

## Abstract

## Six-year (2013-2018) review of the Korean sentinel surveillance system of health care-associated infections

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Health care-associated infections (HAIs) are a significant cause of illness and death. There are six different multi-drug resistant organisms (MDROs) that cause HAIs (vancomycin-resistant *Staphylococcus aureus*, VRSA; methicillin-resistant *Staphylococcus aureus*, MRSA; vancomycin-resistant *Enterococci*, VRE; multidrug-resistant *Pseudomonas aeruginosa*, MRPA; multidrug-resistant *Acinetobacter baumannii*, MRAB; carbapenem-resistant *Enterobacteriaceae*, CRE). The Korea Disease Control and Prevention Agency (KDCA) launched a sentinel surveillance system to monitor the rate of HAIs in 2011. This study analyzed six years (2013-2018) of HAI results reported by 93 participating hospitals. The total number of HAIs was 497,988, including blood-infected cases and cases where other body sites were infected. The annual number (isolation rate per 1,000 patient days) was 77,272 (3.41) in 2013, 80,113 (3.51) in 2014, 85,017 (3.73) in 2015, 85,755 (3.60) in 2016, 83,357 (3.60) in 2017, and 86,474 (3.70) in 2018. Key findings indicated that CRE and VRE-annual numbers and isolation rates tended to increase across all cases as well as in the blood infected cases. Notably, this study determined that although CRE showed a clear increase, increase in VRE might be because its reporting guidance was changed in 2016. With the increase in CRE, the surveillance system for CRE was changed from a sentinel surveillance to total case reporting from June 3rd, 2017. To further investigate the effectiveness of the new surveillance system, further studies are needed.

**Keywords:** Healthcare-associated infections (HAIs), Multi-drug resistant organisms, Sentinel surveillance, Isolation rate

