

International Burden of Disease Conference
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Burden of Disease in Korea, 2008-2019

: results from the National burden of disease study

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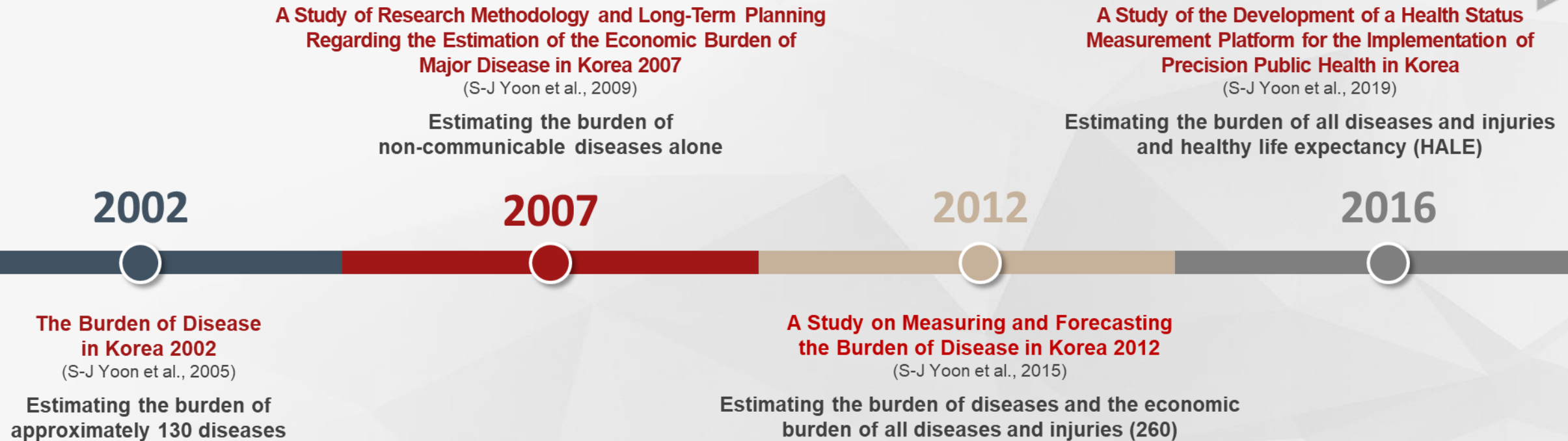


