Clinical vignettes from the semi-structured interviews

1. Criteria for intubation

“The three main criteria for intubation are adequate oxygenation, adequate CO2 elimination and adequate airway protection” {Intensivist #2}.

“She looked a little bit more somnolent and she was very tachycardic and [...] she was very hypoxemic” {Fellow #3}.

“He felt anxious, he was still breathing 40-50 a minute, he was hypercapnic” {NP #2}.

“She needed to be intubated. Actually she got much worse because she aspirated” {Fellow #2}.

“The reason why we decided to intubate was that the pH came back at 6.9. He was more confused, he was taking shallows breaths” {Fellow #1}.

“The family kept saying, he’s anxious, he’s anxious, it’s not his breathing, look at his oxygen saturations [...]. They gave him morphine and lorazepam to control his anxiety. At that point he was still breathing 40-50 a minute [...]. I was still concerned that he wasn’t intubated; his PCO2 was like 60 [mmHg], pH was like 7.27. And then we proceeded to intubate” {NP #2}.

2. Timing of intubation

“There are various ways to approach the problem. Different practitioners have different ways of tackling an issue. Intubation were viewed by some as a last resort, last option. Whereas, some practitioners may want to intervene as early as possible.[...] If you wait too long, then you may end up intubating somebody in a circumstance or condition which is not ideal where we may not have time to prepare, [...] almost like a code situation” {Fellow #1}.
“There are some subtle differences between clinicians [...]. But ultimately I think the final common pathway would be to intubate but it may just be how quickly, there are some differences” {Fellow #1}.

“I would veer towards an optimal time. I don’t know that secret answer of when it is optimal time and that’s why we’re to train and learn [...]. I’m neither for early or late, I’m for optimal time. I don’t know personally what is that and that comes from experience” {Fellow #1}.

“And you see them not doing well and you think oh I should have probably done this a couple of earlier but it’s not clear to me that actually it has any impact on their overall outcome”{Fellow #5}.

“If someone is really sick and is not doing well, you’d rather intubate early than late because then you can protect the lungs form getting injured” {Fellow #4}.

“The risk of overdoing intubation exists and it’s small risk. The risk of failing to intubate a patient and having an airway emergency is very real, and I think if we’re trying to be safe, sometimes we might end up intubating more people than need be if you work them out at the end of the risk of having real hypoxemic respiratory failure, vomiting, unconsciousness, airway closure and then you deal with an emergent airway” {Fellow #6}.

“You do not want to intubate early on when a patient is getting intubated for a bronchoscopy. [...] I would wait until the final moment before you do that” {RT #1}.

“To stay “ahead of the game, [...] give some time to cool the system down” {Fellow #4}.

“If you say we should intubate early, that’s assuming that people at the early stage are identifiable as inevitably progressing to more severe disease which is not the case, and it’s also saying that given the fact that, that will necessary result in more people being intubated and
ventilated, that adverse consequences, the adverse health outcomes, and the additional cost associated with that is trivial, which it is not” {Intensivist #1}.

“Anything we can to prevent this person to have a respiratory arrest” {RT #1}.

“While it wasn’t an emergency, I hated for it to become an emergency and then do it because I think we would have ended up doing CPR” {NP #2}.

“Obviously too late is not good. Later, if you take a more or less fair approach to ... let’s give this a little bit of time” {Intensivist #1}.

“If the intubation is going to happen anyway, we’d rather they pick a time that it can be done in a timely controlled fashion. What I mean by timely is they can get their time to get all the equipment together and gather the team together in a calm fashion” {Respiratory Therapist #1}.

“He was getting worse clinically but I don’t think he ever got to the point where [...] you sort have a force-your-hand kind of thing [...]. I think we intubated him at a time prior to that which is a favorable thing in this case” {Fellow #3}.

“I think that was pretty straightforward in this particular case. The decision to intubate was not controversial and the timing of intubation was not controversial. [...] I don’t think there was this golden window or it would have been much better to have intubated him an hour earlier. He hadn’t declared himself at that point” {Intensivist #2}.

“There is always a risk with BiPAP. You use BiPAP to try and avoid the intubation, especially if the patient is stable. Because intubating patients unnecessarily will cause harm” {Fellow #2}.

“With intubation, [you can cause] lip laceration, break tooth, cause infection and tracheal stenosis” {Fellow #4}.

