

Advancing Disaster Medicine through Recognition-Primed Decision Theory in Medical Education.

Fortaleciendo la Medicina de Desastres mediante la Teoría de la Decisión Basada en el Reconocimiento en la Educación Médica.

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The growing complexity of disasters and public health emergencies has transformed disaster medicine into an educational priority for healthcare professionals. Nevertheless, preparing learners to make effective decisions under uncertainty remains a persistent challenge. Although medical education has increasingly incorporated simulation, competency-based training, and disaster preparedness activities, these approaches continue to emphasize procedural performance more than the cognitive mechanisms underlying expert decision-making. We contend that advancing disaster medicine requires a fundamental shift from protocol-centered instruction toward educational models that explicitly cultivate adaptive clinical reasoning. This educational challenge highlights the need for cognitive frameworks that not only explain expert decision-making but also guide instructional design. In this context, Recognition-Primed Decision (RPD) Theory offers a conceptual framework capable of strengthening how future healthcare professionals learn to think and act in complex emergency situations (figure 1) (1-6).

Rather than describing decision-making as a deliberate comparison of multiple alternatives, RPD explains how experienced clinicians recognize meaningful patterns, mentally simulate feasible actions, and rapidly implement appropriate responses. Beyond explaining expert performance, the educational value of RPD lies in providing a cognitive framework that intentionally supports the development of adaptive expertise. Rather than focusing exclusively on memorizing disaster protocols, educators can foster pattern recognition, situational awareness, and adaptive clinical reasoning through repeated exposure to authentic disaster scenarios. Importantly, recognition-based decision-making complements, rather than replaces, analytical reasoning, allowing learners to integrate intuitive and reflective processes during complex emergencies (4, 7-8).

Disaster medicine represents an ideal environment for operationalizing these principles because emergencies demand rapid prioritization, interdisciplinary collaboration, and continuous adaptation to evolving circumstances. We propose that RPD principles should be integrated longitudinally across undergraduate, postgraduate, and continuing medical education. During early training,

learners may develop recognition skills through guided case discussions that emphasize identifying key clinical cues during disasters. As training progresses, high-fidelity simulations and tabletop exercises can expose students to mass casualty incidents, chemical emergencies, or rapidly evolving public health crises that require prioritization under uncertainty. Structured debriefings following these activities should explicitly explore the recognition cues, mental simulations, and contextual judgments that influenced participants' decisions, helping learners understand not only what decisions were made but how they were reached. Such progressive integration aligns educational practice with the cognitive demands of real disaster response while strengthening communication, coordination, and adaptive decision-making. Educational initiatives in disaster medicine consistently suggest improvements in preparedness, disaster literacy, collaborative performance, and emergency response when these strategies are incorporated into training (5-6, 9-10).

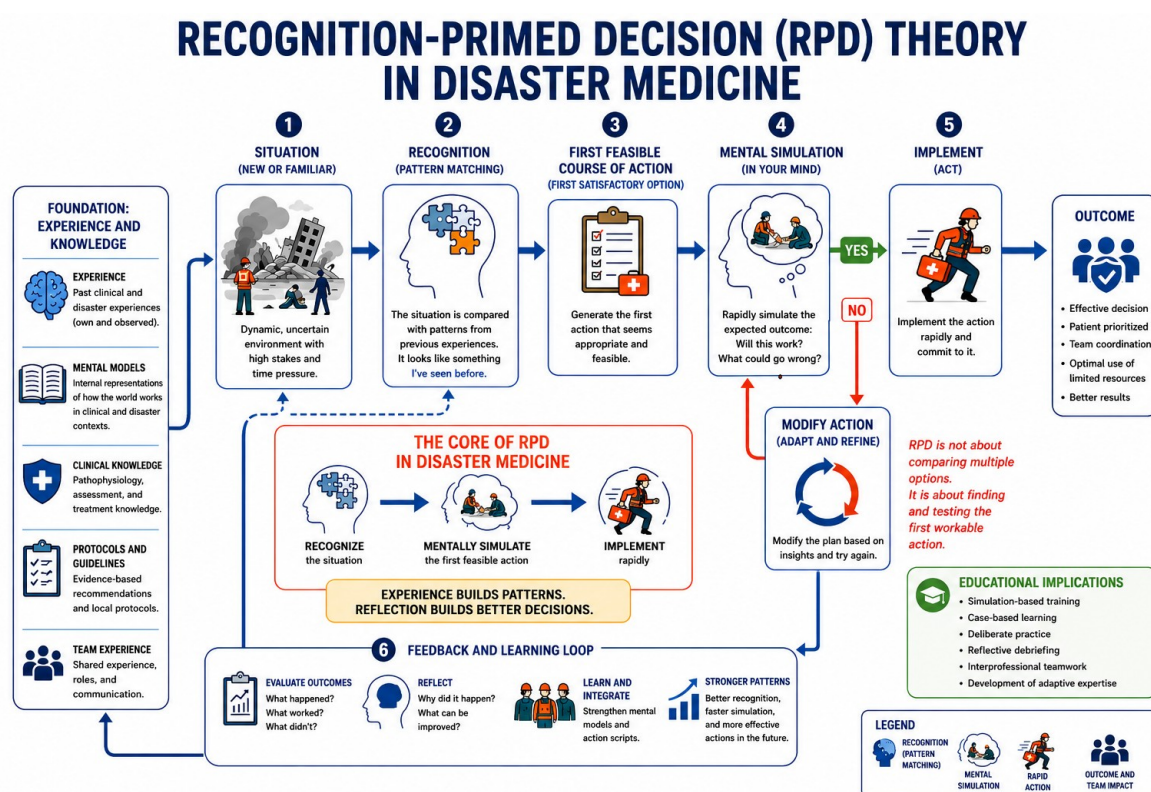


Figure 1. Recognition-Primed Decision (RPD) Theory offers a conceptual framework capable of strengthening how future healthcare professionals learn to think and act in complex emergency situations.

Beyond instructional activities, RPD also has important implications for curriculum design and learner assessment. Rather than evaluating only adherence to disaster protocols, educators may assess learners' ability to recognize evolving situations, justify prioritization decisions, anticipate potential consequences, and adapt management plans as scenarios unfold. This shift promotes assessment of cognitive processes alongside technical performance, providing a more comprehensive evaluation of disaster medicine competence.

Importantly, RPD should not be interpreted as a comprehensive explanation of clinical reasoning. Because recognition-based decision-making depends on accumulated experience, novice learners may require explicit instructional scaffolding before recognition-based strategies become reliable, particularly when they have limited exposure to authentic emergency situations. We therefore emphasize that RPD should complement reflective practice, analytical reasoning, and structured feedback, creating a more comprehensive educational approach to developing adaptive

expertise. Recognizing these limitations strengthens rather than weakens its educational relevance by positioning the theory within a broader framework of clinical reasoning (7-8).

Ultimately, the future of disaster medicine education depends not only on teaching what healthcare professionals should do during disasters but also on intentionally developing how they think and decide under uncertainty. Recognition-Primed Decision Theory provides educators with a practical framework for designing simulation-based learning, structured reflection, and progressive curricular experiences that cultivate adaptive clinical reasoning. Integrating these principles into disaster medicine education may better prepare future physicians to respond safely, efficiently, and confidently to increasingly complex emergencies while strengthening patient care and health system resilience (4-6, 9-10).

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