Original JAMIA Investigations

Research Paper ■

Preparation and Use of Preconstructed Orders, Order Sets, and Order Menus in a Computerized Provider Order Entry System

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Abstract **Objective:** To describe the configuration and use of the computerized provider order entry (CPOE) system used for inpatient and outpatient care at the authors' facility.

Design: Description of order configuration entities, use patterns, and configuration changes in a production CPOE system.

Measurements: The authors extracted and analyzed the content of order configuration entities (order dialogs, preconfigured [quick] orders, order sets, and order menus) and determined the number of orders entered in their production order entry system over the previous three years. The authors measured use of these order configuration entities over a six-month period. They repeated the extract two years later to measure changes in these entities.

Results: CPOE system configuration, conducted before and after first production use, consisted of preparing 667 order dialogs, 5,982 preconfigured (quick) orders, and 513 order sets organized in 703 order menus for particular contexts, such as admission for a particular diagnosis. Fifty percent of the order dialogs, 57% of the quick orders, and 13% of the order sets were used within a six-month period. Over the subsequent two years, the volume of order configuration entities increased by 26%.

Conclusions: These order configuration steps were time-consuming, but the authors believe they were important to increase the ordering speed and acceptability of the order entry software. Lessons learned in the process of configuring the CPOE ordering system are given. Better understanding of ordering patterns may make order configuration more efficient because many of the order configuration entities that were created were not used by clinicians.

■ **J Am Med Inform Assoc.** 2003;10:322–329. DOI 10.1197/jamia.M1090.

Computerized provider order entry (CPOE) systems have received increased attention in the professional[1] and general[2,3] literature over the last several years, in part, because of their potential to help reduce medical errors,[4] improve care quality,[5] and reduce costs.[6] The Institute of Medicine report on medical errors has also drawn attention to CPOE systems as a means of reducing errors.[7] However, installing CPOE systems is difficult, in part, because they require changes in provider workflow and may increase the time physicians spend on orders.[8,9] Ordering through a computer may require either that a valid order be constructed using dialog boxes or that a preconstructed order be selected from a list of valid choices. This is a dramatic change from paper ordering processes that are familiar to

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The authors thank the Clinical Application Coordinators of VA Puget Sound Health Care System, who devoted untold hours to configuring CPRS in support of its users. The authors gratefully acknowledge the hard work of the entire VA CPRS development team. The authors also thank Carl Dvorak (Epic Systems Corporation), Joe Ketcherside, MD (formerly Cerner Corporation, now TheraDoc), Malcolm Gleser, MD (IDX Corporation), and Don Rucker, MD, MBA (Siemens Medical Systems), for their comments. The authors appreciate the efforts and editorial assistance of the *JAMIA* reviewers and editors.

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Received for publication: 02/08/02; accepted for publication: 03/07/03.

most clinicians. The efficiency with which providers can place orders determines the speed of the ordering process, which, in turn, may be important to their satisfaction with and acceptance of automated order entry systems.[9–11]

Organizations wishing to take advantage of the potential of CPOE to improve care quality, reduce errors, and control costs will need to purchase (or develop), install, and configure software. Order configuration begins with creating basic order entry capabilities for various domains such as medications, imaging, and laboratory. Preconfigured orders and order sets can be created to aggregate basic orders to support protocols, pathways, and other needs, and then decision support systems such as prompts and reminders can be developed. For all three steps, the organization will have to be able to configure the system to meet its needs. The purposes of this article are to describe the configuration of ordering software used in the Computerized Patient Record System (CPRS) at Veterans Affairs Puget Sound Health Care System (VA Puget Sound); to report how frequently preconfigured orders, order sets, and order dialogs were used and how the collection of order entities changed over time; and to present lessons learned that may be of value to organizations planning to install CPOE systems.

Materials and Methods

Background

The work described in this report was conducted at VA Puget Sound in western Washington State. VA Puget Sound consists of two medical centers with more than 500,000 outpatient visits and more than 10,000 inpatient discharges annually. The combined medical centers have 536 beds, of which 315 are for acute care. The Seattle Division, where 485 residents and many medical students train each year, is a major teaching hospital of the University of Washington.

