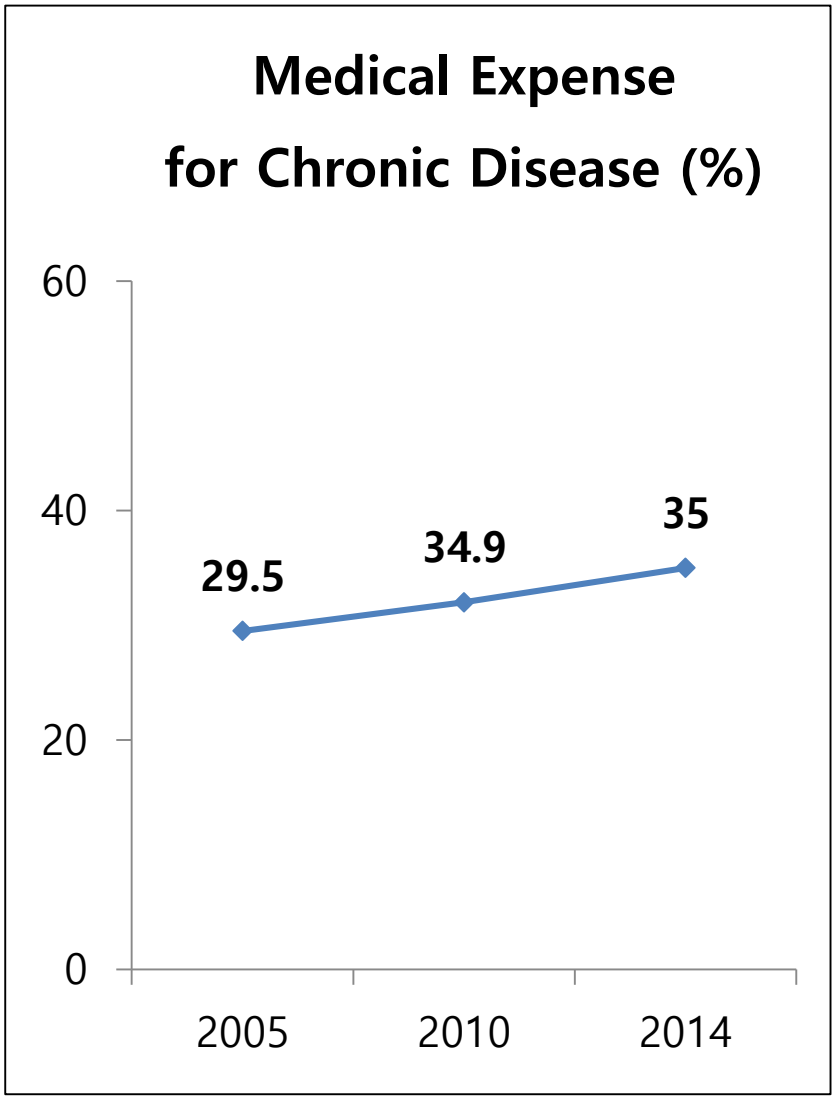
Increase of The aged & Medical Expense



Division	Expected time(year) of Reach			Duration(year)	
	An ageing society(7%)	Old age society (14%)	Superaged society (20%)	7% → 14%	14% → 20%
Japan	1970	1994	2006	24 years	12 years
France	1864	1979	2018	115 years	39 years
Britain	1929	1976	2026	47 years	50 years
USA	1942	2015	2036	73 years	21 years
Korea	2000	2018	2026	18 years	8 years

