

Development of a Hospitalization Appropriateness Screening Tool for Adult using Electronic Claim Data

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INTRODUCTION

- **Appropriateness of hospitalization** has been determined primarily through medical record review, which is considered gold standard.
- However, it has the disadvantage of being time-consuming and cost-consuming, making it difficult to produce regional or national results.
- On the other hand, **computerized screening tools** that have recently been developed **based on electronic claim data** may be less accurate, but can process **large amounts of data in a short period of time at low cost**.
- **South Korea** has been implemented a **universal health insurance system** called Korean National Health Insurance System since 1989 and the basic payment system is based on **fee-for-service**.
- The **medical services actually provided to patients** are collected electrically in much more detail while patients' diagnoses are collected with less precision.

AIM

- **Developing a hospitalization appropriateness screening tool** for adult in a form that can be **computerized** using electronic claim data
- Calculating the estimates of inappropriate hospitalization called **PIA (potentially inappropriate admission)** in South Korea

RESULTS

- Hospitalization appropriateness screening tool for adult has **four definitive** and **five presumptive criteria**.

Table 1. Nine criteria that makes up the hospitalization appropriateness screening tool

Criteria	Matched Electronic Data Interchange codes	Episode*
Definitive criteria		14.9%
D1 General anesthesia	L1211, L1212	10.2%
D2 Intensive care unit admission	AC6**, AC7**, AD1**, AD2**, AD3**, AD4**, AJ1**, AJ2**, AJ3**	3.6%
D3 Hospice ward admission	W****	0.0%
D4 Delivery related fees	R313*, R314*, R435*, R436*, R437*, R438*, R45**, R50**	2.1%
Presumptive criteria		81.7%
P1 Continuous vital sign monitoring	E6544, E6547, E6548, E7200, E7202, R7221. R7222, R7223, RC871, RC874	13.8%
P2 Arterial blood gas analysis	C381**, D040**, D041**	23.9%
P3 Mechanical ventilator	M085*, M086*, M5830, M5850, M5858, M5859, M5860	1.2%
P4 Intravenous injection	KK020, KK031, KK032, KK033, KK051, KK052, KK053, KK056, KK057, KK058, KK059	80.8%
P5 Intramuscular injection	KK010	5.8%

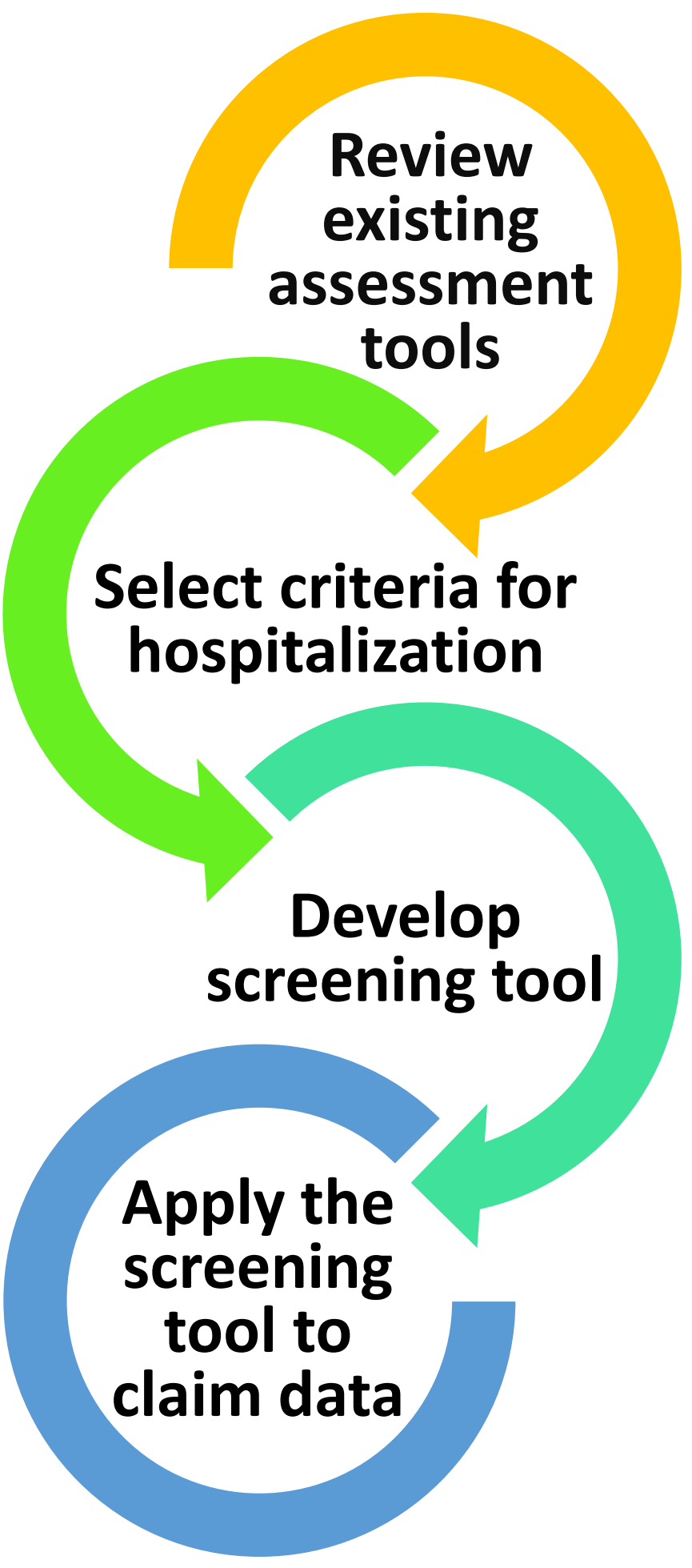
* Proportion of episodes which met each criteria

