Zynx Health Decision Support for Advanced Nursing Practice

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Executive Summary

A multi-state, non-profit healthcare organization with 14 hospitals recently implemented an integrated health information system (HIS) with an electronic medical record incorporating provider order entry and nursing documentation. To facilitate one of the organization’s objectives, i.e., to provide evidence-based care for every patient, the enterprise incorporated a clinical decision support system (DSS), Zynx Health. Zynx Health provides recommended sources of context specific information made available at the point-of-care. The components of the system include ZynxCare® for designing nursing care plans, ZynxOrders® for creating order sets, and ZynxEvidence®, a repository of best practices prescribed for a myriad of clinical conditions and procedures, offering direct links to the evidence (PDFs, web URLs, PubMed citations/abstracts), and an evidence table that defines the hierarchical class of evidence for each individual reference. Zynx Health also provides support rules that trigger action statements within the clinical information system. Within the medical record program, the supporting evidence-based material is cited, and often directly linked.

Zynx Health provides templates for the order sets and care plans, created by their subject specialists, and based upon a comprehensive repository of evidence. The individual enterprise will customize the template to produce their own unique order sets and care plans. Apparently, few frontline healthcare workers in the organization use the wealth of evidence-based material available in the repository. Though healthcare professionals in the enterprise have access to the repository of evidence, it does not appear that nurses, in positions to do so, are promoting the use of Zynx as a source of information for decision making. It is recommended that each nurse manager, each
clinical practice council member, and each nursing education and research council member be asked to promote the use of Zynx Health as a source of evidence-based information. Zynx Health is a decision support tool that should be referred to frequently, at point of care, in an effort to drive clinical improvement at the point-of-care.
Abstract

Zynx Health is a proprietary clinical decision support system. The non-profit healthcare system has recently implemented an integrated information system and incorporated the Zynx Health system as its source of evidence-based clinical information. A subsidiary of Hearst Corporation, Zynx Health has partnered with evidence-based resource providers, e.g., global leaders of medical information, pharmaceutical information, and nursing information, to create a repository of healthcare reference content. Using these types of high quality data, Zynx Health has produced a decision support system application that is embedded in the healthcare system’s electronic health record program. The purpose of this paper is to describe how this decision support system is used to narrow the knowledge gap in the clinical setting, by providing current, high level, evidence-based literature at point-of-care in order to provide the level of care defined by the Institute of Medicine’s definition of quality.
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A classic definition of a clinical decision support system is a system “providing clinicians or patients with computer generated clinical knowledge and patient related information, intelligently filtered or presented at appropriate times to enhance patient care” (Fox et al., 2010, p. 832). Among basic underpinnings of such a system should be evidence-based cognitive resources. Zynx Health, a subsidiary of Hearst Corporation, is a leader in providing such evidence-based clinical decision support systems. Zynx supports decision making, “a process of choosing among two or more alternative courses of action” (Turban, Sharda, & Delen, 2011, p. 41); it does not make decisions.

Evidence-based decision support systems “reduce medical errors and to increase healthcare quality and efficiency” (Berlin, Sorani, & Sim, 2006, p. 656); they narrow the knowledge gaps between “what we know and what we do” and improve patient outcomes through actual practice change (Liu, Wyatt, & Altman, 2006, p. 2). This discrepancy in the availability of evidence-based decision support materials and their accessibility was a problem. It was the difference between a perceived condition (knowledge was available but inaccessible) and a desired condition (knowledge retrievable in a timely, efficient manner). Bakken et al. state that “efforts to facilitate application of evidence into nursing practice are unlikely to be successful unless the approaches used are integrated into the clinical workflow” (2008, p. 413). This particular DSS was chosen as a third party content supplier to solve the problem because of its stellar reputation and the fact that EPIC, the vendor for their system, endorsed the compatibility of Zynx Health (http://www.zynxhealth.com/).
DSS Description