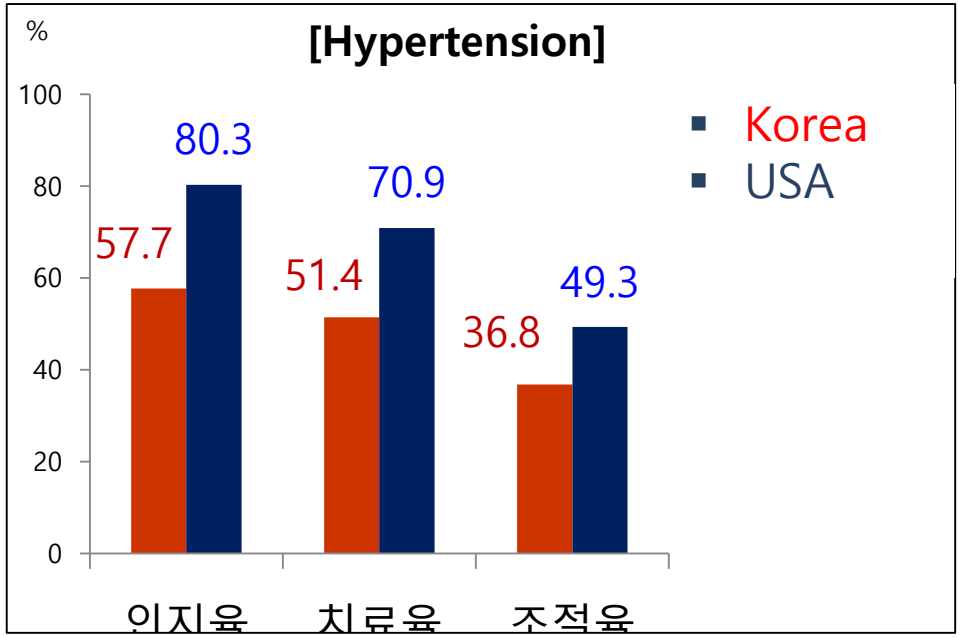
Health Behaviors & Medical Expense

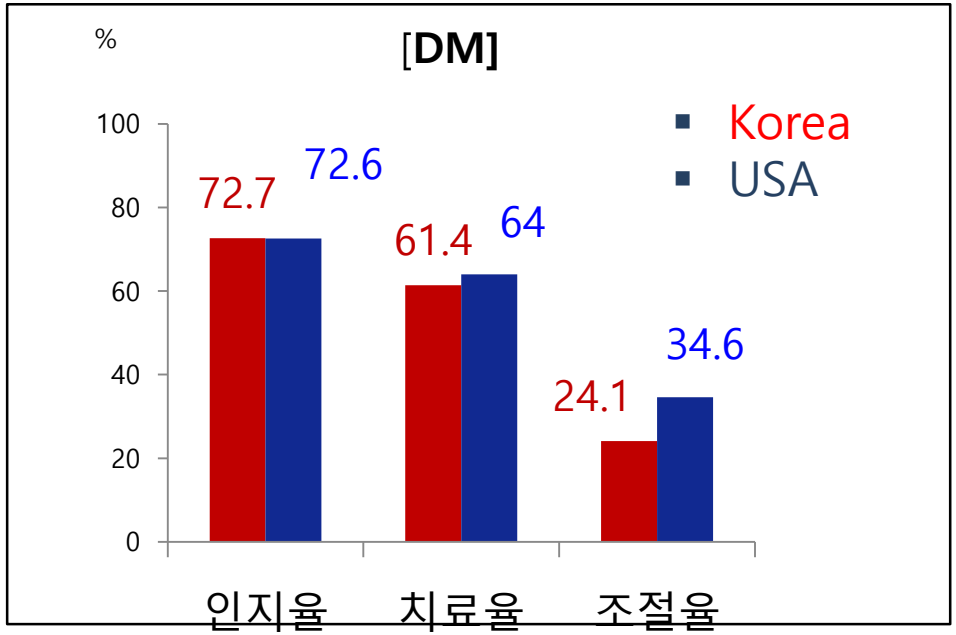




Limitation of Treatment-based medical service

- Average times of Ambulatory care : 14.6(2015) … OECD mean: 6.5
- Although, Treatment / Control rate of disease is **low**





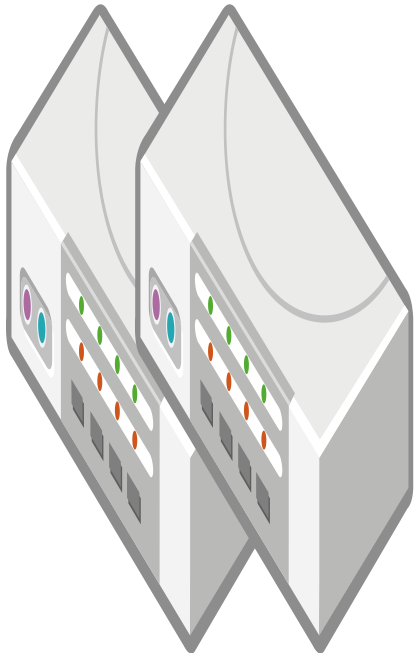
Building NHID (2012.6)

Working DB

- Beneficiary & Contribution DB
- Medical Institution DB
- Health Screening DB
- Medical Aid DB
- Long-term Care DB

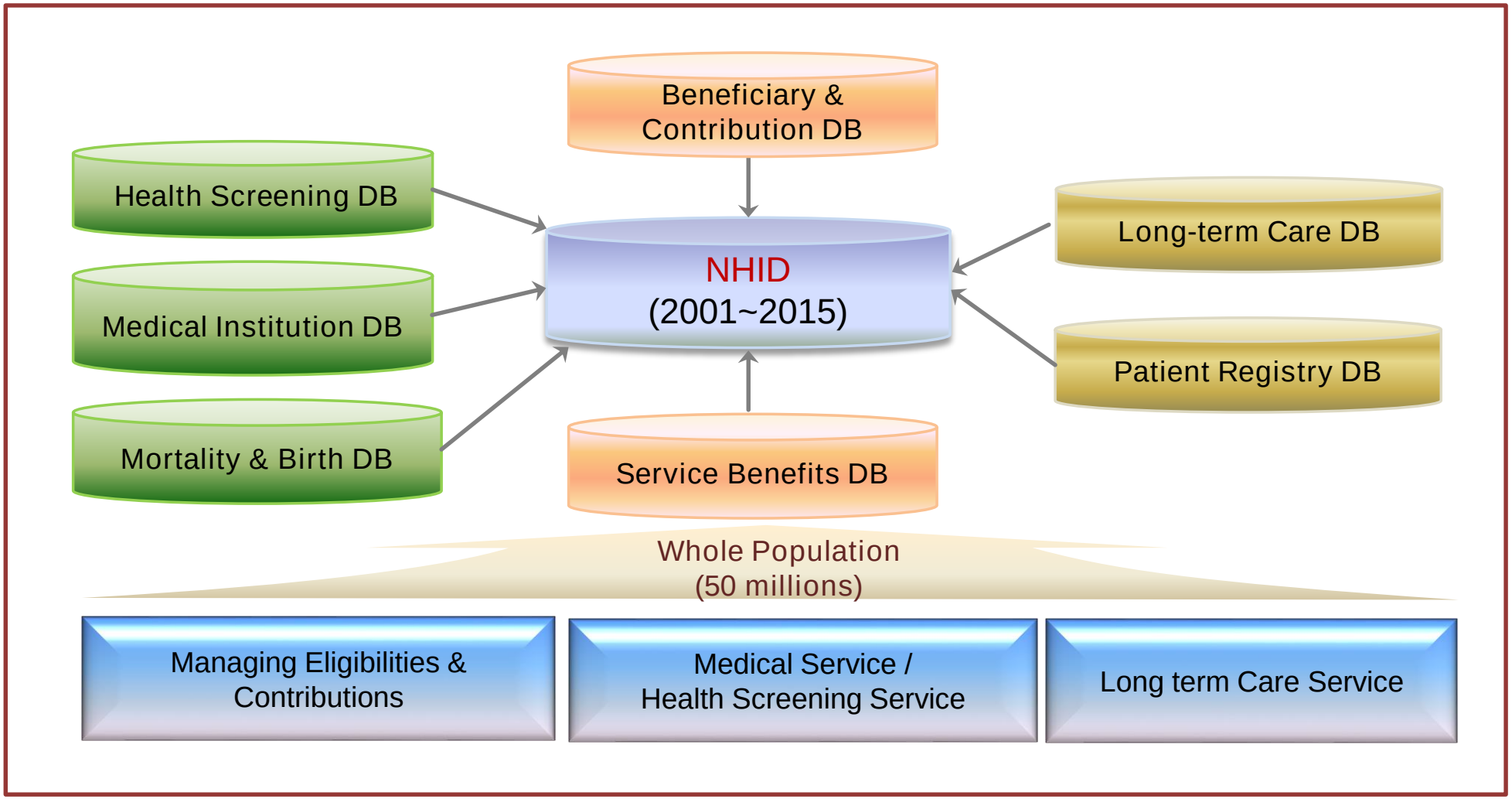
- Extraction of main DB & variables
- Rebuilding DB by date
- De-identification

