

Ensuring safety of patients on oxygen during intrahospital transport

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Abstract

Intrahospital transport of non-ICU patients who require supplemental oxygen can put the patient at risk while off the unit. Unintended interruptions in oxygen could lead to adverse events and result in harm. The goal of this study was to identify the failure mode(s) contributing to potential patient harm while being transported on oxygen and implement targeted interventions to address failure mode(s).

1 Objective

- Employ multidisciplinary Fault Tree Analysis to identify failure modes that could cause unintended interruptions in oxygen during patient transport
- Select high priority failure modes identified throughout patient transport process and target interventions to mitigate these risks

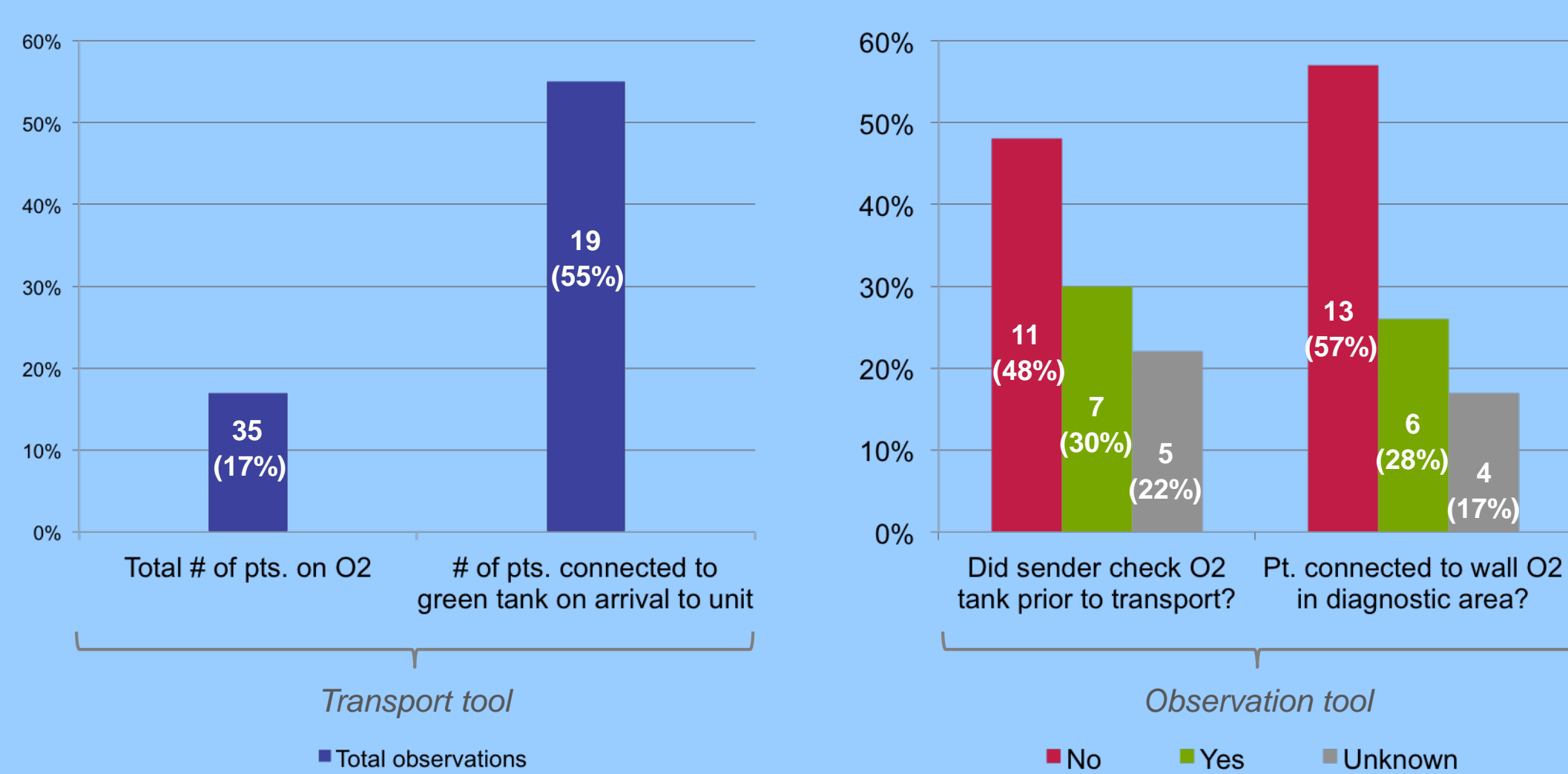
Expected Outcomes:

