

# PLACING THE EXTUBATION IN THE RESPIRATORY THERAPIST'S HANDS – CAN WE BE SUCCESSFUL?

DARCEY LAFRENIERE, ALEX GAMBERO, EMILY PARENT, CHRIS CHAMBERS, MARK HAMLIN  
RESPIRATORY THERAPY, UNIVERSITY OF VERMONT MEDICAL CENTER, BURLINGTON VT

## Background

Many patients who are mechanically ventilated are often extubated long after being clinically ready. Extended and unnecessary mechanical ventilation time can lead to several negative outcomes, such as increased risk of infection, Ventilator Induced Lung Injury (VILI), Ventilator Associated Events (VAE) and increased length of stay (LOS). At our academic medical center, patients' extubations were found to be delayed (after meeting criteria) for several reasons, including resident physician hesitancy, lack of attending MD presence, or proximity to end of shift.

Our goal was to define and implement a protocol with a set of objective criteria for weaning and extubation. Using this protocol, the Respiratory Therapist (RT) would extubate the patient without a physician evaluation – eliminating delay and shortening the course of mechanical ventilation without any unplanned reintubations.

## Methods

Every evening during rounds, weaning and extubation evaluation for every ventilated patient would be discussed between the RT and resident physician provider. If weaning readiness criteria was met, a daily 1 hour spontaneous breathing trial (SBT) would be performed between the hours of 04:00 – 06:00 am.

Weaning readiness was defined as having:

- FIO<sub>2</sub> ≤ 50% with a SPO<sub>2</sub> > 90%
- PEEP (Positive End Expiratory Pressure) ≤ 8 cmH<sub>2</sub>O
- HR < 130
- RR < 38

SBTs were conducted on Pressure Support Ventilation (PSV) 5 and PEEP 5. SBTs were terminated if any of the following threshold values were observed:

- HR < 60 or > 130
- Sustained RR > 38
- Systolic Blood Pressure > 180 or < 90 mmHg
- SPO<sub>2</sub> < 88% despite increasing FIO<sub>2</sub> to 50%
- ETCO<sub>2</sub> increase/decrease > 10 mmHg
- Significant change in respiratory pattern, diaphoresis, or paradoxical breathing pattern

If a successful SBT was completed, the RT would perform pulmonary mechanics, a Rapid Shallow Breathing Index (RSBI) and assess extubation readiness (per protocol).

Patients who met extubation criteria would be extubated by the RT.

Extubation criteria was defined as:

- RSBI ≤ 80 breaths/min/L (0 PS, 5 PEEP)
- NIF > -20 cmH<sub>2</sub>O
- FVC > 10 ml/kg Ideal Body Weight (IBW)
- Cuff leak present
- Secretions manageable (cough, gag, swallow intact)
- Patient following commands, able to lift head off bed

Success was defined as remaining ventilator free for 72 hours post-extubation. All patients who met the initial weaning criteria would have a smart note template placed into their chart, regardless of whether they were extubated or not (See Figure 1). This both served as a tracking tool for data collection, and helped facilitate communication with the attending physician and the rest of the ICU team.

### Vent Wean

Patient {qualifies/does not qualify} for RT driven extubation protocol, as discussed with physician \*\*\*. Will proceed with SBT in the morning.

This patient {RT Did/Did Not Meet Spontaneous Breathing Trial}.

Patient {RT did/did not tolerate weaning trial}

Placed back on previous vent setting due to \*\*\*.

Extubation criteria was {RT extubation met/not met}

RASS \*\*\*  
FVC \*\*\*  
NIF \*\*\*  
Post-SBT RSBI \*\*\*  
Air leak was {Present/ Not present}  
Secretions are \*\*\*  
Patient {is/is not} following commands

Patient met all criteria for extubation, and was extubated to \*\*\*.

Patient met all criteria for extubation, but was not extubated because \*\*\* and was placed back on previous vent settings.

Figure 1: This is a Smart Phrase note that was created to ensure all aspects of weaning were assessed and properly documented in each patient's chart.

## Results

There were a total of 34 patients during the evaluation period who met criteria for weaning and completed a successful 1 hour weaning trial. 21 of these patients were in our Medical ICU (MICU) and 13 were in our Surgical/Neurosurgical ICU (SICU).

Out of the total 34 patients, 12 (35.3%) were successfully extubated by an RT following the protocol, 9 in MICU and 3 in SICU (Table 1). The average time from end of a successful SBT and extubation was 65 minutes.