NHID*



* NHID : National Health Information Data

NHID DB


Beneficiary & Contribution DB
Health Screening DB
Long-term Care DB
NHID (2001~2015)
Medical Institution DB
Patient Registry DB
Mortality & Birth DB
Service Benefits DB
Whole Population (50 millions)
Managing Eligibilities & Contributions
Medical Service / Health Screening Service
Long term Care Service

NHID Variables

Demographic & Social Variables	▪ Sex, Age, Birth, Death, Disability, Residential Area, Biciary Type, Premiums, Workplace Type
Service Benefits DB	▪ Disease, Utilization, Cost, Details, Manpower, Facility, Medical Device
Health Screening DB	▪ Smoking , Alcohol, Physical Activity, Disease History, Mental Health, Body Measure, Lab Test, Cancer
Long-term Care DB	▪ Long-term care applicant info, Grading info, User info, Long-term care institution info, Benefit info

Ⅱ. Current Status of NHI Big Data

▣ Supporting Health Research

▣ Providing Health Information

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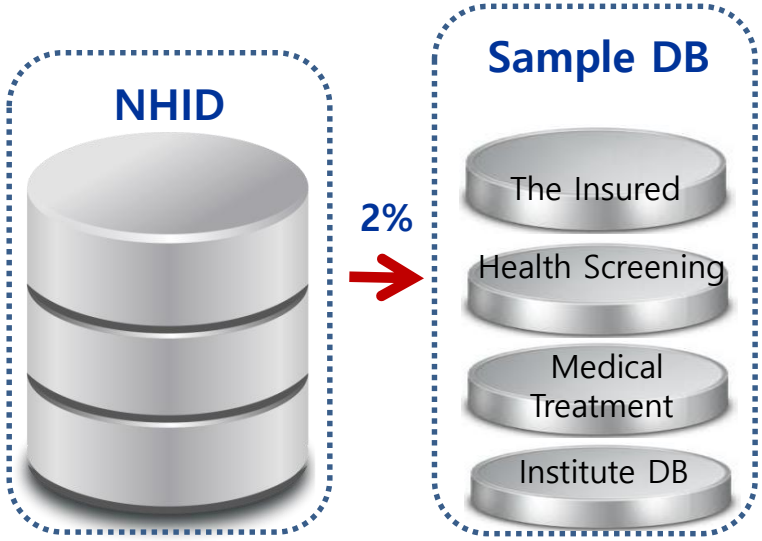
Providing Data for Health Research

1. Sample Research DB (3 types, 2014.7~)

- Sample Cohort DB, Health Screening DB, The Ageing DB

Sample Cohort DB ?

- Subject : 1 million (2% of Whole Population)
- Duration : '02~'15 (14 years)
- Data : The Insured, Medical Treatment
  Health Screening, Institute DB
- Feature : Deidentification,
  Only for Research
- Methods : Portable Device(USB)



Providing Data for Health Research

2. Customized DB for Study

- Providing full data by disease, subject
- Operating in regional big data center
  * 8 centers(HQ, Busan etc.), 80 seats
- DB Features
  * Un-individual, Only for research
  * let result tables out, not raw data

