Clinical Content Vendors

A Review of the Field

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Abstract

In a previous note,¹ we outlined some common characteristics of vendors in the physician order set and clinical content space, and the potential value of these systems both as sources of order sets developed with expert review and based on evidence or best known practice, and as platforms for content management. Here we look specifically at characteristics of the three major vendors in the field— Zynx Health™ ZynxOrder®, ProVation Order Sets, and BMJ's Action Sets—and examine their relative strengths and distinguishing characteristics.

Introduction

All three vendors offer downloadable, evidence- or best practice-based order sets and some combination of the following features:

- An order set download, configuration, customization, and mapping environment, including a platform for online collaboration and discussion tracking;
- Links to evidence bases, embedded in the downloaded content;
- Ability to associate metadata with each order set (e.g., date of implementation; date of next review; clinical owner and reviewers); and
- A mapping and order set export process between the content vendor and the local EMR.

In addition, all offer a variety of associated services and related products.

We describe each vendor's background and basic tools, and present representative comments from interviews with vendor-selected reference customers. Table 1 provides a side-by-side feature and function comparison across the vendors. We conclude with a summary of the distinguishing characteristics of each vendor and recommended action items.

Zynx Health

Background

Zynx Health has been selling evidence-based content since its founding in 1996. Owned by Hearst Corporation, Zynx has over 2,000 hospital clients. In addition to ZynxOrder evidence-based order sets, the company offers interdisciplinary plans of care and other types of clinical decision support content, quality improvement tools, and customized service offerings.

Content Development Methodology

Zynx utilizes a rigorous methodology for the development of evidence and best practice-based order sets and other types of clinical decision support content. The Zynx clinical content team regularly reviews medical publications, guidelines from major medical professional organizations, and regulatory and quality measure requirements to ensure that content is informed by current medical evidence and professional opinion and conforms to regulatory requirements.

¹ See the Applications and Technologies Collaborative research brief "Clinical Content-Knowledge Management Systems: Evidence-Based Order Sets and Knowledge Management for the EMR" (April 2012).

Delivery Model and EMR Integration

The Zynx software runs in a web browser, using a Software as a Service (SaaS) delivery model. With most EMR vendors, Zynx is able to import from the EMR a copy of the local order items catalog. The selected order sets can then be mapped against local order items to create a file containing the orders in the final order set. The order set can then be exported to the EMR using either a proprietary Zynx XML format or a vendor-specific proprietary format, depending on the capabilities of the specific EMR.

Order Set Build and Knowledge Management Platform

Zynx's collaboration and order set build environment is called AuthorSpace[®]. Multiple subject matter experts can review, comment on, and modify order sets remotely and asynchronously in ViewSpace, the collaborative component of the Zynx software. The application maintains a log of the comments and revisions throughout the order set build process. Zynx permits assignment of basic metadata to each order set. This information can be used to manage the process of periodic review and revision.

Zynx provides ongoing surveillance of practice-changing events, guidelines, and performance measures, plus scheduled updates based on systematic searches of the peer-reviewed literature every six months. In addition, alerts based on clinically compelling events such as a U.S. Food and Drug Administration (FDA) drug alert or an announcement of withdrawal of a drug from the market is pushed to customers on a real-time basis.

Zynx also holds two patents related to methods for integrating content platforms with EMRs.

Customer Reviews

Both Zynx reference customers praise Zynx as a reference base and content source for well-vetted evidence-based order sets, and as a platform for review and collaboration.

One reference organization employed Zynx in a key role in an order set standardization effort across the health system. Zynx's evidence-based content became the default standard for current medical knowledge and practice; whenever there was disagreement among clinicians, someone would point to the Zynx content and references and, in the words of the project lead, "the evidence prevailed." Over a several-year period, the organization reduced their number of order sets from 470 to 170, permitting only one version of an order set for a specific condition or procedure. Another customer no longer uses Zynx order sets content, in part due to the complexity of using the Zynx platform to map against their local customized EMR order items catalogue, but rather treats it as a reference base against which to validate their internally developed order sets for currency and adherence to performance measures.

Zynx reference customers praise ViewSpace's functionality as essential to managing order set review and revisions among reviewers, especially across large geographies. One customer finds the ViewSpace functionality so useful that they are using the platform to develop non-clinical content, such as policy templates to meet regulatory requirements.

