



2023 Questionnaire Survey Report on Incidents, Accidents, and Safety Procedures Related to Cardiopulmonary Bypass and Extracorporeal Membrane Oxygenation

**Safety Control Committee
Japanese Society of Extra-Corporeal Technology in Medicine
(JaSECT)**

Objectives & Target Years of the Survey

◆ Objectives

To enhance the awareness of safety management, promote the advancement of extra-corporeal technology, and improve the medical standards and patient safety by gathering and compiling information on incidents/accidents related to cardiopulmonary bypass (CPB) and extracorporeal membrane oxygenation (ECMO) systems.

◆ Target years

2021 and 2022

Background of the Survey

Prior questionnaire surveys (and target years) on incidents/accidents conducted by JaSECT Safety Control Committee:

2010: CPB (2008, 2009)

2011: ECMO (2009, 2010)

2013: CPB & ECMO (2011, 2012)

2015: CPB & ECMO (2013, 2014)

2017: CPB & ECMO (2015, 2016)

2019: CPB & ECMO (2017, 2018)

2021: CPB & ECMO (2019, 2020)



This survey is a continuation of ongoing research.

2023: CPB & ECMO (2021, 2022)

Subjects

632 medical institutions with JaSECT members

Responses

Response rate: 61.2 % (387/632 institutions)



7 institutions replied but were unable to answer the questions due to a managerial decision and thus excluded from aggregation.



Valid response rate: 98.2% (380 institutions)

Levels of Impact on Patients

Level	Impact on patients
Level 0	Errors and/or failures were found in pharmaceuticals and/or medical devices that were not used on patient.
Level 1	Errors and/or failures were found in pharmaceuticals and/or medical devices that were used on patient but had no impact on the patient.
Level 2	Caused changes in patient's vital signs and/or necessitated medical examination.
Level 3a	Necessitated minor treatment or procedure (disinfection, cooling, administration of analgesics, etc.).
Level 3b	Necessitated major treatment or procedure (unplanned procedure or treatment, hospitalization, extension of hospital stay, etc.)
Level 4	Resulted in permanent disability.
Level 5	Resulted in death (excluding that caused by natural course of primary disease).

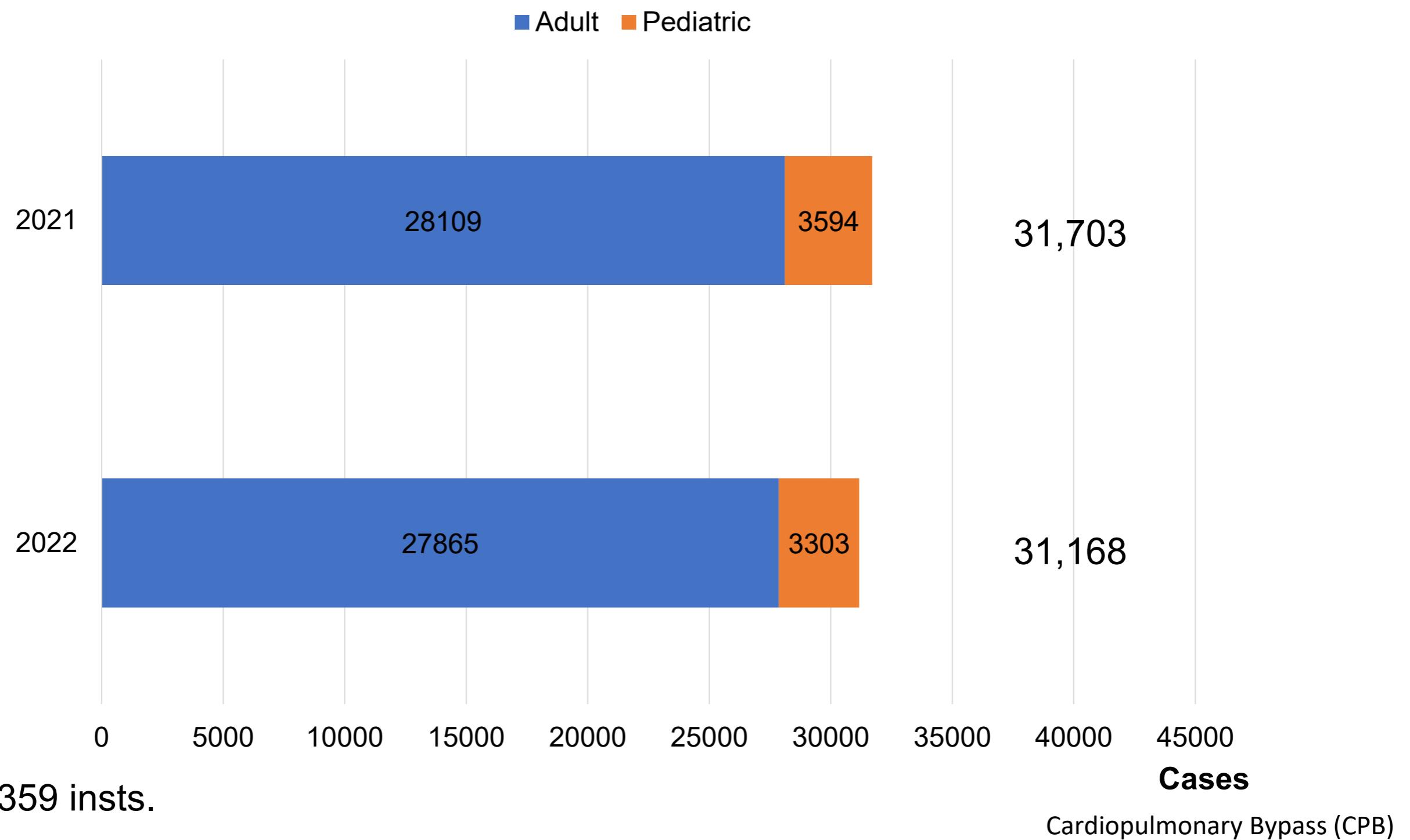


Aggregation Results

Cardiopulmonary Bypass (CPB)

Number of CPB cases

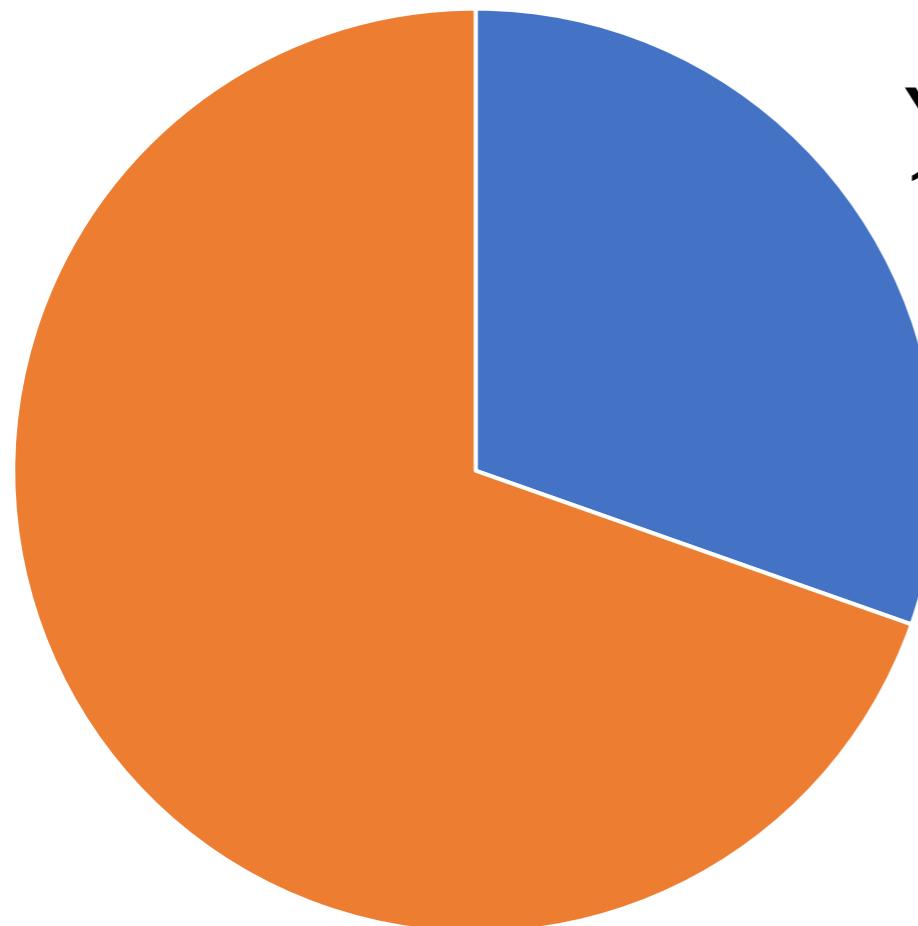
Total CPB cases: 62,871 (Adult: 55,974 Pediatric: 6,897)



CPB-Related Accidents/Incidents & Rates

	2023 Survey			2021 Survey			2019 Survey		
	2021	2022	total	2019	2020	total	2017	2018	total
CPB cases	31,703	31,168	62,871	40,277	38,120	78,397	40,786	40,669	81,455
Impact level (0)	342 1.08%	319 1.02%	661 1.06%	259 0.64%	284 0.75%	543 0.69%	379 0.93%	393 0.97%	772 0.95%
Impact level (1 – 3a)	193 0.61%	222 0.71%	415 0.66%	192 0.48%	245 0.64%	437 0.56%	340 0.83%	345 0.85%	685 0.84%
Impact level (3b – 5)	17 0.06%	20 0.06%	37 0.06%	11 0.03%	12 0.03%	23 0.03%	16 0.04%	22 0.05%	38 0.05%
Total	552 1.74%	561 1.80%	1,113 1.77%	462 1.15%	541 1.42%	1,003 1.37%	735 1.80%	760 1.87%	1,495 1.84%

Did you experience an incident/accident involving a CPB Device?



Yes
108 (30.4%)

No
247 (69.6%)

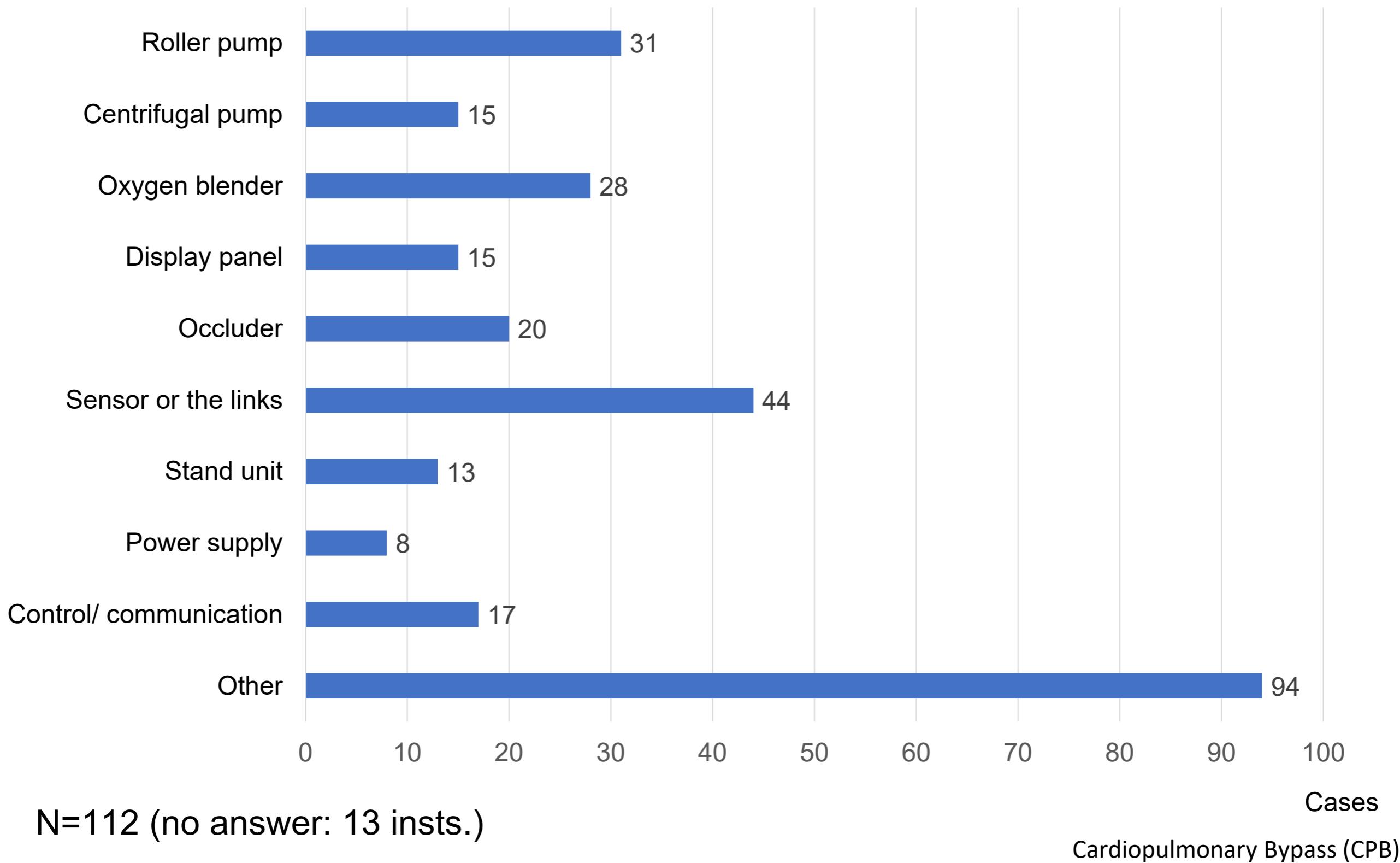
N=359 (no answer: 4 insts.)

Impact level	No. of cases	Frequency*
0	266	0.42%
1~3a	94	0.15%
3b~5	9	0.01%

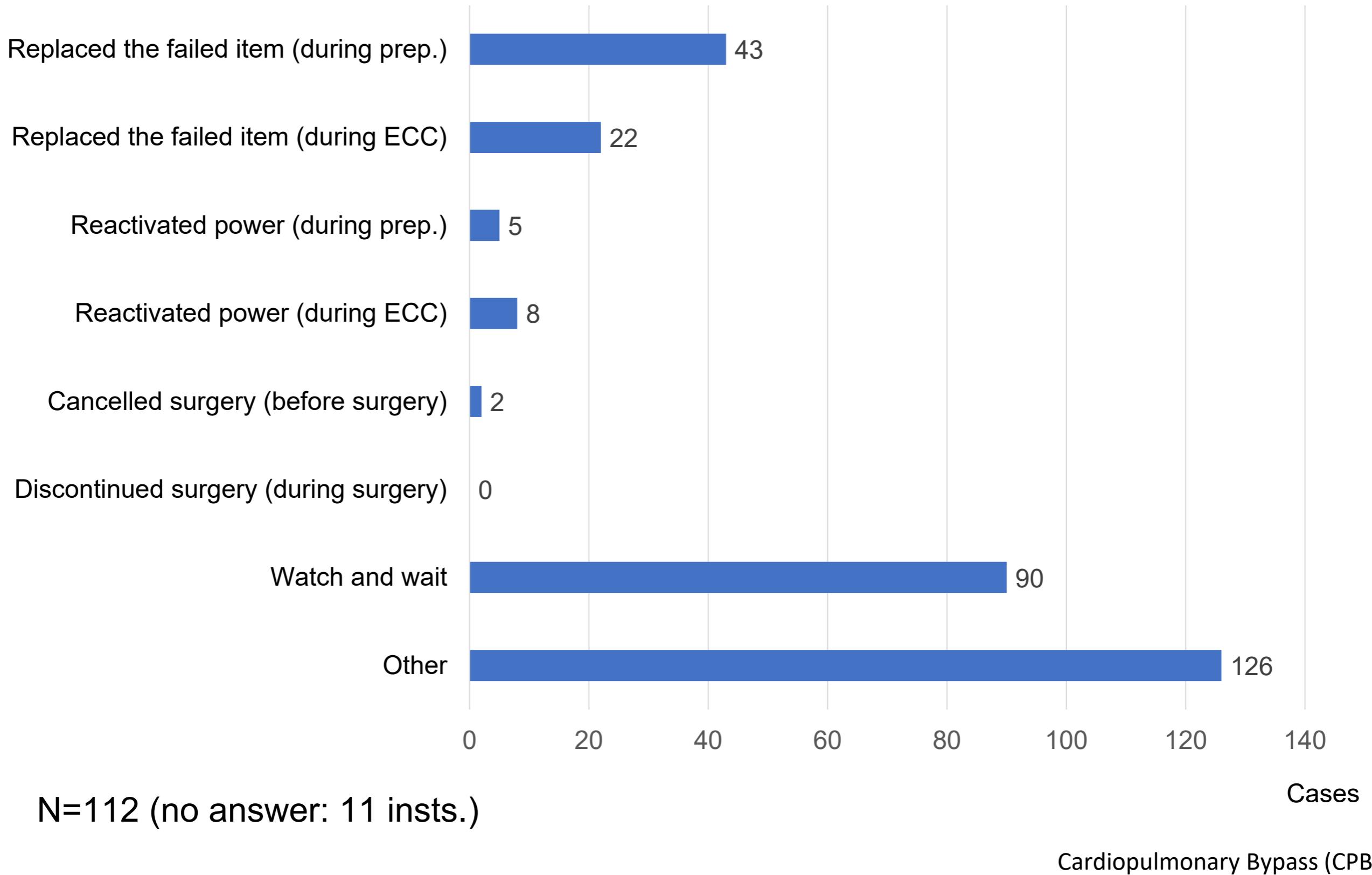
No answer: 4 insts.

*Among 62,871 CPB cases occurring during the 2-year period

Which of the following was involved in the incident/accident and how many times? (Please choose all that apply.)



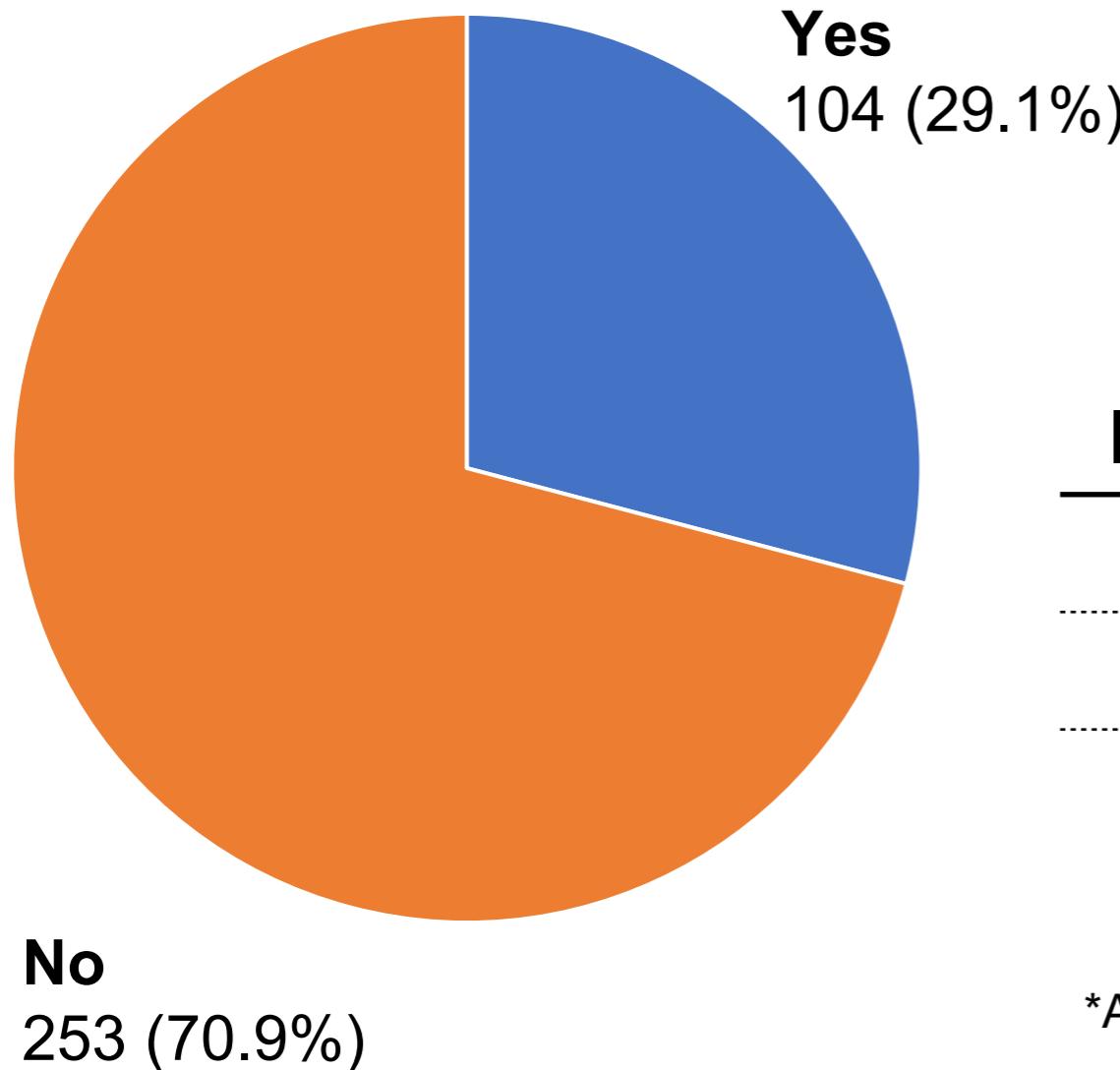
Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



CPB Device-Related Incidents & Rates

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	266	0.42%	172	0.22%	199	0.24%		
1 – 3a	94	0.15%	112	0.14%	117	0.14%		
3b – 5	9	0.01%	6	0.01%	6	0.01%		
	No answer: 4 insts.		No answer: 11 insts.		No answer: 18 insts.			
* Among 62,871 cases			** Among 78,397 cases			*** Among 81,455 cases		

Did you experience an incident/accident involving an Oxygenator?



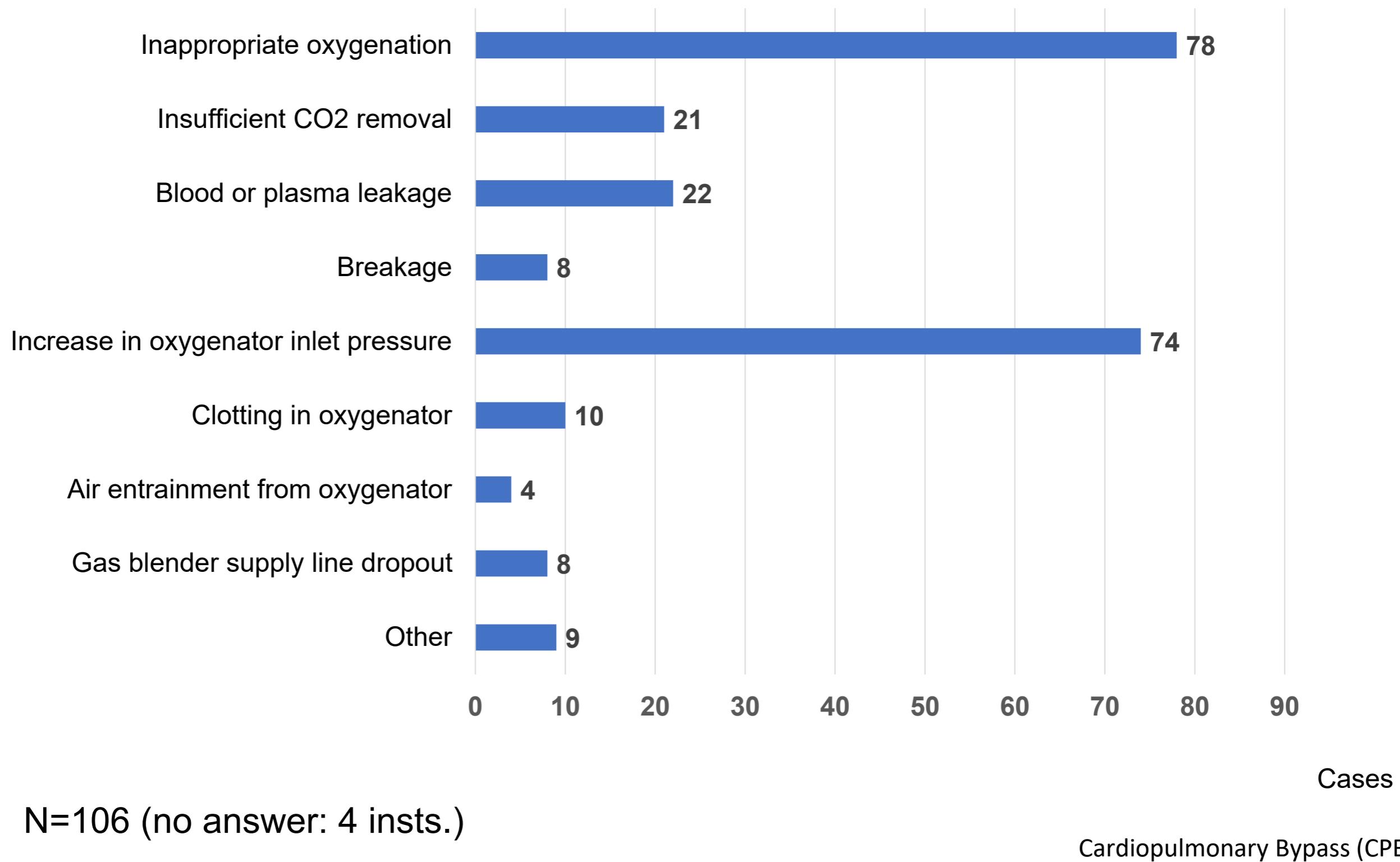
Impact level	No. of cases	Frequency*
0	84	0.13%
1~3a	109	0.17%
3b~5	9	0.01%

No answer: 4 insts.

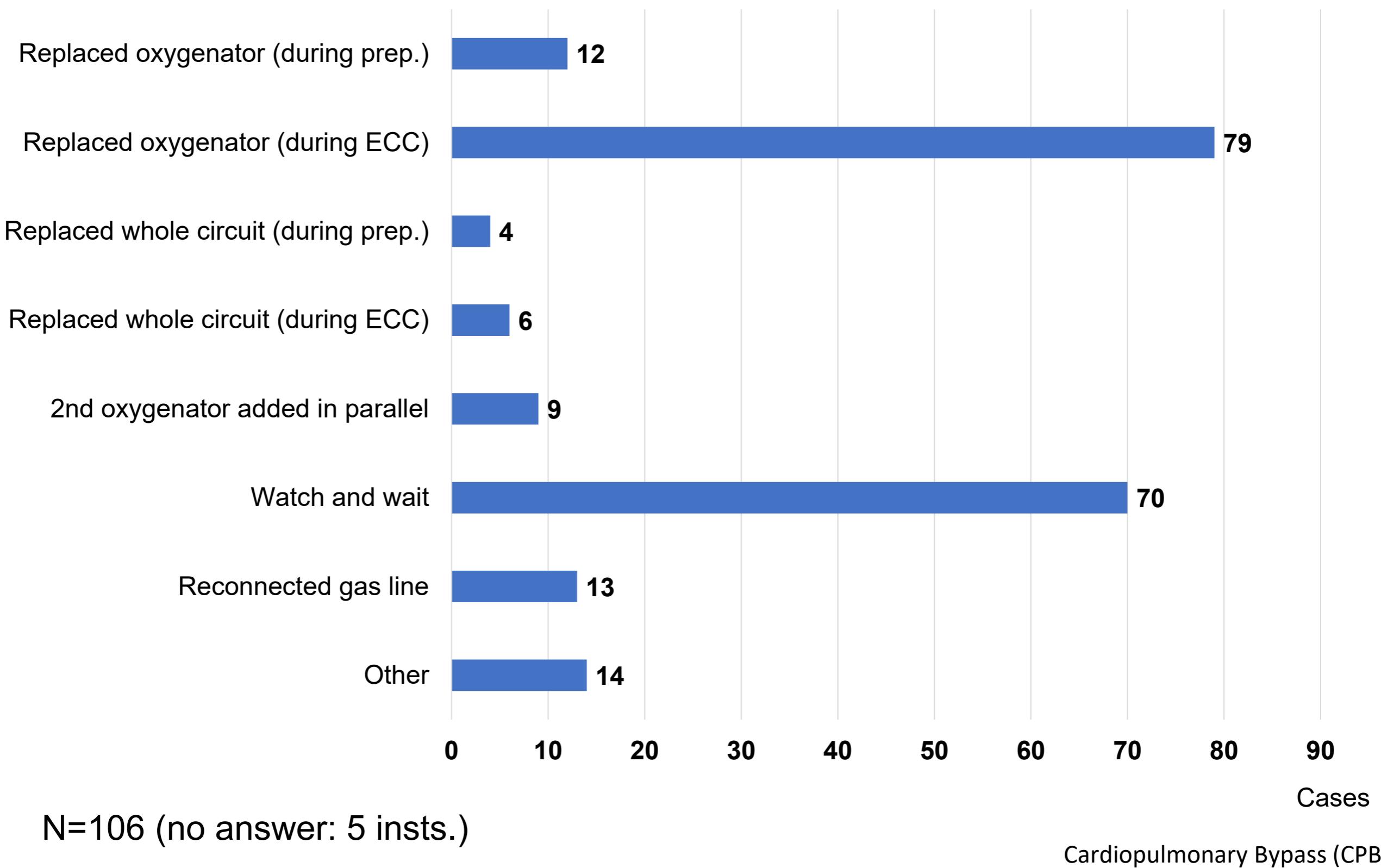
*Among 62,871 CPB cases occurring during the 2-year period

N=359 (no answer: 2 insts.)

How many times did you experience the following incidents/accidents? (Please choose all that apply.)

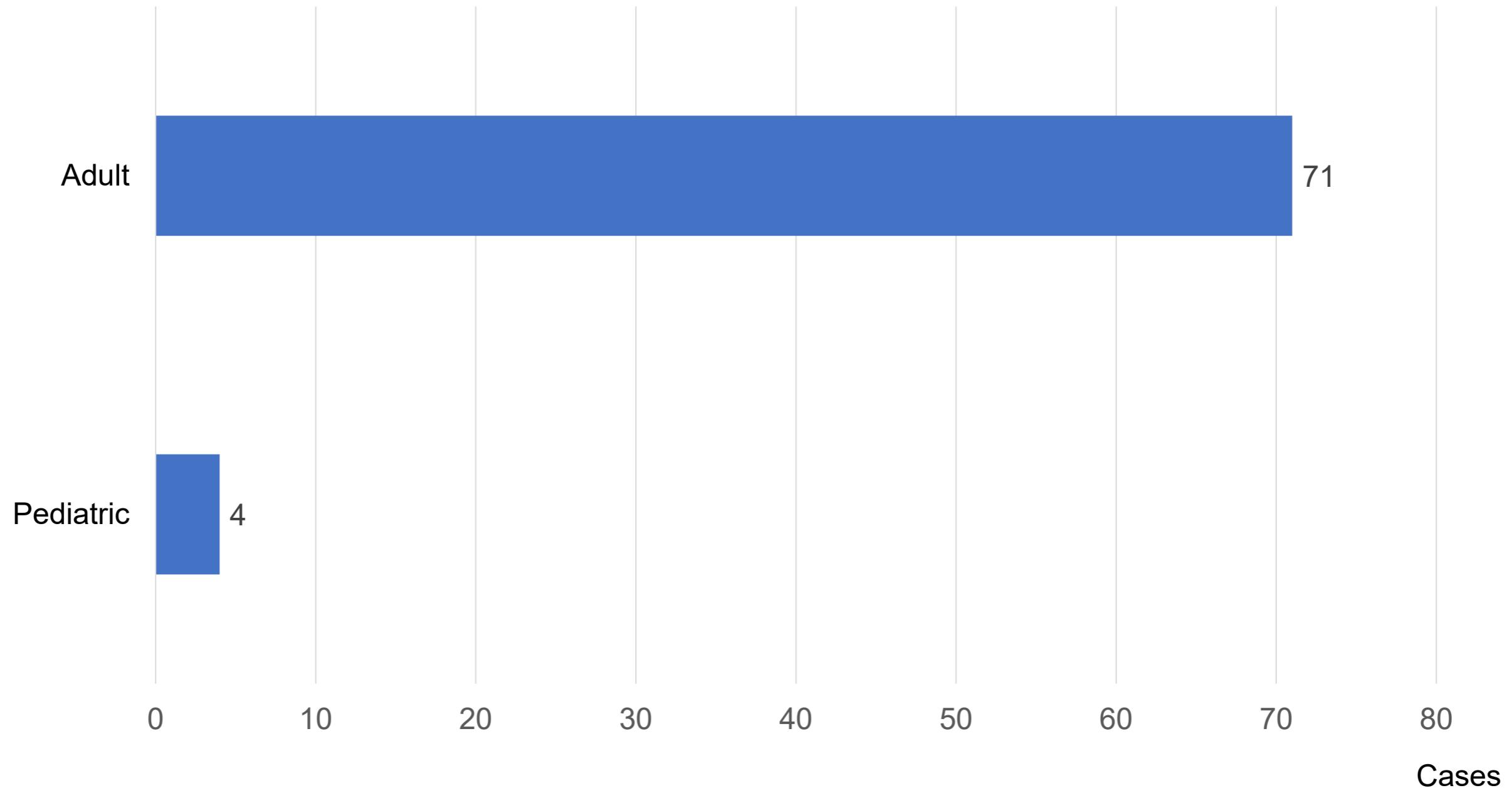


Which of the following actions did you take in response to the incident/accident? (Please choose all that apply.)



Number of Cases

(62 institutions that experienced “increase in oxygenator inlet pressure” and/or “clotting”)

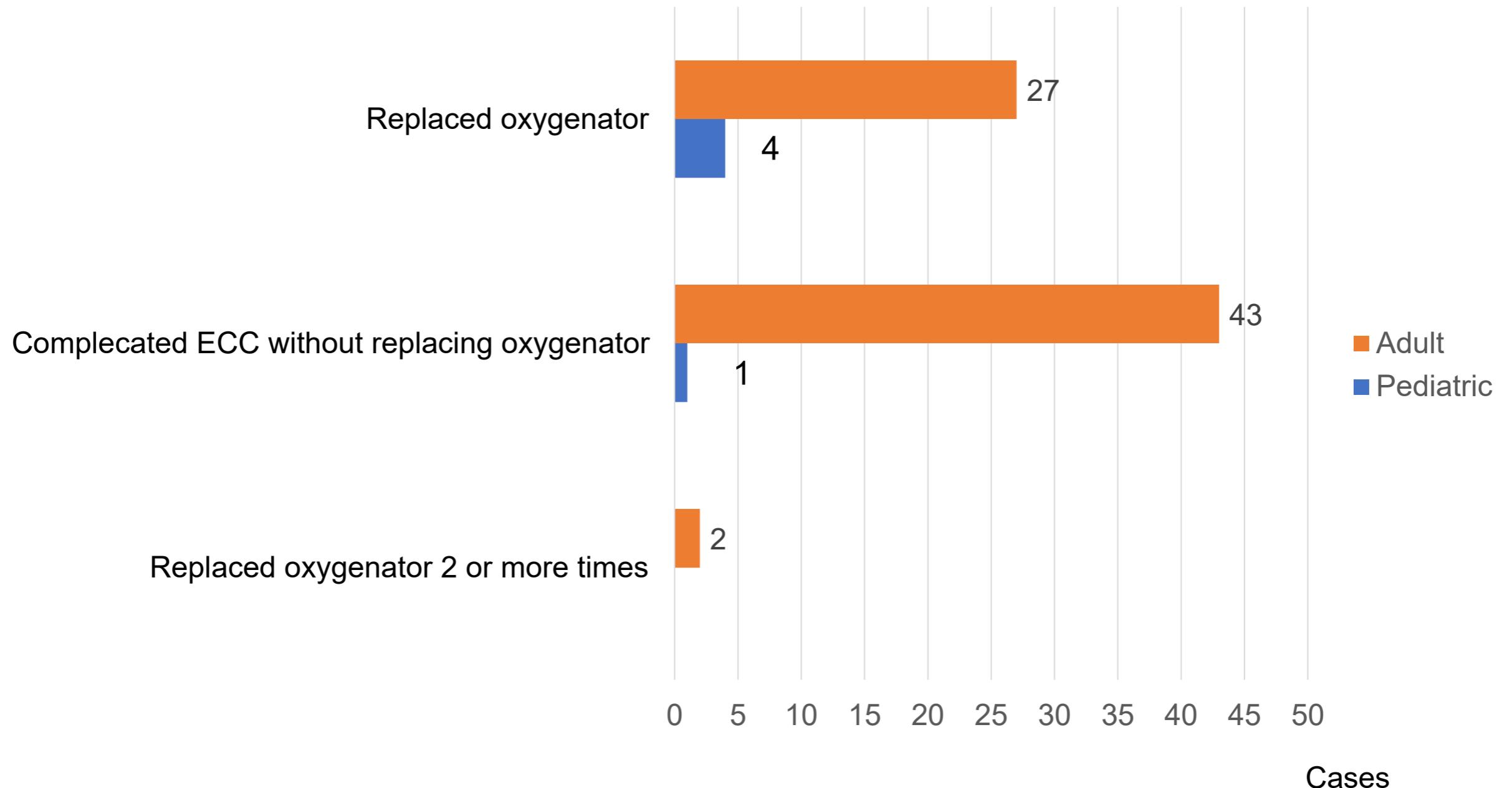


N=60 (no answer: 2 insts.)