In a computerized healthcare information system, such a decision support system (DSS) can be composed of “a database management subsystem, a model management subsystem, a user interface subsystem, and a knowledge-based management subsystem” (Turban et al., 2011, p. 85). Zynx does incorporate the three basic components of a DSS, but does not incorporate the optional knowledge-based management subsystem. With Zynx, the web-based DSS is designed for single users on their own desktop or mobile device. It is built on client-server architecture, where the proprietary database server is accessed through the organization’s web server with the use of a graphical user interface (GUI). It uses software as a service (SaaS). Zynx is a document-driven DSS. Document driven DSS “essentially include all DSS that are text based” (Turban et al., 2011, p. 80). The main function of Zynx is text-driven, personal, decision support; it is neither data-driven nor knowledge-driven, as in automated decision making (Turban et al., 2011, p. 80).

The database management subsystem (DBMS) is software that connects with the repository of data (consisting of the evidence-based materials). The model management subsystem could be described as a one that catalogs, maintains, and integrates the data. The user interface subsystem is the GUI provided by Microsoft Windows.

In October 2010, a proprietary health information system (HIS) was implemented for a multi-state, fourteen-hospital, non-profit healthcare organization, with numerous outpatient facilities, and approximately 8,000 registered nurses in the system. The organization purchased their system from EPIC. The EPIC software provided one database that could integrate an inpatient electronic medical record (EMR), hospital
billing and accounting (including admission, discharge, and transfer), and an ambulatory practice EMR. Different types of decision support tools were integrated within the HIS; for instance, EPIC provides reporting and revenue cycle support tools, among others. The clinical decision support tools included patient-specific alerts and reminders based on algorithms and rules, and information retrieval based on search engines and navigation. These are considered “‘point-of-care’… relatively simple functions” of a DSS (Fox et al., 2010, p. 832). The organization, though, wanted a DSS that could facilitate narrowing the knowledge gap in a clinical setting.

Zynx Health (http://www.zynxhealth.com/) is “the market leader in providing evidence-based and experience-based clinical decision support solutions proven to measurably improve the quality, safety, and efficiency of patient care” (ZynxHealth, 2011a, “Company” section). It is a DSS which provides recommended sources of context specific information, “point-of-care content” for improved patient outcomes (Zynx, 2009, para. 1). Reportedly, Zynx Health evidence-based tools have influenced “the care of more than 50% of patients who are discharged from US hospitals” (Elsevier, 2009, “About Zynx Health” section). The healthcare enterprise has a goal of “enabling a level of care falling within the Institute of Medicine’s definition of quality, “safe, timely, efficient, effective, patient-centered, and equitable” (“Celebrating”, 2011, para. 2). In a competitive healthcare market and with a magnet-oriented nursing environment, such a DSS was a priority purchase.

**Functional Components and Structures of the DSS**

There are three main components of the system: ZynxCare® for designing nursing care plans; ZynxOrders® for creating order sets; ZynxEvidence® for best
practices prescribed for a myriad of clinical conditions and procedures, offering references and links to the prescribed evidence. The links to the evidence are PDFs, web URLs, PubMed citations/abstracts, and an “evidence table”. The “preferred source of evidence-based medical reference” content for Zynx is Elsevier, a global leader in scientific literature (Zynx Health, 2009, para. 6). ZynxEvidence also has a “forecasting functionality” with “easy-to-use custom input and calculation tools” to monitor quality improvement needs and initiatives (Zynxhealth, 2011b, “Support” section).

Thus, within Zynx Health, customized order sets can be created for either inpatients or outpatients, and inpatient care plans can be generated. Providers can access an online library of “specific interventions that enable compliance with quality measures, major regulatory initiatives, and accreditation programs. These sources include the Centers for Medicare & Medicaid Services, The Joint Commission, the American Nurses Credentialing Center (ANCC) Magnet Recognition Program®, the National Quality Forum (NQF), the Institute for Healthcare Improvement, and the American Nurses Association National Database of Nursing Quality Indicators” (Zynxhealth, 2011c, Improved Compliance section).

