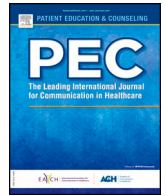




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Discussion

Contextualizing care: An essential and measurable clinical competency

Saul J. Weiner^{a,b}^a Veterans Affairs (VA) Center of Innovation for Complex Chronic Healthcare, Jesse Brown VA Medical Center, Chicago, IL, USA^b Departments of Medicine and Pediatrics, University of Illinois at Chicago College of Medicine, 840 South Wood St, CSN 450, M/C 718, Chicago, IL, USA

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ABSTRACT

Contextualizing care is the process of adapting research evidence to patient life context. The failure to do so, when it results in a care plan that is not likely to achieve its intended aim, is a contextual error. There is substantial evidence that contextual errors are common, adversely affect patient outcomes and health care costs, and are preventable. This evidence comes from over 5000 mostly *incognito* recordings of physician-patient encounters over a range of practice settings that have been analyzed along with the medical records of each encounter utilizing a specialized coding algorithm. Educational and practice improvement interventions have been tested at the medical student, resident, and attending level, each with evidence of benefits and limitations. The author argues that contextualizing care is an essential clinician competency and proposes an evidence-informed strategy for building and reinforcing the requisite skills across the continuum of medical education and professional development.

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1. Background

Clinical decision making can be described as the process of integrating four types of information: A patient's clinical state, the research evidence for managing their clinical state, patient preferences and patient context [1]. Patient context refers to the life circumstances and patient behaviors relevant to planning a particular patient's care [2]. When a clinician fails to elicit or disregards patient context, an otherwise appropriate care plan can result in an unintended and undesirable outcome. Hence, the capacity to identify and incorporate relevant patient context into patient care should be considered an essential clinical competency.

Consider, for instance an otherwise healthy patient ("Ms. Davis") who had lost control of her diabetes as reflected in a rising glycated hemoglobin to 9.0%. That was her clinical state as recorded during a primary care visit. The research evidence indicates that hyperglycemic patients benefit from efforts to improve their diabetes control with diet and medication adjustments. Her physician acted on this information by increasing her insulin dosage and referring her for dietary counselling. They also checked her lipids and renal function, and arranged for her to see an eye doctor for retinopathy screening. Their note in the electronic medical record was randomly selected for a quality audit and met the standard of care.

However, critical information was missed: At a follow up visit – at which the glycated hemoglobin was even higher – another physician asked Ms. Davis why she was having trouble managing her diabetes and learned that she had been distracted for several months since her partner of 30 years had suffered a stroke. She was consumed with caregiving responsibilities and depressed. These changes in her life had diminished her capacity to take her medications consistently and eat healthy meals. The problem had never been that she needed a higher dosage of insulin. Instead, an appropriate care plan would require helping her adapt to a major life disruption. After learning more about the situation, the clinician proposed respite services to reduce caregiver burden, antidepressant medication and counseling to address depressive symptoms. The options were presented gently without a hint of paternalism, such that the patient could comfortably exercise her preferences. The care plan had been contextualized, meaning that it took into account the patient context. At a follow up visit, the patient's diabetes control had started to improve.

The process of taking all four types of information into account is illustrated as a Venn diagram in Fig. 1, which highlights patient context. It should be noted that the original diagram, published in 2001 as a conceptual framework for evidence-based medicine, only included three rings – omitting context [3]. As illustrated in the example above, the omission of patient context can lead to a care plan that, while consistent with the research evidence, is nevertheless inappropriate. Such an omission is called a contextual error [4].

E-mail address: sweiner@uic.edu.<https://doi.org/10.1016/j.pec.2021.06.016>

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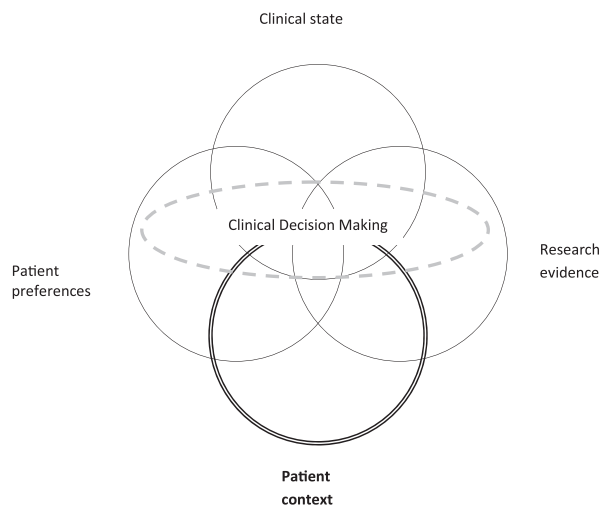


Fig. 1. Clinical decision-making should take into account four types of information, including the patient's (life) context. (Adapted from *On Becoming a Healer* [11]).