Between 1997 and October 1999, we installed CPRS in wards and clinics of VA Puget Sound.[10,12] Since October 1999, CPRS has been used to enter nearly all orders in all inpatient units except the Bone Marrow Transplant Unit. Entered orders include those for medications, intravenous fluids, admission/discharge/transfer orders, nursing orders, laboratory and imaging studies, and all others, except for cancer chemotherapeutic agents, total parenteral nutrition, and do not resuscitate orders. Of the up to 12,000 orders (all types) entered on VA Puget Sound wards and clinics each weekday, roughly two thirds are entered into CPRS directly by the ordering provider. The VA uses a utility program (Patch OR*3*107) to measure the per-facility percentage of medication orders entered directly by the ordering provider. By this measure, providers at VA Puget Sound directly entered 90% of inpatient medication orders, 76% of outpatient medications orders, and 83% overall medication orders. The current VA national average for all medication orders is 89.8%.

CPRS is a layer of software augmenting VISTA, an integrated system of applications that share a common database. All VA medical centers use VISTA, which includes functionality to support the needs of pharmacy, laboratory, admission/discharge/transfer, and other departments. Throughout the VA system, VISTA has been adapted and used continuously for more than a decade.[13] CPRS provides a single record for patient care and is used in the inpatient, outpatient, long-term care, and home settings.

Configuration of CPRS Order Entry Software

Clinicians enter orders into CPRS through one of three basic mechanisms (order dialogs, quick orders, and order sets), which they select from a fourth preconfigured entity, the order menu.[12] An *order dialog* screen can be selected to prepare a single order by completing the appropriate fields using selection windows or entering narrative text. This method gives the most flexibility but requires the most time, because several fields must be completed. Custom order dialogs can be created for specialized needs, such as blood product ordering.

Some orders are preconstructed as *quick orders* that can then be selected with a mouse click for submission or editing. In a quick order, some or all of the order dialog box fields have predefined, default values, saving the provider the time to fill them in manually. The provider only reviews, (possibly) minimally edits, and signs the quick order. Users can create simple quick orders themselves. *Order sets* are quick orders linked in sequences that can be invoked to generate many orders quickly (Table 1). When an order set is launched, all

Table 1 ■ Examples of Order Menus and Order Sets

Surgery Standing Orders (menu)
Anesthesia orders (menu)
Cardiac surgery orders (menu)
Cardiac surgery preop orders (order set)
Admit to SICU Postop orders (order set)
Admit to SICU (quick order)
Mechanical ventilation—initial (quick order)
Cardiac rehab consult (quick order)
Extubation protocol/continuous vent/early Extubation (quick order)
Pacing wires/pacer settings (quick order)
Chest tube/Blake drain (quick order)
Chest tube suction (quick order)
If MAP > [ ] mm Hg... (order set)
If MAP > __mm Hg start nitroprusside drip (quick order)
Nitroprusside 20 mg/50 mL normal saline syringe (quick order)
Nitroglycerin 50 mg/50 mL D_5W syringe (quick order)
Dopamine 400 mg/50 mL normal saline syringe (quick order)
Phenylephrine 25 mg/250 mL NS (quick order)
Epinephrine 8 mg/50 mL normal saline syringe (quick order)
Vasoactive carrier solution (menu)
⋮
General Surgery Orders (menu)
Gynecology Orders (menu)

NOTE. This table shows a small sample of the hierarchy of order menus, showing nesting of order menus (labeled "menu" in this table), each of which contains order sets and quick orders. An example of how an order menu would appear to users is shown in Figure 1. SICU = surgical intensive care unit; MAP = mean arterial pressure; D_5W = 5% dextrose in water; NS = normal saline.

of its components are selected and prepared for signature. Unless the user clicks on the "Stop order set" button while the order set is being run, one cannot select only some of the order set components. After order set completion, individual orders can be deleted or edited from the queue of orders awaiting signature. This is the fastest way to enter orders, because by invoking an order set, a large number of orders can be prepared rapidly for review and signature.

