

# Electronic medical record-embedded clinical decision support decreases inappropriate duration of antibiotics for outpatient pediatric skin and soft tissue infection

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## BACKGROUND

- Most antibiotics are prescribed in ambulatory settings.
- Up to 50% of ambulatory antibiotic prescriptions are unnecessary or inappropriate.
- Studies of ambulatory stewardship interventions have primarily targeted respiratory infections.
- We investigated the impact of an electronic medical record (EMR)-embedded clinical decision support tool on antibiotic duration for outpatient pediatric skin and soft tissue infection (SSTI).

## METHODS

**Interventions:** Our Ambulatory Antimicrobial Stewardship Program implemented stepwise interventions to improve antibiotic prescribing for SSTI:

- Primary Intervention
  - December 2020: Creation of SmartSet (EMR-embedded tool with a templated progress note and antibiotic guidance based on institutional SSTI treatment guidelines) for pediatrics only
- Other Interventions in the study period
  - July 2019: Institutional SSTI treatment guidelines created for both adult and pediatrics
  - May 2020: SSTI education for pediatrics only
  - May 2021: Tableau dashboard with prescribing data visible to ambulatory providers (adult and pediatrics) with additional education and introduction to dashboard for pediatrics only

### Study population:

- Pediatric (<21 years) and adult (≥21 years) patients prescribed antibiotics for SSTI at a Michigan Medicine ambulatory primary care or surgery clinic (in person, virtual, or telephone visits)

### Study period:

- Pre-intervention: 7/1/2019 – 12/31/2020
- Post-intervention: 1/1/2021 – 12/31/2021

## METHODS

### Outcome:

- Appropriate duration of antibiotic treatment (≤7 days) for pediatric and adult SSTI

### Statistical analysis:

- Inappropriate antibiotic duration for SSTI in pediatric patients was compared pre- and post-primary intervention with interrupted time series (ITS) analysis of aggregate quarterly data.
- The trend in adult antibiotic duration was modeled with linear regression.