- **Appropriate hospitalization:** if one or more of the nine criteria for each hospitalization episode was met
- **Potentially inappropriate admission (PIA):** if no criteria were satisfied
- The **overall PIA rate** in South Korea increased slowly from 2017 to 2019 then increased sharply in 2020, the era of COVID-19 pandemic.

Table 2. Potentially inappropriate hospitalization rate in South Korea (2017-2020)

Variables		2017 (N=797,908)	2018 (N=815,654)	2019 (N=810,045)	2020 (N=720,891)
Age group	20-39	23.0%	23.6%	24.7%	29.5%
	40-64	11.6%	11.9%	13.0%	16.5%
	Over 64	5.7%	6.1%	6.8%	11.9%
Sex	Male	10.8%	11.2%	12.5%	17.0%
	Female	13.4%	13.4%	13.9%	18.1%
Insurance	National Health Insurance	12.8%	13.0%	13.8%	18.1%
	Medical aid	5.8%	5.4%	5.7%	10.5%
Total		12.3%	12.4%	13.3%	17.6%

METHOD



- Appropriateness Evaluation Protocol**
: relatively clearly presents the standards for medical services provided to patients
- Procedures needs general anesthesia or admission
 - Close or invasive monitoring
 - Intravenous injection or hydration
 - Intramuscular antibiotics injection more than 3/day
 - Continuous or intermittent mechanical ventilator
- 4 Definitive criteria:** must need hospitalization
5 Presumptive criteria: might need hospitalization
- Linking Electronic Data Interchange codes to each criteria**
- Potentially Inappropriate Admission rate at national level**
: applying the screening tool to inpatient sample dataset based on Korean National Health Insurance claim data

CONCLUSIONS

- The adult hospitalization appropriateness screening tool developed in this study **estimated the patient's condition based on the medical services** actually provided to the patient.
- **Potentially inappropriate admission rate in South Korea** estimated in our study was about **13%** and similar to the result of previous studies using gold standard methods (chart review by healthcare professionals).
- However, if this tool is used for **evaluation and compensation** by institution, there are concerns about **side effects** such as changes in provider behavior and threats to patient safety.
- It is desirable to use this screening tool to **establish the foundation for policies** to reduce unnecessary hospitalizations and to **evaluate policy effectiveness**.

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