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FOUNDATION™

As parents of ventilator dependent children, understanding the factors that contribute to alarm failure and fatigue is so important to avoid unnecessary hypoxic injury and loss of life. Every second matters when dealing with emergent respiratory events; as we say in the field, time is tissue.

Many factors contribute to alarm failure, some are listed below:

1. *The alarms must be set.*

Alarms do nothing for you if they are not set up in your settings. On the Trilogy specifically, it is important to remember that if any modes are changed, the alarm limits set on the initial set up will not flow through to the new one. This is both for changes in ventilator mode or primary vs secondary settings. Doctors may prescribe a change in settings, and if they do not also prescribe alarm limits, not all respiratory therapists will take it upon themselves to input those without an order. This seems simple but just like your television won't work if you don't plug it in, your alarms will not work if they are not set.

2. *The alarm limits should be appropriate for the patient.*

If your alarm limits are not set appropriately, they may alarm you when it isn't needed or, worse yet, fail to alarm when it matters most. For example, if you set your Low VTE alarm to 80, and the patient frequently falls below that number when very relaxed, you'll be alerted very frequently just to see they are resting. Conversely, if it is set at 20, and they are in trouble but still compensating at 30, you could have bought yourself more time before a crash if you had set it higher.

3. *The alarm setting should minimize alarm fatigue.*

Alarm fatigue is a dangerous thing, even in hospitals, where fatalities and injuries due to this phenomenon do occur. If your alarms are such that they go off all the time for non-emergent reasons, like it or not, you will become numb to them and they will lose their power to alert you to an emergency. This is especially dangerous in our community, where many parents frequently go without dedicated nursing help overnight and depend on alarms to alert them to trouble. On my son's ventilator, for example, we have removed the apnea alarm. The reason for this is because he often rides the ventilator at night, even when healthy. Without removing this alarm, it would go off throughout the night, and we would become nonchalant about hearing it, assuming it is a false alarm. We use low minute vent alarm limits instead, which tell us more accurately if his ventilation is inadequate for perfusion.

4. *Keep in mind that alarms are fallible.*

We are so painfully reminded of this fact too often. Too often patients are lost to alarm failure. It is heartbreaking and traumatizing on a whole new level. Sometimes when a ventilator becomes disconnected, if the end becomes somewhat occluded or is still close enough to the trach itself, it may not detect that it has been disconnected. This is a very concerning issue, because you then lose valuable time you could have responded in. The first alarm you may hear will be your oximetry after the patient has already started to decompensate. This is why it is so important to fine tune your other alarm settings to alert you in other ways besides just the circuit disconnect alarm.

5. *In the event your vent alarms fail...*

When vent alarms do fail, or alarm fatigue to them is high, it is highly important to ensure triggering of your secondary alert source...your oximeter. Make sure it is connected, plugged in and charging, and that the limits are set appropriately to alert you in an emergency. The charger of those machines can easily become somewhat dislodged and they can lose battery life. The settings can be set with too high of a delay between hypoxia detection and audio alarm initiation. Be aware of your machines and their settings and tailor them to your child's and families' needs.

6. *Talking to your doctor.*

Not all doctors are that familiar with our home vents, and not all are quick to admit it. Reach out and ask questions; "What are the alarm limits?", "Which alarms are not set?", "Why are the limits where they are?", "Is there anything we can do to make X alarm or Y alarm more accurate and appropriate? We have noticed they go off frequently without apparent cause." If they aren't forthcoming, reach out to your DME RT.