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Using Default Options and Other Nudges to Improve Critical Care

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As a second-year medical resident rotating through the Hospital of the University of Pennsylvania's Medical ICU, I was struck by a seeming disconnect. Attending physicians instructed us to ensure that the heads of beds were elevated 30–45 degrees for all mechanically ventilated patients, based on the best-available evidence. Yet beds for newly admitted patients all started out flat. I wondered why, if head-of-bed elevation was good for most patients in our high-acuity ICU, did the ICU require residents to write orders for it?¹ Would it not be safer for nurses to elevate the beds automatically, unless residents wrote orders to flatten it (e.g., for the occasional patient we admitted with acute stroke)? In other words, shouldn't the preferred option for most patients be the default nursing practice?

Later that year, during morning rounds, I witnessed one of my favorite attending physicians depart from his normal approach to discussing whether to pursue CPR with the wife of patient who was inexorably dying. He said to the wife, "In this situation, there is a real risk that his heart may stop. We would not normally do chest compressions in this situation because of how sick he is. Does that seem reasonable?" Though I would later learn that this choice of wording was spur-of-the-moment, it was clear to all observers how, by establishing

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a do-not-resuscitate order as a norm that would be enacted by default, the physician had made it easier for the wife to assent to a plan of no CPR.²

These experiences motivated me to begin reading the primary literature on “nudges,” or the intentional structuring of choice presentations or decision-making environments to increase the frequency of desired choices without removing any options. In this article, I summarize how nudges may improve the quality of care in the ICU, and provide examples of ICU-based decisions that may be more effectively or ethically influenced by some nudges rather than others.

Default options

Default options are the events or conditions set into place when no alternatives are actively chosen.¹ Intentionally setting defaults has been shown to influence a number of health-related decisions among patients and clinicians, including choices to donate organs,³ go to clinics for influenza vaccination,⁴ prescribe generic rather than trade-name pharmaceuticals,⁵ and choose comfort-oriented approaches to care in advance directives.⁶

The foregoing anecdotes regarding bed orientation and code status discussions are examples of how defaults may be used in ICUs. However, few studies to date have documented the true influence of default options in critical care contexts. One ongoing, large-scale test of default options for patients admitted to ICUs and hospital wards is the Randomized Evaluation of Default Access to Palliative Services (REDAPS) trial.⁷ This stepped-wedge RCT is being conducted at 11 Ascension Health hospitals across 8 states. At randomly assigned times, each hospital transitions from a standard approach to ordering palliative care consultation, whereby physicians must determine that a patient may benefit and then actively order the consult, to a default approach to palliative care consultation. Under this intervention, seriously ill patients who are identified by an electronic health record (EHR)-based algorithm as meeting consensus criteria for palliative care consultation⁸ have orders for such consultation placed automatically on hospital day 2. For the next 24 hours, when that patient’s clinicians open the patient’s chart, they are notified that the default order has been written so that they may cancel it if they choose. Absent cancellation, the order becomes active on hospital day 3. Similar randomized evaluations are needed for other potential default options or alternate nudges in the ICU, including those described in the Table.

When defaults are implausible

Although default options are among the most easily implemented and powerful ways to modify human behavior, there are situations in which setting new defaults could not possibly lead to desirable behavior change. For example, ample evidence shows that red blood cell transfusions should be restricted to critically ill patients with hemoglobin concentrations <7 g/dL.^{9–12} However, transfusions in patients exceeding this threshold remain common¹³ despite the fact that the default in transfusion practices is not to transfuse (action is only required to order units of blood). In situations like this where changing defaults cannot work, policy makers may consider several viable alternatives. For example, anytime a clinician

orders blood for a patient with a hemoglobin concentration >7 g/dL, the EHR could require the clinician to enter a free-text justification to process the order. Notifying the ordering clinician that this justification would become part of the medical record, and viewable to all, would augment accountability.¹⁴ Such accountable justification has effectively changed undesirable clinician behaviors outside the ICU, such as by combating overuse of computed tomography scans¹⁵ and reducing antibiotic prescribing for upper respiratory tract infections.¹⁶