Data Providing Website

Homepage：http://nhiss.nhis.or.kr/

Collaborative Research

3. Networking for joint-research

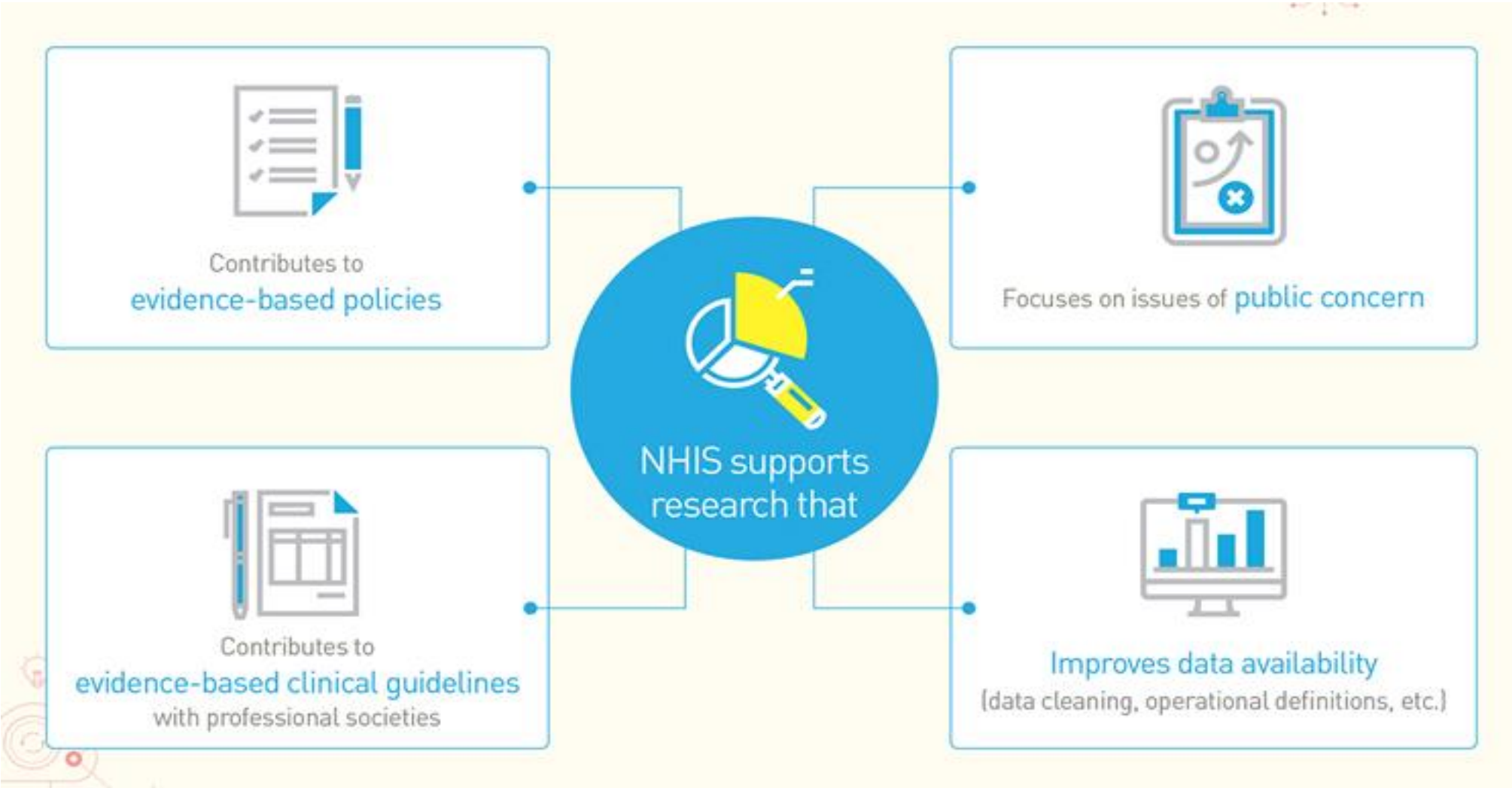
- MOU : 24 organization
  (Society, Public Organization, Hospital etc.)

- Subject : Specific subject in medical society
  Social health, Safety concerns

  - Health concerns : Dring, Smoking, Damage of Humidifier germicide, etc.

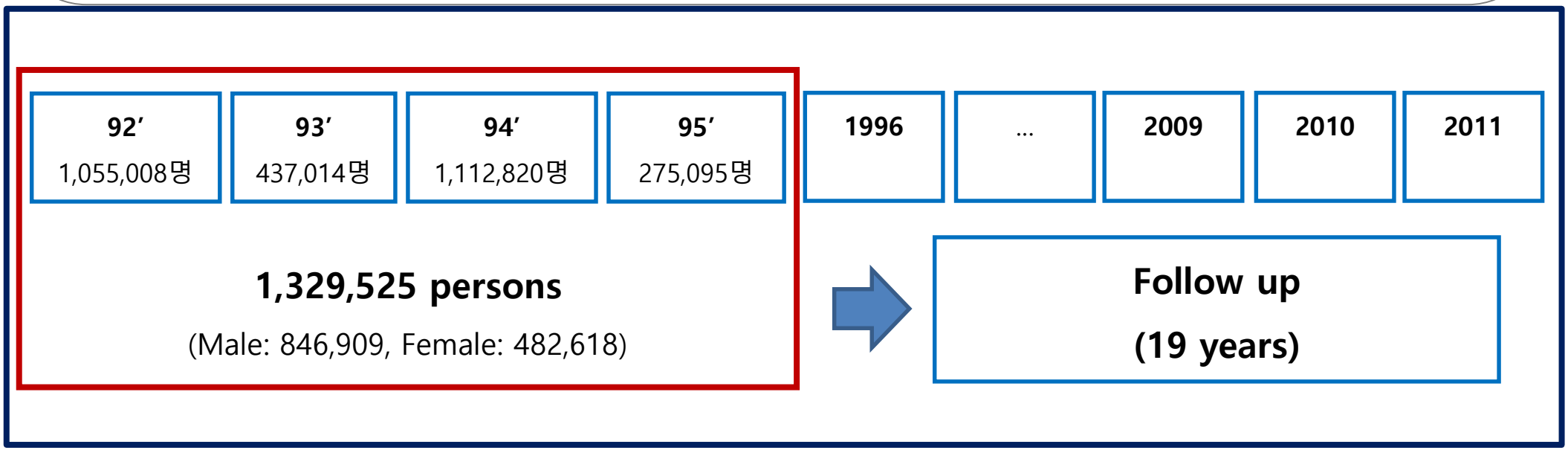
  - Safety concerns : Child/ The aging abuse, Low-birth rate