Cardiopulmonary Bypass (CPB)

Did you replace the oxygenator? (Please choose all that apply.)

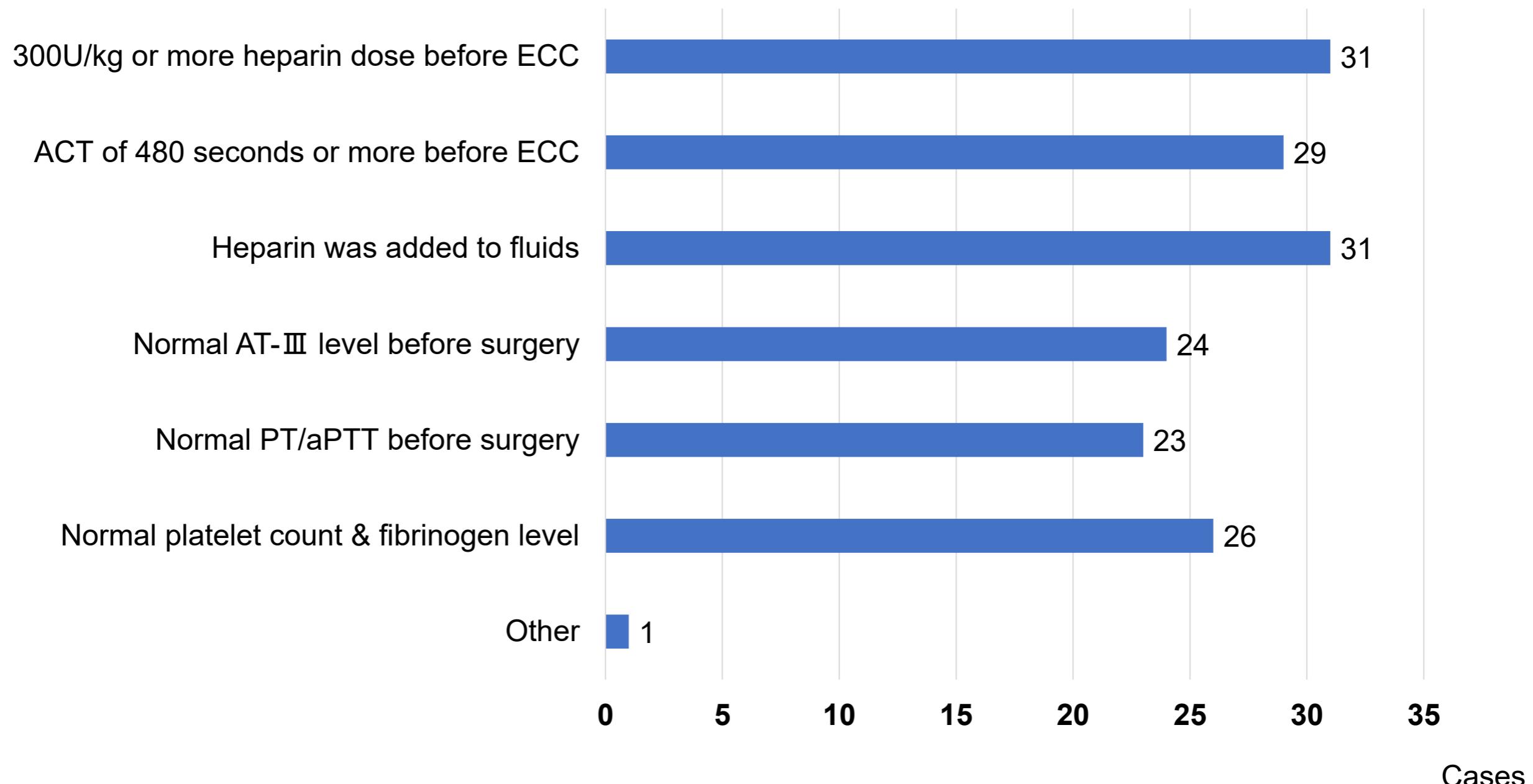
(62 institutions that experienced “increase in oxygenator inlet pressure” and/or “clotting”)



N=62 (no answer: 0 insts.)

Cardiopulmonary Bypass (CPB)

What was the state of the patient when you replaced the oxygenator? (Please choose all that apply.)



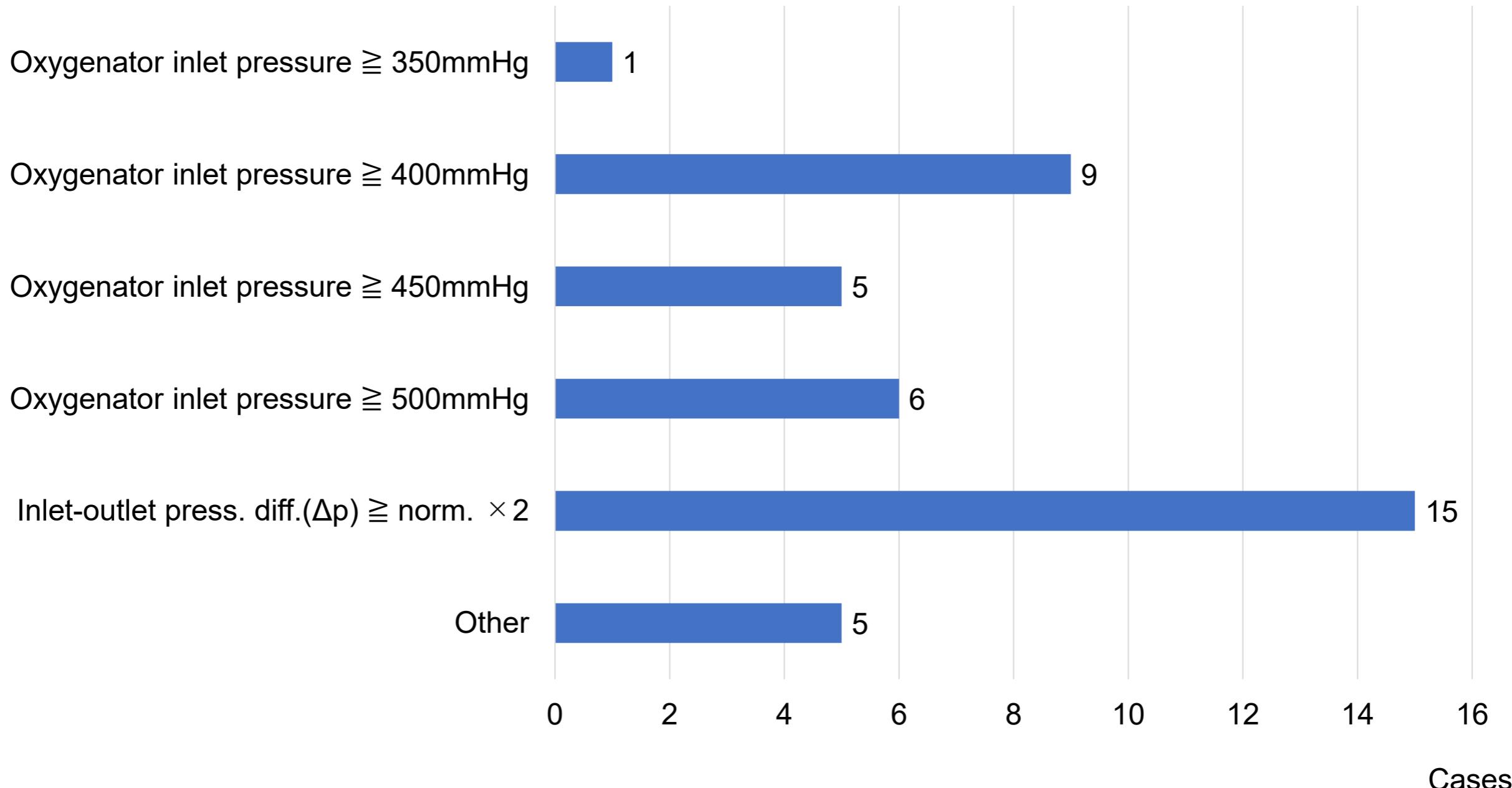
N=26 (no answer: 3 insts.)

Cardiopulmonary Bypass (CPB)

What was reason for replacing the oxygenator?

(Please choose all that apply.)

(27 institutions that replaced oxygenator 1 or more times)



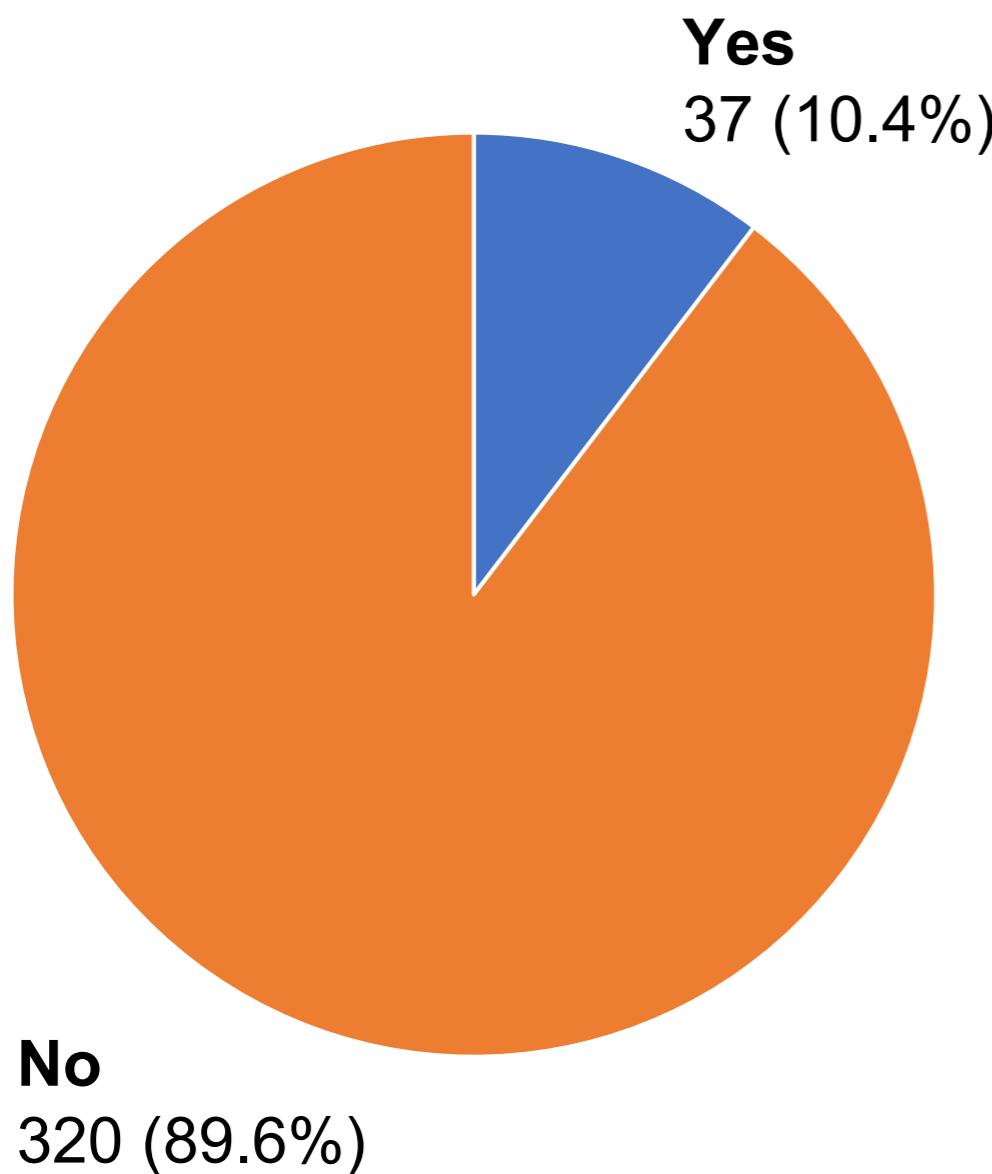
N=26 (no answer: 1 insts.)

Cardiopulmonary Bypass (CPB)

Oxygenator-Related Incidents & Rates

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	84	0.13%	119	0.15%	89	0.11%		
1 – 3a	109	0.17%	106	0.14%	120	0.15%		
3b – 5	9	0.01%	4	0.01%	12	0.01%		
	No answer: 4 insts.		No answer: 11 insts.		No answer: 11 insts			
* Among 62,871 cases			** Among 78,397 cases			***Among 81,455 cases		

Did you experience an incident/accident involving a Venous or Cardiotomy Reservoir?



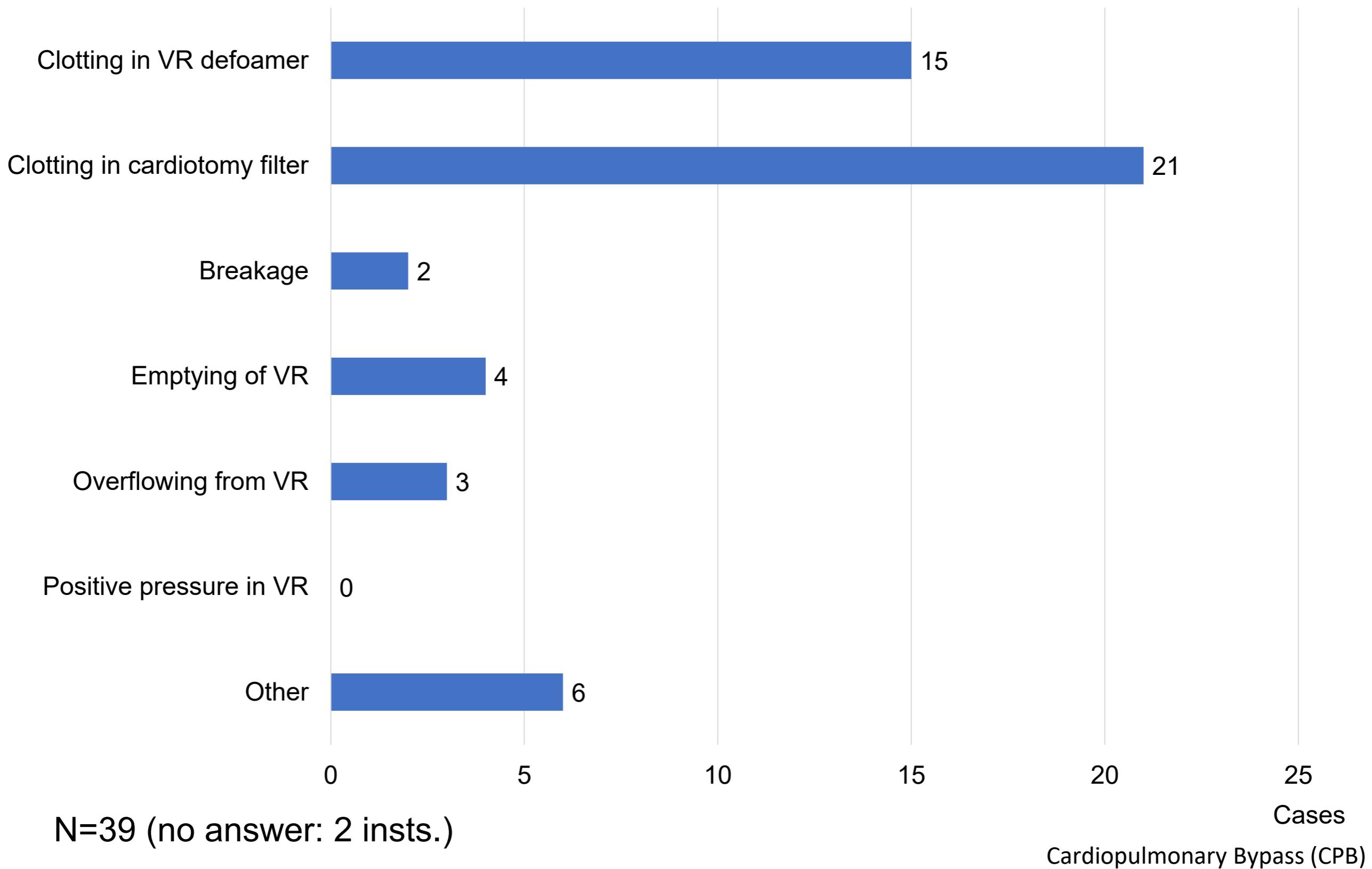
Impact level	No. of cases	Frequency*
0	16	0.03%
1~3a	29	0.05%
3b~5	3	< 0.01%

No answer: 5 insts.

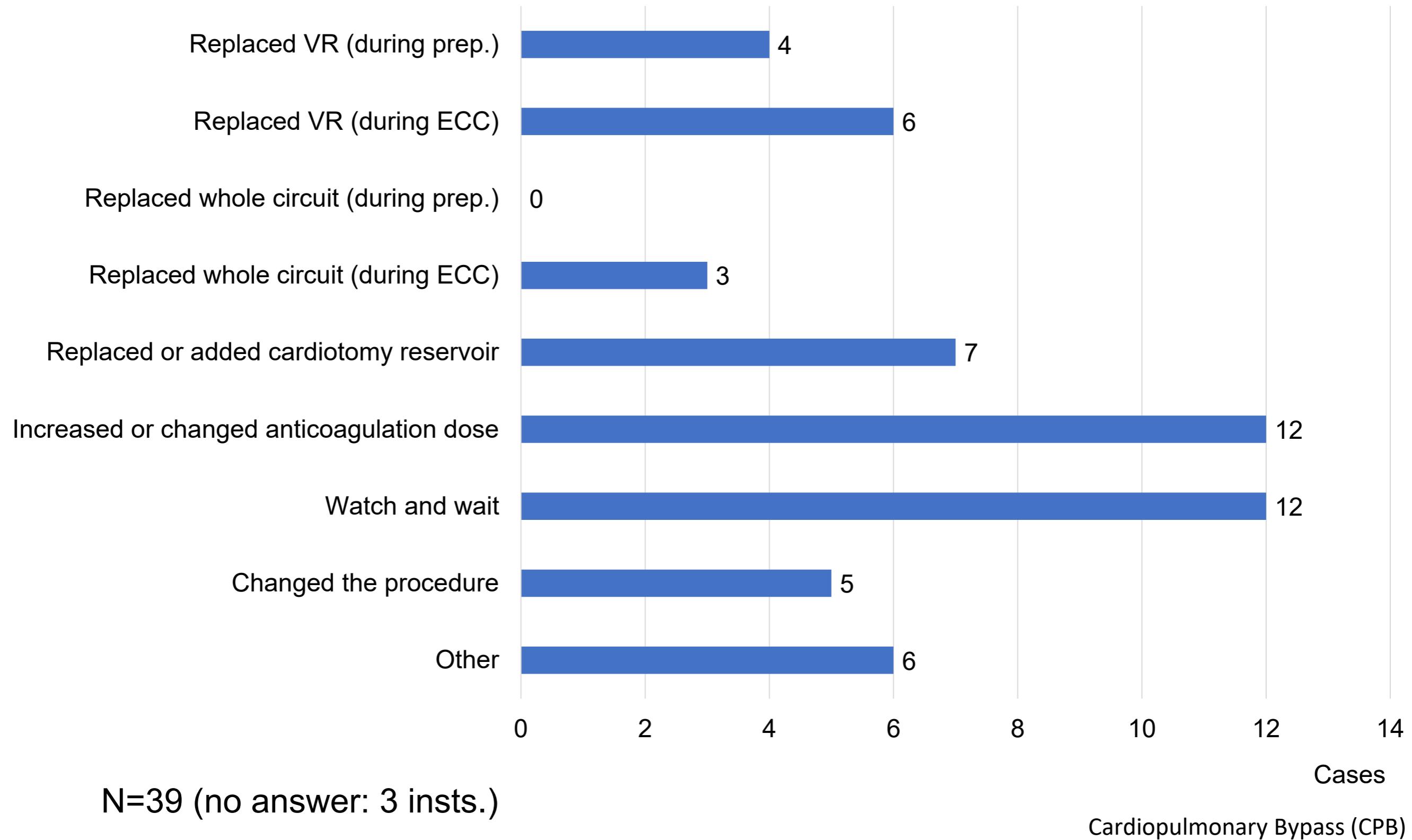
*Among 62,871 CPB cases occurring during the 2-year period

N=359 (no answer: 2 insts.)

How many times did you experience the following incidents/accidents? (Please choose all that apply.)



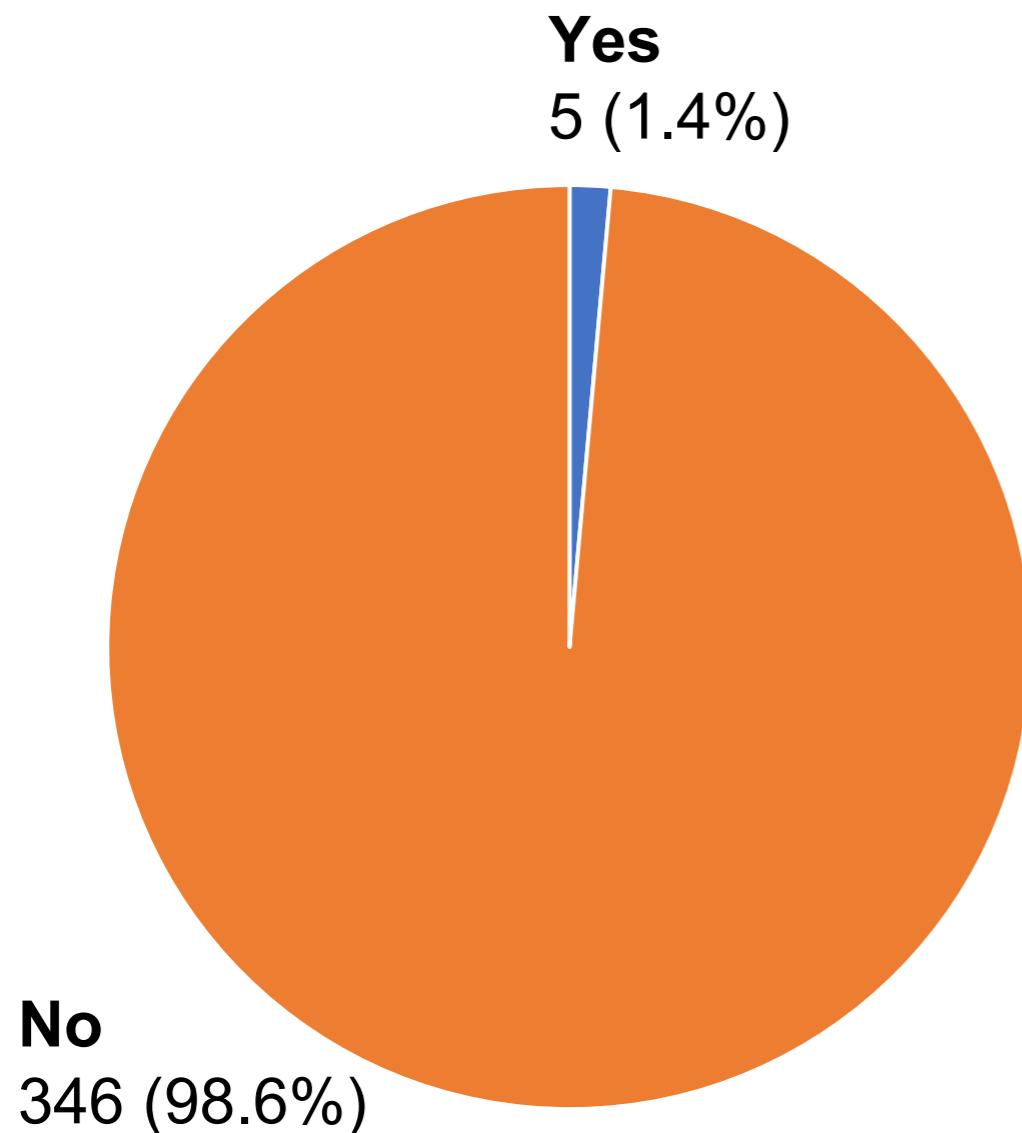
Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



Venous-Reservoir-Related Incidents & Rates

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	16	0.03%	30	0.04%	46	0.06%		
1 – 3a	29	0.05%	21	0.03%	36	0.04%		
3b – 5	3	< 0.01%	0	0.00%	4	< 0.01%		
No answer: 33 insts.			No answer: 33 insts.			No answer: 14 insts.		
* Among 62,871 cases			** Among 78,397 cases			*** Among 81,455 cases		

Did you experience an incident/accident involving an Arterial Line Filter? (excluding oxygenators with built-in filters)



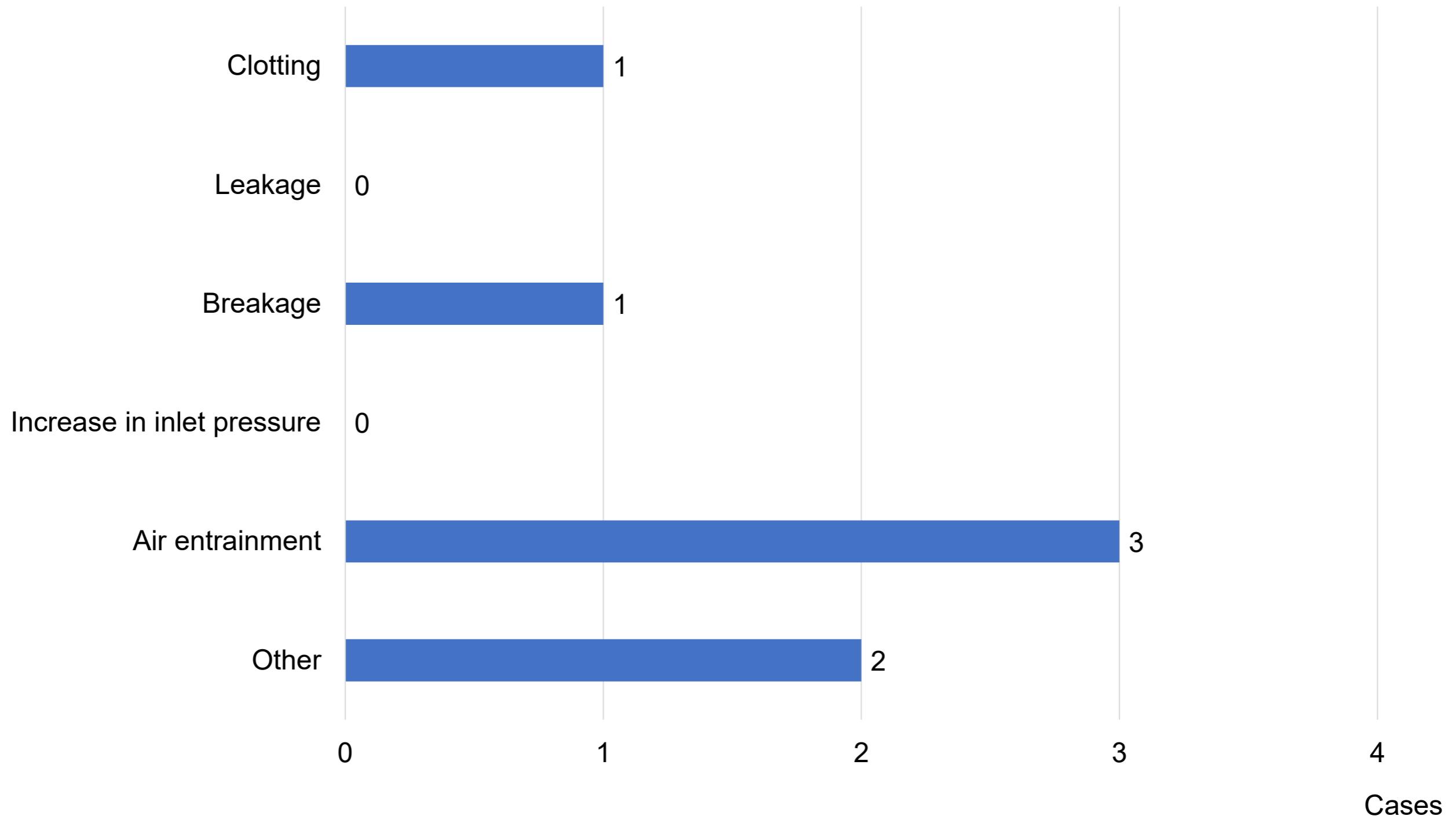
Impact level	No. of cases	Frequency*
0	6	< 0.01%
1~3a	1	< 0.01%
3b~5	0	0%

No answer: 8 insts

*Among 62,871 CPB cases occurring during the 2-year period

N=359 (no answer: 8 insts.)

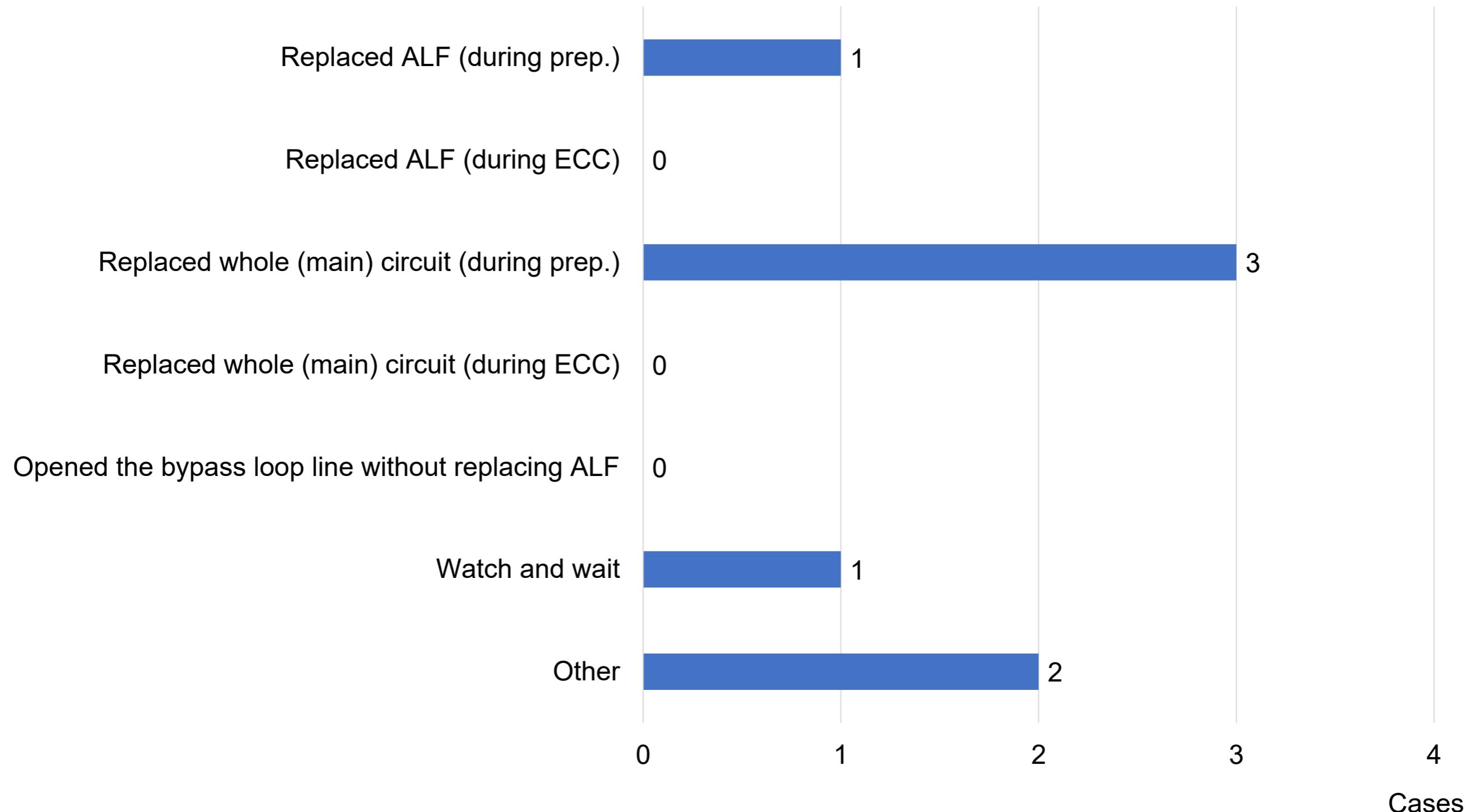
How many times did you experience the following incidents/accidents? (Please choose all that apply.)



N=13 (no answer: 8 insts.)

Cardiopulmonary Bypass (CPB)

Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



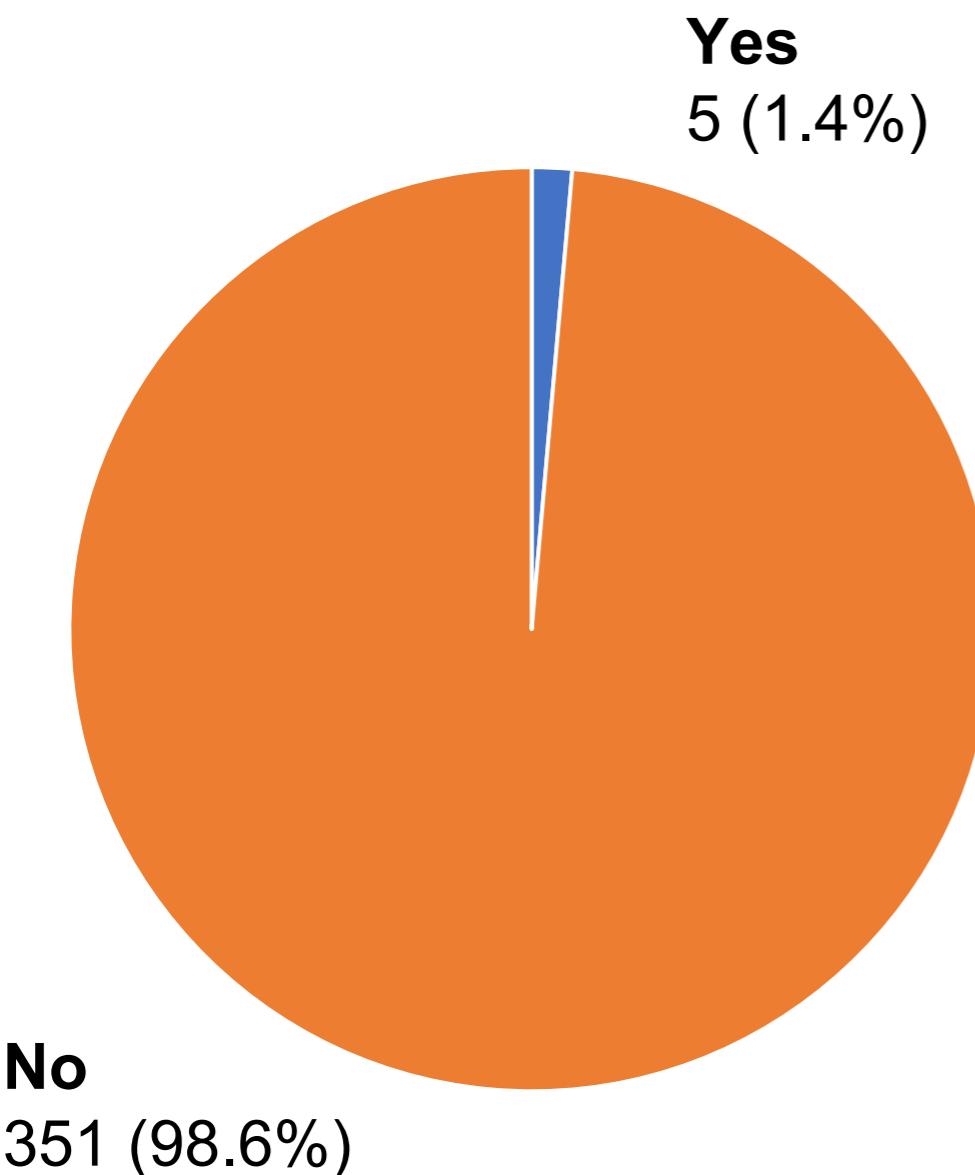
N=13 (no answer: 8 insts.)

Cardiopulmonary Bypass (CPB)

Arterial Line Filter-Related Incidents & Rates

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	6	<0.01%	5	<0.01%	6	<0.01%		
1 – 3a	1	<0.01%	1	<0.01%	3	<0.01%		
3b – 5	0	0%	0	0%	0	0%		
No answer: 8 insts.			No answer: 32 insts.			No answer: 13 insts.		
*Among 62,871 cases			** Among 78,397 cases			*** Among 81,455 cases		

Did you experience an incident/accident related to Blood Supply Interruption due to Blood Pump Failure?