A similar challenge arises in trying to promote adherence to the Critical Care Choosing Wisely Task Force's recommendation that ICU clinicians not continue life support for patients with underlying life-limiting illnesses without offering care focused on comfort.¹⁷ Even the most creative policy maker would be challenged to make such communication happen by default. Thus, we are testing two other approaches to increase adherence to this recommendation in the Prognosticating Outcomes and Nudging Decisions with Electronic Records in the ICU (PONDER-ICU) trial (NCT03139838). In this trial of 4,750 patients with acute respiratory failure requiring mechanical ventilation for >48 hours in 19 ICUs within 10 hospitals in the Carolinas HealthCare System, hospitals transition at randomly determined times from usual care to one of two behavioral economic interventions implemented through the EHR. The first intervention is another example of accountable justification – for all enrolled patients, ICU physicians and advanced practice providers must respond to a yes/no EHR prompt asking if they have offered the patients or their caregivers the option of care focused on comfort. If they indicate that they have not offered care focused on comfort, they must then indicate why in a free-text response in the EHR before signing future orders. The second intervention leverages focusing effects, or people's tendencies to attend strongly to certain elements of choices that they were first prompted to consider.^{18,19} The potential effectiveness of focusing effects in this context was demonstrated in a randomized trial of U.S. intensivists assigned to indicate whether they would discuss withdrawal of life support with the families of critically ill patients described in vignettes.²⁰ Physicians who were assigned to first indicate those patients' prognoses were much more likely to say they would initiate such discussions.²⁰ The PONDER-ICU trial is testing whether similar effects may emerge in reality by forcing ICU clinicians to estimate patients' mortal and functional outcomes prior to signing future orders.

When defaults may be too strong

In some circumstances, setting new defaults may be beneficial on average but yield unintended consequences for subgroups of patients. For example, several health systems are starting to set tidal volumes for newly intubated patients at 6 cc/kg by default based on compelling evidence that such settings save lives among patients with acute respiratory distress syndrome (ARDS).^{21,22} However, although the preponderance of evidence suggests that such lung protective ventilation (LPV) may also be beneficial, or at least safe, for patients without ARDS,^{23–25} some are concerned that use of LPV for non-ARDS patients will require increased sedation and perhaps precipitate delirium.²⁶ Thus, an alternative to defaulting to LPV for everyone would be to require clinicians to actively choose between pre-populated LPV settings or other ventilator settings that they could manually select. Like defaults, forcing an active choice presents the desired behavior as one option for everyone,

such that not choosing it requires some additional action. But it provides the safeguard of requiring active thought in making the choice, rather than allowing inertia to hold sway. Forced active choice interventions have been shown to increase enrollment in retirement plans,²⁷ screening for HIV in the emergency department,²⁸ peoples' willingness to receive influenza vaccination,²⁹ and rates of advance directive completion.³⁰

Improving accrual for future trials

Nudges can also improve the quality of critical care indirectly, by augmenting accrual to critical care randomized clinical trials (RCTs). Difficulties enrolling patients in RCTs are among the greatest barriers to successfully testing new interventions,^{31–34} and most RCTs among patients in ICUs have been dramatically underpowered to detect clinically important treatment effects.³⁵ Low rates of enrollment also limit RCTs' generalizability, since patients who enroll may differ from those who do not.³¹ Thus, methods for improving enrollment in RCTs hold great potential to improve public health by enhancing studies' statistical power, generalizability, and efficiency (through reduced recruitment time and trial costs).³¹

The Randomized Evaluation of Trial Acceptance by Incentives (RETAIN; [NCT02697799](#)) trial is currently testing whether financial incentives can increase accrual to and retention in three different RCTs without representing undue or unjust inducements.³⁶ However, incentives are not the only plausible approach to augmenting accrual – we recently developed a taxonomy of potential behavioral economic interventions to increase RCT enrollment and retention that merit testing,³⁷ particularly in the context of critical care RCTs in which consent is typically provided by surrogates.

