

Sarah Collins, RN, PhD

**Panel 2: Role of clinical documentation for care coordination across the health team**

February 13, 2013

Written Testimony

**Definitions of terms used in this document:**

- *Clinician* refers to all types of health care professionals.
- *Setting* refers to all inpatient care settings (e.g., long term care, acute care, critical care), outpatient care settings (e.g., primary care, specialists), and other settings of care delivery (e.g., home health, tele-health).
- *Domain* refers to all interdisciplinary domains (e.g., nursing, medicine, social work etc.) and inter-specialty domains (e.g., primary care, cardiac care, oncology, pediatrics etc.).
- *Common ground* is defined as shared knowledge (mutual understanding) between two communicators<sup>1</sup>

**1. How do you define clinical documentation?**

Clinical documentation is the primary communication tool for care coordination between and among all stakeholders involved in the healthcare delivery process by serving as the record of the patient's health states **and** as an artifact of the actions (including communication events) performed and planned in response to those health states across settings and overtime. Clinical documentation is comprised of structured and unstructured data that, when interpreted by a clinician or patient, should convey six types of information (see table 1). These types of information are not consistently available in a computable format within the EHR. Some are shared as part of a paper or fax document and in that form may not support effective/efficient decision making. Clinical objectives are often missing from clinical documentation in many settings and systems, but are critical for care coordination.

Table 1. Six critical **types of information** that Clinical Documentation conveys:

<b>Information type</b>	<b>Example</b>
1) The patient's past and current state	condition, diagnosis, assessment data, current assumptions, observations
2) Clinical activities performed	Interventions
3) Communication events	family meeting, handoff transition
4) Response to clinical activities performed	outcomes, evaluations
5) Clinical activities planned	plan of care, decisions made
<b>6) Clinical objectives for future patient states</b>	<b>patient goals (patient preferences and shared goals of care that direct clinicians' delivery of care)</b>

Clinical documentation serves five primary **functions**:

- 1) Communicate information among clinicians, patient, and family separated by time, distance, or domain to establish common ground and enable coordinated continuity of care**
- 2) Computerized analysis and decision support to enable best practices
- 3) Continuous quality improvement to improve safety and quality of care
- 4) Reference for an individual clinician to review the information that he or she documented in prior encounters to enable continuity of care
- 5) Important role in research to identify best clinical practices

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Supporting compliance with local policy, regulation and law for benchmarking is a *by-product* of clinical documentation in that documentation can serve as an artifact of care delivered. Regulatory requirements should not distort clinical documentation functionality and requirements for the clinical end user.

**2. How is clinical documentation used to support care coordination?**

The first function of clinical documentation (outlined above) enables coordinated continuity of care by communicating information among clinicians, patient, and family separated by time, distance, or domain to establish common ground. Table 2 specifies three functionalities for the ideal states of clinical documentation to achieve coordinated care, the current state of functionality, and requirements to overcome the functionality gaps.

**Table 2. Clinical Documentation for Coordinated Care – Ideal State, Current State, Requirements**

Ideal State Functionality	Current State Functionality	Requirements to overcome gaps
1. Context-specific summaries/ visualizations of shared and computable patient data <sup>2-4</sup>	Siloed data across settings	<ul style="list-style-type: none"> <li>• Interoperability standards</li> <li>• Computable content</li> </ul>
2. Patient-centered care planning <sup>5-7</sup>	Siloed care planning concepts across settings <i>and</i> domains	<ul style="list-style-type: none"> <li>• Linkages between plan of care concepts across               <ul style="list-style-type: none"> <li>▪ Cyclical care process</li> <li>▪ Settings</li> <li>▪ Domains</li> </ul> </li> <li>• Explicit documentation of <b>personalized patient goals of care</b></li> </ul>
3. Collaborative documentation that integrates communication tools with structured data to “tell the patient’s” story <sup>8-10</sup>	Siloed documentation functionality based on regulatory requirements and discipline-specific preferences	<ul style="list-style-type: none"> <li>• Collaborative tools that allow user to:               <ul style="list-style-type: none"> <li>▪ Annotate and link structured data to convey clinical relationships, temporal associations, and clinical interpretations</li> <li>▪ Send contextual alerts and messages linked to structured data to coordinate shared decision-making, planning, and personalized goals of care</li> </ul> </li> <li>• Incentives for clinicians and patients to overcome sociotechnical challenges of collaborative documentation tools</li> </ul>

**Ideal state:**

Clinical documentation is most useful to coordinate care when it establishes common ground about a patient’s plan. The plan is dependent on the state of the patient; therefore, the first goal is to establish a shared understanding of the current state of the patient. By establishing a shared understanding of the patient state, shared clinical objectives (patient goals) for future patient states can be established.

