

Background

Access to safe, effective and affordable medicines is crucial for enhancing health outcomes and achieving universal health coverage.

The World Health Organization (WHO) has introduced the concept of essential medicines since 1975 to address the population priority of healthcare needs on medicines.

China has launched National Essential Medicines Policy (NEMP) In 2009, as a key component of healthcare system reform to realize universal health coverage for all citizens. However, the long-term impacts of NEMP in remote and rural China are under-investigated.

This study aims to examine the long-term sustainability of NEMP on drug availability, affordability, and usage in a rural county in Southwestern China.

Materials and Methods

Study Design and Setting

We used a quasi-experimental design to investigate the long-term trends in drug availability, price and usage after NEMP (2012-2017), considering the impacts of second-stage policies.

The study focused on a rural, remote, and poverty-stricken county in Yunnan province, southwestern China, as an exemplary sample to study NEMP as a complex social intervention at a micro-level

Policy

The implementation of NEMP in the selected county unfolded in two stages.

- In the initial stage (2010.9-2015.10), targeted all primary care facilities, introducing centralized procurement, mandatory use of essential medicines (100%), and the zero-markup regulation on retail prices.
- The second stage (2015.11-2016.7), expanded NEMP to secondary care facilities, including centralized procurement, mandatory use of essential drugs (>50%), and zero-markup regulation.

Data Collection

Data were price and retail price of medicines. collected from all primary care facilities in the county (7 THCs and 71 village clinics). Drug procurement records from July 2012 to June 2017 were extracted from the provincial electronic centralized procurement system. A total of 113,482 purchase records were included in the analysis.

Materials and Methods

Drug Categorization

Medicines were categorized by:

- (1) *Policy properties* (essential: 430; non-essential: 45);
- (2) *Ingredient types* (western/chemical/biological: 236; TCM: 239)
- (3) *Therapeutic attributes*, according to the Anatomical Therapeutic Chemical (ATC) system.

In total, 338 unique western medicines (essential: 318; non-essential: 20) and 312 unique TCMs (essential: 286, non-essential: 26) were analysed.

Outcome Measures

The availability of medicines was quantified by the number of medicines accessible in healthcare facilities. Drug usage was measured by sales in monetary value, and drug prices were traced by the drug price index (DPI). Three commonly used DPIs were calibrated:

DPI-L measures the ratio of prices in different periods, weighted by the consumption quantity in the baseline period.

$$L_p = \sum P_1 Q_0 / \sum P_0 Q_0$$

DPI-P is weighted by the consumption quantity in reporting periods, assuming changes in quantity occur once after the changes in price.

$$P_p = \sum P_1 Q_1 / \sum P_0 Q_1$$

DPI-F is therefore used to mitigate these biases, by averaging the changes in baseline and reporting periods.

$$F_p = \sqrt{L_p \times P_p}$$

Statistical Analysis

Interrupted time-series analysis (ITSA) was applied to examine the immediate and sustained impacts of NEMP on different outcomes.

In ITSA, data were analysed quarterly (20 observation points between 2012.7-2017.6), Segmented linear regression models were built with two interruption points:

$$Y_t = \beta_0 + \beta_1 T + \beta_2 X_{1,t} + \beta_3 T X_{1,t} + \varepsilon_t$$

where Y_t denotes the outcome in quarter t , T denotes the time point since observation, and $X_{1,t}$ and $X_{2,t}$ denote whether the first-stage and second-stage policy has been implemented at T (coded 0 or 1).

Group differences by facility levels (THCs vs village clinics) and medicine types (western vs TCMs) were examined by two-group ITSA.

Results

Availability of medicines

The number of available medicines increased during 1st-stage NEMP but decreased after the 2nd-stage, varying by facilities and medicines.