Collaborative Research



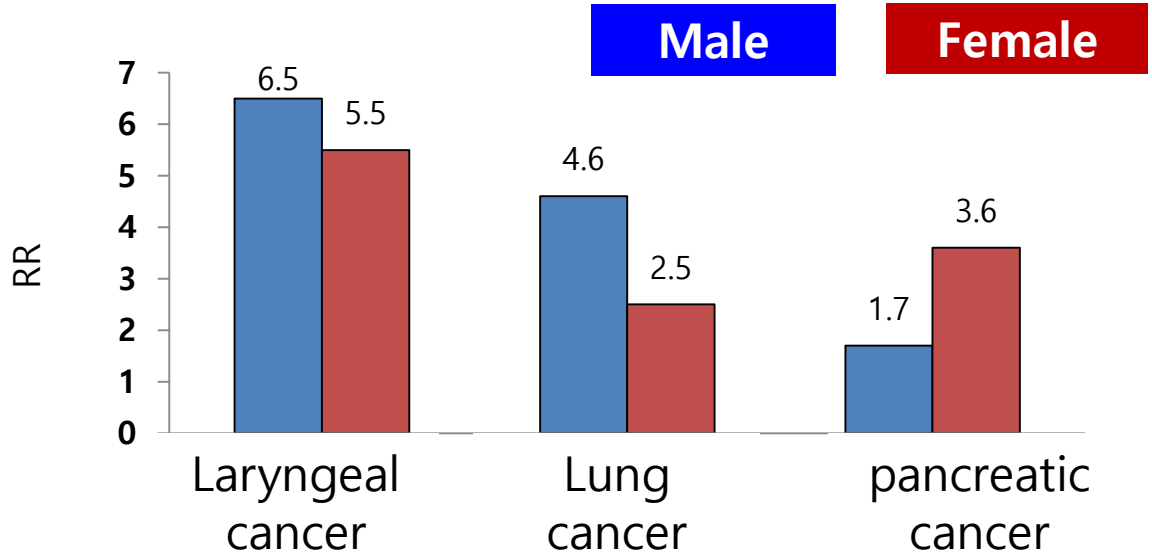
Study Example ; based on NHID

- Smoking Effect on Health Outcomes (2012)
  - Population : 1,329,525 persons 30 aged more in health screening DB of the employees and dependents during 1992~1995
  - Follow up : 19 years(1993~2011) for disease • death



Study Example ; based on NHID

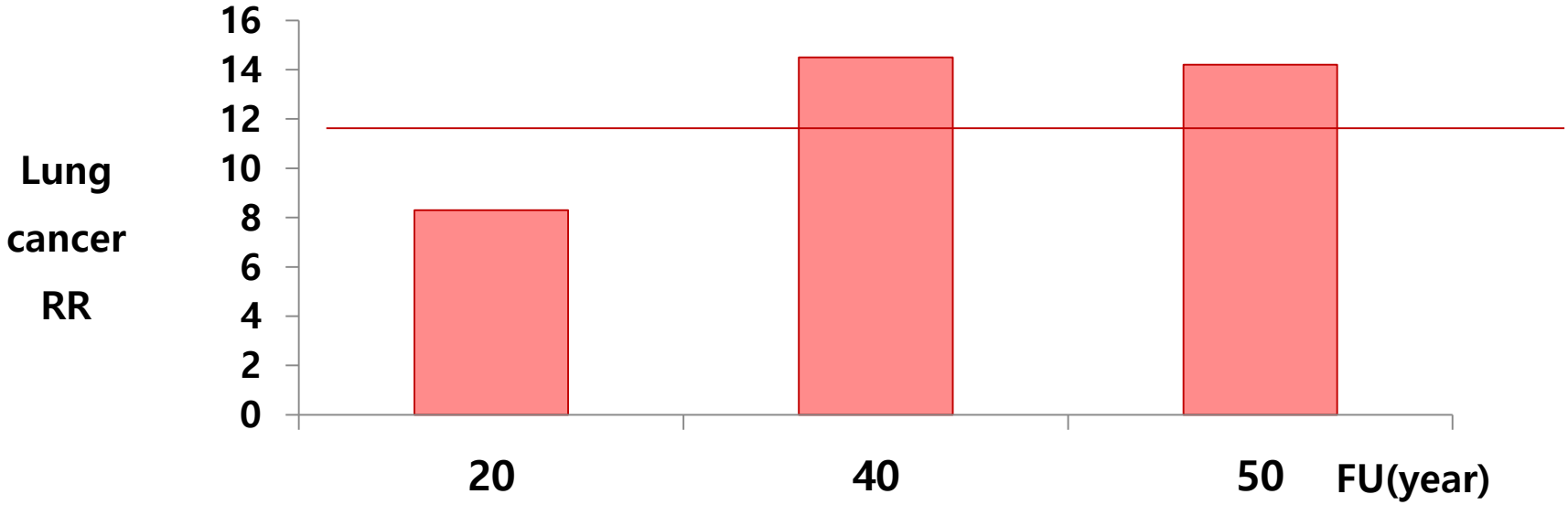
- Research Results
  - Disease of Relative Risk(RR) of smokers over Non-smokers in Korea
  - Health Insurance Expenses by smoking
  – 1.6914 trillion KRW (2011), Account for 3.7% out of total expense
- Use of Results
  - Providing evidence for the smoking lawsuit in Korea ('14. 4.14)
  - Providing evidence for plan and assessment of health policy



Study Example ; based on NHID

- High smoking rate during1980-1990 in Korea → Lasting smoking impact on health
  -> Need long period study

- UK research show that Smoking impact is the highest in 40 years after smoking exposure in GP cohort study



Supporting Health Service

Personal Health Record (My Health Bank), 2012~)