Clinical documentation can support care coordination through three mechanisms: 1) Context-specific summarization and visualization of computable patient data across domains/settings/time, 2) Shared care planning tools that support care process linkages to establish common ground across domains/settings/time, 3) Collaborative documentation that integrates communication tools with structured data to “tell the patient’s” story.

### **Current State and Gaps:**

Patient data is siloed across settings despite a high overlap in the types of clinical concepts exchanged during transitions of care. These clinical concepts exchanged during transitions are ripe for computer-based standards for interoperability.<sup>2-4</sup> Due to a lack of interoperability of electronic data between systems, clinicians coordinating care between settings still use archaic technological solutions such as facsimile and manual data entry, despite the implementation of electronic health records (EHRs). Additionally, user interface requirements for specific information consumption needs vary across domains, settings, and stages of care. Manual configuration and design of summaries and visualizations to meet the needs of users in each clinical context is not scalable and requires computable content for sophisticated and automated design.

Varieties of tools exist within EHRs to support coordination of care plans and associated activities between disciplines. However, it is important to note that many *interdisciplinary* care planning tools within EHR systems **exclude physicians**. The implications of siloed care planning concepts are vast. Siloed problem lists and care plans are a great challenge in the development of sophisticated coordination of care tools that enable sharing of patient-centric plans and goals by all clinicians within the care team and patients.

EHR functionality is often siloed based on regulatory requirements for structured data reporting and discipline-specific preferences for notes and templates. These EHR siloes that are artifacts of who is documenting (nurse, physician, social worker) and how (semi-structured note, flowsheet, checklist, structured form) result in a fragmented “story of the patient”. The lack of tools to convey a patient-centered story results in an increased reliance on verbal communication that leads to a continuous loop of out of date information and underutilization of the EHR.<sup>11</sup>

### **3. Which aspects of clinical documentation are most critical/important for care coordination?**

The explicit documentation of Personalized Patient Goals is the most critical aspect of documentation for care coordination. However, the documentation of coordinated patient goals cannot be separated from the functionality and processes that facilitate the generation and usefulness of those goals. It could be argued that ALL types of clinical documentation are important and it is impossible to specify the specific data that is most critical for care coordination in every instance. Interoperable computable data allows for context-specific summaries of patient data at the point of care. This consumption of shared data is critical to establish a shared understanding of a patient state which, in turn, is required to establish explicit and shared clinical goals.

By definition, the delivery of coordinated care requires **two critical components**: 1) **goals that are aligned** among team members, and 2) **engagement of patients** as a full member of the care team. Within a homogenous setting or domain, clinical goals and preferences may be implicit because the users have a high degree of common ground due to shared training, shared work culture/practices, and shared domain focus.<sup>1</sup> The criticality of explicit goal alignment is a well-accepted notion in many complex industries in addition to healthcare. Patient care that crosses settings and domains requires common ground among the participants coordinating care and this is done by establishing common clinical goals based on a shared understanding of patient state. However, my research found that 25% of verbally stated goals in a critical care setting were not documented anywhere in the EHR. Of the 25% of goals not documented, actions for those goals were 60% less likely to be documented. The most referenced source of goals by clinicians was the attending physician note, but that note contained only 61% of the stated goals of care.<sup>6</sup> These findings indicate a gap in documentation that may inhibit coordination of care, particularly across distinct clinical settings and domains.

Coordinated care requires the operationalization of patient-centered teams that actively align goals with patient preferences to formulate “Personalized Patient Goals”. Yet, the patient/family’s voice is often absent in clinical documentation. The occurrence of a discussion with a patient may be documented, but the content of such a discussion is often missing. Documentation that a family meeting occurred is much less useful to clinicians than documentation of the shared decisions and outcomes of the family meeting. As EHRs begin to integrate patient-generated data it will be important to require a patient-centric design that puts patient-generated data at the center of the EHR experience with an important care coordination function in mind – shared decision making for personalized patient goals of care.