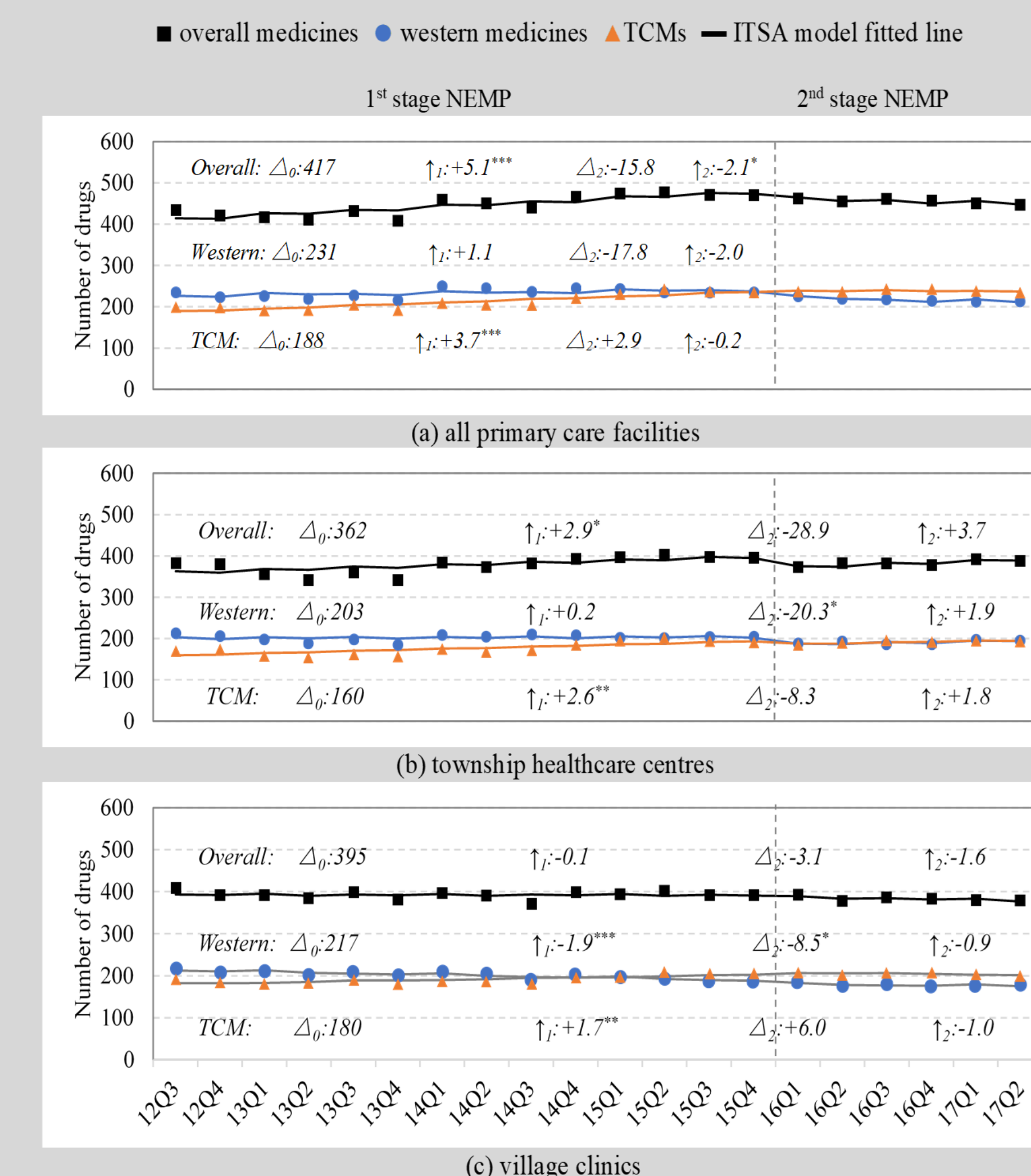


Figure 1. Number of medicines by facility level and essential medicine type

Sales of medicines

Overall drug expenses in primary care facilities kept steady with no significant trends over the observation period. There was a non-significant and abrupt increase (+15.9%) after 2nd-stage NEMP, mainly occurring in THCs. No significant difference in the sales trend was detected by facility levels