I . Overview of the KNBD study



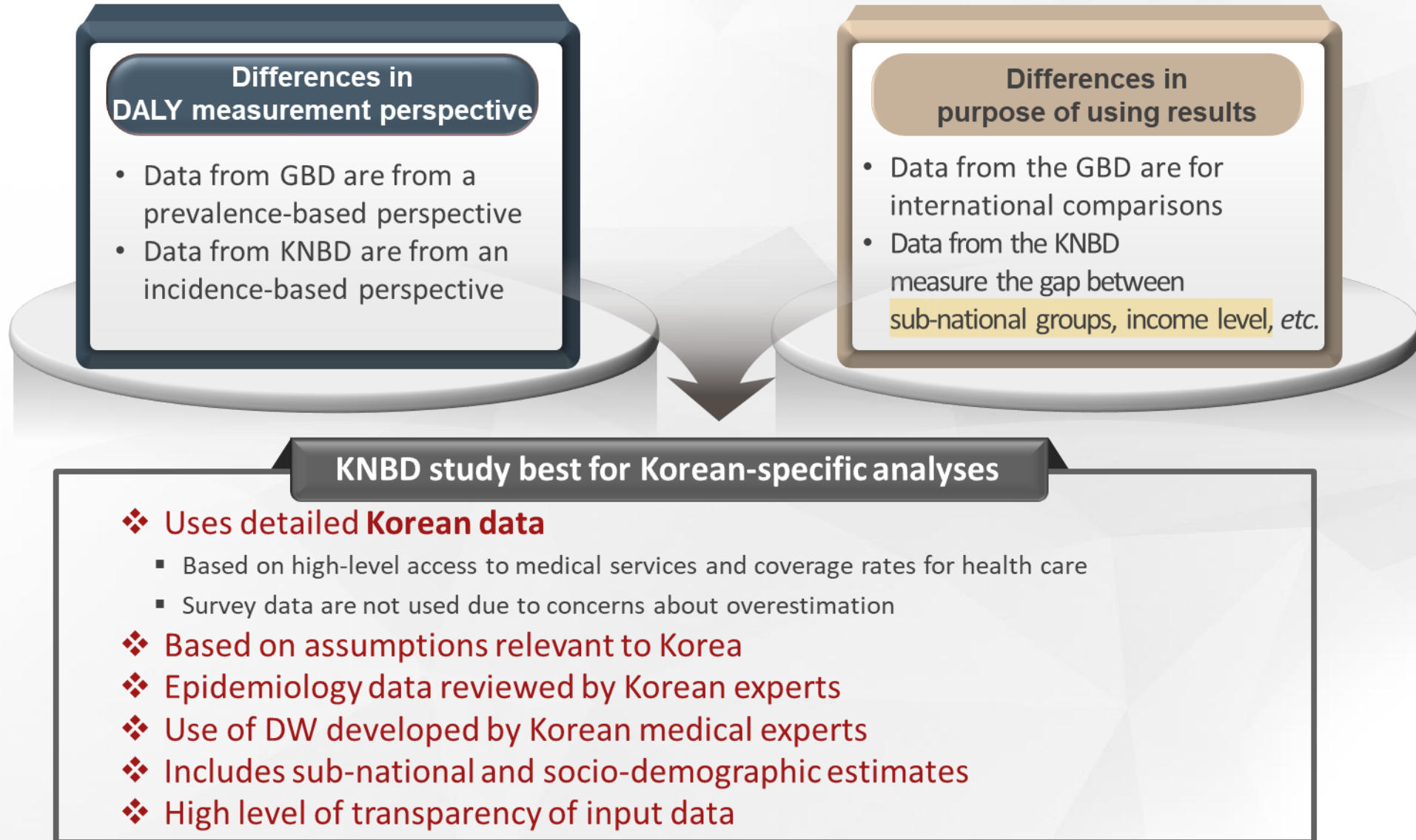
I . Overview of the KNBD study

01. History of the KNBD (Korean National Burden of Disease) study



- Increase in the target diseases since 2002: 130('02) → 260('12~)**
- Modification of the methodology for considering the Korean-specific context**
 - ❖ Data: aggregated data → individual data (*reconstruction with cohort data using personal ID*)
 - ❖ Disability Weight (DW): subdivide the disease category and quantitative expansion of the survey

I . Overview of the KNBD study

02. KNBD study vs. GBD study



II. Methods



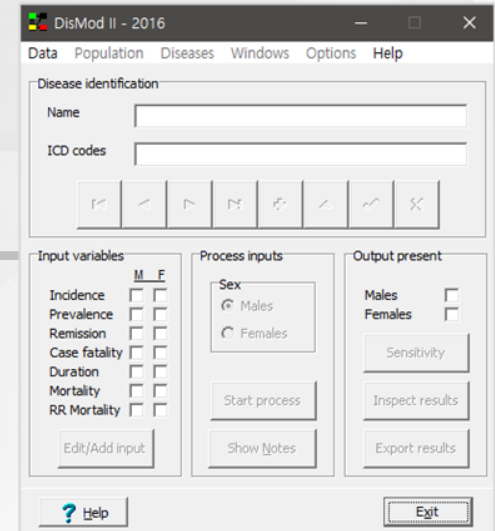
01. Data for measuring input parameters

Database

- ❖ Uses **national representative data sources** to estimate epidemiological parameters
 - **Population**
 - Residents registered with the Ministry of the Interior and Safety
 - **Mortality and life expectancy**
 - Cause of death statistics and life expectancy tables from Statistics Korea
 - **Non-fatal health loss**
 - **“National Health Insurance Service (NHIS) claims big data”** (except Oriental medicine claims)
 - Cohort data re-construction using individual level claims data
 - National Hospital Discharge In-depth Injury Survey from the Ministry of Health and Welfare