**3.a. Within your organization, have you developed a formal or informal process to ensure that these elements are always captured?**

At Partners Healthcare Systems we engage in a number of processes/principles to facilitate the capture of useful data to coordinate care:

- a. Multidisciplinary stakeholder end-user engagement
- b. Clinical subject matter experts as panelists to collaboratively vet clinical content
- c. Use of reference terminologies and interoperability standards
- d. Anticipation of sociotechnical requirements
- e. Content curation for avoidance of redundant documentation
- f. Data entry tasks aligned with clinical workflow, not regulatory, requirements
- g. Monitor use of free-text entries for optimization to structured templates
- h. Transparent re-use of structured data to end-user for clinical decision support or other innovations

It is important to note that reliance on policies and documentation compliance measures that do not consider the perceived clinical utility of the required content to the clinical end-user and patient is likely to result in underutilization of EHR care coordination functionalities. The technology acceptance model posits that clinicians will utilize technology, even if it is difficult to use, when they perceive that it is useful. Confirming this notion, my research demonstrated that nurses document beyond minimal compliance requirements when they perceive that it is clinically useful to highlight a clinically significant change of structured patient data at a given point in time that may be useful to coordination care or detect deterioration of the patient's state in the future.<sup>9</sup> In this study, nurses were found to annotate structured data with free-text comments to contextualize and communicate the patient's story – functionality that they perceived as useful and convenient to use.

**4. Have you developed a structured approach or format for capturing certain elements/aspects of your clinical notes?**

Structured approaches that lack a clinical context and visualization of linkages to related clinical data types are not perceived as useful by clinicians because they fail to convey basic clinical relationships and common processes of care. My research findings indicate that data entry should: 1) Allow the user to document and associate structured data for a given point in time without changing screens, 2) Provide communication tools to support collaborative documentation associated with structured data.<sup>9</sup> Data display should: 1) Convey the temporal relationships between concepts, and 2) Link plan of care concepts.<sup>9</sup> While structured approaches are useful for data re-use given the architecture of most EHRs today, the industry needs to look ahead at collaborative EHR functionality that allows the ability to annotate and link structured data and unstructured messages (notes) as a means to provide context and tell the patients story. Moreover, as device integration and natural language processing becomes more sophisticated, data entry tasks will be decreased and the role of the clinician within the EHR will shift from data-entry tasks to value-added clinical interpretation, annotations, and linkages of structured data. These value-added clinical interpretations will be most critical for coordination of care between domains and settings where common ground to establish shared understanding is inherently low and face to face and verbal communication are unrealistic and expensive.

**5. What challenges have you faced integrating data across care teams and settings? What solutions have you identified to address these challenges?**

The following points are in reference to the ideal state, current state and requirements outlined in Table 1.

1. **Current State:** Siloed patient data across settings<sup>2-4</sup>  
**Ideal state:** Dynamic summaries and visualizations of patient data to promote shared understanding of patient state at the point of care  
**Specific Requirements:**
  - Interoperability standards for all settings of care

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- Computable content to help process data and anticipate needs for context-specific consumption of data at the point of care

Patient-centered coordinated views of standardized data across all settings and domains facilitate the purposeful transfer of information. Summaries and visualizations of patient information for coordination of care are critical for all transitions of care and coordination of activities at the point of care. Transitions include *all* transitions within the inpatient setting, between the inpatient and outpatient settings, within the outpatient setting, and among all other settings. Transitions within the inpatient setting include, but are not limited to, handoff, rounds, and transfers between units. Episodes of care should not be siloed and summaries of information are critical to prevent those silos from forming. There is a need to combine data from different disciplines and documentation tools across settings of care to generate dynamic and real-time summaries of care. Interoperability standards are necessary to share standardized and computable patient data across settings. The specific data that is most critical for care coordination will depend on the domain, setting, and phase of care. Smart systems with computable data can learn and anticipate context-specific user needs to tailor the user interface for efficient information consumption at the point of care. Standardized content tailored to the data consumption needs of users in a particular clinical setting allows for variation due to the clinical context of care (i.e. pediatric, ambulatory surgery center) while minimizing information overload. This type of tailoring may improve patient safety by preventing communication breakdowns of specific information critical to a specific domain. Content specifications for interoperability may be cross-mapped with domain-specific, evidence-based care coordination content specifications.

