

## Patient Safety Tip of the Week

April 12, 2022

### A Healthcare Worker’s Worst Fear

As healthcare workers, our worst fear is that we might make a mistake that causes harm or death to one of our patients. Some also fear that such a mistake will lead to loss of respect from colleagues or a malpractice suit. But few would fear that such a mistake could lead to criminal charges and time in prison.

But all that changed recently. In multiple columns we discussed the tragic incident at Vanderbilt in which a patient died after accidentally being given the neuromuscular blocking agent (NMBA) vecuronium instead of the sedating agent Versed. See our Patient Safety Tips of the Week for December 11, 2018 [“Another NMBA Accident”](#), January 1, 2019 [“More on Automated Dispensing Cabinet \(ADC\) Safety”](#), February 12, 2019 [“From Tragedy to Travesty of Justice”](#), and September 7, 2021 [“The Vanderbilt Tragedy Gets Uglier”](#) for details. In late March 2022 a jury convicted RaDonda Vaught, the nurse involved in that incident, of gross neglect of an impaired adult and negligent homicide ([Kelman 2022](#)). She was acquitted of reckless homicide, a more serious charge than negligent homicide.

Vaught did make multiple serious mistakes in the incident. But there were multiple system problems that contributed to the devastating outcome. In fact, in our prior columns we identified at least 19 points where interventions or different decisions could have prevented this tragic death.

Any time we review an incident in which human error occurred, we always ask “Could another nurse/physician/pharmacist have made similar errors under these same circumstances?”. In the Vanderbilt NMBA incident, we concluded that it was quite conceivable that another nurse might have made similar errors given the same set of circumstances and contributing factors. That is, the many system issues actually put that nurse in a position where human error would leave her at the “sharp end” of the error cascade. As such, we would not have even recommended terminating the nurse. Yet she ultimately had her nursing license revoked by the Tennessee Board of Nursing and now has been convicted of these criminal offenses.

Vaught readily admitted the error(s) immediately after the incident and showed remorse at every stage. Vaught did not testify in the trial. But, according to Kaiser Health News

([Kelman 2022](#)), she previously admitted to the drug error in an interview with law enforcement officials in which she said she "probably just killed a patient." And, during proceedings before the Tennessee Board of Nursing she testified that she allowed herself to become "complacent" and "distracted" while using the medication cabinet and did not double-check which drug she had withdrawn despite multiple opportunities. She told the nursing board "I know the reason this patient is no longer here is because of me" and, as she broke down crying, "There won't ever be a day that goes by that I don't think about what I did."

It is worthwhile reiterating details of the incident, its contributing factors, and lessons learned. We pieced together details of the case from the CMS inspection report ([CMS 2018](#)) and media reports at the time ([NewChannel5 2018](#)), ([Kelman 2018a](#)), ([Kelman 2018b](#)), ([Ellison 2018](#)).

The patient was a 75 y.o. woman with an intracranial hemorrhage, admitted to the hospital's Neuro ICU. Two days later she was alert and oriented and stable and was now in the Neuro Stepdown Unit and waiting for a bed on the regular floor. On that day she was sent to the radiology department for a total body PET scan. The patient told staff about claustrophobia and a physician ordered Versed 2 mg intravenously for sedation for the procedure. PET scan staff requested a nurse from the Neuro ICU administer the Versed because their own nurses would not be able to perform monitoring of the patient.