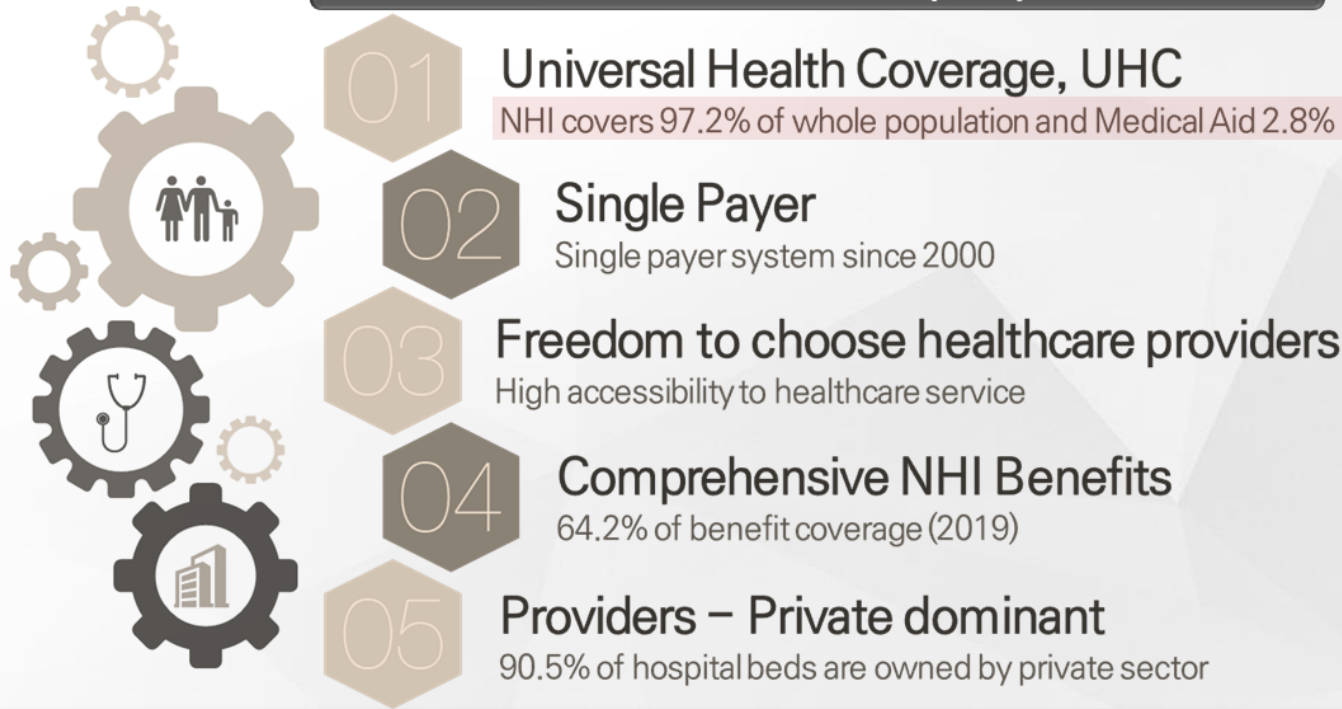
Length of duration and Age of onset

- ❖ Estimate using **DISMOD-II** program by WHO
- ❖ particularly for infectious diseases
 - directly calculated them using the claims data (cohort data)

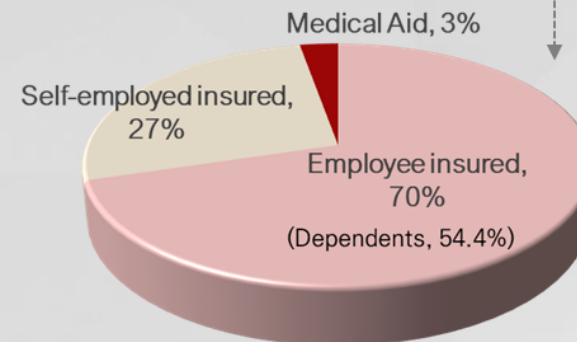


01. Data for measuring input parameters (cont.)

National Health Insurance (NHI) in Korea



Classification		Coverage	
	Total	52,880	100.0 %
NHI Program	Subtotal	51,391	97.2 %
	Employee insured	37,227	70.4 %
	Self-employed insured	14,164	26.8 %
	Medical Aid	1,489	2.8 %



National Health Insurance Service (2020) 2019 NHIS Statistical Yearbook

(unit: 1,000 persons)