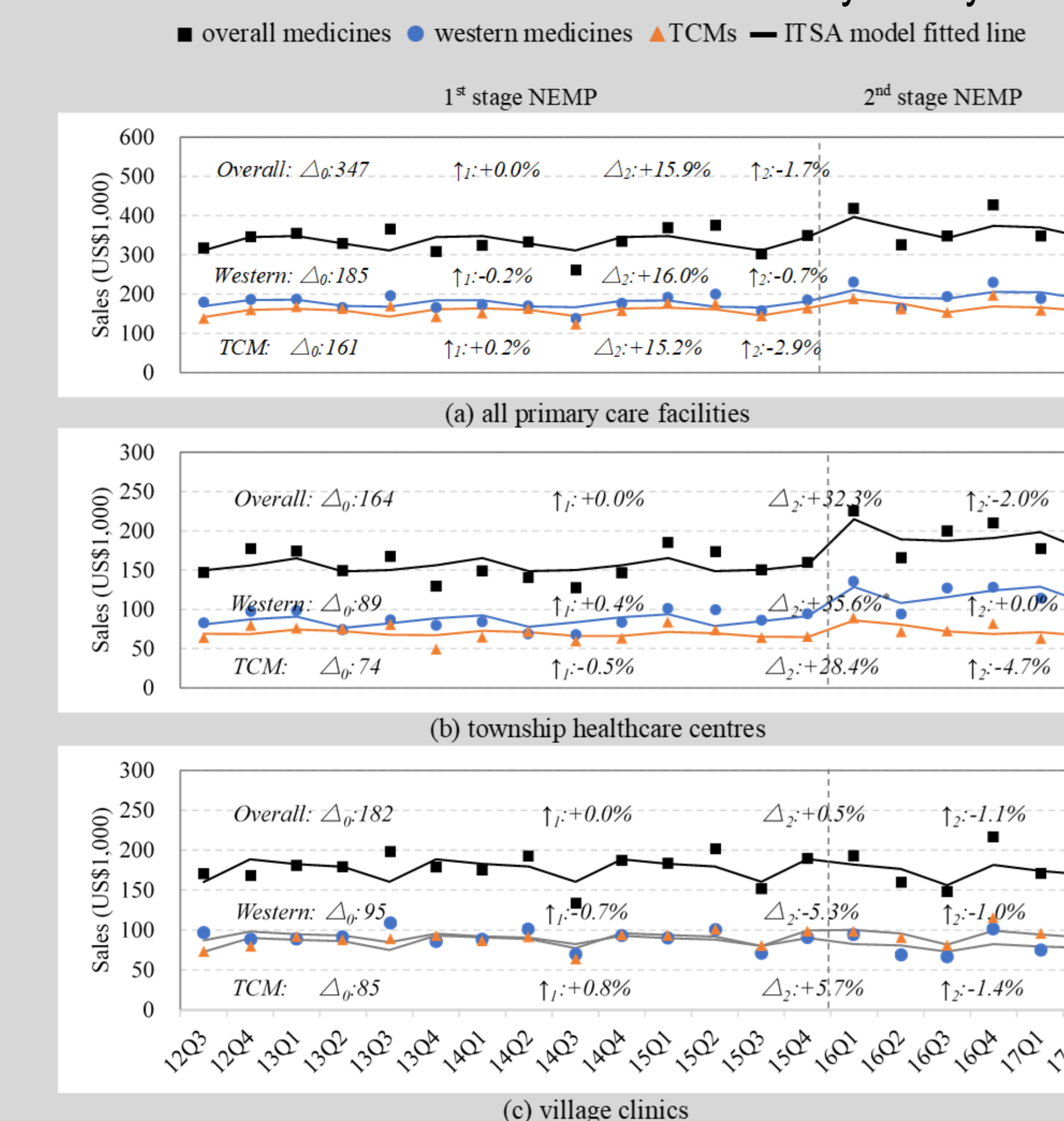


Figure 2. Sales of medicines by facility level and essential medicine type

Results

Price of medicines

Overall DPI in the primary care system witnessed long-term increases (+0.2% per quarter, $P=0.016$) during both NEMP stages. Village clinics showed a significantly higher growth rate than THCs, especially in western medicines. Western medicines in village clinics also encountered significantly higher price rises than TCMs.