Clinicians select the individual regular (dialog-style) orders, quick orders, or order sets from *order menu* screens created for specific clinical purposes. On an order menu, order set names are not visually distinguishable from quick orders, unless the name of the order set actually includes the phrase "order set." Order menus may be arranged in a hierarchy (Table 1). In the example in Figure 1, a quick order for a chest x-ray was selected from an order menu, and the pop-up dialog with preset chest x-ray field values is shown for user review (and possible editing). Usually, order menus provide a clinical problem-based orientation to a collection of orders. Order menus can be used also to group orders according to: the service that should receive the orders (e.g., IV team, ward staff, or laboratory for collection of specimen); the location of care (e.g., American Lake or Seattle campus); or when a laboratory test should be drawn in a clinic ("lab for today," "lab in one month," "lab in 3 months"). Order menus can be used to select rapidly many quick orders; the user holds down the control key as each quick order is selected by mouse clicks. When the control key is released, all quick orders that were selected from the menu appear as a group at once. In this way, order menus can be used to create a series of orders almost as quickly as through use of an order set.

Gathering and Implementing Content for Order Configuration

In the course of preparing for and supporting the CPRS implementation at VA Puget Sound, thousands of "order configuration entities" (we use this term to refer to order dialogs, quick orders, order sets, and order menus) were prepared over a three-year period. Preparing a quick order