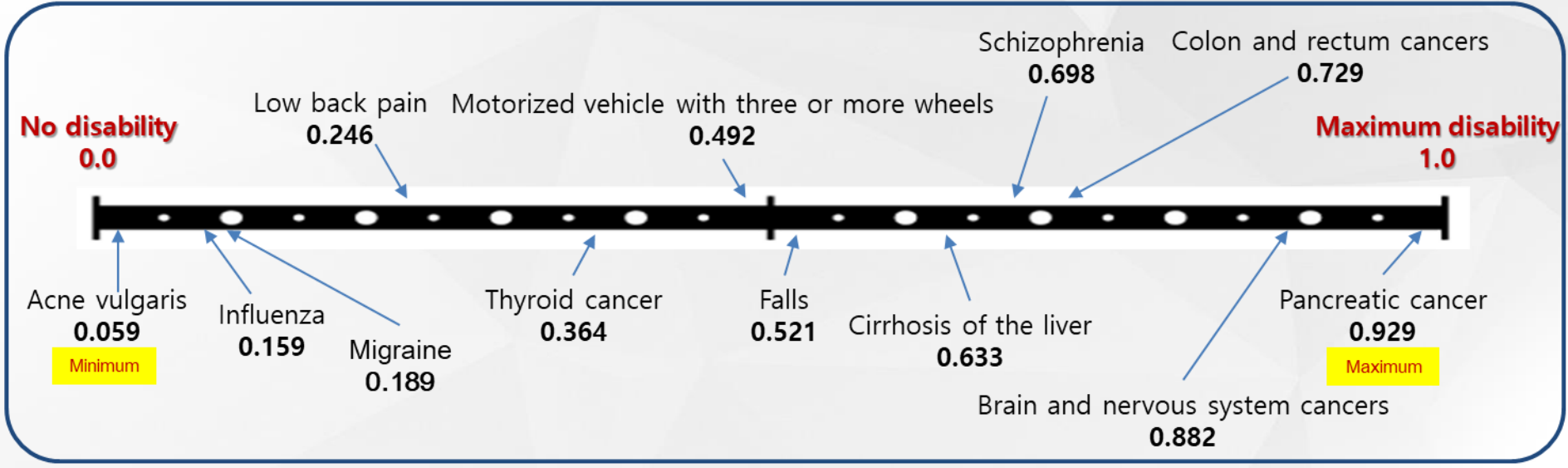
II. Methods

02. Disability Weights (DWs)

Questionnaire Please order in a better health condition.

Ranking 1	D
Ranking 2	E
Ranking 3	A
Ranking 4	C
Ranking 5	B

- A. Malaria
- B. Almost death
- C. Leukemia
- D. Diabetes mellitus
- E. Alzheimer's disease and other dementias



※ Reference:



III. Main findings



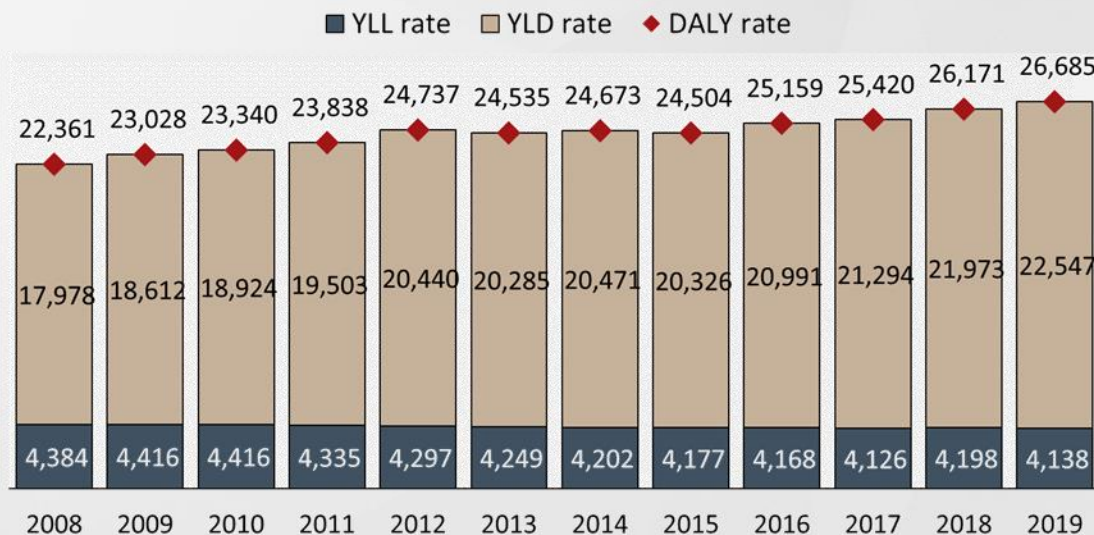
III. Main findings

01. Trend of the DALY rates in Korea, 2008-2019

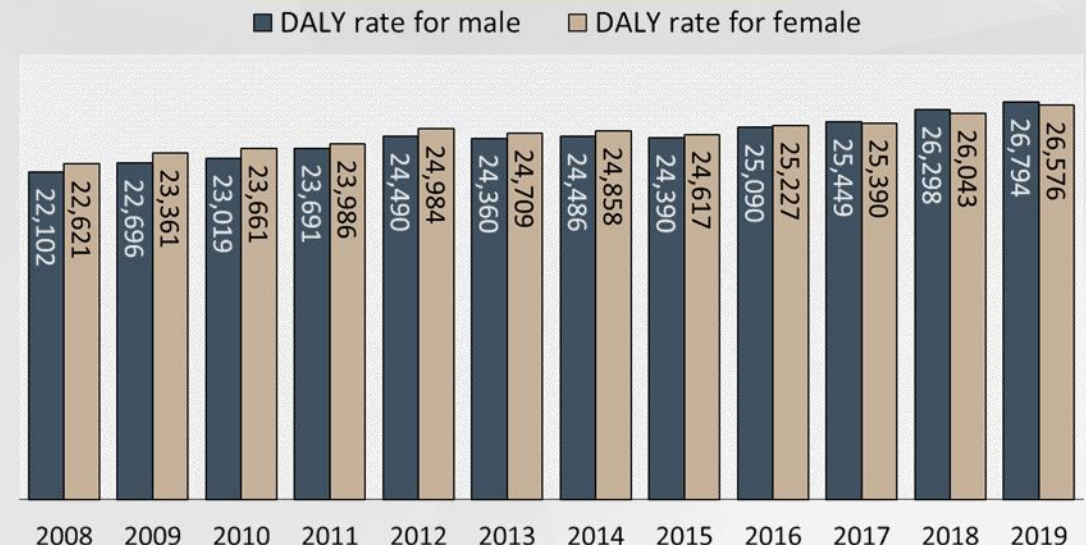
Trend of the DALY rates (per 100,000 population)