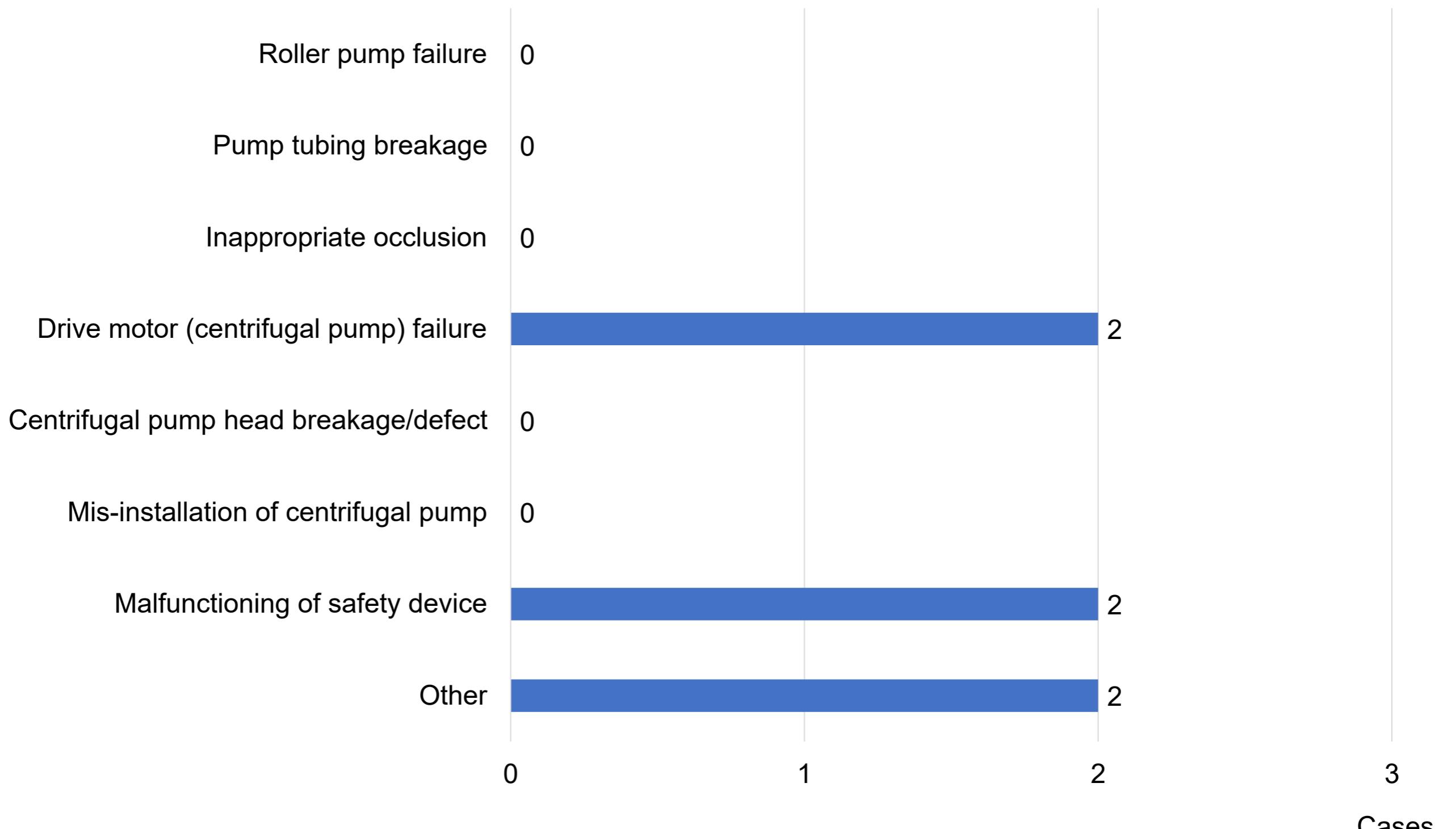
Impact level	No. of cases	Frequency*
0	3	< 0.01%
1~3a	2	< 0.01%
3b~5	1	< 0.01%

No answer: 3 insts.

*Among 62,871 CPB cases occurring during the 2-year period

N=359 (no answer: 3 insts.)

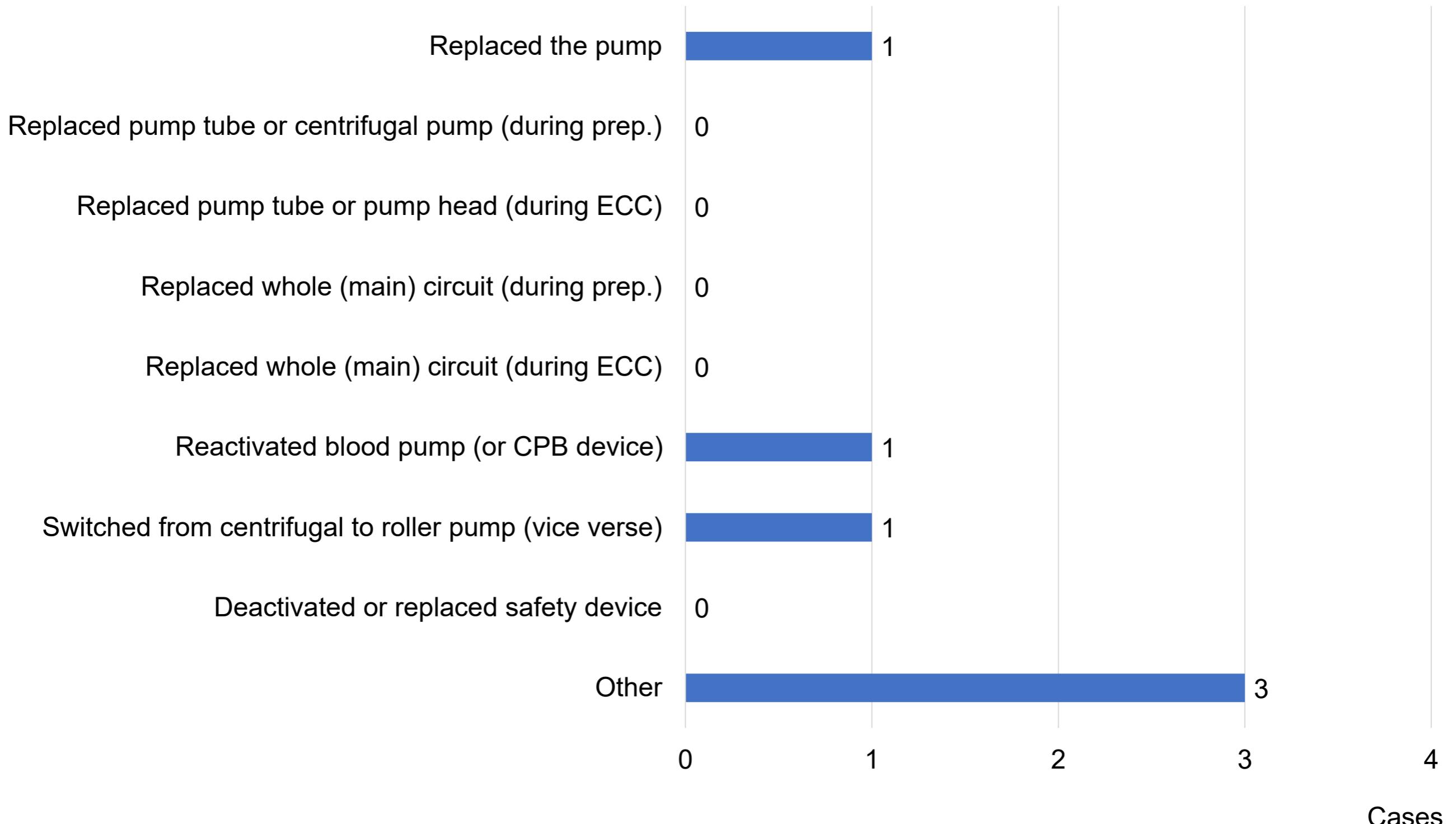
How many times did you experience the following incidents/accidents? (Please choose all that apply.)



N=8 (no answer: 3 insts.)

Cardiopulmonary Bypass (CPB)

Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



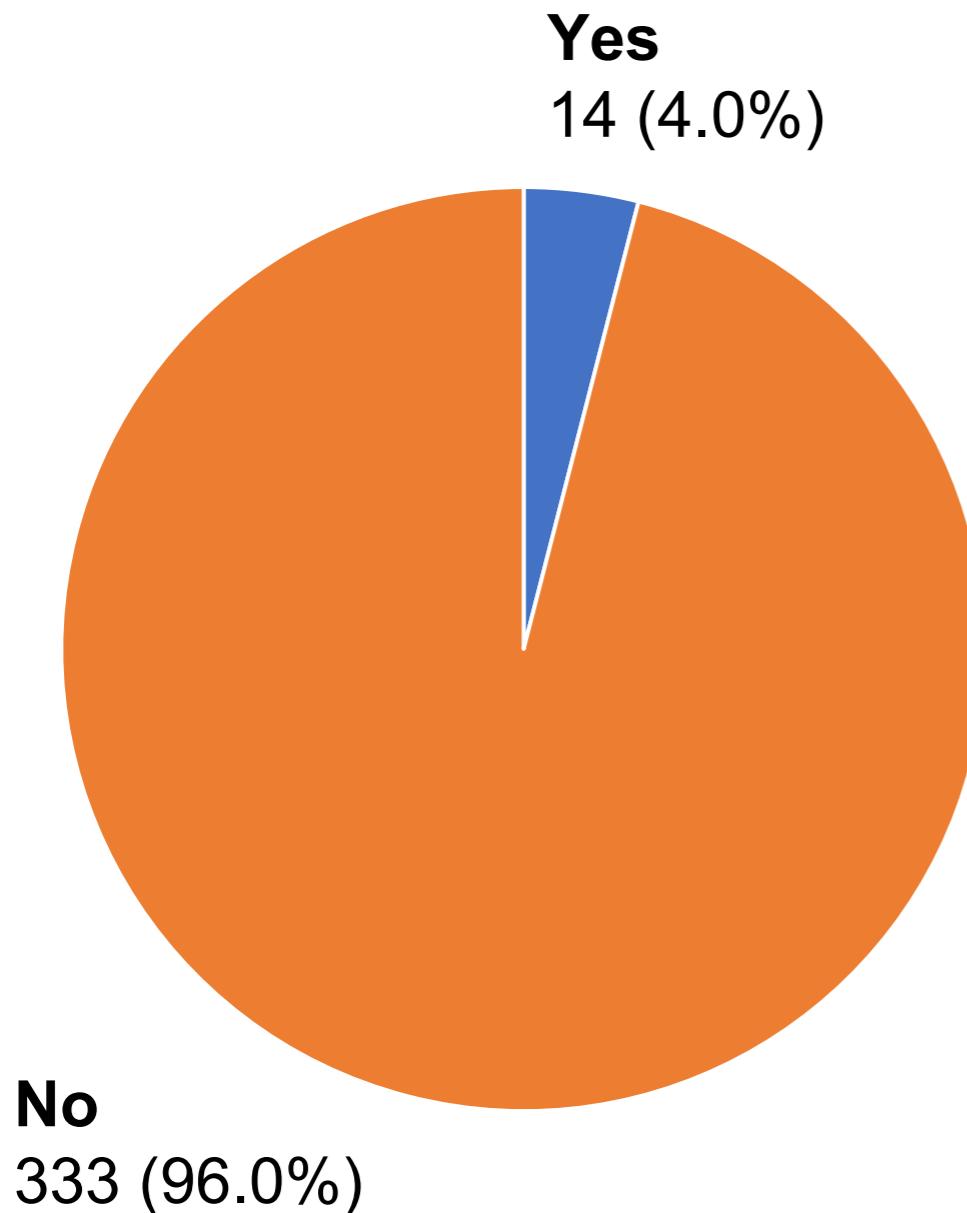
N=8 (no answer: 3 insts.)

Cardiopulmonary Bypass (CPB)

Blood Supply Interruption Incidents & Rates due to Blood Pump Failure

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	3	<0.01%	7	<0.01%	7	<0.01%		
1~3a	2	<0.01%	8	<0.01%	7	<0.01%		
3b~5	1	<0.01%	0	0%	0	0%		
	No answer: 3 insts.			No answer: 8 insts.			No answer: 7 insts.	
	* Among 62,871 cases			** Among 78,397 cases			*** Among 81,455 cases	

Did you experience an incident/accident caused by Mishandling of Blood Pump?



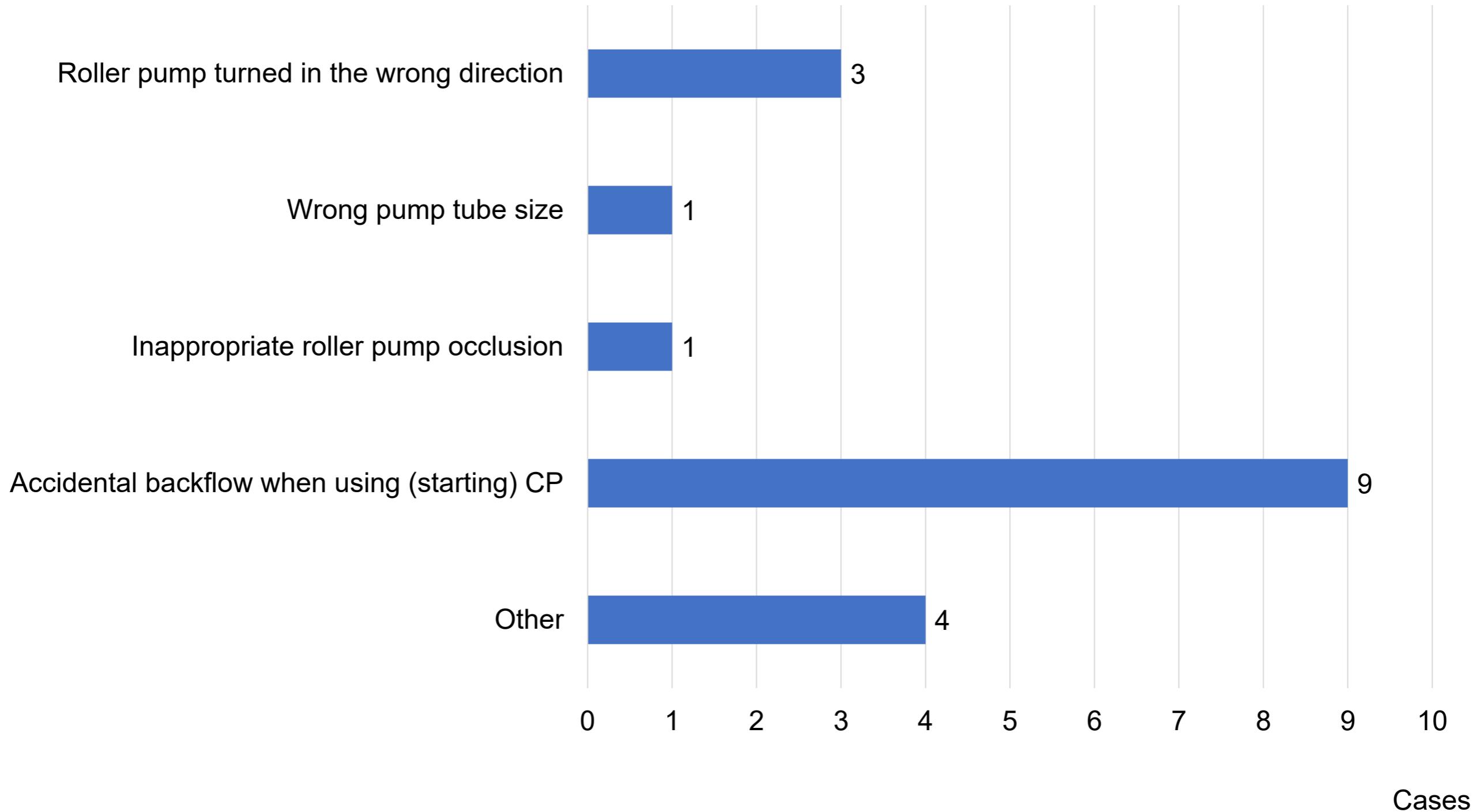
Impact level	No. of cases	Frequency*
0	11	0.02%
1~3a	6	<0.01%
3b~5	1	<0.01%

No answer: 12 insts.

*Among 62,871 CPB cases occurring during the 2-year period

N=359 (no answer: 12 insts.)

How many times did you experience the following incidents/accidents? (Please choose all that apply.)



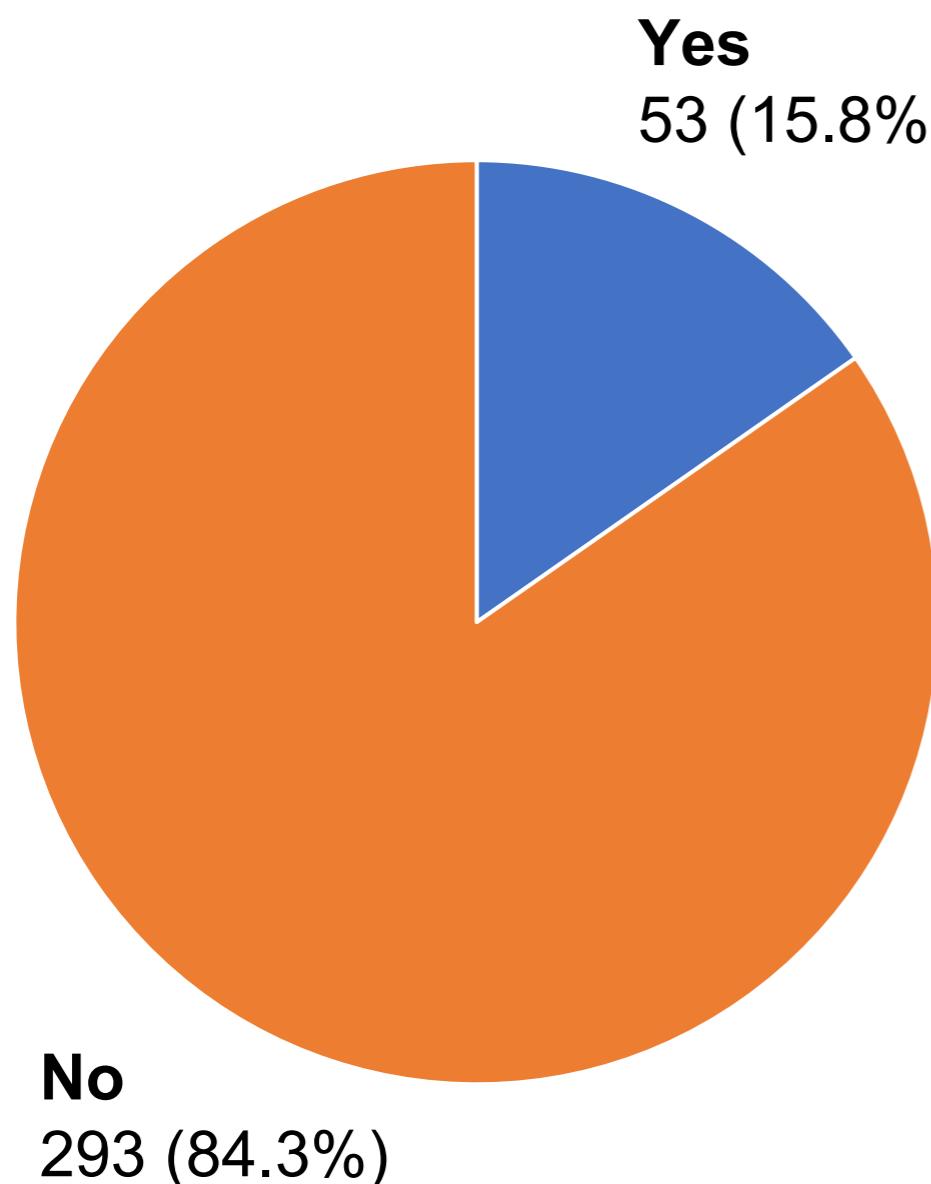
N=26 (no answer: 12 insts.)

Cardiopulmonary Bypass (CPB)

Blood Pump Mishandling Incidents & Rates

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	11	0.02%	14	0.02%	12	0.01%		
1~3a	6	<0.01%	9	0.01%	39	0.05%		
3b~5	1	<0.01%	0	0%	0	0%		
No answer: 12 insts.			No answer: 17 insts.			No answer: 23 insts.		
* Among 62,871 cases			** Among 78,397 cases			*** Among 81,455 cases		

Did you experience an incident/accident involving a Meter or Alarm Device?



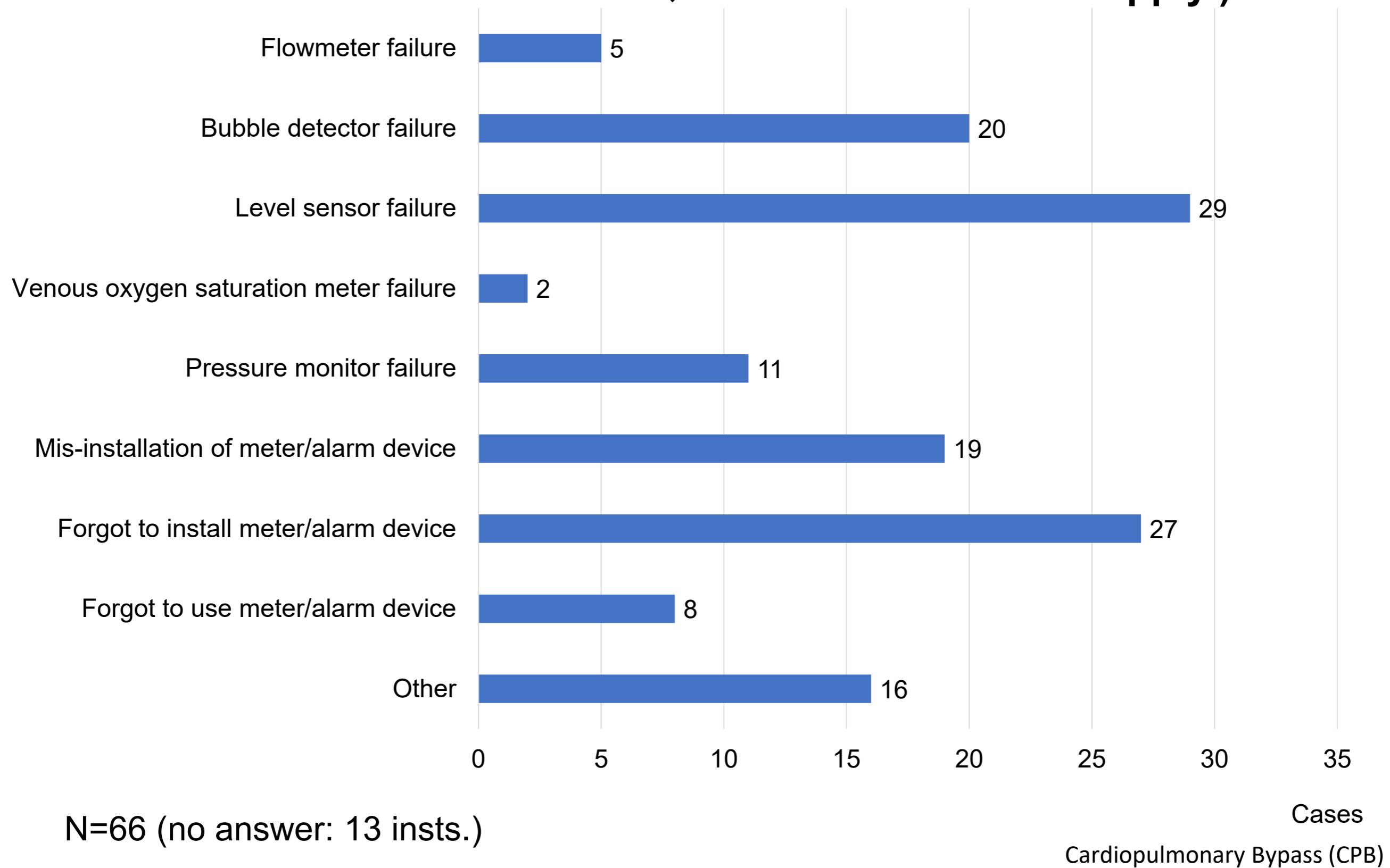
Impact level	No. of cases	Frequency*
0	104	0.17%
1~3a	12	0.02%
3b~5	0	0%

No answer: 13 insts.

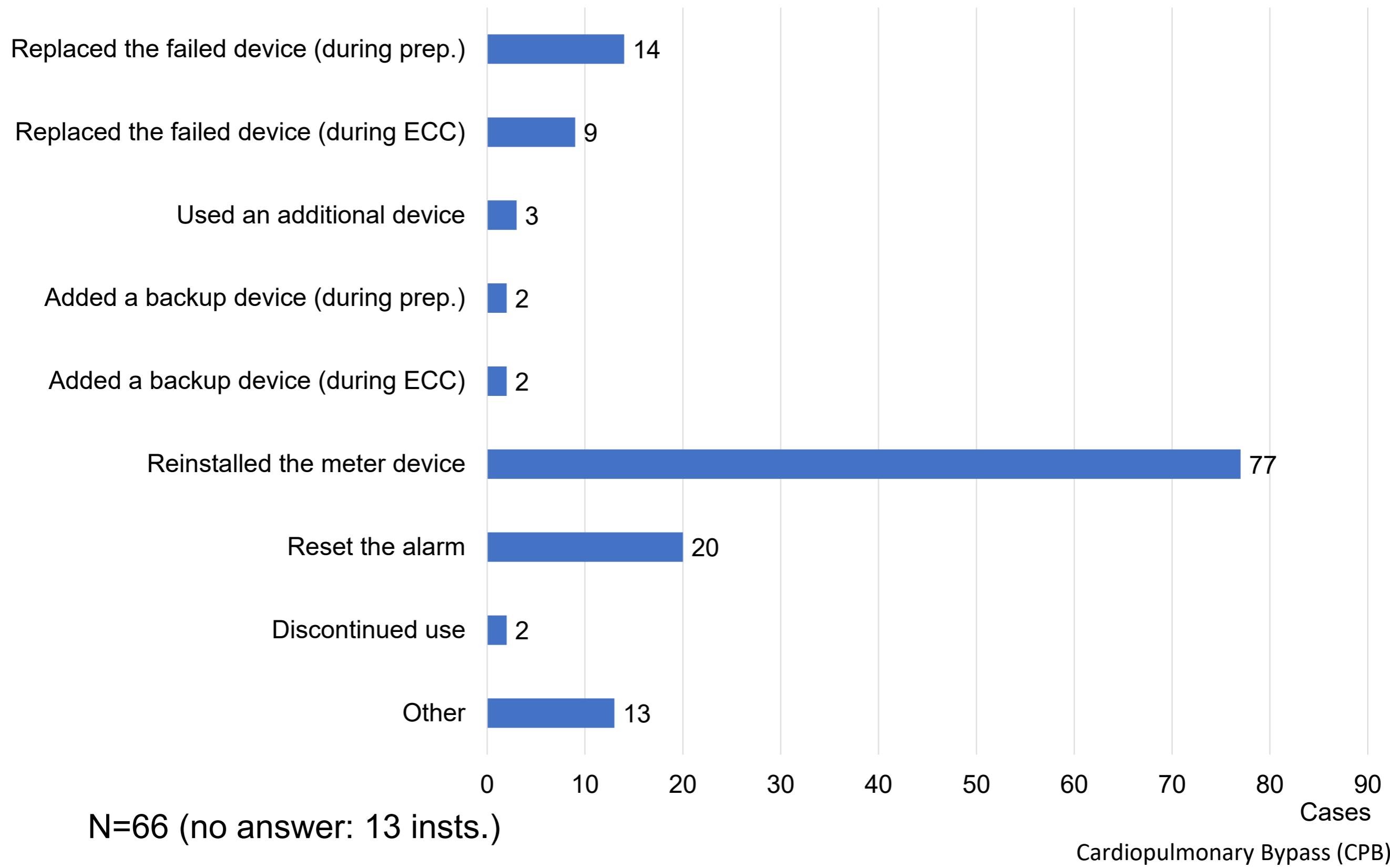
*Among 62,871 CPB cases occurring during the 2-year period

N=359 (no answer: 13 insts.)

How many times did you experience the following incidents/accidents? (Please choose all that apply.)



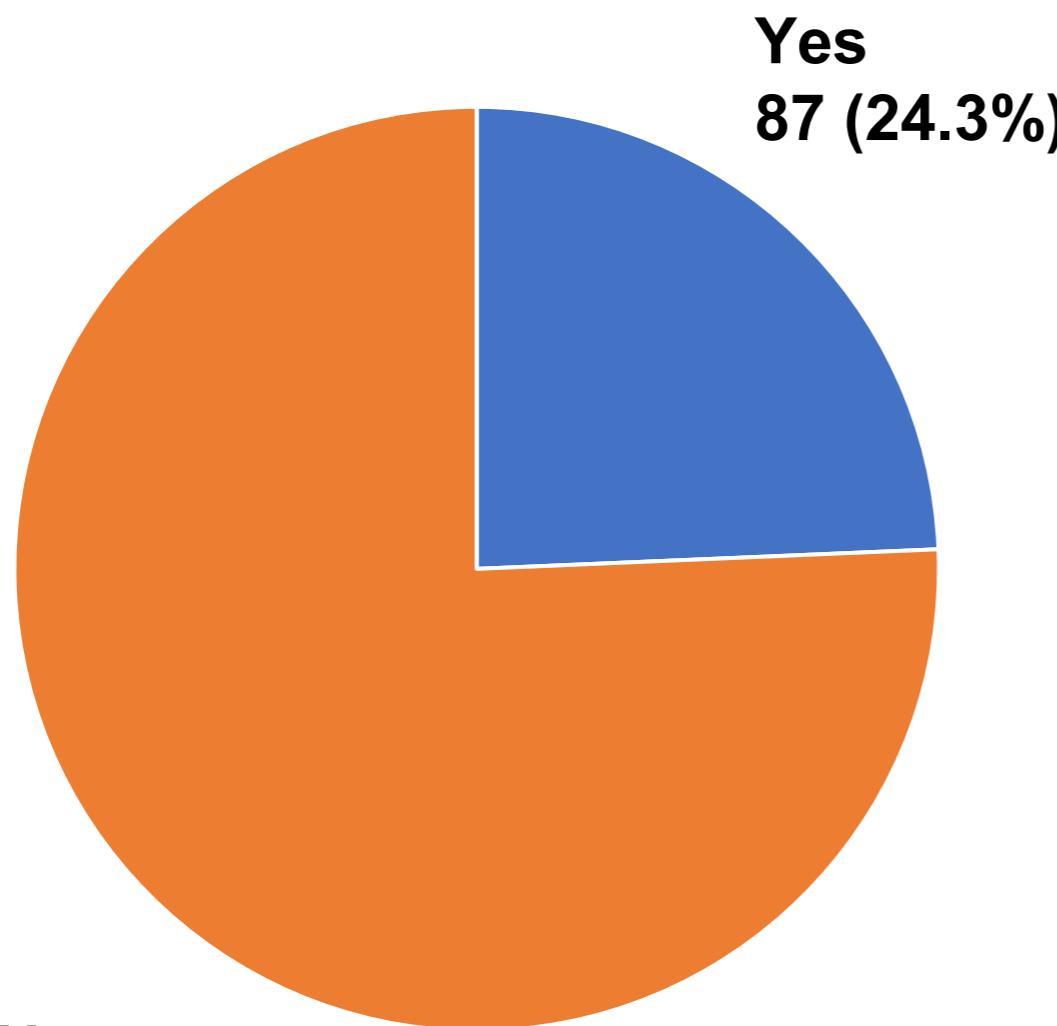
Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



Meter/Alarm-Related Incidents & Rates

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	104	0.17%	120	0.15%	134	0.16%		
1~3a	12	0.02%	25	0.03%	26	0.03%		
3b~5	0	0%	0	0%	0	0%		
	No answer: 13 insts.		No answer: 9 insts.		No answer: 20			
	* Among 62,871 cases		** Among 78,397 cases		*** Among 81,455 cases			

Did you experience an incident/accident involving CPB Circuit? (excl. blood pump, oxygenator & arterial filter)



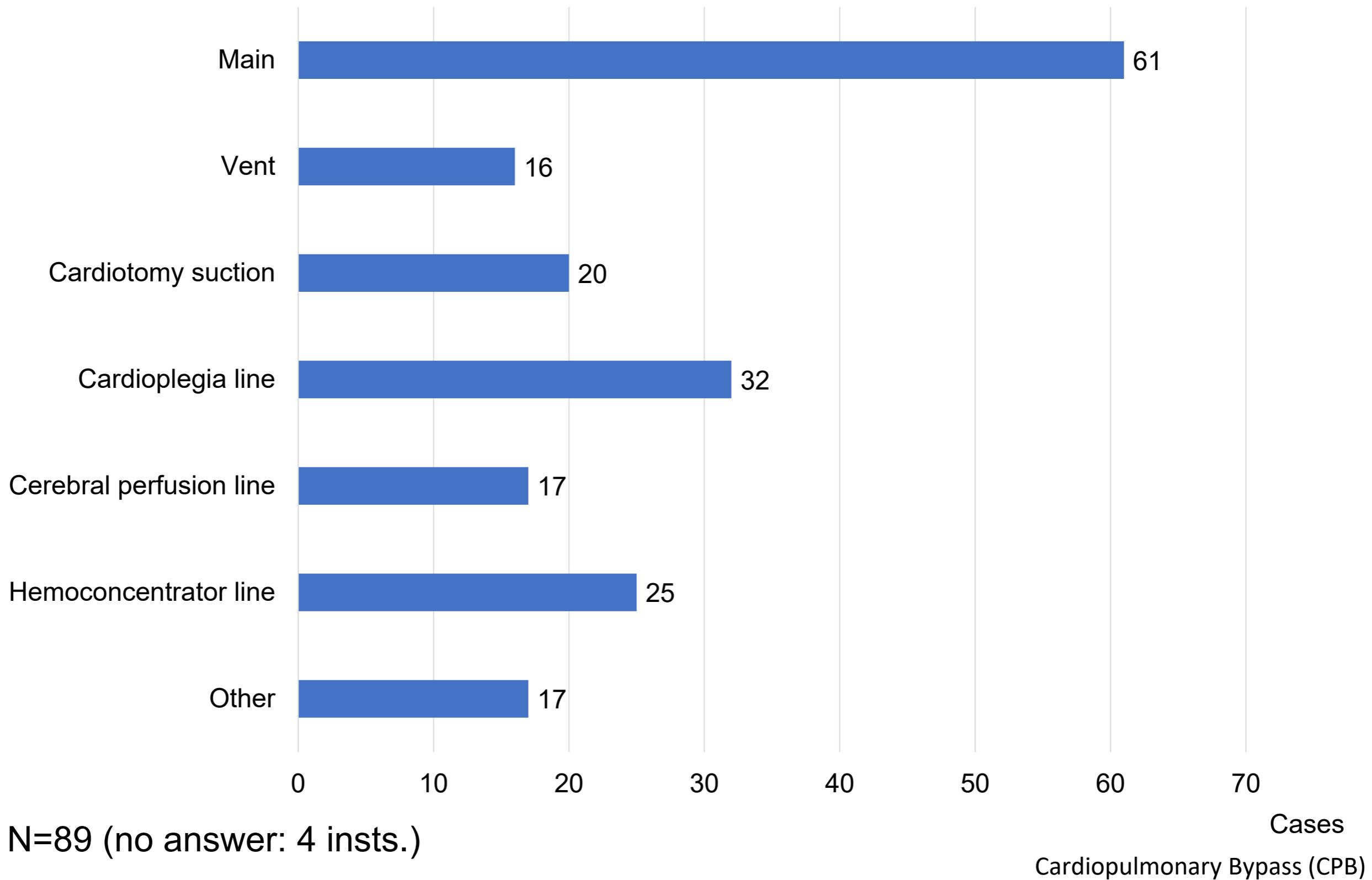
Impact level	No. of cases	Frequency*
0	109	0.17%
1~3a	62	0.09%
3b~5	2	< 0.01%

No answer: 8 insts.

