



# Impact of VIRTUO Blood Culture System Installation on Workflow Efficiency and Reporting Timeliness in the Emergency Laboratory



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## Introduction

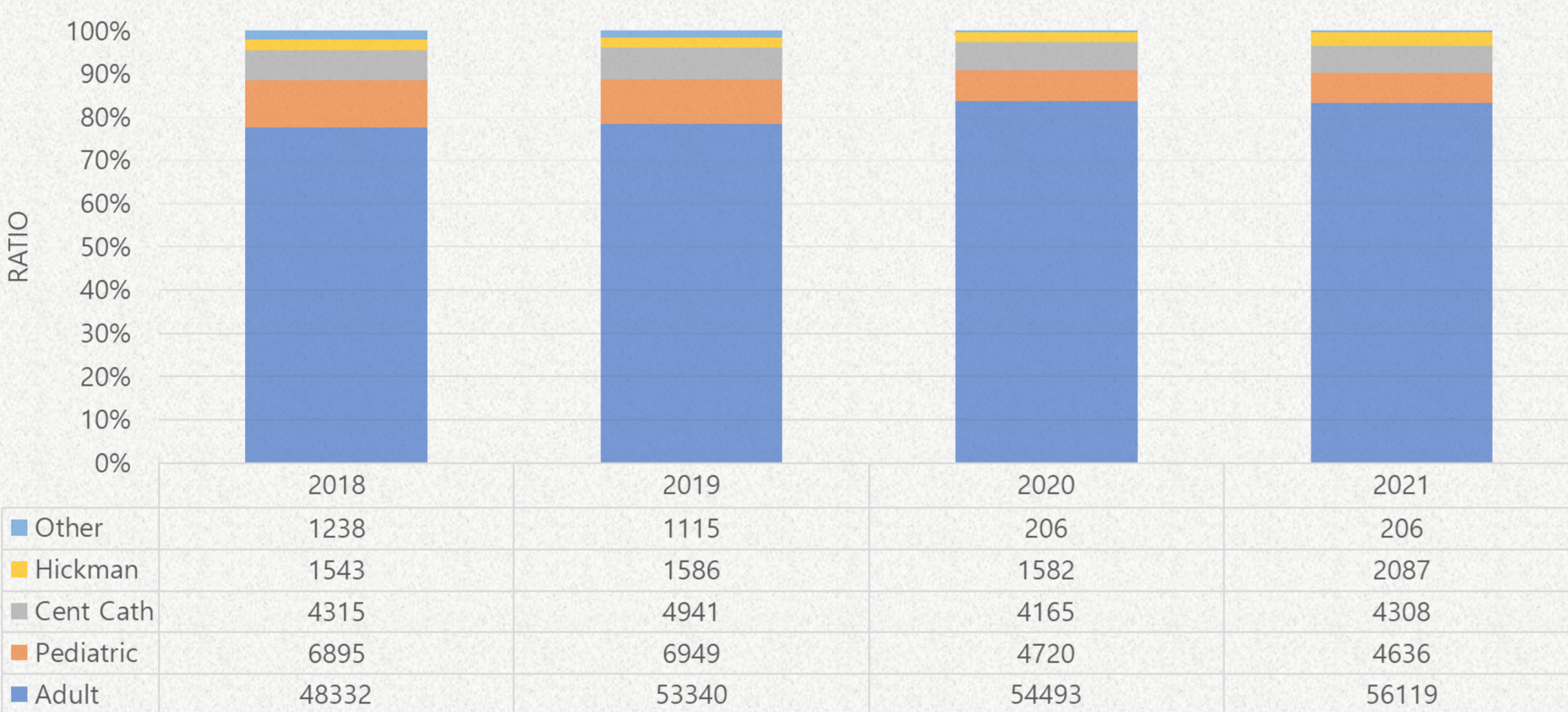
Timely detection and reporting of bloodstream infections (BSIs) are critical for early intervention, especially in emergency and intensive care settings. The VIRTUO® blood culture system was installed to replace BacT/ALERT 3D (BA3D) and BACTEC FX systems in our emergency laboratory. This study evaluates its impact on incubation delays, reporting times, and overall laboratory efficiency.