Health Screenings

- Checking latest 5 years

Questionnaires

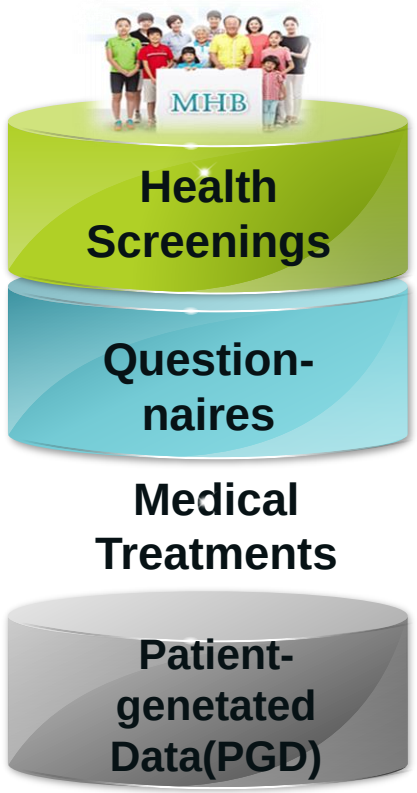
- Checking 5 years health questionnaire

Medical Treatments

- Checking latest 1 year of medical treatments/ prescriptions

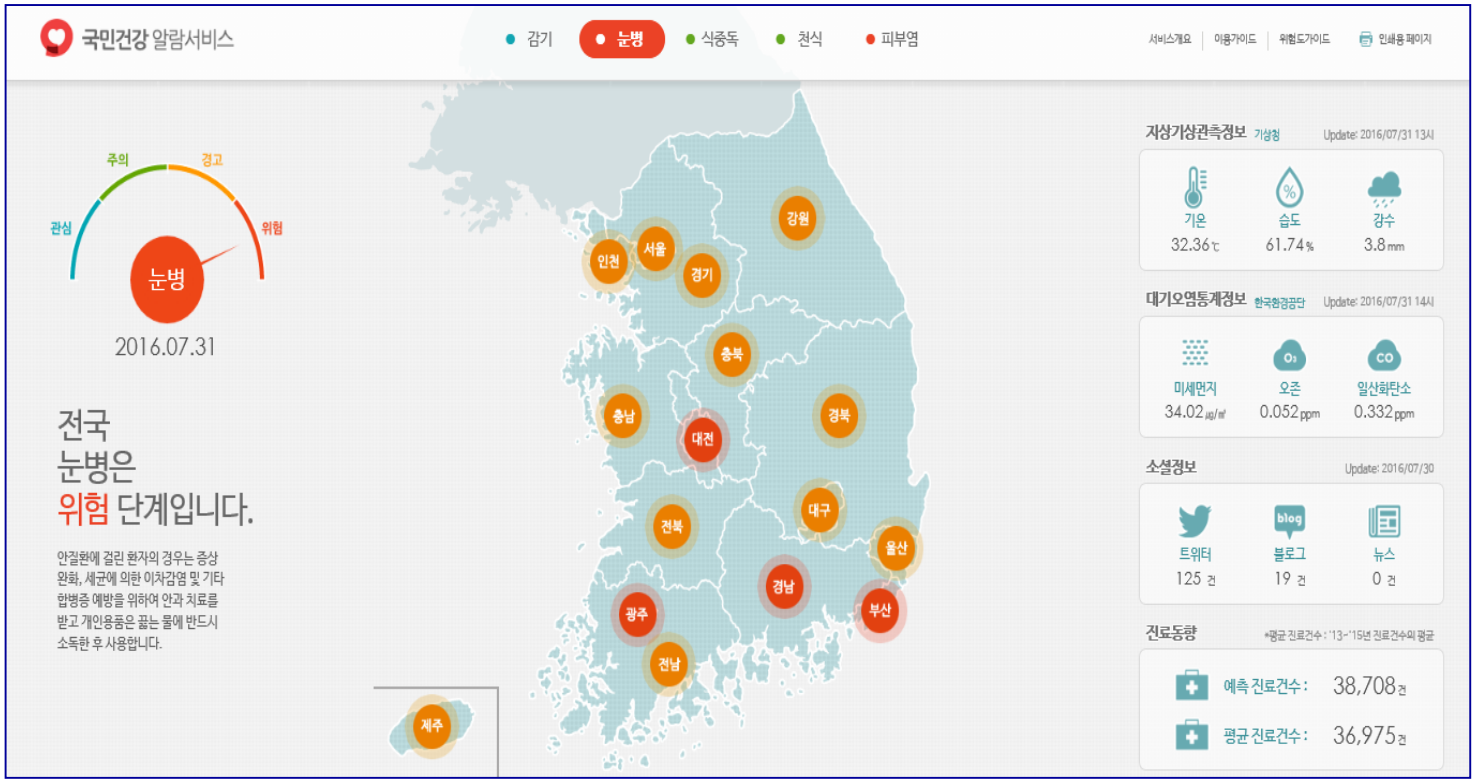
Patient-generated data (PGD)

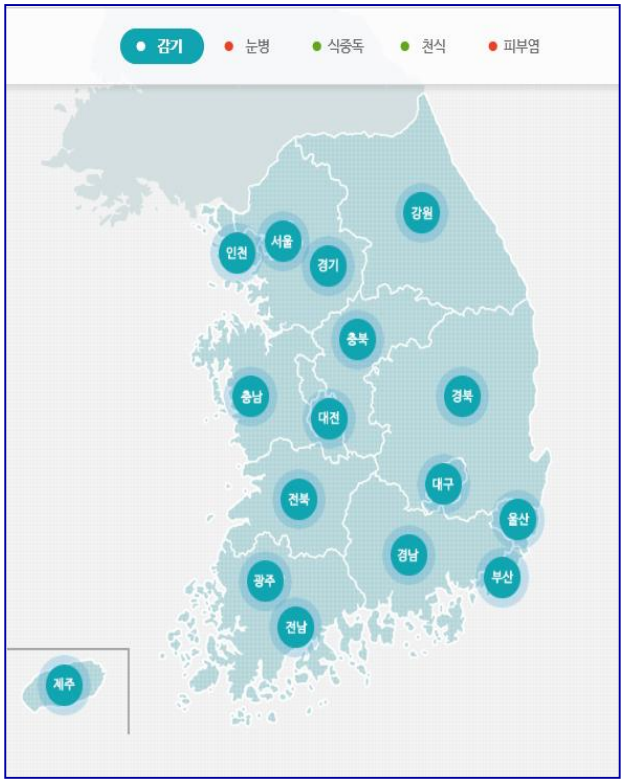
- Self-input Measurements of BP, DM. etc.



