White Paper
Adopting Clinical Decision Support Systems:  
A Best Practice Snapshot for Ophthalmology

Seeing the Forest through the Trees: Clinical Decision Support Systems and Best Practices
You are among the norm if you are striving to create less paper, enhance your practice’s diagnostic efforts, improve patient safety, and prevent medical errors in your practice. After all, what healthcare provider does not want to achieve these goals? And as most providers are aware, implementing Clinical Decision Support Systems (CDSS) can help you achieve best practices by improving the accuracy and speed of patient data, with clinical information gathering and the subsequent application of data-specific analysis to improve patient care.¹

Yet, accomplishing the goal of implementing clinical decision support (CDS) to achieve best practices is often easier said than done.² In many healthcare settings CDS systems may be challenging to deploy. Often it is too time-consuming for busy staff members to input patient data, as this may require a temporary interruption of workflow. Although the first steps of implementing CDS may cause some pain, you can usually gain a payoff. According to some experts, CDS improved practitioner performance by 64 percent and patient outcomes by 13 percent.² And specifically, ophthalmologists are seeing the forest through the trees, since they are implementing CDS best practices before many other specialists.

However, ophthalmologists are not heading down the CDS best practices path alone, since several organizations are providing guidance. The American Academy of Ophthalmology (AAO) continuously develops and issues the most clinically relevant, specialty-focused procedural and practice data sets for ophthalmology. In addition, the Health Information and Management Systems Society (HIMMS) are offering a broader guide for implementing CDS best practices.

Why is managing information in ophthalmology heading down a unique path?
Ophthalmologists are continuing on the right path by embracing clinical and administrative data management technologies faster than many others, and for several reasons:

- A focus on treating medical problems beyond routine eye exams
- The requirement to capture and manage complex and interconnected data
- High patient volumes requiring practices to combine accuracy and efficiency

In addition, ophthalmology often combines medicine and surgery with a detailed clinical follow-up. Extensive data sets for each patient typically comprise numbers, text, and images. Being excellent at creating, managing, and sharing data is becoming second in importance only to the medical and surgical expertise of the practice itself.
So, at the point of care, ophthalmologists continue to evaluate and ask for electronic health record (EHR), practice management, and clinical decision support solutions developed explicitly for the clinical diagnoses, treatments, procedures, and administrative challenges inherent in ophthalmology.

CDS is maturing into a vital medical information, diagnosis, and procedural tool that may enhance both productivity and clinical accuracy across the spectrum of general and specialty medicine. At its core, computerized CDS is a knowledge-based computer program functionality that supports clinical diagnosis and treatment plan processes, promotes the use of best diagnostic and procedural practices, provides condition-specific guidelines, and may enhance population-based patient management. What current best practice solutions should an ophthalmologist or practice manager consider when evaluating EHR, practice management, and CDS technologies?

**Ophthalmology Clinical Decision Support—choosing the right path with AAO.**

In the practice of ophthalmology, there are different types of CDS interventions to consider. Preferred Practice Pattern® (PPP) guidelines—offered by the American Academy of Ophthalmology (AAO) (The Academy)—should be the primary source for CDS parameters developed for the practice of ophthalmology.

The AAO continuously develops and issues the most clinically relevant, specialty-focused procedural and practice data sets for ophthalmology. The Academy designs its PPP guidelines to identify characteristics and components of quality eye care. “Based on the best available scientific data, PPPs provide guidance for the pattern of practice, not for the care of a particular individual.”

**HIMSS as a source for CDS—running from the ground and up.**

Ophthalmologists can go beyond the AAO to consider additional CDS sources and interventions. An excellent source to broaden CDS knowledge and create potential CDS options for an ophthalmology practice is the Health Information and Management Systems Society (HIMMS). In the Society’s published work, “Improving Outcomes with Clinical Decision Support: An Implementer’s Guide,” second edition, 2011, 10 types of CDS Interventions are described:

- Immediate Alerts: Warnings and Critiques
- Event-driven Alerts and Reminders
- Order Sets, Care Plans, and Protocols
- Parameter Guidance
- Smart Document Forms
- Relevant Data Summaries (Single-Patient)
- Multi-Patient Monitors and Dashboards
- Predictive and Retrospective Analytics
- Filtered Reference and Information and Knowledge Resources
- Expert Workup Advisor

Because the HIMSS publication presents CDS from the ground up, and from a practice management perspective, it may provide a useful overlay to AAO’s PPP guidelines. Some ophthalmologists and
practice managers may find the HIMSS CDS data “too much.” The key is to develop an overall awareness of potential CDS solutions that may enhance the ophthalmology practice.

While the AAO PPP guidelines focus on ophthalmic medicine and related clinical guidelines, the HIMSS publication provides a broader look at CDS options. It could be useful as a compendium for ophthalmologists wishing to add specific CDS functionality to their existing practice patterns. Doing so may position a practice to reach enhanced levels of administrative productivity, clinical data management accuracy, and overall practice efficiency and sustainable profitability.