The reference customers are less satisfied with the Zynx mapping and order set export functionality, which they describe as cumbersome and error-prone. One customer chooses to manually map all Zynx orderables to their EMR's catalogue terms rather than use the Zynx tool, even though manual mapping is a very laborious process. Another uses their EMR vendor's knowledge compiler to perform mapping and reconciliation rather than use the Zynx tools.

In addition, the reference customers do not use the Zynx content management platform to maintain their order sets over time, citing the platform's lack of useful reporting capabilities and inadequate metadata tracking functionality. They perform most content maintenance outside of the Zynx platform; one customer uses SharePoint for this purpose, and another uses tools within their EMR.

ProVation Order Sets

Background

Publishing house Wolters Kluwer purchased UpToDate, the widely used online medical content publication, in 2009. ProVation Order Sets was launched in 2007 to build evidence-based and best practice order sets based upon and referenced to UpToDate content and using a joint editorial process. As of March 2012, ProVation Order Sets had 111 contracted customers in the United States, comprising 272 hospitals. Of these, 57 customers had completed implementation, and the remainder were in the process of implementing.

In addition to order sets, ProVation offers rules and alerts, care plans and "content modules" containing small sets of orders for specific conditions or therapies that can be used across multiple order sets.

Content Development Methodology

ProVation Order Sets employs a joint editorial process with publishers of UpToDate. Order sets are developed in a three-step process. ProVation authors review the medical literature and develop new or revised content in collaboration with UpToDate specialist experts. The content is then peer reviewed by a wider panel of experts, after which a grading editor reviews and grades the content according to strength of recommendations.

Delivery Model

Unlike the other vendors reviewed here, ProVation Order Sets is implemented using a client-server model so the purchasing provider organization implements the application locally, and thus owns a copy of the knowledge management platform. The advantage of this model is, should the organization decide to end their subscription to ProVation Order Sets, they still retain this platform along with all of the metadata and collaboration tools. The disadvantage is one of cost and complexity: rather than simply logging onto a web browser, the customer must purchase database and application servers, and desktop hardware must conform to certain specifications.

Order Set Build Platform

ProVation Order Sets Manager is the workspace for order set importing and building. Customers can view all available order sets in a Library view. When an order set is selected for implementation, all links to UpToDate evidence are imported to the local application with the order set and are visible to all reviewers. The application tracks authors, review dates, and other metadata on all order sets. It permits sending automated emails—for example, when an order set is due for yearly review—to listed reviewers asking them to review order sets. A message is sent from the ProVation Order Sets Manager to the email addresses of the reviewer(s), with a URL link to review and reassess the order set. Order Sets Manager permits multiple reviewers to work on an order set at one time, and keeps a log of all comments and revisions.

ProVation order content is indexed at a granular level, facilitating accurate and efficient integration into an EMR's computerized practitioner order entry (CPOE) system. The high level of data structure also enables some unique functionality. One example is One Click Updates, which automatically informs order set owners about

new evidence that affects existing order sets and permits immediate updating of multiple order sets at once. It also permits merging of order sets, and anticipatory suggestion of relevant content during order set construction.

ProVation sends content updates to customers quarterly. In addition, alerts about important new developments (for example, FDA alerts) are sent automatically to customers as they occur.

EMR Integration

As of the end of March, ProVation Order Sets was able to export finished order sets to the EMR or for printing in the following file formats: standard XML, PDF, and RTF; CSV and interactive PDF (in testing); and the proprietary formats for EpicCare - Nursing Care Plans (testing), and Allscripts SCM; Cerner PowerPlans; McKesson ODT, iForms; and Meditech Magic and Client Server.

Customer Reviews

The three Provation reference customers point to several differentiators in their selection of the Provation Order Sets product. All indicated that the near-universal physician recognition and use of UpToDate Online was an important factor, and the linking of order sets to UpToDate content was a powerful factor in obtaining physician buy-in for use of external content. All reference customers indicated a strong preference for the Provation Order Sets client-server delivery model as it allows them to own and keep the content management platform should they decide to cancel their subscription to Provation.