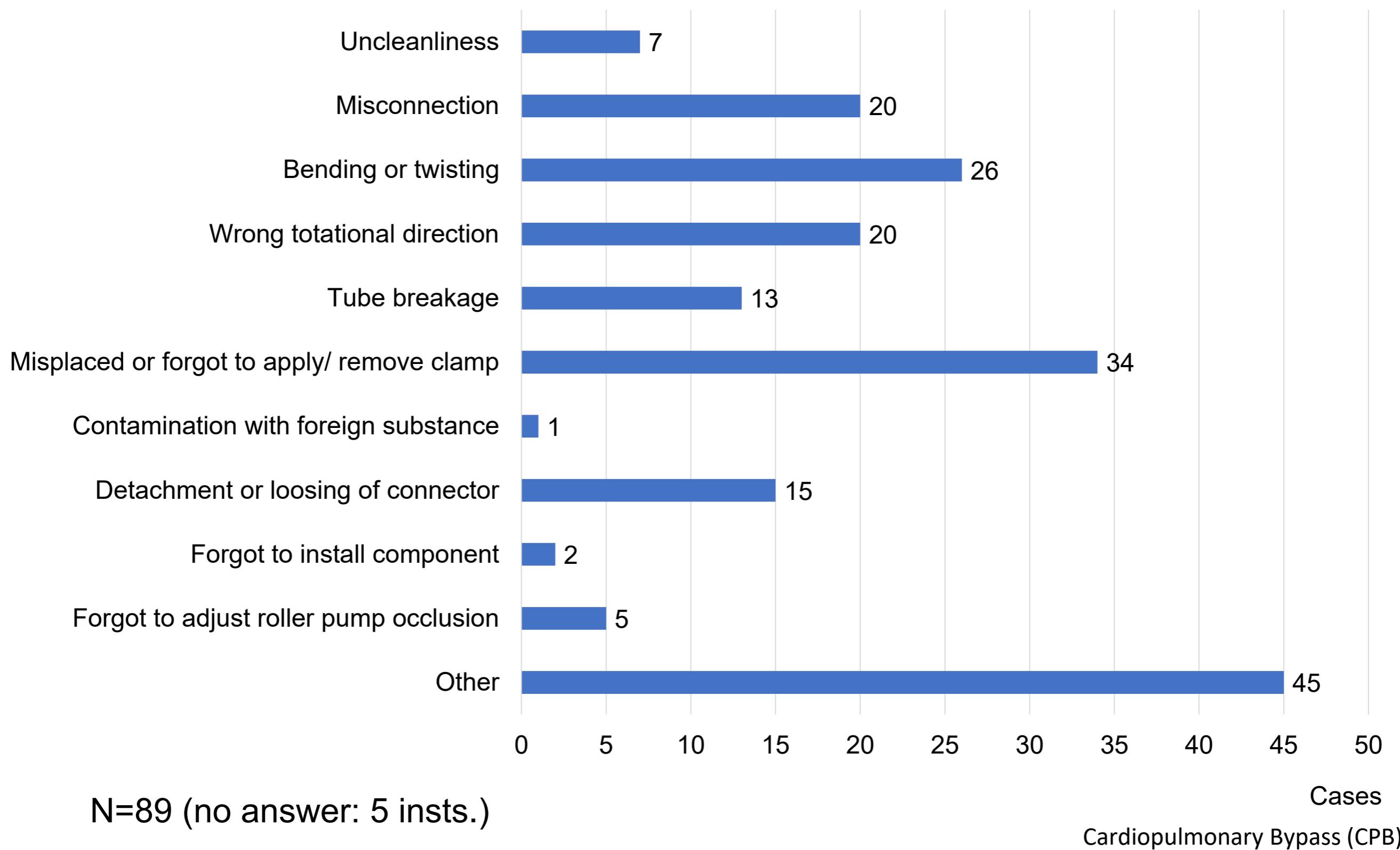
*Among 62,871 CPB cases occurring during the 2-year period

N=359 (no answer: 2 insts.)

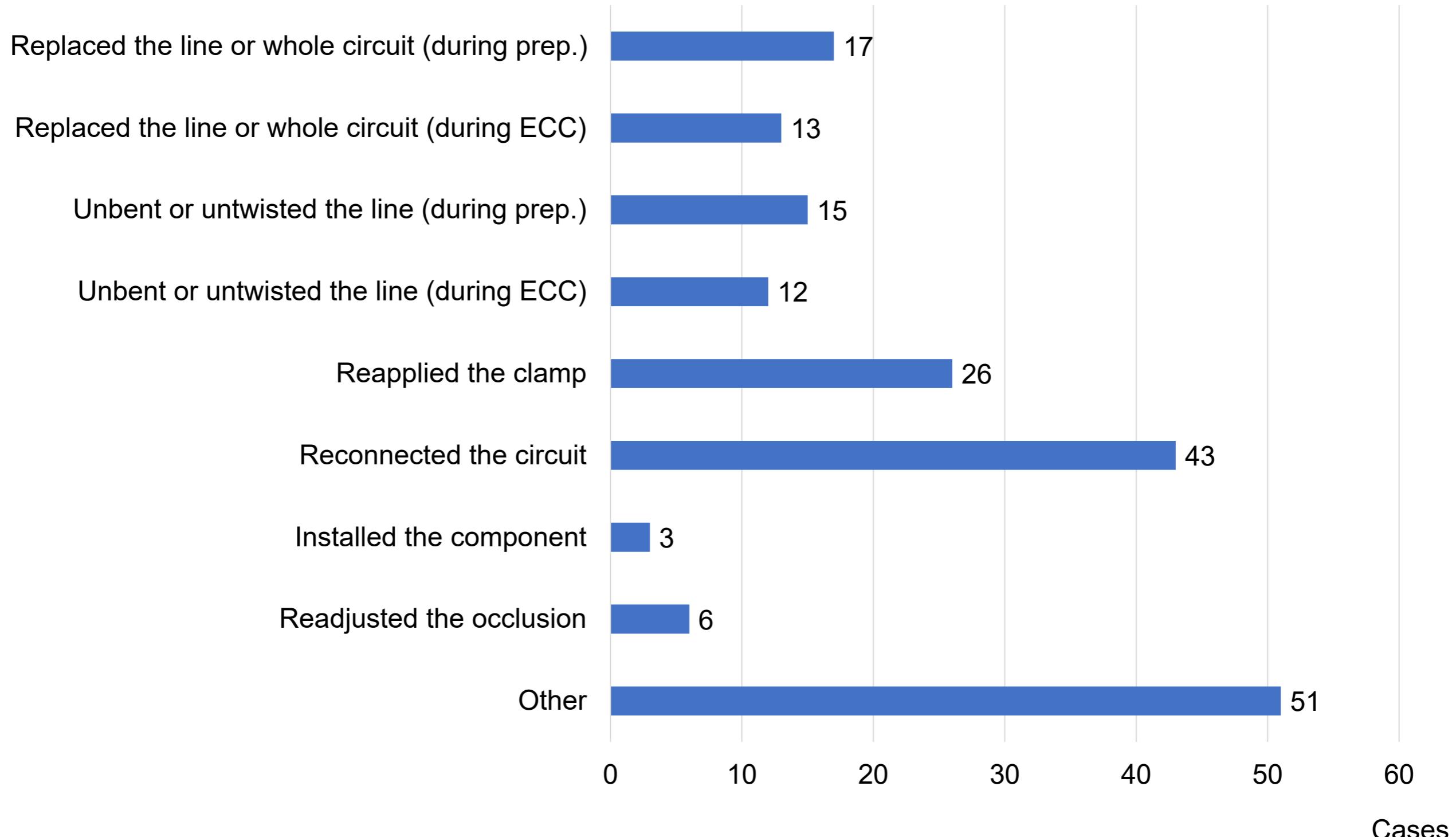
Which of the following circuit/line was involved in the accident/incident and how many times? (Please choose all that apply.)



Which of the following causes was responsible for the accident/incident and how many times? (Please choose all that apply.)



Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



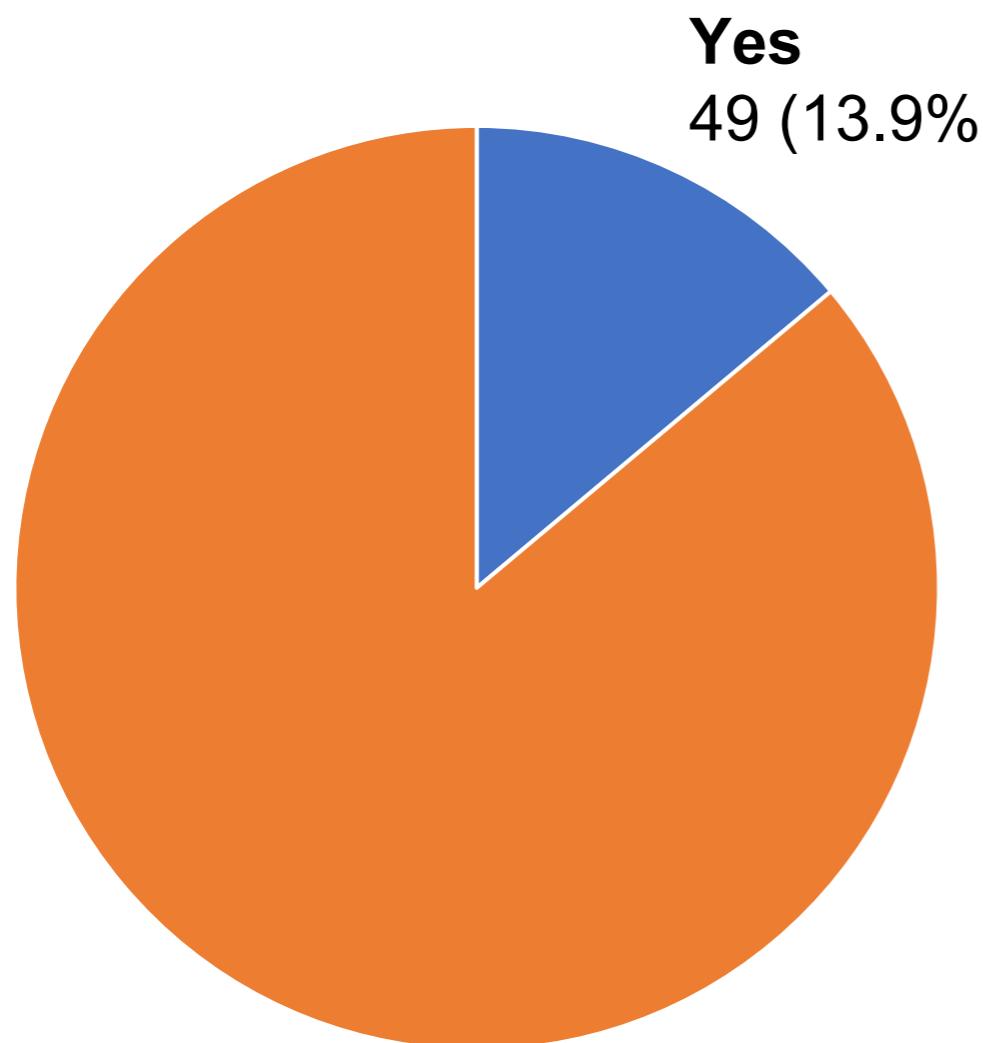
N=89 (no answer: 5 insts.)

Cardiopulmonary Bypass (CPB)

CPB-Circuitry-Related Incidents & Rates

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	109	0.17%	152	0.19%	145	0.18%		
1~3a	62	0.09%	71	0.09%	110	0.14%		
3b~5	0	0%	0	0%	2	<0.01%		
	No answer: 18 insts.		No answer: 13 insts.		No answer: 18 insts.			
* Among 62,871 cases			** Among 78,397 cases			*** Among 81,455 cases		

Did you experience an incident/accident involving a Cannula?



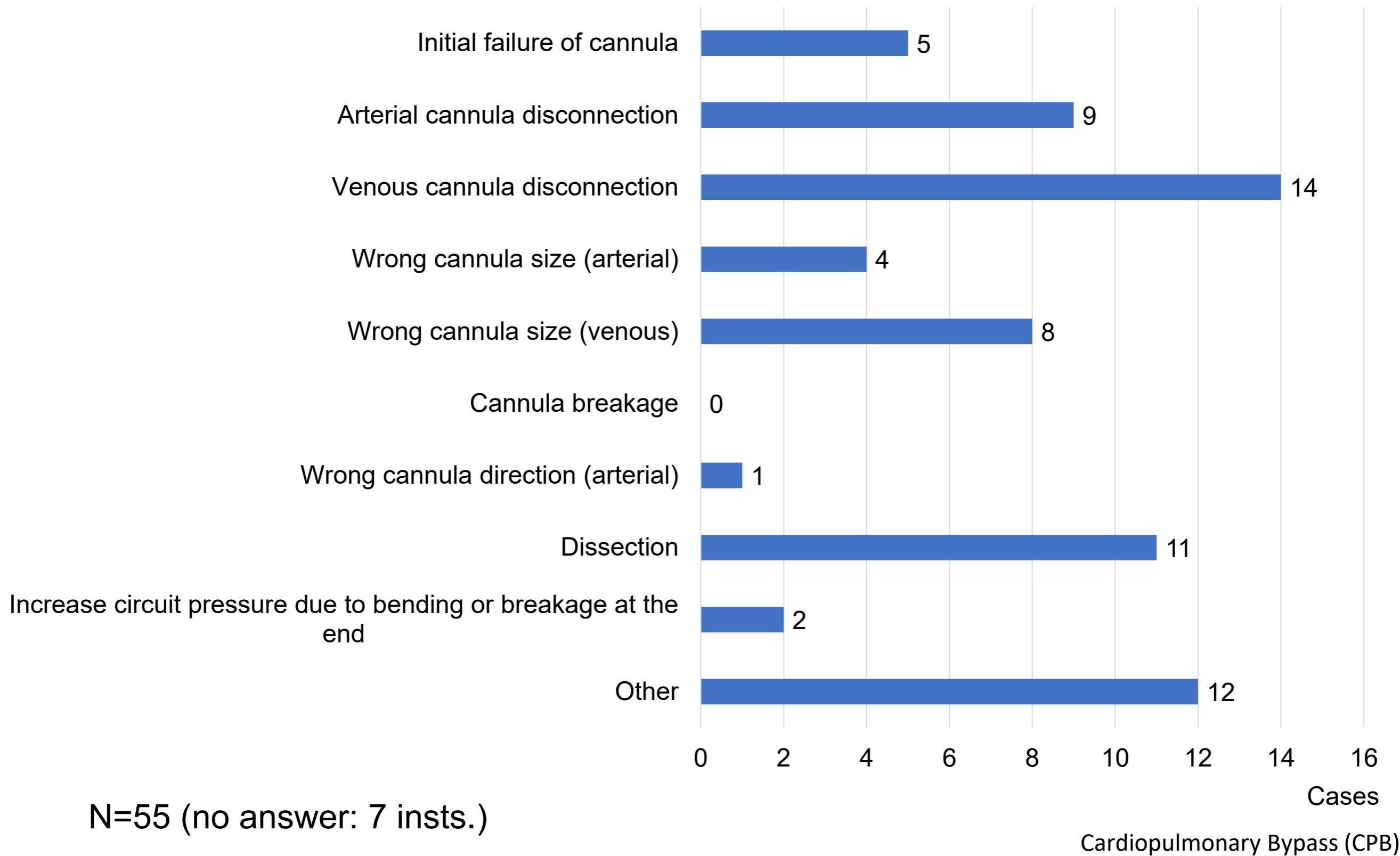
Impact level	No. of cases	Frequency*
0	19	0.03%
1~3a	33	0.05%
3b~5	5	< 0.01%

No answer: 12 insts.

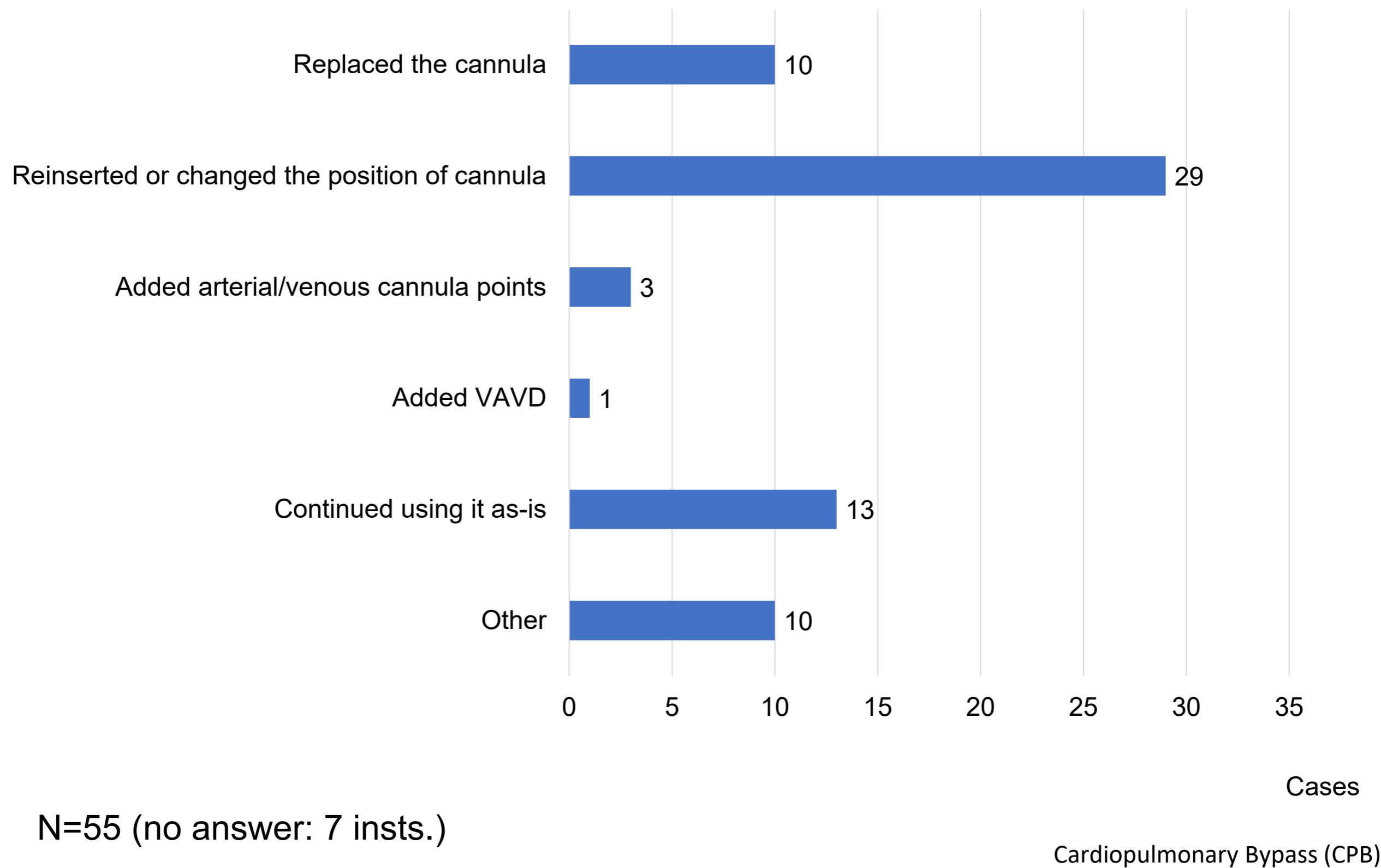
*Among 62,871 CPB cases occurring during the 2-year period

N=359 (no answer: 6 insts.)

How many times did you experience the following incidents/accidents? (Please choose all that apply.)



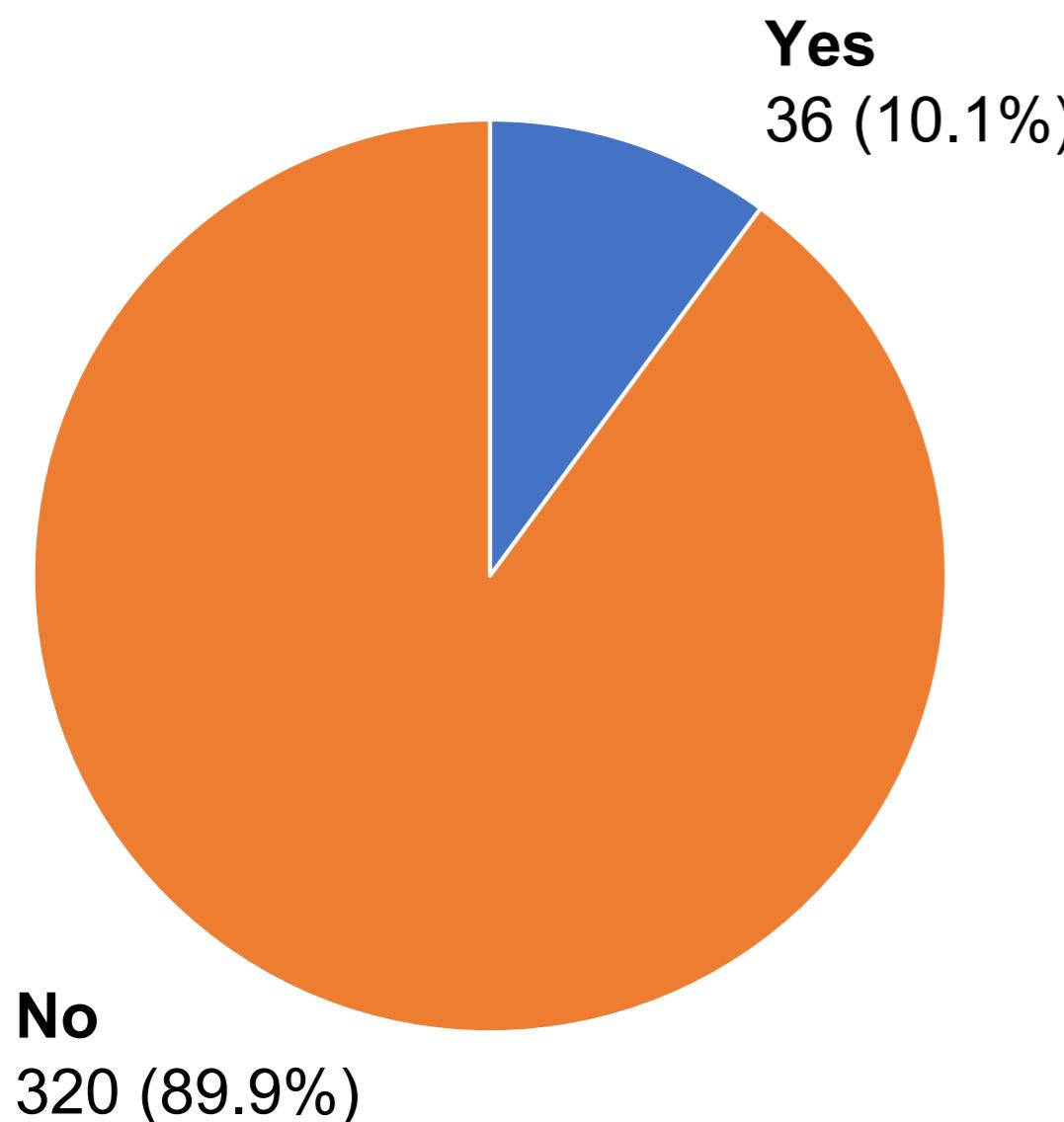
Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



Cannula-Related Incidents & Rates

2023 Survey			2021 Survey		2019 Survey	
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***
0	19	0.03%	48	0.06%	41	0.05%
1~3a	33	0.05%	49	0.06%	92	0.11%
3b~5	5	<0.01%	11	0.01%	16	0.02%
	No answer: 12 insts.		No answer: 10 insts.		No answer: 14 insts.	
	* Among 62,871 cases		** Among 78,397 cases		*** Among 81,455 cases	

Was there an instance of Forgetting to Supply Oxygen at the start of ECC?



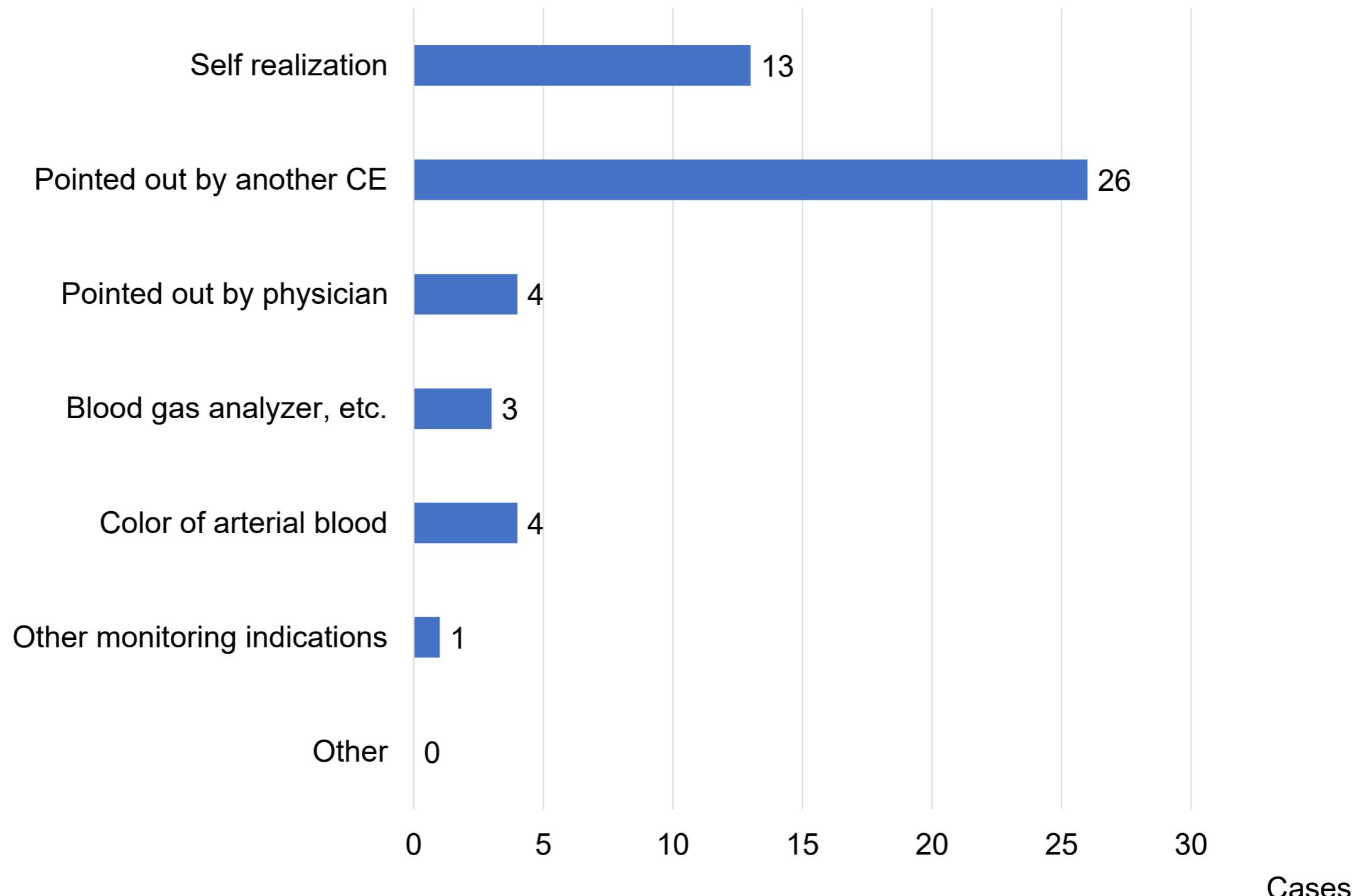
N=359 (no answer: 3 insts.)

Impact level	No. of cases	Frequency*
0	23	0.04%
1~3a	25	0.04%
3b~5	0	0%

No answer: 3 insts.

*Among 62,871 CPB cases occurring during the 2-year period

What made you realize that you forgot to supply oxygen? (Please choose all that apply.)



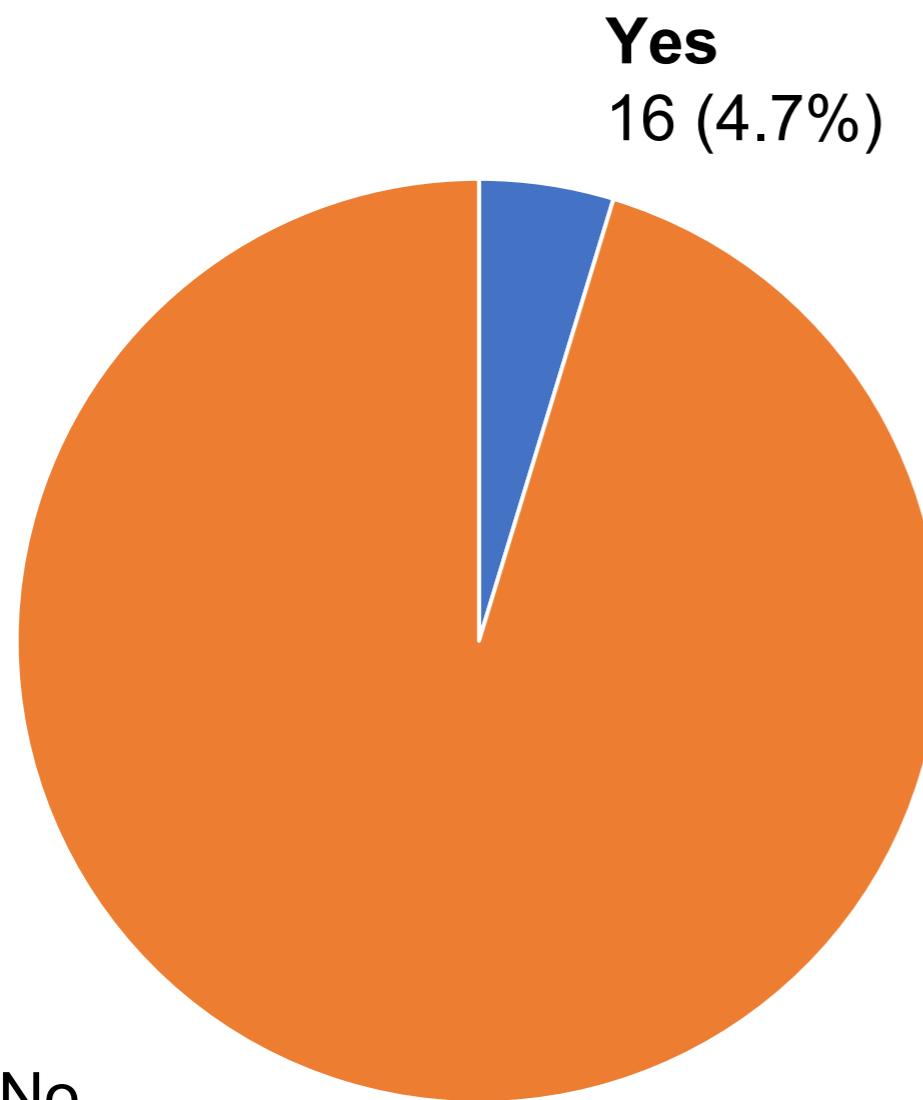
N=39 (no answer: 3 insts.)

Cardiopulmonary Bypass (CPB)

Incidents & Rates of Forgetting to Supply Oxygen at the Start of ECC

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	23	0.04%	38	0.05%	44	0.06%		
1～3a	25	0.04%	32	0.04%	34	0.04%		
3b～5	0	0%	0	0%	0	0%		
	No answer: 3 insts.		No answer: 9 insts.		No answer: 8 insts.			
	* Among 62,871 cases		** Among 78,397 cases		*** Among 81,455 cases			

Did you experience an Inadvertent Air Entering the Bloodstream?



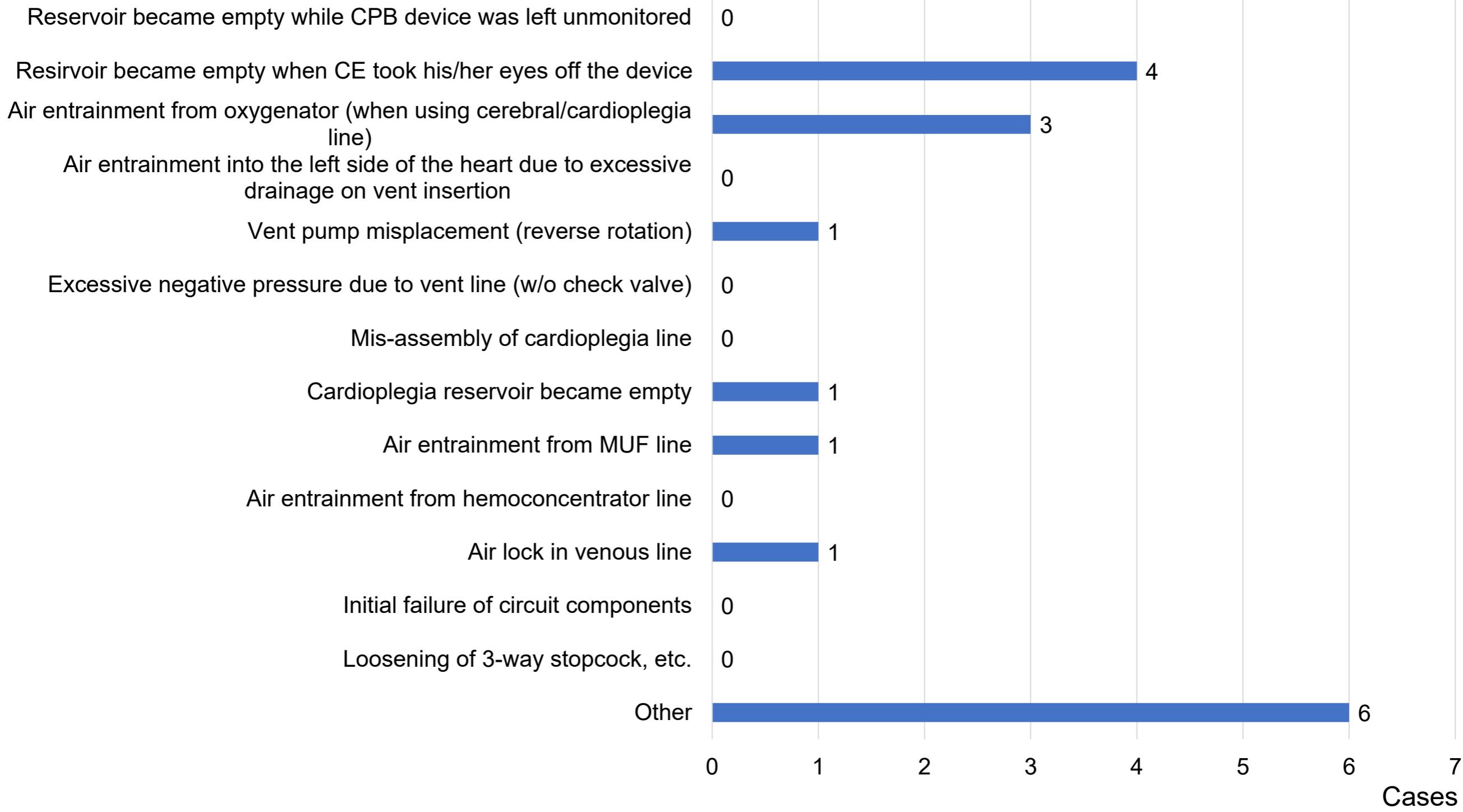
No
325 (95.3%)

N=359 (no answer: 18 insts.)

Impact level	No. of cases	Frequency*
1～3a	15	0.02%
3b～5	3	<0.01%
No answer: 19 insts.		

*Among 62,871 CPB cases occurring during the 2-year period

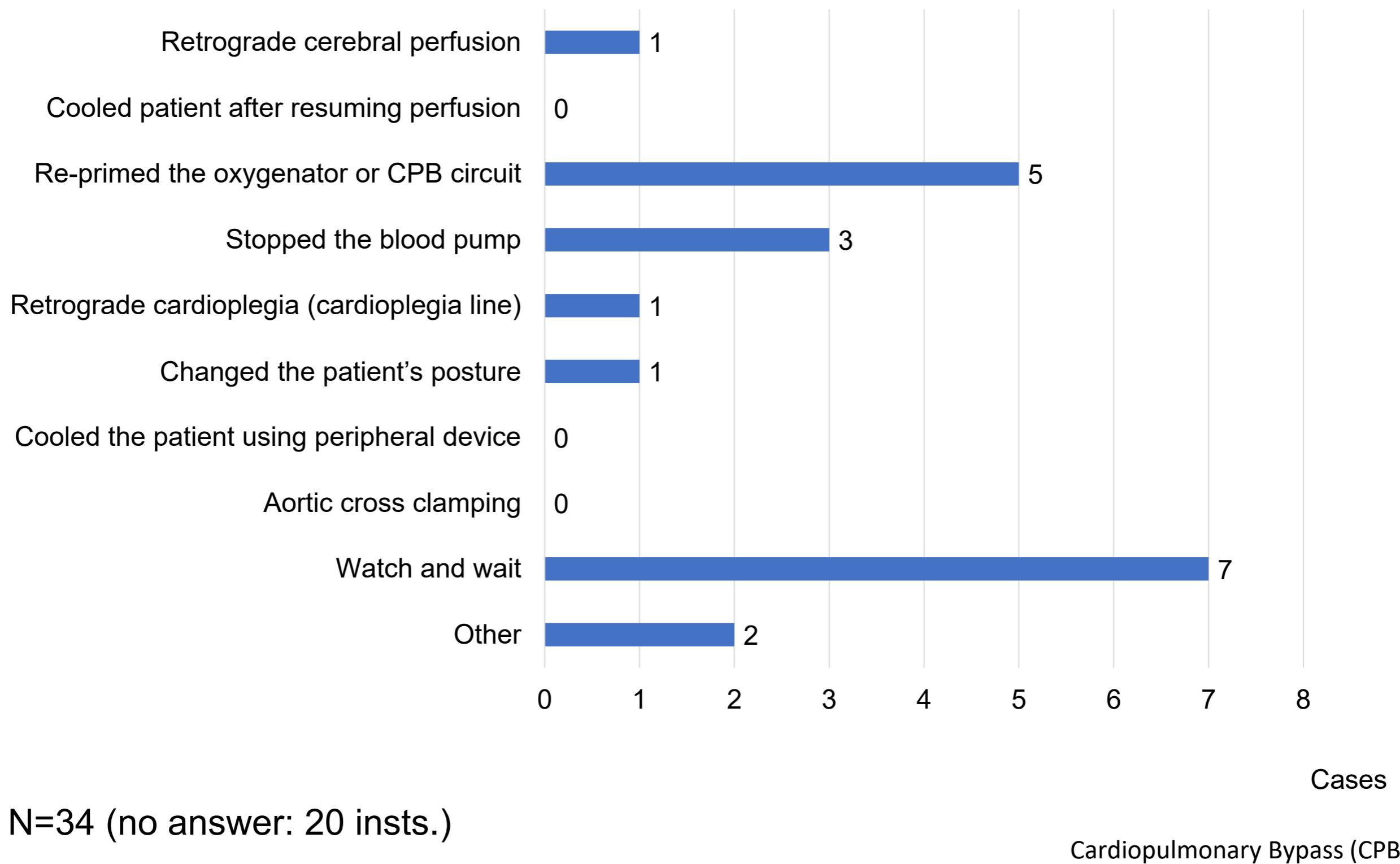
Which of the following caused the air entering and how many times? (Please choose all that apply.)



