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An Electronic Health Record Based on Structured Narrative

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Objective: To develop an electronic health record that facilitates rapid capture of detailed narrative observations from clinicians, with partial structuring of narrative information for integration and reuse.

Design: We propose a design in which unstructured text and coded data are fused into a single model called *structured narrative*. Each major clinical event (e.g., encounter or procedure) is represented as a document that is marked up to identify gross structure (sections, fields, paragraphs, lists) as well as fine structure within sentences (concepts, modifiers, relationships). Marked up items are associated with standardized codes that enable linkage to other events, as well as efficient reuse of information, which can speed up data entry by clinicians. Natural language processing is used to identify fine structure, which can reduce the need for form-based entry.

Validation: The model is validated through an example of use by a clinician, with discussion of relevant aspects of the user interface, data structures and processing rules.

Discussion: The proposed model represents all patient information as documents with standardized gross structure (templates). Clinicians enter their data as free text, which is coded by natural language processing in real time making it immediately usable for other computation, such as alerts or critiques. In addition, the narrative data annotates and augments structured data with temporal relations, severity and degree modifiers, causal connections, clinical explanations and rationale.

Conclusion: Structured narrative has potential to facilitate capture of data directly from clinicians by allowing freedom of expression, giving immediate feedback, supporting reuse of clinical information and structuring data for subsequent processing, such as quality assurance and clinical research.