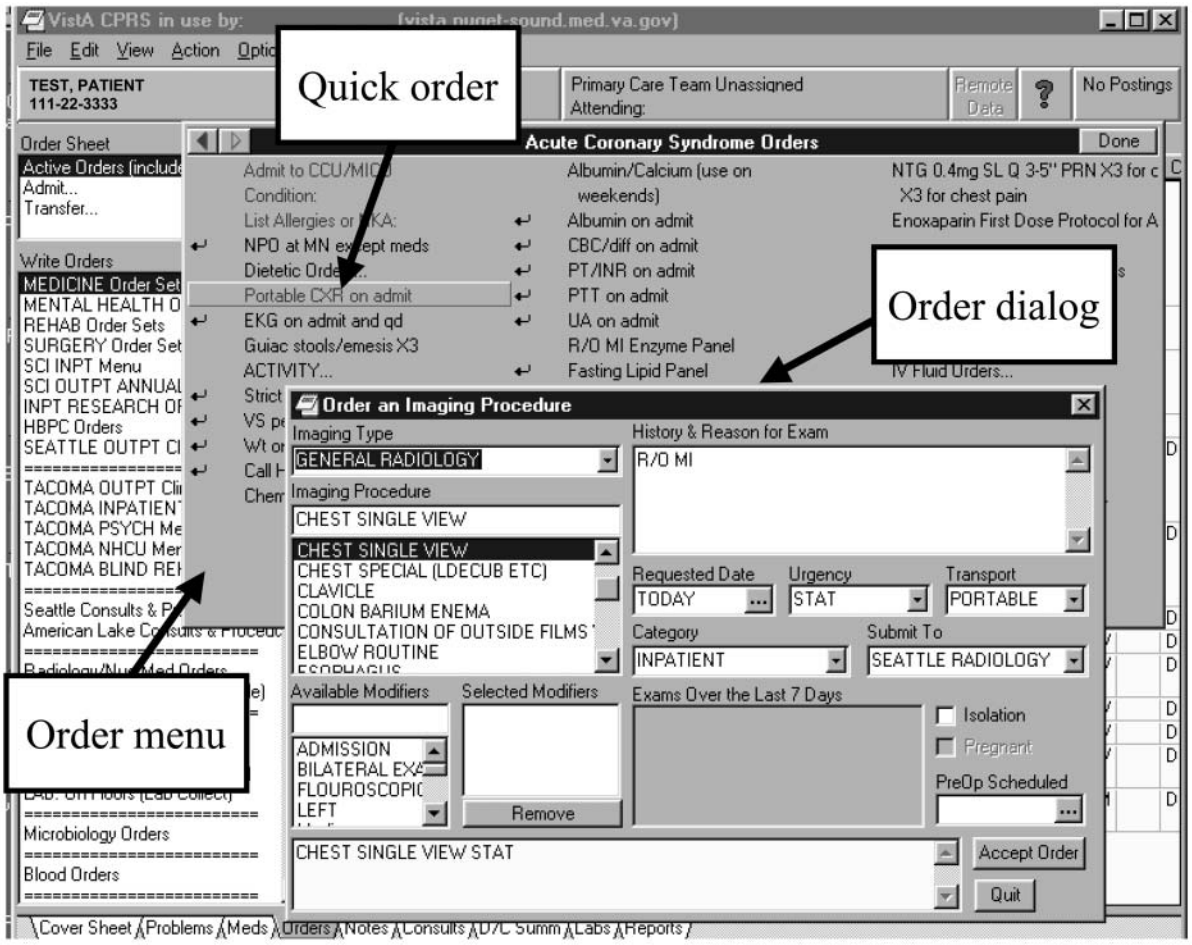

Figure 1. Screen from the Computerized Patient Record System (CPRS) showing an order dialog, a quick order, and an order menu containing a list of quick orders. In this example, the user has selected the "Acute Coronary Syndrome Orders" *order menu* from the "Medicine Order Sets Menu" (*now hidden*) to use in writing orders for a patient in the coronary care unit (CCU) with acute coronary syndrome. From the "Acute Coronary Syndrome Orders" order menu, the *quick order* for a portable chest x-ray was selected, generating the precompleted *order dialog* for an imaging order. A blue font (which cannot be seen here but shows up on the actual screen) indicates that quick orders have been previously selected from that menu.

requires at least several minutes; preparing a screen containing multiple quick orders or an order set may require several hours (including the time required to review the order collection with the clinical content expert, and to test it).

Order configuration was performed by Clinical Application Coordinators (CACs), the CPRS support staff who also trained and supported users and assisted clinical units with the transition from paper to electronic processes. At the beginning of the VA Puget Sound CPRS project, there were 12 CACs. The majority of the order configuration tasks were undertaken by three of the CACs. Effort required by subject matter experts who guided the creation of order sets and order menus was greatest at the beginning of the project. Because the work was distributed over a large number of clinicians and medical center staff, the impact on individual experts was not large.

We created this collection of order configuration entities using several methods (Fig. 2). We started by collecting preprinted paper orders from clinical units throughout VA Puget Sound. These preprinted orders included collections of orders for postoperative care following particular procedures, orders for admission to the coronary care unit for evaluation of chest pain, and many others. We then solicited ideas for useful order configuration entities from physicians, nurses, physical therapists, respiratory therapists, pharmacists, dieticians, and many other individuals responsible for entering or receiving orders. We asked clinicians with expertise in clinical domains to assume responsibility for editing order sets that are used commonly in their area of expertise, for example, the coronary care unit, or for patients with cellulitis or pneumonia. The leaders of clinical departments were asked by the project steering committee to oversee this process.

Data Used in This Study

For this study, we used a reporting utility (VA File Manager) to create a delimited file containing one record for every CPRS order configuration entity used in the production version of CPRS at VA Puget Sound.* Each record contains the entity name, identifier, display name, entity type (quick order, order menu), name space (location within the VISTA database hierarchy), and other fields, and represents a single order configuration step. Some of these quick orders, order menus, and order sets are used commonly every day, whereas others are rarely or never used but are available if they are selected. This extract represents the configuration as it existed on January 13, 2000. Because order configuration entities are added and edited continuously to suit the needs of the active medical center, this sample is representative but is not identical to the order configuration as it exists today. To determine how the number and type of order configuration changed over two years, a similar extract was obtained on January 25, 2002, and the results were compared.

*Contact primary author for a copy of this file and a collection of order menus and order sets.

To determine how frequently the order configuration entities were used, we also extracted a file containing the name of the order configuration entity used in entering each order in the six months between January 13, 2000, and July 12, 2000. This file also allowed us to measure the frequency with which users created "personal quick orders." The file did not allow measurement of the use of order menus, only the order entities used on those menus. To determine the number of orders submitted to each filing service, we used VA File Manager to extract a listing of the date, time, and service type of all orders entered into CPRS between September 1997 and July 2000.

No data obtained in this analysis included any field that could be used to identify an individual patient or provider.

Results

Number of Order Configuration Entities

The order configuration extract obtained in 2000 contained 8,079 entries. The distribution of the types of order configuration entities is shown in Figure 3. Nearly two thirds of these entities—5,982—were quick orders that appeared to users on order menus from which quick orders and order sets were selected. To manage this large collection, 703 ordering menus were created. The menus were organized in a hierarchy varying in depth from one to six levels. Order sets comprised a smaller number of the configuration entities. (We created fewer order sets because users preferred to use order menus as described in the Materials and Methods section of this article under "Configuration of CPRS Order Entry Software.") Users created 93 personal quick orders.