Contextual errors occur when there is a failure to contextualize care. Contextual error is a subtype of medical error, in that it constitutes the "...use of a wrong plan to achieve an aim." [5]. The plan is wrong, however, not because of a mischaracterization of the clinical state or research evidence, but rather because of a failure to adapt that information to the patient's context. The effect, however, is comparable: The care plan is not aligned with the goals of care.

Contextualizing care is a competency consisting of skills and attitudes outlined below. In addition, three types of evidence are introduced that suggest that it should be central to how we train and evaluate the performance of physicians: First, that the performance of an individual or group of physicians at contextualizing care is measurable [6]. Second, that applying those measures has demonstrated that contextualizing care predicts both better patient outcomes and lower costs [7,8]. And, finally, that sharing performance data with clinicians can improve their performance and their patient's healthcare outcomes [8].

2. Observing a competency

Competency at contextualizing care can be described as the capacity to identify from the complexity of another person's life that which is relevant to their present moment as a patient, and then to draw on that information to assist them with their needs [9]. As observed during a clinical encounter it consists of four steps [1]: First a clinician recognizes clues that a patient may be struggling with a life situation that is complicating their care. These clues, called "contextual red flags," include patient behaviors such as missed appointments or not refilling medications, changes in the status of a chronic condition such as loss of blood pressure control, or patient utterances during a medical encounter such as "Boy, it's been tough since I lost my job." The second step – if contextual red flags are identified – is asking patients about them, a process called "contextual probing." For example: "Ms. Davis, I notice that your blood sugar has been unusually high lately. Is something going on that is making it more difficult for you manage your diabetes?" The third step is clarifying the patient's response to ascertain whether there are in fact challenges that are complicating their care. These are called "contextual factors." And, finally, when contextual factors are revealed, the fourth step is taking these factors into account when considering the other three types of information relevant to clinical decision making (Fig. 1), i.e. to "contextualize the care plan." Hence the process proceeds as follows:

Table 1

Contextual Domains – Areas to consider when there are clues that a patient's circumstances or behaviors may need to be addressed when planning their care.

1	Access to Care	7	Skills, Abilities and Knowledge
2	Competing Responsibilities	8	Emotional State
3	Social Support	9	Cultural Perspective/
4	Financial Situation	10	Spiritual Beliefs
5	Environment	11	Attitude towards Health
6	Resources	12	Care Provider and System
			Health Behavior

Contextual red flag → Contextual probe → contextual factors → contextualized care plan.

There are two points in the process when clinician inattention to patient context can trigger a contextual error: either neglecting to probe a contextual red flag or neglecting to address a contextual factor in a care plan. Neither is certain, however, to lead to a contextual error: Sometimes there is no underlying contextual factor; and, when there is, sometimes the patient reveals it spontaneously. For instance, with regard to latter, Ms. Davis might have volunteered the information to her doctor at the first visit that her partner had become ill and that she was overwhelmed by her caregiver role. Perhaps because she was depressed and distracted, doing so did not occur to her. Nor should it have. Just as it is not the patient's job to know what symptoms their physician needs hear about to characterize their clinical state, it is also not their job to know what contextual factors may be relevant. Physicians must be skilled in eliciting and integrating all information essential to effective patient care.

Contextual factors can be grouped into 12 contextual domains (Table 1) [10]. Note that the six on the left pertain to life circumstances, and the six on the right to drivers of patient behavior. Such a list can serve as a kind of "differential" for a clinician attempting to identify relevant patient context. Ms. Davis was experiencing "competing responsibilities" as a caregiver, and a change to her "emotional state," domains 2 and 9, respectively.

The capacity to reliably recognize contextual red flags, ask about them, elicit contextual factors, and incorporate the information into care planning is the competency to contextualize care. Without it, physicians are prone to practice medicine "out of context" resulting in care that is often inappropriate given their patients individual circumstances and needs. While the four step process is primarily cognitive, as detailed above, it may occur almost instinctively if the clinician engages openly and fully with patients – with a sense of shared humanity – rather than holding them at arm's length. The physician who engages with curiosity and concern about why Ms. Davis' diabetes control is going in the wrong direction is bound to ask about what is going on and what they can do to help. In so doing, they are contextualizing care [11].

