NN✪HA

National Network for Oral Health Access

GUIDE TO THE FUTURE:
USING HIT TO IMPROVE ORAL HEALTH ACCESS AND OUTCOMES

TABLE OF CONTENTS

Acknowledgements

The National Network for Oral Health Access

The National Network for Oral Health Access (NNOHA), a 501(c)3 non-profit organization, was founded in 1990 by a group of dental directors from Federally Qualified Community Health Centers (FQHCs). They recognized that peer-to-peer networking, services, and collaboration could improve operations of Health Center dental programs that serve underserved populations. NNOHA has a diverse membership of Health Center oral health providers: dental directors, dental hygienists, and their support teams, who understand that inadequate access to oral health services can adversely affect a person's speech, appearance, health, and quality of life. To better serve these low-income individuals, NNOHA coordinates efforts to benefit community, migrant, and homeless Health Center dental clinics across the United States through NNOHA's Board of Directors, which represents all ten HRSA regions, as well as a modest staff.

NNOHA communicates with its members and supporters via:

- An electronic listserv where colleagues can share advice and network

- A quarterly newsletter in both electronic and hard copy formats

- The nnoha.org website, which includes contact info, links, and reference materials, including the Dental Operations Manual and dental forms library

- The annual National Primary Oral Health Conference, where members can obtain Continuing Education credits, network, and learn the latest oral health best practices.

In addition to establishing these materials and venues for communication, other highlights of NNOHA's accomplishments and activities include:

- Supporting oral health providers in Health Centers

- Successfully promoting oral health expansion in Health Centers

- Co-sponsoring the National Primary Oral Health Conference

- Building links with the dental schools

- Running a job bank on the website for oral health providers

- Involving oral health in the diabetes collaborative

- Chairing, and actively helping to develop and implement the Oral Health Collaborative Pilot

- Most recently, NNOHA received funding from HRSA through a Cooperative Agreement, which will facilitate sustaining and expanding oral health services in Health Centers.

MEMBERS OF THE NNOHA
HEALTH INFORMATION TECHNOLOGY (HIT) COMMITTEE

Huong H. Le, DDS Chairperson

Dr. Huong Le graduated from Baylor University with a degree in Chemistry and obtained her Doctor of Dental Surgery from the University of Texas Dental Branch in Houston. She did her General Practice-Hospital Dentistry residency program at Jerry L. Pettis Veterans Memorial Hospital. After completion of her residency, she joined a private practice in northern California where she provided hospital dentistry to primarily pediatric, medically compromised, physically and mentally challenged patients at Rideout Memorial Hospital in Marysville, CA.

Prior to coming to Asian Health Services to be their dental director, Dr. Le worked as a dental provider/ dental director for two other community health centers in the Central Valley of California. Dr. Le is a member of the American Dental Association, California Dental Association and Alameda County Dental Society. She has served in advisory roles on different committees at the CDA on access and Medi-Cal issues. At the present time, Dr. Le serves as a member on Board of Directors of National Network for Oral Health Access and Western Clinician Network, Co-chair of Legislative Committee and a Secretary for Alameda County Dental Society, and a member of California Dental Association Policy Development Council and CDA House of Delegates. Her other memberships include Oral Health Access Initiative, Oral Health Access Council, California Primary Care Association Clinicians Committee and Community Health Center Network Dental Director Committee. She is one of the trainers for First Five Initiative of the state of California. Additionally, Dr. Le serves as Assistant Clinical Professor at UCSF School of Dentistry, A. T. Still School of Dental and Oral Health in Arizona and faculty/director of Lutheran Medical Center–affiliated AEGD program at Asian Health Services. Dr. Le is also a consultant for the California Pipeline Project, grant reviewer for HRSA and a member of the Institute for HealthCare Improvement Vanguard Oral Health Disparities expert panel. In December 2007, she was recognized by NNOHA with the Outstanding Clinician Award.

Clifford Hames, DDS

Dr. Clifford Hames is VP, Chief Dental Officer/Chief Infection Control Officer for Hudson River HealthCare (HRHC). This year marks Dr. Hames' 20th year of service with HRHC, where he now oversees 7 dental programs, including 5 onsite programs, 1 school-based program, and one mobile dental vehicle, with 22 dental chairs operational in underserved areas in 3 counties throughout the mid Hudson Valley area of NY.

Dr. Hames' commitment to the underserved started when he received a National Health Service Corps (NHSC) scholarship while attending Columbia University School of Dental and Oral Surgery. Following graduation in 1984, Dr. Hames fulfilled his NHSC contract by practicing general dentistry for two years at Boriken Neighborhood Health Center in East Harlem. He then served an additional year as their Dental Director before relocating to northern Westchester County to gain some private practice experience. While working in private practice

part-time, Dr. Hames remained active in community health center dentistry by first working at Ossining Open Door (now Open Door Medical Centers), and then moving on to Peekskill Area Health Center (now HRHC).

Dr. Hames has worked with NHSC as an alumnus of their scholarship program where he has served as an interviewer of future health professionals as part of the NHSC selection process. He continues his association with NHSC as an NHSC ambassador.

Dr. Hames is a member of the 9th District Dental Association, New York State Dental Association, American Dental Association, New York State Oral Health Care Coalition, Clinical Directors Network, Dental Management Coalition, and the National Network for Oral Health Access. He served as President of Dental Management Coalition for 5 years from 2002-2006, during which time he developed and implemented their listserv and website. He maintains a staff affiliation with Lutheran Medical Center's AEGD Residency Program, and has also served as an attending for Columbia University's AEGD Residency Program.

Starting in 2001, Dr. Hames transitioned HRHC's dental departments to using phosphor storage plates and digital radiography from using dental x-ray film and processing chemistry. In 2006, HRHC's dental departments became chartless when they gradually shifted to an electronic dental record (Dentrix Enterprise with HL7 interface to Medical Manager) over a period of five months. Next year, their Dentrix HL7 shall interface with eClinicalWorks.

Margaret M. Drozdowski, DMD

Dr. Margaret Drozdowski received her undergraduate degree from St. Joseph's College and her graduate degree from University of Connecticut School of Dental Medicine in 1998. She completed her residency training in Advanced Education in General Dentistry also at the University of Connecticut. After spending three years as an associate in private practice, she joined the Community Health Center Inc. in September 2002 as a general dentist. Since 2005, she has served as the Dental Director for the agency. Currently Community Health Center, Inc is Connecticut's largest FQHC with offices in twelve cites, seven cities with dental clinics locations operating 44 dental chairs, and 164 "mobile delivery sites" throughout the state. Seventy thousand patients consider CHC their Health Care home and this year we will provide approximately 275,000 health care encounters.

Dr. Drozdowski continues a general dentistry practice at the New Britain site. She has a faculty appointment at the University Of Connecticut School Of Dentistry and participates in clinical supervision of AEGD residents and 4th year dental students. In 2008, she was named as one of "40 under 40" outstanding graduates of the University of Connecticut.

Lohring Miller, DDS

Lohring Miller received his DMD (dental degree) from the University of Oregon Dental School (now Oregon Health Sciences University School of Dentistry) in 1977. He has been a member of the American Dental Association, the Oregon Dental Association, and the Lane County Dental Society since that time. He has been a member of the Academy of General Dentistry from 1997 to 2006 and is a member of the Association for Public Health Dentistry.

Dr. Miller was in private practice in Lane County from 1977 until he sold his practice in 2001. The last three years of dental school he worked at a free clinic. Since retirement from private practice he worked at the Siskiyou Community Health Center Dental Clinic from 2001 to 2005. He was appointed Dental Director in January of 2004 and served as the Dental Director until the end of 2005. Presently he is the Dental Director of the Clocktower Dental Clinic, a Federally Qualified Health Center, at Lane Community College.

Dr. Miller is also teaching part time in the Dental Clinic at Lane Community College. He currently is working on programs to prevent dental diseases in vulnerable children through WIC, Headstart, and the public schools. He is also working on opportunities for undergraduate and graduate dental students as well as Lane's dental assisting and hygiene students to treat low-income patients in the Clocktower Dental Clinic.

Colleen Lampron, MPH

Colleen Lampron is the Executive Director of the National Network for Oral Health Access (NNOHA), the Co-Chair of the Oral Health Disparities Collaborative Pilot, and an oral health Consultant. She has extensive experience in Health Care including various roles to support high quality clinical practice at Health Centers, hospital quality improvement, and two years as a Peace Corps volunteer in the Dominican Republic. Prior to joining NNOHA in 2006, Ms. Lampron worked for ten years with Health Centers in Colorado on clinical quality improvement and access to health care. Ms. Lampron has specific expertise in Health Center oral health, oral health quality improvement, clinic operations, and policy.

Ms. Lampron earned a Masters degree in Public Health from the Johns Hopkins University School of Hygiene and Public Health and a Bachelor of Science in Public Health from West Chester University in Pennsylvania.   She was a Presidential Management Intern at the HRSA Denver field office. As a consultant, all of her work is dedicated to her professional passion - improving oral health access and outcomes for underserved populations.