That nurse from the Neuro ICU was already going to the ER to administer a swallowing study. The nurse looked in the patient's profile on the ADC (Automated Dispensing Cabinet) for the Versed but could not find it. (The ADC was in the Neuro Intensive Care Unit, not in radiology.) Therefore, the nurse used the override function on the ADC to search for it. The nurse recalled talking to an orientee about the swallowing study while entering the first two letters "VE" into the ADC. The first medication on the list was chosen. The nurse did not recognize that the medication chosen was vecuronium, not Versed. The nurse looked at the back of the vial to see how to reconstitute the medication but did not recheck the name of the medication on the vial. The nurse grabbed a sticker from the patient's medication file, a handful of flushes, alcohol swabs, and a blunt-tip needle. The nurse put the medication vial in a baggie and wrote on the baggie "PET scan, Versed 1-2 mg" and went to Radiology to administer the medication. The nurse found the patient waiting in the PET scan area, reconstituted the medication, and administered the medication intravenously to the patient, then left the PET scan area. In the CMS interview the nurse could not remember the exact dose administered but thought it was 1 milliliter. The nurse put the leftover medication in the baggie and gave it to another nurse. The nurse did not monitor the patient after administering the medication.

The order for Versed had been entered at 2:47 PM. It was verified by a pharmacist at 2:49 PM. It was never dispensed from the ADC. Vecuronium, however, was dispensed from the ADC at 2:59 PM, via the override function. There was never an order for vecuronium and no verification from a pharmacist.

The nurse did not document the administration of the medication. Apparently the nurse had been told that the “new system” would capture it in the MAR.

Sometime after the administration of the vecuronium the patient was found unresponsive. CPR was administered and resuscitation efforts included intubation and restoration of a heartbeat. The patient was not actually in the PET scan when she suffered the arrest. The patient was first in an “injection room” where she received injection of the radioactive tracer and then the injection of what was thought to be Versed. The patient was then moved to a “patient room” where they are expected to wait for up to an hour for the radioactive tracer to circulate. It was in this room where the patient was found by a transport attendant to be “unresponsive”. Radiology technicians were able to visualize the patient in that room (via camera) and noted she had her eyes closed but resolution was not good enough for them to detect whether she was breathing or not. It was estimated that 30 minutes had elapsed from the time the patient was put in that “patient room” and the time she was found unresponsive.

Nurses in the Neuro ICU heard the code call to Radiology and wondered whether it might be for their patient who was having a PET scan. It was their patient, and she was brought back to the Neuro ICU after the resuscitation. There a second nurse showed the baggie to the first nurse and asked “Is this the med you gave the patient?”. When the nurse answered “yes”, the second nurse said “This isn’t Versed. It’s vecuronium.”

The patient was subsequently put on comfort care after discussion with family about the neurological sequelae and died the following day.

Clearly, Vaught made the following errors:

- After entering only the first two letters “VE” for Versed she chose the first drug shown and she overrode a warning in a red box stating that it should be for STAT orders
- She removed the vial from the ADC and did not look at the label which was for vecuronium, not Versed.
- She did not question why she had to reconstitute this preparation (which would not ordinarily have been required if the drug was Versed).
- After administering the medication to the patient in the PET suite, she left to perform another task in the ER, and did not monitor the patient to whom she had administered the medication. (Note that the CMS report does not detail how long she actually observed the patient before leaving the PET suite).
- She failed to document anywhere the details of the drug administration (again, note that there were some system issues that contributed to failure to document).

We refer you back to our December 11, 2018 Patient Safety Tips of the Week “[Another NMBA Accident](#)” and February 12, 2019 “[From Tragedy to Travesty of Justice](#)” for discussion of all the system issues we identified as root causes or contributing factors.

But, to summarize, we identified at least 19 points where interventions or different decisions could have prevented this tragic death:

1. Ordering the PET scan  
We don't know details about the indication for the PET scan. We suspected that it might have been looking to see if this was a hemorrhagic metastasis. Testimony in the trial suggests that was the reason. But, even then, we'd question whether the PET scan would have been more appropriately ordered as an outpatient, in which case she probably would have been given an oral sedating agent and there would have been no phone call to the Neuro ICU for a nurse to administer an IV sedating agent.
2. A good pre-PET scan checklist could have flagged claustrophobia and the possible need for sedation before the patient was sent to the PET suite. Then, a more informed decision about the need for monitoring might have been made.
3. Was a PET sedation protocol available?  
Recognizing that a substantial number of patients require sedation for PET scans, and that certain sedating agents are contraindicated during PET, there should be formal protocols for PET that take into account how long the sedation is required. Those protocols should include specific drugs and routes of administration as well as guidelines about who needs to be monitored and what monitoring equipment is needed.
4. Choice of route of administration for a sedating agent  
We wondered why an intravenous agent was chosen rather than an oral agent, particularly since fairly long duration action was desired here. But when we looked at practices of some PET scan units, we found it fairly common that intravenous agents like midazolam were used.
5. A "Ticket to Ride" checklist for intrahospital transport might, likewise, have raised the need for patient monitoring during the procedure.
6. Decision that patient did not need monitoring  
The decision that the patient did not need monitoring was actually made by a different nurse. The PET scan technicians had thought the patient needed monitoring but the patient's nurse from the Neuro ICU told them she did not need monitoring.
7. Decision to send a nurse who may not have been familiar with patient  
The nurse who was sent to administer the drug was a "help nurse" who did not have primary responsibility for the patient. It is not clear how much, if anything, she actually knew about that patient. We wonder what sort of "handoff" was actually done between the primary nurse and the nurse sent to the PET suite.
8. Generic vs. brand name issue  
The CMS investigative report indicates the physician order was for Versed (brand name) but the ADC search function defaults to generic names, hence "Versed" did not appear on the ADC search. There should be better consistency between how brand names and generic names are handled in all IT systems. Culture also plays a role here. We do see that, in most settings, healthcare professionals will still call it "Versed" rather than "midazolam".
9. ADC did not have an adequate warning  
As discussed above, the ADC warning for vecuronium should have been

something like **“Verify that the patient is intubated and mechanically ventilated or that this drug is being used for an intubation procedure”**. See our comments later regarding the warning.

10. Double checks were not required for ADC overrides  
Even though we’ve noted double checks are not without their own problems, an independent double check might well have identified that the wrong drug had been pulled. A double check is probably not needed for all drugs in an ADC, but clearly should be required when someone is attempting to remove an NMBA. (Note that, ideally, there would have been two double checks here - one to override the ADC warning, and one to identify the drug that was removed from the ADC).
11. Drug vial did not have salient enough warning  
The vial in the current case did have a red top and message “WARNING: PARALYZING AGENT”. Yet that was not conspicuous enough to get the attention of the nurse. It seems to us you need to put it in some unique sort of container, perhaps a cardboard or plastic “cage” or something that makes it more difficult to remove as a means of attracting attention to the high-risk nature of the medication.
12. Nurse failed to look at drug name on the vial  
No excuse here. This clearly would have prevented the accident.
13. Nurse failed to ask herself why she needed to reconstitute the medication  
Simply thinking “I don’t recall ever having to reconstitute Versed before” should have been a clue that this was the wrong drug.
14. Nurse sent to do 2 separate tasks (ER swallow test, PET scan sedation)  
It almost sounds like the second task was an afterthought “Since you are going down to the ER anyway, why don’t you stop on the way and give this sedation to the patient in the PET suite?”. We’d certainly wonder how the communication actually took place and what details were included in this “handoff”. In addition, the double task may have contributed to the distraction in which the nurse was describing the swallowing test to the orientee at the same time she was withdrawing the medication from the ADC.
15. Barcoding was not implemented in the radiology/PET suite  
If there had been the opportunity to barcode scan both the patient’s ID bracelet and the medication vial/label, it’s likely that vecuronium would have been recognized as the wrong medication.
16. Inadequate post-dose observation  
The CMS investigative report does not mention how long the nurse stayed with the patient following the administration of what she thought was Versed. Sedation following Versed administration might take a while. Paralysis after injection of vecuronium should be apparent within a few minutes at most. So even observing the patient for a few minutes might have identified the accident. What is not clear is what the patient’s condition was when she was moved from the “injection room” to the “patient room” where she was to stay while the radiotracer was distributed. Did no one notice paralysis?
17. No physiologic monitoring done  
All thought that the medication to be administered was Versed. Injection of

Versed or other sedating agent in a patient with an acute neurological condition should have merited monitoring with at least EKG and pulse oximetry. Capnographic monitoring would probably have been difficult in the PET suite. But even though an early rise in pCO<sub>2</sub> would have been missed, the patient ultimately would have developed hypoxia and heart rate changes that should have led to alarms and resuscitation.