- ❖ The DALY rate is steadily increasing. From 2008 to 2019, the DALY rate increased 19.3%.
 - There was no significant change in the YLL rate; however, the YLD rate showed a tendency to increase during 2008-2018 → *The growth in the YLD rate is faster than that of the YLL rate*
 - In 2008, the DALY rate for men was lower than that for women;
 - as the gap between men and women gradually narrowed, in 2019, the DALY rate for men was 217 units higher than that for women

Distribution of YLL and YLD in 2008-2019



DALY rates by gender in 2008-2019

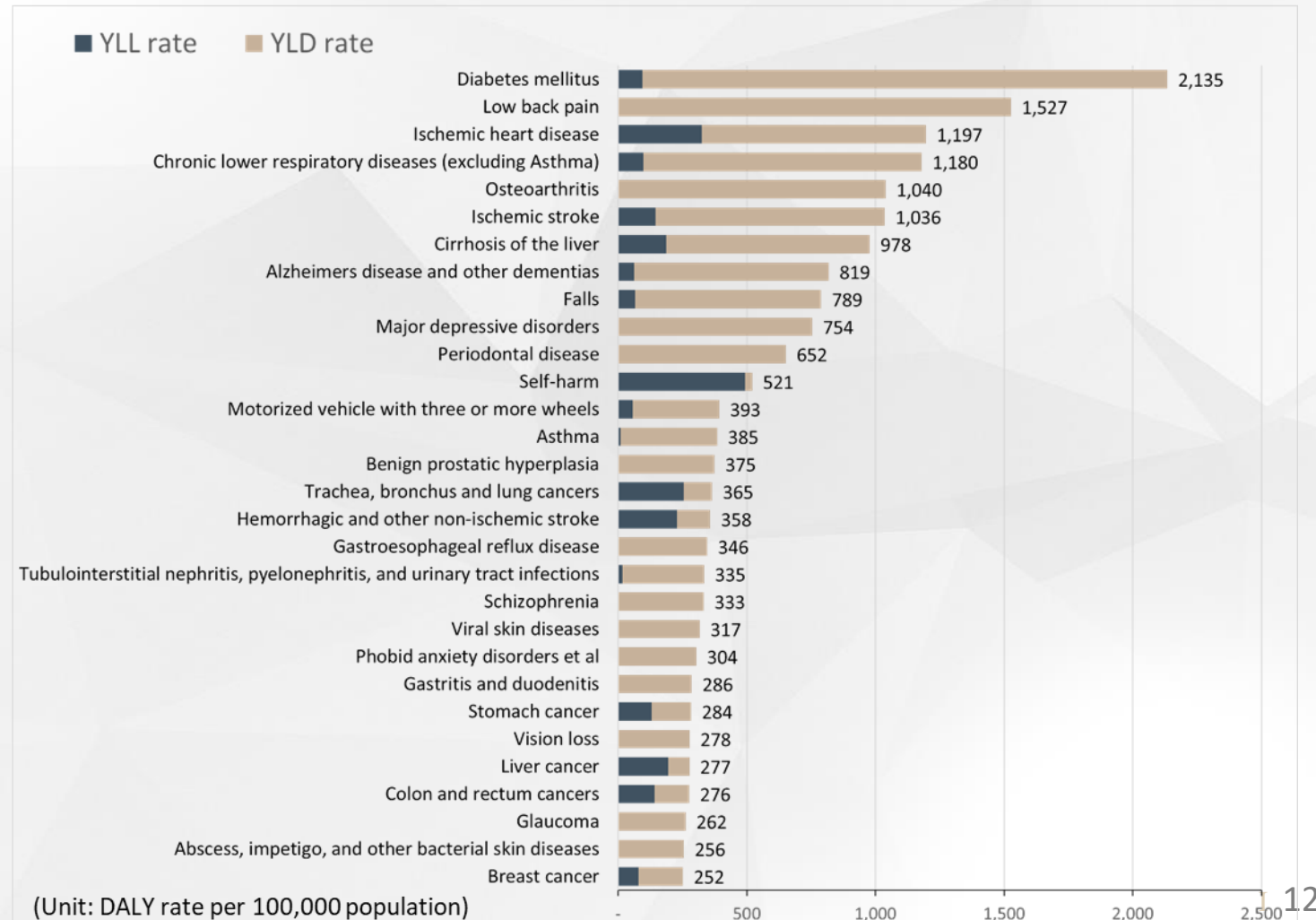


III. Main findings

02. Leading specific causes (levels 3 and 4) of DALYs, 2019

Top 30 leading specific causes of DALYs in South Korea, 2019

- ❖ The DALY rate per 100,000 population for **diabetes mellitus was the highest at 2,135 (8.0%)**, followed by low back pain at 1,527 (5.7%), ischemic heart disease at 1,197 (4.5%), chronic lower respiratory diseases (excluding asthma) at 1,180 (4.4%), and osteoarthritis at 1,040 (3.9%).
- ❖ **The DALY rates of the top five diseases accounted for 26.5% of the total burden of disease for Koreans in 2019, and that of the top 10 diseases accounted for 42.9%.**



III. Main findings

03. Leading specific causes (levels 3 and 4) of burden : 2008 vs. 2019



Rank change and rate of change for the top 30 leading specific causes of DALYs

❖ The changes over the past 11 years (2008-2019) for the 30 specific causes ranked at the top of the burden of disease in 2019 are as follows.