ABOUT FULL CIRCLE PROJECTS

Full Circle Projects, Inc. is a San Francisco based HIT consulting firm whose mission is to help safety net providers and community health centers improve quality of care and efficiency through the effective use of technology. Principal and co-founder, **SA Kushinka,** has over 25 years of experience in the selection, implementation and evaluation of HIT systems, and served as the Project Director for the NNOHA HIT project. Assisting Ms. Kushinka in the preparation of and research for this paper were Project Associate **Allison Fels** and consulting partner **Vatsala Pathy.**

The benefits cited for adoption of technology in clinical medicine – quality improvement, outcomes measurement, patient safety, process efficiencies, cost reduction and coordination of care – hold equally true in dentistry. Yet while support for implementation of electronic health records (EHRs) and the development of a Nationwide Health Information Network builds, the need for information technology in Health Center oral health programs remains conspicuously absent from most discussions. The National Network for Oral Health Access (NNOHA) commissioned this White Paper on Health Information Technology (HIT) in Oral Health Programs to raise the awareness of this underserved market segment to help oral health providers and their patients reap the benefits that technology promises.

The national conversation about improving our health care system through EHRs, has taken place largely in headlines and sound bites from Presidential press conferences. This conversation has, however, provoked complex and challenging questions about what it means to implement HIT and how it should be done.

Dental programs in Health Centers that share locations with their medical counterparts are in a unique position to advocate and advance truly integrated care supported by HIT. By creating interfaces between dental and medical systems and operations, there are new opportunities for Health Centers to foster patient safety and promote improved health. Furthermore, there is a need for more study on the effectiveness of preventive oral health measures. These studies cannot be performed without adequate technology.

This document gives context for a discussion on the benefits of integrated dental HIT. It serves to educate vendors, payers, Health Center administrators and other key stakeholders about the largely unmet needs of this market segment and provides a collection of resources for Dental Directors considering HIT implementation. Specifically, NNOHA's HIT Committee goals are to:

- Provide Dental Directors, Executive Directors, and IT decision makers with objective comparisons between the current leading dental software products, given that no one product currently satisfies all the needs of Health Center Dental Programs.

- Provide input to dental software developers on areas for improvement within existing applications to better meet the challenges of Health Center patient care and practice management of dental programs.

- Advocate integration of a dental module within electronic health records as a vital part of the product functionality offered to Health Centers.

- Provide Dental Directors and Health Center dental programs with practical resources for selecting, implementing, and optimizing HIT.

DENTAL HIT SYSTEMS AND ADOPTION AMONG HEALTH CENTERS

Adoption of information technology in the dental setting has been nominal at best. While approximately 166,000 dentists practice in 120,000 practices across the United States,[1] according to the University of Pittsburgh Center for Dental Informatics, only 25% of dentists use a computer while working chairside, and less than 2% have paperless offices.[2] There are a multitude of reasons for this. In addition to the factors affecting the general slow rate of adoption in medical settings, there has also been a lack of significant media coverage, government focus, and investment in fostering technology in dental clinics. Advancing dental information technology requires increased federal grant funding and representation in the larger HIT dialogue among policymakers, foundations, and government officials.

Technology enabled process improvements in oral health are increasingly urgent, due to the vast increase in patients and insufficient numbers of providers. Health centers are one of the largest providers of oral health services for low-income populations. Approximately 69% or 694 Health Centers nationally provide dental services utilizing the expertise of over 2,100 dentists and over 800 dental hygienists.[3] According to the Health Resources and Services Administration (HRSA), in 2007 over 2.8 million dental patients made almost 6.7 million visits to dental health professionals at Health Centers, a 123 percent increase in such visits over 2000. Nevertheless, there continues to be a shortage of dental providers and oral health capacity in Health Centers.

By reviewing data available through the federal government, NNOHA believes that there are currently four medical providers for every dental provider. Some experts estimate that as many as 7,500 additional dental providers are required to address the needs of Health Center patients.

Health Centers have been at the cutting edge of clinical technology adoption in ambulatory care settings as part of public-private partnerships and demonstration projects supported through philanthropy. There has also been growing interest in adopting technology to directly aid Health Center dental programs and providers both inside and outside the dental treatment room, including supporting administrative staff with scheduling and billing functions.

---

[1] American Dental Association Survey Center. Distribution of dentists in the United States by region and state, 1999. Chicago: American Dental Association; 2002.

[2] Schleyer, Titus K.L., DMD, Ph.D., et.al. "Clinical Computing in Dentistry", *Journal of the American Medical Informatics Society*, 2006.

[3] http://www.hrsa.gov/medicaidprimer/oral_part3only.htm

NNOHA HIT Committee members enumerated several specific objectives in their vision for greater technology adoption in the Health Center oral health setting:

- Foster integration of medical and dental information in Health Centers
- Increase the efficiency and accuracy of required reporting to HRSA
- Focus on all aspects of the patient's health, including oral, systemic, mental and behavioral health
- Enhance Health Center dentist recruitment and retention
- Gather and use data to support population health improvements
- Evaluate the effectiveness of clinical interventions
- Enable quality of care improvement measurement
- Improve the quality of care for health center patients
- Increase Patient Safety

Whether focused on clinical or public health, these goals are to improve the patient outcomes, and it is widely recognized that these efforts are simply not scalable without the effective use of technology.

Quality Improvement in Oral Health: HRSA's Oral Health Disparities Collaborative is applying the Chronic Care Model, developed by Ed Wagner, with a focus on quality outcomes in perinatal oral health, especially treatment of periodontal disease in pregnant women, and risk assessment, prevention and treatment of early childhood caries. Collaborative participants base treatment decisions on explicit guidelines or standards of care, ideally supported by an evidence base of best practices. Care teams devise ways to embed these standards and best practices into the day-to-day practice of the dental care team. Ongoing education for providers and care team members about new protocols of care occurs regularly and feedback about performance is integrated into standard clinic operations.

Standardization of treatment protocols among dentists, dental hygienists and dental assistants is a priority as is ensuring that the care team is using all of its members to the full extent of their licensure or certification. The Oral Health Disparities Collaborative is an example of how quality of care can be improved through systematic improvements in care delivery. However, the effort also highlights the importance of technology in meeting project objectives and demonstrating improved outcomes.

EVALUATING ORAL HEALTH TECHNOLOGY SYSTEMS

To support Health Center dental programs considering technology purchases, the NNOHA HIT Committee engaged in an evaluation of a small group of systems, as a basis for developing the starter set of system requirements in Appendix A. It also articulates the unique requirements of Health Center dental providers for vendors interested in this market segment, which NNOHA's Board of Directors estimates at $800,000,000 annually.

Three types of technology systems serve the oral health market. Some vendors provide all three modules described below, while others partner to offer clients a complete suite of integrated products.

Electronic Dental Record (EDR)

An electronic treatment record contains baseline information regarding:

- Patient's personal information, including demographic and financial data

- Medical and dental history information including medical conditions and medications prescribed by the patient's care providers as well as self-prescribed, over-the-counter medications and supplements, and medical alerts such as allergies or premedication needs

- Progress notes that include:
    ➤ Soft tissue clinical findings (including any pathology from oral cancer screenings as well as periodontal charting)
    ➤ Hard tissue clinical findings (including tooth-related conditions, TMJ, occlusion, and other pertinent findings consistent with the community standard of care)
    ➤ Digital images
    ➤ Other diagnostic tests including laboratory or pathology records
    ➤ Treatment plans with sequencing based on the above findings
    ➤ Record of treatment rendered (including all pertinent information regarding the treatment consistent with the community standard of care)
    ➤ A record of all communications and referrals on behalf of the patient to other staff members, specialists, labs, insurance plans, etc

Dental Practice Management (DPM)

Dental practice management software has several discrete functions:

- **Provider schedule templates** — provides the ability to develop and apply an appointment schedule by provider and location.

- **Appointment scheduling** — provides an electronic appointment book with many advanced capabilities such as scheduling procedures that requires multiple visits, moving blocks of patient appointments at a time, and providing a waiting list for the next available appointment.

- **Billing** — provides the ability to maintain preferences, billing codes, authorization information, and eligibility and claim form requirements based on coverage type. Most systems provide the ability to produce claim forms or to submit claims electronically, as well as to produce statements for patient fees and co-pays.

- **Accounting** — provides financial data on charges, collections, posting, account receivables, adjustments and write-offs.

- **Reporting** — a feature of importance to Dental Directors and practice managers, many systems have reports built into the application or provide the ability to query the database for ad hoc reporting or to customize these reports by entering date ranges, specific patient characteristic (e.g., insurance, dentist, procedure codes, etc.) to filter data. Other applications provide the ability to use a more powerful reporting tool that is generally purchased separately, such as Crystal Report Writer or Business Objects.

Digital Radiography

The integration of digital radiography into the electronic dental chart is essential to dentists. Products that have built-in digital radiography systems are more likely to achieve the robust functionality, flexibility and performance (i.e., speed of access and ease of image manipulation) that are needed for chairside use. These electronic systems instantly acquire and store images where they can be manipulated, viewed and transferred without using film. Sensors or phosphor plates take the place of film. Digital radiography has been shown to significantly reduce radiation exposure compared to using D-speed x-ray film. There are two general types of systems:

- Direct digital images use a charge coupled device (CCD) or complementary metal oxide semiconductor (CMOS) device to convert light into electrons, which are collected and turned into pixels that show brightness and contrast. Sensors can be used over and over, and the same sensor is moved from one place in the mouth to the next when taking images.

- Phosphor storage plate systems (PSP) trap electrons in a phosphor layer until processed. A laser beam releases stored energy causing emission of light that is read by a phosphor diode, which processes in seconds. The phosphor plates are erased by bright light and are reusable.

