Decision-support for clinicians-how to implement.

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Introduction: I focus on clinical trial application of clinician decision-support because this is a first step in providing the credible information necessary to build a foundation for wide spread use of clinician decision-support in clinical practice. Meeting the scientific requirements of rigorous clinical trials (clinical experiments) highlights similar challenges that exist in the usual clinical care practice environment.

Compliance of physicians with evidence-based treatments or guidelines is low across a broad range of health care topics, in part because we lack widespread application of detailed clinical decision-support protocols. This low clinician compliance contributes to uneven cointervention effects in clinical trials and thus contributes to unnecessary variation of clinical trial results. Cointerventions are confounders introduced after allocation of subjects to the clinical trial experimental groups. Cointerventions, unlike confounders present before randomization, cannot be made uniform across clinical trial groups through randomization. Many cointerventions are clinical care processes that influence clinical trial outcomes, independent of the experimental clinical trial intervention under study.

Experimental method and result reproducibility is required before new information is included in standard sources in many scientific domains. This is a scale and domain-independent scientific requirement. The absence of detailed clinical decision-support protocols is a critical barrier to the uniform management of cointerventions needed to conduct high quality clinical trials (1, 2). The clinical research community does not possess tools to standardize clinician decisions associated with delivery of cointerventions and cointerventions are not commonly controlled in clinical trials. As a result clinical trials, and especially non-blinded clinical trials like those of mechanical ventilation, suffer from excess variation, non-reproducible methods, low scientific credibility, and variable results (2, 3). Cointervention effects likely explain many inconsistencies observed in different studies of the same putative intervention. Much of the often inconsistent and conflicting results of clinical trials (4, 5) and clinical care are likely due to non-reproducible methods because the judgments of clinicians become an unarticulated and unidentifiable part of the experimental or clinical care method. These unidentified and unarticulated elements influence outcomes in different studies and clinical reports and remain a barrier to understanding.

Methods: We embed rules (intelligence) into the eProtocols to minimize avoidable errors and omitted documentation, and to maximize the use of best practices. As data are input into the system they trigger one or more rule sets; such rules may also be invoked by passage of time. Output from the eProtocol decision logic is stored in the patient's eProtocol database, and sent to the appropriate caregiver(s) at the bedside. We develop, validate, and establish safety of the eProtocols using mature methods (1, 2, 6-8).

Results: We have built, validated, employed clinically, and distributed adequately explicit bedside computer protocols (eProtocols) that enable reproducible clinical care in critical care medicine for mecfhanical ventilation, intravenous fluid, and blood glucose management (1, 2, 6-10). eProtocols are adequately explicit computer protocols that enable reproducible clinician decision methods that can control experimental cointerventions. An adequately explicit protocol can elicit the same decision from different clinicians when faced with the same clinical information. Clinician compliance with our eProtocol recommendations is 94%.

Discussion: Adequately explicit computer protocols enable a reproducible clinician decision method that standardizes clinician decision making while retaining patient-specific treatment and preserving ultimate clinician decision-making authority (1, 2, 6, 8, 11). Individualized patient care is preserved because the computer protocol requires explicitly, patient-specific, clinical data. Differences in clinical data represent unique patient expressions of the disease. This leads to different and individualized recommendations from the computer protocol for each patient, even though the decision-making logic is the same for all patients. Therefore, eProtocols enable a reproducible clinician decision method that is adaptive, responds to patient changes, and individualizes patient care decisions.

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