In ZynxOrder®, there are modules for both clinical conditions or procedures, and for each module there are rules (a collection of topic-specific resources that provide the evidence), order sets (created by specialists and offered as templates to be customized), and general information, including a definition of the scope of the condition or procedure, with a list of reminders for the provider. For instance, for bariatric surgery, the reminders include beta-blockers, DVT prophylaxis, and warming techniques (Zynxhealth, 2011d). Each reminder is provided with links to evidence-based documentation upon which the
reminder was established. Zynx Health’s Evidence Monitor is updated with interdisciplinary evidence or medical evidence at 3 months intervals. There are thousands of articles covering hundreds of conditions, and the evidence is often at hand with the click of an “infobutton” (e.g., a Web page or a PDF).

**How the DSS Supports Advanced Nursing Practice Decision Making**

For nursing, the objective of the DSS is to improve patient outcomes. This can be accomplished by providing a platform that integrates the nursing care plan with access to evidence-based interdisciplinary materials at point-of-care. Key decisions to be supported by the functions of the DSS are “information management, focusing attention, and patient-specific consultation” (Bakken et al., 2008, p. 413).

Zynx links evidence-based content to different items in the care plan. For instance, on the care plan for “Bariatric Surgery – Postoperative”, under the category titled "Deep Vein Thrombosis - Risk of", there is a subcategory of "Treatment and Procedures. The first entry for this category is "Graduated anti-embolic stocking application". Next to that entry is an icon, either citing or directly linking to the "evidence" from either a national organization's performance measures (like CMS) or a meta-analysis or systematic review.

Zynx also produces preoperative templates. For instance, in the care plan for "Bariatric Surgery - Hospital Preoperative", under “Interventions”, the DVT related entry includes “Perioperative DVT prophylaxis should be used. The options include LDUH, an LMWH, a factor Xa inhibitor, combined with IPC or graduated compression stockings”. Next to this intervention statement is a link citing or providing the “evidence”. In Zynx, under the scope notes for each condition or procedure, a publication date is provided,
assuring the end-user of the currency of the information. The scope note also provides the date of last review and the date of last major update.

**Agency Utilization of DSS**

The enterprise has completely utilized the ZynxOrder® and ZynxCare® components. Their EMR is based on these software applications. There are numerous outpatient primary care and specialty practices within the system that share the EMR program, and the embedded decision support system. Any healthcare organization desiring to participate in the Medicare and Medicaid EHR Incentive Program would benefit from this DSS, as established by the American Recovery and Reinvestment Act of 2009. Measure 10 on that list of core objectives is “Implement one clinical decision support rule related to a high priority hospital condition along with the ability to track compliance with that rule” (Centers, 2010). The Zynx Health DSS can do this.

The decision to embed a decision support system (DSS) into the electronic health record (EHR) program was made by a Computerized Provider Order Entry Clinical Leadership Team (CPOE-CLT) (Denmark, 2011, Construct section, para. 1). Key decision makers involved in the choice of a decision support system typically include the stakeholders: the chief medical officer (CMO), the vice president/chief nursing officer (CN)), the chief information officer (CIO), IT project leader, nurse informaticist, the decision support analysts, system librarian, and invested medical and nursing practitioners, as well as the Chief executive officer (CEO). This enterprise does not have a chief knowledge officer. The CIO is responsible for all HIS applications, including aligning the decision support system to the enterprise’s strategic goal, i.e., to achieve evidence-based care for all patients. The CMO and CNO were the primary conduit
through which the need was vocalized, but the CIO is responsible for integrating these
types of needs with the enterprise’s business goals (Tan & Payton, 2010, p. 38).