Poor neurological status, provider declined, planned procedures, and other (12, 5, 2, 4) respectively, were given as reasons for not extubating the other 22 patients (Table 2).

None of patients that were extubated via the RT driven protocol required reintubation within the 72 hour window.

## Conclusions

Implementing a respiratory therapy driven weaning and extubation protocol can facilitate successful and timely extubation by RTs. Safety measures as outlined in our protocol, along with attending physician support in our ICUs, supported this practice change at our academic medical center. With clearly defined criteria and a care plan in place, RTs can evaluate, assess and perform extubation without direct physician guidance.

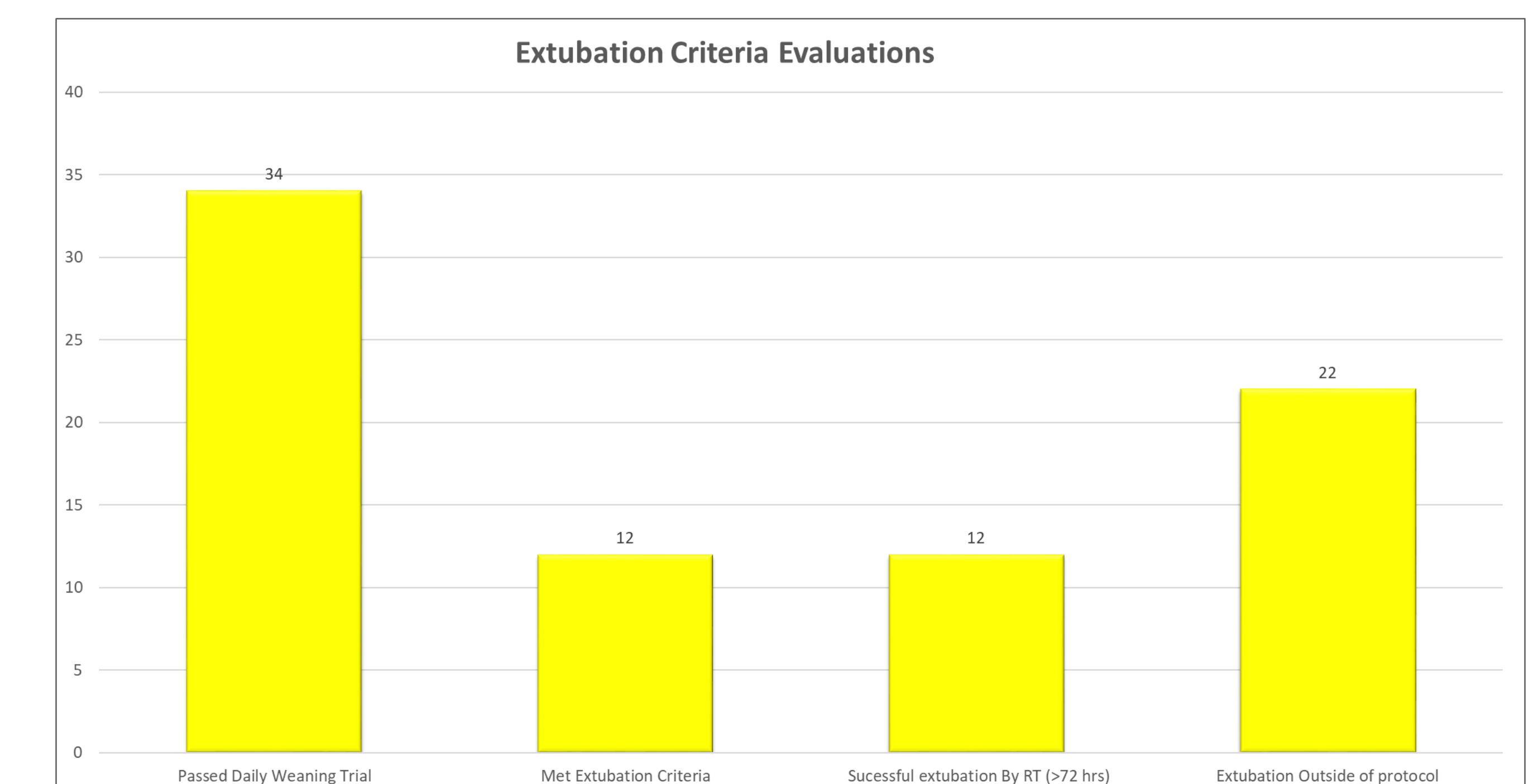


Table 1: This graph shows the total number of patients that passed a daily weaning trial, met extubation criteria and were extubated, successfully extubated, and patients that were extubated outside of the RT driven protocol