## RESULTS

### Pediatric:

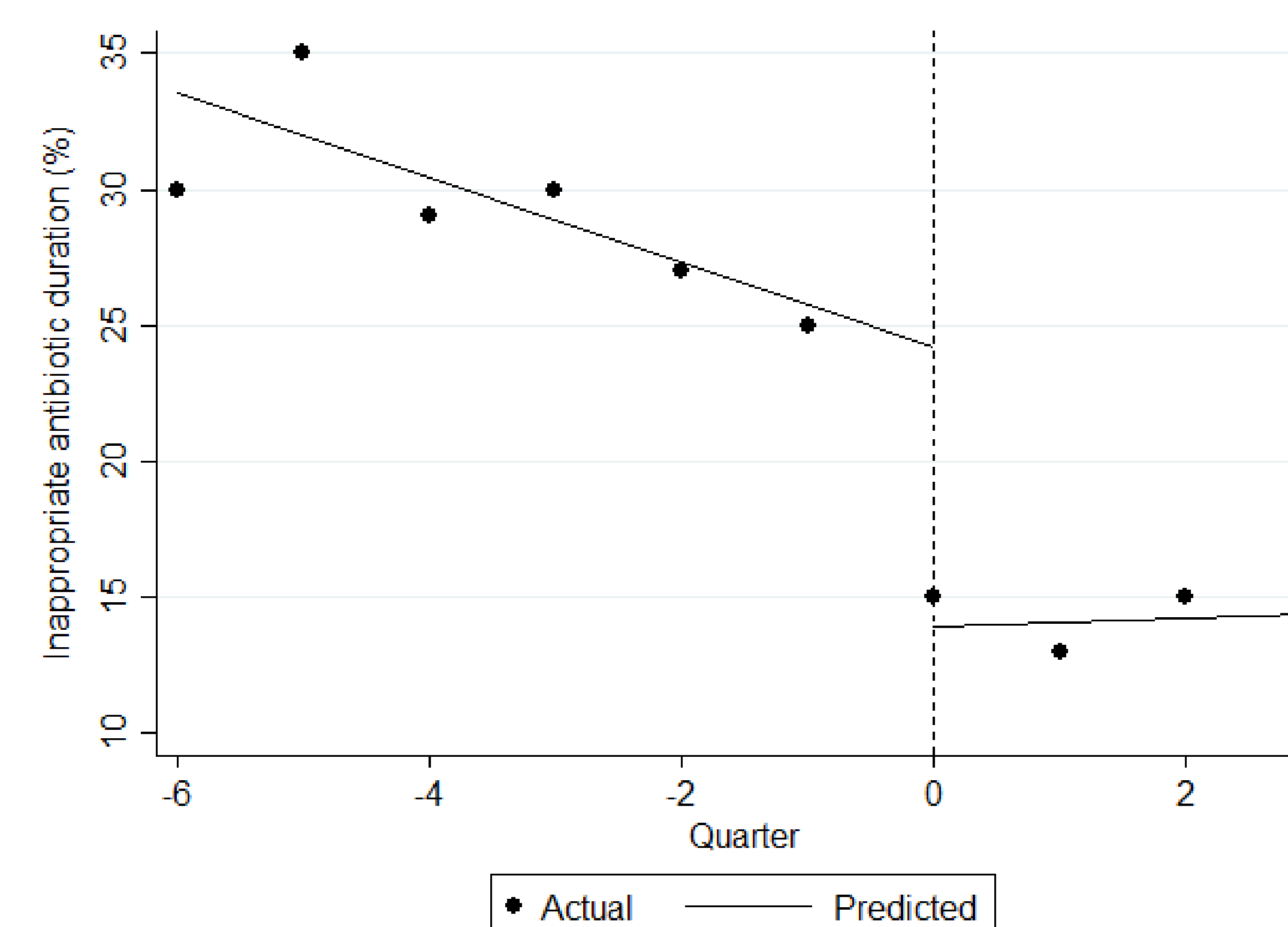
- 1,417 (948 pre-intervention; 469 post-intervention) pediatric visits were included.
- In the pre-intervention period, following the creation of guidelines for SSTI, the percentage of inappropriate antibiotic duration for pediatric patients was decreasing by 1.6 percentage points per quarter ( $p < 0.01$ ) from a high of >30%.
- After SmartSet implementation, there was an immediate decrease in inappropriate antibiotic duration of 10.3 percentage points ( $p < 0.01$ ), a relative decrease of 40% from the modeled percentage just prior to intervention (Figure 1).
- In the post-intervention period, inappropriate antibiotic duration for pediatric patients remained stable around 14%.

### Adult:

- 4,491 (2,838 pre-intervention; 1,653 post-intervention) adult visits were included.
- Inappropriate antibiotic duration in adults averaged 22.9% over the study period and did not change ( $p = 0.88$ ) (Figure 2).