The continuity of care document (CCD) standard is a useful starting point to specify the important types of content for care coordination. However, the CCD was developed based on only outpatient care transitions. My research has extended the CCD categories to include content categories that pertain to inpatient transitions of care that have also been mapped to the HL7 virtual medical record (HL7 vMR) categories.<sup>2-4</sup> Furthermore, the notion of an ad hoc summary like the CCD is simply a reflection of what can be done given existing EHR tools (and standards). EHRs need to move beyond the generation of ad hoc summaries during “episodic transitions” to data summarization and visualization of real-time computable data based context-specific requirements from across domains, setting, and time at the point of care. The source of data should not be used as criteria for inclusion or exclusion into a care coordination summary, rather the type of content should indicate inclusion. The source of data is critical to include as metadata for information display to the user and for provenance. Including/excluding select sources is not consistent with the concept of patient-centered care. It is critical that the same set of content is interoperable across all transitions and curation must ensure that duplicate content does not exist elsewhere in the system. To handle information overload, data should be visualized leveraging temporal and clinical associations and include functionality to “zoom in, zoom out and search” historical data.<sup>9</sup>

2. **Current State:** Siloed care planning concepts across settings *and* domains<sup>5,6</sup>

**Ideal State:** Patient-centered care planning

**Specific Requirements:**

i. **Shared ontological infrastructure for three types of interoperability requirements for linking plan of care concepts**

a. **Linkages between plan of care concepts to reflect the cyclical care delivery process to the end user**

i. **Assess patient’s state**

- ii. Diagnose patient problems
- iii. Decide on patient goals of care
- iv. Plan care
- v. Intervene/act to achieve goals
- vi. Evaluate achievement of goals

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- b. Linking plan of care concepts across settings (e.g., acute care and long-term care)
- c. Linking plan of care concepts across domains (e.g., nursing and medicine)
- ii. Explicit documentation of **personalized patient goals of care** based on a shared understanding of patient state and preferences among all clinicians and the patient/family

A plan of care is a sophisticated platform to share goals, contextual data that informs goal development, and plans to achieve goals. Care coordination tools that fail to explicitly link interdisciplinary care planning and patient preferences will propagate misaligned goals and isolated plans, leading to poor communication and outcomes.<sup>12</sup> Specific requirements for integrating knowledge concepts to support coordination of care will include linking (i.e., associating) care planning documentation concepts within and across domains, settings, and time to reflect the cyclical care planning process. Care planning requires linking concepts that convey the patient's *current clinical state* (i.e., problems, assessments) with *current and planned activities* (i.e., tasks, interventions) for the purpose of achieving *clinical objectives for the future state* of the patient (i.e., goals, preferences) by facilitating *continuous evaluation* of progress toward those objectives (i.e., outcomes). For patient-centered care coordination these care planning linkages are critical within and across disciplines.<sup>12-29</sup> The greatest challenge to incorporating a plan of care for care coordination is incorporating a singular patient-centric plan of care. Most EHR infrastructures do not support linkages among stages of the care process. Many current EHR systems silo problems diagnosed by physicians (medical diagnoses) from problems diagnosed by nurses (nursing diagnoses), nutritionists (nutrition diagnoses), physical therapists (physical therapy diagnoses), clinical social workers (clinical social worker diagnoses) and other healthcare professionals. These information silos lead to redundancy and information overload at best - and misaligned priorities, contradictory plans, delays in care, and unsafe interventions at worst. An ideal system will integrate clinically linked concepts, such as the patient's sign/symptom of "shortness of breath", the medical diagnosis "congestive heart failure" and the nursing diagnosis "impaired gas exchange" and overlapping concepts such as the short and long term common goals of care ("symptom management", "prevent exacerbations", "treat underlying cause"). Explicit linkages between care planning concepts, either established by the user or automatically recommended by the system based on its ontological infrastructure, are necessary for patient-centric care planning tools that promote continuous evaluation and follow-up of current treatment plan(s) and revision of clinical goals.