- Color refers to the change in DALY rate from 2008 to 2019: purple signifies an increase of more than 100%, blue signifies an increase of 50% or more but less than 100%, and green signifies a decrease.

Rank, 2008	Rank, 2019	Specific causes (levels 3 and 4)	DALY RATE (2008)	DALY RATE (2019)	Percentage change in DALY rate
1	1	Diabetes mellitus	1,658	2,135	28.7%
4	2	Low back pain	995	1,527	53.5%
5	3	Ischemic heart disease	835	1,197	43.3%
3	4	Chronic obstructive pulmonary disease	1,080	1,180	9.3%
8	5	Osteoarthritis	807	1,040	28.9%
7	6	Ischemic stroke	810	1,036	28.0%
6	7	Cirrhosis of the liver	831	978	17.7%
29	8	Alzheimer's disease and other dementias	203	819	303.3%
11	9	Falls	522	789	51.1%
12	10	Major depressive disorders	382	754	97.3%
23	11	Periodontal disease	289	652	125.7%
10	12	Self-harm	528	521	-1.2%
9	13	Motorized vehicle with three or more wheels	579	393	-32.1%
2	14	Asthma	1,115	385	-65.5%
37	15	Benign prostatic hyperplasia	164	375	128.5%
22	16	Trachea, bronchus and lung cancers	290	365	25.9%
15	17	Hemorrhagic and other non-ischemic stroke	362	358	-1.1%
30	18	Gastroesophageal reflux disease	194	346	78.4%
19	19	Tubulointerstitial nephritis, pyelonephritis, and urinary tract infections	340	335	-1.6%
17	20	Schizophrenia	344	333	-3.2%
39	21	Viral skin diseases	154	317	106.2%
33	22	Phobic anxiety disorders et al.	184	304	65.4%
13	23	Gastritis and duodenitis	373	286	-23.5%
20	24	Stomach cancer	333	284	-14.8%
48	25	Vision loss	128	278	117.7%
21	26	Liver cancer	316	277	-12.3%
25	27	Colon and rectum cancers	234	276	18.1%
52	28	Glaucoma	108	262	141.8%
24	29	Abscess, impetigo, and other bacterial skin diseases	251	256	1.8%
41	30	Breast cancer	149	252	69.8%

(Unit: DALY rate per 100,000 population)