Why did we have so many quick orders, order sets, and menus? We created the quick orders to populate menus, which gather together preconfigured orders for convenience. Each menu contained as many as 50 quick orders. We also had separate quick orders for different styles of ordering medications, laboratory studies, and other services. For example, we had a separate order menu containing dozens of frequently ordered inpatient laboratory tests for "collection by ward staff" and a similar screen for "collection by lab staff," and so on. We had separate consult screens, for example, to order urology consults for hematuria and for prostatic hypertrophy. These screens differed because they contained specific instructions (that the urology section requested) for the ordering clinicians at the time they initiated the consult. Of note, informal feedback indicates that the more complex the consult hierarchy for a given service and the more prerequisites required by that service, the less helpful the requesting user found it to be. We tried to balance ease of order entry with ensuring that the consult service obtains the information necessary to process the request efficiently.

Table 2 shows how order configuration entities were divided among the order filling services to which CPRS orders are transmitted. It shows that the majority of the configuration effort was directed toward orders and order

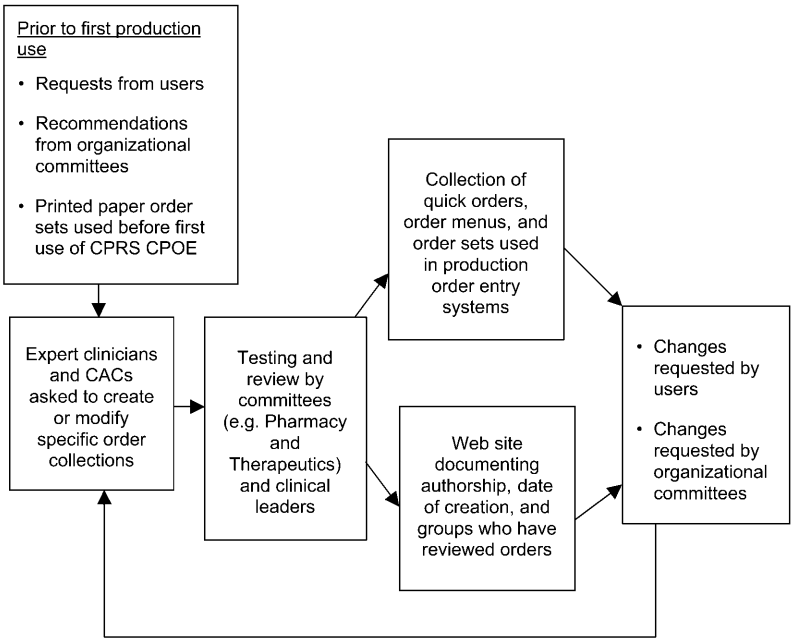

Figure 2. Process for initial creation and ongoing maintenance of collection of preconfigured orders, order menus, and order sets used in the Computerized Patient Record System (CPRS) at VA Puget Sound. CACs = Clinical Application Coordinators. These are individuals who configure CPRS software and train and support clinical users. CPOE = Computerized Provider Order Entry.

dialogs intended for three filling services: laboratory, pharmacy, and nursing staff. The latter category includes orders to be filled on a nursing unit, for vital signs monitoring, activity, wound changes, and dressing changes, for example. Most of the order configuration for medication orders was directed toward inpatient care.

Frequency of Use of Order Configuration Entities

Just over half of the order configuration entities were used at least once during a six-month period, and many were used hundreds or thousands of times (Table 3). Of the 5,298 quick orders, 57% were used at least once, 1,190 (22%) were used between ten and 99 times, and 84 (2%) were used between 1,000 and 9,999 times. (These figures include quick orders individually selected from order menus and those included in order sets.) The ten most commonly used quick orders were for ordering laboratory tests and panels for the same day. These quick orders reduced the task of specifying the required fields for a laboratory test (e.g., chemistry panel, to be collected by ward staff, immediately) to a single mouse click. The most frequently used order sets were short—comprising less than five linked quick orders—and were used to order collections of tests that frequently were ordered together. For example, one of these order sets was used in the surgical intensive care unit to order daily laboratory tests for critically ill patients. Clinicians used quick orders and order sets to prepare orders for all filling services: laboratory, pharmacy, imaging, consults, and nursing orders.