While there is no comprehensive data on the level of technology adoption in Health Center dental programs, a survey conducted in 2006 suggests that technology adoption in general dentistry is on the rise. [4] The authors of the study successfully screened 1,039 of 1,159 randomly sampled U.S. general dentists in active practice. The survey revealed that:

- Two hundred fifty-six (24.6%) had computers at chairside and thus were eligible for the study, of which 102 respondents (39.8%) were interviewed. Clinical information associated with administration and billing, such as appointments and treatment plans, was stored predominantly on the computer; other information, such as the medical history and progress notes, primarily resided on paper.

- Nineteen respondents, or 1.8% of all general dentists, were completely paperless. Auxiliary personnel, such as dental assistants and dental hygienists, entered most data. Respondents adopted clinical computing to improve office efficiency and operations, support diagnosis and treatment, and enhance patient communication and perception. Barriers to adoption included insufficient operational reliability, program limitations, a steep learning curve, cost, and infection control issues. [5]

---

[4] Schleyer, Titus K.L., DMD, Ph.D., et.al. "Clinical Computing in Dentistry", Journal of the American Medical Informatics Society, 2006.
[5] ibid.

Challenges to the Adoption of Technology in Health Center Dental Programs

There are numerous challenges to technology implementation among dental providers in Health Centers, ranging from product issues to factors inherent in Health Center environments. Significant gaps exist among current product offerings, including:

- **Products Designed for Private Practice —** The vast majority of dental software applications were designed for private practice and do not meet the unique reporting and operating environment needs of Health Centers without significant customization. There are over 40 products listed in a recent ADA product survey; however, fewer than six are known to be in use in Health Center dental programs.

- **Federal, State and Grant Reporting —** There is a need for practice management products to address the unique reporting issues faced by Health Centers, including the specific reporting requirements for HRSA in the Uniform Data Set (UDS). Many states have their own set of data requirements (such as the OSHPD report in California). Local community foundations require data to show the effectiveness of their grant making investments. Systems designed for private practice typically do not collect this data nor do Health Center reports come as a standard part of the application.

- **Billing —** Health Centers have unique billing needs for Medicaid, which can vary from state to state. In addition, they have sliding fee scale requirements for patients based on the federal poverty level, a cost-sharing arrangement that is unique to Health Centers.

- **Data Definitions and Data Collection —** Among the special data requirements for Health Centers are distinguishing an "encounter" from a "visit" or "episode of care", tracking unduplicated patients, and tracking demographic information, such as race, language and ethnicity. Most commercial systems are not designed to collect this data. Even when user definable fields are available to store this information, often it cannot be extracted or reported via standard system queries.

- **Population Health Management and Quality Improvement —** A key attribute of Health Centers is their focus on quality improvement, performance measurement, and outcomes measurement. Health Centers are on the forefront of population health management in the dental as well as medical setting (see Quality Improvement in Oral Health sidebar), and there is a pressing need to develop technological tools to support these efforts. Repetitive and time-consuming manual chart audits limit the ability to collect statistically significant quantities of data on a regular basis.

Health Level 7 (HL7): is a non-profit organization, which has developed a common language, or messaging standard, for healthcare information systems in order to exchange information between applications. This is often referred to as supporting the "interoperability" of systems, i.e., transferring data collected in one system to another system while preserving the meaning of the data. Messaging standards are important because they define how information is presented and communicated from one system to another. Using HL7 standards saves effort, time, and money in interface projects.

HL7 has become the standard in interfacing between health information applications to promote a universal health information exchange system.

Other important standards to be aware of include Digital Imaging and Communication of Medicine (DICOM) for transmitting digital images in medicine and dentistry, Current Dental Terminology (CDT), Current Procedural Terminology (CPT), and the Standardized Nomenclature of Dentistry (SNODENT) for determining how information is represented through a coding scheme.

- **Integration with Medical Systems —** Health Center dental programs are generally co- located with medical clinics, thereby providing both a unique challenge and an opportunity for electronic dental record vendors to maximize patient-centric integration between the two settings. Because most dental applications are developed for stand-alone practices, integrating or interfacing to medical practice management and electronic health records is rarely addressed. Developing and maintaining interfaces can be cost-prohibitive unless both systems are built on a standards-based or open platform. The NNOHA HIT Committee found very few dental systems that supported standard messaging protocols (see HL7 sidebar) and fewer still that are fully integrated with an EHR.

- **Enterprise-wide Demographic Database —** Health Centers provide a wide range of care including medical, dental, mental, and behavioral health services. Patients are offered the opportunity to receive comprehensive care within one organization, even if there are multiple sites. A central data repository is critical for preserving accurate, up-to-date patient demographic and eligibility data. Once a patient is registered into the central database (typically the medical practice management system), ancillary and "subscriber" systems, such as dental and mental health, can be simultaneously updated with this information if the specialty systems are interfaced. Without these interfaces, a comprehensive and integrated patient demographic record is difficult to achieve. Inaccurate demographic and health management data can adversely impact patient safety or confidentiality.

- **Medical Information Needed for Oral Health Care —** The overarching vision of the National Health Information Network is to integrate relevant clinical information across the continuum of care; for Health Centers this need is a daily reality. Dentists need to know information about patient allergies, conditions, pain assessments, current medications and medical history for treatment. Often, this information is captured in electronic format in the medical clinic. While some EHR vendors have plans to develop an integrated dental record into their EHR products, only one system was found that currently provides these features (see product analysis in Appendix B).

- **The Joint Commission (TJC) Accreditation Standards —** To meet TJC (formerly JCAHO) requirements for integrated care, particularly with regard to medication reconciliation, there are key data elements regarding medications, allergies, diagnoses and procedures that must be integrated between systems within an organization.

- **Mobile Computing —** Some Health Center dental providers will take dental services to their patients by operating dental vans for schools, homeless, migrant, or rural populations. Technology systems must be able to support mobile computing with synchronization to a master database.

Other challenges relate more to the Health Center operating environments than to the software systems.

- **Funding Sources —** Most Health Centers operate on razor thin margins, with unpredictable funding sources. Medicaid cuts and changes to reimbursement strategies leave very little operating capital for HIT investments.

- **Limited IT Support —** Many smaller Health Centers are challenged to hire and sustain dedicated Information Technology and Information Systems resources. Volunteers or staff members with an interest in technology (but fulfilling another full time role) will often be the only support available for selection, implementation, training, maintenance and optimization of technology systems within a Health Center. Even where dedicated IT resources exist, support for dental systems can frequently take a lower priority to support for the medical systems.

- **Leadership —** The selection and implementation process itself can be a challenge to many Dental Directors and their teams. Unfamiliar jargon, the high price tag, and potential organizational disruption can be a significant barrier to clearly articulating and advocating for dental needs in a Health Center's technology planning process. Professionals for whom providing oral health care is a primary motivator may be understandably reluctant to delve into a time-consuming and risky technology implementation project.

Key Success Factors for HIT Acquisition and Implementation

While much of the focus is directed at selecting the "perfect" system – and the right system is clearly a critical decision – organizational factors can play an even greater role in determining the degree to which benefits will be achieved. There are a number of key factors proven to yield positive results for organizations selecting, implementing, optimizing and sustaining HIT.
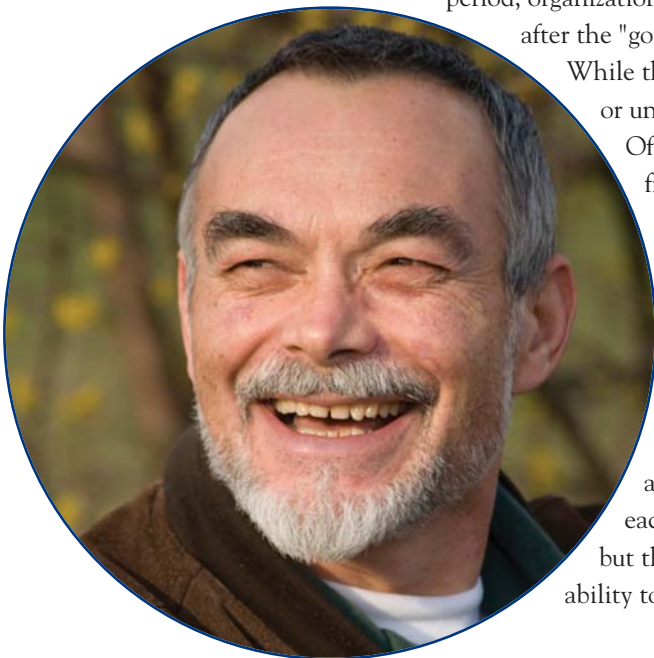
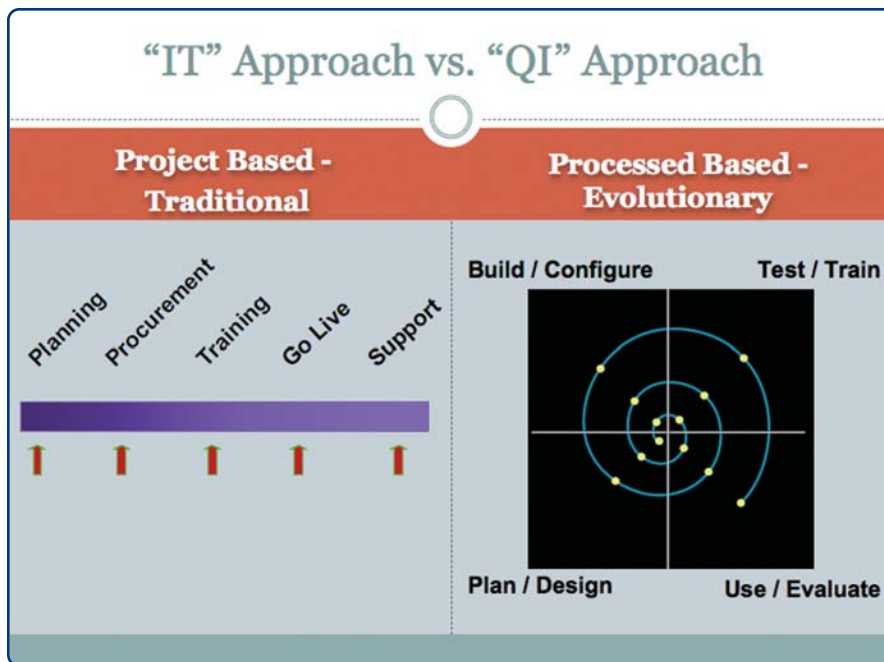## Leadership commitment is critical throughout the process.