“If I could temporize and obtain a better condition for him to be intubated” {Fellow #5}.

“I look at the clinical picture actually; that’s what makes me decide early/late” {Fellow #4}.
“It depended on the disease process, the presentation, the patient's previously expressed wishes and [...] to the extent that the disease process is well understood and the anticipated course is understood” {Intensivist #2}.

“I never thought about it [...] I don’t totally understand that variation” {Fellow #3}.

3. Patient factors

“If it someone young who is getting really sick, I will always try to intubate them early so I can kind of control so they don’t get worse” {Fellow #3}.

“She had acute pancreatitis, she was developing [acute respiratory distress syndrome] ARDS, her mental status had already deteriorated” {Intensivist #1}.

“For [chronic obstructive lung disease] COPD, we prefer noninvasive [ventilation], same for heart failure because they generally respond well to noninvasive management and we just need to buy some time” {Intensivist #4}.

“If the patient is neutropenic or immunocompromised, we try a little bit hard to avoid intubation because there are some studies that show that noninvasive ventilation may be superior if we can manage to get by with that” {Fellow #5}.

“I personally rely by looking at the vitals, looking at the patient, examining the patient [...]. Labs and other tests like x-ray would help us in our decision” {Fellow #1}.

“We needed to do a broncho alveolar lavage [...] and because of the amount of oxygen he was on we anticipated he’d remain on the ventilator after the procedure. That’s not an uncommon scenario” {Intensivist #3}.

“The patient did not want to be intubated but yet, culturally want to be full code, want everything done so, [he] saw intubation as a last resort” {NP #2}.
“There are some cultural and linguistic differences in term of their understanding of what they’re experiencing and our understanding of what they’re experiencing” {Intensivist #2}.

“The chest x-ray looked horrible. But the decision to intubate was based on clinical picture” {Fellow #2}.

‘Her doctor said: ‘She was hypoxemic and in obvious respiratory distress with an altered mental status’. Usually that is all we need to know; we don’t need to see numbers or anything like that. [...] Sometimes time is of the essence and we’re not going to sit on that, waiting for lab results to come back confirming that it is true” {RT #1}.

4. Clinician factors

“The nurse was the first one who brought her to my attention. She basically pulled me over and said you know this patient is not doing so well“ {Fellow #2}

”As a nurse, you still want to voice your cause; you’re the voice for the patient” {Nurse #1}.

“It depends on us to recognize the signs of respiratory failure and say we need to do something about this. So we are there from the beginning” {RT #4}.

“I’m a physician assistant. If it comes from the mid-level, I will say my influence is not as much as a fellow” {PA #1}.

“If I’m uncomfortable with the plan, that’s what I want to happen: I would ask people to step aside and let’s do this, do come up with something concrete before you walk away from my door” {NP #2}.

“Residents, nurse practitioners, fellows can share what they feel but finally the [attending] would [have] the final say” {Fellow #1}. 

“I would expect an anesthesiologist to have more lenient criteria for intubation of patients, because he can probably deal with a more complicated airway than I can” {Fellow #6}.

“I think so much of it is experience, not even experience in [time], just experience in certain situations’ {NP #2}.

“It’s a matter of how a certain practitioner wants to do it and is comfortable practicing and has been trained to doing it in a particular way” {Fellow #1}.

“The [attending]s who come at the bedside are generally the ones who intubate earlier; [as opposed to] some of them we have to call with concerns” {Fellow #4}.

“Oh...just kind of a sixth sense; you can just kind of tell after so many years working here” {RT #2}.

“A feeling that the patient was not doing well either based on just gestalt or some sort of value to back that up” {Fellow #3}.

“There are some patients [when] you just know, [you] just need those signs [that] are right there that [indicate the] need to be intubated right away” {RT #2}.

“If you look at the patient, I think you get a better sense” {RT #3}.

“[Patients] request is usually more generic [...] it’s rather you know help me, I can’t breathe [...] do something whatever is necessary” {Intensivist #2}.

“She was with mild respiratory failure, possible ARDS, on BiPAP, appropriately at that time, and the plan was to keep her on BiPAP or intubate if she gets worse” {Fellow #2}.