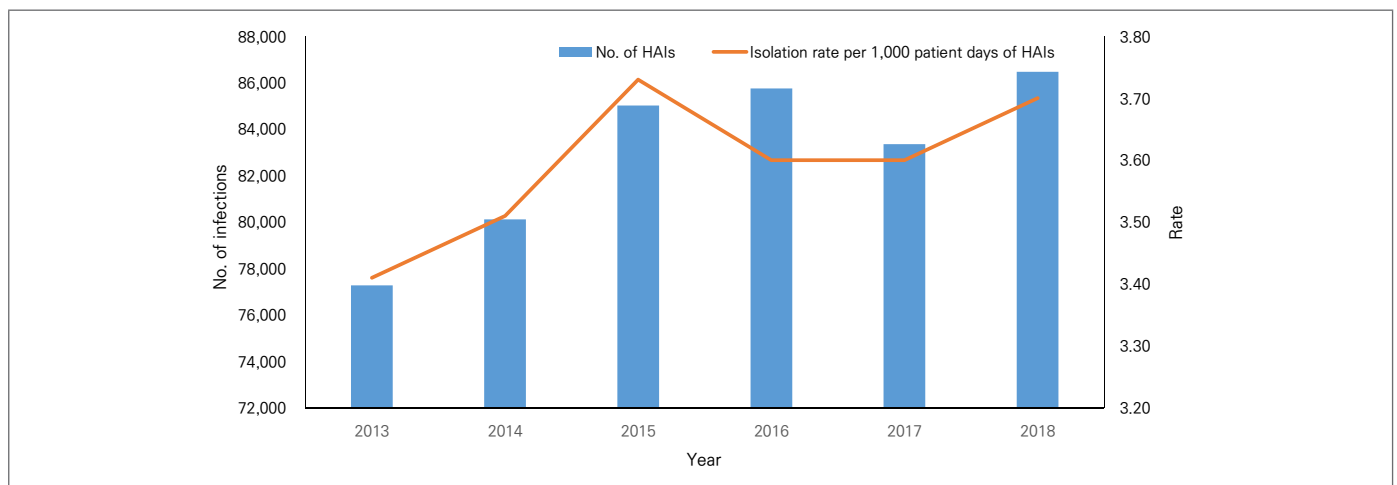


Figure 1. Healthcare-associated infections (HAIs) from 2013 to 2018

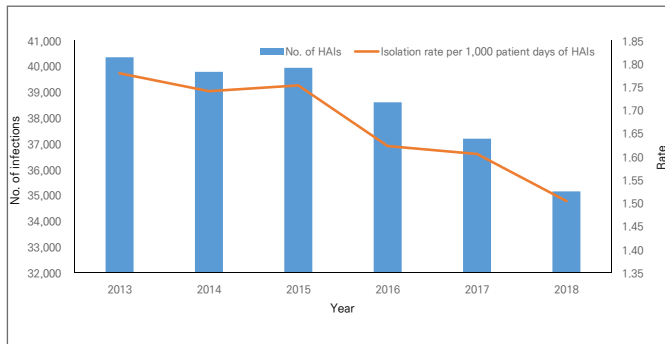


Figure 2A. MRSA Annual number and isolation rate\*

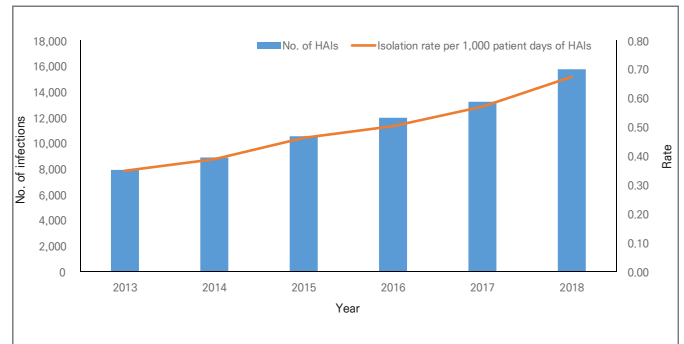


Figure 2B. VRE Annual number and isolation rate\*

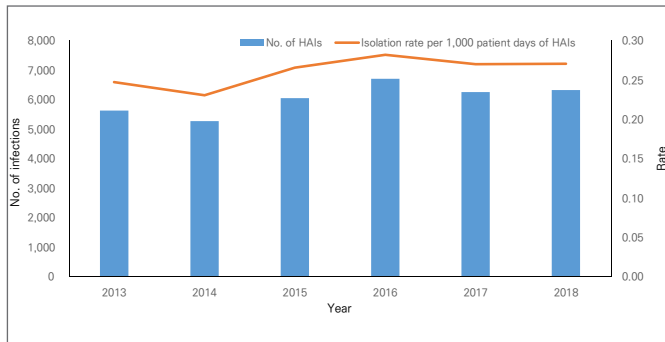


Figure 2C. MRPA Annual number and isolation rate\*

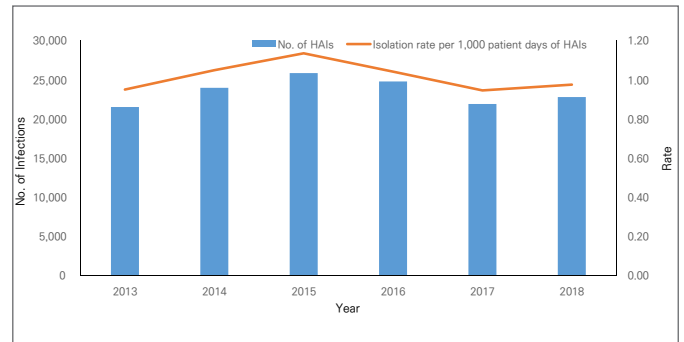


Figure 2D. MRAB Annual number and isolation rate\*

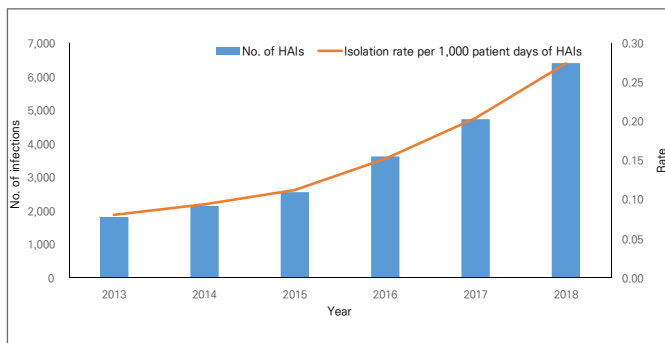


Figure 2E. CRE Annual number and isolation rate\*

\*Isolation rate per 1,000 patient days

**Table 1.** Annual number and isolation rate per 1,000 patient days of healthcare-associated infections (HAIs) by multi-drug resistant organism from 2013 to 2018

Year		VRSA/VISA	MRSA	VRE	MRPA	MRAB	CRE	Total
2013	Infection	0/11	40,364	7,948	5,625	21,506	1,818	77,272
	Rate*	0/0.00	1.78	0.35	0.25	0.95	0.08	3.41
	Proportion (%)	0/0.01	52.24	10.29	7.28	27.83	2.35	100
2014	Infection	0/11	39,797	8,917	5,267	23,972	2,149	80,113
	Rate	0/0.00	1.74	0.39	0.23	1.05	0.09	3.51
	Proportion (%)	0/0.01	49.68	11.13	6.57	29.92	2.68	100
2015	Infection	0/28	39,954	10,566	6,048	25,860	2,561	85,017
	Rate	0/0.00	1.75	0.46	0.27	1.14	0.11	3.73
	Proportion (%)	0/0.03	47.00	12.43	7.11	30.42	3.01	100
2016	Infection	0/29	38,615	12,002	6,703	24,781	3,625	85,755
	Rate	0/0.00	1.62	0.50	0.28	1.04	0.15	3.60
	Proportion (%)	0/0.03	45.03	14.00	7.82	28.90	4.23	100
2017	Infection	0/2	37,206	13,251	6,253	21,907	4,738	83,357
	Rate	0/0.00	1.61	0.57	0.27	0.95	0.20	3.60
	Proportion (%)	0/0.00	44.63	15.90	7.50	26.28	5.68	100
2018	Infection	0/4	35,164	15,787	6,320	22,789	6,410	86,474
	Rate	0/0.00	1.50	0.68	0.27	0.98	0.27	3.70
	Proportion (%)	0/0.00	40.66	18.26	7.31	26.35	7.41	100