All Provation reference customers liked the product's knowledge management tools and they use them to track and manage order set content over time. Several customers had previous experience with Zynx and cited the stronger content management tools in Provation as one of the drivers to switch vendors. Customers specifically cite Provation's tools for order set manipulation (i.e., naming conventions, line orderable mapping, search functionality, One Click Updates, and user role management tools), the ability to merge order sets, and strong customer service as perceived differentiators from competitors. One customer cited Provation Order Sets' smooth interface with their Meditech Client Server EMR as an important factor during their content vendor selection process.

BMJ Group's Action Sets

Background

BMJ Group, publisher of the British Medical Journal and many other medical publications, launched an online order set product based upon their well-recognized paper and online Clinical Evidence and Best Practice publications in 2010. BMJ Group has strong international brand recognition, and the distribution of early Action Sets customers reflects this. At the time of this writing, BMJ Group has contracted with two clients in the United States, one in the Cayman Islands, and nine in the United Kingdom, all in various stages of implementation.

Content Development Methodology

Like Zynx and Provation, Action Sets order sets are developed by a network of experts based on evidence from the medical literature, guidelines by professional organizations, Cochrane reviews, and other sources; and the order sets contain links to evidence summaries with links to relevant information in Clinical Evidence and Best Practice publications. In addition, Action Sets order sets are reviewed by experts from different global regions and modified according to different national practices, guidelines, and regulatory requirements.

Delivery Model and Order Set Build Platform

Delivery model and order set build platform. Action Sets are delivered via SaaS. Action Sets was originally developed specifically to interoperate with the Cerner Millennium EMR. Customers with the Cerner EMR can download order sets from Action Sets directly into Cerner Care Designer, the EMR's native order set development environment. Cerner customers choosing Action Sets thus may get the benefit of this unique level of integration, bypassing the need to export the order items catalogue and import and reconcile an order set file. BMJ Group has partnered with a third party to use their document management toolset for robust, easy-to-use clinical content design, build, management, and audit tools, similar to the Zynx and ProVation products. BMJ Group is able to import order item catalogues from EMRs, and export finished order sets to the EMR in file formats including XML, HTML, Microsoft Word, PDF and Excel.

Customer Reviews

All three Action Sets customers agree that a decisive factor in their selection of the BMJ Group product was the pricing—in all cases, well below half the price quoted to them for Zynx or Provation products. All reference customers indicate that the pricing offered by BMJ Group was part of a new market penetration strategy.

All reference customers employed Cerner's EMR, and cited the potential for integration between the Action Sets content and the Cerner order set build tools as a factor in their selection. One customer subsequently determined that their Cerner order items catalogues were inconsistent and too heavily customized to take advantage of this integration; instead they are using the Action Sets content as a reference source and building their order sets from scratch in the Cerner EMR.

Other factors cited by reference sites included the perceived depth and breadth of content assimilated by the Action Sets team; international perspective (one non-US customer); and the broad skill base and deep experience of BMJ Group's knowledge engineering team.

One customer uses the Action Sets platform for handling BMJ-identified required changes to medications or other elements of order sets. According to this customer, when a medication is withdrawn or a practice changes, BMJ Group identifies those customers who have affected content in their systems and notifies the customers. Following local review, this customer uses the Action Sets platform to push an XML file containing the new content to the EMR.

The reference customers were not aware of other knowledge management workflow functionality (such as a collaboration space, or the ability to email reviewers when a review is due). None of the reference customers indicated they use the platform for online review and collaboration; rather, they perform these functions separately by email.

One customer indicated that the non-US origin of the content was something of a hindrance to their clinicians when it came to adoption of certain simple practices. While major medical management practices were in common and provided assurance of overall adherence to evidence-based medical practice, many of the subspecialist groups preferred to build order sets for specific practices based on guidelines from their professional organizations rather than incorporate the BMJ Group material. The customer stated that BMJ Group "needs to do a better job of 'Americanizing' their content" if they are hoping to break into the US market.