3) **Current State:** Siloed documentation functionality based on regulatory requirements and discipline-specific preferences<sup>7,9,11</sup>

**Ideal State:** Collaborative documentation that integrates communication tools with structured data to "tell the patients" story

### **Specific Requirements:**

- Collaborative tools that allow clinical user to contextualize, annotate, and link structure data to convey clinical relationships, temporal associations, and clinical interpretations
- Collaborative tools that allow messaging to coordinate and personalize plans and goals in the context of (and with specific linkages to) summaries and visualizations of structured and computable patient data
- Incentives for clinicians and patients to overcome sociotechnical challenges of collaborative documentation tools

Integration of the six types of clinical documentation in table 1 is essential to enhance the user experience by conveying the patient story. A delineation of the types of clinical documentation is useful to understand the breadth of EHR functionality; however, for coordinated care these functions should not be siloed to the user. Unfortunately, the "story of the patient" can be lost as clinicians are increasingly moving away from narrative descriptions into regulatory required checklist and forms-based documentation that provide views siloed by domain, setting, or EHR functionality. Collaborative documentation tools can leverage communication (messaging) tools to contextualize structured data to share and retain knowledge and clinical judgments that informed plans, goals, and decisions for reference by all members of the care team overtime. A nurse I interviewed commented on the lack of contextual information in the EHR about prior patient-care decisions that had been made: "You feel inadequate in the morning when you've had a patient for twelve hours that's in distress and within a half an hour, the

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dayshift comes and it's like the security at nights with a flashlight and the cop with a gun at 7:00 AM. I'll have a migraine trying to fight this [without all the information] for twelve hours."<sup>30</sup>

Yet, collaborative documentation has many challenges. For example, documenting clinicians are not the direct beneficiary of the information and may have differing perceptions of responsibility and rewards.<sup>18</sup> This challenge combined with reliance on verbal communication in the clinical setting, and EHR functionality that is not perceived as clinically useful, may lead to a continuous loop of out of date information.<sup>11</sup> In summary, clinicians may lack common ground (i.e., knowledge gaps regarding the patient's clinical state, goals, and plan) necessary to achieve coordination of care through clinical documentation due to a number of reasons that are driven by underutilization of the EHR. Based on these challenges, incentives to maintain up-to-date collaborative documentation are required.

### **6. Is there a tool, instrument, or artifact that will assist in coordination?**

#### Knowledge Management Tools

Partners Healthcare System leverages a suite of knowledge management tools for standard terminologies, content authoring, and subject matter expert collaborative content curation. Partners Healthcare System is developing a knowledge management infrastructure that will enable development, refinement, reuse and management of standardized, interoperable, and useful clinical content for use in clinical documentation to coordinate care overtime and across domains and settings.

#### Extension to Continuity of Care Document (CCD) Standard for care coordination

My prior work includes extension of the CCD for inpatient transitions of care. The extension of the CCD was based on a literature review of inpatient handoff content for nurses and physicians<sup>2</sup> and was confirmed in an analysis of critical care interdisciplinary handoff artifacts<sup>3</sup> and current (unpublished) work in the acute and critical care setting.

#### Common Goals of Patient Care and Collaborative Tools

My prior work includes a prototype of a collaborative tool for the clinical documentation of Common Goals of Patient Care.<sup>7</sup> This publication explicates clinicians' specific requirements and design principles that may be employed for collaborative documentation of personalized patient goals for care coordination.

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### **References**

1. Coiera, E. When conversation is better than computation. *JAMIA* **7**, 277–86 (2000).
2. Collins, S., Stein, D. M., Vawdrey, D. K., Stetson, P. D. & Bakken, S. Content overlap in nurse and physician handoff artifacts and the potential role of electronic health records: A systematic review. *JBI* (2011).doi:10.1016/j.jbi.2011.01.013
3. Collins, S. *et al.* In Search of Common Ground in Handoff Documentation in an Intensive Care Unit. *AMIA* (2011).
4. Illa, A. *et al.* Mapping HL7 vMR to CCD and Hospital Handoff Codes. *AMIA* [accepted for presentation, publication in press] (2012).
5. Collins, S., Bakken, S., Vawdrey, D. K., Coiera, E. & Currie, L. Model development for EHR interdisciplinary information exchange of ICU common goals. *IJMI* **80**, e141–9 (2011).
6. Collins, S., Bakken, S., Vawdrey, D. K., Coiera, E. & Currie, L. M. Agreement between common goals discussed and documented in the ICU. *JAMIA* **18**, 45–50 (2011).

