

Validation Assessment: Cooperative Communications System (CCS)





Background

- The fragile health of patients who are admitted to a Burn Intensive Care Unit (BICU) requires clinicians and clinical teams to make time-pressured diagnostic and therapeutic decisions based on complex sets of information.
 - Clinicians need to find, and use, the most important, or *salient*, information in order for these decision to be optimal.
 - Barriers to these decisions, and related behaviors, which we term “cognitive work,” delay patient care and increase care cost, length of stay, and cause the potential for misadventures
 - Over the past 3 years, we have developed an IT system to support BICU individual and team cognitive work and communication.
 - This system enables clinicians to obtain salient information through three means:
 - role-based data views,
 - The ability to personally configure displays, and
 - data mining to reveal trends and patterns.
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- Nemeth, C., Anders, S., Brown, J., Grome, A., Crandall, B. & Pamplin, J. (2015a). Support for ICU Clinician Cognitive Work through CSE. In A. Bisantz, C. Burns & T. Fairbanks (Eds.). *Cognitive Engineering Applications in Health Care*. Boca Raton, FL: Taylor and Francis/CRC Press.
 - Nemeth, C., Anders, S., Strouse, R., Grome, A., Crandall, B., Pamplin, J., Salinas, J., Mann-Salinas, E. Developing a Cognitive and Communications Tool for Burn ICU Clinicians. *Military Medicine*. Society of Federal Health Officials (AMSUS). (*in press*).



Objectives

We will evaluate the CCS to verify improvements to decision making that result from clinician use with the following questions:

- 1. How does decision making or task completion compare when using standard of care and CCS prototype** in terms of:
 - Efficiency (i.e. time to decision or action),
 - Reliability (i.e. multiple team members make the same decision, arrive at the same conclusion, or support the same action), and
 - Accuracy (i.e. key decisions or actions are completed as anticipated)
- 2. What is the clinician's subjective experience using standard of care and CCS prototype** with respect to:
 - Information Salience (i.e. ease with which needed information can be found)
 - Communication effectiveness (i.e. efficiency, reliability, and accuracy of communication)
 - Trust (i.e., confidence in the system and decisions made using it)



Protocol

- Two clinical teams will engage in clinically-relevant, simulated patient scenarios using either the current Essentris-based health record or the CCS.
- This validation assessment will occur over a 2 day period with each clinical team separated by at least a 2 day interval.
- Teams will consist of the following individuals (table), some of whom will be
 - *dedicated* to the care of the simulated patient (i.e. have no other assigned patient care duties on the day of study)
 - *on-duty* (i.e. performing their daily care activities as if there were no simulated patient)

Team Member	Daily Responsibility
Bedside Nurse	Dedicated (simulated patient only)
Resident	Dedicated (simulated patient only)
Charge Nurse	On-Duty
ICU attending	On-Duty
ICU resident team	On-Duty
Rehabilitation Specialist	On-Duty
Respiratory Therapist	On-Duty
Dietician	On-Duty
Consultants (surgeon, ECMO, etc.)	On-Duty



Study Activities

- Research observers will shadow key decision makers and record observations (field notes, audio /video) during :
 - Handoff from Facilitator (resident/bedside nurse, other available team members)
 - Pre-Rounds/Morning Assessment (resident, bedside nurse)
 - Multidisciplinary Rounds (all consented team members)
 - After rounds care and decision making (bedside nurse and resident, with consultation/assistance from team members)
 - After Action review (all consented team members)
- The CCS may also record clinician activities with respect to:
 - What information is viewed and for how long
 - What messages are sent
 - What alerts are responded to