“We had decided to intubate him at that point of time, the main driver was his mental status and his worsening labs and the fact that he was acidotic, we thought he is not stable” {Fellow #1}.

“That evening [...] she had showed the decline that we expected her to have but hoped she didn’t and performed intubation” {Fellow #5}.
“And then she became unresponsive, [...] and we decided to intubate. She never lost a pulse or anything like that [...]. She stopped talking to me; so that was the thing” {Fellow #4}.

“Had I been a little bit sooner aware of both the cadence of her ARDS and the decline in her mental status, I likely would have intubated her sooner’ {Intensivist #1}.

“The overall question was: was she clearly getting bad enough that she needed intubation and if so, at what point [...] was it clear [...], and that was the point I wasn’t aware of until the point at which we intubated” {Intensivist #1}.

“The frequent reassessment of patients and the clinical trajectories are critical” {Fellow #6}

“This is what we’re going to do and when and why, or this is what we’re not going to do, when or why. So, I think that’s the most important thing here, because everyone does have different experiences” {NP #2}.

“As a nurse, physicians listen to you if they know you” {RN #2}

5. System factors

“Usually all the team members are there and then we decide how we want to go ahead” {Fellow #1}.

“It’s driven by I guess all the team members, but the final say is by the [attending]” {Fellow #1}.

“It was a collective decision triggered by the lab results initiated by his worsening clinical condition; the nurse informed [about the lab results], the nurse practitioner followed up. The [attending] was called” {Fellow #1}.

“Team dynamic wise, if there is ever a concern and everybody is [...] on a different page, usually we’d step aside and discuss as a team, nursing, respiratory, fellow, [attending], and try to get everybody on the same page, [...] in a collaboration” {NP #2}. 
“There is a hierarchy [...]. Usually it’s a consensus thing [...] but the final decision [comes from] the [attending]” {Fellow #1}.

“I usually try to make the decision, but the [attending] has to approve” {Fellow #2}.

“Ultimately who makes the decision is the [attending]” {Fellow #4}.

“The best [attending]s in those scenarios will verbalize to the team though, this is why, this is the communication piece, this is why I want to wait, or this is why I’m not willing to wait” {Nurse Practitioner #2}.

“There is no guideline or a definition that said it in that we need to intubate at this hour, if someone presents with x, y, z” {Fellow #1}.

“Personally, I do not believe in protocolized medicine. I believe in looking at your patient and making a decision based on what you are looking at” {Fellow #4}.

“I think intubations work really well [...]. They always have this checklist that we have to make sure we have everything, which is helpful. They always make us think about what if it goes wrong, then what are we going to do” {Fellow #4}.

“There is so much complexity [...] There’s not a unique solution [...] it is possible to simplify the logic to a few variables, but does that actually improve practice” {Intensivist #1}?

“Coming off with this set of criteria that is suggested to the clinicians with them having ability to change it based on their clinical judgment” {Intensivist #4}.

“The night team signed out to us that we thought he was going to force our hand and we would have to intubate him [...] but he sort of had been just hanging on” {Fellow #3}.

“Among our colleagues, there are some differences of opinion, which are defensible differences in term of who need to be intubated or not so it’s not a simple, readily solvable equation and we do go back and forth at times. It’s a running joke...don’t touch my patient” {Intensivist #1}. 
• Representative responses from the questionnaire

1. “Can you give some examples when a patient was intubated too early?”


“Many times non-invasive isn’t given long enough chance.”

“It is usually the opposite, too late.”

2. “In what circumstances would you justify early intubation?”

“Progressing ARDS.”

“Planned procedures (i.e., patient leaving the ICU and may decompensate in less accessible area). High-risk for failure (i.e., previous illness exacerbations requiring intubation).”

“Burn. Trauma.”

“Unstable airway, unconscious patient, GCS < 8, uncontrolled vomiting.”

“If the stress of respiratory compromise will compromise other hemodynamics. If it allows for a smooth, calm intubation rather than an emergent, rushed intubation.”

“In a patient with a difficult airway, if we wait too long, we may encounter a quicker decompensation if we delay”.

“Sometimes it's just a feeling.”

“Patients that have required intubation in the past for the same type of situation.”

“If it prevents the emergent need to intubate; it can sometimes be easier in a less stressful scenario.”.

“When the patient appears uncomfortable or verbalizes discomfort related to respiratory failure if patient is in acute distress and NIV is not a viable option.”