HIT is a strategic asset of an organization that needs to be managed with the same attention given to other strategic assets, such as capital and human resources. Selection, implementation and management of HIT cannot be delegated to "the IT guy" or to the vendor. Responsibility rests with the leaders of an organization and, in this case, with the Dental Directors in particular. This does not mean that Dental Directors need to become technology experts; they do need to support the efforts of those implementing the system by allocating staff time, advocating for resources, removing roadblocks, setting the strategic direction for the implementation, and holding staff accountable for their efforts.

Take a quality Improvement or process-based approach to systems implementation.

HIT implementation must be based on a QI or process approach, rather than a standard IT or project based approach (see illustration). Although a set of sequential activities are required during the initial conversion period, organizations often make the mistake of thinking that they are finished after the "go-live", which is, in fact, just the beginning of the journey. While the concept of continuous implementation may seem daunting or unappealing, mastering the process can be extremely rewarding. Often an organization will implement only the basic features up front and then expand their use of the system over time as they have a chance to make the necessary process changes. The expansion is often haphazard and accidental rather than structured and orderly. By taking a spiral approach (see graphic below), beginning at the innermost point in the lower left quadrant and travelling outward, an organization can roll out features and functions in a deliberate way, with measurable benchmarks and milestones for success to be achieved before tackling the next feature set. The rate at which each organization completes an implementation cycle will vary, but the pace will likely accelerate as Health Centers improve their ability to manage change.

"IT" Approach vs. "QI" Approach

Project Based - Traditional

Planning · Procurement · Training · Go Live · Support

Processed Based - Evolutionary

Build / Configure · Test / Train · Plan / Design · Use / Evaluate

Understanding each organization's needs and capabilities leads to better IT choices.

Keep in mind that there is no "one size fits all" solution, especially in the unique environment facing Health Centers. There is a tendency to assume that because a product works well for a neighboring Health Center dental program, purchasing that same product will be risk free. This is not true. Product selection should be based on the needs and capabilities of each organization, which provide the best way to confidently assess each vendor's product offering. For example, if a vendor touts a sophisticated data extraction tool and report writer but the organization has only an occasional volunteer IT support staff, the likelihood of fully utilizing that feature is slim. Instead, this organization could negotiate a specified amount of custom report writing from a vendor, or be prepared to train internal staff to use the report writing capabilities.

Clearly articulating and documenting needs and capabilities can help develop functional requirements that form the heart of a vendor Request for Proposal (RFP). The requirements are used as a structured and objective guide in evaluating vendor demonstrations. Strengths and deficits can be more clearly identified and matched to the organization's needs. Vendors should be asked to document how they plan to meet each of the organization's key functional requirements and their response to the RFP should be included as an attachment to any contract.

NNOHA HIT committee members have prepared a "starter set" of requirements found in Appendix A and a guide for developing good requirements can be found in Appendix D to assist organizations in customizing this starter set.

Selection and implementation requires a multi-disciplinary, inclusive process.

Increasingly, technology systems reach all aspects of dental program operations, from chairside oral health care to electronic claims submission. While priority should be given to the needs and requirements that support Dental Directors and dental providers – the organization's most expert and constrained resources – a multi-disciplinary approach that considers all staff and departments is essential to achieving success and buy-in. If one group feels

disenfranchised from the selection process it is difficult to subsequently expect enthusiasm for the use of the system. Operational processes become tightly integrated through technology systems; suboptimal use of one module can have a ripple effect on the system as a whole.

Implementing a new system is a stressful process and has often been called a disruptive innovation. Forming a team with representation from each department or discipline can both help in selecting a product and establishing a network of change agents, who will be essential in the initial and on-going implementation process.

Putting technology management structures in place is required to achieve sustainable benefits.

Understanding that dedicated technology resources are scarce in Health Centers (and practically non-existent in dental programs), there are relatively low-cost technology management structures that can aid in defining accountability for the multitude of tasks and activities associated with good technology management.

- Continue to utilize the multi-disciplinary team that selected the system and make each member a "Super User" for implementation and beyond. Each team member will become the owner of their particular module (scheduling, billing, charting, digital radiography, etc.), and take responsibility for training their colleagues and keeping the module up to date. Be sure to add this responsibility to job descriptions including the percentage of time that will be allocated to this function.

- Establish brief but regular meetings of this Super User network to discuss issues related to the system. Assign one team member the responsibility to briefly document issues and their resolution, particularly if they require vendor support for resolution.

- Establish a forum for regular training to maximize the use of the system. Vendors typically provide initial training and training on system upgrades, but usually this just scratches the surface of the full capabilities of the system. Beyond the initial vendor training, a 10 minute "tip of the week", a discussion of advanced use of the system, or a report of data accuracy/error trends can be added to established dental clinic or departmental meetings. Meetings will be more frequent during initial phases of the implementation and can be reduced as the organization becomes more adept with the system.

- Establish "right-sized" written guidelines, policies and procedures for using the system so that data is collected in a standardized way. Dental systems today are highly flexible and configurable, but with these features come a level of complexity that must be carefully managed. Without standards of usage, data that comes out of the system cannot be trusted.

- Streamline communication with the system vendor through one or two authorized individuals. Vendors can get mixed messages about the organization's problems and priorities if all staff members are permitted to communicate these specific issues directly to the vendor.

- Take advantage of established user groups, either sponsored by the vendor or by a network provider of dental systems. Many Health Centers are choosing to join these networks that have been established to host practice management, electronic health records and dental systems, as well as provide support services. While there are many advantages to this model, individual Health Centers are still responsible for ensuring that the system is being used consistently and to its fullest extent by all staff members, according to the organization's policies, procedures and practices.

FIVE KEY QUESTIONS TO ASK WHEN CONSIDERING ORAL HEALTH SYSTEMS

1. **How will you ensure that your dental patient database is synchronized with the medical side for continuity of care and accurate reporting?** The recommended approach is to have one central demographic database (usually the medical practice management system) that can be interfaced to the oral health system. This is most easily accomplished by an HL7 interface. If the system you select does not offer an HL7 interface, your organization needs clearly defined and regularly audited manual procedures to ensure the databases are in sync, or be prepared to pay substantially more for a point-to-point custom interface. HL7 also allows for integration with key data elements needed from the EHR.

2. **How many locations and providers will need access to the oral health system, for what purpose and what percentage of time?** Many dental systems are designed for single office use. Unless a system is architected to support multi-site organizations with high patient volume, network latency (slow performance) and data corruption can occur. In addition, most vendors price their product based on number of users, or licenses, needed. For health centers that rely on part time and volunteer staff, a "body count" approach can be costly and inappropriate. Finally, some users may need "view only" access to the system and should not require a separate license.

3. **How much information will need to be in the dental system to be useful to providers on day one?** How will this information get entered? Define the organizational standards for data that needs to be present in the system (e.g., existing radiographs and X-rays, active medications, last three treatment plans, balance forward on accounts, etc.) and the methods and resources required to input this data. Input methods may include scanning in notes, manually entering data, converting data from other systems.

4. **What is the TOTAL cost of ownership of the proposed system?** Software licenses and hardware (computers, printers, scanners, monitors, servers, radiograph sensors/scanners, network upgrades) are relatively straightforward costs associated with implementation of a new system. However, there are "soft costs" associated with integrating technology into a dental program as well. For example, training includes not only the vendor's costs but also the cost of reduced productivity while staff attends training, learns the new system and follows new processes. Systems that are not intuitive to use can increase this start up time. Implementing new systems requires a project manager (either internal or an outside consultant), time for setting up the system and entering data. Ongoing maintenance and support purchased from the vendor also need to be in total cost calculations.

   Some Health Centers may find that a hosted model – where the server and software are located offsite and the system is accessed through the Internet – is a more cost effective solution. Commonly known as an ASP (Application Service Provider) model, the host may be a clinic network, consortium or the vendor. For Health Centers with scarce technology resources, this may be a viable option; however, there may also be limitations on individual customizations allowable for each of the network's subscribers.

