

Reducing Oral Broad-spectrum Antibiotics Use at an Outpatient Setting

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Introduction

Global concerns

- Antibiotic resistance has been threatening the effective prevention and treatment against infections worldwide.
- It has been accelerated by misuse and overuse of antibiotics in medicine and food production in these years.
- It could lead to prolonged illness and increase risk of serious complications in vulnerable populations.
- Without an immediate global action, it could lead to increased disease burden as well as tremendous healthcare cost.

Local concerns

- In Japan, oral antibiotics accounted for more than 90% of total antibiotics consumption.
- Among oral antibiotics, Japan consumed a higher rate of broad-spectrum antibiotics such as third generation cephalosporin, macrolides and fluoroquinolones, and lower rate of penicillin compared with EU countries.
- Most of those prescriptions occur in outpatient setting.
- An urgent response is required to correct the rampant and frequent use of antibiotics in the primary care and prevent drug resistance.
- Furthermore, antibiotics were among the most frequent drug group associated with adverse drug events (ADEs) at the outpatient setting.

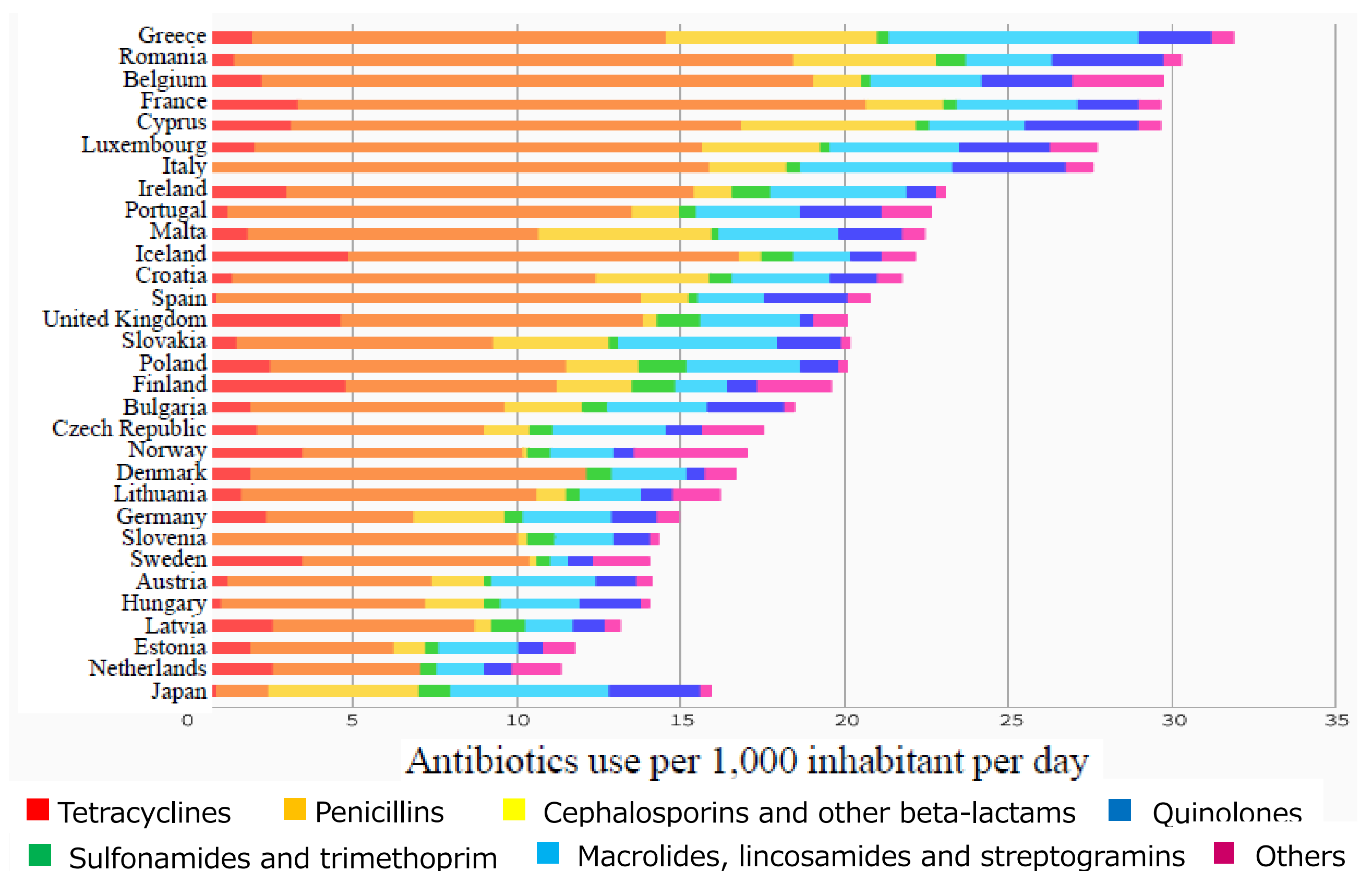
Rationale

- The Japanese national action plan is to reduce the total antimicrobial use to two-thirds of current use, and the use of oral cephalosporin, quinolones and macrolides to one-half, by 2020.
- However, there has been no antibiotic stewardship program to assess the rampant use of oral broad-spectrum antibiotics or guide their appropriate use at the outpatient clinics.
- Assessment of the problem and provision of solutions will promote antimicrobial stewardship and improve the management of infectious diseases.

Objectives

- To assess the utilization rates of both total and broad-spectrum antibiotics at the outpatient department
- To establish interventions to reduce inappropriate use of both total and broad-spectrum antibiotics in accordance with the Japanese national action plan
- To evaluate the outcome of the interventions and plan for further actions

Comparisons of antibiotics use for humans in EU countries and Japan (AMR Clinical Reference Center, National Center for Global Health and Medicine)