Table 1. Content Vendor Comparison

	Zynx Health	ProVation Order Sets	BMJ Action Sets
Background	Founded 1996Ownership: Hearst Corporation	Founded 2007Ownership: Wolters Kluwer	Founded 2010Ownership: BMJ Group
Contracts and Client Base	 Over 2000 US hospitals International client base in Canada, UK, UAE 	 111 customers totaling 272 hospitals; 57 of these have completed implementation 	 2 US clients contracted; 10 UK clients contracted; all in implementation
Service Delivery Model	SaaSEHR Direct Build Services (custom build in client EHR)	Client-Server	• SaaS
Content Types	 Order sets Care plans Rules Care management checklists Forecasters 	Order setsCare plansRules and Alerts	Order sets
Foundational Knowledge Reference Links	Zynx Evidence linksLinks to partner evidence providers	 UpToDate Lippincott Williams & Wilkins	BMJ Clinical Evidence BMJ Best Practice
Order Set Build Functionality	 ViewSpace collaboration space Create standard workflows for content review and approval progress tracking Build by importing EMR orders catalogue mapping to Zynx platform Audit trail based on versioning 	 Order Sets Manager collaboration space Online review and messaging to reviewers Audit log of comments and revisions Build by importing EMR orders catalogue mapping in Order Sets platform 	 With Cerner EMR: build directly in Cerner Care Designer Other EMRs: Build by importing EMR orders catalogue and BMJ XML files and mapping in their platform
Knowledge Management Functionality	 Track basic metadata New evidence alerts within the order sets and plans of care Notifications sent to clinicians when content is ready for review 	 Basic metadata tracked Reporting and query tools for updates Management tools autonotify reviewers when review needed One click updates Order set merging 	 Unique identification and versioning scheme MetaData included with XML files Collaboration space for review and comments
Update Frequency	 Scheduled updates every six months Ongoing surveillance of practice-changing events, guidelines, and performance 	Quarterly, plus real-time alerts	Not reported

	measures		
EMR Integration	 Zynx proprietary XML format Multiple vendor specific formats 	 Standard XML, PDF, and RTF; CSV Proprietary formats for EpicCare for Care Plans (in testing), Allscripts SCM; Cerner PowerPlans; McKesson ODT, iForms; Meditech Magic and Client Server 	 Cerner: Direct import of order sets into Cerner Care Designer Other vendors: XML file, PDF and HTML files; Extract of catalogue

Summary: Distinguishing Characteristics

Brand and History

Zynx has the longest track record and the most experience in the field. One consequence of this may be that their customers have had longer experience and time to identify shortcomings. On the other hand, all Provation customers pointed to the name brand value of *UpToDate* as a decisive factor in their selection of the product compared with Zynx.

The significance of Zynx's possession of patents for aspects of the EMR integration process is unclear. Competitors indicated that they have reviewed these closely via multiple avenues and do not believe their processes or technologies infringe upon the patents. To date there has been no litigation surrounding the patents.

Service Delivery Model

ProVation's local install of the order set build and knowledge management platform distinguishes their product from those of Zynx Health and BMJ Group. The initial cost of additional hardware appears to be more than counterbalanced by the security to the customer of owning the order set build and knowledge management platform.

Reference Base

All three vendors have respected content development methods based on literature, guidelines, and strong knowledge of regulatory requirements. In the US market, ProVation Order Sets receives the most plaudits for brand name recognition of their reference source, *UpToDate*; outside of the US and in the United Kingdom in particular, BMJ's *Clinical Evidence* has strong brand recognition. Brand recognition can be important in gaining physician acceptance of externally developed order sets.

Order Set Build Functionality

Both Zynx and ProVation provide robust platforms for collaborative order set building. Provation has taken a very aggressive approach to rigorously structuring their content at a granular level, making it easy to manipulate. Provation customers expressed more satisfaction with their product's build environment and the ease of manipulation and combination of order set components.

Integration with EMRs

This remains challenging for all three vendors. The magnitude of the challenge varies depending on the specific target EMR. Cerner customers may have an advantage in integration with BMJ Action Sets given their history of joint development for the Millenium platform. It is notable that Epic Corporation is the only major EMR vendor that has thus far not accommodated order catalogue export, or XML order set file import from the content vendor platforms.

Knowledge Management Functionality

ProVation has the best demonstrated knowledge management functionality of the three, and their customers take full advantage of this platform for ongoing management of their content. Zynx has only recently begun to address some aspects of workflow and clinical knowledge management that Provation addressed from the outset, and no Zynx reference customers were utilizing the platforms for ongoing knowledge management.