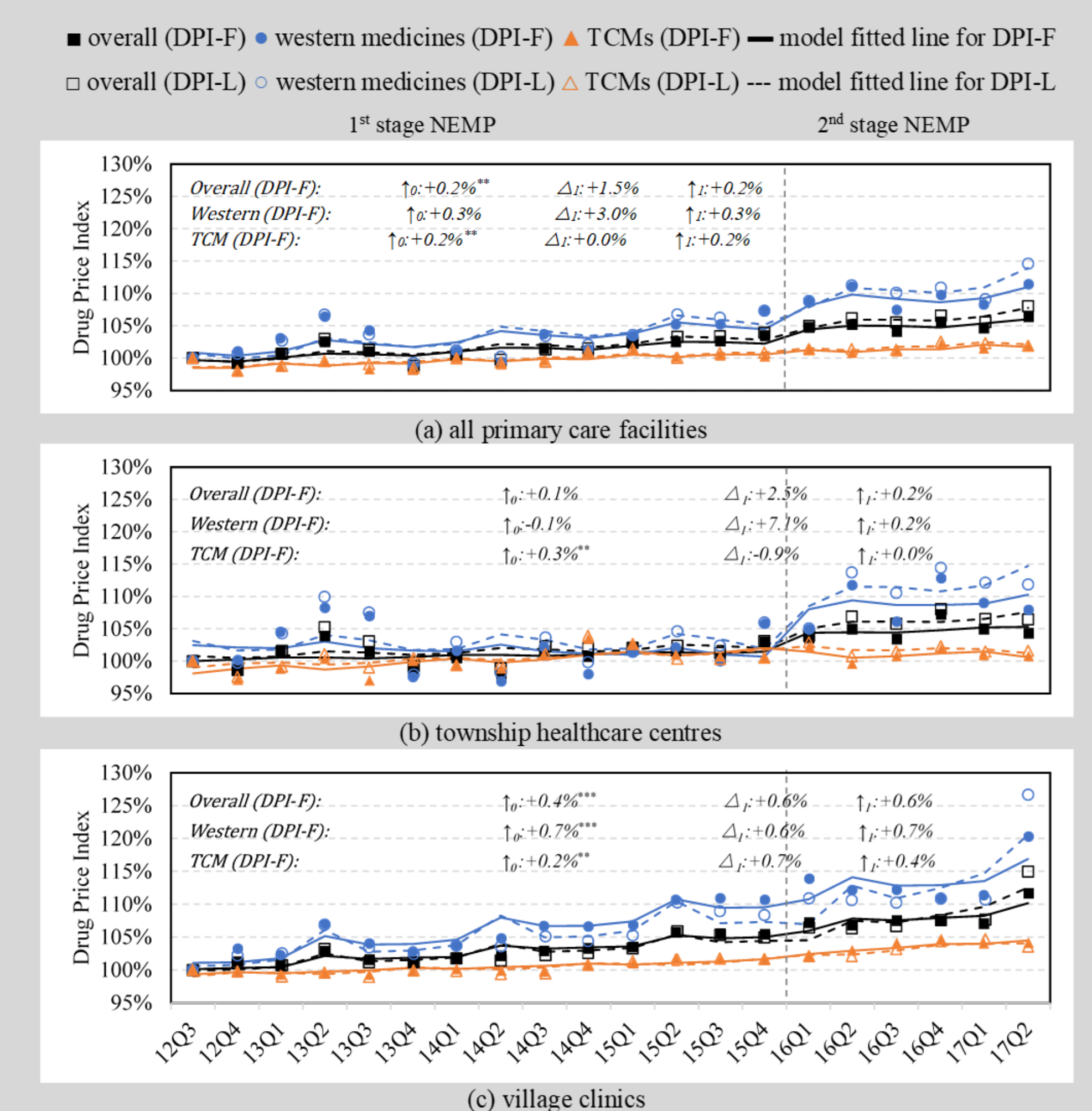


Figure 3. Retail price of medicines by facility level and essential medicine type

Discussion & Conclusion

- The overall availability and usage of essential medicines in the rural primary care system in southwestern China remained steady during the long-term implementation of NEMP, with mild increases in prices.
- Meanwhile, notable discrepancies and structural changes emerged across different facility levels and medicine types. TCMs showed greater improvements in availability and smaller price rises compared to western medicines. Village clinics faced more severe challenges of the continuously decreases in the availability of western medicines and distinct price hikes.
- Further policy adaptations should address the uneven long-term impacts of NEMP.

Contact information

Poster Presenter
Dr. Xuechen Xiong
The University of Hong Kong
Email: xuechen@hku.hk