There are no known communication problems with Zynx Health and the
enterprise HIS. The GUI is efficient, and consistent. Because it is a document-driven
database, data (evidence) organization is a primary concern, but there does not seem to be
any complaints with the format that Zynx Health offers for retrieving the evidence, i.e.,
data extraction (Turban et al., 2011, p. 92). The query facility returns results in an
acceptable time, and the data directory (the catalog) is up to date (Turban et al., 2011, p.
93). Data quality is the hallmark of Zynx, with its primary evidence-based sources. Data
integration is left to the end user: the system is not a decision-making system. Scalability
appears to be under control, as older references are removed when newer evidence is
published and accessed. Zynx Health is, for the enterprise, ID and password protected:
one must be on the intranet before the DSS can be accessed. Document-driven, the DSS
data does not require encryption.

Few frontline healthcare workers actually see or use the wealth of
evidence-based material available in the repository. Though healthcare professionals in
the enterprise have access to the repository of evidence, it does not appear that nurses in
positions to do so are promoting the use of Zynx as a source of information for decision
making. It is recommended that each nurse manager, each clinical practice council
member, and each nursing education and research council member be asked to promote
the use of Zynx Health as a source of evidence-based information, a decision support tool
that should be referred to frequently, at point of care, in an effort to drive clinical
improvement at the point-of-care. The caveat to this recommendation, however, is that
management must create time, within the workflow, to “mine” the decision support
system so that it becomes an efficient, effective source of knowledge.

**DSS Product Use**

The data sources for Zynx Health is the evidence-based literature found in
journals, on the Web, and in the white papers of professional healthcare associations and
reports as published by agencies working with quality measures, major regulatory
initiatives, and accreditation programs listed on page 8 of this paper. Concerning the
identified problem, i.e., a discrepancy in the availability of evidence-based decision
support materials and their accessibility, the information requirements for decision
making with Zynx Health consisted of embedding the evidence in the EHR, at the point-of-care.

For instance, the patient has had bariatric surgery. The order set that an advanced
practice nurse would use is labeled “Bariatric, Postoperative”. On the order set are scores
of options that can be selected. One of these options is a category “Respiratory”. There
are links to “Evidence” for several of the following choices. One choice is “Biphasic
positive airway pressure (BIPAP). Next to those words on the screen is an icon leads
directly to a clinical reminder, a rationale for the reminder, and five references to journal
articles with classification labels as to what level of evidence the article represents.

In Zynx Health, data (the evidence) is captured when their subject specialists
employ data mining in the literature. When new material or updates for a subject are
located, they are stored in the repository (the database management system). Processing
the evidence document would include cataloging it and applying standardized keywords
for queries. The query facility takes the request (the query), consults the directory, “pulls
recommendations” (Berlin et al., 2006, p. 661) and communicates the results to the end user’s computer screen. The familiar GUI in Internet Explorer facilitates engagement of the end user, with both the query and the query results. Usage reporting in Zynx Health is done through organizational requests run on the proprietary DSS’s web server.

Availability of the DSS to every employee in the organization is assured through two separate portals on the opening page of the healthcare organization’s eLibrary Web page. One portal is a dropdown list placed under the “Quick Resources” tab; the second eLibrary portal is an icon, included in a section of several other icons for other evidence-based resources in the library’s electronic collection. Zynx Health DSS is embedded in the EHR software. This document-driven system communicates only with the institution’s eLibrary, where access to journals (through the library’s subscriptions) is controlled by the institutional IP address range). Otherwise, there is no communication with other systems within the institution.

In conclusion, Zynx Health, as a DSS integrated within the EHR of the organization, enables evidence-based nursing practice, through “real-time, point-of-care access to a virtual library… of quality filtered sources” (Pochciol & Warren, 2009, p. 318). The Zynx Health DSS can bridge the knowledge gap between what nurses know and what they do by providing the most current evidence-based material upon which patient care should be based. Zynx Health DSS for nursing can have a substantial impact on improving patient outcomes.
References


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