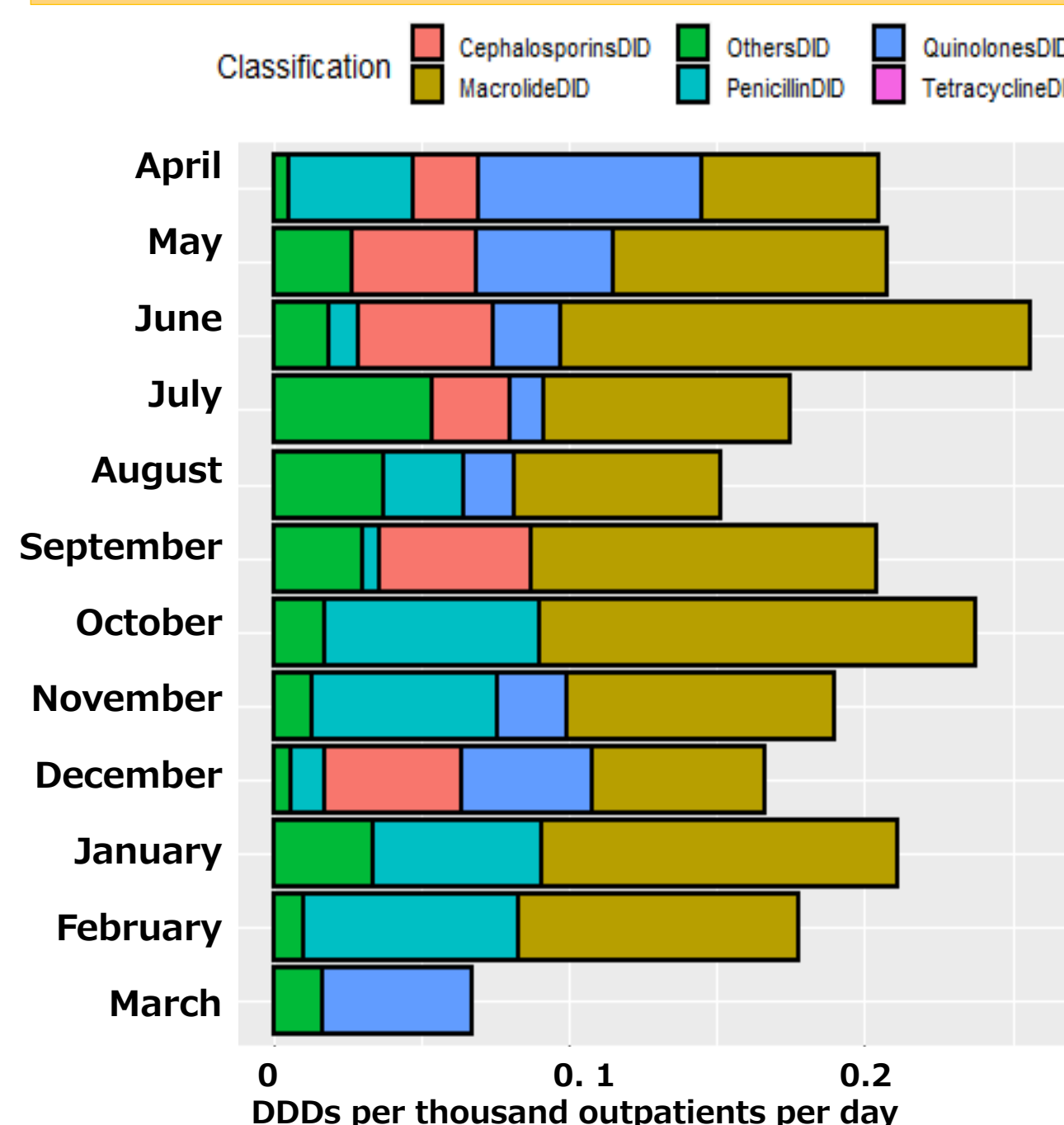


Strategy of change

Components

Surveillance on the baseline antibiotics use (April 2018-March 2019)

The same trend as the national data



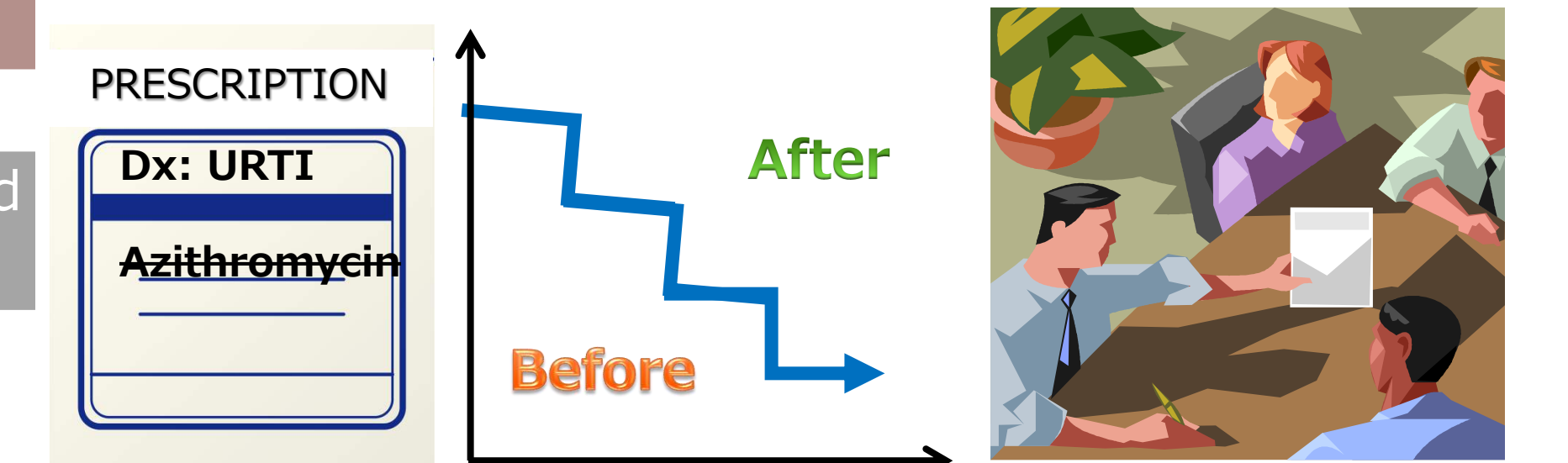
- Advocacy to the stake holders of outpatient departments for collaboration on the project
- Develop tools to carry out strategies
- Implementation of the strategies
- Monitor and analyze the monthly trend of antibiotics use
- Sharing the results of analysis to the learning community and discussion on further actions necessary for improvements

