Comparative Study on the Hospitals Allocative Efficiency

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Outline

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I. Background and Goal

- <Practical background>Propriety of Public Efficiency evaluation

① Purpose of measuring efficiency of the public has not to be reflected in parameter selection for efficiency evaluation.
② Measuring efficiency without reflecting public goals can increase unfairness in budget allocation. ← More pay for hospitals that are already efficient in healthcare markets.

- <Methodological background> Identifying the efficiency effects of the Casemix-based Funding system (CbFS) by controlling for confounding variables

. ➔ The Outcome-Based Efficiency for the whole healthcare system is less clear.<Table 1>

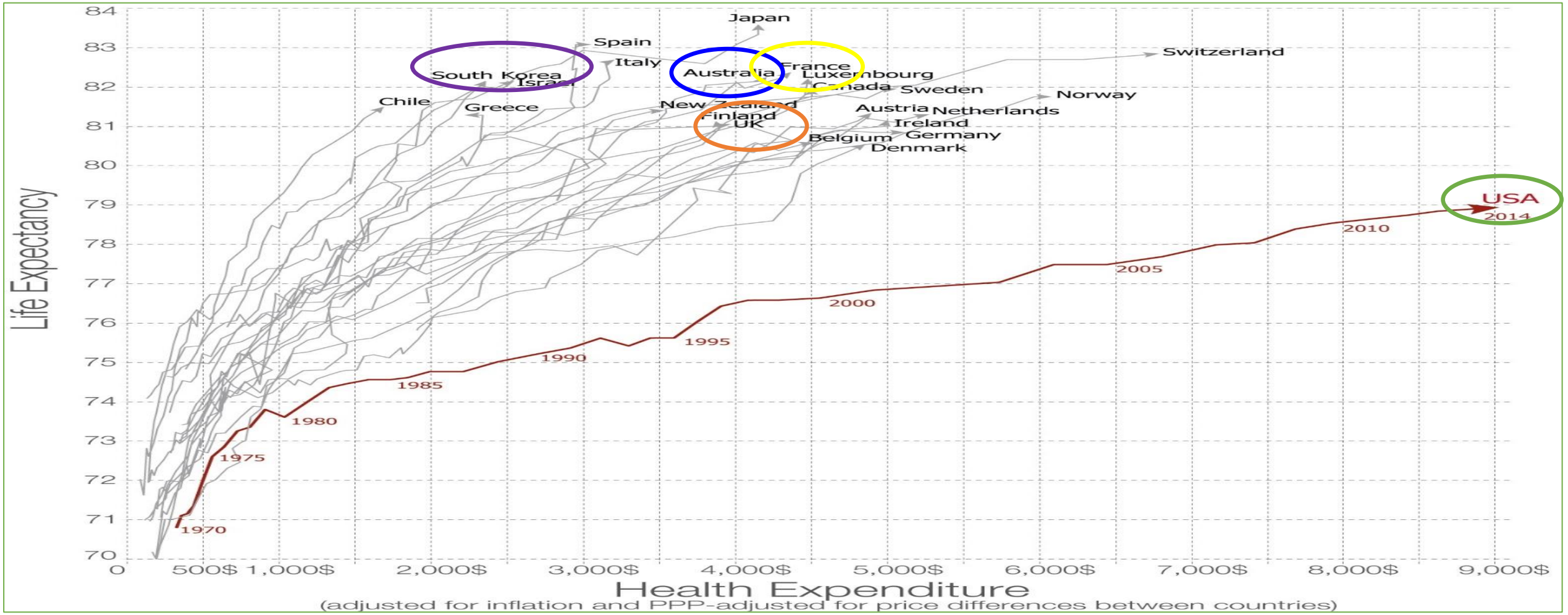
<Table 1. Efficiency frame in healthcare>

	Efficiency of overall of the health sector			
	Definitions	Measured by(indexs, datas)		
Efficiency	Maximization of health outcome with the least costly mix of health interventions.			
Outcome-based	Health status, Value in Health	utility, Pareto Optimality, willingness to Pay, etc	quality of life years (QALYs), EQ-SD, etc	life expectancy (disability - adjusted), Mortality, etc
Output - based	Intermediate products, Measurable results(benefits)	physics consultations , number of patients treated, etc	hospital discharges, length of stay(LOS), etc	productivity
Input	Resources used to deliver healthcare services	physical terms (number of physicians, hospital beds, devices, etc)	financial terms (healthcare spending, etc)	unit cost per DRG

* Source. Stephen Palmer et al.,(1999), Ghans,(2008), J Akazili et al(2008), WHO(2003, 2010), HIRA(2018, 2021)

※Example(Outcome-based efficiency analysis)

- The Outcome Based healthcare Efficiency shows a real INCREASE of life expectancy among OECD countries which started before application of DRG/CbFS and a total healthcare spending per capita (PPP) directly UNRELATED to the Output Based Hospital Efficiency changes.



Source. OECD (2023), *Health at a Glance Indicators 2023* https://images.app.goo.gl, Rodrigues et al.,(2024) in 2024 PCSI conference

[Research Goal]

This study explores Output based methods of defining efficiency used as criteria

for evaluating and paying hospital services from a public perspective,

not clinicians or hospital managers.