N=34 (no answer: 20 insts.)

Cardiopulmonary Bypass (CPB)

Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)

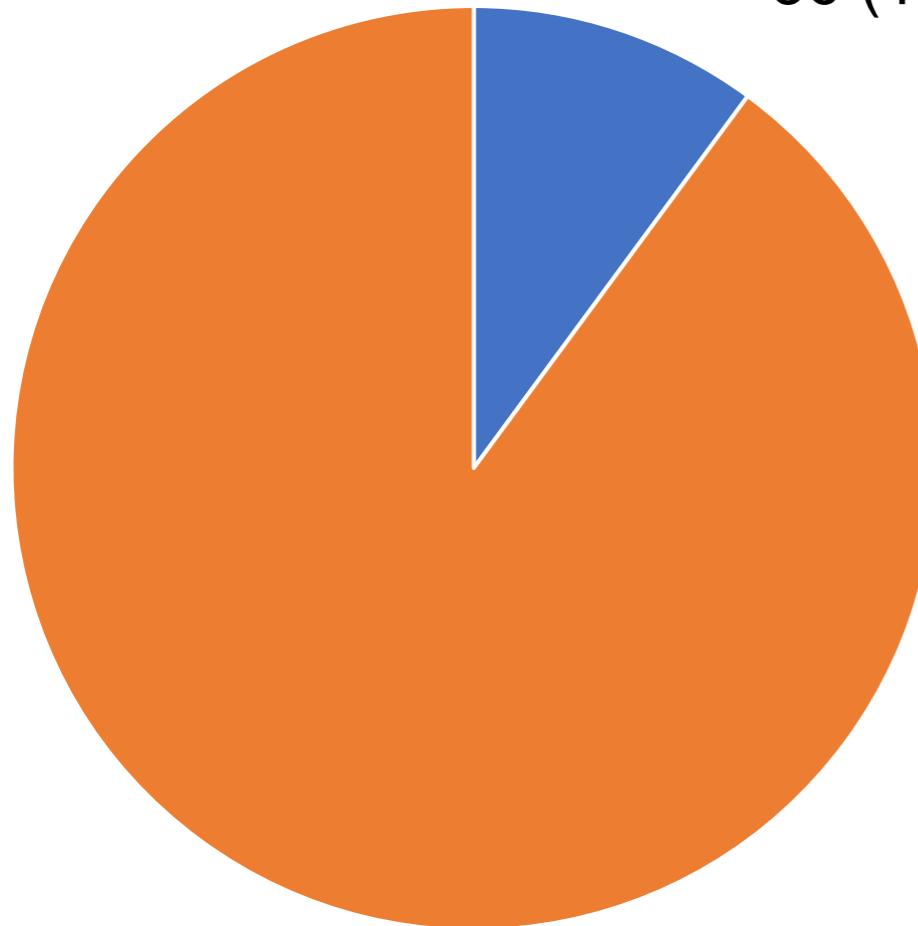


Incidents & Rates of Inadvertent Air Entering

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	—	—	—	—	—	—	—	—
1~3a	15	0.02%	28	0.04%	17	0.02%		
3b~5	3	<0.01%	3	<0.01%	2	<0.01%		
	No answer: 19 insts.			No answer: 26 insts.			No answer: 26 insts.	
	* Among 62,871 cases			** Among 78,397 cases			*** Among 81,455 cases	

Was there an instance of Unexpected Drainage from Arterial or Venous Cannula after ECC?

Yes
36 (10.1%)



No
322 (89.9%)

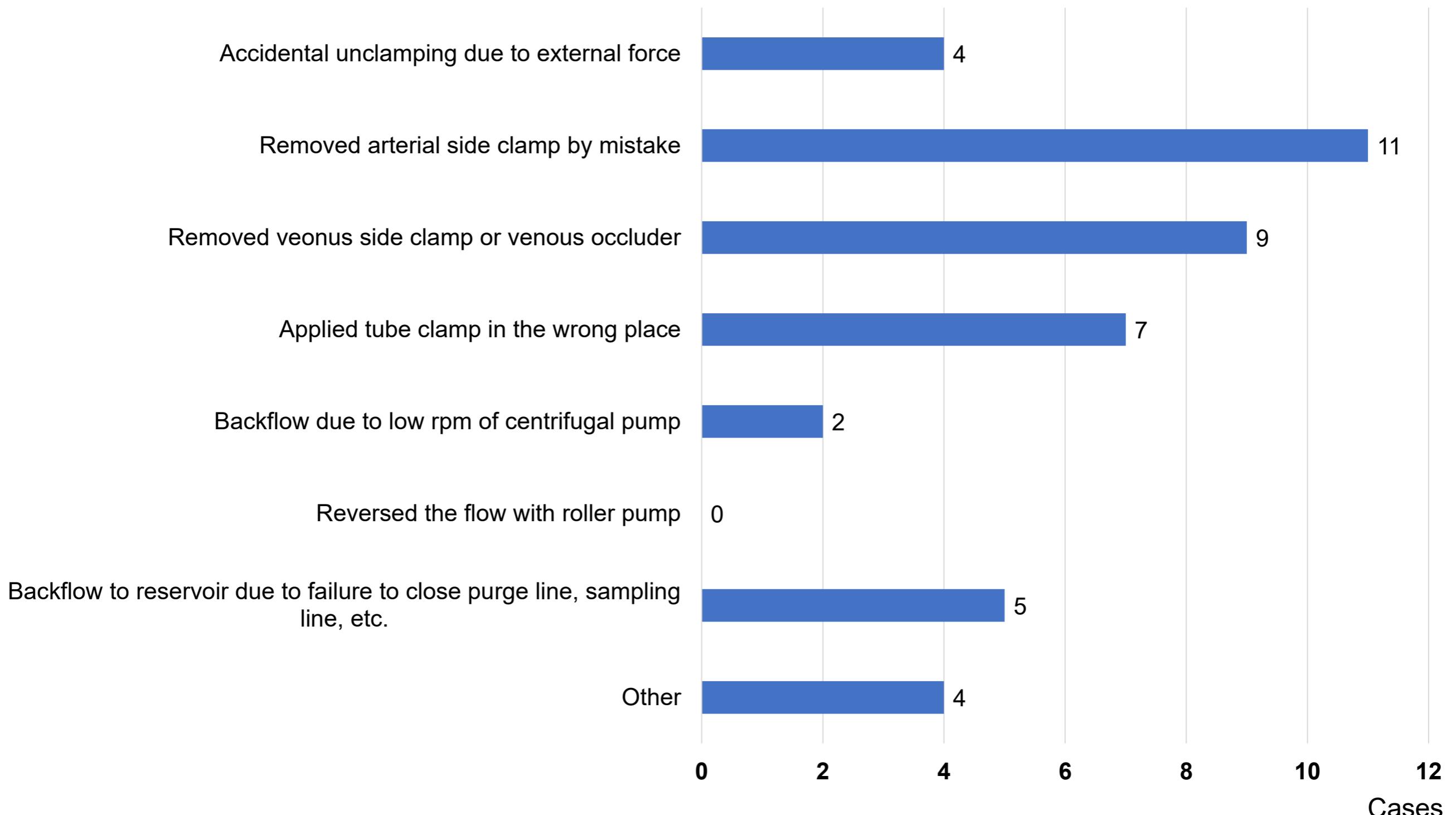
N=359 (no answer: 1 insts.)

Impact level	No. of cases	Frequency*
1～3a	35	0.06%
3b～5	5	< 0.01%

No answer: 5 insts.

*Among 62,871 CPB cases occurring during the 2-year period

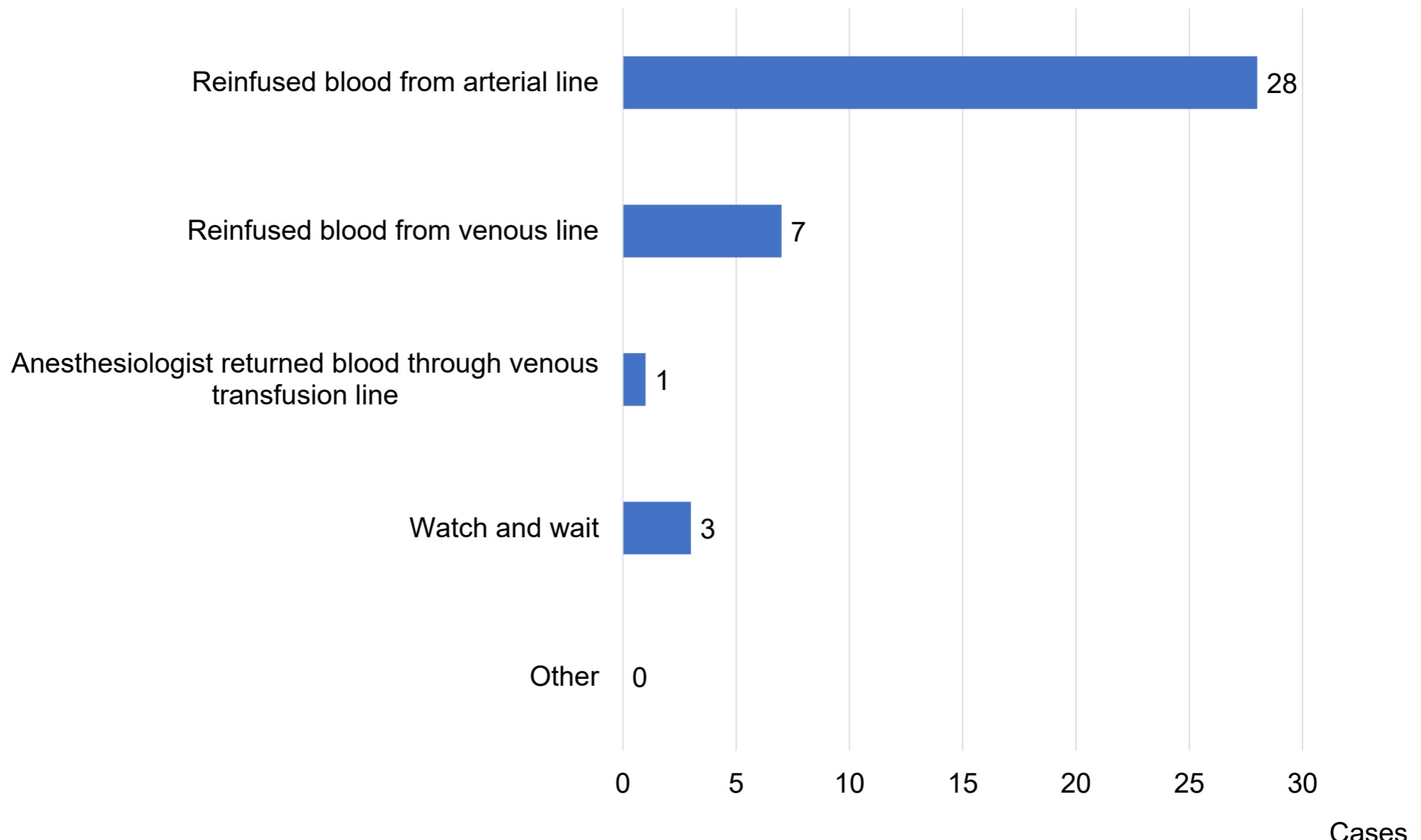
How many times did you experience the following incidents/accidents? (Please choose all that apply.)



N=37 (no answer: 3 insts.)

Cardiopulmonary Bypass (CPB)

Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



N=37 (no answer: 6 insts.)

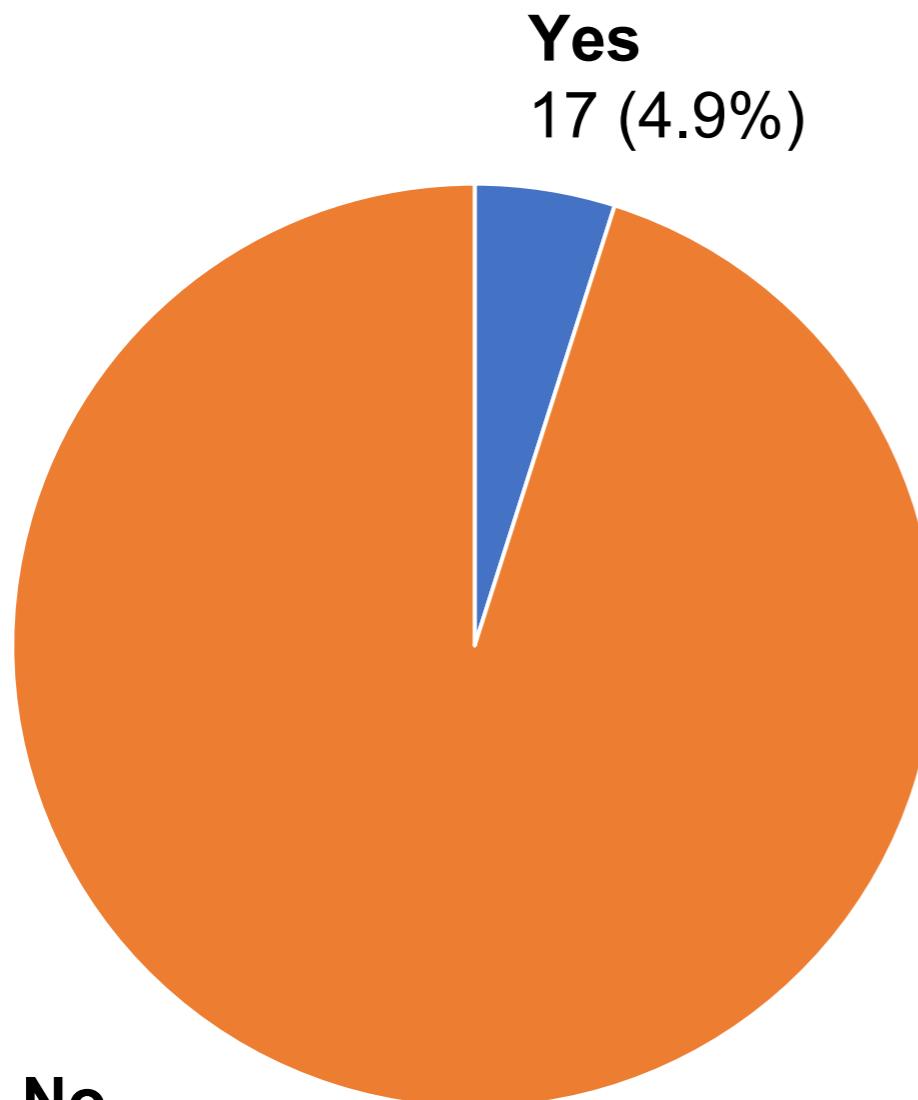
Cardiopulmonary Bypass (CPB)

Incidents & Rates of Unexpected Blood Drainage after ECC

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	—	—	—	—	—	—	—	—
1~3a	35	0.06%	42	0.05%	65	0.08%		
3b~5	5	<0.01%	2	<0.01%	4	<0.01%		
No answer: insts.			No answer: 6 insts.			No answer: 4 insts.		
* Among 62,871 cases			** Among 78,397 cases			*** Among 81,455 cases		

Did you experience a Medication Error?

(excluding errors in cardioplegia)



Impact level	No. of cases	Frequency*
0	8	0.01%
1~3a	20	0.03%
3b~5	0	0%

No answer: 9 insts.

*Among 62,871 CPB cases occurring during the 2-year period

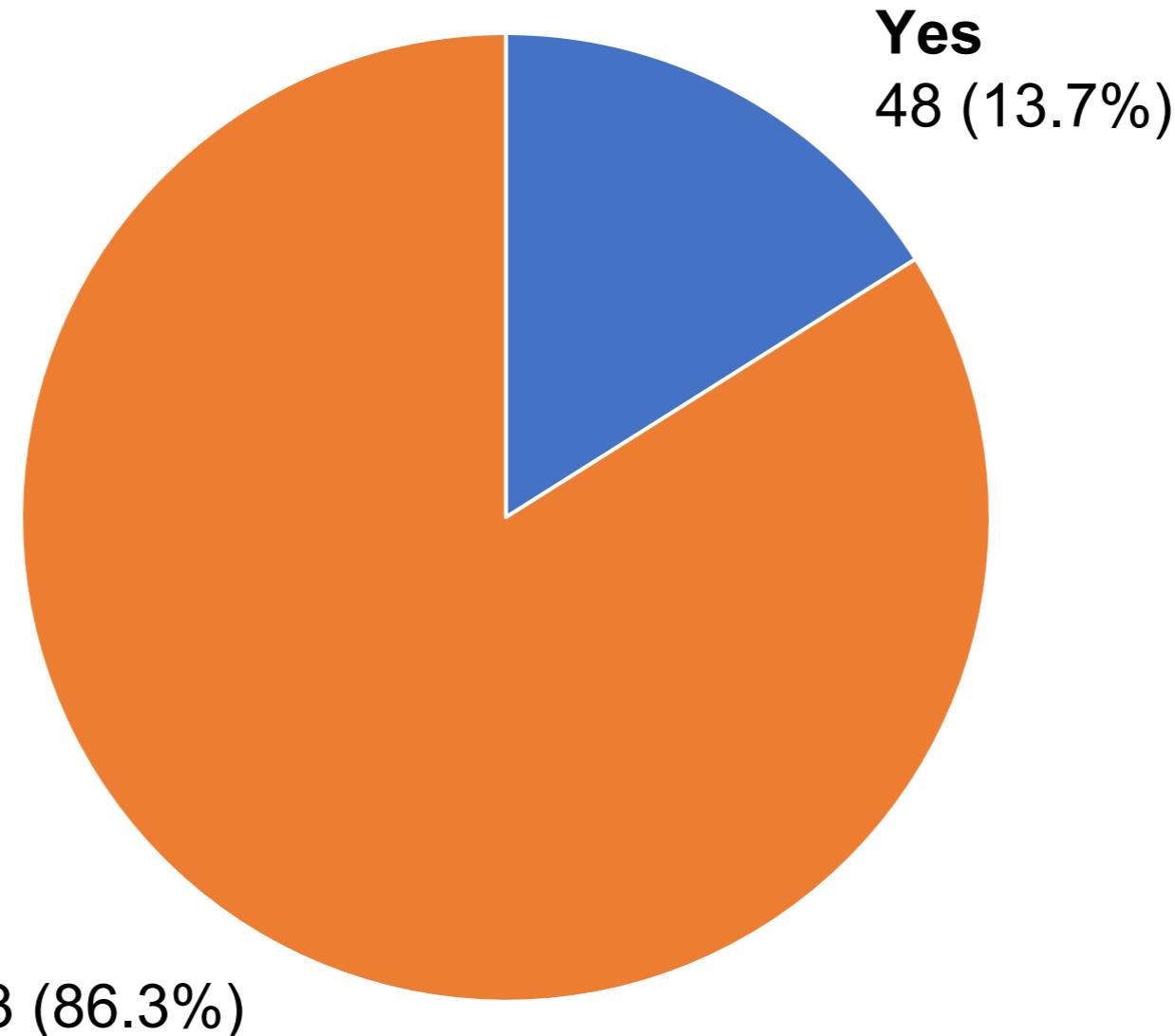
N=359 (no answer: 9 insts.)

Cardiopulmonary Bypass (CPB)

Incidents & Rates of Medication Errors

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	8	0.01%	1	0.01%	8	0.01%		
1~3a	20	0.03%	19	0.02%	19	0.02%		
3b~5	0	0%	0	0%	0	0%		
	No answer: 9 insts.		No answer: 10 insts.		No answer: 14 insts.			
	* Among 62,871 cases		** Among 78,397 cases		*** Among 81,455 cases			

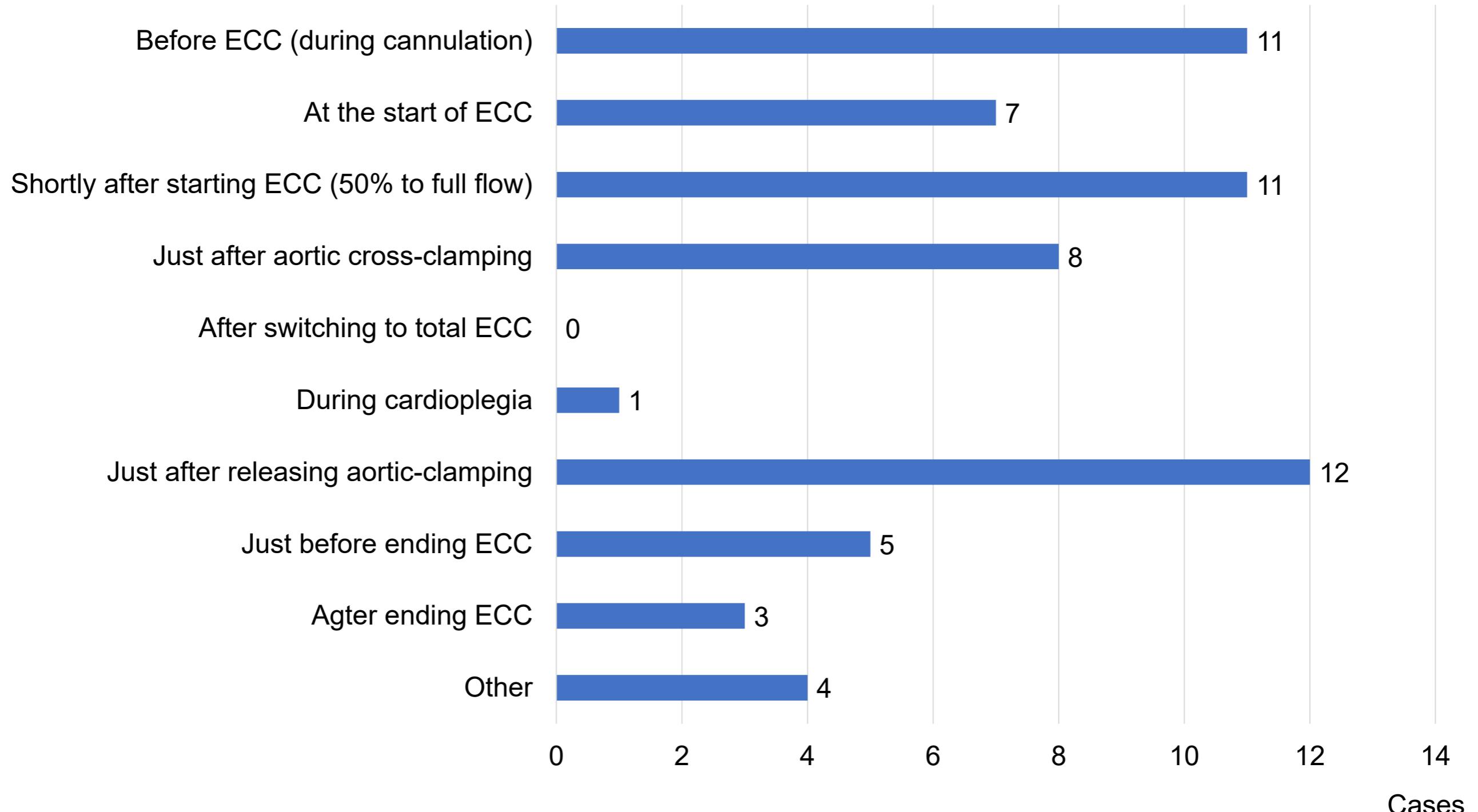
Did you experience an Intraoperative Dissection?



N=359 (no answer: 8 insts.)

Cardiopulmonary Bypass (CPB)

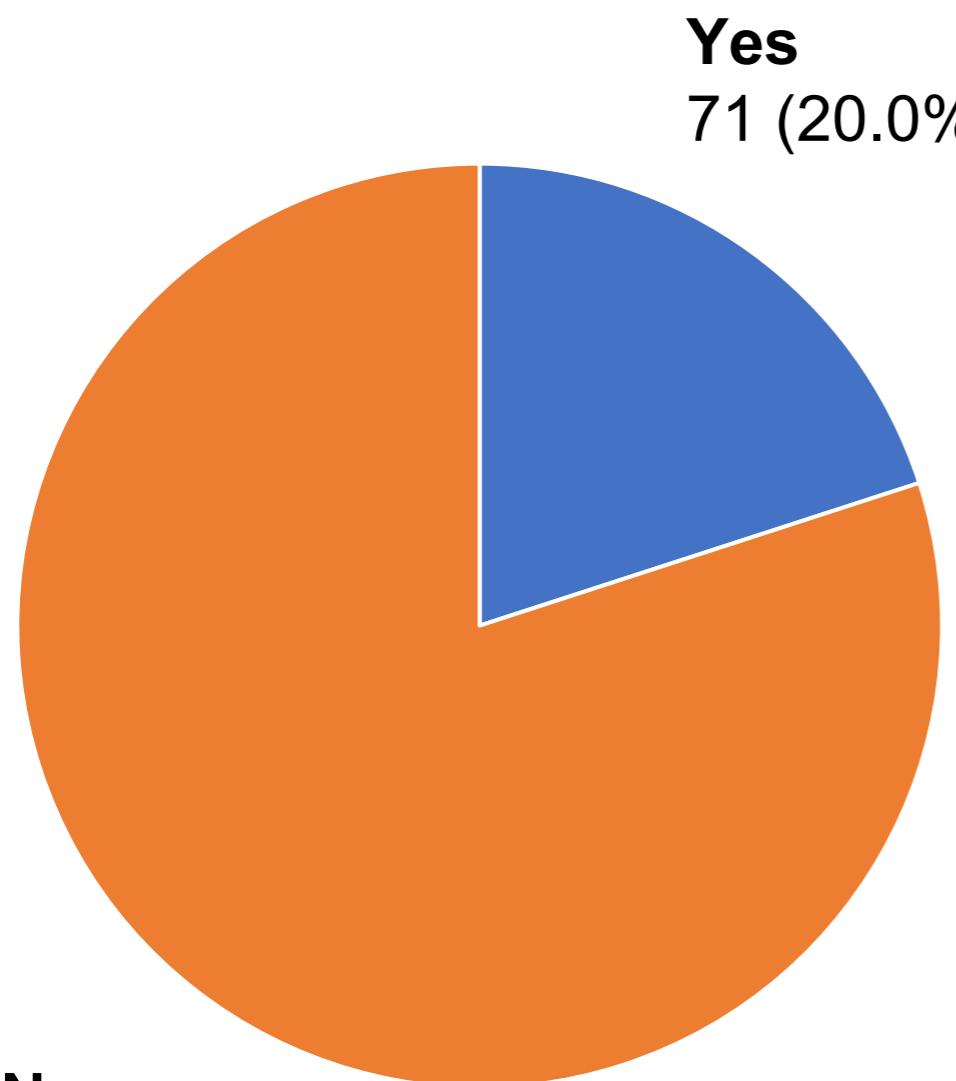
When did you notice it? (Please choose all that apply.)



N=56 (no answer: 8 insts.)

Cardiopulmonary Bypass (CPB)

Did you experience an incident/accident related to Cardioplegia?



No
284 (80.0%)

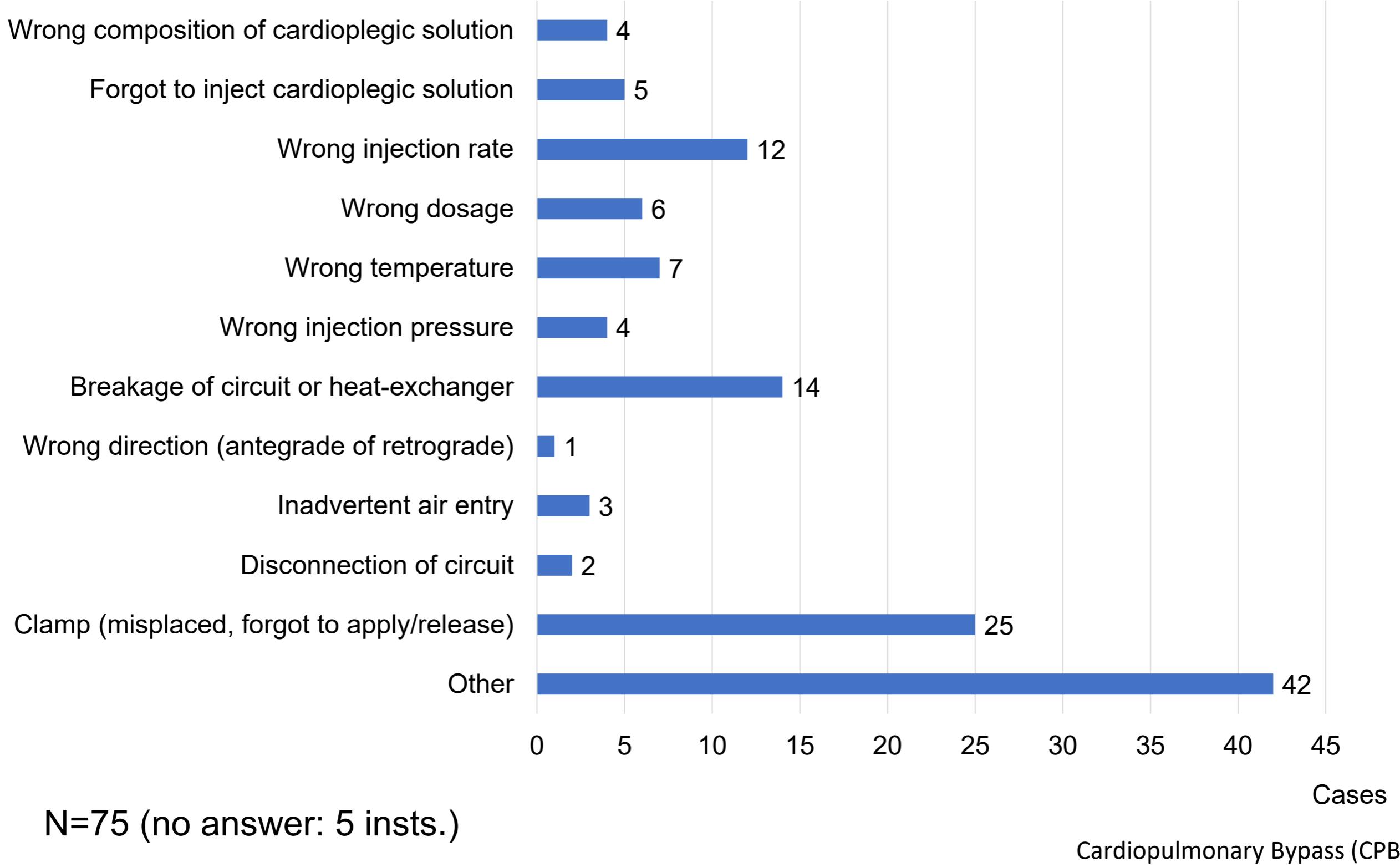
N=359 (no answer: 4 insts.)

Impact level	No. of cases	Frequency*
0	79	0.13%
1~3a	40	0.06%
3b~5	2	< 0.01%

No answer: 7 insts.

*Among 62,871 CPB cases occurring during the 2-year period

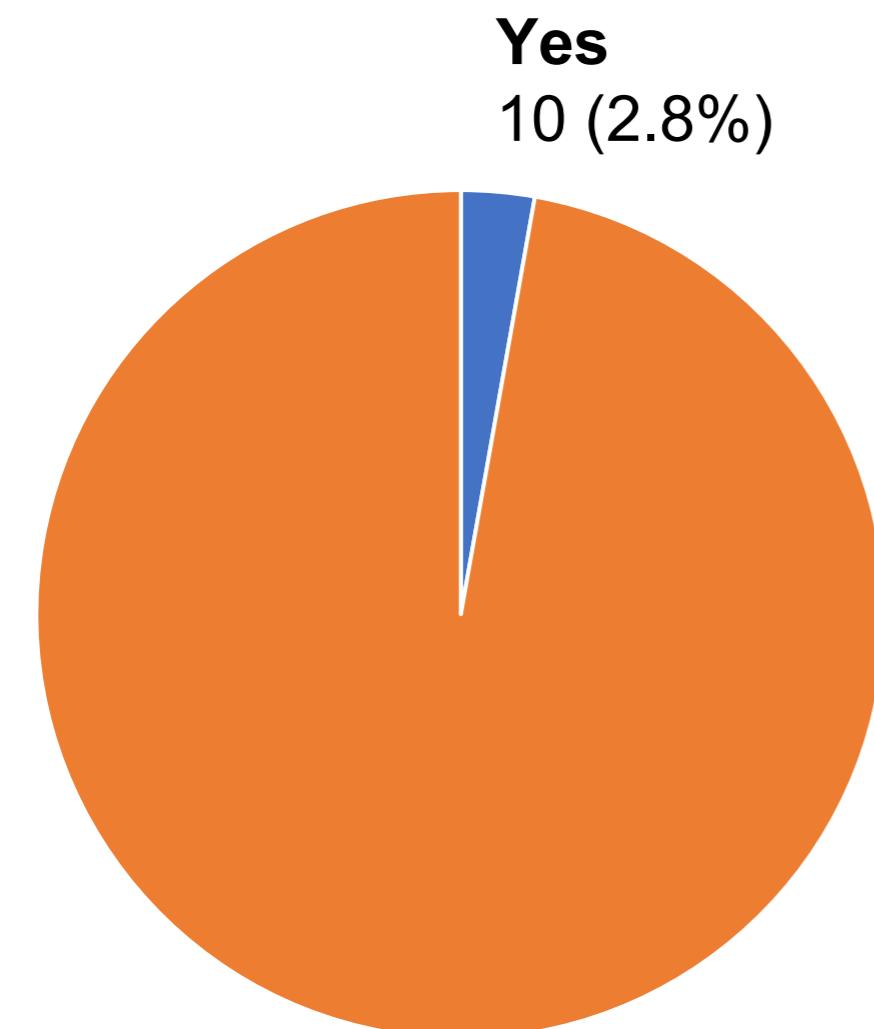
How many times did you experience the following incidents/accidents? (Please choose all that apply.)



Cardioplegia-Related Incidents & Rates

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	79	0.13%	95	0.12%	136	0.17%		
1~3a	40	0.06%	87	0.11%	114	0.14%		
3b~5	2	<0.01%	2	<0.01%	2	<0.01%		
	No answer: 7 insts.		No answer: 16 insts.		No answer: 10 insts.			
	* Among 62,871 cases		** Among 78,397 cases		*** Among 81,455 cases			

Did you experience a Power Interruption or Outage during CPB?