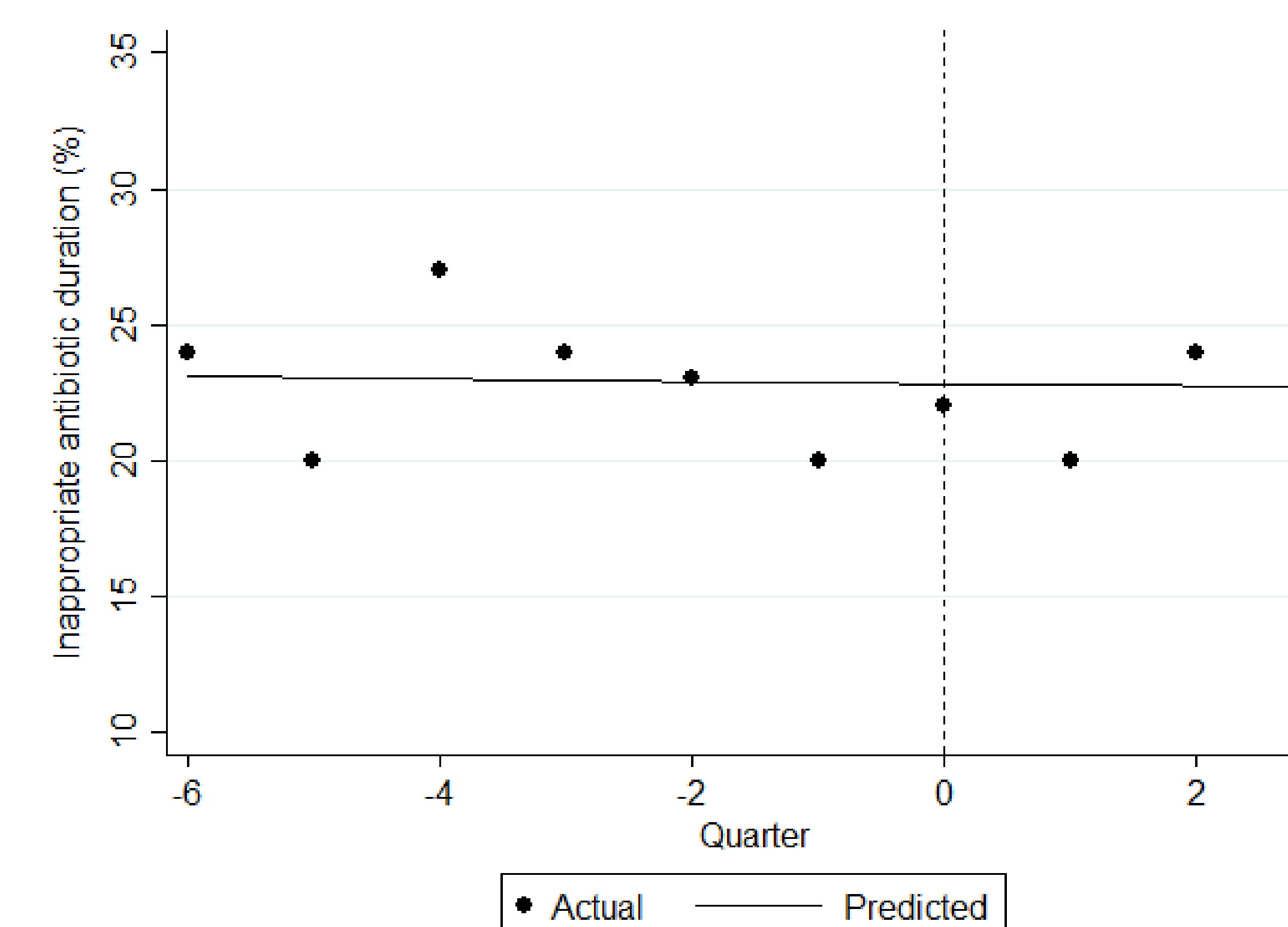
## RESULTS

**Figure 1. Inappropriate duration of antibiotics for SSTI in pediatric patients pre- and post-intervention**



Time is represented in 3-month intervals, with quarter 0 indicating the intervention at the end of December 2020.

**Figure 2. Inappropriate duration of antibiotics for SSTI in adult patients pre- and post-intervention**



## CONCLUSIONS

- Following guideline implementation and pediatric-specific education, inappropriate antibiotic duration for ambulatory pediatric SSTI was modestly declining.
- An EMR-embedded clinical decision support tool was associated with an additional relative decrease of 40% in inappropriate antibiotic duration for SSTI in pediatric patients.
- There was no additional change after implementation of a dashboard with prescribing data to provide passive audit and feedback.
- In the same health system with comparable adult SSTI guidelines but no dedicated education or EMR-embedded clinical decision support tool, the percentage of inappropriate antibiotic duration for adults was unchanged.
- Our findings suggest that timely EMR nudges can provide additional benefit over guidelines alone.

## AMBULATORY STEWARDSHIP WEBSITE