18. EMAR or way to document medication administration in the radiology/PET suite was not available.

Perhaps, if required to do formal documentation of the medication administration at the time of administration, the nurse might have recognized the mistake at a time when rescue of the patient was still possible.

19. Time pressures?

The previous day was a holiday and the PET unit was very busy, likely catching up on scans that might have been done a day earlier. If it were less pressured, perhaps the threat to send the patient back without a scan (if she could not be sedated immediately) might not have taken place.

It is conceivable that a different action or decision at any one of the above 19 points might have prevented this tragic accident. Yes, several of these relate directly and solely to the nurse. But the majority are enabling factors that can allow a human error to break through multiple defense systems and lead to patient harm.

**ADC overrides** are a central issue in this case. Vaught did override a warning on the ADC screen. But we identified two system issues regarding ADC overrides. First, hospital **policy and ADC settings apparently did not require an independent double check for the override.**

Second, even more importantly, the **warning on the ADC screen was inadequate.** The nurse may well have considered this a “STAT” order since she was told to go down to the PET suite now or they will send the patient back here without doing the scan. The hospital had been having some technical problems with medication cabinets in 2017 but they were apparently resolved prior to Vaught pulling the wrong medication from the ADC. The hospital’s medication safety program director testified during the trial that, at the time of the incident, there was labeling on the pockets for paralyzing agents that gave a warning to nurses when they remove it from the drug case. "There's a pop-up message and another layer or warning that you're accessing a paralyzing agent." ([Sutton 2022](#)).

Our recommendation is that the warning for removal of an NMBA should include a “hard stop”, i.e. it should require a specific action prior to removal. A proper warning would have said something like “**Verify that the patient is intubated and mechanically ventilated or that this drug is being used for an intubation procedure**” and require that verification on screen.

Note that ISMP ([ISMP 2019](#)), in its own review of the issue following this case, agrees with us and recommends “Display an interactive warning (e.g., “**Patient must be intubated to receive this medication**”) on ADC screens that interrupts all attempts to

remove a neuromuscular blocker via a patient's profile or on override. The warning should require the user to enter or select the purpose of the medication removal ("other" should not be a choice) and verify that the patient is (or will be) manually or mechanically ventilated. This type of warning provides an opportunity to specify why the user is being interrupted and requires the user to document a response."

We also don't know what the unit's "culture" was regarding overrides. The CMS inspection report ([CMS 2018](#)) does not mention whether overriding an ADC alert was an issue unique to this nurse or whether ADC overrides had become a routine part of the culture of the unit (i.e. "normalization of deviance"). How often do nurses in that unit (or elsewhere in the hospital) override warnings when removing drugs from an ADC? Hospitals need to keep logs of ADC overrides and include review of these in their quality improvement and patient safety activities.

Another issue raised by this case has to do with the number of letters needed to be entered on the ADC screen to identify a drug. In this case, entering just "VE" led to vecuronium being chosen rather than Versed. In 2019 ISMP, in its "[Guidelines for the Safe Use of Automated Dispensing Cabinets](#)", recommended the entry of a **minimum of five characters** of a drug name during searches in ADC's. (Note that ISMP's "[Guidelines for Safe Electronic Communication of Medication Information](#)" also include that requirement for medication searches on other forms of electronic communication.) That is an improvement but, even then, there are challenges. ISMP saw reports where even entry of 5 letters was associated with errors ([ISMP 2021](#)) and summarized the circumstances in which these errors were occurring. Despite these limitations and challenges, ISMP still recommends using at least five characters when conducting drug name searches. In that 2021 article ISMP has recommendations for dealing with drug names with the same beginning characters beyond five letters and some other problematic issues.