Goals

33% ↓ Total antibiotic use
50% ↓ Use of Macrolides, Cephalosporins and Quinolones
BY 2020

Educate physicians on the guidelines for the proper use of antimicrobials developed by the Ministry of Health, Labor and Welfare

Remove azithromycin from the default setting on prescription for upper respiratory tract infection



Methods and Results

Data source: medical billing and prescription data from April 2018 to October 2020

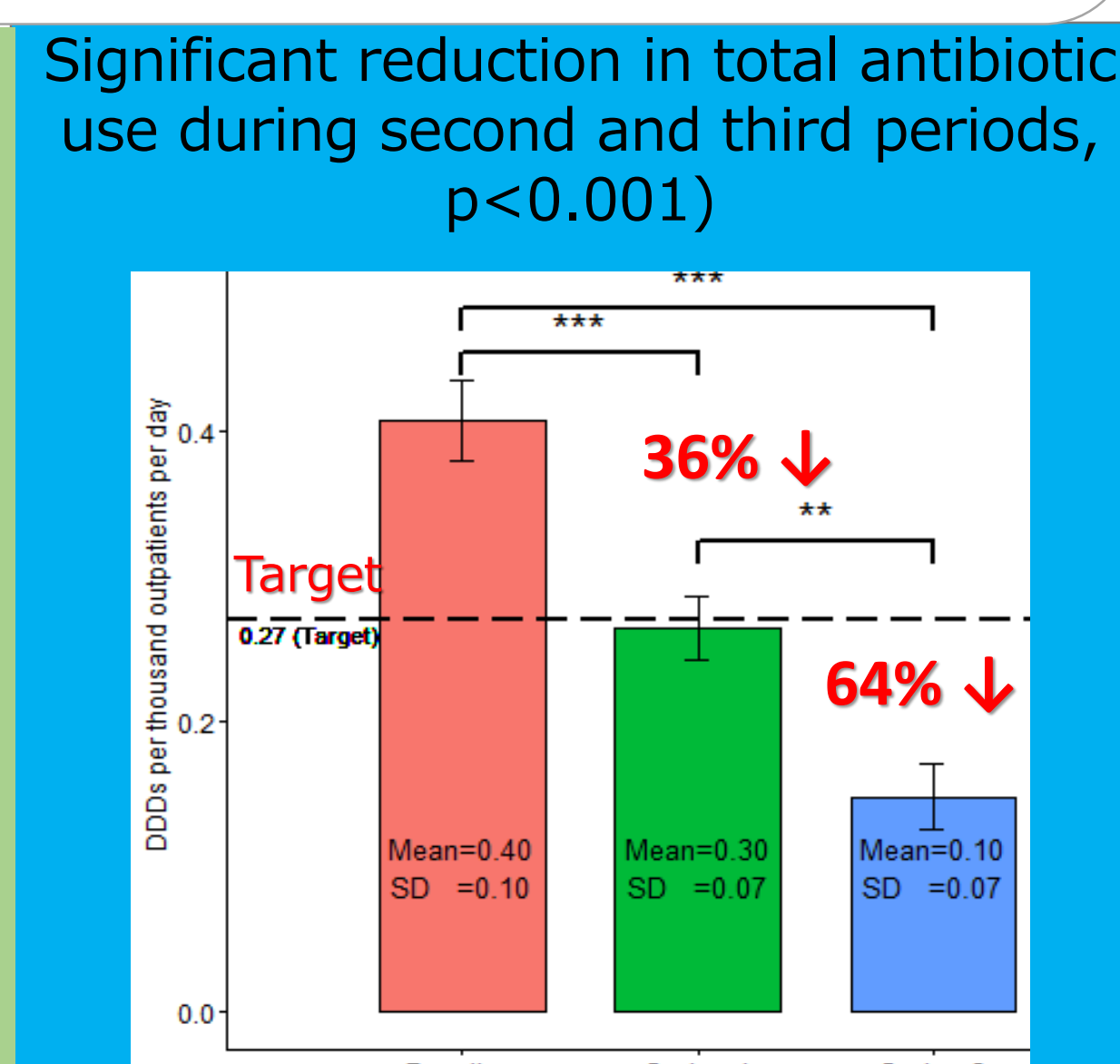
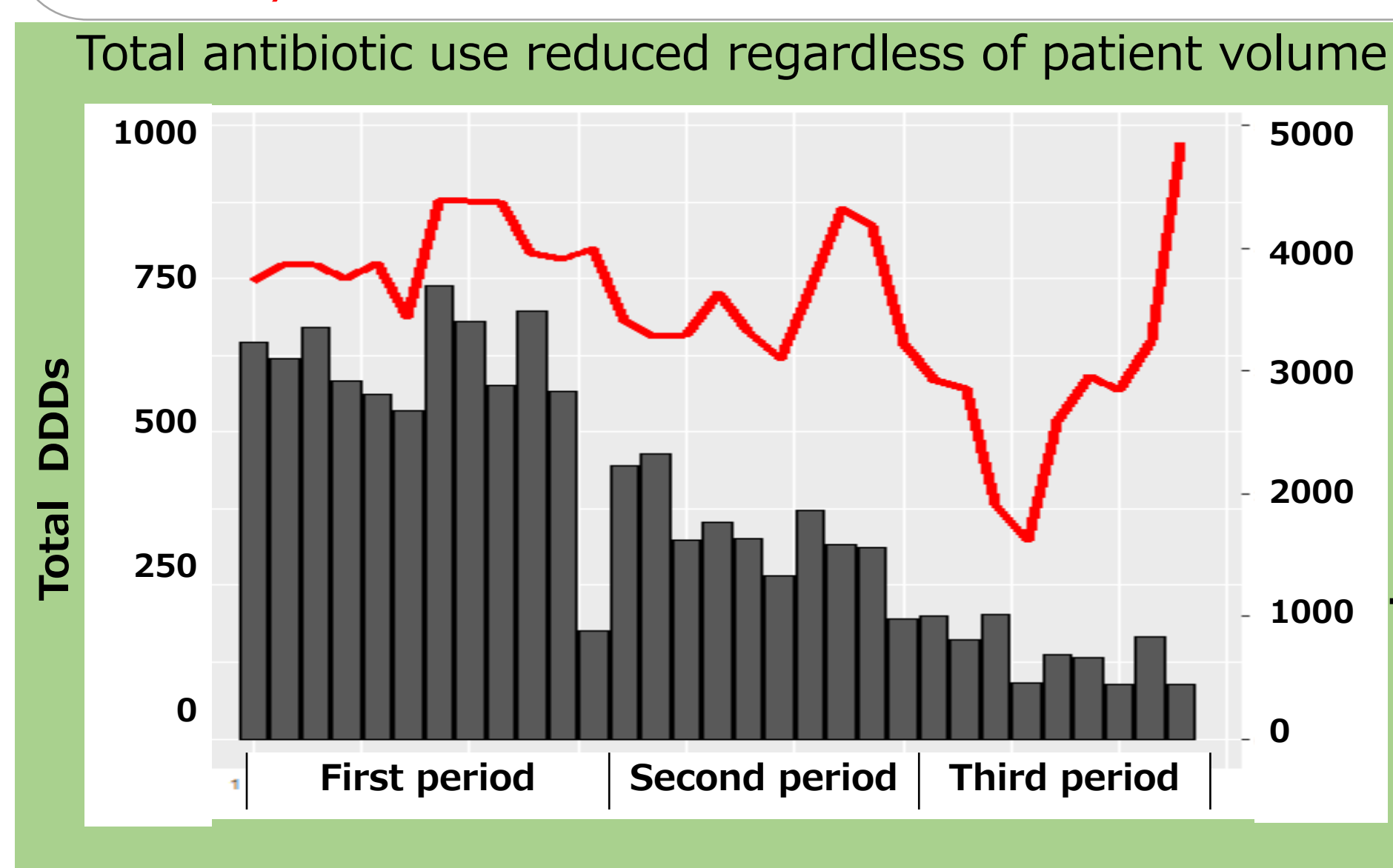
Method: Compared antibiotic utilization rates in three time periods