Study Time Line

Team and study activities

	Day 0	Day 1	Day 2
Team 1 (week 1)	Study & CCS Orientation	Scenario A: with or without CCS 0700 Pre-Rounds/Assessment 0900 (last patient) – MDR 0930-1330 – Simulated Patient Care 1400 (or at time of completion) - AAR	Scenario B: with or without CCS 0700 Pre-Rounds/Assessment 0900 (last patient) – MDR 0930-1330 – Simulated Patient Care 1400 (or at time of completion) - AAR
Team 2 (week 2)	Study & CCS Orientation	Scenario B: with or without CCS 0700 Pre-Rounds/Assessment 0900 (last patient) – MDR 0930-1330 – Simulated Patient Care 1400 (or at time of completion) - AAR	Scenario A: with or without CCS 0700 Pre-Rounds/Assessment 0900 (last patient) – MDR 0930-1330 – Simulated Patient Care 1400 (or at time of completion) - AAR



Day before/day of Study

- Ensure that it is safe to proceed with the study. Safe to proceed criteria are as follows:
 - BICU Census is below 9
 - BICU CRRT Census is below 5
 - ECMO census is below 2
 - A dedicated resident and nurse are available to manage the simulated patient (**no actual patient responsibilities**)
 - Nurse-to-patient ratio will be 1:1 or greater
 - There are no safety concerns from the BICU head nurse, BICU medical director, Burn Center Chief Nurse, or Burn Center Director.



During the Simulation

- Care of a *real* patient ALWAYS takes precedence over care of a simulated patient.
- If, for any reason, you need to pause, delay, or stop the simulation for a real patient safety or a real staff member safety concern, you should do so by telling the research staff.
- If at any time you feel the simulation study is causing the potential for impacting optimal, safe care of *real* patients, you should pause, delay, or stop the simulation by telling the research staff.



QUESTIONS

Simulation orientation

This is a high fidelity Mannequin that you should treat as if he is a REAL patient. You can touch him and interact with him.

- He has pulses
- His pupils react
- He has lung sounds, heart sounds, bowel sounds.
- You can give him IV medications and fluids through the IV lines already in place. IV Pumps can be set normally, but please keep all of them except the LR on hold (vice actively delivering medications) – this will save our props to use again in the future.
- Vital signs from your monitors can be seen on this computer screen instead of the normal monitor.
- The ventilator will be working, but the settings and pressure measurements should be taken from the flow sheet taped to the ventilator, not the ventilator screen/dials.
- You should do your assessments and use Essentris to document care as usual.
- Medications/equipment can be obtained by going to the sim team outside the room.
- If you wish to draw blood, please take it from the arterial line.
- You do need to wet down his dressings, but you should not “drench” him☺
- **If you have any questions about the simulation or clinical data, ask Dr. Team member 1 *only*, do not ask questions of other research team members outside of technical issues related to the computer.**
- **You should only need to speak with your nurse/resident/attending. Dr. Team member 1 will also service as any consultant, the RT, rehabilitation, and dietician specialist you might need to interact with. You can call him at xxx-xxxx or speak with him in person.**

Some things during this simulation will require you to “suspend disbelief”. We have worked hard to make this experience as life-like as possible. The patient may be plastic but the situation is very real. I ask that you act like this is a real patient and meet us halfway in engaging with this exercise fully.

- He will not physically change temperature (but you can see it on the monitor).
- He will not move his arms, legs, hands, or feet. If you stimulate him to do so (i.e. painful stimulus), you need to ask about the reaction he has.
- UOP Will be shown on the cards on the Urimeter – use those values even if the fluid in the Urimeter does look different
- Obtain all images and laboratory results (when using the EMR only) from Dr. Team member 1.
- Vigileo/EV1000 numbers will be simulated if you use them
- The skin appearance is simulated
- Do not touch below the blue sheets

If there is a particular piece of equipment that you would use in performing your daily duties and procedures but do not see, then just ask for this equipment and I may either get it for you or ask that you simulate this. Do not assume that you should simulate anything unless I tell you this during the scenario. Be sure to think out loud and vocalize abnormal or critical findings. Not only will this allow me to evaluate your behavior, this also is great practice for real life in providing a shared mental model during your daily communication.

Reminder: We recommend that you always keep the CCS system on/visible when it is a part of the study – this should help you maintain situational awareness.

Finally, -lease do not share the details of this simulation with anyone because these cases could be used in the future for training and education.