## Materials and Methods

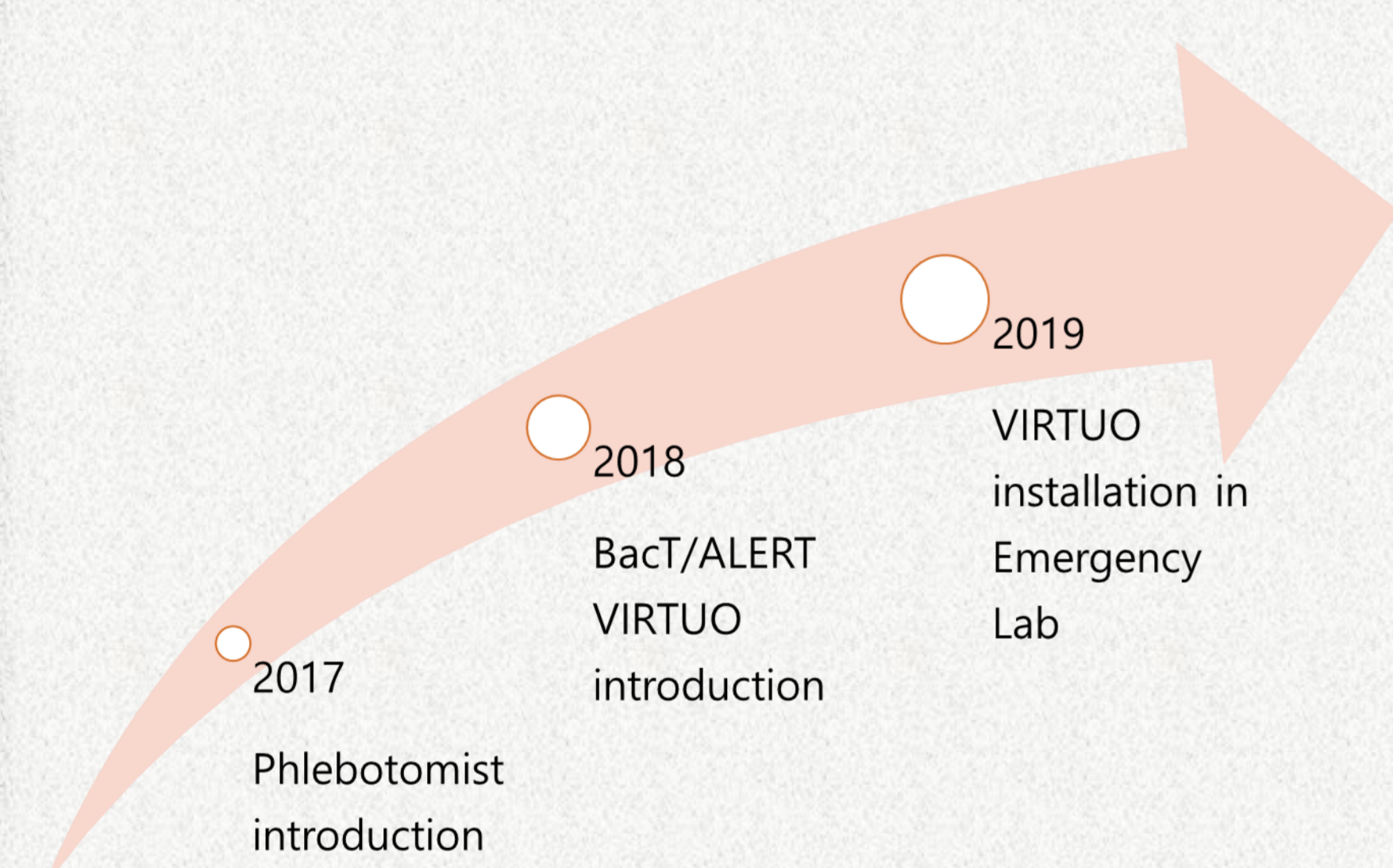
### Seoul National University Bundang Hospital

- 1,334 beds
- Annual volume of laboratory testing: 20,000,000 tests <
- Annual microbiology testing: 300,000 tests <
- Annual blood culture: 60,000 tests <