II. Method

- Conceptual descriptive study
- Data: International organizations(WHO, OECD, World Bank), and data released by country
- Period : before and after CbFS introduction in each country
- CbFS is divided into the Patient Classification System(PCS) and the Payment System for Acute Care(PSA).
- **Output efficiency** is defined Out based Efficiency indicators, which are determined in the context of each country's CbFS goals. <Table 2>

<Table 2. Variables for the Output based efficiency>

Input	Hospital expenditure	
Output	Volume and Accessibility	Doctor consultations per person
		Diagnostic exams of hospital unit(CT, MRI)
		Hospital discharge rates of Acute care
		Hospital Average length of stay of Acute care

※ Sources. https://data-explorer.oecd.org/, https://www.who.int/data

II. Method

- Categorization: **Two external factors which are related to efficiency in each country**, namely, **"Healthcare Market Environment" and "Prevailing Reimbursement Arrangement".** <Table 3> ,<Table4>

Healthcare Market Environments were made from ①Share of ownership types across countries(% of acute care beds) and ② Hospital profit-seeking activities

① Public owned hospitals(%,), Private Non-profit making (%) , Profit-making, privately owned hospitals(%) : France(66, 9, 25), UK(96,4,0), KOREA(5, 96, 0) , US(14.7, 49.2, 36.1), AU(92, ,10)

② Whether hospital behaviors profit-seekers or not

Prevailing Reimbursement Arrangements meant typical payment systems each country before implementations of CbFS

<Table 3. Efficiency evaluation frame >

Category	Healthcare Market Environment			
Prevailing Reimbursement Arrangement (pre CbFS)		Mean Market-based	Mean Public-based	Mixed-based
	Fee-for-service	Type Ⅰ. [Korea, US]	Type Ⅲ.	Type Ⅴ.
	Bundled Payments (Global budget, per diem)	Type Ⅱ.	Type Ⅳ. [England)]	Type Ⅵ. [France, Australia]

*Source. Alaxander Geissler et al.,(2012), W. Petewelch et al.,(2023), Conrad Koble et al.,(2009)

<Table 4. Objectives of PSA CbFS (France,Victoria) and PCS CbFS (UK,US,Korea) and Efficiency evolution>

		France 1996/2003*	UK(England) 1991/2003	USA 1965/1983	Korea 1991/1997***	Australia(Victoria) 1993/2012**
Catory (Type I ~TypeVI)		Type VI	Type IV	Type I		Type VI
Objectives of the CbFS		Budgetary allocation, Planning	Budgetary allocation, Planning		Volume Control (number of services)	Improving care quality, performance
			Increase transparency	Increase accessibility	Increase accuracy	Increase transparency
		Benchmarking (activity, cost)	Benchmarking (activity, cost)	Patient classification	Patient classification	Benchmarking (activity, cost)
			Patient satisfaction (Accessibility:Waiting time)		Reducing conflicts among stakeholders	Reducing the per capital cost of health care
What is Efficiency improvement?	Output (outcome)	Volume < ↑ >	**Volume < ↑ >**	Volume < ↑ >	**Volume < ↓ >**	N/A
		Equity < ↑ >	Equity < ↑ >	N/A	N/A	Equity < ↑ >
		N/A	Quality of Care< ↑ >	N/A	N/A	Quality of Care< ↑ >
	Input	Financial terms< ↓ >	Financial terms< ↓ >	Financial terms< ↓ >	Financial terms< ↓ >	Financial terms< ↓ >
		Physical terms< ↑ >	Physical terms< ↑ >	Physical terms< ↓ >	Physical terms< ↓ >	Physical terms< ↑ >

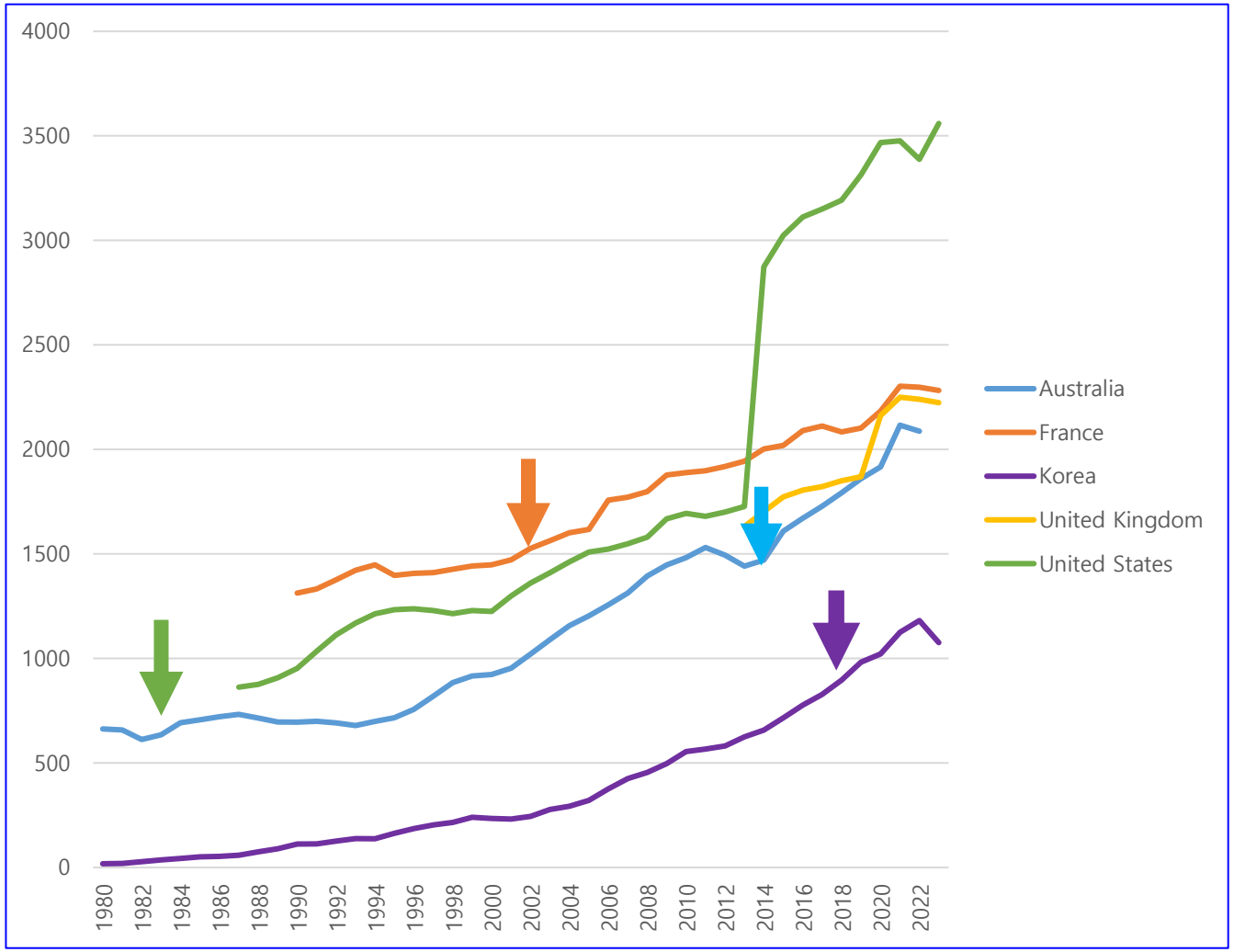
* The two years(/) are divided into the implementation periods for Patient Classification System(PCS) and Payment System for Acute Care(PSA), respectively.