III. Main findings

04. DALY rates by income level (2019)

DALY rates (per 100,000 population) by income level in 2019

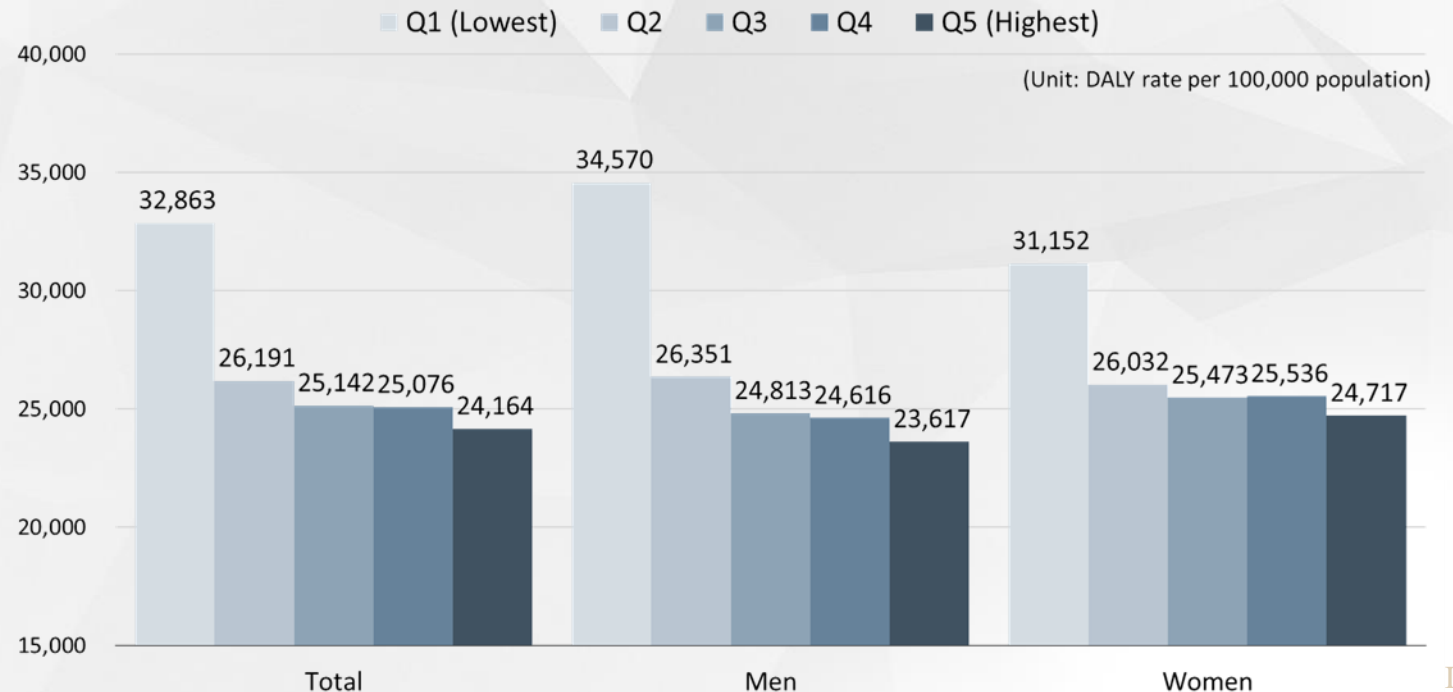
- ❖ *The burden of disease tends to decrease as the income level increases.*
 - DALY rate of 32,863 in the lowest income level (Q1), was **1.36 times higher** than that of the highest income level (24,164 per 100,000 in Q5)
 - For men, the difference in the DALY rate between Q1 and Q5 was 1.46 times, and for women, it was 1.26 times.

Method for calculation of DALY by income level

- *The insurance premium was adopted to calculate the income as a proxy indicator*
 - The NHIS scales insurance premiums based on subscribers' wages and incomes
 - We used ***an equivalized annual household income*** based on insurance premium in this study and divided it into quintiles by year and gender



$$\frac{\text{Annual Household Income}}{\text{Number of Household Member}^{0.5}}$$