The verdicts in this case go well beyond the travesty of justice done to RaDonda Vaught. They have implications that will be on the minds of healthcare workers everywhere. The American Nurses Association issued the following statement ([ANA 2022](#)) after the verdict in this case was reached:

"We are deeply distressed by this verdict and the harmful ramifications of criminalizing the honest reporting of mistakes.

Health care delivery is highly complex. It is inevitable that mistakes will happen, and systems will fail. It is completely unrealistic to think otherwise. The criminalization of medical errors is unnerving, and this verdict sets into motion a dangerous precedent. There are more effective and just mechanisms to examine errors, establish system improvements and take corrective action. The non-intentional acts of Individual nurses like RaDonda Vaught should not be criminalized to ensure patient safety.

The nursing profession is already extremely short-staffed, strained and facing immense pressure – an unfortunate multi-year trend that was further exacerbated by the effects of the pandemic. This ruling will have a long-lasting negative impact on the profession.

Like many nurses who have been monitoring this case closely, we were hopeful for a different outcome. It is a sad day for all of those who are involved, and the families impacted by this tragedy.”

And the American Organization of Nursing Leadership ([AONL 2022](#)) issued the following statement:

“The verdict in this tragic case will have a chilling effect on the culture of safety in health care. The Institute of Medicine’s landmark report To Err Is Human concluded that we cannot punish our way to safer medical practices. We must instead encourage nurses and physicians to report errors so we can identify strategies to make sure they don’t happen again. Criminal prosecutions for unintentional acts are the wrong approach. They discourage health caregivers from coming forward with their mistakes, and will complicate efforts to retain and recruit more people in to nursing and other health care professions that are already understaffed and strained by years of caring for patients during the pandemic.”

We, too, are concerned. We hope that this does not lead to failure to report medical errors because of fear of criminal action. There obviously was no criminal intent by RaDonda Vaught. She was straightforward in owning up to the mistakes she made and she lives with this every day. We hope that reporting and analysis of this tragic case have led to multiple improvements and lessons learned that every healthcare organization should be aware of.

We hope that RaDonda Vaught will appeal the convictions. Absent that, we hope that the judge will show leniency in sentencing. It has been a tragedy for the family of the patient who died unnecessarily. But it is also a tragedy for RaDonda Vaught and nurses and healthcare professionals everywhere.

**Some of our prior columns on neuromuscular blocking agents (NMBA’s):**

June 19, 2007	<a href="#">“Unintended Consequences of Technological Solutions”</a>
July 31, 2007	<a href="#">“Dangers of Neuromuscular Blocking Agents”</a>
November 2007	<a href="#">“FMEA Related to Neuromuscular Blocking Agents”</a>
May 20, 2008	<a href="#">“CPOE Unintended Consequences - Are Wrong Patient Errors More Common?”</a>
January 31, 2012	<a href="#">“Medication Safety in the OR”</a>
February 7, 2012	<a href="#">“Another Neuromuscular Blocking Agent Incident”</a>
October 22, 2013	<a href="#">“How Safe Is Your Radiology Suite?”</a>
December 9, 2014	<a href="#">“More Trouble with NMBA’s”</a>
December 11, 2018	<a href="#">“Another NMBA Accident”</a>
January 1, 2019	<a href="#">“More on Automated Dispensing Cabinet (ADC) Safety”</a>

February 12, 2019 “[From Tragedy to Travesty of Justice](#)”  
April 2019 “[ISMP on Designing Effective Warnings](#)”  
February 2021 “[ISMP: 2 Alerts on NMBA’s](#)”  
September 7, 2021 “[The Vanderbilt Tragedy Gets Uglier](#)”

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