Introduction:
The increasing emergence and spread of drug-resistant pathogens all over the world has become catastrophic world health problems. In fact, we experienced an uncontrollable outbreak of multidrug-resistant pathogens and ICU closure for 3 weeks in January 2013. Based on the experience, we built an infection control bundle including contact precautions for every patient in the ICU, carrying personal alcohol-based hand rubs, cohorting patients who acquired drug-resistant pathogens, active surveillance cultures once a week, and enhanced environmental disinfection in January 2013. The purpose of this study is to evaluate the effectiveness of the systemic infection control bundle approach against acquisition of drug-resistant pathogens.

Methods:
This was a retrospective historical control study conducted from April 2008 to March 2019 in 18-bed ICU of a tertiary care hospital in Japan. Every patient admitted to the ICU during the study period was eligible. Patients were divided into 2 groups: Conventional (from April 2008 to December 2012) or Intervention (from January 2013 to March 2019). The primary outcome was the number of hospital-acquired MRSA. We defined hospital-acquisition as the isolation of MRSA after 48 hours of hospitalisation.

Results:
A total of 13,047 patients were included during the study period. There were 5,128 patients in the control group (39.3%) from 2008 to 2012 and 7,919 patients in the intervention group (61.7%) from 2013 to 2019. The hospital-acquisition of MRSA was observed 284 patients (5.5%) in the control group and 150 patients (1.9%) in the intervention group. The interrupted time-series analysis suggested that the intervention was significantly associated with reduced hospital-acquisition of MRSA [risk ratio, 0.342(95% confidence interval, 0.282-0.416);< 0.01](Fig.1).

Conclusion:
The Bundle approach could be an effective strategy to prevent hospital-acquisition of drug-resistant pathogens in ICUs.
Predicted trend of hospital-acquired MRSA by interrupted time-series analysis