3. Measuring contextualization of care

The process of ascertaining whether a clinician is contextualizing care during a medical encounter requires listening to an audio recording of the visit while also accessing the patient's medical record. This can be accomplished at scale by inviting patients to carry an audio recording device into their visits and return it when they leave. The protocol, referred to as "patient-collected audio," should be approved and monitored by the health care facility's quality improvement or peer review committee. When implementing a patient-collected audio program, we adhere to three principles: both

43 y/o old man presented with loss of control of his asthma

1. **Red Flag:** Heard on audio: “Boy, it’s been tough since I lost my job.”
2. **Failure to Probe:** The provider did not ask “How has it been tough since you lost your job?”
3. **Contextual Factor Revealed by Pt.:** The patient went on to say that he’s having trouble paying for his asthma inhaler (Domain: Financial hardship)
4. **Failure to Address Contextual Factor in Care Plan:** The provider does not respond. Missed opportunity to discuss affordable alternatives.

Fig. 2. Standardized four-line format for providing feedback on each 4C coded encounter.

physicians and patients must feel safe participating, the audio recording process should impose no burden or distraction during the visit, and the value of the program should be evident to both parties [12].

Once the audio data is collected and uploaded to a secure server, it is analyzed utilizing Content Coding for Contextualization of Care (or “4C”) [6,7]. 4C coding follows the 4 step logic detailed above and is typically learned over the course of two days, or from a publicly available video and instruction manual [13,14]. Trained coders should achieve at least 85% inter-rater agreement as to whether a care plan was contextualized [6]. Coding an encounter takes about one and a half times the length of the recorded visit. Each encounter is summarized in four lines as illustrated in Fig. 2, a concise format that is useful for providing feedback. The performance of a physician or group of physicians can be plotted over time, tracking two data

points: The percentage of contextual red flags probed, and the percentage of contextual factors incorporated into the care plan. These data can be utilized to track change over time. In Fig. 3, the contextualizing care rate increased from 54% to 88% among the cohort of participating physicians following ongoing feedback on their performance.

4. Impact on health care outcomes and costs

Ascertaining whether contextualization of care improves health care outcomes can be determined by prospectively tracking contextual red flags for which a contextual factor has been identified. For instance, in the case of Ms. Davis, the red flag was a rising glycated hemoglobin for which the contextual factors included caregiver responsibility and depression. The first care plan was coded as a contextual error (medication dosage increase), and the second as contextualized (respite care and management of depression). The research assistant assigned to track outcomes after a visit, looked up the glycated hemoglobin and documented that it had gone up in the first encounter (bad outcome), and down in the second (good outcome). Not surprisingly, the contextualized care plan was associated with the desired outcome. Importantly, to prevent bias when tracking outcomes, the research assistant is blinded as to whether the care plan was coded as contextualized or as a contextual error.

Hence the desired (good) outcome is always prospectively defined based on the contextual red flags, whether it be a reduction in missed appointments, frequent emergency department visits, unfilled medications, or loss of control of a chronic condition. In an analysis of 601 recorded visits containing 548 contextual red flags, contextualized care – which occurred in just 59% of visits – significantly predicted better outcomes [7]. A subsequent study of 4496 audio recorded encounters at six Department of Veterans Affairs (VA) outpatient clinics generated similar findings [8]. In that study

