

**Supplemental Digital Content (SDC):**

**Table S1.** Sum Square and Mean Square between and within Group among 14 Patients with Acoustic, Electrocardiogram-Based, and End-Tidal Carbon Dioxide-Based Respiratory Rate Monitoring

Group	RR <sub>ECG</sub> vs. RR <sub>co2</sub>			RRa vs. RR <sub>co2</sub>			RR <sub>ECG</sub> vs RRa		
	SS	Df	MS	SS	Df	MS	SS	Df	MS
Between	32562	13	2504.8	25030	13	1925.4	75985	13	5845.0
Within	331415	3521	94.1	65551	3521	18.6	344131	3521	97.7

Df, degree of freedom; MS, mean square; RRa, acoustic respiratory rate; RR<sub>CO2</sub>, end-tidal carbon dioxide-based respiratory rate; RR<sub>ECG</sub>, ECG-based respiratory rate; SS, sum square.

**TABLE S2.** Mean, SD, and Median of First 15 Minutes RR after Admission for 14 Patients with All Three Methods of RR Measurement

Patient	RR <sub>CO2</sub>			RR <sub>a</sub>			RR <sub>ECG</sub>		
	Mean	SD	1 <sup>st</sup> ,2 <sup>nd</sup> ,3 <sup>rd</sup> quartiles	Mean	SD	1 <sup>st</sup> ,2 <sup>nd</sup> ,3 <sup>rd</sup> quartiles	Mean	SD	1 <sup>st</sup> ,2 <sup>nd</sup> ,3 <sup>rd</sup> quartiles
Case 01	15.3	3.9	14,14,15	15.9	3.3	14,15,16	20.8	9.0	14,18,25
Case 02	19.8	4.4	18,20,22	15.0	1.7	14,16,17	34.2	18.6	21,29,41
Case 03	12.4	4.2	10,10,15	11.7	2.5	14,15,16	20.4	14.7	11,14,25
Case 04	11.9	0.3	12,12,12	12.8	1.6	10,10,14	17.6	14.6	12,12,16
Case 05	11.8	1.4	12,12,12	13.2	2.3	12,12,13	27.7	17.3	17,23,33
Case 06	15.0	3.0	12,15,17	12.2	0.6	12,13,13	22.3	13.5	15,20,23
Case 07	14.1	3.4	12,12,17	14.2	2.1	12,12,12	26.1	12.6	17,23,31
Case 08	11.9	0.5	12,12,12	14.8	2.5	12,14,16	14.2	6.0	11,12,14
Case 09	15.6	3.1	14,16,18	14.5	2.1	13,15,16	21.5	14.1	9,22,28
Case 10	16.0	5.1	14,14,14	14.0	1.1	13,14,16	23.0	11.0	15,19,27
Case 11	14.1	7.2	12,12,14	14.5	2.7	14,14,14	26.1	15.3	14,23,32
Case 12	22.9	7.0	17,22,28	15.7	2.5	14,15,18	32.3	11.7	26,29,37
Case 13	11.9	0.4	12,12,12	16.2	3.0	15,16,17	14.2	6.0	12,12,16
Case 14	19.6	10.7	15,19,21	16.1	3.1	13,17,19	25.6	12.2	19,22,26

RR<sub>a</sub>, acoustic respiratory rate; RR<sub>CO2</sub>, end-tidal carbon dioxide-based respiratory rate, RR<sub>ECG</sub>, ECG-based respiratory rate; SD, standard deviation.

**TABLE S3a.** Confusion table of  $RR_{ECG}$  and  $RR_{CO_2}$  (N=14) in 4 categories.

$RR_{ECG}$	4	0	14	680	25	1: RR 1~5
	3	2	38	2650	24	2: RR 6~9
	2	0	5	78	0	3: RR 10~29
	1	0	0	18	0	4: RR $\geq 30$
		1	2	3	4	
		$RR_{CO_2}$				

**TABLE S3b.** Confusion table of  $RR_a$  and  $RR_{CO_2}$  (N=14) in 4 categories.

$RR_a$	4	0	14	0	0	1: RR 1~5
	3	2	57	3375	48	2: RR 6~9
	2	0	0	51	1	3: RR 10~29
	1	0	0	0	0	4: RR $\geq 30$
		1	2	3	4	
		$RR_{CO_2}$				

**TABLE S3c.** Confusion table of  $RR_{ECG}$  and  $RR_a$  (N=14) in 4 categories.

$RR_{ECG}$	4	0	5	714	0	1: RR 1~5
	3	0	47	2667	0	2: RR 6~9
	2	0	0	83	0	3: RR 10~29
	1	0	0	18	0	4: RR $\geq 30$
		1	2	3	4	
		$RR_a$				