First period: April 2018 to March 2019 (Baseline)

Second period: April 2019 to January 2020 (After launching online reservation system to before intervention)

Third period: February 2020 to October 2020 (After intervention)

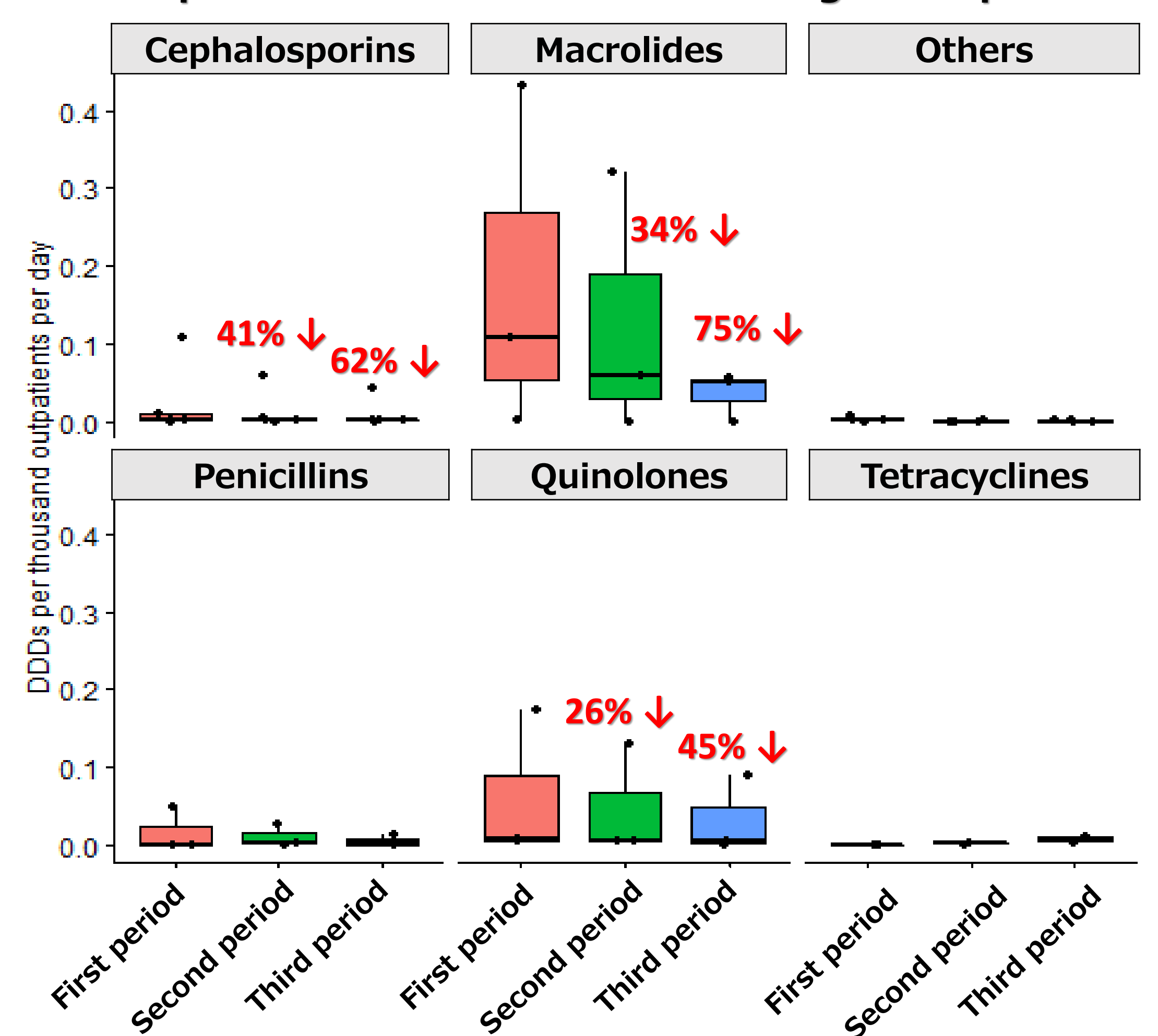
Data analysis software: R i386 4.1.0



Calculation of antibiotic utilization rate

- Convert dosage in grams for each antibiotic (e.g. 120 tablets of azithromycin 250 mg ⇒ 250*120=30,000mg= 30 grams)
- Using the ATC code of each antibiotic from WHO ATC/DDD system, convert the dosage in grams into defined daily dose (DDDs). Azithromycin's ATC code is J01FA10 and DDD is 0.3 gram. **Utilization rate in DDDs ⇒ 30/0.3=100DDD**
- Calculate the DDDs for 1000 outpatient visits per day (DID). Let's say there were 2000 outpatient visits. **Utilization rate in DID ⇒ {(100 DDD/number of outpatient visits)*1000}/365 days= 50/365=0.137 DID**

Comparison of antibiotics use during three periods



Discussions and conclusions

Discussions

- From the baseline assessment of antibiotic use trend at the clinic, we observed the same trend as the national data in the primary care setting, which is, consumption of a higher rate of broad-spectrum antibiotics such as third generation macrolides, third-generation cephalosporin and fluoroquinolones.
- Therefore, we have set the same target as the National Action plan, which is to reduce the total antimicrobial use to two-thirds of current use, and the use of oral cephalosporin, quinolones and macrolides to one-half, by 2020.