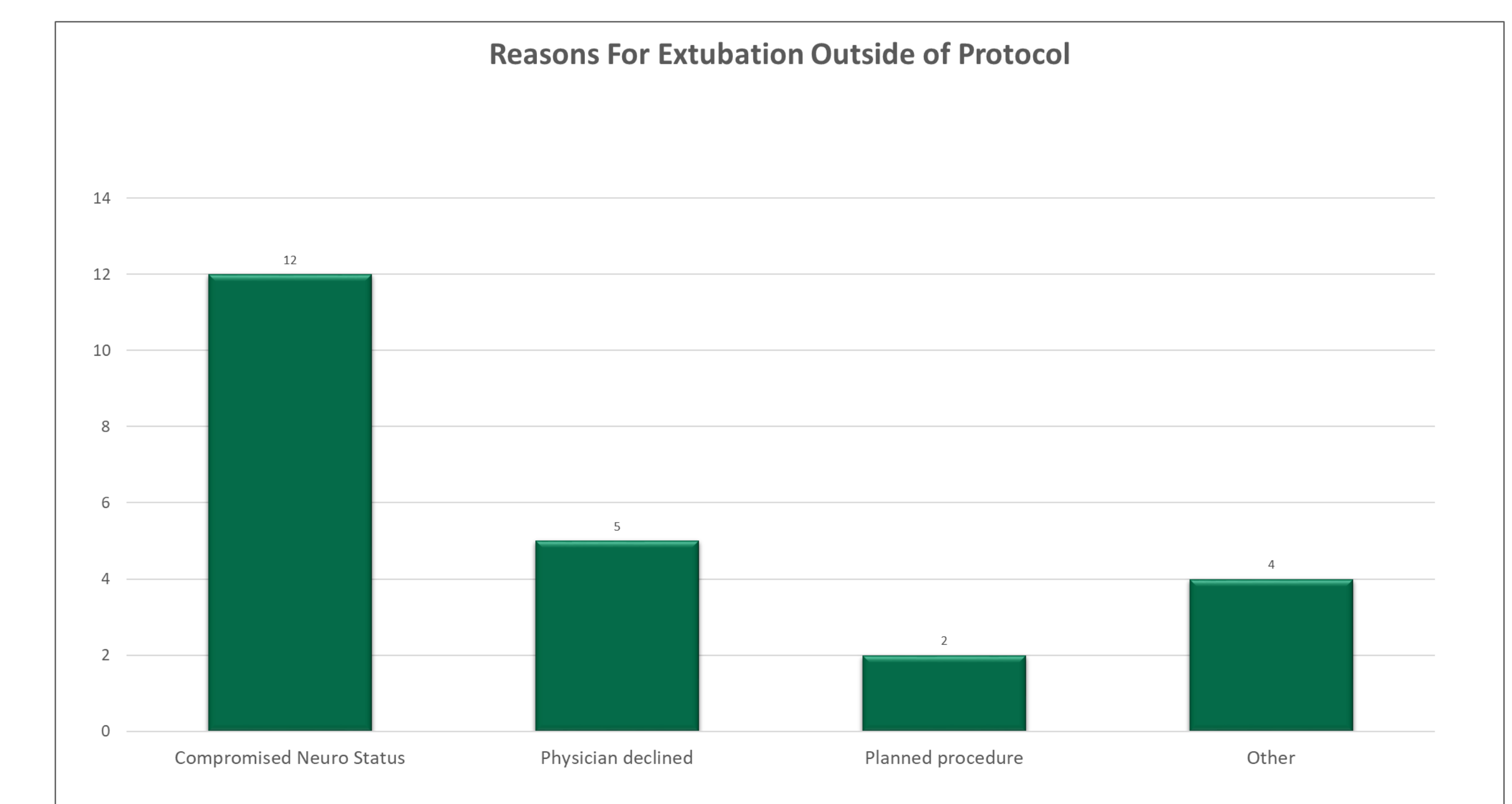


Table 2: This graph shows number of patients extubated outside the RT driven protocol and the number of patients per each reason.