5. **How will oral health perspectives be represented in the organization's technology planning on an ongoing basis?** Most Health Centers are either planning for or in the process of implementing an EHR and oral health system requirements need to be represented in the strategic technology planning process. This seat at the table for dental programs is necessary not only for system integration considerations but also to advocate for IS/IT resource allocations – either through an ASP or through allocation of the organization's IS/IT staff to manage the electronic dental record system.

Conclusion: A Call to the Future

There are a multitude of possibilities for all stakeholders invested in advancing the efforts of oral health in Health Centers, especially in utilizing technology as a tool to improve the health of individuals and their communities. There are compelling reasons to energize and support work in this area. Primarily, HIT is critical to fostering improvements in the quality of care, through better coordination and improvements in patient safety. HIT is also a critical tool in the cutting edge work that Health Centers have been doing in the area of population health and is even more important given the growing connections between oral and general health. In addition to improved quality of care benefits, these stakeholders will experience individual benefits:

- For Dental Directors, there are tremendous opportunities to better monitor their QI or process based approach to dental HIT implementation. By having improved quality of care as the driver for HIT implementation, Dental Directors have an opportunity to create a strong and lasting foundation for the spread of technology among Health Center dental programs. This can create a positive "domino effect" for other Dental Directors contemplating the adoption of HIT in their clinic.

- Policymakers and funders can engender change by creating funding opportunities that foster HIT integration between the dental and medical side of Health Center operations; that help to spread the adoption of HIT in dental settings; and encourage a quality improvement-based approach to technology implementation. With the growing momentum around fostering integrated systems of care, Health Centers provide a unique testing ground for integrating care between the dental, medical, and mental health settings, through the successful use of HIT.

- For vendors, there are numerous opportunities to either strengthen existing products or develop new products that meet the unique needs of Health Center dental programs. This sector of the HIT market remains largely untapped and currently uses products that are inadequate in meeting the gamut of needs in this setting. There are specific gaps individually for electronic dental chart systems, practice management systems, and digital radiography products that if addressed, could help to spread HIT adoption in Health Center dental settings. There is also a need to better integrate these products both within the Health Center dental setting and between the dental and medical side of a Health Center.

Health Centers have often been the trailblazers in defining and implementing innovations in care, and dental clinics provide yet another opportunity to for innovation. Much work remains to be done – both at the clinic level and across the field. By creating a multi-pronged but unified strategy that bridges the goals and objectives of Dental Directors, Executive Directors, policymakers, funders, and vendors, Health Center patients and their communities can receive better care through the thoughtful adoption of a variety of health information technologies.

A RESOURCE GUIDE
FOR DENTAL DIRECTORS AND STAFF

APPENDIX A:

STARTER SET OF FUNCTIONAL REQUIREMENTS FOR A DENTAL HIT SYSTEM

Using the American Dental Association product evaluation survey as a basis, the NNOHA HIT Committee members customized the requirements to more closely reflect the needs of health center providers. These requirements were then used as the basis for a product evaluation of four dental products found in CHCs, or for those expressing an interest in supporting this market segment. These requirements are offered as a starting point for oral health programs to use in their system selection process but they are not intended to be complete or inclusive of all organizational perspectives. Customizing and prioritizing the requirements to meet your organization's needs are essential. Requirements that are particularly important to Health Centers have been noted with an asterisk. Appendix C contains the HIT Committee's opinion of each vendor's ability to meet key Health Center requirements.

1.		Usability and Navigation
	1.01	Page forward and page backward functions are provided for multi page screens (data entry and display).
	1.02	User interface provides a patient summary with a snapshot of all exams, notes, and treatments with dates.
★	1.03	The system has user-definable fields throughout the application that are fully reportable.
★	1.04	Drop-down menus are available for data entry, progress notes, treatment plans with spell-check and choices displayed alphabetically or most frequently used.
	1.05	User interface provides the ability to see the patient's documents and digital radiograph scans and chart on one screen.
	1.06	Hot Keys, buttons, and jumps advance from one part of a patient's file to another while retaining current patient when inside patient record.
	1.07	Hot Keys, buttons, and jumps advance from one clinic location to another when in appointment scheduling mode.
	1.08	Display and data entry screens for all applications accessed via functionally grouped menus and submenus.
★	1.09	System provides the ability to designate certain fields as required data entry fields that prevent the user from continuing until data is entered (e.g. PAIN ASSESSMENT; VITAL SIGNS).
	1.10	Error detection/correction employed and smart data entry features available to enhance accuracy of data by editing date ranges, numeric vs. alphanumeric, valid number range, etc.
	1.11	Document scanning of medical history automatically populates medical alerts including allergies, medications, and medical conditions from practice-defined medical history form template.
	1.12	Tabs or special rapid access markings of the screens/pages are available for ease of locating information.
★	1.13	The patient chart/record /scanned and digital image can be accessed in 5 seconds or under.
	1.14	Records lock in order to prevent simultaneous modification by more than one person.
	1.15	A practice defined progress note "lock down" prevents further changes without formal amending of the entry.
	1.16	The system provides the ability to print entire chart with one or two commands for portability or legal review.
	1.17	Archiving/purging of records with verified printed output is available.
	1.18	The system supports patient search by a number of criteria including name, birth date, and other demographic data.
	1.19	The system supports merging charts for the same patient with multiple charts. This function is available to authorized users without programming assistance.
	1.20	The system can auto-populate progress notes with prescriptions entered in the drug database.
	1.21	Clinical note templates are customizable by procedural code.
	1.22	The system provides context sensitive online help, i.e. highlighting a field and clicking "help" provides information specific to that field.
	1.23	System prevents duplication of social security numbers.
	1.24	Patient profile includes demographic, financial and commitment information as well as guardianship/conservator, nearest relative/emergency contact, and parent information.

Training and Support

	2.01	Vendor provides training on all features of the system. Training may be through video, on-site (before, during and after EDR implementation), tutorials, or in combinations.
	2.02	Support is available by telephone during the prevailing work hours of dental offices in the clinic's geographical area with the option to have evening and Saturday hours of coverage available via phone or online for web-based software version of application.
	2.03	Maintenance fees include training on system upgrades.
★	2.04	Vendor monitors federal and state regulations and incorporates necessary forms and features to support them as part of maintenance fees.
	2.05	Vendor provides a Service Level Agreement as part of the purchase contract that describes priority/severity of problems and the response time associated with them.
	2.06	Vendor provides a mechanism for customers to influence the addition of new features and functions into the product.
★	2.07	Trainers and account managers understand the requirements of FQHCs, Migrant Healthcare, Homeless Healthcare and government payers.
★	2.08	A user group has been established with regular meetings and specific tracks for Health Center users.

Care Management and Treatment Planning

	3.01	A comprehensive display of treatment completed and planned is displayed.
	3.02	Treatment plans can be constructed in phases.
	3.03	Onscreen treatment planning - virtual charting – is available.
	3.04	Procedures performed and pending are tracked. A report of either can be produced.
	3.05	A treatment plan broken down by visit with financial requirements, time spreads, & notes on a report for the patient is available.
	3.06	Multiple treatment plans can be stored and generated for one patient.
	3.07	The system provides the ability to identify and retain deleted and/or changed treatment plan items.
	3.08	Printed treatment plans indicate date, time, and user printing the treatment plan.
	3.09	Explanatory notes can be stored with individual treatment plan items.
	3.10	Dentist can utilize a "status" to be applied to any treatment plan or its items.
	3.11	Treatment plans can be constructed in phases including multiple treatment plans that can be stored and generated for one patient. • Customizable treatment plans based on treatment priority order / clinical findings. • Ability to create alternative treatment plans based on clinical findings.
	3.12	Ability to print incomplete treatment plans by: provider, procedure or user defined criteria.
	3.13	Ability to transmit treatment plans electronically to third party carriers for pre-determinations.
	3.14	Ability to automatically calculate insurance benefits and patient financial liability when entering procedures on a treatment plan.
	3.15	Ability to monitor treatment plans by medical diagnosis such as diabetes.
★	3.16	A Dental Lab tracking module is available that interfaces with the Appointment module indicating the patient's next scheduled appointment and allowing dental staff to enter by patient dual identifiers and location: • the dental lab where the clinical case is being sent, • the date when the case was picked up; • the date when the case is requested back; • a description of the dental work being processed; • the signature or initials of the staff member sending out the case, • the actual date the dental lab work is returned; • the signature or initials of the staff member checking in the case.
	3.17	An integrated patient education system based on practice defined fields and reports from CHC oral health disparities targeting specific systemic illness, oral conditions, or financial classes.
	3.18	Ability to create templates with treatment plans and chart notes that allow charting by exception to minimize typing.
	3.19	Ability to display or generate next appointment, recall information.
★	3.20	The system has an integrated recare / recall system capable of generating multi-lingual patient reminders.
★	3.21	Built in ability to create treatment completion reports and user defined outcome measures such as: • # of completed treatment plans • # of children with sealed permanent molars • # of infants and toddlers receiving fluoride varnish • # of parents receiving anticipatory guidance • # of diabetics receiving periodontal therapy

Tooth and Periodontal Charting

	4.01	Ability to chart supernumerary teeth in primary and permanent dentitions.
	4.02	Ability to view radiographs on the same screen as the area being charted.
	4.03	Ability to see the date of the exam on the tooth charting and periodontal charting/PSR as part of the data collected.
	4.04	Ability to overlay the full mouth periodontal exam or PSR findings over the tooth charting for a better general synopsis.
	4.05	Ability to conduct a PSR independent of a full mouth periodontal examination.
	4.06	Ability to utilize voice recognition, voice activated software to record periodontal findings during a full mouth periodontal exam or PSR.
	4.07	Customizable practice defined full mouth periodontal exam templates.