** Australian PCS started in Victoria in 1993 and applied to the national level in 2012. (Duckett, 1995)

*** In 1997, South Korea launched a pilot project for a case payment system targeting seven diseases. From 2020, the New KCPS, covering all inpatient diseases, started to apply to private hospitals from public hospitals. .

III. Healthcare Spending(Inpatient of Hospitals,1983~2022)

- **Measure:** Expenditure US dollars per person, PPP converted, Constant prices, 2020
- **Health care provider**: Hospitals(General hospitals, Mental health hospitals, Specilized hospitals(other than mental health hospitals)
- **Mode of provision:** Inpatient
- **Financing Scheme**: Government/Compulsory schemes(Social health insurance schemes and Compulsory private insurance schemes



Medicare Inpatient Prospective Payment System (IPPS) launch year in the US(1983)

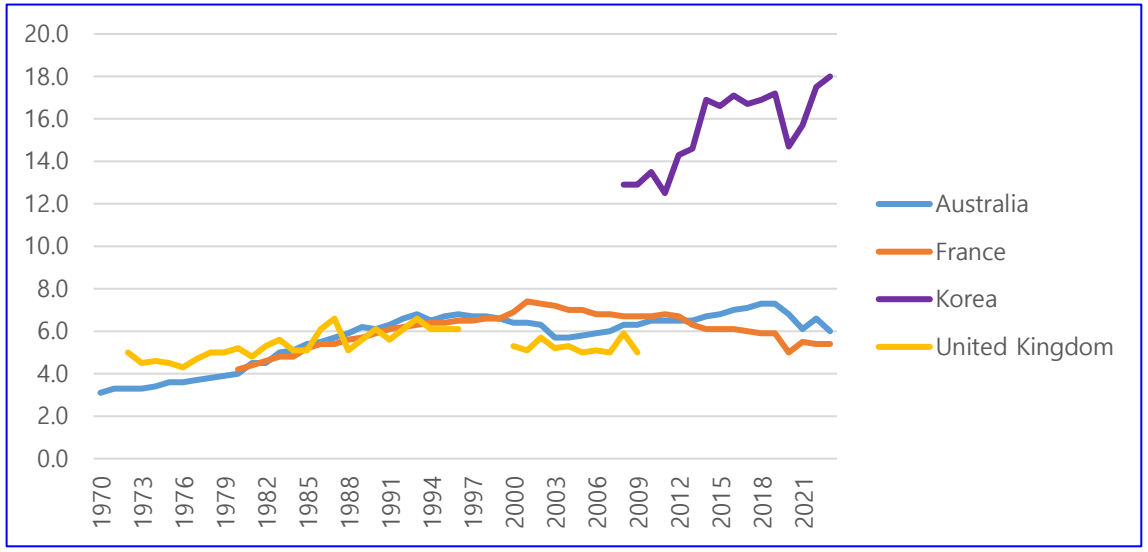
Tarification à l'Activité (T2A) and Payment by Results(PbRs) launch year in the United Kingdom and France(2003)

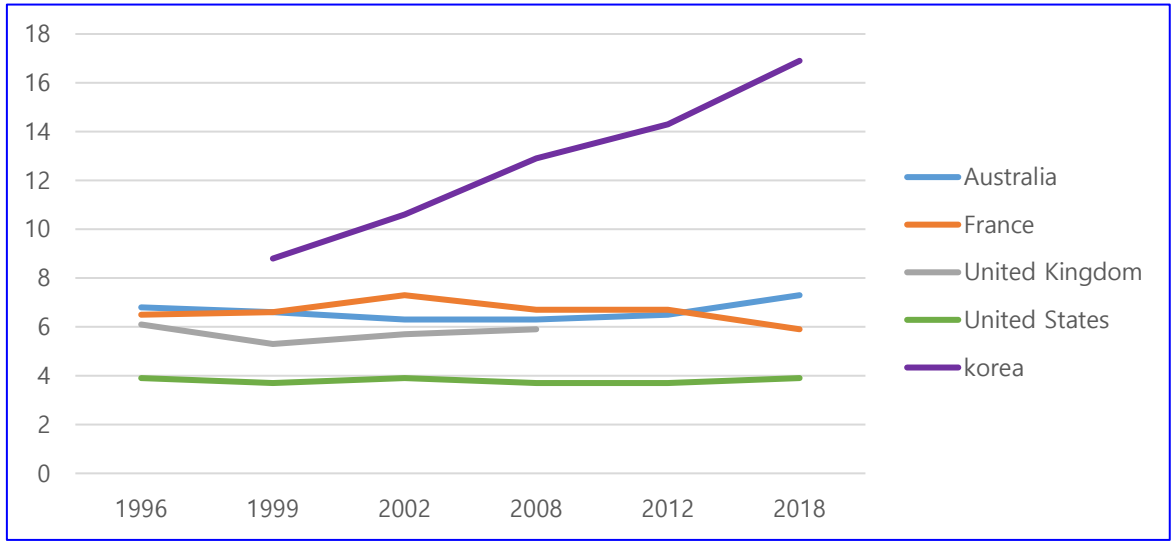
Activity-Based Funding (ABF) launch at federal level in Australia(2013)