- Implement pilot program geared towards enhancement of non-ICU patient care quality and safety during transport

2 Approach

- Performed a prospective observational review to validate failure modes identified through FTA analysis.
- Data collected through:
 - Transport tool: n = 205 total transports
 - Observation tool: n = 25 random transports observed of patients on supplemental oxygen

Data Collection



3 Results

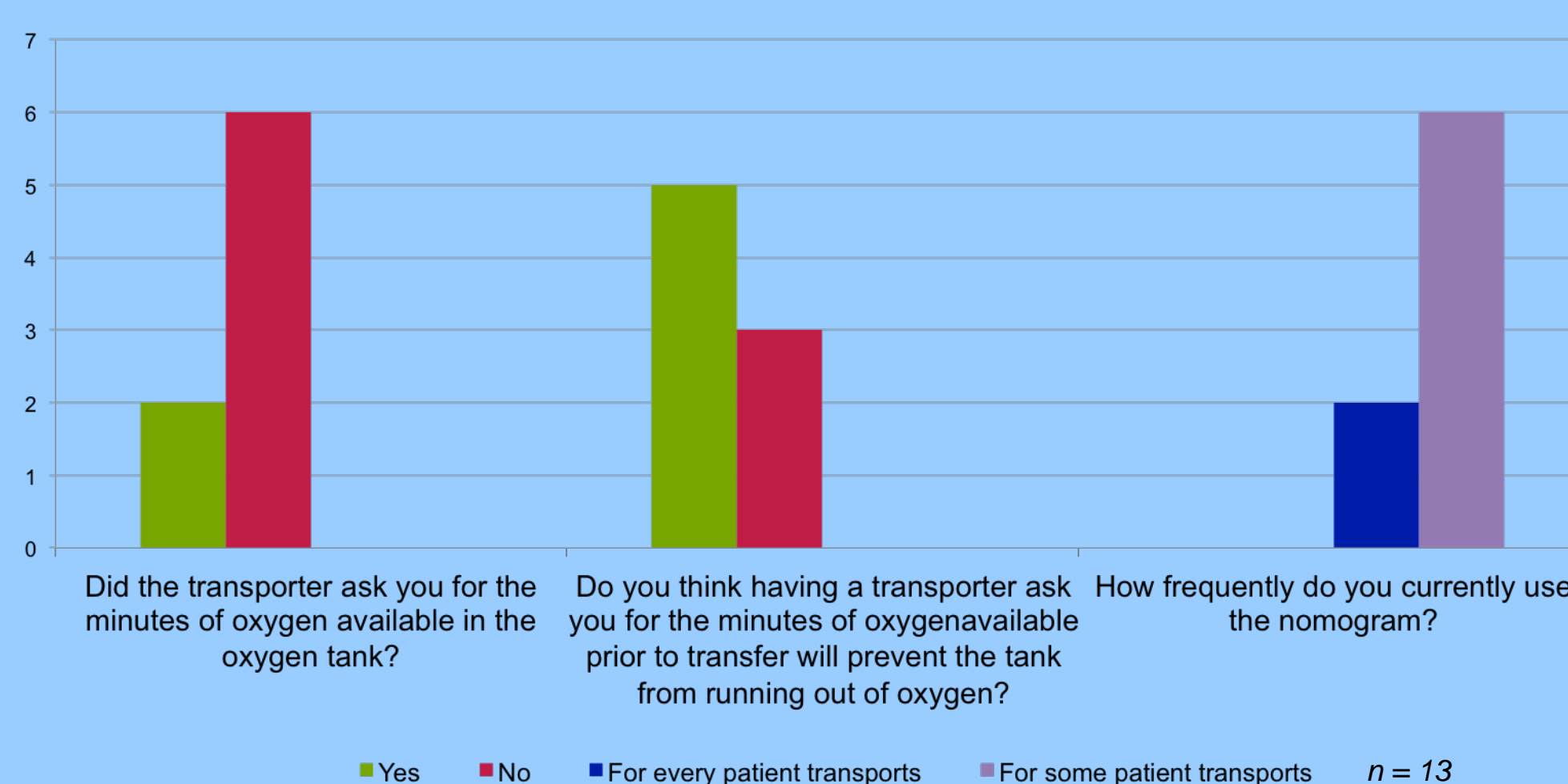
- Failure modes that were identified and targeted in phase 1 of the pilot program include:
 - Unclear expectations of sender and transporter
 - Lack of standardized process from sending unit to receiving unit
 - Lack of accountability for oxygen management while being transported