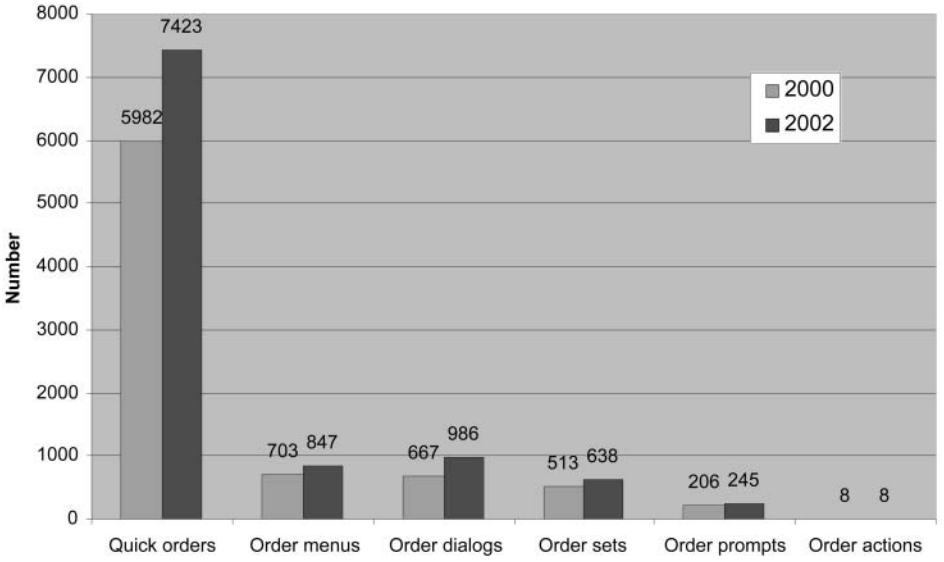

Figure 3. Number of order configuration entities in VA Puget Sound Computerized Patient Record System (CPRS) production system in 2000 and 2002. See text for a definition of quick orders, ordering menus, order dialogs, and order sets. Order actions are admission, discharge, and other system actions. Order prompts are labels for data entry fields on order dialogs.

Table 2 ■ Number of Order Configuration Entities for Each Filling Service

Order Entity (Namespace*)	Number	
Laboratory (LR)	1,852	
Medications (PS)	1,842	
Inpatient (PSJQ)		1,185
Outpatient (PSOQ)		657
Consults and procedures	551	
Consult orders (GMRCT)		483
Procedure orders		66
Generic consult orders		2
Radiology (RA)	338	
Dietary (FH)	85	
Nursing (OR GX)	1,747	
Other (various)	480	

*Namespace refers to the location within the VISTA database.

Distribution of Orders by Service

The services to which orders were submitted between September 1997 and July 2000 are shown in Table 4. Laboratory and medication orders were by far the most common types of orders entered. Outpatient medication orders, which include both new prescriptions and refills, were entered more commonly than inpatient medication orders. The largest number of order configuration entities were created for medication and laboratory order entry; not surprisingly, the greatest number of orders generated were directed to these services.

Change in Order Configuration Entities

Figure 3 shows how the number of order configuration entities changed between 2000 and 2002. The total number of order configuration entities increased by 26%, from 8,079 to 10,147. The increase was distributed across most of the types of entities except for actions. Faulty order configuration entities were corrected; unused ones were not deleted.

Discussion

Goals for a CPOE systems should include fast, convenient ordering for clinicians and generation of orders that are accurate, complete, and free of errors for transmittal to nursing and ancillary services. If these goals are met, it will be possible to configure the CPOE system to improve safety and to assist the ordering clinician in submitting appropriate and efficient orders for the patient at hand. These goals have been achieved largely in some centers[14–16]; many other health care organizations wish to achieve them.

Table 4 ■ Number of Orders Sent to Each Service between September 1997 and July 2000 at VA Puget Sound

Service to Which Order Sent	Number
Laboratory	3,089,477
Medications	3,072,920
Outpatient	1,889,722
Inpatient	1,183,198
Consults and procedures	355,165
Other inpatient	440,906
Radiology	235,812
Dietary	203,513
Adverse reaction	4,562
Other	46