\*Rate: Isolation rate per 1,000 patient-days of HAIs = number of HAIs / number of patient-days \* 1,000

**Table 2.** Annual number of healthcare-associated infections (HAIs) from 2013 to 2018 according to infected sites

	2013	2014	2015	2016	2017	2018	Total
Blood	6,434	5,961	6,839	6,187	6,307	7,038	38,766
	8.33%	7.44%	8.04%	7.21%	7.57%	8.14%	
Other infected sites	70,838	74,152	78,178	79,568	77,050	79,436	459,222
	91.67%	92.56%	91.96%	92.79%	92.43%	91.86%	

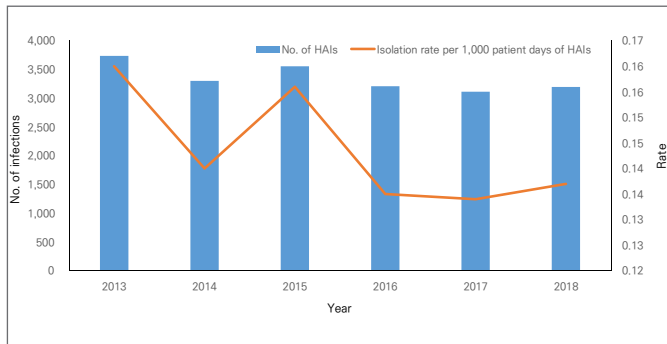


Figure 3A. MRSA Annual number and isolation rate\* in blood

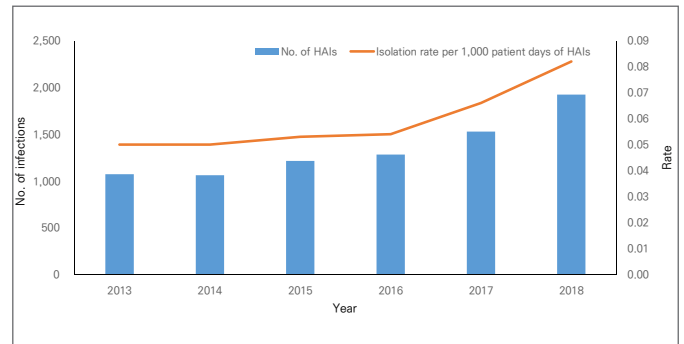


Figure 3B. VRE Annual number and isolation rate\* in blood

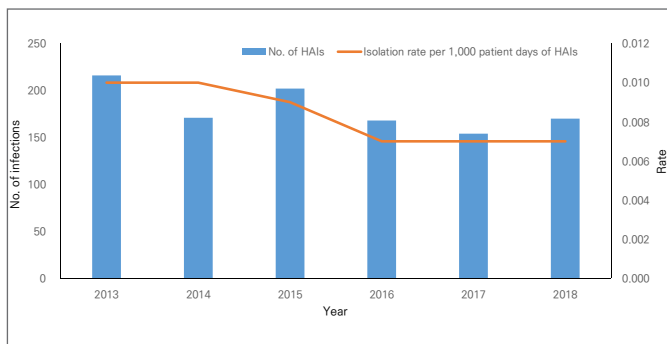


Figure 3C. MRPA Annual number and isolation rate\* in blood

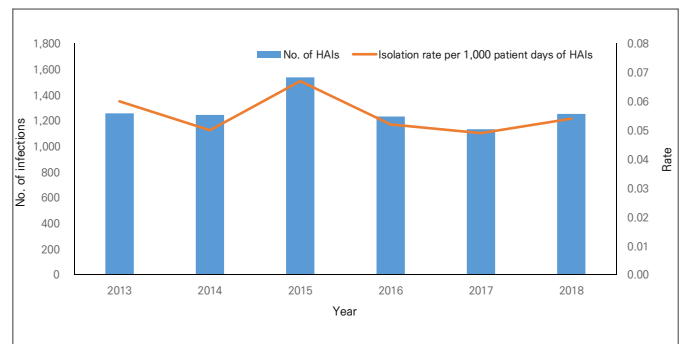


Figure 3D. MRAB Annual number and isolation rate\* in blood

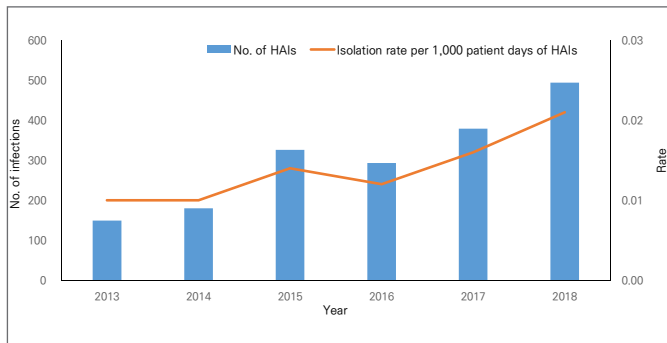


Figure 3E. CRE Annual number and isolation rate\* in blood

\*Isolation rate per 1,000 patient days