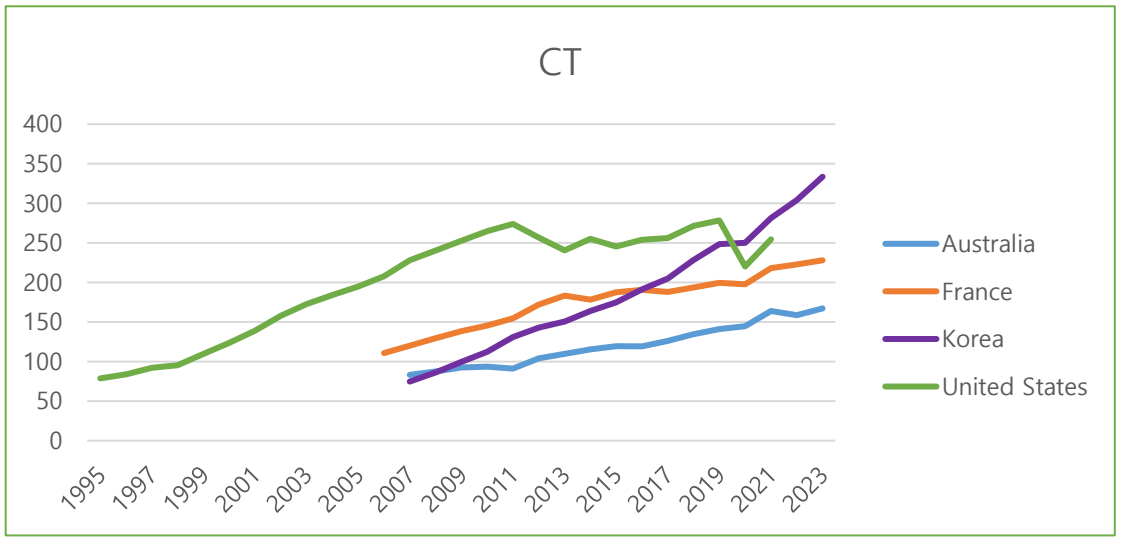
New Korean Case payment system(New KCPS) expand to private hospitals in Korea(2020)