Productivity Measurement and Support

	5.01	System has a built in way to track and report broken, failed, or canceled appointments according to user defined criteria.
	5.02	System tracks lost production and unscheduled treatment from broken appointments.
	5.03	System provides patient listing for confirmation of appointments (with comments on financial information if applicable).
	5.04	All statistics and reports available by location of treatment, provider, or combination thereof.
	5.05	Average patient case fee (average production and collection per patient over a date range by provider) is calculated.
	5.06	Referral report showing referred, treatment planned, treatment performed, fees and collections is available.
	5.07	The system quantifies the number of active patients using practice-defined criteria of "active".
	5.08	Historical reporting of transactions available by user defined date parameters.
★	5.09	The system calculates unduplicated patients for UDS reporting.
	5.10	Ability to assign an "effective date" to provider schedule templates and maintain several templates simultaneously for the same provider.
	5.11	Ability to track the number of vacation, sick, personal, continuing education and holiday time taken by providers (and support staff) over the course of the year.
	5.12	Ability to track via a virtual sign-in/sign-out time clock staff members' punctuality.
	5.13	Ability to monitor access and efficiency using the following measures: • track the average time in days to the third next available appointment for routine care, • track the average amount of time a patient waits to be seated for their appointment, • track the average amount of time of a patient visit from when the check in to when they check out, • monitor patient's satisfaction with their dental visit via an electronic patient satisfaction survey.

	Billing	
★	6.01	Ability to support FQHC/Medicaid requirements to bill by an encounter rate (individual procedures roll up to an encounter rate).
★	6.02	Ability to calculate a sliding scale fee for service based on federal poverty guidelines.
★	6.03	Supports secure electronic billing to governmental payers.
	6.04	Insurance forms printing for completed and planned services, including Medicaid and ADA standard dental claim form.
	6.05	Day sheet generation for balancing the deposits and viewing billings for the day.
	6.06	Aging dates reflect current (under 30 days), 30-60 days, 61-90 days, 91-120 days, over 120 days.
	6.07	Separate and combined aging by provider, payer, contracts, grants, etc.
	6.08	Open item accounting for insurance billing and tracking.
	6.09	Automatic generation of a fee upon entry of a procedure code.
	6.10	Ability to see outstanding balance from Appointment Screen and Charting Form.
	6.11	Claim form duplication for resubmission.
	6.12	Insurance aging and auditing of submitted, paid, non-submitted claims.
	6.13	Insurance coverage breakdown per policy, employer, or company that list deductibles, maximums, % per category, etc.
	6.14	Reflection of primary insurance payment when secondary claim is sent.
	6.15	Changes estimated insurance portion when entering charges.
	6.16	Single screen posting of batch insurance payments.
	6.17	Supports electronic remittance posting.
	6.18	Ability to transfer old balances to another responsible party.
	6.19	Open item accounting for insurance billing and tracking.
	6.20	Open item insurance estimation.
	6.21	Secondary insurance processing generated by primary insurance response.
	6.22	Ability to check insurance eligibility, insurer coverage for proposed treatment in real time.
	6.23	Account balance broken down by: previous balance, today's treatment and fees, 3rd party coverage information.
	6.24	Deductible and/or co-payment owed; remaining coverage; expected payment from 3rd party.
	6.25	**Statements –** Statements reflect estimated insurance benefit and patient balance; PPO, HMO coverage, processing and eligibility handling.
	6.26	Dunning statements generated for billing.
	6.27	Multiple cycles for billing statements (for example, aging date, alphanumeric by name, etc).
	6.28	Financial arrangements on statements.
	6.29	Statements printed on request for single patient.
	6.30	Print statements in user defined order.
	6.31	Adding a statement comment to a patient group.
	6.32	Immediately displays walk-out statement (i.e., what is owed by patient and insurance).

Integrates Records Among Sites that are Geographically Disparate

		7.01	Ability to schedule one provider at multiple locations using the same provider number.
		7.02	Online patient profile inquiry screen available at all sites.
		7.03	All statistics and reports available by location of provider, treatment performed or combination thereof.
		7.04	Offers keyboard "hot keys" to quickly switch between location sites for access to appointment schedules, patient records, etc.
★		7.05	One database links geographically disparate sites.
		7.06	Ability to operate the system in a mobile van with access to central database.

Meets TJC (formerly known as JCAHO) Standards

★		8.01	Meets TJC requirements for medication reconciliation between health records.
★		8.02	Meets TJC standards for dual patient identifiers to prevent clinical errors.
★		8.03	Meets TJC standards for authentication and authorization when logging on to the system.
		8.04	Meets TJC standards for medication abbreviations (i.e., "dirty dozen") and prevents users from entering these abbreviations.

Imaging and Document Scanning

		9.01	Ability to roll over "thumb nail" views of scanned radiographs and documents in series or table format with resultant "zoom preview" of contained images.
		9.02	Multiple users can access same radiographs simultaneously.
		9.03	Integrated EDR document scanning module is compatible with duplex scanner software allowing scanning of two sides of documents at once.

Integration with PM/EHR Systems

★		10.01	Ability to interface demographic information from medical practice management system, including one time population of database, using HL7 messaging standards.
★		10.02	Ability to receive diagnoses, allergies, and medication lists interfaced from EHR.
★		10.03	Database is exportable / importable or has interchangeability so that other applications can use the data.

Technical Requirements

★	11.01	Ability to run the application on thin client technologies.
	11.02	The system is available through an Application Service Provider (ASP) option.
★	11.03	The system is HIPAA and TJC compliant for security and privacy, with well-documented backup and restoration procedures.
	11.04	Ability to access remotely via a virtual private network (VPN) from anywhere with internet access.
	11.05	The system is standards-based and hardware/software independent for digital radiography.
★	11.06	Access to the database for reporting purposes is made available through a commercially available reporting tool.
	11.07	A tutorial is provided on how to export data from fields within the software to programs like Crystal Reports and Microsoft Office applications.

APPENDIX B:

PRODUCT EVALUATIONS

The NNOHA HIT Committee engaged in a product evaluation, facilitated by Full Circle Projects, of four leading dental systems, and wishes to thank these four vendors for participating in the evaluation and providing the information that follows. The vendors are:

- Dentrix Enterprise by Henry Schein, Inc.
- EagleSoft by Patterson Dental
- PracticeWorks by Kodak
- QSI Dental

Vendors were given the starter set of dental system requirements found in Appendix A and asked to demonstrate their product to the Committee members with these requirements in mind. Demonstrations were held throughout June 2008, both in person and via the Internet. Readers should keep in mind that the demonstrations were brief (1.5 – 2 hours) and thus could not address all the issues, questions, and requirements comprehensively. Although the HIT Committee has provided a narrative summary and evaluation of the key Health Center requirements, it should not be construed as a "certification process". Dental Directors and Health Center staff are encouraged to use this information as a basis for their own system selection and procurement process.

The Committee's overall impression of these products is that they share many key features; all are designed well, each has its strengths, and weaknesses, and there is no "one size fits all" solution. There is, however, a major difference between software designed for private practice and that geared for the FQHC market. Software geared for private practice tends to focus on the core competencies of productivity measurement, time management, financial management, and commercial insurance billing. These systems have less emphasis on the EHR integration requirements, connectivity between multiple sites, outcome based reporting, and TJC standards. They have robust practice management systems and solid EDRs with integration of digital radiography.

Dentrix Enterprise and QSI are more suited for the Health Center market. They offer HL7 interfaces, are beginning to manage reporting a bit differently, and track some types of data that the private practice systems do not do "out of the box". Health Centers require private practice oriented HIT systems to accommodate user defined fields and make other customizations to meet the reporting requirements of Health Center dental directors and administrators.

Another mission of the HIT Committee was to identify the key components lacking in most systems or requiring further development to better support Health Center dental programs. One area requiring development is seamless, bi-directional interoperability between the medical and dental practices. Dentists want to be able to review pertinent medical history at a click of a button. Medical colleagues want to know that their patients' oral health needs are being addressed. This level of connectivity would not only improve patient safety in terms of medication management and allergies, but would also help provide an "all-inclusive" health home for the patient. Vendors that can support this goal will likely flourish in the Health Center market.

COMPANY: HENRY SCHEIN, INC.

PRODUCT NAME: DENTRIX ENTERPRISE

Dentrix
Contact: Randy Foley
randy.foley@henryschein.com
248-582-1529 main
248-990-5653 mobile
248-547-5640 fax

Vendor's Statement of Capabilities:

"Dentrix Enterprise is a wholly owned subsidiary of Henry Schein, Inc, a Fortune 500 company with 2007 revenues of 5.9 billion dollars, and is the number one software program found in Health Dental Centers. Main features unique to Dentrix Enterprise in comparison to all other dental practice management systems include: HL7 interface with any HL7 compliant medical program including most medical and EHR systems used by Community Health; UDS reporting including tables 3A, 3B, 4, 5, 6 & 9; multi-site logic and reporting for multi-site practices; the leading electronic restorative and periodontal charting system with a fully integrated imaging system; sliding fee schedules & RVU schedules. Whether a Health Center is in the market for a complete practice management system with a fully integrated electronic dental record or simply an electronic dental record interfaced with their medical PM/EHR system, Dentrix Enterprise has the right solution."