4 Interventions

- Training to nursing staff on proper use of the nomogram to estimate the minutes of available oxygen in a portable tank
- Formal handoff between nursing staff and transport to increase accountability of oxygen management
- Documentation of number of minutes till cylinder depletion on transporter tool to increase awareness of oxygen therapy

Interventions are in progress on two nursing units and within radiology transport

Post-implementation Pilot Survey Results



5 Lessons Learned

- Increased awareness of portable oxygen supply**
Survey results and interviews with the transport and nursing staff indicate interventions have been well received
- Increased patient safety and improved quality of care:**
Both teams agree that hospital-wide implementation would help mitigate or prevent an adverse event from occurring
- Increased accountability and a double check in the process**
Hand-off process fosters accountability and empowers the transport team to serve a key role in patient safety

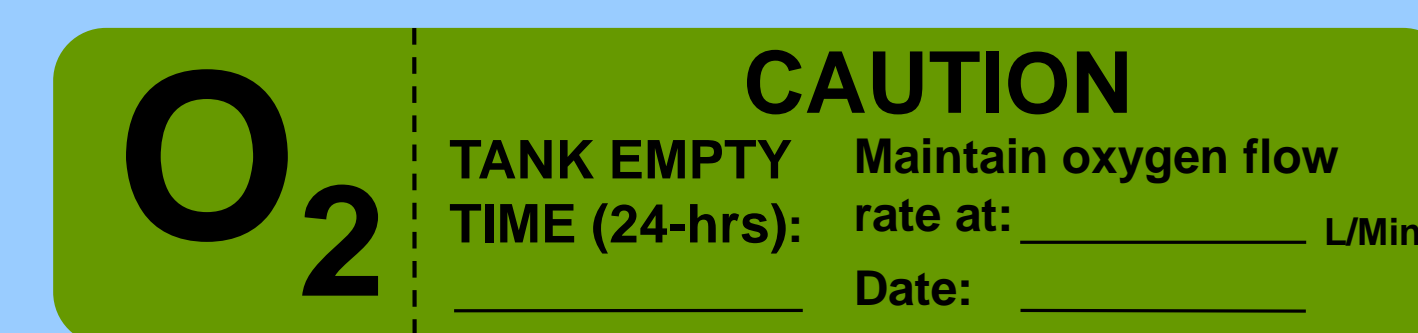
6 Limitations

- Transporters did not actively participate in the pilot as well as low survey response rate among nursing staff of units pilot was implemented
- Low volume of patients being transported on oxygen during the pilot period
- Pilot roll-out occurred two weeks prior to Epic implementation

6 Phase II Pilot Considerations

- Nurses will be given easy-to-use nomograms in the form of badge holders to reference when calculating tank empty times
 - Increase awareness and accountability of oxygen management by using oxygen therapy labels in every patient transport to communicate flow rate and estimated tank empty time
 - Continue to empower transport team's participation in patient safety through ...
- Interventions will focus on two additional nursing units and radiology transport, followed by hospital-wide implementation

Oxygen therapy label prototype



Nomogram prototype

Flowrate (Liters/min)	E Cylinder Duration Guide		
	1000 PSI (1/2 Full)	≤1500 PSI (3/4 Full)	2000 PSI (Full)
0.5	10 hr	15 hr	20 hr
1	5 hr	7 hr 45 min	10 hr
1.5	3 hr 24 min	5 hr	6 hr 45 min
2	2 hr 30 min	3 hr 30 min	5 hr
2.5	2 hr	3 hr	4 hr
3	1 hr 50 min	2 hr 30 min	3 hr 20 min
4	1 hr 15 min	1 hr 55 min	2 hr 30 min
5	1 hr	1 hr 30 min	2 hr
6	50 min	1 hr 17 min	1 hr 40 min
8	35 min	52 min	1 hr 10 min
10	30 min	46 min	1 hr
15	20 min	30 min	40 min

Original nomogram

FLOW RATE	CYLINDER PRESSURE (PSI)							
	≥2000	1800	1500	1200	1000	800	600	500
0.25	2240	2016	1680	1344	1120	896	672	560
0.5	1120	1008	840	672	560	448	336	280
1	560	504	420	336	280	224	168	140
2	280	252	210	168	140	112	84	70
3	187	168	140	112	93	75	56	46
4	140	126	105	84	70	56	42	35
6	93	84	70	56	47	37	28	23
8	70	63	52.5	42	35	28	21	18
10	56	50	42	34	28	22	17	14
15	37	33	28	22	19	15	11	9
25	22	20	16.8	13	11	9	7	6

References

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