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7. Collins, S., Bakken, S., Vawdrey, D. K., Coiera, E. & Currie, L. M. Interdisciplinary Computerized Common Patient Goals Tool. *WISH ACM CHI 2010, Atlanta, Georgia* 29–32 (2010).
8. Collins, S. *et al.* Relationship Between Nursing Documentation and Mortality. *CHEST [in press]*, (2011).
9. Collins, S., Fred, M. R., Wilcox, L. & Vawdrey, D. K. Workarounds Used by Nurses to Overcome Design Constraints of Electronic Health Records. *NI2012* 93–97 (2012).
10. Collins, S. & Vawdrey, D. K. “Reading between the lines” of flowsheet data: Nurses’ optional documentation associated with cardiac arrest outcomes. *ANR in press*, (2011).
11. Collins, S., Bakken, S., Vawdrey, D. K., Coiera, E. & Currie, L. M. Discuss now , document Later : CIS/CPOE Perceived to be a “ Shift Behind ” in the ICU. *Medinfo 2010* 178–182 (2010).doi:10.3233/978-1-60750-588-4-178
12. Dykes, P. C. *et al.* Leveraging standards to support patient-centric interdisciplinary plans of care. *AMIA Annual Symposium Proceedings 2011*, 356–63 (2011).
13. Müller-Staub, M., Needham, I., Odenbreit, M., Lavin, M. A. & Van Achterberg, T. Implementing nursing diagnostics effectively: cluster randomized trial. *Journal of advanced nursing* **63**, 291–301 (2008).
14. Wang, N., Hailey, D. & Yu, P. Quality of nursing documentation and approaches to its evaluation: a mixed-method systematic review. *Journal of Advanced Nursing* **67**, 1858–75 (2011).
15. Darmer, M. R. *et al.* The effect of a VIPS implementation programme on nurses’ knowledge and attitudes towards documentation. *Scandinavian journal of caring sciences* **18**, 325–32 (2004).
16. Campbell, J. Strategies for Problem List Implementation in a Complex Clinical Enterprise. *AMIA Annual Symposium Proceedings* 285–289 (1998).
17. Keenan, G. M., Yakel, E., Tschannen, D. & Mandeville, M. Documentation and the Nurse Care Planning Process. *Patient Safety and Quality: An Evidence-Based Handbook for Nurses* 175–206 (2008).
18. Zhou, X., Zheng, K., Ackerman, M. S. & Hanauer, D. Cooperative Documentation : The Patient Problem List as a Nexus in Electronic Health Records. *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work (CSCW '12), February 11-15, 2012, Seattle, WA* 911–920 (2012).
19. Stein, D. M., Vawdrey, D. K., Stetson, P. D. & Bakken, S. An analysis of team checklists in physician signout notes. *AMIA Annual Symposium Proceedings* 767–71 (2010).
20. Bayegan, E. & Tu, S. The helpful patient record system: problem oriented and knowledge based. *Proceedings of AMIA Annual Symposium* 36–40 (2002).
21. Jao, C., Hier, D., Galanter, W. & Valenta, A. Assessing physician comprehension of and attitudes toward problem list documentation. *AMIA Annual Symposium proceedings* **20**, 990 (2008).
22. Poissant, L., Taylor, L., Huang, A. & Tamblyn, R. Assessing the accuracy of an inter-institutional automated patient-specific health problem list. *BMC medical informatics and decision making* **10**, 10 (2010).
23. Prophet, C. M., Drive, H. & City, I. The Patient Problem / Nursing Diagnosis Form : A Computer-Generated Chart Document. *Proc Annu Symp Comput Appl Med Care* 326–30. (1993).
24. Miller, J. & Driscoll, C. Management of Prenatal Care Information: Integration of the Problem List and Clinical Comments. *Top Health Inform Manage* **24**, 42–49 (2003).
25. Okuhara, Y. *et al.* New approach to the medical information system for quality management in patient care: development of Problem Mapping System. *Journal of medical systems* **23**, 377–87 (1999).
26. Linnarsson, R. & Nordgren, K. A Shared Computer-Based Problem-Oriented Patient Record for the Primary Care Team. *Medinfo 1995* 1663 (1995).
27. Stitt, F. W. The Problem-Oriented Medical Synopsis: a patient-centered clinical information system. *Proc Annu Symp Comput Appl Med Care* 88–92 (1993).
28. AHIMA Problem Lists in Health Records: Ownership, Standardization, and Accountability. *Journal of AHIMA* 1–12 (2012).
29. AHIMA Best Practices for Problem Lists in an EHR Work Group. Best Practices for Problem Lists in an EHR. *Journal of AHIMA* **79**, 73–77 (2008).



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30. Collins, S. Informatics Methods to Understand Interdisciplinary Communication Related to Common Goals in the Intensive Care Unit. (2009).