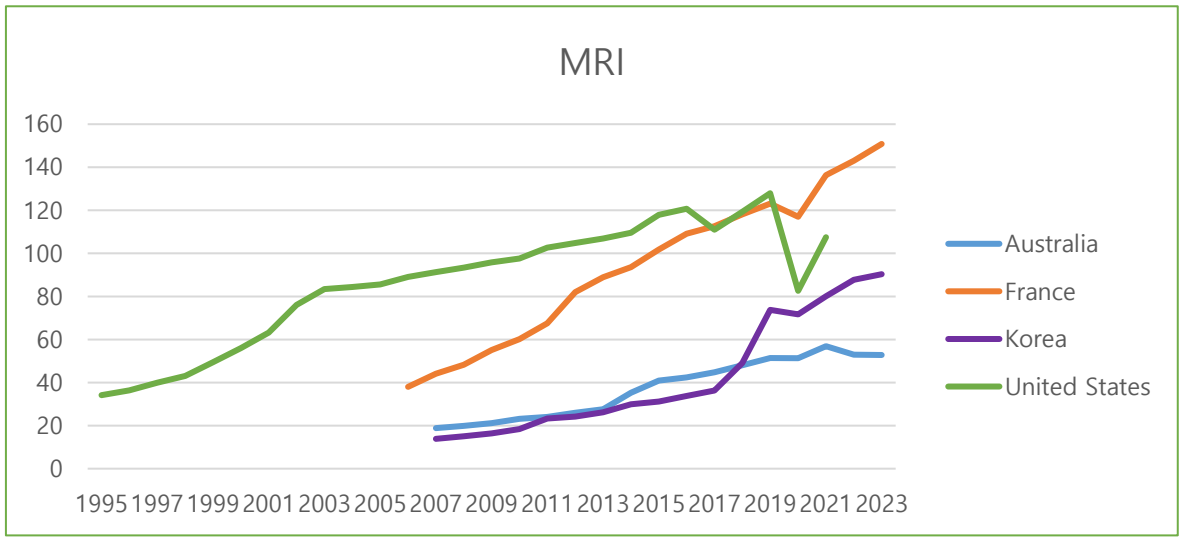
Source. https://data-explorer.oecd.org

III. Accessibility (Doctor consultation per person/ Diagnostic exams 1,000 per person)





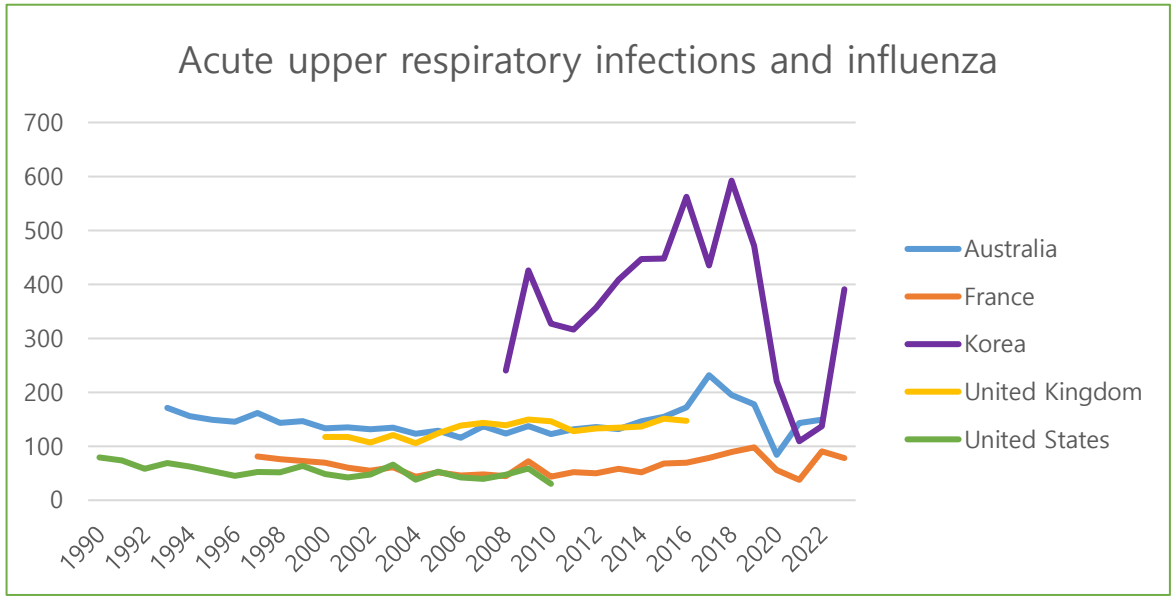


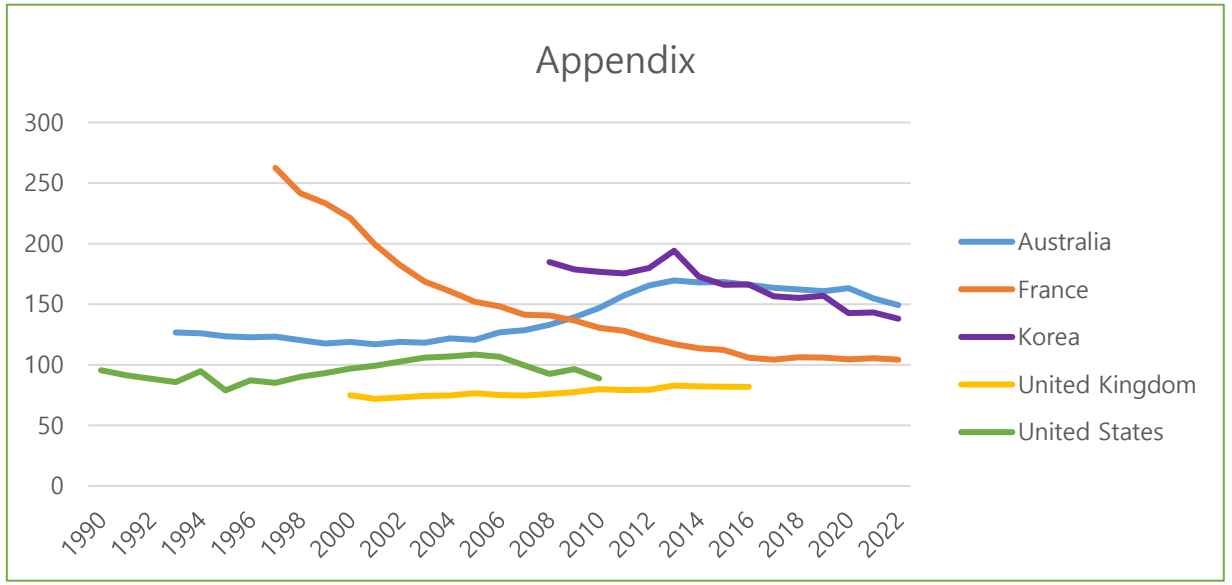


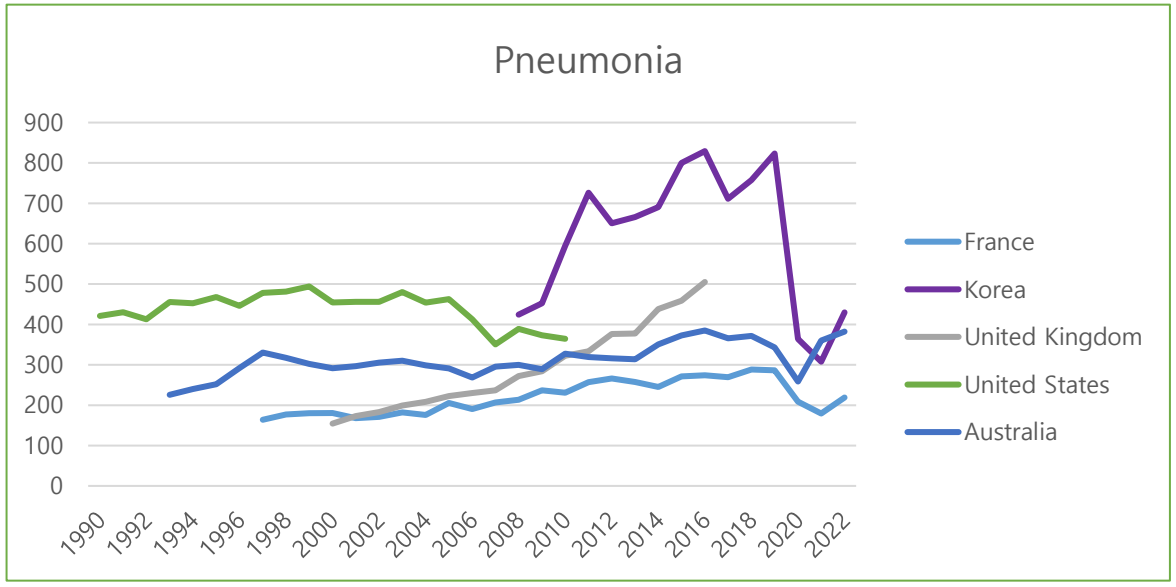
Source. https://www.oecd.org/en/data/indicators, https://dataexplorer.oecd.org