**Typical concerns for Clinical Decision Support (CDS) technology—choose the path of integration.**

CDS technology is not a panacea. The technology continues to evolve as do the macro approaches that professional health informaticists are considering during the build-out of health informatics, health information exchanges, and reaching the ultimate goal of point-of-care access to comprehensive patient data and related CDS systems anywhere, anytime. Health information professionals, physicians, clinicians, and other professionals involved in the clinical processing and management of patients share some overall concerns regarding CDS:

- “Cookbook medicine”
  - CDS and PPP are guidelines, not absolute
- Ambiguity
  - Evidence often does not support a single, specific approach
  - Range of options is often inappropriate
- Run counter to accepted practices
  - Evidence does not always support accepted practices

Therefore, the use of CDS systems in ophthalmology should focus on integration with established routine and specialized workflows. In addition, responsibility for the quality of CDS systems used in ophthalmology should be a shared obligation among the AAO, HIMSS, ophthalmologists, related industry organizations, and research institutions and universities that study the evolution of CDS systems, CDS system integration into EHRs, and medical cognition.

**Start with the seed of integrated EHR and Practice Management systems for ophthalmology—flourish with CDS tools.**

To evaluate and potentially engage CDS tools without first adopting a robust, integrated EHR and practice management system could be like putting the cart before the horse. For example, you may not be fully realizing the productivity and accuracy benefits gained by leveraging CDS without capturing the data in an EHR. The data becomes secure and the accuracy of the CDS-influenced data is maintained. Other approved professionals, departments, or institutions can access the data in the EHR. Best practice use of EHR and practice management systems provides several levels of value and impact across medicine, including ophthalmology.
Every ophthalmology practice should evaluate EHR and practice management solutions based on the specific needs and objectives of a practice. However, there remain core collections of shared factors that you should always consider when evaluating the systems for purchase and use that include:

- Ease of use
- Practice subspecialty mix
- Patient volume
- Workflow and workflow cycles
- Clinical needs
- Number of office locations
- Systems
- Data security and backup features
- Integration with practice management software
- Data exchange requirements (other healthcare orgs and clinicians)
- Image management needs
- Integration with image management systems

**Six seeds—must have elements of an EHR/Practice Management system to help your ophthalmology practice grow.**

Beyond the common factors of logical EHR and practice management systems evaluation, the AAO and NextGen Healthcare — a longtime AAO partner — recommend six additional criteria. These suggestions may help ensure that your practice selects an EHR and practice management system that provides both technical excellence and specialty practice knowledge of clinical and administrative data management. The following six criteria include:

1. **A single system.** The AAO has commented at length about the difference between a single, integrated solution and an interfaced solution comprising several vendors’ products. In the complex world of managing ophthalmic data and high patient volumes, the simplicity offered by a single, integrated system provides the best possible user experience and results.

   The additional complexity of multiple, interfaced databases may reduce functionality and specialty options compared to a robust, integrated, single system. Interfaced solutions that link separate databases, and often-separate servers, can open the practice to myriad data compatibility issues and the potential of multiple upgrading over time.

2. **Select a Specialty Market Leader.** If you have a mid-to-long-term vision for your ophthalmology practice, you should select an EHR and practice management vendor with an equally long-term vision—and with an industry record of accomplishment to continually carry out that vision.

   The advantages of collaborating with a strong vendor include being able to confirm the vendor’s financial stability; asking for and receiving their ongoing plans and progress for ophthalmology-specific enhancements to their offering; and knowing the company has the resources to quickly gain new industry certifications as they arise.
3. **Select an Ophthalmology Specialist.** Patients select ophthalmology specialists for good reason. Ophthalmic medicine providers should select an EHR and practice management provider for the same good reason. A health information data vendor with a record of accomplishment of providing ophthalmology EHR and practice management solutions can provide unique value, such as:

- Rich ophthalmic templates and workflow
- Clinical decision support and alerts
- Flexible and comprehensive reporting
- 5-Star usability within the specialty
- Image management integration
- MU certification under CMS
- Depth and functionality to achieve future stages of MU attestation

4. **Select a Meaningful Use (MU) Specialist.** Because the government is driving so much of our emerging digital healthcare trends, an EHR and practice management provider should have deep resources to track, understand, and educate clients on regulatory requirements and incentive opportunities. Gathering this intelligence, communicating its impact on clients, and providing solutions that will leverage these requirements do demand an integrated effort that requires a dedicated team of professionals.

5. **Select One Partner that Possesses Both Industry Knowledge and Good Products.** No one would argue that the overall health of “the practice” should be the number one priority of the ophthalmologist. However, over the long-term, sustaining a viable and profitable practice will require an increase in functional data management. While superior EHR and practice management “product” is important, so is collaborating with a vendor that stays on the leading edge of mega trends in emerging healthcare delivery models, reimbursement protocols, regulatory requirements, and information interoperability standards.