“Sepsis presenting with mental status changes.”
“If the patient is hemodynamically unstable and has other organ dysfunction.”

3. “Can you give some examples of a situation when a patient was intubated too late?”

“Severe ARDS, prolonged trial of NIPPV with high tidal volumes or high trans-pulmonary pressure. Hypoxia and altered mental status (poor airway protection). Hypoxic and hypercapnic respiratory failure.”

“When cardiac involvement has occurred (bradycardia, asystole, hypotension), CPR, Extreme hypoxemia.”

“A delirious patient is given sedatives and non-invasive ventilation but soon arrests or aspirates.”

“Patient who has a history of difficult intubation, CCS [intensivist] is sometimes hesitant to do the invasive approach and rely on the non-invasive ventilation.”

“I feel age is a factor - tendency to wait longer on 'younger' patients - to the point of respiratory arrest - despite vital sign indicators.”

“When patient is unsure if they want to be intubated. Or terminal illness is present and we are trying to hold off for possible goals of care discussion.”

4. ‘In what circumstances would you justify delay in intubation?’

“COPD. Immunocompromised hosts with lung mild ARDS.”

“Questioning end of life decisions.”

“Waiting for family to arrive when the ability to be extubated is unlikely.”

”Noninvasive measure or diuresis have not been attempted.”

“Mild distress, tolerating non-invasive, vitals and respiratory condition improving.”

“Patient changed wishes (remains oriented) - patient in some/mild' distress and wishes to give noninvasive a trial, or 'wait a bit' before intubation.”
“Rarely appropriate except in maybe CHF/COPD.”

5. “Can you define what ideal timing for intubation means to you?”

“Intubation timing appropriately balances the risk of avoiding intubation with the risks of additional time on mechanical ventilation.”

“Urgent, but not emergent circumstances (i.e., controlled environment with adequate preparation/resources).”

“Patient is intubated in a controlled fashion. Enough time is allotted for the team to discuss the induction plan, including drugs to be used. Able to avoid profound hypoxia during intubation.”

“A discussion with the patient and family that points out the evidence of impending respiratory failure that would benefit from early intubation.”

“Very close observation and monitoring and prompt response to an unfavorable trend - especially in consciousness or CO2.”

“There is never a perfect or ideal time to intubate.”

“Safe, calm, not rushed, with no significant hemodynamic compromise.”

“No regrets.”

“I don’t think this can be defined. I go by looking at the patient, my instinct and by what experience has taught me.”

“Not too early--give trial of alternatives in stable patient. Not too late, do not wait for decompensation.”

“When the ‘writing is on the wall’ so to speak, in other words, the intubation is inevitable, the ICU team recognizes this and intercedes with the intubation before the patient has severe distress. Circumstances are more controlled and there is less risk for the patient.”
“I don't know if I can identify it, it is something that comes with experience. It changes with each patient and situation.”

“Clinical judgment.”

“Pt is failing, but not yet in extremis.”

“Multidisciplinary team talks and collaborates on the needs for intubation with the patient. It means labs are drawn, patient is assessed and patient’s wishes are considered.”

“Intubated prior to any harm coming to patient (aspiration, hemodynamic perturbations).”

“Controlled environment-all staff has ample time to prepare for intubation including room positioning, medication administration and planning for the airway/possible.”

6. “Aside clinical criteria like in this case, what other element(s) from the patients' chart would you need to make a decision to intubate?”

“Difficult airway.”

“Code Status.”

“Medical history of other comorbidities, perhaps similar episodes in the past.”

“End organs at risk of ischemia (i.e. CAD, CVD, AKI), hemodynamic instability”,

“Code status, patient/family wishes, goals of care.”

“POLST.”

“Goals of care, trajectory, previous intubation procedure notes.”

“Nothing. Intubation should be a clinical decision.”

7. “Aside patient's factors, what other factors could influence your decision to intubate?”

“Shift change-- I hate to leave a patient with borderline respiratory status for my night colleague to deal with, so I will often bias toward intubation before my shift ends.”

“Availability of support, drugs and monitoring.”
“Clinical urgent demands, family and patient wishes.”

“Nursing and respiratory resources, medical coverage.”

“Clinical intuition.”