### Blood culture specimen



### Events in Blood culture



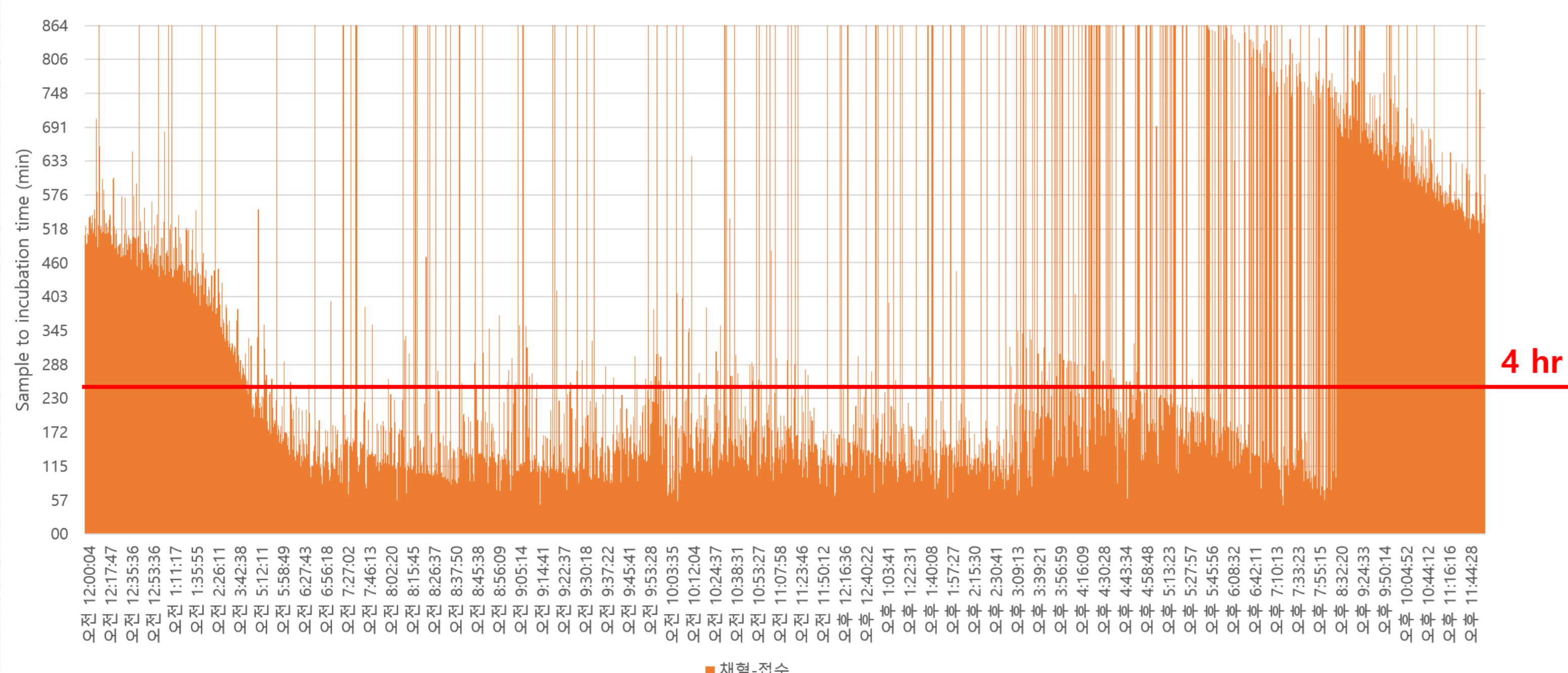
### Equipment allocation after installation of VIRTUO

- Present**
  - VIRTUO A module, 2; B module, 3
  - BacT/Alert 3D: 2
  - BACTEC FX: 2
- Allocation**

Year	GW	ER/ICU
~ 2018	BA3D, VIRTUO	FX
2019~	VIRTUO, FX, BA3D	VIRTUO

### Incubation delay at night shift

2018. Time from collection to incubation



### Night shift sampling: 13,211 tests (31.6%, 2018)

- 20:00 ~ 07:00
- Total 41,746 tests (sampling time check)
- All 62,324 tests

Night shift sampling	2018 1/2		2018 2/2		
	FX	BA3D	FX	BA3D	
Sample-incubation (min)	1st quartile	45	189	55	211
	2nd quartile	86	441	90	455
	3rd quartile	151	554	159	553
Sample-report (min)	1st quartile	7293	7375	7313	7412
	2nd quartile	7395	7645	7410	7666
	3rd quartile	7510	7776	7490	7777