Client base (# of organizations):	• Dentrix Enterprise has 314 customers representing approximately 1,800 locations. • Core Dentrix is found in over 26,000 private dental practices.
Number of safety net/Health Center clients:	• Of the 314 customers, 167 are community health/public health/CHC. 72 are a vocational school, hospital, correctional facility, and Indian Health Facility. 75 are private dental practice management companies (DPM's).
Largest client (number of connected sites and number of users in one organization):	• Forty-three sites using a total of 243 concurrent users. • Ten sites with 400 concurrent users.
Can the application be offered on an ASP basis?	• Dentrix Enterprise is currently hosted by a number of hosting services specific to community health including Health Choice Networks (HCN), Michigan Primary Association (Virtual CHC) & Ohio Shared Information Systems (OSIS).
Pricing Methodology:	• See Below.
Maintenance Fees:	• Included in Pricing Below.

Pricing

- **Satellite Sites**

  Each dental office that installs or runs the Dentrix Enterprise software at that location is required to obtain a separate Site License. Pricing models include a minimal five concurrent users per site or a ten concurrent user per site. Pricing models for either the five or ten concurrent user models also include an Electronic Dental Record only model or a full Electronic Dental Record with practice management model. The former will be interfaced to an HL7 compliant medical program whereas all billing is passed to the medical program and the latter model can be used where Dentrix Enterprise is used for billing as well as an EDR. The EDR only model includes a bi-directional interface. Please note that a fee may be charged for the HL7 interface from your medical software for their side of the HL7 Interface. Digital X-rays, Intra-oral Imaging and Voice Charting are optional with all configurations.

- **For the Electronic Dental Record only the Dentrix Enterprise application site license for 10 concurrent users per site includes the following products:** HL7 Bidirectional Interface, Office Manager, Family File, Electronic Scheduling, Patient Restorative and Perio Charting and Document Center, (NO BILLING):

Site #	NNOHA Pricing	Annual Support & Enhancements per Site
1	$18,950	$2,695
2	$7,550	$1,315
3	$5,950	$1,075
4	$5,000	$835
5	$4,500	$715
6	$4,500	$715
7	$4,500	$715
8	$4,500	$715
9	$4,500	$715

  The investment figures above are per site for up to 10 workstations, additional workstations are $500 each plus $60 per year for annual support & enhancements

- **For the Electronic Dental Record only the Dentrix Enterprise application site license for 5 concurrent users per site includes the following products:** HL7 Bidirectional Interface, Office Manager, Family File, Electronic Scheduling, Patient Restorative and Perio Charting and Document Center, (NO BILLING):

Site #	NNOHA Pricing	Annual Support & Enhancements per Site
1	$16,450	$2,095
2	$7,950	$1,075
3	$5,950	$835
4	$4,500	$595
5	$4,500	$595

  The investment figures above are per site for up to 5 workstations, additional workstations are $1,595 each plus $190 per year for annual support & enhancements.

- **For the Practice Management and Electronic Dental Record Model the Dentrix Enterprise application site license for 10 concurrent users per site includes the following products:** Ledger (Billing), Office Manager, Family File, Electronic Scheduling, Patient Restorative and Perio Charting and Document Center, (NO HL7 Interface):

Site #	NNOHA Pricing	Annual Support & Enhancements per Site
1	$13,950	$2,095
2	$7,550	$1,315
3	$5,950	$1,075
4	$5,000	$835
5	$4,500	$715
6	$4,500	$715
7	$4,500	$715
8	$4,500	$715
9	$4,500	$715

The investment figures above are per site for up to 10 workstations; additional workstations are $500 each plus $60 per year for annual support & enhancements

- **For the Practice Management and Electronic Dental Record Model the Dentrix Enterprise application site license for 5 concurrent users per site includes the following products:** Ledger (Billing), Office Manager, Family File, Electronic Scheduling, Patient Restorative and Perio Charting and Document Center, (NO HL7 Interface):

Site #	NNOHA Pricing	Annual Support & Enhancements per Site
1	$11,450	$1,495
2	$7,950	$1,075
3	$5,950	$835
4	$4,500	$595
5	$4,500	$595

The investment figures above are per site for up to 5 workstations, additional workstations are $1,595 each plus $190 per year for annual support & enhancements

- **HL7 Interface**

  The investment for the HL7 interface is included with the EDR only model and optional with the Practice Management Model.   A typical bi-directional interface consists of basic demographic information coming from the medical software and completed dental charges being sent to the medical software. Other options include appointment data with visit numbers coming from the medical system and clinical notes being sent to the medical system.   Please note that some medical software packages require that an HL7 interface be licensed for their software as well. It is the responsibility of the medical software to send the appropriate HL7 messages and to process the ones that are sent from Dentrix. For the Practice Management Model a typical implementation that will enable you to have a one way interface of basic demographic data from your HL7 compatible medical software to Dentrix Enterprise is $4,995 plus an annual license of $1,200. A typical bi-directional interface with basic demographic information coming from the medical software and completed

dental charges being sent to the medical software is $9,995 plus an annual license fee of $1200. Additional fees may apply for additional systems and data such as, Appointments, Patient Visit Numbers and Clinical Notes.

- **Installation**

  Installations need to be scheduled during a pre-installation conference call that will be held to assure a smooth transition to Dentrix Enterprise. Installation of the software performed over a telephone connection by our technicians including the creation of the data tables on your SQL Server, and testing the connectivity between the database, OS and application is included. On-site installation assistance from our Technical department for 40 hours on-site is available for $8,000 plus travel related expenses. Additional time is billed at the rate of $250 per hour plus travel. Weekend telephone installation is available at an additional cost of $6,000.

- **Training**

  $800 per eight-hour day, plus travel expenses from a Dentrix Certified Trainer. As an option, we provide a "Train the Trainer Program" at our corporate facility in Utah or at your site. The course is a full week and will only include students from your organization. The "Train the Trainer Program" is $3,600 for the first person and $600 for each additional person in the same class. Travel expenses are not included in the tuition.

- **Data Conversion**

  There are three parts of a data conversion: 1. extraction of data from old system, 2. manipulating the data to conform to a standard file format, 3. building the database. The fee is $1,250 per database.

The following items are not included in the above investments:

- Hardware, Preparation of the computer site & On-Site labor and/or installation

- Third party software such as Microsoft 2003 Server, Microsoft Terminal Server, Citrix, Microsoft SQL 2000/2005 & Microsoft Word

- Custom Software Modifications

- Applicable State & Local Sales Taxes

- Travel Expenses for Training/On Site Install

- HL7 Fees from Medical System

NNOHA HIT Committee Evaluation Summary:

The NNOHA HIT Committee acknowledges Dentrix Enterprise as the leading software application found in Health Centers. The product is architected to provide multi-site support and a bi-directional HL7 interface with the medical practice management system. Trainers and support personnel understand the Health Center environment and provide support for UDS reporting, encounter rate billing, and hosted/ASP deployment. An annual users group is convened with a track specifically for Health Centers. The Committee found the user interface and navigation to be generally friendly and intuitive, with support for record locking (preventing simultaneous entry or modification of records by multiple users), patient searches, and chart merging to be particularly strong. Data entry from drop down menus and optical character recognition (OCR) scanning were cited as weaknesses to Enterprise's usability.

Additional strengths of the product include comprehensive and user-friendly treatment planning capabilities, including: the display of planned, pending, and completed treatments; recall and recare features; the ability to apply a status to the treatment plan or its items; and printing incomplete treatment plans by user-defined criteria. However, the Committee found that the ability to store and generate multiple treatment plans for one patient, as well as the ability to retain deleted and /or changed treatment plans was a weakness in the product. Several features of Dentrix Enterprise support productivity measurement and tracking. These include: tracking lost production and unscheduled treatments from broken appointments; statistical reporting across the enterprise (by location of provider, treatment performed, or combination); UDS reporting; and other historical reporting by user defined date parameters.

Dentrix Enterprise is packaged with integrated imaging functionality. The digital radiograph processing software is not user friendly and the resultant images using phosphor storage plates fall short of the diagnostic quality of traditional x-ray film and chemical processing with developer and fixer. Although this feature is part of the product now, it was not originally architected that way. Henry Schein purchased the product that is now bundled with Dentrix Enterprise, and support processes are still somewhat disconnected for the two products. Radiography is generally strong within the product; however, the HIT Committee felt that a higher degree of ability to manipulate the digital images would be beneficial.

The Lab Case tracking module, present in the private practice version of Dentrix, is still missing from Dentrix Enterprise, and would be a welcome addition to Health Center dental practices where dental management staff often oversee more than one location.

The HIT Committee finds Dentrix Enterprise to be technically strong with an accessible database for reporting, and a viable choice for Health Centers, especially those that are multi-site. Deeper integration with the electronic health record – particularly for allergies, medications, diagnoses, and procedures – is an area where the Committee recommends that Henry Schein focus its efforts on continuing development.

COMPANY: PATTERSON DENTAL, INC.

