

**Supplemental Data Table S1.** Pre- and post-TLA configuration description

Module	Pre-TLA			Module	Post-TLA		
	Number of modules	Capacity	Throughput		Number of modules	Capacity	Throughput
<b>Pre-Analysis Module</b>							
Input Buffer Module	2	300 tubes	800 tubes/hr	Bulk Input Module	2	700 tubes	1,000 tubes/hr
Centrifuge	4	40 tubes	250 tubes/hr (5 min)	Input Output Module	1	780 tubes	750 tubes/hr
Decapper	2	N/A*	400 tubes/hr	Centrifuge	5	80 tubes	300 tubes/hr (10 min)
Aliquoter	2	N/A*	400 tubes/hr	Decapper	2	2,000 waste caps	800 tubes/hr
Barcode Labeler Module	2	N/A*	450 tubes/hr				
Secondary Tube Sorter	2	N/A*	400 tubes/hr				
Sample Output	2	300 tubes	800 tubes/hr				
<b>Analysis Module</b>							
Hitachi P module	4	44 positions	800 tests/hr	Atellica CH930	9	70 positions	1,800 tests/hr
Hitachi D module	8	16 positions	2,400 tests/hr	Atellica IM1600	2	42 positions	440 tests/hr
Architect i2000SR	2	135 positions	200 tests/hr	cobas e801	9	48 positions	300 tests/hr
cobas c 701	1	70 positions	2,000 tests/hr	cobas c702	2	70 positions	2,000 tests/hr
cobas e 602	4	25 positions	170 tests/hr	Alinity i	1	47 positions	200 tests/hr
<b>Post-Analysis Module</b>				Sealer	2	19,000 seals	800 tubes/hr
				Refrigerated Storage	4	15,360 tubes	800 tubes/hr
				Desealer	1	10,000 seals	200 tubes/hr
<b>Conveyor Track</b>							
Unidirectional Track	N/A <sup>†</sup>			Wide Belt Buffer	1	600 tubes	N/A
				Bi-Directional Track	78 m <sup>‡</sup>	N/A	3,600 tubes/hr

\*No designated capacity for each pre-analysis module; <sup>†</sup>No specific information given for one-way track conveyor; <sup>‡</sup>The total length of track.

Abbreviations: N/A, not applicable; TLA, total laboratory automation.

**Supplemental Data Table S2.** General characteristics of the study samples

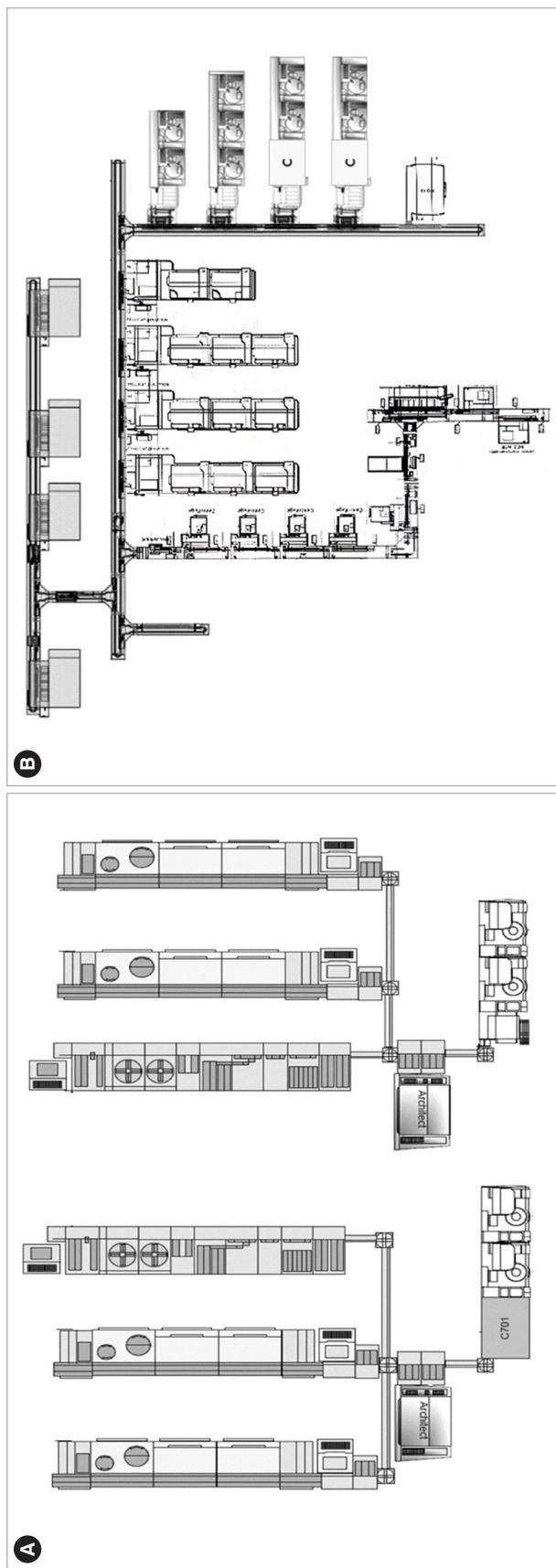
	Pre-TLA			Post-TLA			ΔTotal
	CC	IM	Total	CC	IM	Total	N (%)
<b>Total Tests</b>							
N tests/month	1,059,265	92,236	1,151,501	1,082,504	99,915	1,182,419	30,918 (2.7)
N tests/day	52,963	4,612	57,575	51,548	4,758	56,306	-1,269 (-2.2)
N tests/hr	6,620	576	7,197	6,443	595	7,038	-159 (-2.2)
<b>TAT (min)</b>							
Mean ± SD	61.4 ± 501.2	212.4 ± 273.6	73.5 ± 407.2	59.6 ± 106.6	171.2 ± 118.5	69.0 ± 114.9	-4.5 (-6.1)
Median (IQR)	52.0 (52.0–64.0)	77.0 (66.5–92.3)	66.0 (52.0–89.0)	57.0 (55.0–61.5)	70.0 (64.0–79.5)	63.0 (56.0–78.5)	-3.0 (-4.5)
90th percentile	92.7	517.4	126.7	79.4	421.4	108.3	-18.4 (-14.5)
99th percentile	155.4	1,493.1	262.6	129.4	1,292.5	227.7	-34.9 (-13.3)

Abbreviations: CC, clinical chemistry; IM, immunoassay; IQR, interquartile range; SD, standard deviation; TAT, turnaround time; TLA, total laboratory automation.

**Supplemental Data Table S3.** Annual cost allocation by analytic phases and types based on the percentage of activity

Analytical methods	Annual Cost Allocation (1,000 USD)			
	By analytic phases			By analytic types
	Pre-Analysis	Analysis	Post-Analysis	
CC		-		200.5
IM				155.7
wTTM	128.7	80.3	147.1	-

Abbreviations: CC, clinical chemistry; IM, immunoassay; wTTM, weighted tube touch moment; USD, US dollar.



**Supplemental Data Figure S1.** Laboratory layout. (A) Pre-TLA with subtotal automation systems. (B) Post-TLA with entirely incorporated automation systems. Images were obtained with permission from the clinical laboratory of Severance Hospital, Yonsei University, Seoul, Korea.

Abbreviation: TLA, total laboratory automation.