Action Items

Health care organizations (HCOs) considering contracting with an order set content vendor should do the following:

- Be sure to see a full demonstration of all of the types of functionality covered in this report, with particular emphasis on the features and functions of the online collaboration/order set build platform(s) and the knowledge management functions.
- Request to speak with a customer who is utilizing the knowledge management functions of the candidate platform. Review with them the product's ability to perform the specific functions covered here and in a previous report.² It is our belief that possessing and utilizing robust processes and systems for the ongoing management of the clinical content that HCOs are building into their systems at an accelerating rate will be a key differentiator for organizational success in the future.
- Inquire into the vendor's ability to integrate the content build and export the
 completed order set to your specific EMR product. Obtain names of reference
 customers who use your specific EMR version and can confirm the level of content
 platform-EMR integration that is possible.

² See the Applications and Technologies Collaborative research brief "Managing the Clinical Knowledge Lifecycle" (October 2011).

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KLAS Konfidence KLAS Konfidence Level Description



Lowest possibility in variability of score

Medium possibility in variability of score

Highest possibility in variability of score

(min. required to publish a ranking)

Limited data, typically early trending data

Data Details



ProVation Order Sets (order sets) Konfidence Level



©zynxhealth

ZynxOrder (order sets) Konfidence Level



Performance Indicators



	 Wolters Kluwer Health 	© zynxhealth		
Sales & Contracting	ProVation Order Sets (order sets)	ZynxOrder (order sets)	Clinical Decision Support	Software Avg.
Contracting experience	7.4	7.2	7.7	7.2
Product works as promoted	8.1	7.3	8.0	7.3
Money's worth	7.5	6.7	7.7	7.3
Avoids nickel-and-diming	85 %	91 %	91%	78 %

	Wolters Kluwer Health	© zynxhealth		
Implementation & Training	ProVation Order Sets (order sets)	ZynxOrder (order sets)	Clinical Decision Support	Software Avg.
Quality of implementation	8.3	7.1	8.1	7.1
Implementation on time	8.6	7.6	8.2	7.4
Quality of training	8.1	6.6	7.8	7.1

	. Wolters Kluwer Health	© zynxhealth		
Functionality & Upgrades	ProVation Order Sets (order sets)	ZynxOrder (order sets)	Clinical Decision Support	Software Avg.
Overall product quality	7.9	7.6	8.1	7.4
Delivery of new technology	7.6	6.8	7.6	7.1
Ease of use	7.8	6.4	8.0	7.4
Product response time	7.8	7.8	8.2	7.5
Supports integration goals	6.7	7.2	7.5	7.3
Product has needed functionality	69 %	52 %	79 %	68 %

Wolters Kluwer

©zynxhealth

	Sets (order sets)	sets)	Support	Avg.
Quality of phone/web support	8.2	7.8	8.1	7.2
Proactive service	8.3	7.4	8.0	6.8
Vendor executive involvement	8.3	0.2	7.7	6.9
Lives up to expectations	7.9	7.0	7.9	7.2
Keeps promises	100 %	88 %	96 %	85 %

	 Wolters Kluwer Health 	©zynxhealth		
General	ProVation Order Sets (order sets)	ZynxOrder (order sets)	Clinical Decision Support	Software Avg.
Part of long term plans	95 %	84%	95 %	87 %
Overall communication	8.2	7.0	7.9	7.2
Recommend to peer/friend	8.4	7.0	8.1	7.3
Overall satisfaction	8.1	7.1	8.0	7.3
Forecasted overall satisfaction	8.5	7.2	8.1	7.5
Would you buy again	95 %	68 %	93%	83 %
Ranked client's best solution	() 40 %	() 40 %	36 %	31 %

User Commentary (Last 12 Months)

Functionality and Upgrades

CMO

Physician

CIO

Director

Physician

Physician

Sep 2011

Sep 2011

Sep 2011

Sep 2011

Aug 2011

Aug 2011

Sep 2011

Sep 2011	CMIO	ProVation is very simple to use. It is a very reliable and robust product. I think the evidence and the updates are good. The business model is fair.
Sep 2011	Manager	The electronic process for reviewing order sets is such an improvement over the paper process. The

software handles the workflow of the review process, and the annotations and acceptance or rejection notes are all documented throughout the process. It is so much better than trying to get a group of people in a room with a stack of papers.