The results of this study show that one health care system undertook extensive configuration of order entry software in support of a CPOE implementation. The majority of the order configuration effort involved the creation of more than 5,000 preconstructed orders or quick orders. More than half of these quick orders were used at least once by users. Quick orders are popular with users, because it is much faster to submit an order using a quick order than to enter all the required information de novo. Recognizing that a desired quick order could be difficult to find among the large collection of orderable entities, system developers grouped quick orders on order menus corresponding to clinical problems or scenarios, such as admitting a patient with upper gastrointestinal hemorrhage to the intensive care unit. There were 703 clinically oriented order menus, each containing one or more (usually many) quick orders. Use of problem-oriented order menus has been shown to reduce the time required to enter orders.[17]

Preconstructed order entities serve several other purposes within CPRS beyond speed for the ordering provider. Although not documented in the current study, preconstructed orders can increase the accuracy and completeness of the order entered, therefore, reducing the time required by the performing service (for example, pharmacy). The performing service usually reviews quick orders upon their creation at system configuration; getting them right "up

Table 3 ■ Frequency of Use of Order Configuration Entities

			Number of Times Entities Used during a Six-month Period					
	Number Prepared	Number Used at Least Once (% Prepared)	1	2–9	10–99	100–999	1,000–9,999	≥10,000
Quick orders	5,298	3,012 (57)	309	868	1,190	561	84	0
Order dialogs	667	333 (50)	34	75	114	93	12	5
Order sets	513	68 (13)	3	22	24	15	4	0
Action	8	1 (13)	1	0	0	0	0	0
Total	6,486	3,414 (53)	347	965	1,328	669	100	5

NOTE. The number of times that order configuration entities were used between January 13, 2000, and July 12, 2000, is shown. For example, 75 of the 667 order dialogs prepared for use were used between two and nine times during that six-month interval. Usage data for order menus are not available.

front" makes it less likely that an end user will generate an incorrect version of the order de novo. Quick orders and order dialogs can be used as a tool to guide the ordering clinician toward an accurate, safe order. In that sense they are complementary to decision support tools such as automated order checks, which usually are invoked after the order is prepared. Preconstructed orders and order sets can be used also to guide clinician behavior, particularly if they are grouped together in a fashion convenient for the ordering clinician.[15,18] In a screen used to admit patients with pneumonia, for example, instructional text can both inform clinicians of recommended choices for empiric antimicrobial therapy and make it easy to follow the recommendation.

Did our order configuration effort pay off? Was the effort necessary, and should it be emulated by other sites implementing CPOE systems? Our analysis shows that a large percentage of these order configuration entities were used. We also know that when order menus containing quick orders are used, in some settings it can reduce the time required to enter admission orders from 19 minutes to 11 minutes.[17] However, because 47% of the order configuration entities were not used, it would have been more efficient to concentrate our effort on those entities that would be used. The problem is that we did not know in advance which would be used and which would not be used. At the beginning of our project, we opted to err on the side of creating more order configuration entities, because we felt that the cost of creating too many was lower than having too few. Other sites may elect to spend less effort in configuring orders, yet successfully implement their system. This could be accomplished, for example, by having a better understanding of order entry patterns—what orders are entered most frequently—before implementing CPOE. One other site has reported using a similar number of order sets in comparably sized organization.[19] It is also possible to take an approach whereby a "core set" of orderable entities is created at startup and allowing the set to expand as users "promote" self-created, locally useful orderable entities to be available housewide, after appropriate clinical review and validation.

One measure of acceptance of CPOE is the percentage of medication orders entered in a health care organization that are entered directly by the ordering provider. By this measure, VA Puget Sound is similar to some VA medical centers of comparable size and complexity, but many VA medical centers have a higher medication CPOE percentage. The reason for differences among facilities in the percentage of directly entered medication orders has not been examined, but there are many potential contributing factors, including whether facility management mandates CPOE and whether the facility has large numbers of consultants and teaching programs. High staff turnover may affect compliance with CPOE. The percentage of medication orders directly entered by clinicians is an important measure but by itself does not give a complete assessment of the success of a CPOE system that also includes orders for laboratory, x-ray, consultations, and other services. Other potentially important measures are more difficult to measure, including provider satisfaction with the order entry process, speed of entry, accuracy of orders, error rate, and compliance with disease management guidelines and formulary recommendations. A better understanding of the impact of order configuration on these aspects of the order entry process would assist efforts to improve the CPRS interface for clinicians.

The increase in the number of order configuration entities over two years shows there is a significant need for ongoing maintenance of the library of such entities. The two-year study interval began more than two years after the first production use of CPRS for order entry at VA Puget Sound.