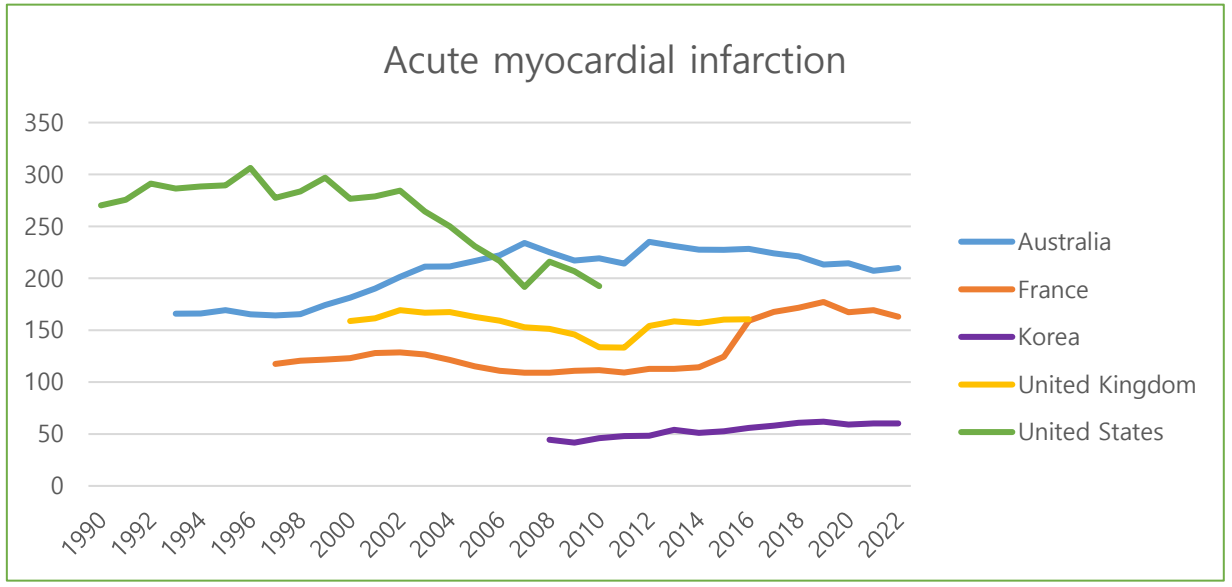
https://apps.who.int/nha/database/ViewData/Indicators