No
348 (97.2%)

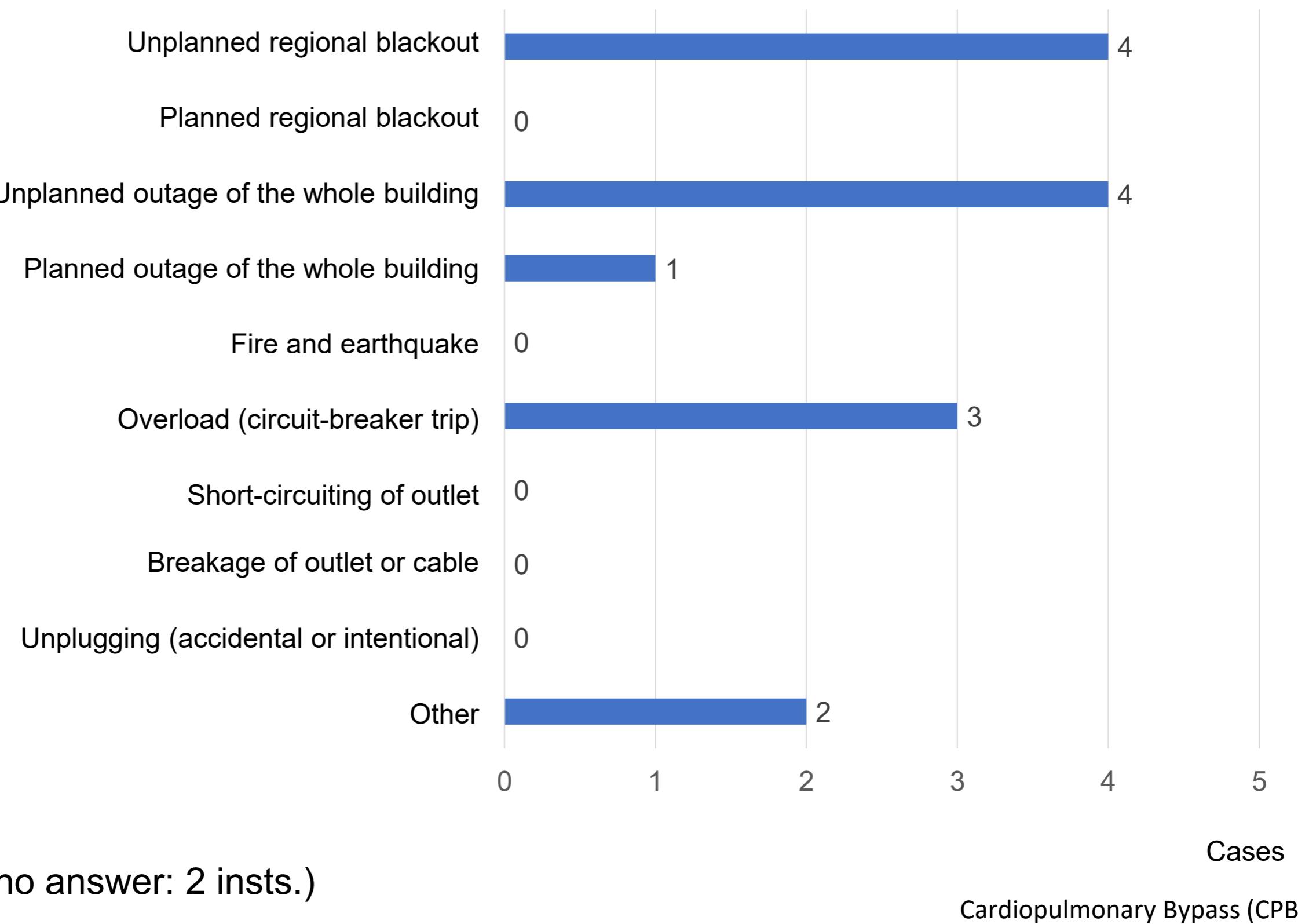
N=359 (no answer: 1 insts.)

Impact level	No. of cases	Frequency*
0	7	0.01%
1~3a	4	< 0.01%
3b~5	0	0%

No answer: 1 insts.

*Among 62,871 CPB cases occurring during the 2-year period

How many times did you experience the following incidents/accidents? (Please choose all that apply.)



Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)

CPB device was not affected because of hospital's UPS



Main pump was not affected because of built-in battery



Hand-cranked the pump because of battery failure



Reduced the no. of devices and reset circuit breaker



Extended cable to outside the operating room



Used power generator



Discontinued surgery



Other



0 2 4 6 8
Cases

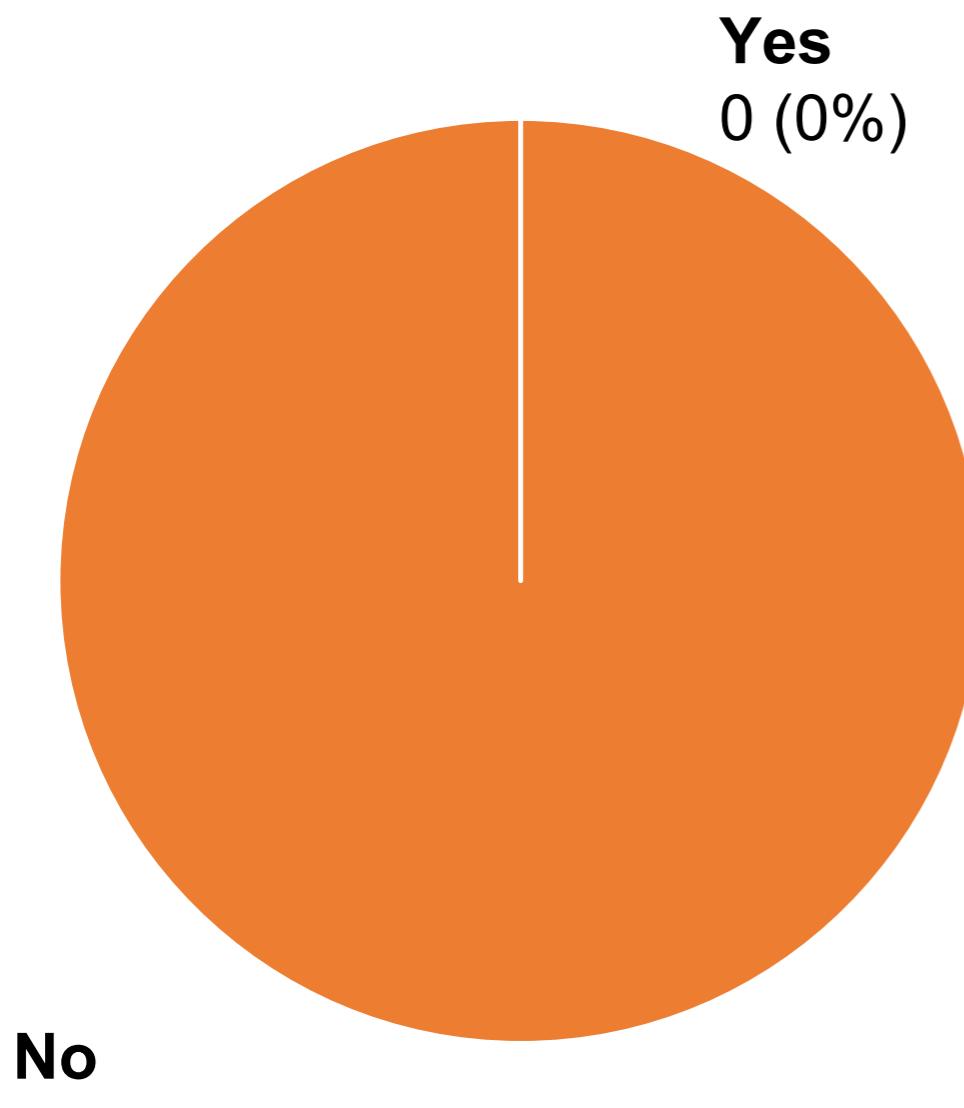
N=11 (no answer: 3 insts.)

Cardiopulmonary Bypass (CPB)

Incidents & Rates related to Power Interruption/Outage

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	7	0.01%	6	<0.01%	11	0.01%		
1~3a	4	<0.01%	3	<0.01%	5	0.01%		
3b~5	0	0%	0	0%	0	0%		
	No answer: 1 insts.			No answer: 6 insts.			No answer: 2 insts.	
	* Among 62,871 cases			** Among 78,397 cases			*** Among 81,455 cases	

Did you experience an Interruption of Medical Gas Supply during CPB?



Impact level	No. of cases	Frequency*
1～3a	0	0%
3b～5	0	0%

No answer: 1 insts.

*Among 62,871 CPB cases occurring during the 2-year period

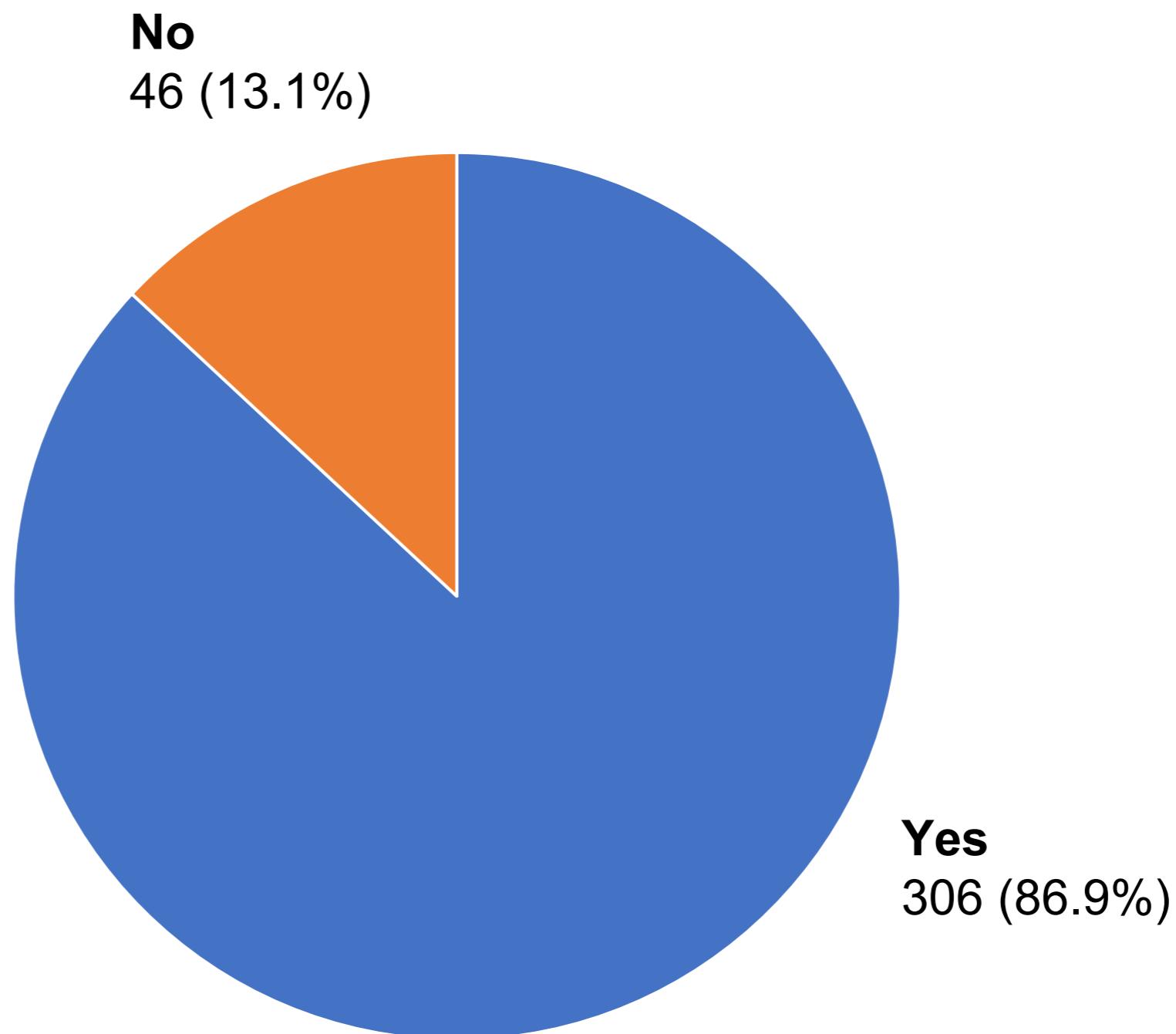
N=359 (no answer: 1 insts.)

Cardiopulmonary Bypass (CPB)

Incidents & Rates related to Medical Gas Supply Interruption

2023 Survey			2021 Survey			2019 Survey		
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***		
0	-	-	-	-	-	-	-	-
1~3a	0	0%	1	<0.01%	1	<0.01%		
3b~5	0	0%	0	0%	0	0%		
	No answer: 1 insts.		No answer: 5 insts.		No answer: 2 insts.			
* Among 62,871 cases			** Among 78,397 cases			*** Among 81,455 cases		

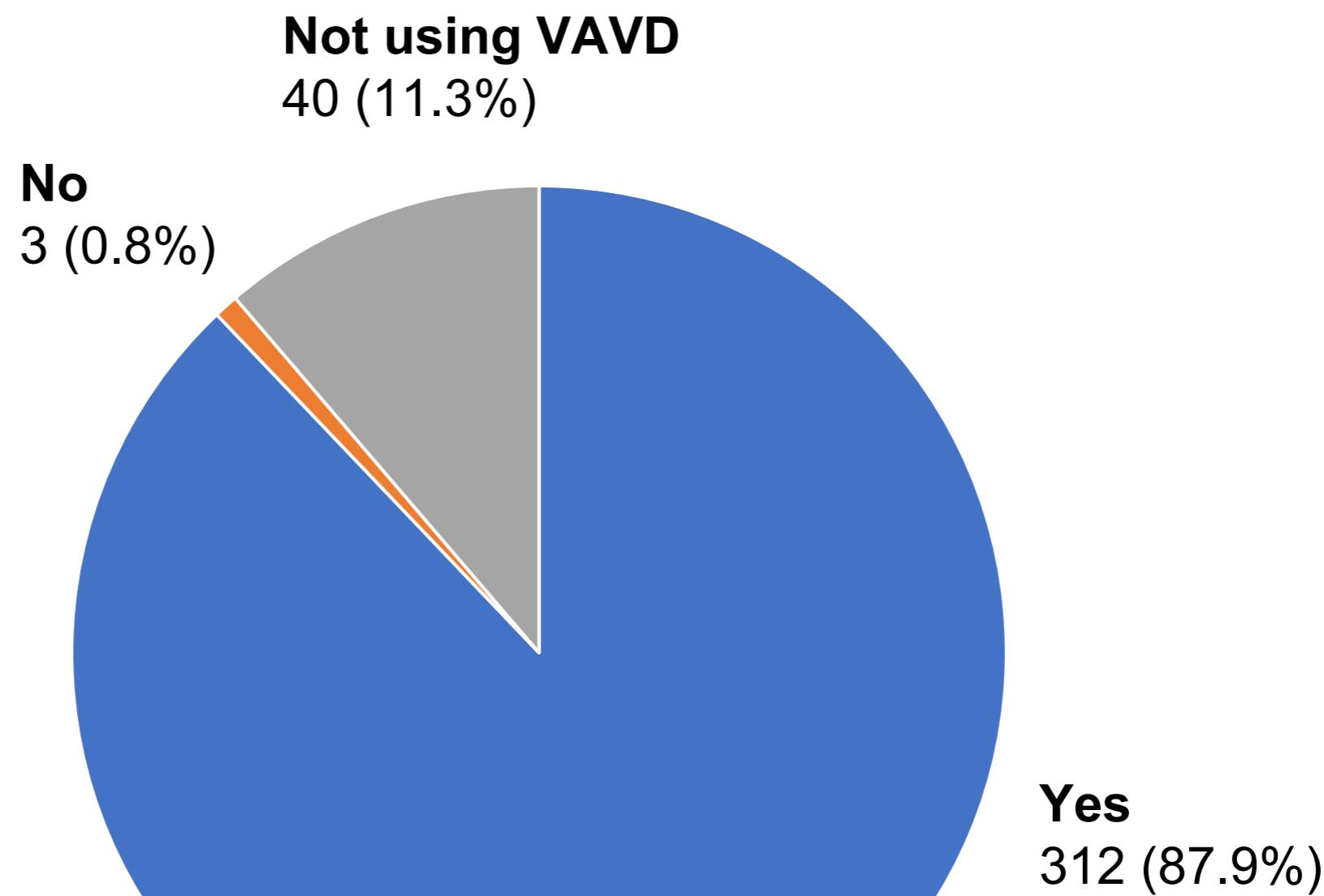
Do you have an emergency kit in place?



N=359 (no answer: 7 insts.)

Cardiopulmonary Bypass (CPB)

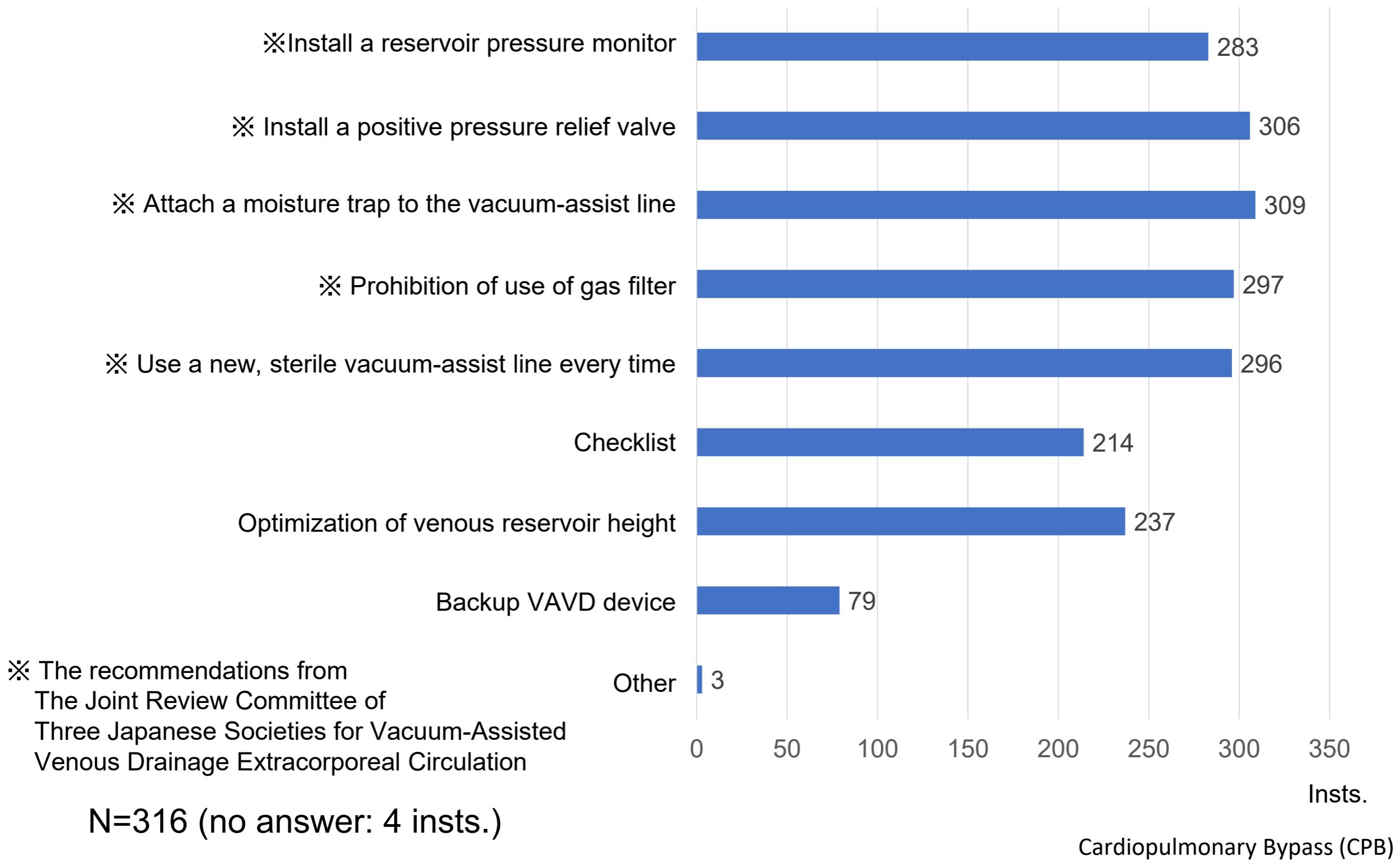
Do you take safety measures when using VAVD?



N=359 (no answer: 4 insts.)

Cardiopulmonary Bypass (CPB)

Which of the following safety measures do you take when using VAVD? (Please choose all that apply.)



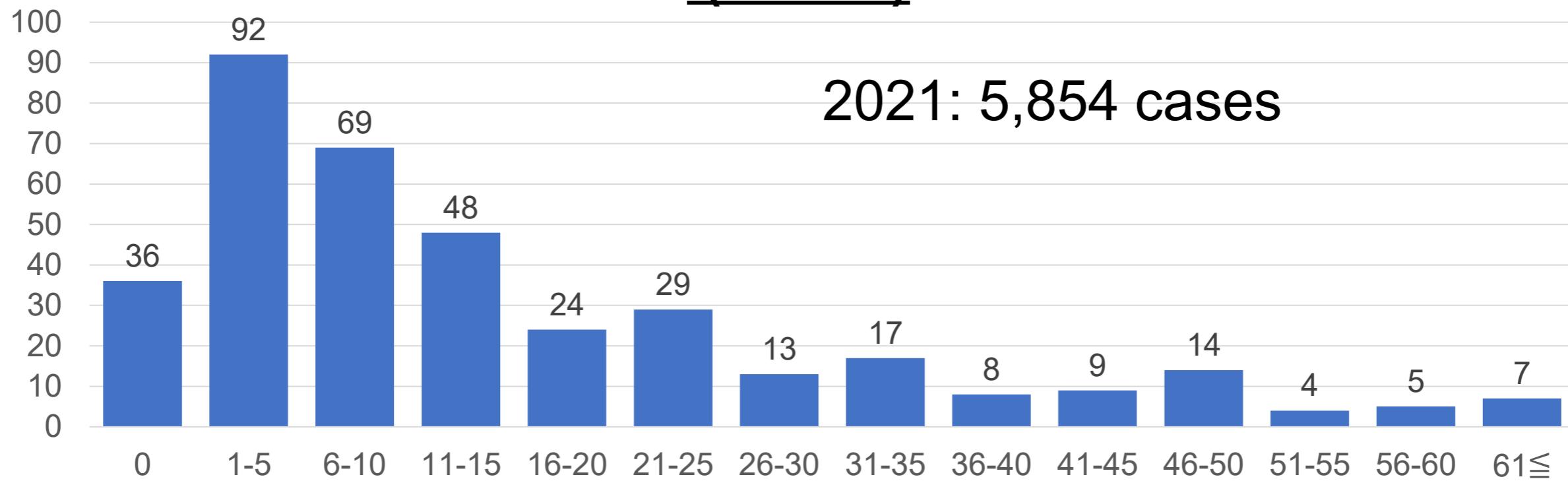


Aggregation Results

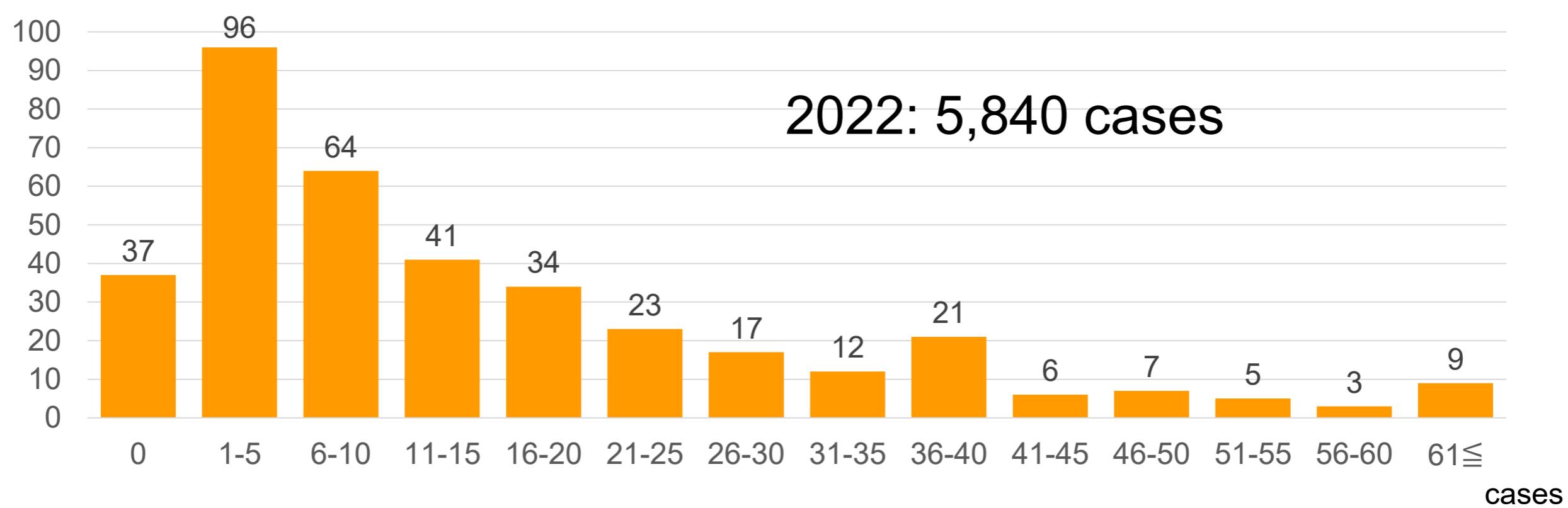
Extracorporeal Membrane Oxygenation (ECMO)

Distribution of Cases with Extracorporeal Membrane Oxygenation (ECMO)

Insts.



Insts.

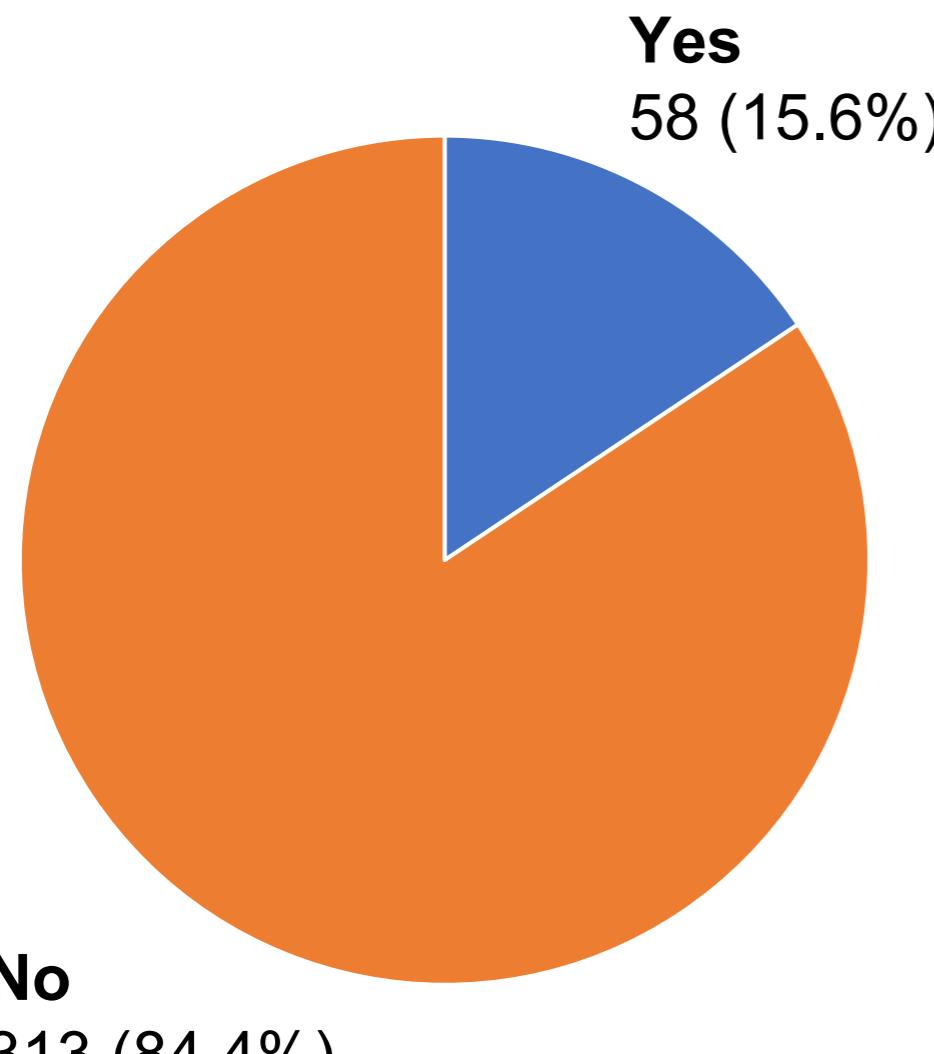


Extracorporeal Membrane Oxygenation (ECMO)

ECMO-Related Incidents/Accidents & Rates

	2023 Survey			2021 Survey			2019 Survey		
	2021	2022	total	2019	2020	total	2017	2018	total
ECMO cases	5,840	5,854	11,694	6,230	5,949	12,179	5,811	5,525	11,336
Impact level (0)	79 0.68%	73 0.62%	152 1.30%	55 0.88%	59 0.99%	114 0.94%	58 1.00%	57 1.03%	115 1.01%
Impact level (1 – 3a)	144 1.23%	164 1.40%	308 2.63%	119 1.91%	105 1.77%	224 1.84%	161 2.77%	128 2.32%	289 2.55%
Impact level (3b – 5)	27 0.23%	27 0.23%	54 0.46%	24 0.39%	22 0.37%	46 0.38%	27 0.46%	23 0.42%	50 0.44%
Total	250 4.28%	264 4.51%	514 4.40%	198 3.18%	186 3.13%	384 3.15%	246 4.23%	208 3.76%	454 4.00%

Did you experience a Sudden Stop or Deceleration of Blood Pump?



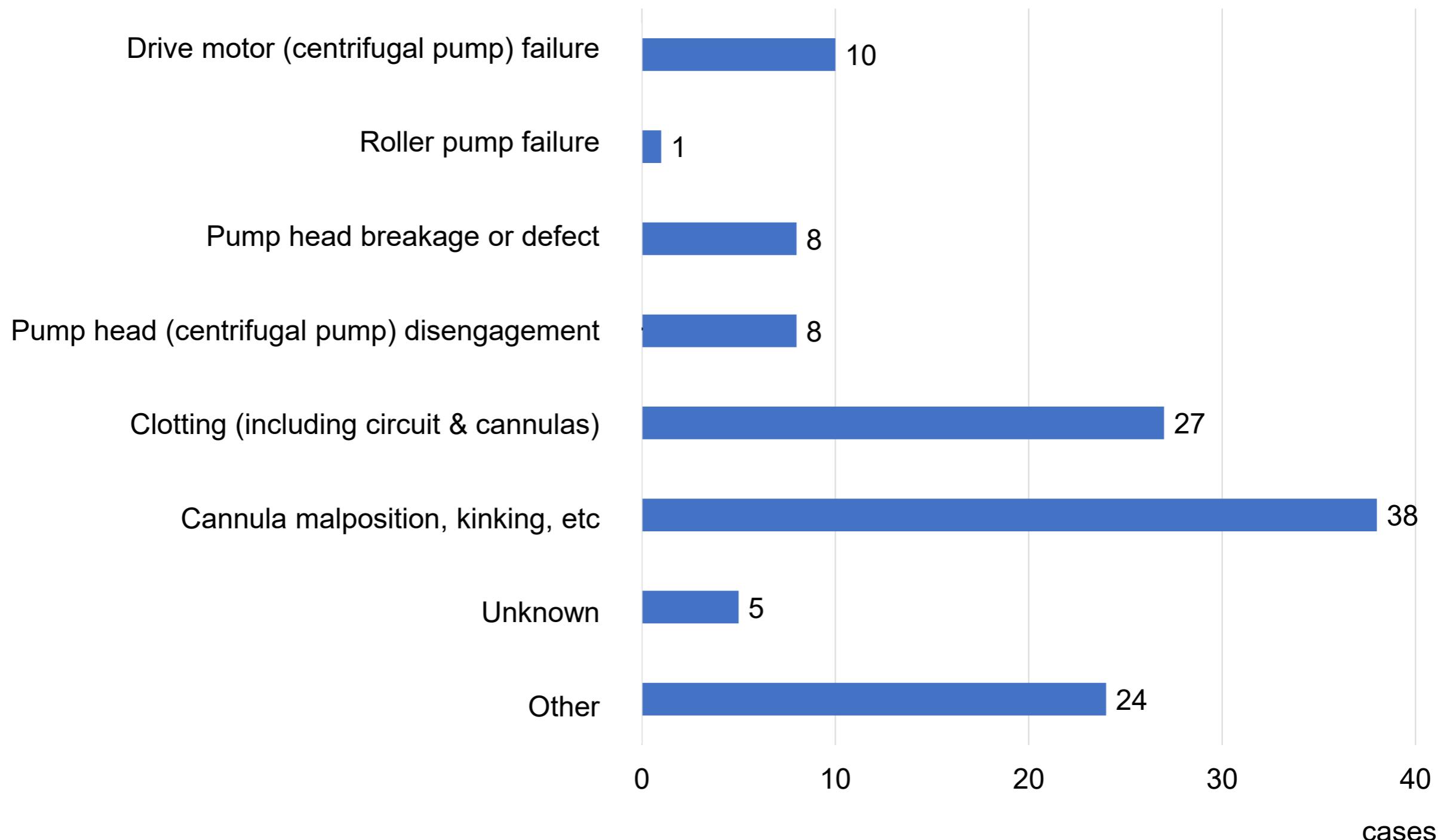
Impact level	No. of cases	Frequency*
1~3a	74	0.63%
3b~5	31	0.27%

No answer: 9 insts.

*Among 11,694 CPS cases occurring during the 2-year period

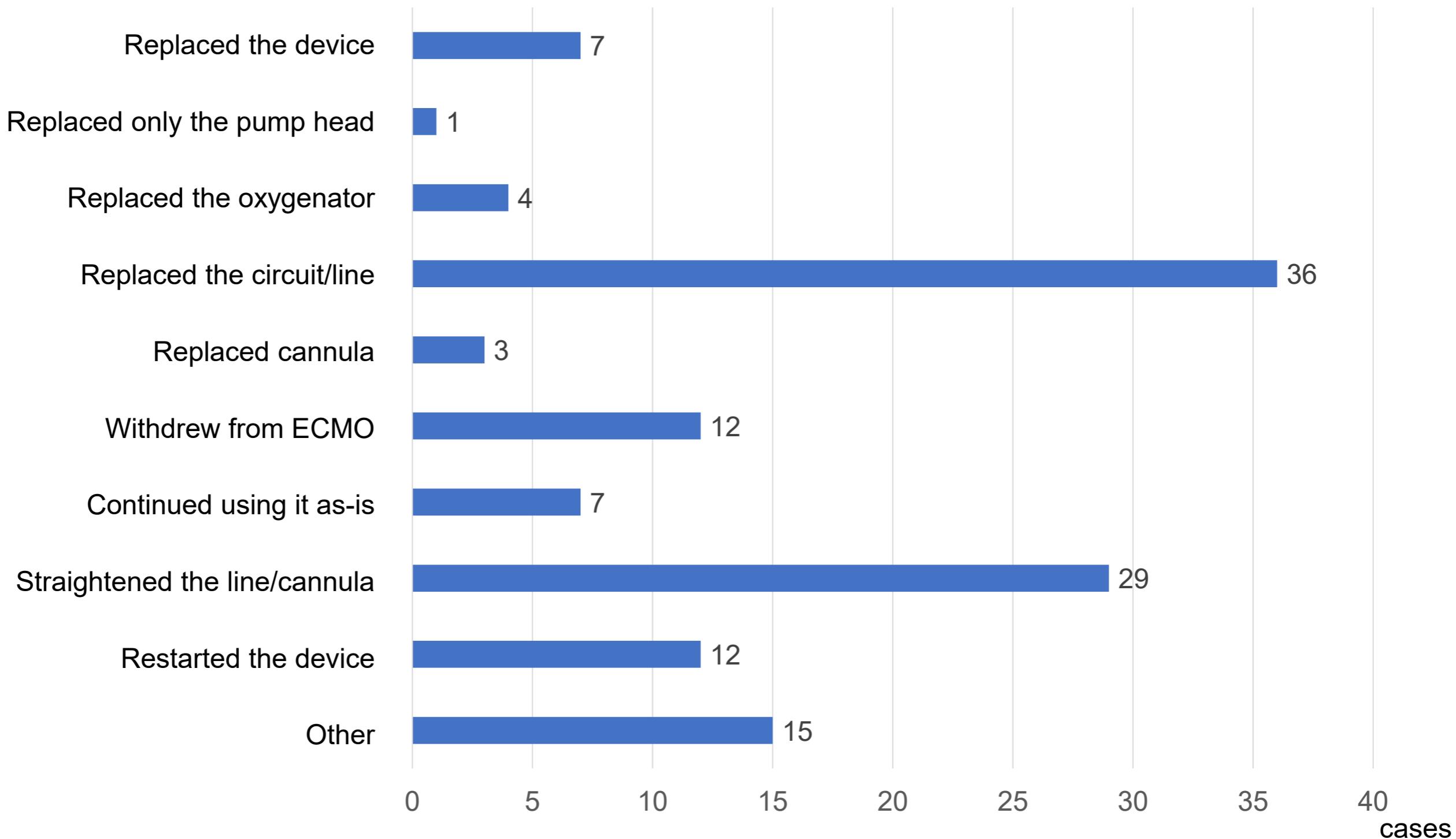
N=375 (no answer: 4 insts.)

How many times did you experience the following incidents/accidents? (Please choose all that apply.)



N=62 (no answer: 5 insts.)

Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



N=62 (no answer: 5 insts.)