CPOE systems created by vendors or self developed by health care organizations vary in their features and in the need and capability for configuration. Some of the work undertaken to configure CPRS orders may not be necessary in other systems. For example, inpatient laboratory orders submitted using CPRS at VA Puget Sound (but not at all CPRS sites) must be designated in an order dialog field to be sent to the laboratory phlebotomy team, nurse, or IV team, depending on patient location, collection urgency, or the presence of a central venous catheter. To save clinicians the effort of remembering to enter this field correctly (if it was entered incorrectly, the test may not be performed), we created separate screens containing common laboratory orders for use in patients in intensive care units, with central venous catheters, and other special cases.

Order configuration steps described in this report occur in sites using other systems for similar reasons—to save time for the ordering clinician and for order-filling services and to increase order accuracy and completeness.[20] Electronic medical record system vendors have different names for the order dialogs, quick orders, order sets, and order menus, but most have similar features to speed the ordering process. At one site, up to 30% of orders came from order sets or order templates.[15] Creating a large collection of quick orders and order sets is an important and time-consuming step in the preparation for installation of CPOE systems.[19] Unfortunately, to our knowledge, it is not possible for these order configuration entities to be shared electronically between CPRS sites, or between sites using different order entry systems. Although differences in formulary and practice style may limit sharing of some order menus and preconfigured orders, there would be advantages to new and established sites if some order sets could be imported and modified to meet local needs. We are hopeful that such sharing will become more common to reduce the cost of order configuration for new CPOE sites.

Conclusions and Lessons Learned

We have described the configuration of CPOE software used at a combined inpatient and outpatient health care facility. The majority of the configuration consisted of creating 667 order dialogs, 5,982 quick orders, 513 order sets, and 703 ordering menus. Just over half of this collection of order configuration entities was used during a six-month period. We summarize our experience with the following observations and recommendations that may be of use to others:

1. Create a clinically oriented, clear, convenient hierarchy of menus to simplify locating relevant orderables. The more quick orders, order sets, and order menus are created, the harder it is for the clinician to find what is needed for the patient at hand. However, an alternative approach—allowing orders to be entered in natural language—has been shown to speed the order entry process in at least one domain.[17,21]
2. Design an ordering framework that simultaneously allows the ordering clinician to follow a pathway (orders by disease [pneumonia] or for a specific purpose [comfort care]), that allows the clinician to order with guidance ("Which angiotensin 2 receptor antagonists are on the formulary?" or "How do I convert a patient from patient controlled analgesia to oral analgesics?"), and that allows the clinician to order something complex quickly if he or she knows exactly what he or she wants to order (e.g., prednisone taper).
3. Design a system for systematically requesting, approving, developing, reviewing, renewing, or removing order configuration entities and for tracking the evidence supporting the design of each order configuration entity.
4. Establish relationships with oversight committees (Critical Care, Pharmacy and Therapeutics, Transfusion, Primary Care Council). Order configuration should be aligned with their policies.
5. Balance the use of order sets and quick orders, with safety as your guide. They provide standardization and rapid ordering. From our experience (although not well documented in this study), order menus provide flexibility and individualized care.
6. Study pre-CPOE ordering patterns so that your order configuration efforts are concentrated where they will be most used. We learned that many of our configuration steps—particularly quick orders—were not used.
7. Do not make assumptions about user needs in isolation. Assumptions by system experts and programming staff are fraught with hazard and likely to result in lack of use or rework. Active and ongoing involvement of physicians and other CPOE users is critical in the configuration and maintenance processes.
8. Remember that there is no finished product in the order configuration process, only the current state of the art, which (as with the hardware that supports it) will soon be obsolete. The order configuration process is endlessly iterative, with new demands made by providers as they gain familiarity with the system and its potential and as new system capabilities prompt changes in previous configuration steps. Clinical care itself evolves rapidly. The configuration efforts described in this report are part of ongoing processes aimed at tailoring our CPOE system to the needs of users and the organization.

This configuration was time-consuming, but we believe it is essential to the acceptability and safety of our heavily used CPOE system. Better understanding of ordering patterns may make order configuration more efficient. Progress toward simplifying and speeding the ordering process and sharing order configuration may lead to increased acceptance of CPOE and reduced costs for configuration and support.

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