

# From Critique to Collaboration: Rethinking Computerized Clinical Alerts

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The safe prescribing of medications via computerized physician order entry routinely relies on clinical alerts. Alert compliance, however, remains surprisingly low—with up to 96% of such alerts ignored daily. Prior approaches, such as improving presentational factors in alert design, had limited success, mainly due to physicians' lack of trust in computerized advice. While designing trustworthy alert is key, actionable design principles to embody elements of trust in alerts remain little explored. To address this issue, we focus on improving the trust between physicians and computerized advice by examining why physicians trust their medical colleagues. To understand trusted advice among physicians, we conducted three contextual inquiries in a hospital setting ( $n = 22$ ) and corroborated our findings with a survey ( $n = 37$ ). Drivers that guided physicians in trusting peer advice included: timeliness of the advice, collaborative language, empathy, level of specialization, and medical hierarchy. Based on these findings, we introduced seven design directions for trust-based alerts: endorsement, transparency, team sensing, collaborative, empathic, conflict mitigating, and agency laden. Grounded in these results, we then proposed a model to guide the design of trust-based clinical alerts. Our model constitutes of three key dimensions, using colleagues' endorsement, foregrounding physicians' prior actions, and adopting a suitable language. Using this model, we iteratively designed, pruned, and validated a set of novel alert designs. We are currently evaluating eleven alert designs in an online survey with physicians. The ongoing survey evaluates the likelihood of alert compliance and the perceived value of our proposed trust-based alerts. Next, we are planning in-lab studies to evaluate physicians' cognitive load during decision making and measure attention to different trust cues using gaze duration and trajectories. Our work contributes to the current debate on how to design effective alerts to improve patient safety.

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