Incidents & Rates Related to Sudden Stop or Deceleration of Blood Pump

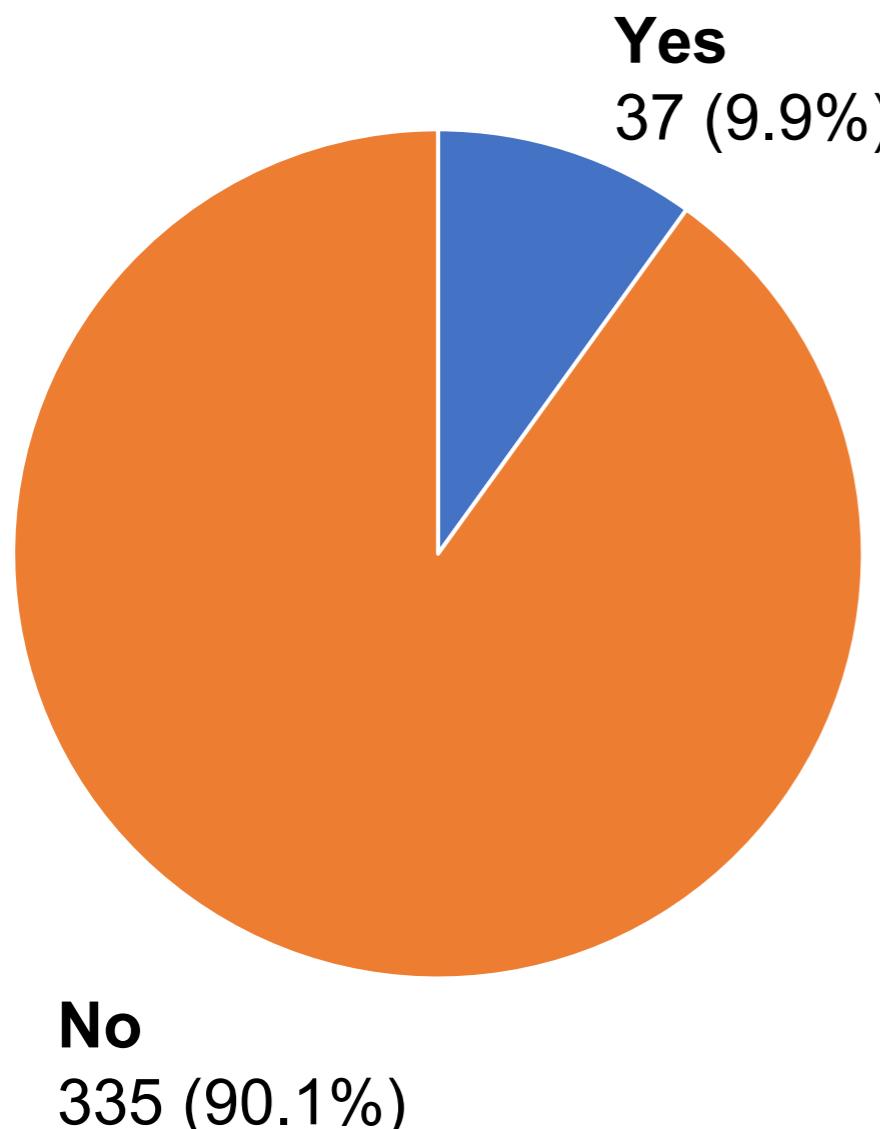
Impact level	2023 Survey		2021 Survey		2019 Survey	
	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***
0	—	—	—	—	—	—
1~3a	74	0.63%	133	1.09%	69	0.61%
3b~5	31	0.27%	16	0.13%	8	0.07%
	No answer: 9 insts.		No answer: 9 insts.		No answer: 9 insts.	

* Among 11,694 cases

** Among 12,179 cases

*** Among 11,336 cases

Did you experience an incident/accident involving a Flow Sensor?



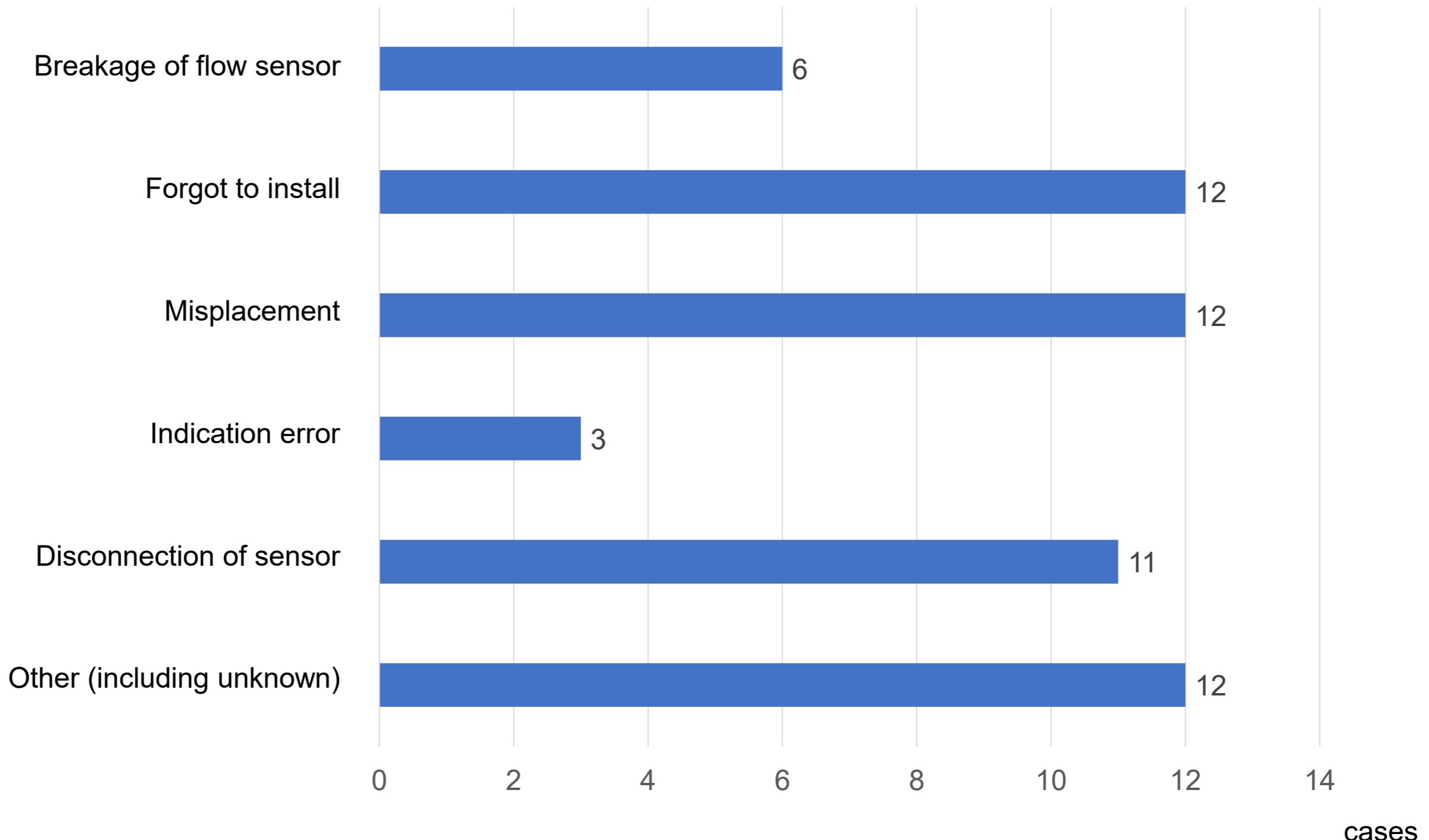
N=375 (no answer: 3 insts.)

Impact level	No. of cases	Frequency*
0	33	0.28%
1~3a	11	0.09%
3b~5	0	0%

No answer: 3 insts.

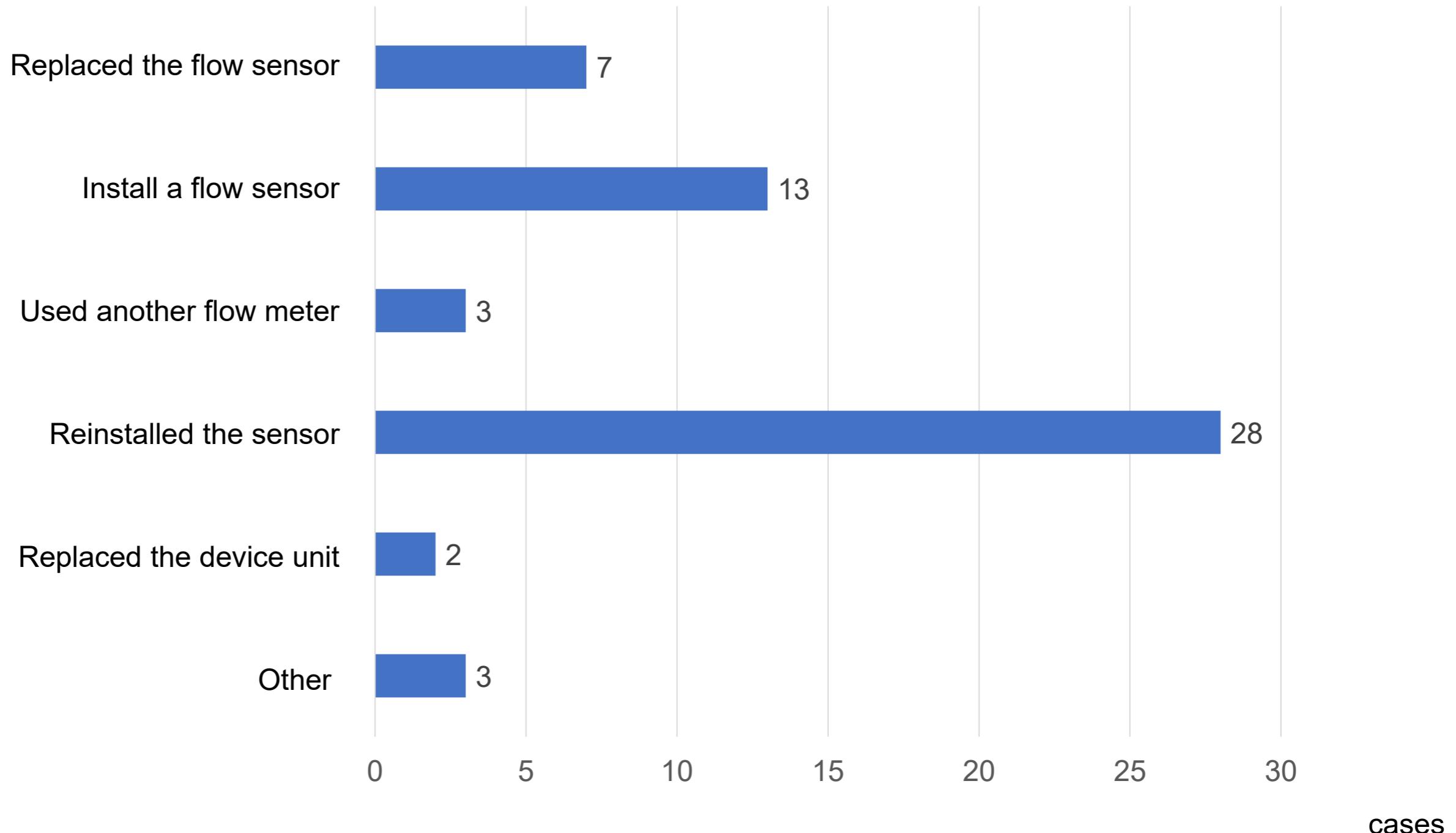
*Among 11,694 CPS cases occurring during the 2-year period

How many times did you experience the following incidents/accidents? (Please choose all that apply.)



N=40 (no answer: 5 insts.)

Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



N=40 (no answer: 5 insts.)

Incidents & Rates of Related to Flow Sensor

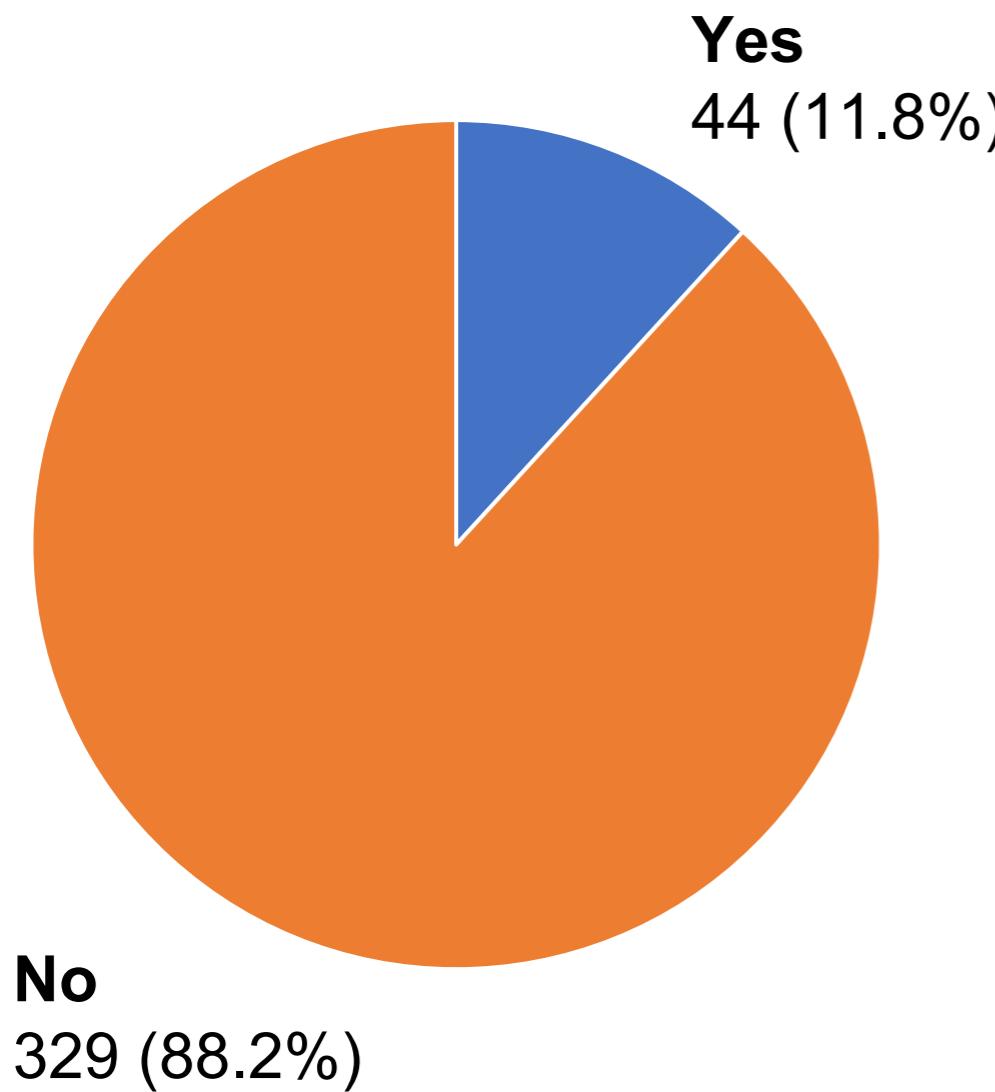
	2023 Survey		2021 Survey		2019 Survey	
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***
0	33	0.28%	65	0.53%	53	0.47%
1~3a	11	0.09%	14	0.12%	34	0.30%
3b~5	0	0%	1	0.01%	1	0.01%
	No answer: 3 insts.		No answer: 6 insts.		No answer: 6 insts.	

* Among 11,694 cases

** Among 12,179 cases

*** Among 11,336 cases

Did you experience Air Entering into the Circuit?

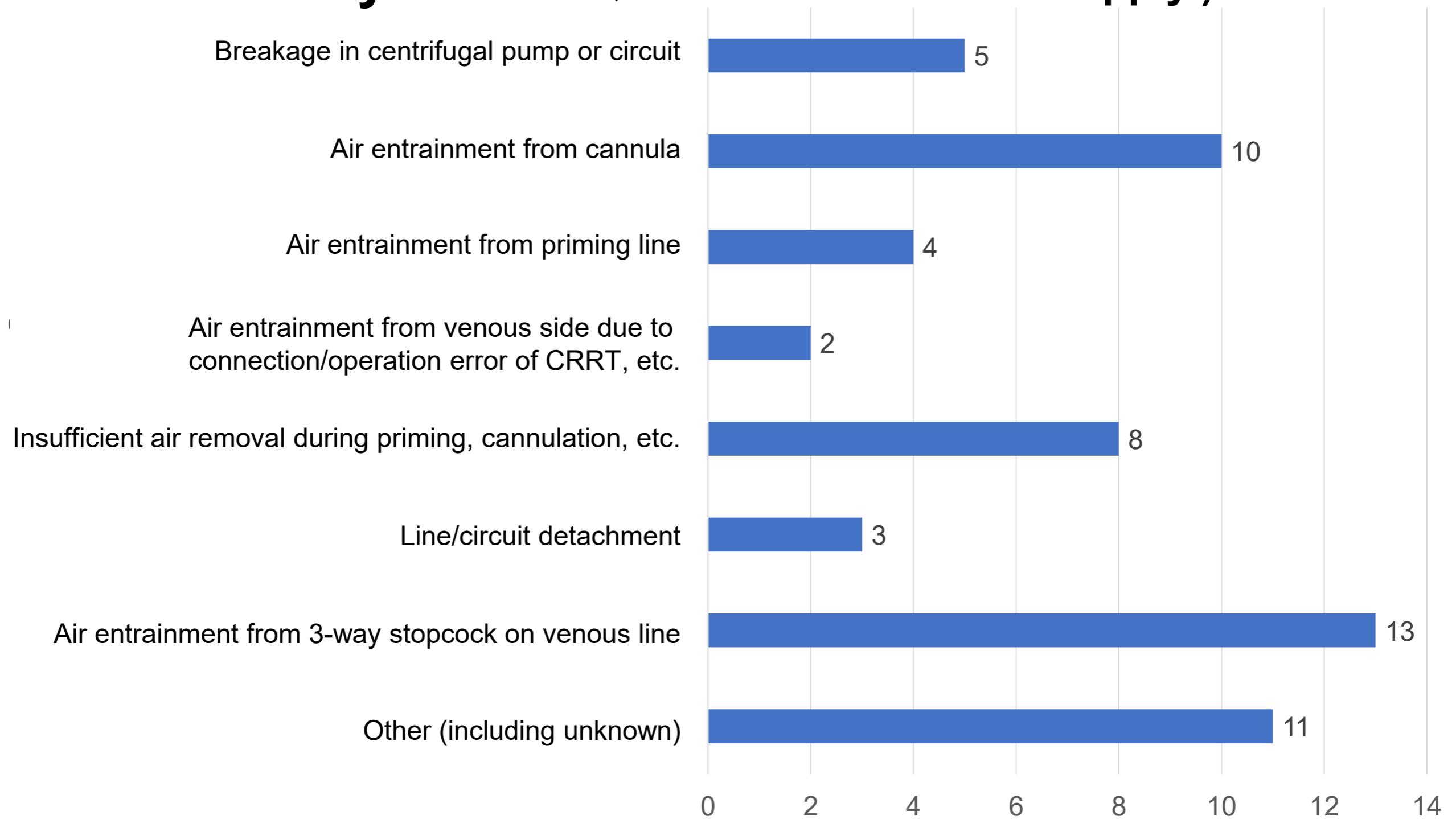


Impact level	No. of cases	Frequency*
1~3a	43	0.37%
3b~5	7	0.06%
No answer: 7 insts.		

*Among 11,694 CPS cases occurring during the 2-year period

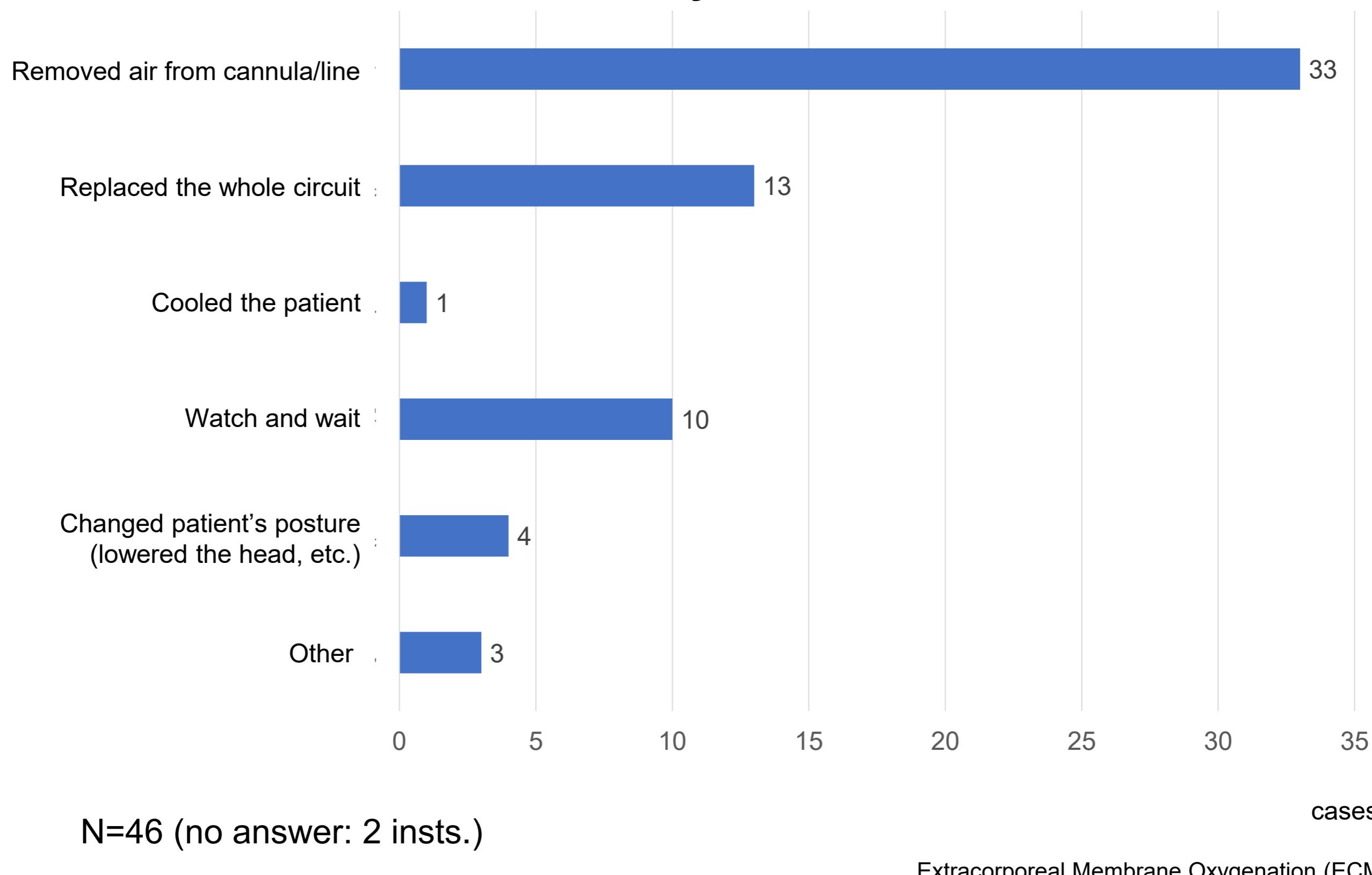
N=375 (no answer: 2 insts.)

Which of the following caused the air entering and how many times? (Please choose all that apply.)



N=46 (no answer: 2 insts.)

Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



Incidents & Rates of Air Entering into Circuit

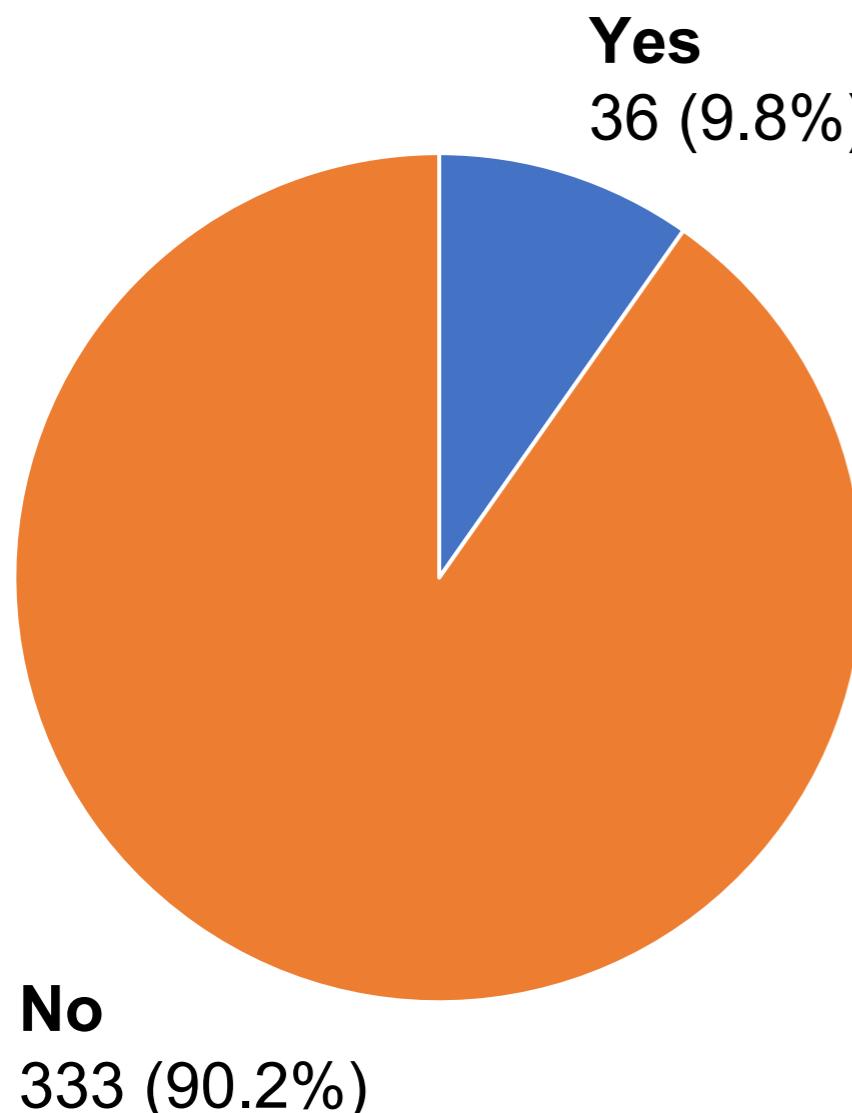
Impact level	2023 Survey		2021 Survey		2019 Survey	
	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***
0	-	-	-	-	-	-
1~3a	43	0.37%	55	0.45%	54	0.48%
3b~5	7	0.06%	11	0.09%	7	0.06%
	No answer: 7 insts.		No answer: 5 insts.		No answer: 5 insts.	

* Among 11,694 cases

** Among 12,179 cases

*** Among 11,336 cases

Did you experience Unexpected Bleeding from the Circuit?

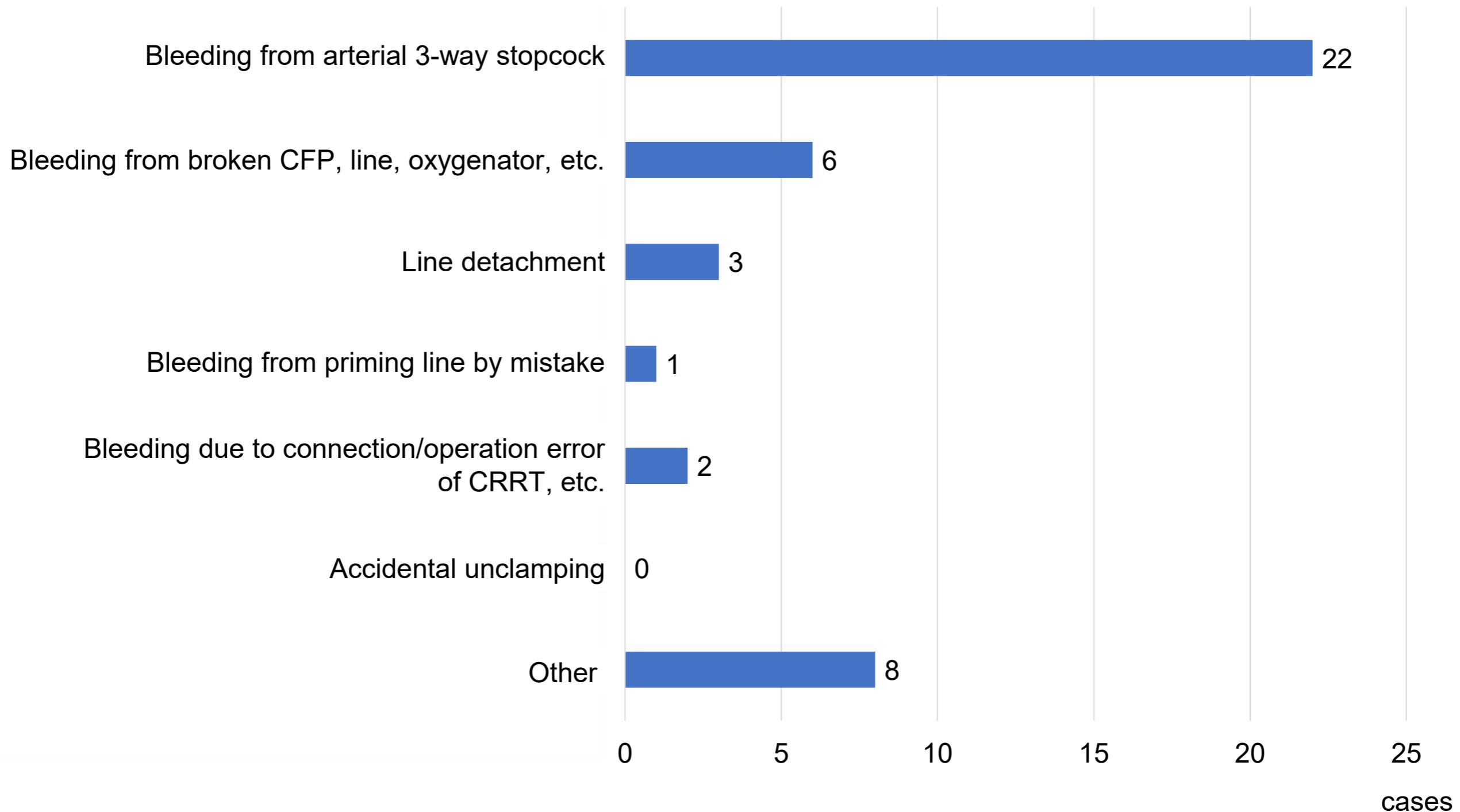


Impact level	No. of cases	Frequency*
1～3a	32	0.27%
3b～5	7	0.06%
No answer: 7 insts.		

*Among 11,694 CPS cases occurring during the 2-year period

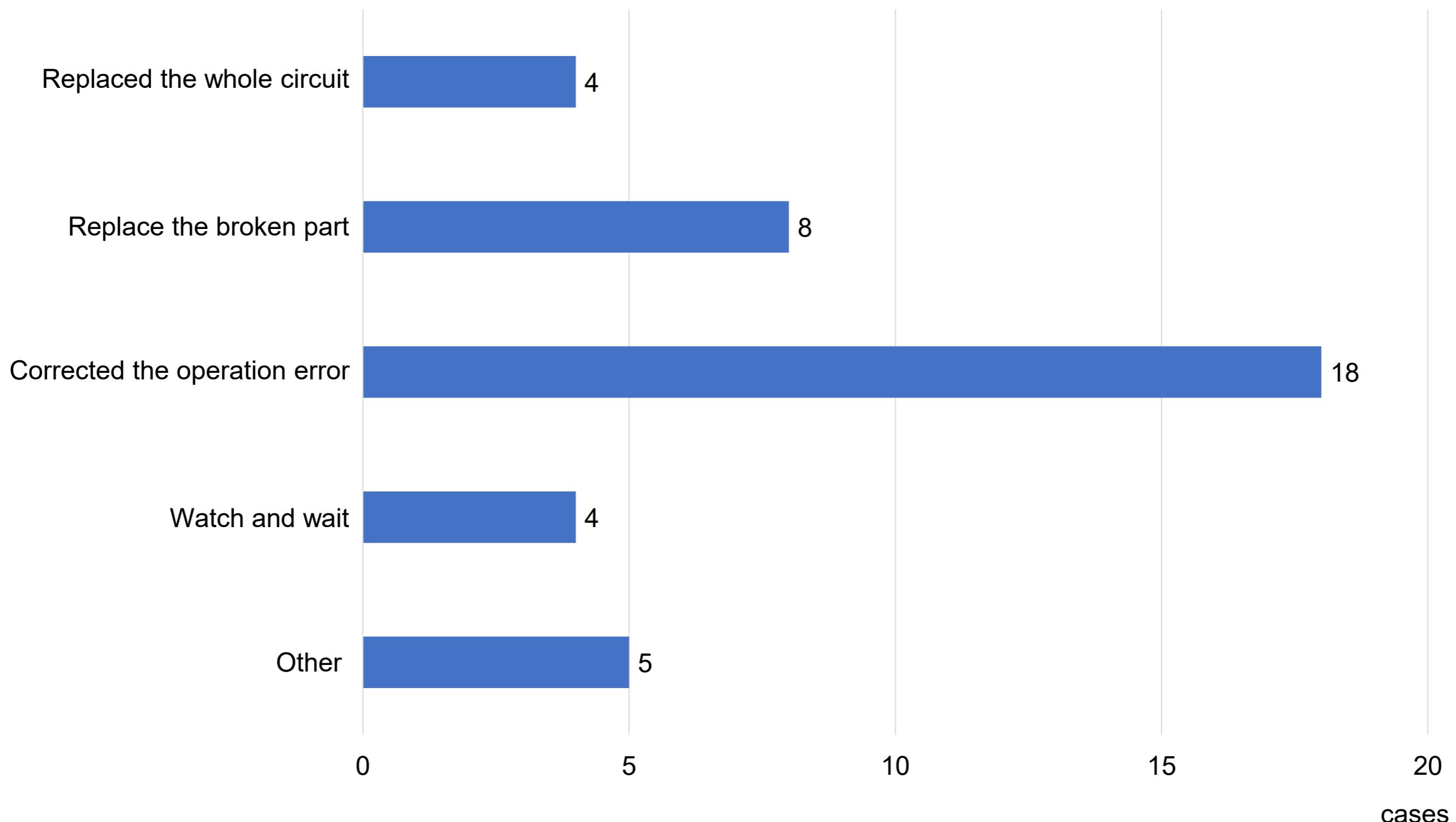
N=375 (no answer: 6 insts.)

How many times did you experience the following incidents/accidents? (Please choose all that apply.)



N=42 (no answer: 7 insts.)

Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



N=42 (no answer: 7 insts.)

Incidents & Rates of Unexpected Bleeding from Circuit

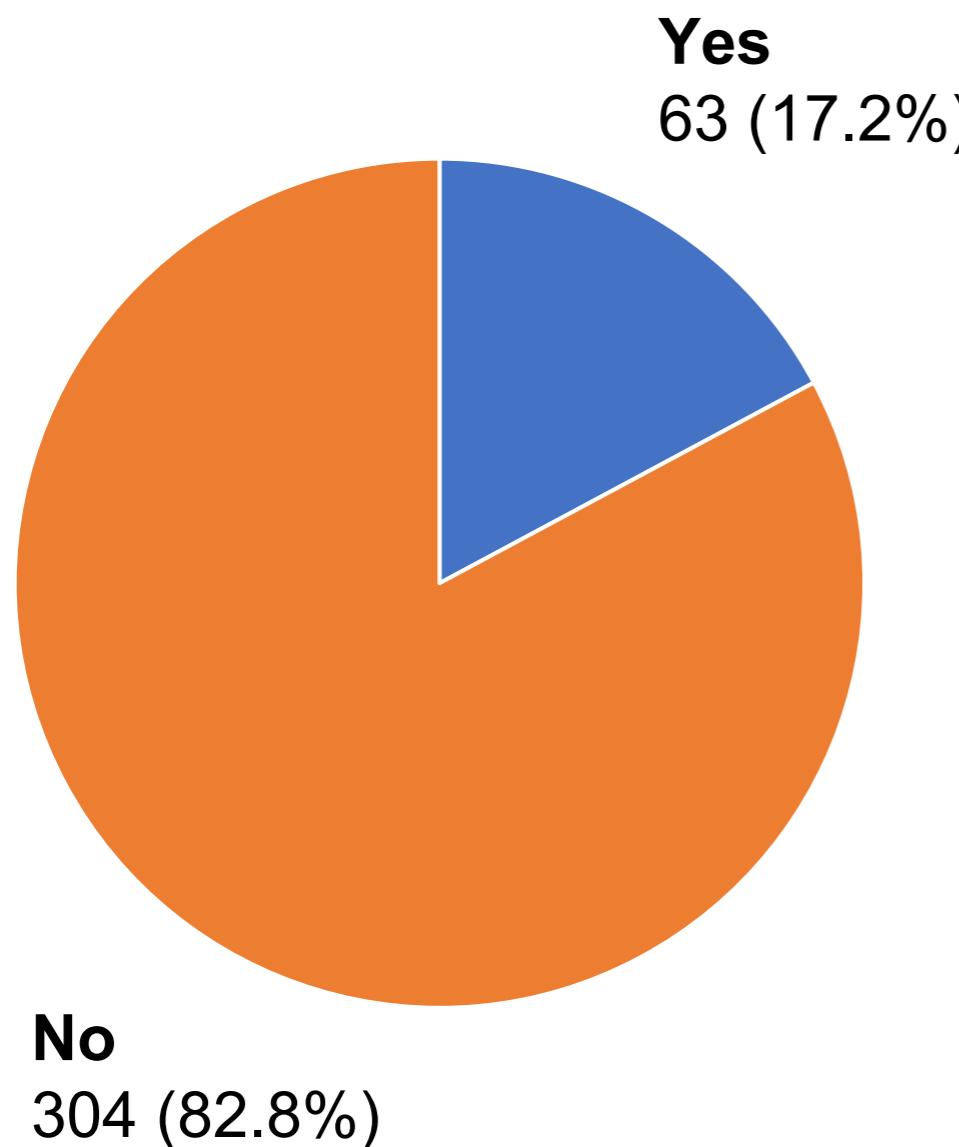
	2023 Survey		2021 Survey		2019 Survey	
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***
0	-	-	-	-	-	-
1~3a	32	0.27%	63	0.52%	56	0.49%
3b~5	7	0.06%	6	0.05%	2	0.02%
	No answer: 7 insts.		No answer: 6 insts.		No answer: 8 insts.	