We needed a system to give us a workaround for physicians. The purpose of the order sets was to provide some decision support for the physicians as they ordered for patients. In linking up the best available medical evidence with a series of orders that cover the gamut from diagnosis to disposition, to diagnostic aides, and to treatments, the ProVation order sets fulfill their role nicely.

When physicians or clinicians look and see that ProVation is supported by UpToDate, they just feel okay. For example, when we have a meeting on order sets, that is an ego contest. But when we look at the links in ProVation that open UpToDate, the clinicians all remember why they wanted to do things this way. So this just makes decision making easier on all of us.

Wolters Kluwer ProVation Order Sets is great. It has basically eliminated the need for us to have meetings to approve or review order sets. That is all done virtually. The content that has come out of it is very good, and our physicians feel very confident in the evidence.

Wolters Kluwer ProVation Order Sets provides healthcare facilities with a foundational library and necessary materials, like templates. The system does a good job of maintaining control and keeping track of change management, so providers can see all the versions of their order sets. ProVation Order Sets allows for communication between providers' key stakeholders. It also does a good job of providing them with a day and time resource if the clinical system should ever go down and has a downtime repository. The system definitely provides benefits to our facility.

Every quarter, Wolters Kluwer releases updates, and we have the option, as an institution, to take certain parts of these updates or the whole thing. Other companies force their clients to take it all, or they don't get any of it.

Wolters Kluwer has a maintenance tool that is very useful; it is one of the main reasons we decided to go with this product. When things change, or when we want to approve an order set, we can send it out to any person we want and at any time interval. Everyone involved with the order set can click on a series of links and agree or suggest changes to a running dialogue on the site.

Implementation and Training

Sep 2011 VP/Other Executive The implementation of ProVation Order Sets is probably where Wolters Kluwer stood out the most. They were just phenomenal. They were very organized and very well prepared. The implementation was stellar.

CMIO There is tremendous acceptance of ProVation from the physician community. Most physicians probably use UpToDate in their daily care, so it is an easy transition to ProVation. It is an added value.

ROI / Cost (care and feeding)

Oct 2011 Manager We have received our money's worth from ProVation. The prices of other vendors were a lot higher. People are very impressed with what the product is producing. They like what we are showing them.

Sep 2011 Director ProVation has helped us with evidence that enables us to streamline our order sets. We have gone from 3,000 order sets to around 1,300. This is helping us tremendously in standardizing our patient care with the best evidence-based medicine.

Service and Support

Sep 2011	Analyst/Coordinator	I have to say that Wolters Kluwer's customer service is excellent. They are quick to respond, even if the response is just that they need to get back to us. We have been very impressed with their customer service. They are also quite proactive and check in with us just to see how things are going and to let us know what is going on with them.
Sep 2011	Physician	Wolters Kluwer has been working with us to make the process of sending over order sets require just one click. They have really tried to make it easier to use their product. We are really quite pleased.
Sep 2011	Manager	Wolters Kluwer is a great company to work with. They have excellent people, and the customer support is excellent. The support is very responsive and very proactive. They have certainly helped alleviate the pain that goes with this type of project.
Sep 2011	Physician	Wolters Kluwer is very innovative. If they really get the system to interface with our EMR and the order sets transfer over in one click, I will rate them a nine in my satisfaction. Other vendors don't treat us as well as Wolters Kluwer does. They really want to understand how we use their product and how they can make it better. They are so focused on service, which is the complete antithesis of our other vendor.
Sep 2011	Manager	Wolters Kluwer's support has been excellent. I know the scale only goes up to nine, but I would rate them a ten if I could.

Win/Loss - Why they were selected (by current clients)

Sep 2011	СМО	One of the reasons we chose ProVation over Zynx was because it was linked to UpToDate. There is nothing wrong with Zynx, but the depth of the linkage and the heavy use of UpToDate by the practitioners tilted the scale strongly in favor of ProVation. We click the link in the order set in our EMR and it takes us to UpToDate so we can answer our questions on the spot.
Sep 2011	СМО	The level of reference to the literature in the database that our physicians use really elevated ProVation over Zynx for our needs. For a system that is already linked to UpToDate and has similar needs, ProVation is the best.
Sep 2011	CMIO	We were deciding between ZynxOrder and ProVation, and we felt ProVation would better help us consolidate to Wolters Kluwer for most pieces of our CDS content. ProVation is powered by Wolters Kluwer, so it made sense.