Infectious Disease Alram Service(2014. 5~)

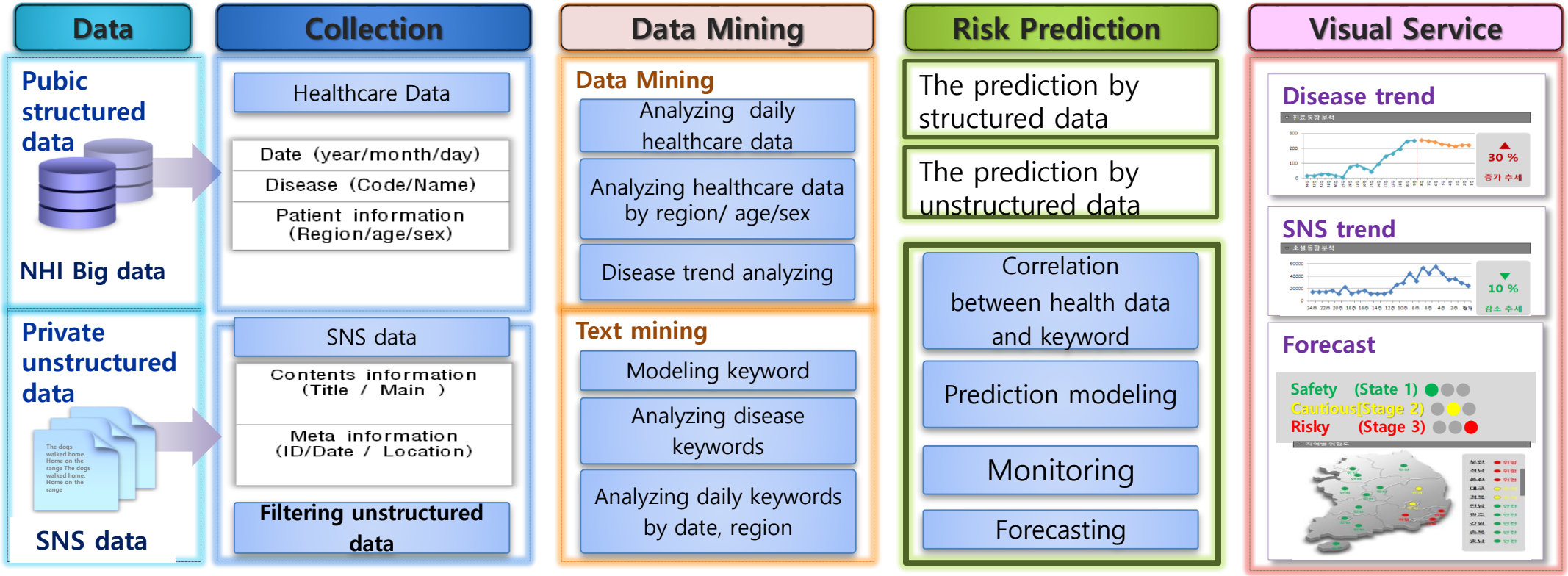
- Target : 5 disease (Flu, Eye disease, Dermatitis, Asthma, Food poisoning)
- Alram : Concern → Caution → Alert → Danger
- Contents : Disease & Social Media & Climate Information





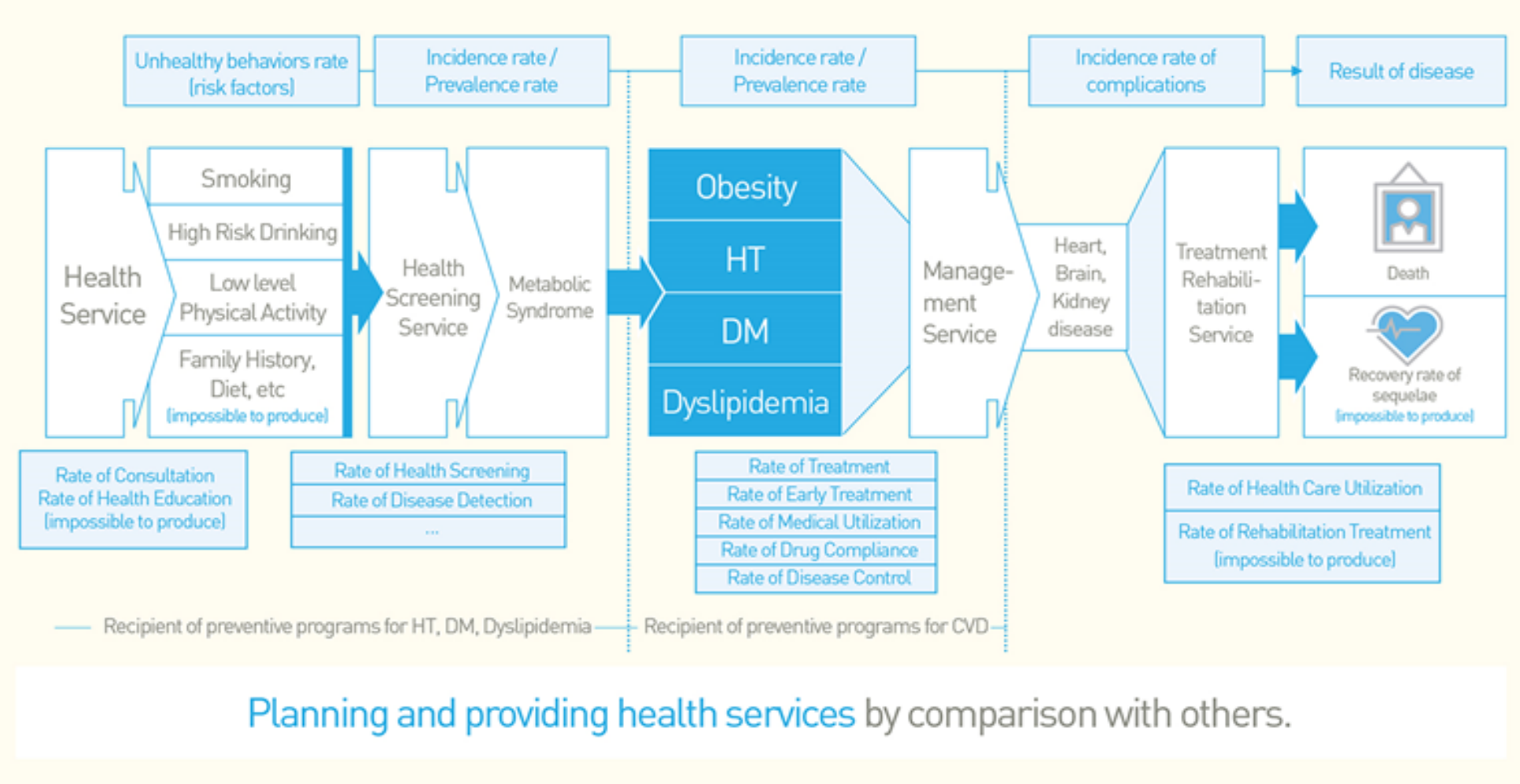
■ Public Data : (NHIS) Medical Record, (The Meteorological Administration Agency) Climate Data, (Ministry of Food and Drug Safety) Food Poisoning DB, (Ministry of Environment) Pollution DB