- We have achieved our goals of reducing total oral antibiotic use by 64%, the use of macrolides by 75% and that of cephalosporins by 62%, except for the use of quinolones.
- However, factors contributed by COVID-19 pandemic might have contributed to achievement of goals, in addition to the measures we have taken.
- We are still working on the evaluation of appropriate use among those with symptoms of infectious illness, and between in-person and telemedicine prescriptions by chart review since we realized that quantitative data alone was insufficient for sustained improvement over time.

Reflection and messages to others

- We need to get engaged with the patients more. If we were to start this again, we would make sure that we have reached out to the patient and family population to convey clear messages about inappropriate use of oral antibiotics.
- The greatest challenge is COVID-pandemic. Telemedicine is still in its fundamental stage and we were unable to reach out patients and families through this platform.
- We can start a small, compact and effective improvement projects which really bring great impact.
- As in this case, we can reduce the antibiotic utilization rate which has great impact on the patients as well as public health concerns.

References

- The Government of Japan. Antimicrobial Resistance (AMR) Action Plan. 2016.
- Ohmagari N. National Action Plan on Antimicrobial Resistance (AMR) 2016-2020 and relevant activities in Japan. Glob Health Med. 2019 Dec 31;1(2):71-77.
- Higashi T, Fukuhara S. Antibiotic prescriptions for upper respiratory tract infection in Japan. Intern Med. 2009; 48:1369-1375.