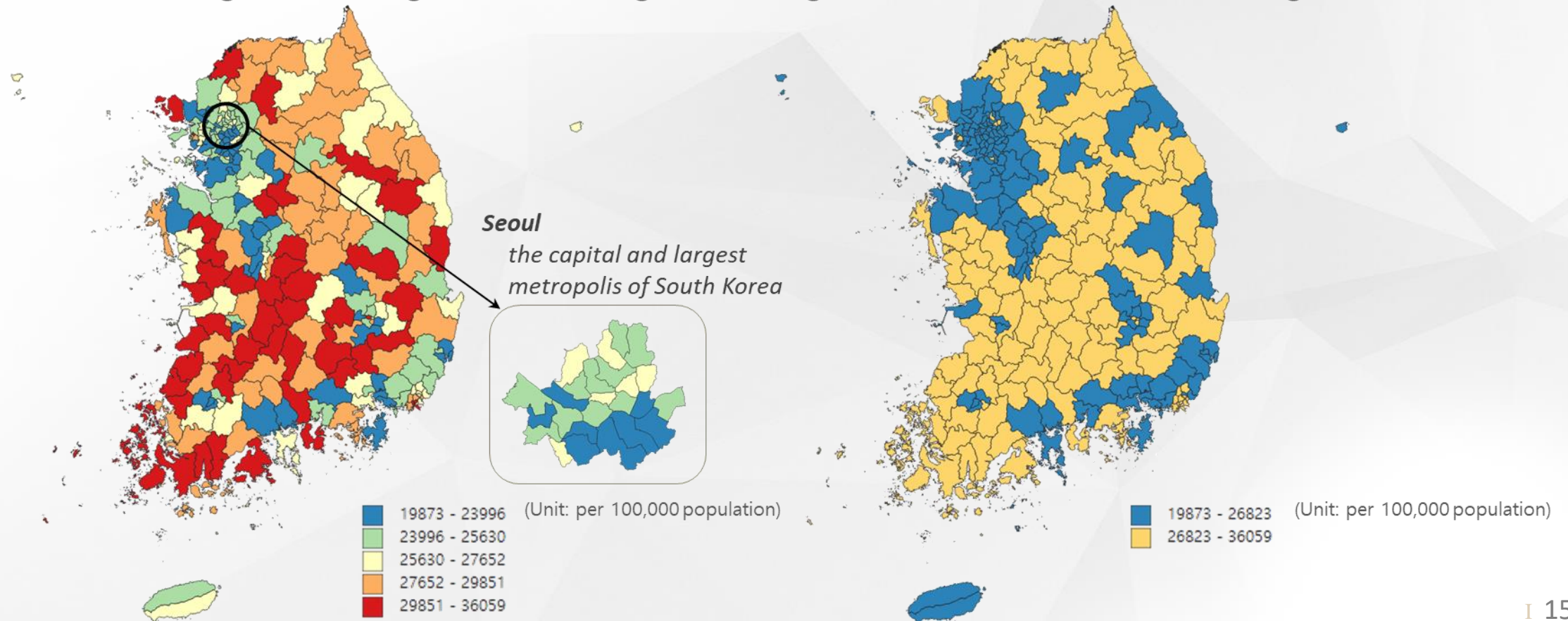


05. DALY rates by region (2019)



Sub-national DALY rate (divided into 250 administrative districts)

- ❖ *There was a 1.8-fold difference between the highest and lowest DALY rates*
- ❖ As of 2019, 122 regions were higher than the regional average DALY rate of 26,823, and 128 regions were lower.



06. Comparison of KNBD and GBD results

 DALY rates

	GBD result (GBD 2019)	KNBD (2019)
	Model-driven	Data-driven
Ranking	<ol style="list-style-type: none"> 1) Low back pain (1,338) 2) Diabetes type 2 (984) 3) Self-harm (977) 4) Other musculoskeletal disorders (882) 5) Lung cancer (839) <p>(DALY rate per 100,000 people)</p>	<ol style="list-style-type: none"> 1) Diabetes mellitus (2,135) 2) Low back pain (1,527) 3) Ischemic heart disease (1,197) 4) Chronic lower respiratory diseases (excluding Asthma) (1,180) 5) Osteoarthritis (1,040) <p>(DALY rate per 100,000 people)</p>
DALY rate	23,224 DALY per 100,000 people	26,685 DALY per 100,000 people
Perspective for the measurement of DALY	<ul style="list-style-type: none"> • YLL: Incidence-based • YLD: Prevalence-based 	<ul style="list-style-type: none"> • YLL: Incidence-based • YLD: Incidence-based
HALE	72.33 years	70.58 years



IV. Implications and Challenges



IV. Implications and Challenges

01. Implications

- Our findings on the burden of disease provide valuable and quantitative data for the prioritization and evaluation of prevention strategies and implementation of health policies.
 - ❖ can be use as useful data for community-centered (or customized) health promotion policies and projects for setting national health policy goals.

- We could measure DALYs by using our own methodology
 - ❖ various domestic epidemiological data at the individual level
 - ❖ know-how accumulated from past experience

- We expanded the scope of measuring the burden of disease at the national level
 - ↳ *by gender, age group, region, and income level*
 - ❖ confirmed the possibility of the KNBD study **to further subdivide the entire population**
 - ❖ enabled the **measurement of health level disparities** in the population

02. Challenges

1 Perspective for DALY: Incidence-based vs. prevalence-based

- ❖ DALY estimation of prevalence-based approaches for international comparisons
- ❖ Need research to estimate the distribution of health sequelae

2 Database for measuring non-fatal health losses

- ❖ In Korea, the coverage rate is high in the National Health Insurance System
 - However, mild illnesses (e.g., migraines) with high OTC prescriptions may be underestimated
 - In particular, it is necessary to consider whether diseases such as migraines are regarded as those that reduce healthy life expectancy
 - Using the survey results to estimate the prevalence of these diseases overestimates the burden of diseases

3 Identifying risk factors for the burden of disease by population group characteristics

- ❖ Identify effective interventions for each population group (by region, income level, etc.)
 - ➔ *Identify the most appropriate and cost-effective risk factor intervention to reduce the burden of disease on the entire population by performing data-driven simulations*





THANK YOU