“Confidence that intubation is technically safe given available resources, if intubation is procedural in nature, are the proceduralists ready to perform the procedure (i.e. is the GI Bleed Team ready to perform the EGD?)”

“Goals of care discussion with family.”

“Situation on the unit.”

“My decision... if difficult airway will defer to more experienced or call anesthesia for difficult airway.”

“Back up available.

“Ethical concerns.”

“Staffing availability, patient's outlook and plan for hospital stay, i.e. if they are going to surgery tomorrow anyway it may be easier to lean towards early intubation if patient is beginning to 'declare themselves.”

“Stated wishes from the two hour time period where he was hopefully able to communicate effectively, cultural beliefs?”

“Nurses input, projected trajectory of recovery.”

“A collaborative decision by the Team.”

8. “What factors may contribute to this variation [in timing of intubation]?”

“Comfort with airway. Opinion on risk of spontaneous breathing versus mechanical breathing”.

“Provider preference, comfort with NPPV.”
“Peer pressure and work flow, distractions, allied health requests, family requests, efficiency, confidence in team...”

“Individual experience, procedural expertise, clinical workload (i.e. available time to closely observe un-intubated patient).”

“Perception of clinical severity.”

“Lack of standardized guidelines.”

“Experience, patient factors, time of day, family dynamics, many factors.”

“Clinicians experience, opinion, education, training/ previous situations.”

‘Provider experience, recent experiences with similar patient population.”

“Need to be less invasive, consideration for patient and family preferences.”

“Level of comfort of waiting with physician and staff. Comfort level with difficult intubation.”

“Tolerance of uncertainty is a phenomenon which is rarely discussed, but is the key. Some of us tolerate not knowing whether the patient will crump in the next hour and some of us value control of the situation with no tolerance for uncertainty.”

“Protocols.”

“Different beliefs and experiences of physicians. Some physicians are more aggressive than others overall no matter what the situation.”

“Different background (anesthesia versus critical care), different level of experience and perhaps failure to recognize, unit awareness and the number of active critically ill patients who need attention to the number of capable providers, nursing staff persistence.”

“Work load, person practice styles.”

9. “In your role, what obstacle(s) do you envision that prevent you from making your case, regarding the decision to intubate?”
“difference of opinions amongst practitioners and experience.”

“family dynamics, sometimes team dynamics, overall rare.”

“Inexperience, lack of communication amongst providers.”

“I believe I can state my concerns to the team without any obstacles.”

“Room nurse comfort.”

“Barriers to closing the loop on communication can sometimes be difficult to overcome. Access and sharing of the same information to the entire team.”

“As a nurse, I do not have the final decision. I am able to present what I have observed.”

“As a nurse taking direct care of the patient, you sometimes get a feeling that is hard to describe to the providers and it doesn't always show up in terms of the numbers. Sometimes you can just tell when a patient is headed toward intubation even if their ABG and sats still look OK.”

“Failure of recognition of subtle clinical signs of distress.”

“I can suggest intubation, but I cannot order it.”

“Providers not spending any time with the patient—only seeing the patient for a few seconds before moving on to something else.”

10. “Shift changes have been considered a period of increase acuity but also opportunity for difference in perspective and opinion. Can you give one of two examples to illustrate this fact?”

“Hand off between care givers with difference in levels of experience.”

“There is sufficient variation among [attending]'s preferences regarding intubation [...], I am aware of situations where staff will wait for shift to change to suggest a decision that is more likely to be accepted by incoming [attending].”
“I think work load throughout the day and a fresh set of eyes at shift change can change a person's perspective on how a patient look.”

“During handoffs on the unit different parties might present fresh opinions and perspectives that have not been considered or have been overlooked; so this might contribute to decision making process.”

“Sign out at bedside. Multiple providers re-evaluating the patient at bedside and discussing clinical course and trajectory is a great opportunity to reconsider whether to intubate a patient who may be on PAP and need intubation.”

“I prefer to not leave a patient in with high potential for failure to a partner who is coming on for the night or day.”

“Patient whose family is unsure of changing goals of care. Sometimes conversations with different care providers affect decision.”

“A new nurse with a fresh set of eyes may see things that a tired nurse after a 12 hour shift has overlooked. A more experienced nurse or newly educated nurse could be taking over with a new perspective on the patient’s condition.”