

AN EVALUATION OF TAIWAN’S NHI PHARMACLOUD SYSTEM FROM THE PERSPECTIVE OF ANTIBIOTIC STEWARDSHIP

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INTRODUCTION

More and more countries are implementing antimicrobial stewardship programs due to the serious global issue of antimicrobial resistance. In 2013, Taiwan introduced the National Health Insurance (NHI) PharmaCloud System to improve drug safety and reduce duplication. However, only a limited number of local studies have evaluated the effectiveness of this system from a nationwide perspective.

OBJECTIVE

This study aims to analyze trends and impacts on antibiotic prescription rates following the implementation of the NHI PharmaCloud System, particularly in clinics with high antibiotic use.

METHOD

We analyzed retrospective and longitudinal data from the NHI Administration’s Healthcare Quality Information Disclosure Platform on nationwide antibiotic prescription rates from 2006 to 2024. A Difference-in-Differences (DID) approach was used within a linear regression to examine trend effects in our study. Additionally, Generalized Estimating Equations (GEE) were employed to account for repeated measures across clinics and to assess the system’s impact on antibiotic use.

RESULTS

Among 7,364 clinics, the findings show that there was a significant effect of implementing the NHI PharmaCloud System for antibiotic stewardship ($\beta = -0.008$, $P < 0.001$), initially; however, this benefit diminished over time ($\beta = 0.002$, $P < 0.001$), indicating limited long-term effectiveness across all clinics. Nonetheless, antibiotic use rates decreased by 0.001 per year ($P < 0.001$) as the intervention progressed in public clinics, and the intervention’s impact was more pronounced in clinics with high antibiotic use ($\beta = -0.030$, $P < 0.001$).

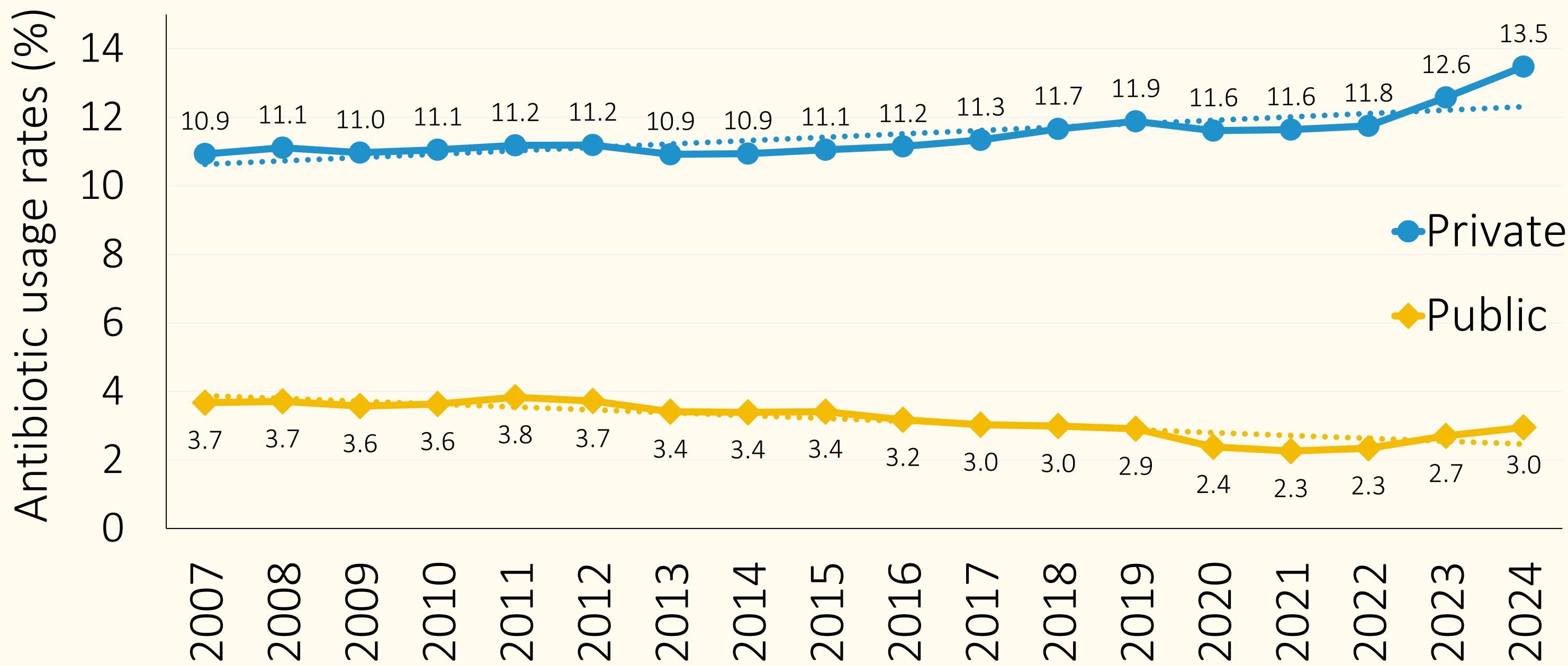


Figure1. The antibiotic usage rates by year.

Table1. Summary of study subjects.

	N/Mean	%/SD
Total	7,364	
Clinic characteristics		
Specialty	4,404	59.8
Ownership		
Public	381	5.2
Private	6,983	94.8
Location		
Taipei	2,016	27.4
Northern	961	13.0
Central	1,647	22.4
Southern	1,215	16.5
Kaoping	1,347	18.3
Eastern	178	2.4
Rural area		
Urban	5,661	76.9
Rural	1,559	21.2
Remote	144	2.0

Table2. The effect of the basic model and the sensitivity models.

	All	Public	Private
PharmaCloud (ref: before)	-0.008**	-0.002	-0.008**
Trend	0.002**	-0.001**	0.002**
Usage level (ref: low)	0.117**	0.122**	0.118**
PharmaCloud*Usage level	0.008**	-0.03**	0.008**
Clinic characteristics			
Specialty (ref: no)	0.027**	0.011*	0.028**
Private ownership (ref: public)	0.026**	-	-
Location (ref: Taipei)			
Northern	-0.012**	-0.007	-0.012*
Central	-0.014**	-0.009*	-0.014**
Southern	-0.02**	-0.016**	-0.02**
Kaoping	-0.024**	-0.008*	-0.025**
Eastern	-0.021**	-0.006	-0.023**
Rural area (ref: no)			
Rural	-0.007**	0.011**	-0.009**
Remote	0.001	0.028**	-0.008

*P<0.05; **P<0.001

CONCLUSIONS

The benefits of the NHI PharmaCloud System are evident primarily in public clinics, with limited impact observed in private clinics. Nevertheless, this study offers evidence supporting the potential of antibiotic stewardship efforts. From a policy perspective, given the limited influence on private clinics, we recommend that health authorities enhance education and awareness campaigns on appropriate antibiotic use within the private sector.

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