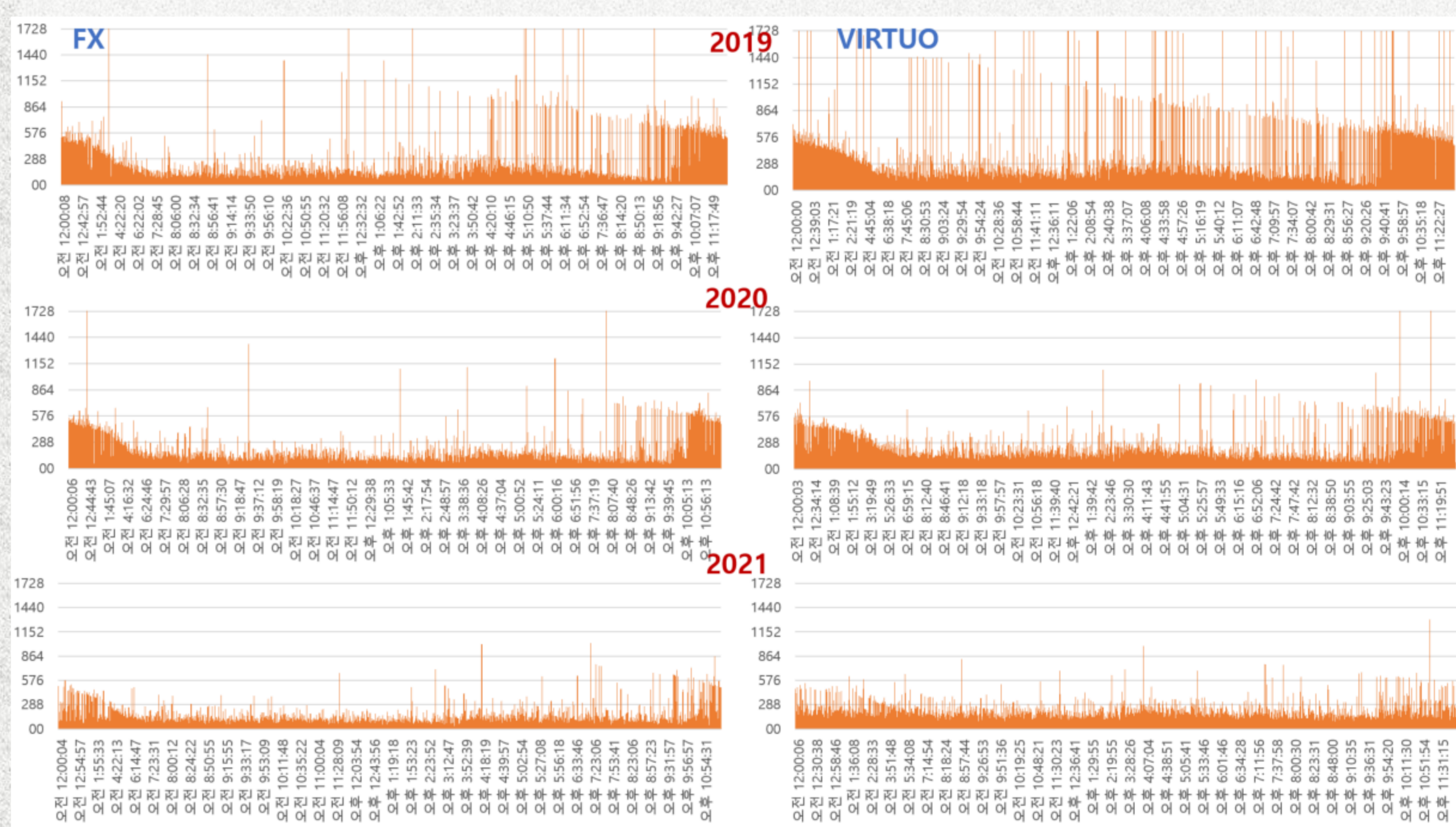
> 7 hours delay

> 4 hours later reporting compared to FX



We retrospectively analyzed blood culture data from 2018 (prior to installation) and 2021 (after installation) using laboratory information systems. Sampling times, incubation delays, and time to positivity were compared between systems. In particular, we focused on samples collected during night shifts (20:00–07:00), which accounted for 31.6% of total tests (13,211/41,746). Comparative analysis included time to incubation and time to positive result reporting.

## Results



### Incubation delay after installation of VIRTUO at Emergency Lab

Night shift sampling	2019 1/2		2019 2/2		2020 1/2		2020 2/2		2021 1/2		2021 2/2		
	FX	VIRTUO	FX	VIRTUO	FX	VIRTUO	FX	VIRTUO	FX	VIRTUO	FX	VIRTUO	
Sample-incubation (min)	1st quartile	52	63	47	48	49	43	46	44	55	51	50	48
	2nd quartile	119	193	121	88	117	82	81	72	92	81	84	77
	3rd quartile	351	482	428	192	383	181	162	120	158	126	136	122
Sample-report (min)	1st quartile	7317	7322	7341	7264	7322	7262	7280	7255	7273	7259	7266	7263
	2nd quartile	7425	7508	7432	7332	7439	7324	7346	7297	7320	7296	7306	7301
	3rd quartile	7619	7720	7676	7612	7643	7490	7503	7365	7386	7354	7367	7354

2018 2/2, BA3D 7666 min  
→ 2021 2/2, VIRTUO 7301 min  
→ About 360 min reduced  
→ 6 hours early reporting!

## Conclusion

The implementation of the VIRTUO blood culture system significantly reduced incubation delays and enabled earlier reporting of positive blood cultures, particularly during the night shift. These improvements enhance the timeliness of clinical decision-making in critical care settings.