* Among 11,694 cases

** Among 12,179 cases

*** Among 11,336 cases

Did you experience an incident/accident associated with Cannulation?



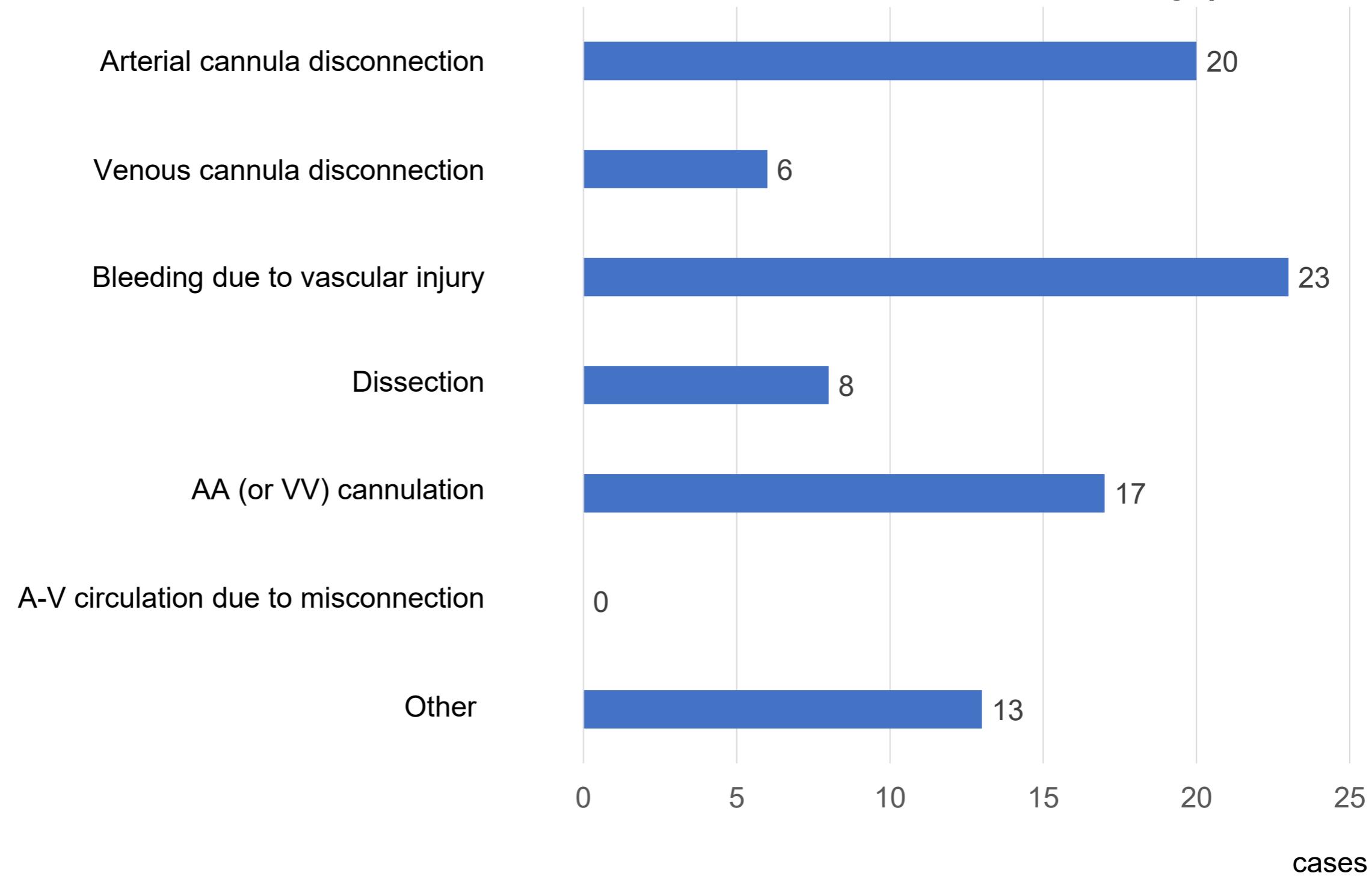
Impact level	No. of cases	Frequency*
0	8	0.07%
1~3a	45	0.38%
3b~5	27	0.23%

No answer: 5 insts.

*Among 11,694 CPS cases occurring during the 2-year period

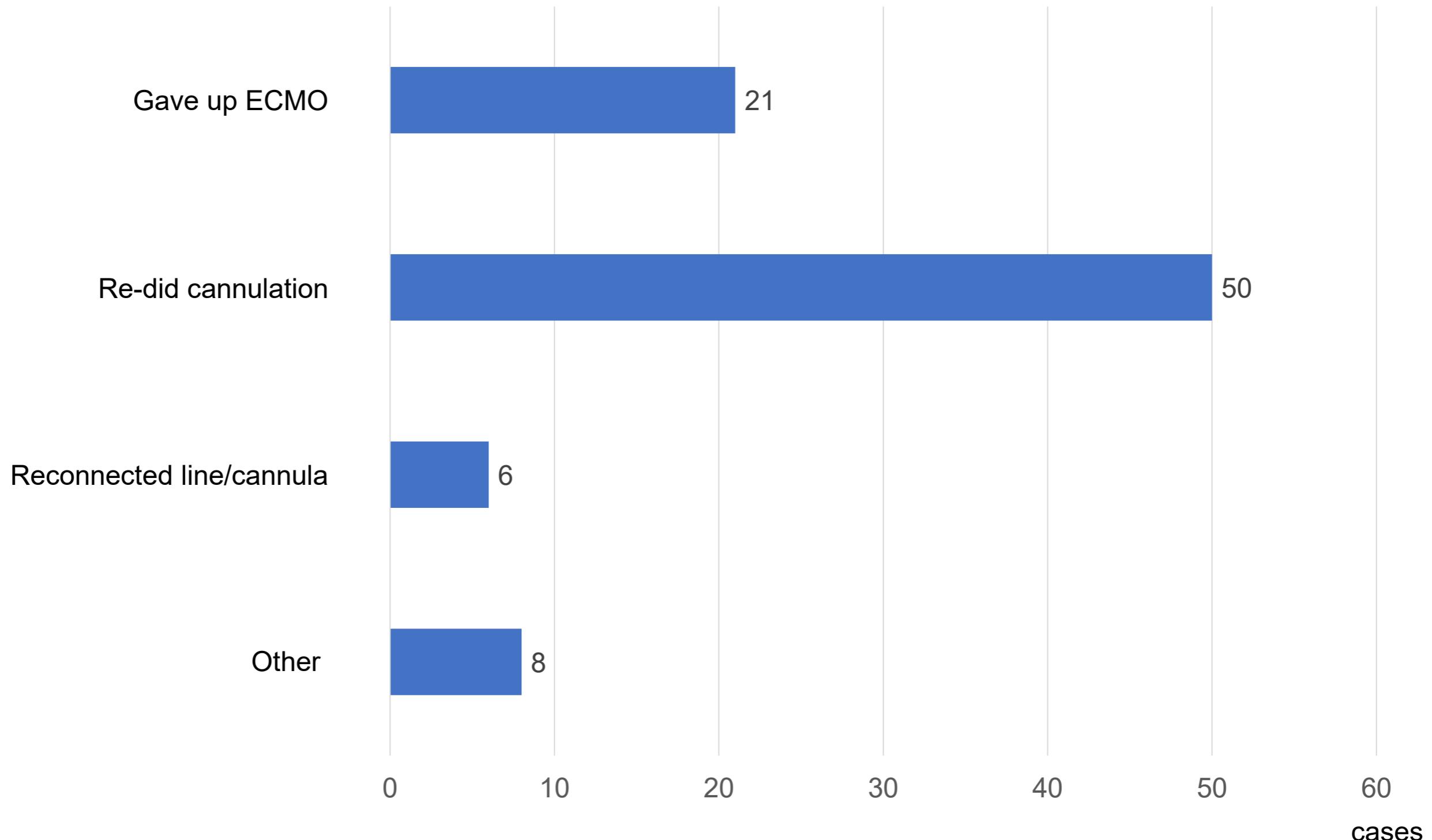
N=375 (no answer: 8 insts.)

How many times did you experience the following incidents/accidents? (Please choose all that apply.)



N=71 (no answer: 3 insts.)

Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



N=71 (no answer: 5 insts.)

Incidents & Rates Related to Cannulation

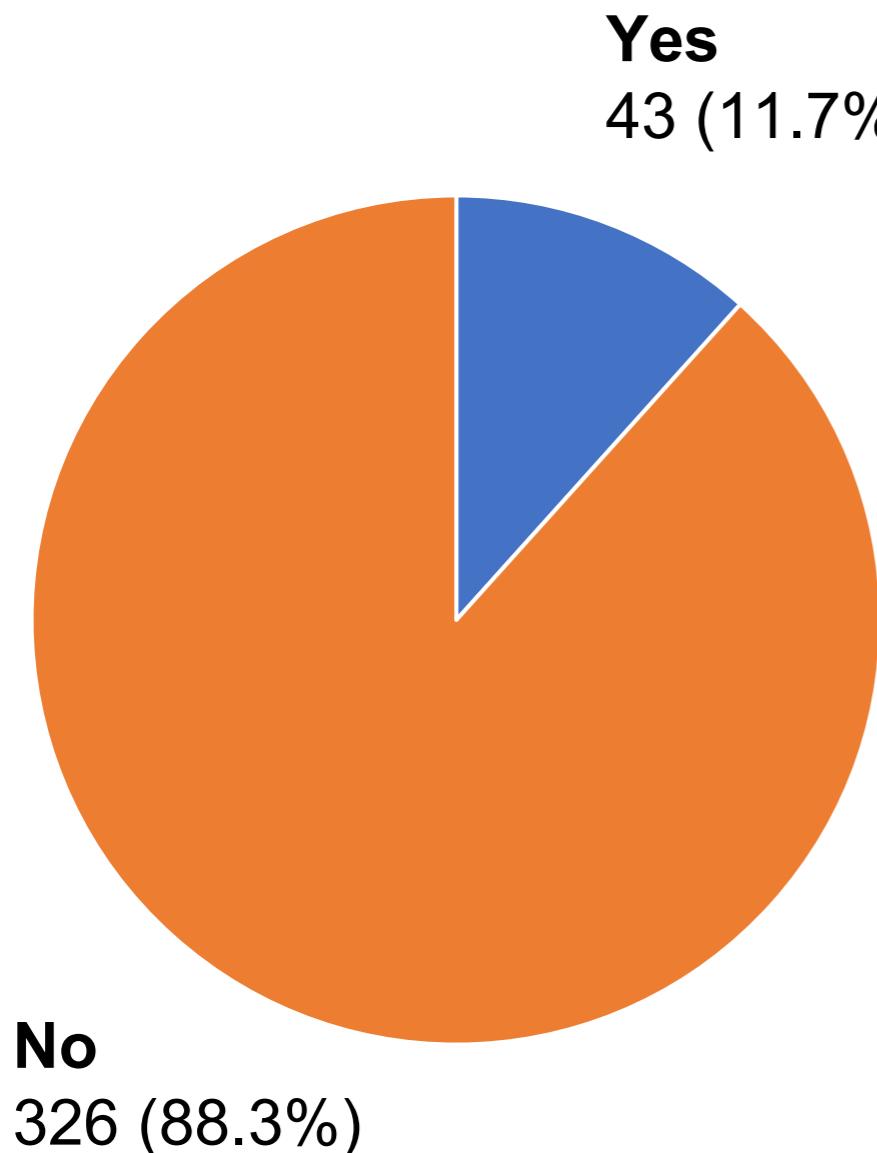
	2023 Survey		2021 Survey		2019 Survey	
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***
0	8	0.07%	11	0.09%	16	0.14%
1～3a	45	0.38%	71	0.58%	74	0.65%
3b～5	27	0.23%	51	0.42%	40	0.35%
	No answer: 9 insts.		No answer: 9 insts.		No answer: 9 insts.	

* Among 11,694 cases

** Among 12,179 cases

*** Among 11,336 cases

Did you experience an incident/accident During Transport to or in CT/Angiography Room?

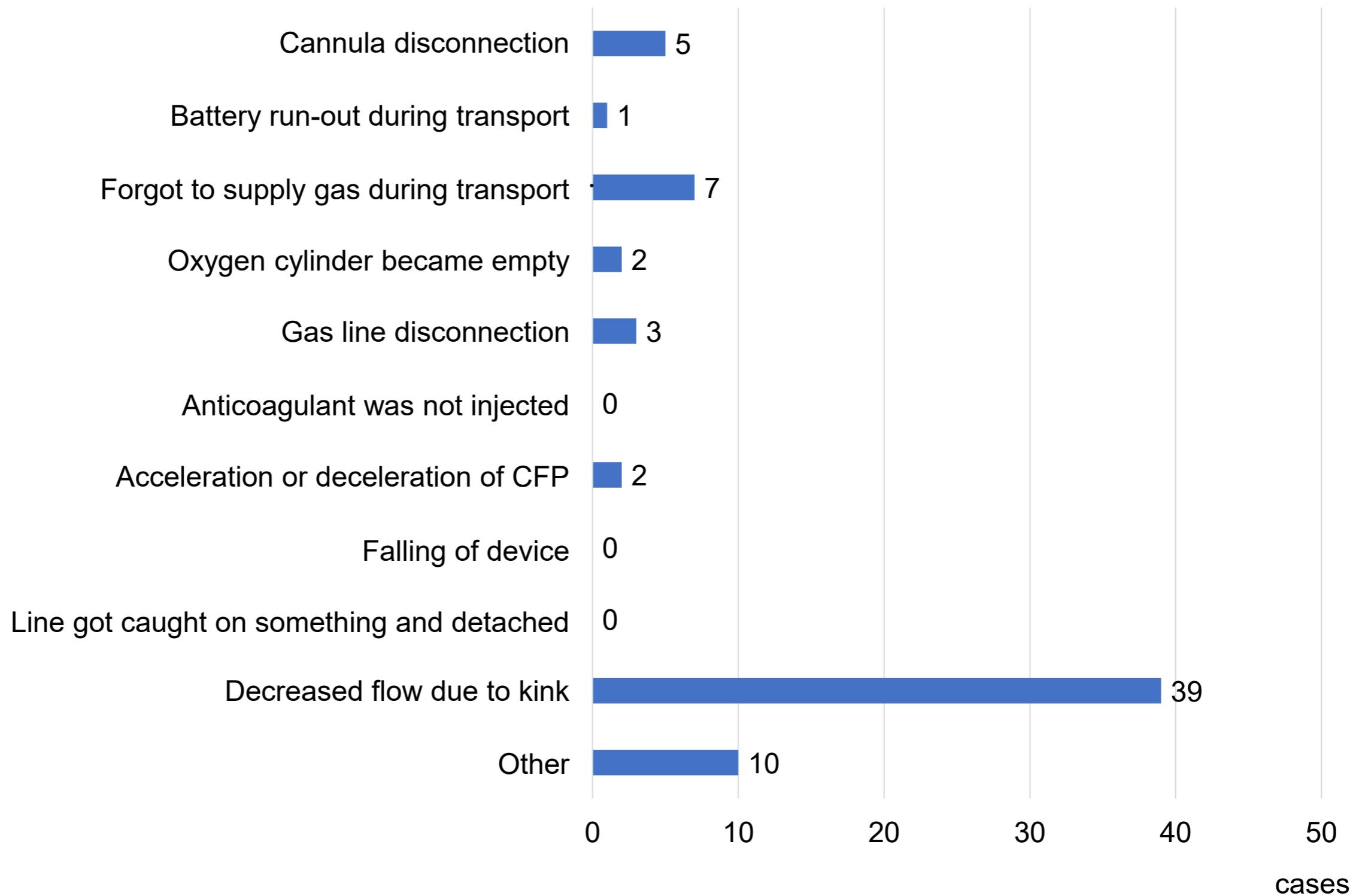


Impact level	No. of cases	Frequency*
1～3a	62	0.53%
3b～5	5	0.04%
No answer: 8 insts.		

*Among 11,694 CPS cases occurring during the 2-year period

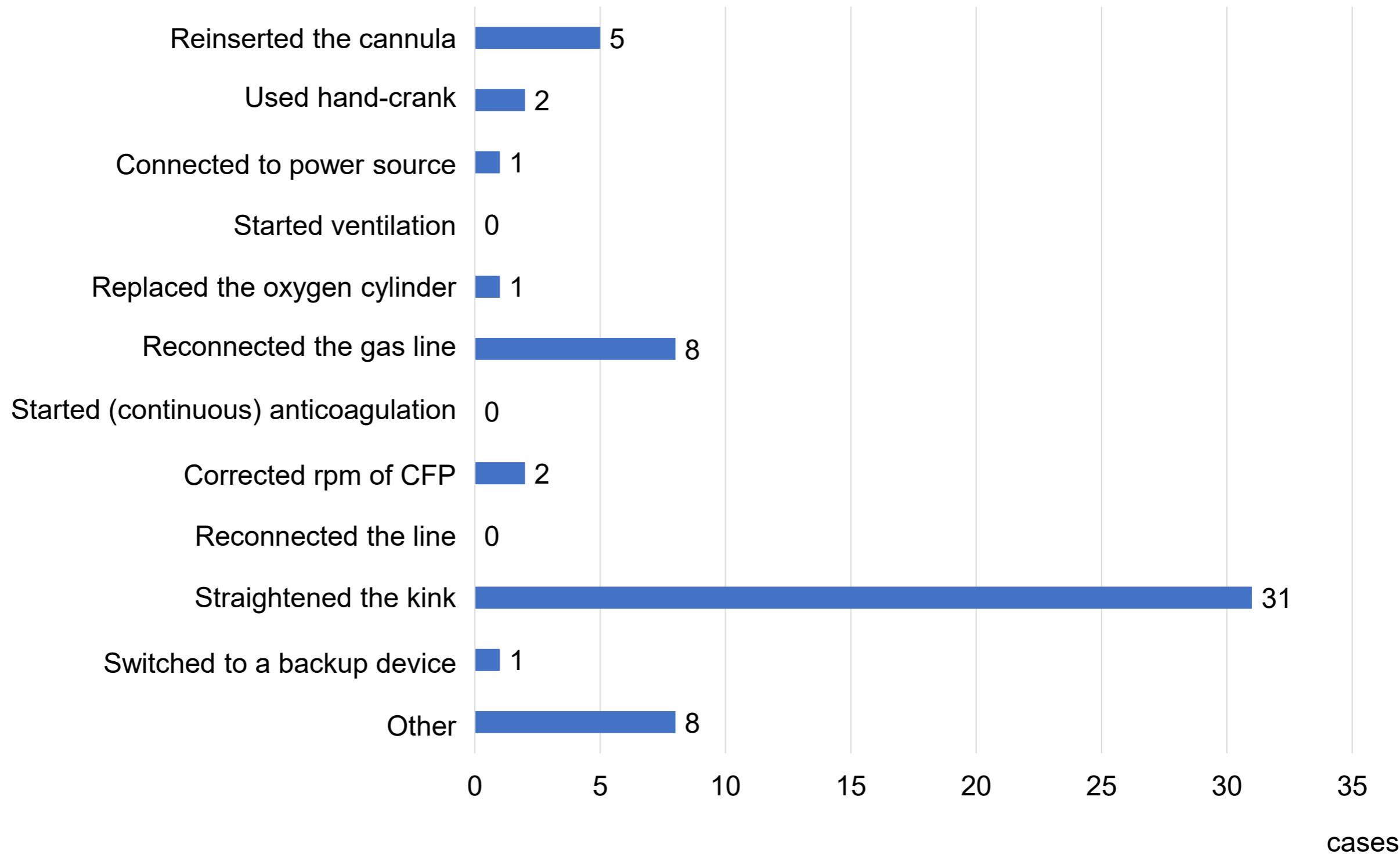
N=375 (no answer: 6 insts.)

How many times did you experience the following incidents/accidents? (Please choose all that apply.)



N=49 (no answer: 6 insts.)

Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



N=49 (no answer: 10 insts.)

Incidents & Rates Related to Transport or Destination

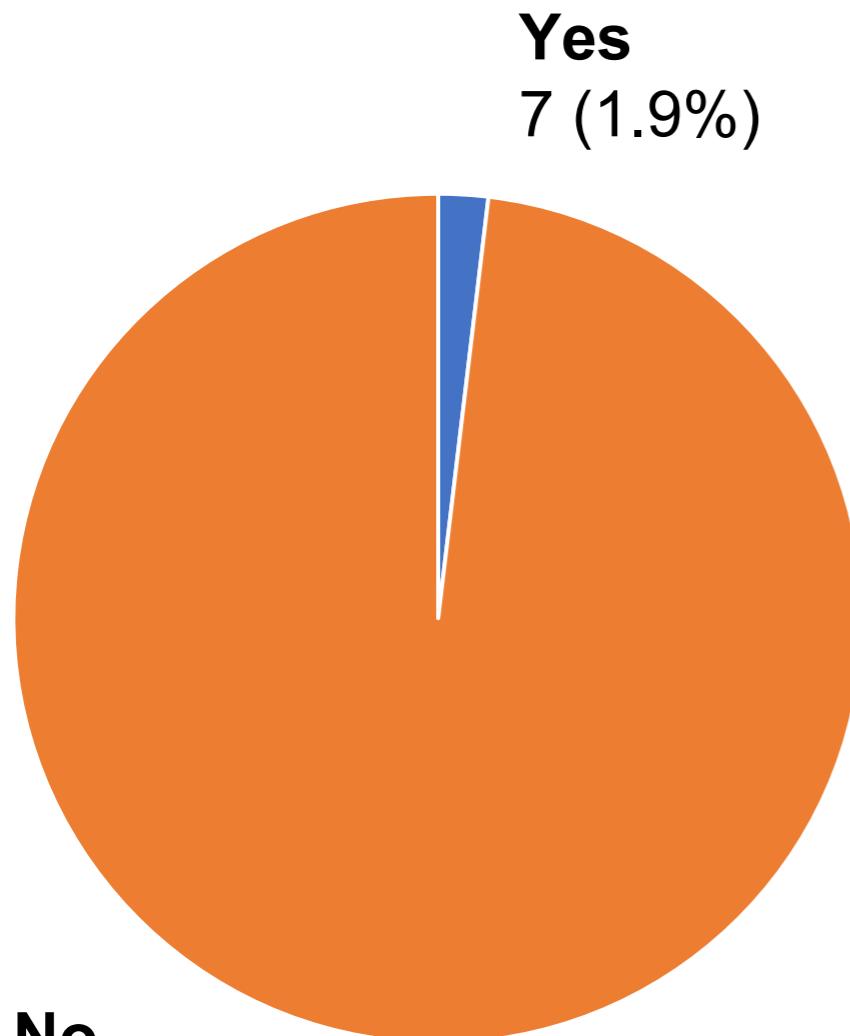
	2023 Survey	2021 Survey	2019 Survey			
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***
0	-	-	-	-	-	-
1~3a	62	0.53%	82	0.67%	92	0.81%
3b~5	5	0.04%	4	0.03%	5	0.04%
	No answer: 8 insts.		No answer: 7 insts.		No answer: 3 insts.	

* Among 11,694 cases

** Among 12,179 cases

*** Among 11,336 cases

Did you experience an incident/accident related to Power Outage or Interruption?



No
363 (98.1%)

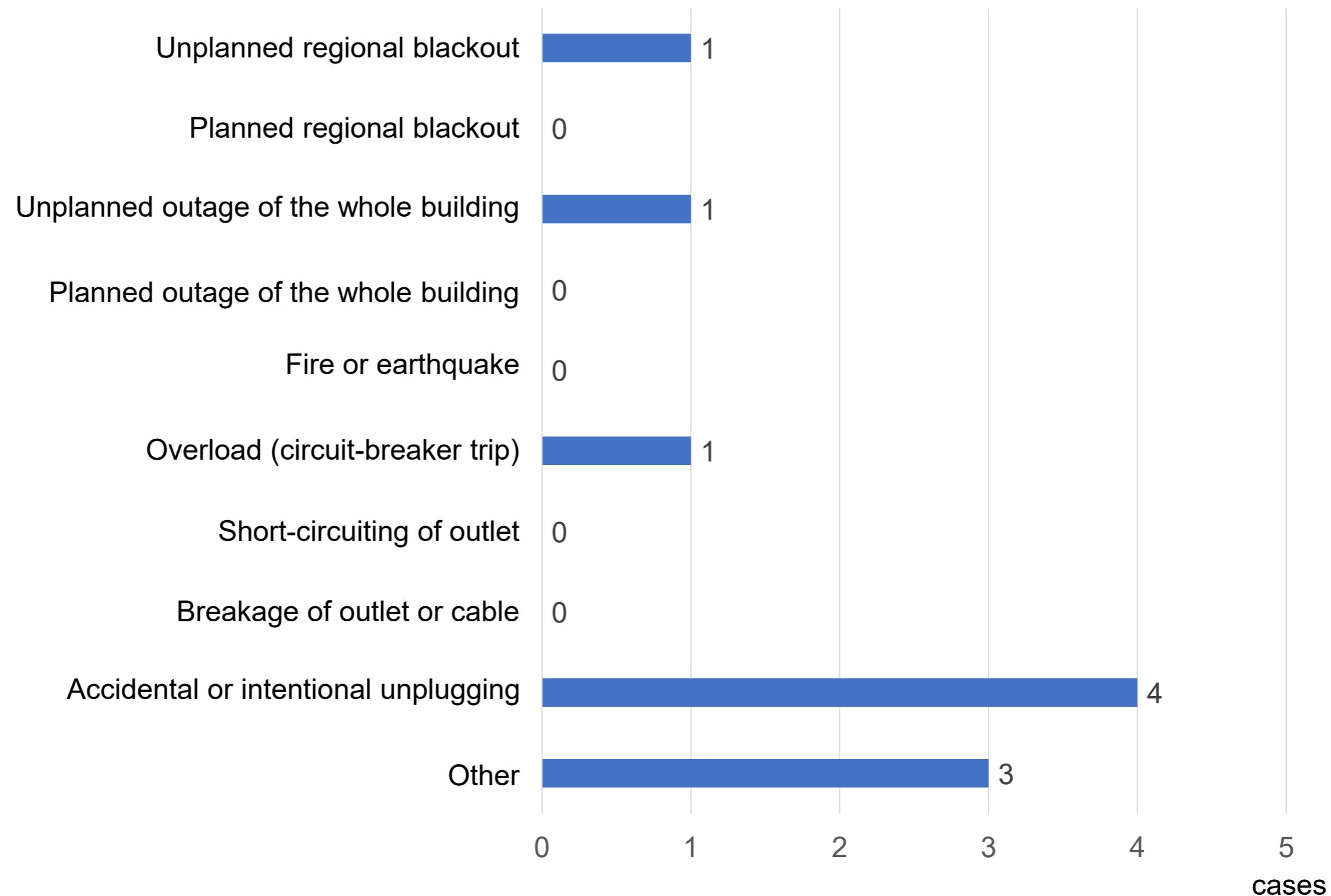
N=375 (no answer: 5 insts.)

Impact level	No. of cases	Frequency*
0	3	0.03%
1~3a	6	0.05%
3b~5	0	0%

No answer: 5 insts.

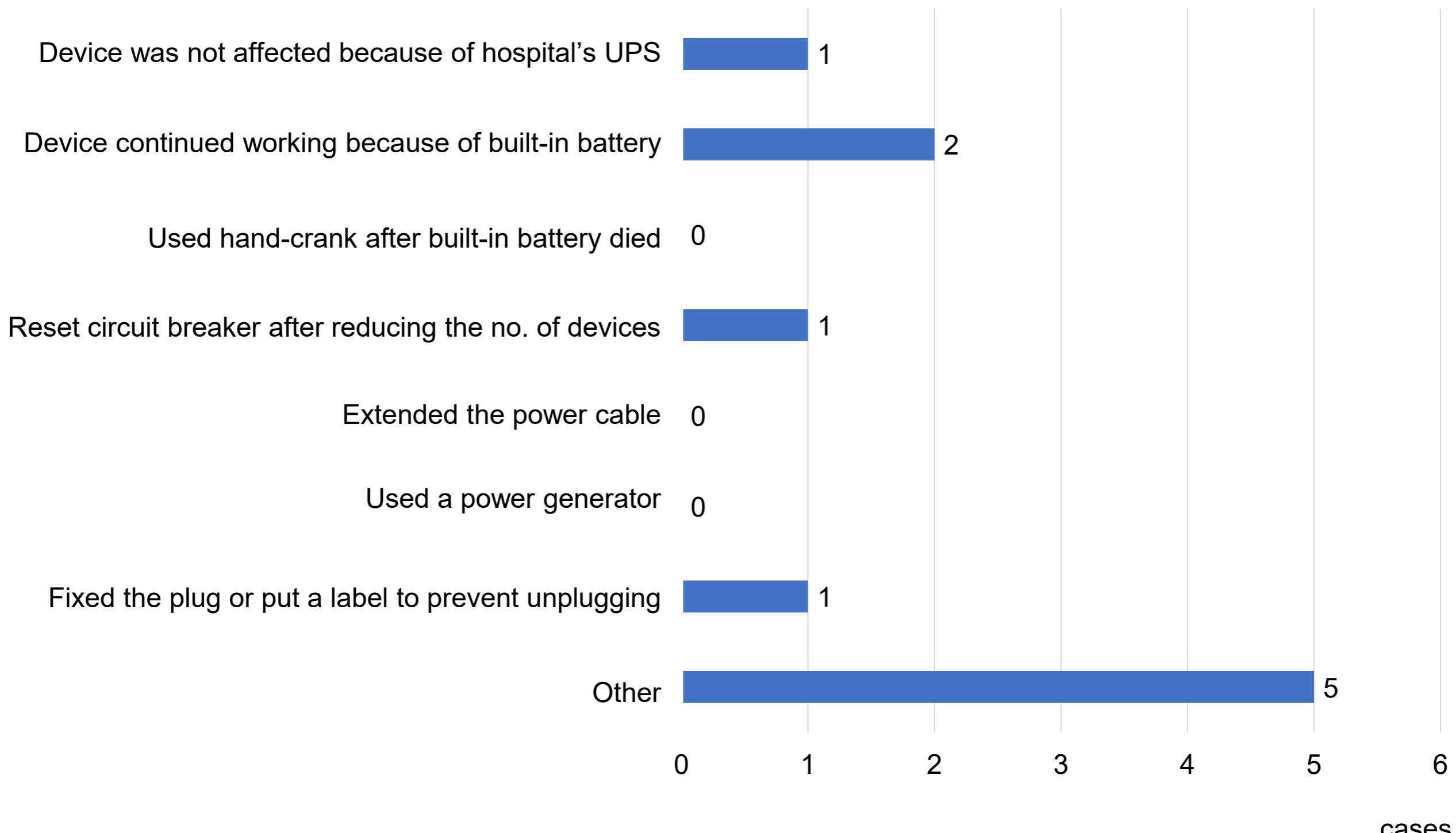
*Among 11,694 CPS cases occurring during the 2-year period

How many times did you experience the following incidents/accidents? (Please choose all that apply.)



N=12 (no answer: 4 insts.)

Which of the following actions did you take in response to the accident/incident and how many times? (Please choose all that apply.)



N=49 (no answer: 5 insts.)

Incidents & Rates of Power Outage/Interruption

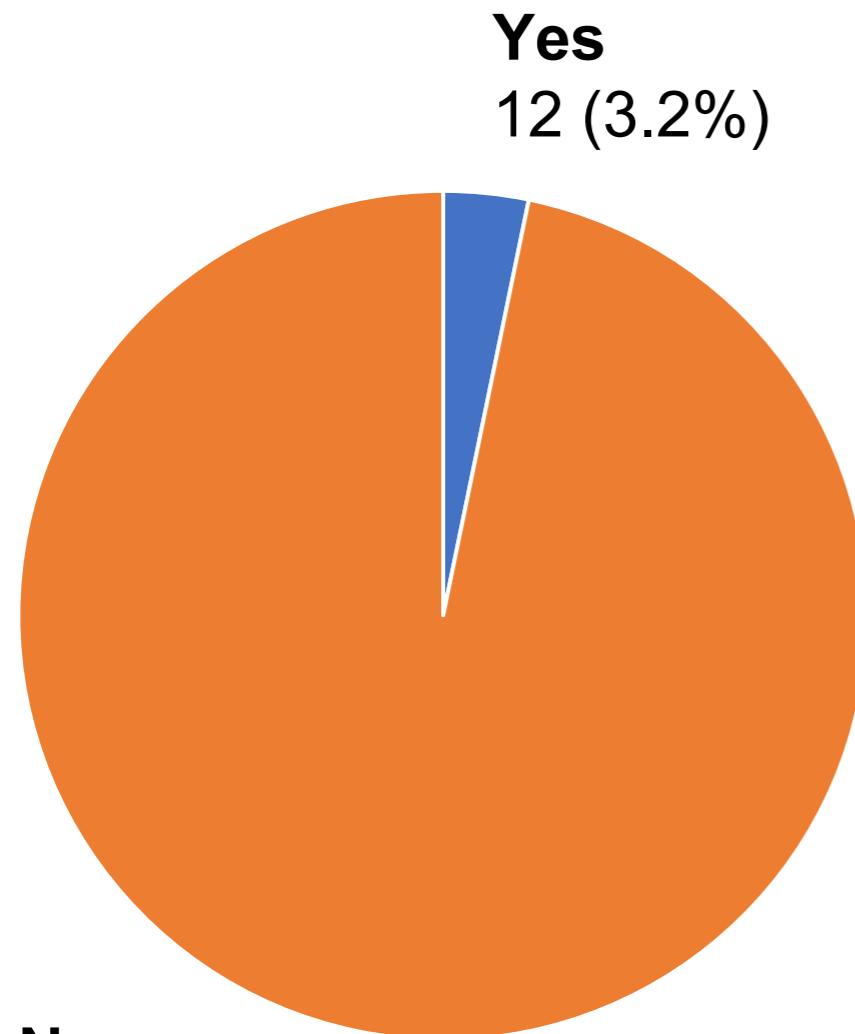
	2023 Survey		2021 Survey		2019 Survey	
Impact level	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***
0	3	0.03%	11	0.09%	5	0.04%
1~3a	6	0.05%	3	0.03%	9	0.08%
3b~5	-	-	-	-	1	0.01%
	No answer: 5 insts.		No answer: 4 insts.		No answer: 5 insts.	

* Among 11,694 cases

** Among 12,179 cases

*** Among 11,336 cases

Did you experience an Interruption of Medical Gas Supply?



Impact level	No. of cases	Frequency*
1～3a	10	0.09%
3b～5	1	< 0.01%

No answer: 5 insts.

*Among 11,694 CPS cases occurring during the 2-year period

N=375 (no answer: 4 insts.)

Incidents & Rates of Medical Gas Supply Interruption

Impact level	2023 Survey		2021 Survey		2019 Survey	
	No. of cases	Frequency*	No. of cases	Frequency**	No. of cases	Frequency***
0	—	—	—	—	—	—
1~3a	10	0.09%	11	0.09%	5	0.04%
3b~5	1	< 0.01%	3	0.03%	0	0%
	No answer: 5 insts.		No answer: 3 insts.		No answer: 1 insts.	

* Among 11,694 cases

** Among 12,179 cases

*** Among 11,336 cases