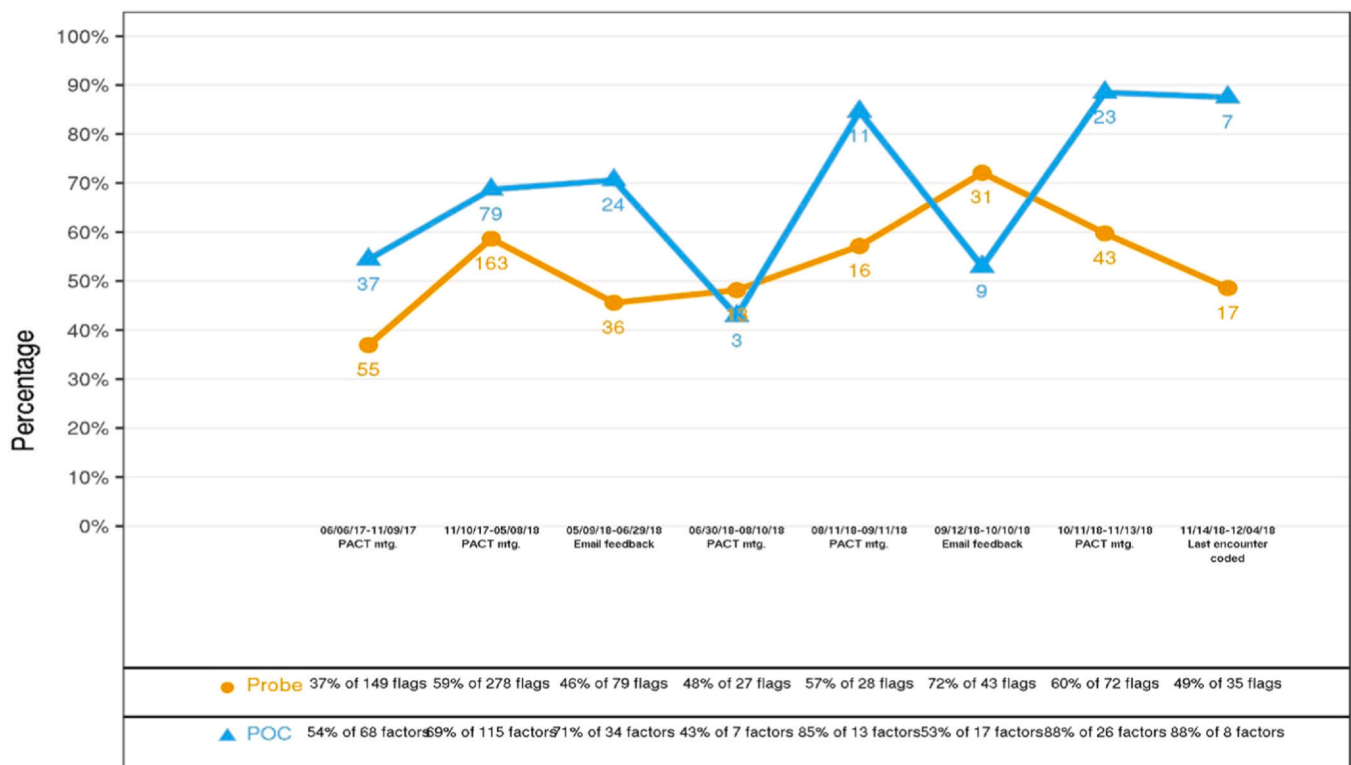


Fig. 3. Percentages of audio recordings in which physicians in a group practice probed a contextual red flag and contextualized the plan of care (POC) in response to feedback over time.

contextualizing care had a number needed to treat (NNT) to improve one contextual red flag of 6.

Contextualizing care can also reduce the costs of care, through two mechanisms: by reducing overuse and misuse of medical services, and by reducing medical need. The former has been documented experimentally utilizing unannounced standardized patients (USPs) trained to present in multiple practice setting as real patients while strictly adhering to a script [15]. In one script an actor visited 50 practices, each time portraying a patient who had lost control of his asthma. The contextual factor was a loss of health insurance, and the contextual red flag was a comment that “Boy, it’s been tough since I lost my job.” Physicians who contextualized the care plan typically just switched the patient to less costly generic versions of their medication. Those who overlooked the context often treated the asthma symptoms with more aggressive care, including additional medication, pulmonary function testing, and referral to a specialist. This pattern of overuse and misuse following contextual errors recurred with multiple scripts. The latter driver of cost savings – reducing medical need – was seen in an analysis of the hospitalization rates of patients in the six-site VA study reference above. A 2.5% reduction in hospitalization rates that could be attributed to an increase in contextualization of care rates, against a comparison group, generated approximately \$25 million in cost savings [8].

While contextualizing care reduced cost through the two mechanisms described above, a potential concern is that it may lengthen the medical encounter – which would come at a cost. When examined empirically, however, this has not been the case. While probing contextual red flags adds time to the medical encounter, especially early in the visit, on average it saves a commensurate amount of time on the backend by preventing unnecessary discussions about additional interventions the patient does not need. This was discovered when comparing the length of recordings of contextualized and not contextualized visits in the USP study when physicians had seen the “same” patient [2].