■ Private Data : SNS(Social Network Service) : Twit, Blog, News



Providing Regional Health • Disease Index

❖ Supporting Regional Customized Health Service



Ⅲ. Future Plan

Extended PHR(Personal Health Record)

AS IS

MY HEALTH BANK

Health Information	Disease Prediction
Medical Check-up results Questionnaire about health habits Medical history Medication Self-recording	Health risk appraisal Prediction of strokes Metabolic syndrome Check Obesity program

TO BE

Life Log Data

Walking	Blood-pressure
Diet	Glucose

Medical Images

CT	MRI
X-ray	Sonography

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Provide health information via Homepage

Support Self Health Management

Share with the medical practitioners

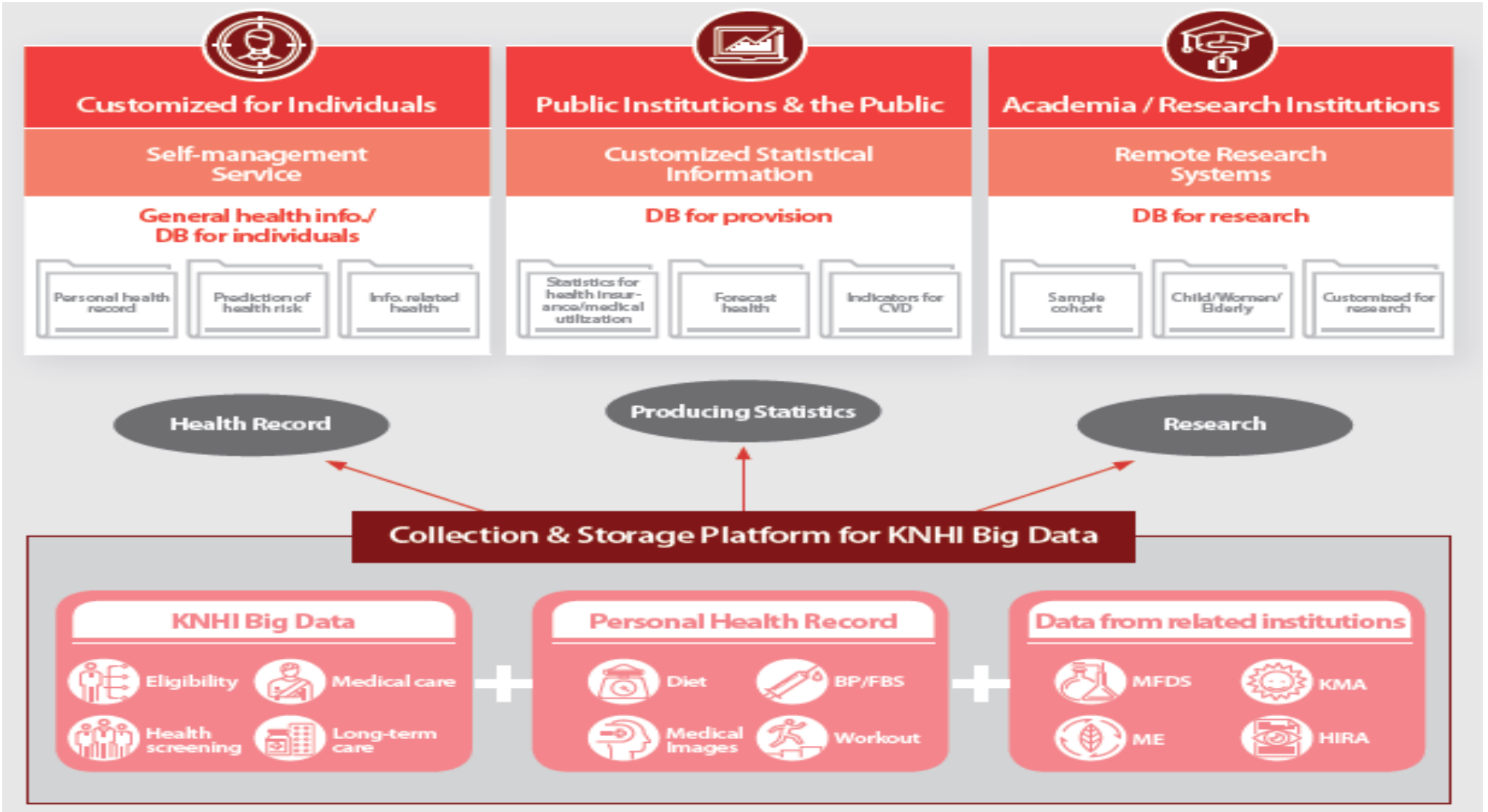
Approve

Treatment and Consulting

Transfer Health Information

Update Information

KNHI Big Data Platform



Thank you

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