III. Volume(Hospital Discharges of Acute care diseases per 100,000 persons)

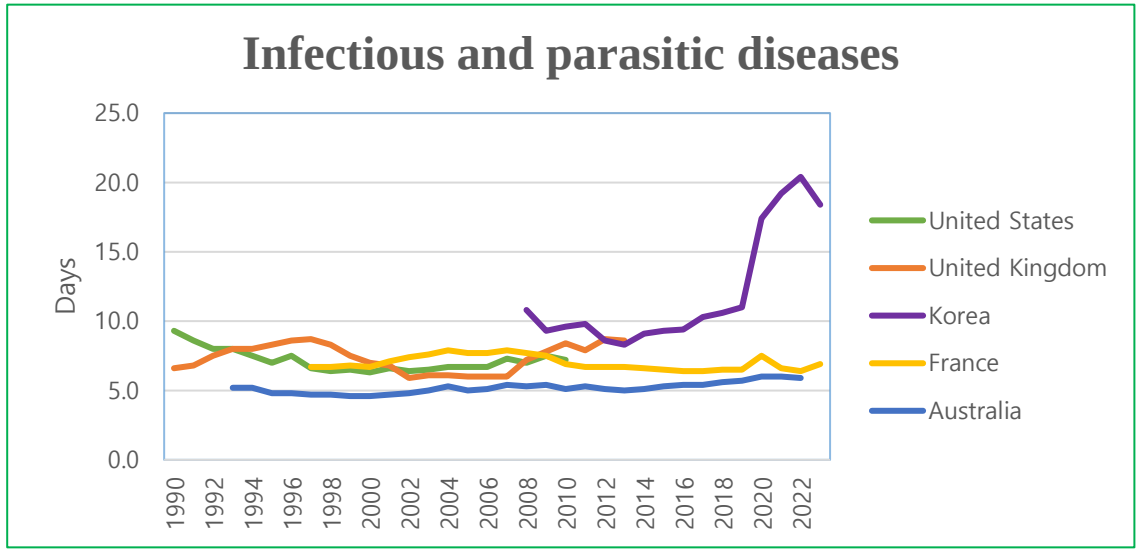


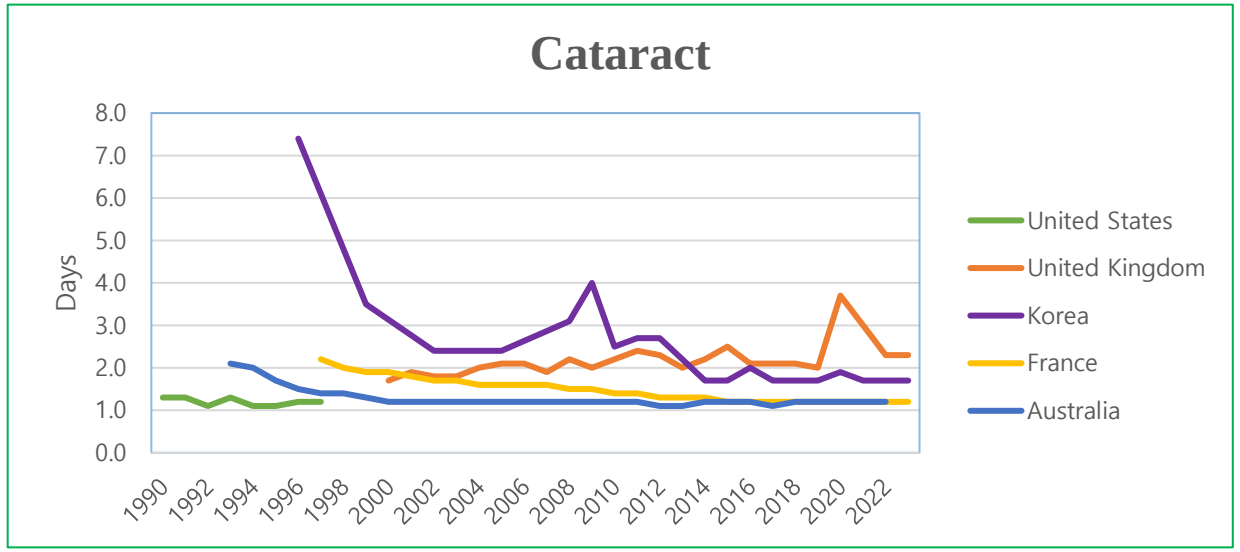


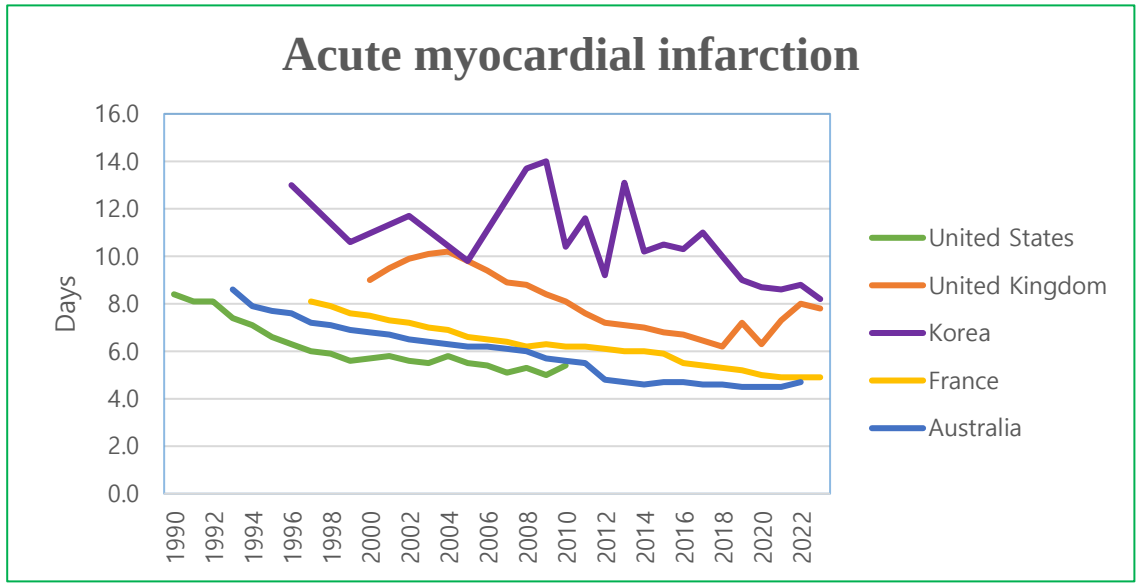


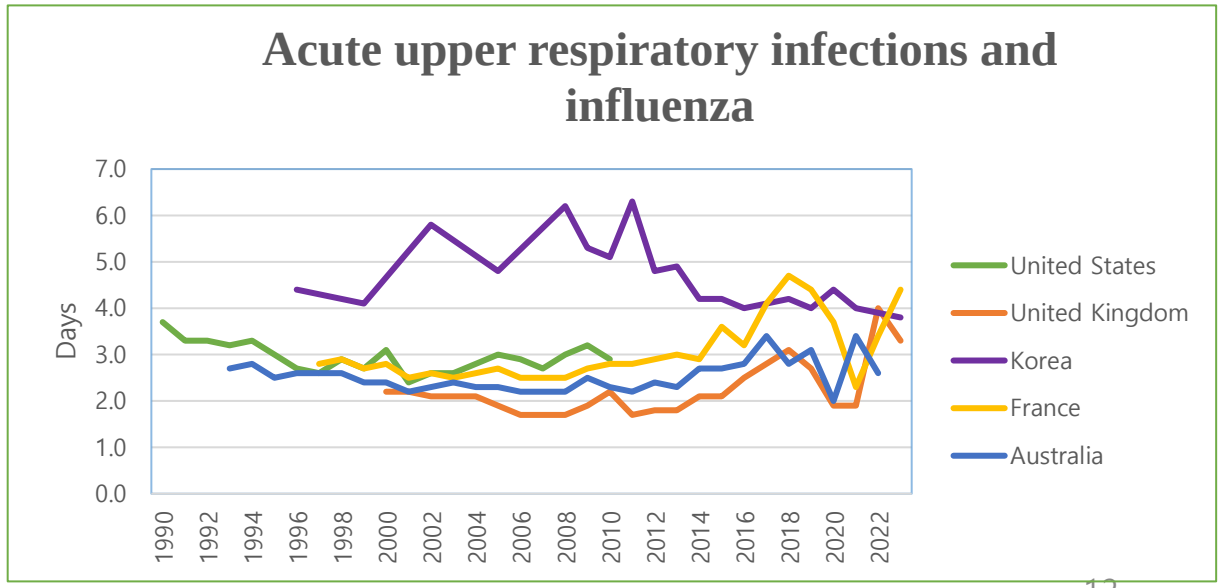


III. Volume(Hospital Average length of stay of Acute care)









Source. https://dataexplorer.oecd.org/

Ⅲ. Output Based Hospital Efficiency Measure

USA Medicare Output Based Efficiency

year	Medicare Total Hospital spending in BillionDollar 2022 (nominal Dollar)	Average LOS (days)	Total Medicare Hospital Spending Per capita in Dollar 2022 (total population in million)	Total Medicare Hospital Spending Per capita in Dollar 2022 PPP (GDP thousand billions)
1983	120,5 (40.9)	7.6	523 (230390)	4025 (3.6thousand Billions)
2022	353.2 (353.2)	5.1	1044 (338390)	1044 (25.4 thousand Billions)

Definition

1. Output : the variation 1983-2022 for ALOS in hospitals acute care inpatient

2. Input : the variation 1983-2022 of Total Medicare Hospitals spending per capita in Dollars 2022 adjusted for PPP

※ Sources

OECD https://www.oecd.org/en/data/indicators/length-of-hospital-stay.html

Nlm https://www.ncbi.nlm.nih.gov/books/NBK574438/

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World Bank, Population ages 65 and above for the United States [SPPOP65UPTOZSUSA], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SPPOP65UPTOZSUSA, September 26, 2024.

France Output Based Efficiency

year	Total hospitals spending in Billions Euros 2023 (nominal euros)	Average LOS(days)	Hospital Spending Per capita in Euros 2023 (population million)	Hospital Spending Per capita in Euros 2023 PPP (GDP thousand billions)
1996	62.2 (43.3)	7.1	1054 (59)	1718 (1.3thousand Billions)
2003	71.2 (51.2)	6.8	1165 (61.1)	1782 (1.6 thousand Billions)
2023	100.7	5.1	1472 (68.4)	1472 (2.8thousand Billions)

Definition

1. Output : the variation 1996-2023 for ALOS in hospitals acute care inpatient

2. Input : the variation 1996-2023 of Total hospital spending per capita in Euros 2023 adjusted for PPP

* Source
OECD https://www.oecd.org/en/data/indicators/length-of-hospital-stay.html
Drees:www.data.drees.sante.gouv.fr >etudes et résultats
INSEE: https://www.insee.fr>information Convertisseur Franc/Euro

Australia Output based Efficiency

year	Total Public Hospitals spending in Billion AU Dollar 2022 (nominal Dollar)	Average LOS (days)	Total public Hospitals Spending Per capita in AU Dollar 2022 (population in million)	Total public Hospitals Spending Per capita in AU Dollar 2022 PPP (GDP US Dollar 2023thousand billions)
2012	64.6 (51.3)	2.58	2847 (22.7)	3615 (1.98 thousand Billions)
2022	89.7 (89.7)	2.22	3371 (26.6)	3371 (1.73 thousand Billions)