5. Improving performance

Broadly, there are three potential strategies for improving clinician performance at contextualizing care: through (a) medical education and training; (b) audit & feedback to those in practice, and (c) the use of technology. Each has its strengths and limitations. In a randomized controlled trial (RCT) of a medical education intervention to improve contextualization of care targeting fourth year medical students, improvements were seen in skill but not performance [16]. Specifically, trained medical students were significantly better when tested on standardized patients in a simulation laboratory compared to untrained peers. This same finding was replicated with resident physicians in a subsequent study [7]. They had acquired the skill. However, when the same physicians who had demonstrated it under conditions when they knew they were being observed were tested utilizing real patients carrying concealed audio recordings, they ceased to outperform their untrained peers [17]. This “skills-to-performance” gap demonstrates that it is harder to change what practitioners do in actual practice (i.e. their performance) than what they do under testing conditions (i.e. their skill).

A subsequent study assessed the efficacy of a quality improvement (QI) program based on audit & feedback to improve contextualization of care among internal medicine and family medicine attending primary care physicians, nurse practitioners, nurses, and clinical pharmacists [8]. Audit & feedback is an evidence based strategy for changing actual performance in practice [18]. In this QI program the audit part consisted of patient-collected audio followed by 4C coding, and the feedback consisted of group and occasionally

individual review of documented examples of contextualized care and contextual errors (Fig. 2), along with tracking statistics (Fig. 3), facilitated by a peer clinical champion. Participating physicians receive Practice Improvement (PI) Maintenance of Certification (MOC) credit from either American Board of Internal Medicine or the American Board of Family Medicine [19].

In an evaluation of the program utilizing a stepped-wedge design [20], a significant improvement in outcomes, and – as noted earlier – a reduction in hospitalization rates were documented compared to the control [8]. This reduction resulted in nearly \$75 saved for each dollar invested in the program. While promising, however, an audit & feedback program has its limitations. First, logistically it is challenging to set up. It requires significant trust building to implement an audio recording process in clinical care. And, second, the effect seems to plateau. The percent of audio recording in which care is contextualized usually plateaus at about 70–80%, leaving substantial room for improvement.

The clinical decision support (CDS) tools in the electronic medical record offer a potential technological solution. In an ongoing RCT, patients in the intervention group complete a questionnaire eliciting contextual information from the 12 domains (Table 1) [21]. Their affirmative responses are routed through the patient portal and appear in a “contextual care box” in the physician’s note template at the start of the visit, e.g. “Mr. Smith would you like to know he has trouble keeping track of his medications.” In addition, the electronic medical record (EHR) inserts a list of positive red flags (e.g. missed appointments, non-refilled meds) in the contextual care box. Finally, where there is likely an appropriate intervention (e.g. order a pill box when a patient says they can’t keep track of their medications), a preliminary order is placed automatically that the physician just needs to accept. 4C coding is underway to ascertain whether and, if so, to what extent, these CDS tools enhance physician performance at contextualizing care.

6. Conclusion

The term “competency” in medical practice is defined as “An observable ability of a health professional that can be measured and assessed to ensure acquisition.” [22] Competence at contextualizing care can be observed, measured, and assessed with a high degree of inter-rater reliability. It can also be learned and deficits in performance, once identified, corrected. Furthermore, when clinicians demonstrate competence at contextualizing care, their patients have significantly better outcomes, evidence that it is an essential competency and that the method for measuring it – patient-collected audio with 4C coding – is valid.

In light of its implications for patient care, it should be included in the ACGME Core Competencies and specialty specific milestones, as well as the Taxonomy of Competency Domains of the American Association of Medical Colleges [23,24]. Until it is recognized and assessed, the performance of physicians at contextualizing care is not likely to improve and contextual errors will continue to occur frequently, with adverse consequence for patient care and health care costs.

Milestones describing the skills, knowledge and attitudes requisite to contextualize care can serve as a roadmap for curriculum development at each stage of training. For instance, second year medical students in a pharmacology class should demonstrate knowledge not only of what medications would be optimal for a patient presenting with hypertension, diabetes, or an infection, but also what they would do if their patient could not afford recommended treatment, or lacked skills to manage their care, or had competing responsibilities that confounded the care plan. And, at the other end of the continuum, clinicians should demonstrate not

only the knowledge but the practice of contextualized care planning whenever contextual factors complicate their patients' care. Physicians who are inattentive to patient life context should not be considered competent.

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Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: The author is co-founder of a company that provides management consulting services to clinicians and institutions interested in collecting quality and performance data that include methods mentioned in this article.

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