An example of the type of studies needed is a recently launched, 3-arm trial ([NCT03284359](#)) comparing a standard approach to consent with two behavioral economic interventions designed to increase enrollment among surrogates of mechanically ventilated patients who would be eligible for a hypothetical trial of different bronchoalveolar lavage interventions to aid in diagnosing the etiology of acute respiratory failure. The first intervention is a brief “nudge bundle” that includes 5 yes/no questions to be completed by surrogates before their consent is solicited. These questions encourage the surrogate to reflect on whether the patient is someone who likes to help others, and thereby leverage injunctive and descriptive norms,³⁸ duties of reciprocity,³⁹ self-prophecy,⁴⁰ and the foot-in-the-door technique⁴¹ to augment enrollment. The second intervention is a forced active choice intervention in which surrogates must either consent to their loved one's participation, or actively withhold consent by signing a declination form. The trial is designed not only to determine whether the interventions increase enrollment, but also to determine whether they dull perceptions of the trial's risks (thereby representing a potential undue inducement) or preferentially increase enrollment among disadvantaged patients or surrogates, such as those with lower income or education (thereby representing a potential unjust inducement).

Ethical considerations

A hallmark of clinical nudges is that they influence decisions without restricting choice.⁴² Because no options are removed, nudges are less threatening to autonomy than many

standards in healthcare that clinicians routinely accept such as the formulary restrictions applied in most hospitals and criteria limiting the use of extracorporeal membrane oxygenation. However, because debate exists regarding whether nudges might occasionally infringe upon autonomy,^{43,44} applying nudges to patients or caregivers merits careful justification. We have recently argued that nudges in healthcare are ethically justified so long as they are set to promote the known or reasonably assumed best interests of those affected by the nudges.⁴⁵

Conclusions

In summary, a wide range of behavioral economic interventions, or nudges, may improve the delivery of critical care and the scientific basis for such care. Because nudges are often inevitable – some option must be presented first or as the default – the task for the conscientious clinician is not to avoid nudging, but to avoid restricting choice.^{46,47} Similarly, the task for the conscientious health system is to examine the range of cases in which nudges already exist, and determine whether different nudges, including those implicit in the structures of EHRs, could improve clinical care.¹ Finally, the task for the conscientious investigator is to conduct rigorous evaluations of nudges to determine which may most substantially improve the efficiency of critical care research without unduly or unjustly inducing participation.

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Table

Policies based on nudges that may improve the quality of critical care

Policy	Type of Nudge	Supportive evidence
Foley catheters and arterial lines are automatically removed after 3 days absent orders to the contrary	Default	Several sources ^{48,49}
For patients meeting established criteria, sedative infusions are interrupted each morning absent orders to the contrary	Default	Kress et al. ⁵⁰
Enrolling patients in minimal-risk research by default	Default	Several sources ^{37,51,52}
Requiring clinicians to select pre-populated lung-protective ventilation settings or manually enter other settings for all newly intubated patients	Forced active choice	Several sources ²¹⁻²⁵
Ordering labs in EHR requires actively choosing between deferring the day's labs and selecting each desired lab	Forced active choice	Reviewed in Halpern et al. ¹⁷
Orders for red blood cell transfusions in patients with hemoglobin >7 g/dL require free-text justification in EHR	Accountable justification	Several sources ^{9-11,13}
Forcing ICU clinicians to estimate patients' prognoses	Focusing effect	Several sources ^{20,53}
Enabling patients or surrogates to consent to all indicated ICU procedures, consent to one currently indicated procedure, or not consent to that procedure	Expanding choice sets	Several sources ^{54,55}