Definition

- Qutput : the variation 2012-2022 for ALOS in public and private acute care inpatient hospitals

2. Input : the variation 2012-2022 of Total public and private Hospitals spending per capita in Au Dollars 2023 adjusted for PPP

※Sources
https://www.aihw.gov.au/hospitals/latest-updates-and-downloads/data

World Bank, Population ages 65 and above for the United States [SPPOP65UPTOZSUSA], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SPPOP65UPTOZSUSA, September 26, 2024.

UK(England) Output based Efficiency

year	Total hospitals spending in Billions Euros	Acute care LOS(days)	Healthcare Spending Per capita in Euros (population million)	Healthcaare Spending Per capita in Euros 2022 PPP (GDP thousand billions)
1991	52.4	10 ▼	480 (58)	1100 (1.1thousand Billions) ▲
2012	148	6 ▲	2800 (64)	3400 (2.7 thousand Billions)
2021	277	7.1	6500 (67)	5900 (3.1 thousand Billions) ▲

Definition

1. Output : the variation 1991 -2021 for ALOS in hospitals acute care inpatient

2. Input : the variation 2016-2023 of healthcare spending per capita in Euro 2022 adjusted for PPP

* Source

OECD https://www.oecd.org/en/data/indicators/length-of-hospital-stay.html

https://apps.who.int/nha/database/ViewData/Indicators/en

EUROSTAT

IV. Findings and Suggestions

	Output-based efficiency	Outcome-based efficiency
Measures	• Hospital spending per capita adjusted for inflation(or PPP) and Average Length Of Stay(ALOS)	• Total healthcare expenditure per capita(PPP) and Life expectancy
Results	• Hospital expenditure has decreased in the US, France and Australia since the introduction of the Payment System for Acute Care (PSA), whereas South Korea and the UK (England) have increased. • ALOS have decreased except UK(England) since 2012.	• Total healthcare spending is Top High for USA, Top Less for Switzerland, Norway, Middle for Canada, Australia, France and EU Less for Korea and UK. • Life expectancy is Top for Japan, Middle for France, Korea, Australia, Norway, Canada, Netherlands, EU, UK. Small for USA.

<Findings>

- Output-based efficiency vs. Outcome-based efficiency
- Volume and Accessibility : Type1 have increased, Type4 remained stable or have increase since start the CbFS.

<Suggestions>

- **Output-based efficiency frameworks** are encouraged for the evaluation of the hospital efficiency for public purposes.
- **Key considerations for public efficiency evaluation :** Healthcare market environment and Public goals each country
- **Need for Development of Output-based modelling:** Integration of national policy objectives and hospital resource use

Thank you for attention

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