6. **Select a Partner with a Track Record.** Research the reputational footprint of prospective EHR and practice management providers. How much testimonial communication do they use to gain market visibility? Have industry research firms, publications, and associations ranked them? Are they involved in the ongoing dialog of industry standards around interoperability and Health Information Exchange capabilities? Visit a regional or national healthcare information management tradeshow and get a feel for the company’s presence at the show. Also, reach out and talk to your peers about their personal experiences with the system and company they chose as their EHR and practice management vendor.

**The path forward for EHR, Practice Management and CDS systems in ophthalmology.**

The AAO provides very specific recommendations to guide the future development of these related technologies. Unique workflows in ophthalmology will continue to influence requirements. For example,
because the specialty integrates medicine and surgery so frequently, ophthalmological EHR applications should support documentation and data management in, and transitions between, the office and the operating room. Furthermore, non-ophthalmologists often perform medical clearance duties that may require data from other healthcare providers who are not part of the ophthalmology practice.\textsuperscript{7}

The AAO cites additional unique characteristics of ophthalmology that should influence future designs of EHR and practice management systems:

- You should incorporate into the EHR system useful mechanisms for drawing—including digital pen technologies. Ophthalmic medicine is visually intensive, comprising physician sketches, formal imaging studies, and other related imaging (as well as traditional, clinical quantitative and qualitative assessment) to evaluate a patient’s condition.
- Incorporate features to capture, track, and display ophthalmic vital signs, such as visual acuity and intraocular pressure (IOP). Later stages of MU within the ophthalmology specialty may require capture of specialty-specific practice patterns and data.
- Multi-functionality of ophthalmology EHRs is important. Systems should support general testing; generate orders for and collect data from laboratory systems, Picture Archiving, and Communication Systems (PACS); and meet specific ophthalmology evaluation and testing needs.

**Conclusion**

Ophthalmology is a demanding medical specialty practice for EHR, practice management, and CDS systems. The layering and overlap of data types is significant. For example, patient evaluation and diagnostic workflows may simultaneously include multiple outputs from different tests including:

- Graphical displays of measurement (visual field testing, electroretinography)
- Numerical data (auto refraction, keratometry, biometry)
- Ophthalmic image data (fundus photography, optical coherence tomography)\textsuperscript{7}

Ophthalmologists are combining state-of-the art EHR and practice management systems with an understanding of different types of CDS options available, to create a high performance ophthalmic medicine practice, which is sustainable, accurate, safe, productive, and accountable.

Future EHR and practice management systems for ophthalmology should handle evolving AAO PPP guidelines and incorporate various levels of CDS solutions and tools offered directly by vendors or created by astute ophthalmologists and ophthalmic practice managers with various levels of healthcare IT skills.
**NextGen Healthcare—A Leading Provider of Practice Management and Electronic Medical Records Software**

**NextGen Healthcare Provides More than 50% of the Installed Base of Ophthalmology EHRs**

NextGen Healthcare is continuing to commit to significant technical and professional resources to the practice of ophthalmology. The result—more than half of all ophthalmology EHR installations in the nation use NextGen® Ambulatory EHR and NextGen® Practice Management solutions.

To achieve and maintain the dominant market share position in ophthalmic EHR and practice management systems, NextGen Healthcare has developed an exclusive and extensive ophthalmology knowledge base. It continues to grow and hundreds of practicing ophthalmologists are constantly evaluating and updating it.

**Instrument Interfaces**

The NextGen® solution is one of the most complete in the industry, providing seamless interfaces with digital imaging and testing devices such as the Humphrey Visual Field Machine, IOL Master, corneal topography equipment, OCT machine, lensometers, digital photography equipment, and:

- Interface digital imaging systems through an HL-7 connection to save time and reduce errors
- Digital data capture from the most popular screening devices directly to the EHR template
- Pre-screening equipment outputs are captured directly into the EHR
- Import most S-video, RGB devices, a-scans, b-scans directly into the EHR

**Clinical Decision Support (CDS) Differentiators of NextGen Ambulatory EHR**

In broader terms, beyond the practice of ophthalmology, NextGen Healthcare continues cutting-edge work to incorporate CDS functionality into the company’s EHR platform. Examples of CDS functionality in the NextGen Ambulatory EHR include:

- Integration with the American College of Physicians (ACP) Physician’s Information and Education Resource (PIER)—context-sensitive diagnosis and treatment guidelines for more than 400 diseases
- Incorporation of Isabel Diagnosis Checklist System provides relevant checklists of likely diagnoses based on symptoms, signs, and test results
- Linkage to other rules-based clinical guidelines or medical research databases

**Clinical Decision Support (CDS) for Glaucoma**

Glaucoma evaluation and management is an example of CDS functionality within the NextGen Ambulatory EHR. Guidelines for tracking and timing of follow-up testing and full exams are included, along with alerts to confirm comprehensive evaluation, treatment, patient education, and continued follow-up. CDS in the NextGen® system also may include recommendations for additional screenings, workups, referrals, or management of patients.
References for NextGen Healthcare Ophthalmology White Paper


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Patent pending.