PRODUCT NAME: EAGLESOFT

EagleSoft
Contact: John Reinhardt
john.reinhardt@pattersondental.com
303-518-1359 mobile

Vendor's Statement of Capabilities:

"EagleSoft is the most adaptive and technologically advanced dental software package on the market today. Front desk, clinical and imaging procedures are all at your fingertips in one patient record. EagleSoft delivers the most comprehensive digital integration package in the industry, with more than 20 digital integration options available. What's more, EagleSoft comes with Patterson's legendary support. Support is always just one click or phone call away. We stand behind every aspect of EagleSoft."

Client base (# of organizations):	• There are over 18,000 EagleSoft users.
Number of safety net/Health Centers clients:	• This data is not centrally tracked, but a reasonable estimate would be 75-100 clients.
Largest client (number of connected sites and number of users in one organization):	• EagleSoft has one customer with 3 locations and 150+ workstations and is using EagleSoft on the same network. EagleSoft also serves an organization with approximately 130 separate dental practices and each uses a separate EagleSoft database on their own network.
Can the application be offered on an ASP basis?	• EagleSoft is not currently web-based or available via the web.
Pricing Methodology:	• See Opposite.

Pricing:

EAGLESOFT PRICING & PACKAGING REFERENCE (Effective – June 9, 2008)

Front Desk / Office
- Practice Management   (Previously sold for $3960)   FREE
  (Includes Accounts, Scheduler, Money Finder, eBusiness and more)
- Multi-User Licensing (Previously sold for $1080)   FREE

Clinical
- Charting - Visual Tooth and Perio charting $ 1800
- Advanced Imaging - Digital X-ray $ 1800
- Advanced Imaging -Video Capture $ 1800

  OPTIONAL SOFTWARE MODULES
- Advanced Imaging (Digital & Video Capture)   FREE *

  *** REQUIRES PURCHASE OF $5000 IN DIGITAL OR CAMERA PURCHASE***
- Cosmetic Imaging $ 1800
- Voice Activation $ 1800
- Clinical Bundle (Charting, Digital X-ray, Video Capture, Cosmetic Imaging $ 6840
  ($ 360 savings)

Data Conversion and Image Conversion
- Data Import - Includes patient demographics and accounts receivables   FREE
- With account history $ 1800
- Date Evaluation - Assessment of data and review with client   FREE
- Image Conversion $ 1800 **

  *** Image conversion limited to Dentrix, ImageFX, Schick and Vixwin**

NOTE: Other conversion options are available and will be determined and discussed upon review

Training
- Initial training day (includes travel and hotel expenses) $1200
- Consecutive training day - (Monday, Tuesday, Wednesday) $ 600
- Consecutive training day - (Thursday, Friday) $ 800
- Half day Training $ 600

NOTE: Additional options and packages are available. Training period determined by the objective and modules of software purchased as well as the needs of the staff at the practice

Technical Support
- Practice Management Only $ 100 per month
- Practice Management and Clinical $ 140 per month

NNOHA HIT Committee Evaluation Summary:

The HIT Committee gave EagleSoft a high rating for its full and seamless integration of digital radiography, a feature of great importance to dentists. However, the system has shortfalls in providing some of the specific features necessary for Health Centers. EagleSoft was found to be exceptionally user-friendly and intuitive by the Committee. It included such functionality as: hot keys, buttons, and jumps to advance from one part of a patient's profile to another; the ability to see a patient's documents and digital radiograph scans and chart on the same screen; and error detection / correction and smart data entry features to enhance accuracy of data entry.

EagleSoft provides online help as well as a comprehensive support package for both hardware and software, if desired. Treatment plans can be broken down by visit on reports, procedures can be tracked as performed and pending, multiple treatment plans can be stored and generated for one patient, and "status" can be applied to any treatment plan or its items. Other strengths regarding patient care and treatment planning include recare / recall information displays, the ability to print incomplete treatment plans by user defined criteria, and the ability to transmit treatment plans electronically to third party carriers. Particularly impressive was a robust suite of patient education materials available through a companion product, Caesy Patient Education. EagleSoft was found to be HIPAA compliant and to meet TJC standards for authentication and authorization when logging on to the system.

EagleSoft was found to lack proficiency in some important requirements for Health Center billing including the calculation of a sliding scale fee based on federal poverty levels and encounter rate billing. The tracking and reporting abilities (UDS reporting, personnel tracking, access and efficiency tracking, and population health management) of EagleSoft are limited. EagleSoft does not follow HL7 protocols for information exchange and does not meet TJC requirements such as medication reconciliation between electronic health records. Finally, EagleSoft does not currently offer a thin client or web-based application and was not able to prove its efficiency to geographically link disparate sites with one database.

COMPANY: KODAK DENTAL SYSTEMS

PRODUCT NAME: PRACTICEWORKS

PracticeWorks
Contact: Matt Hendrickson
800-262-8144 Ext 72050 office
801-659-8561 fax
matt.hendrickson@practiceworks.com

Vendor's Statement of Capabilities:

"PRACTICEWORKS Software goes beyond standard dental practice management systems. We provide automated tools that proactively manage your day-to-day business processes so that the information you need is at your fingertips. Now, the latest version of PRACTICEWORKS Software gives you more tools to operate your office efficiently. Our comprehensive set of scheduling, charting, financial and integration features offers you a robust, easy-to-use system that can help your practice become more productive, efficient and successful."

Client base (# of organizations):	• PracticeWorks has approximately 29,000 clients.
Number of safety net/Health Centers clients:	• This information is not tracked by PracticeWorks.
Largest client (number of connected sites and number of users in one organization):	• This information is not tracked, but PracticeWorks does have clients with multiple sites. These clients are listed under one license.
Can the application be offered on an ASP basis?	• PracticeWorks does not offer an ASP system at this time. PracticeWorks does, however, offer Subscription Pricing to replace the traditional purchase prices above. Subscription prices can be as low as $315/mo, which include IWT (Training on Demand) and Unlimited Support/Updates.
Pricing Methodology:	• Pricing 1-3 users with IWT (Training on Demand) $6390. • Pricing 10 users with IWT (Training on Demand) $8390. • Price Varied depending on total users beyond 10.
Annual Maintenance Fees:	• $114/month for unlimited Support and Software Updates.

NNOHA HIT Committee Evaluation Highlights:

The HIT Committee found PracticeWorks to be exceptionally user friendly and intuitive with rapid data entry through drop down menus, easy construction of progress notes and treatment plans, error detection / correction and smart data entry features to enhance accuracy, and real time updating of information.

PracticeWorks supports optimal patient care and treatment planning by supporting merging of charts for patients with multiple charts, allowing treatment plans to be constructed in phases, permitting on screen treatment planning, tracking of performed and pending procedures, allowing sorting and ordering of treatment plans, and having the ability to transmit treatment plans electronically to third party carriers.

The product also has good tracking features, including: a dental lab tracking module; tracking and reporting of broken, failed or canceled appointments; lost production tracking; and unscheduled treatment tracking from broken appointments. PracticeWorks offers a great asset in providing the ability to calculate insurance benefits and patient financial liability when entering procedures on a treatment plan. It also has a strong billing and financial management module. PracticeWorks' clearing house is used to transmit claims electronically to payers. Reporting can be filtered by user defined date parameters and the database is exportable / importable so that other applications can use the data. PracticeWorks integrates digital radiography images very well and is HIPAA compliant for security and privacy.

In general, PracticeWorks did not demonstrate a proficient understanding of, or prove to be a prominent player in, the Health Center market. Tracking modules were not able to support population health management, and the product lacked the ability to produce UDS report statistics. Encounter rate billing and sliding scale fee calculation were also lacking in the product. The product did not meet TJC standards important to the Committee and lacked the ability to interface demographic information from a medical practice management system through HL7 protocols. PracticeWorks is not offered on an ASP basis and has not demonstrated significant multi-site capability.

COMPANY: QSI, Inc.

PRODUCT NAME: QSI

QSI
Contact: Kathleen Knoll
knoll@qsi.com
949.255.2600 ext. 217

Vendor's Statement of Capabilities:

"With over 35 years of experience implementing dental practice solutions, Quality Systems, Incorporated (QSI) represents the most comprehensive information technology product suite available for dental practice organizations in the marketplace today. During the last three decades, QSI has built a reputation of anticipating changes in healthcare and delivering solutions that address those changes. QSI, throughout its entire history has remained focused on the needs of large, ambulatory group practice enterprises. Within the marketplace, QSI is the only vendor who, for more than 30 years, has consistently implemented and supported dental practice organizations that manage 100 or more clinical practice locations per single practice entity. Large enterprises require cost-effective, standardized, stable, reliable, secure solutions, which are compliant with state and federal regulations.

QSI has a history of delivering solutions that meet these requirements, and is a company that understands the need to deliver its products and services in a timely, flexible, and responsive manner to ensure the success of its customers clinical and business operations. QSI believes that our diverse and long-term client base demonstrate QSI's ability to implement and support dental solutions for diverse practice requirements. Currently, QSI has implemented and supports clients of all practice size and types, from one location to more than 400 "live" practice sites managed by a single company - more than any other dental practice management company in the U.S. marketplace."

Client base (# of organizations):	• There are currently approximately 6,000 practice sites utilizing QSI and NextGen products of which approximately 2,000 utilize the QSI dental solution suite.
Number of safety net/Health Centers clients:	• There are currently approximately 180 safety net/community health centers utilizing the NextGen EPM/EMR suite of which approximately 10% utilize the QSI electronic dental record. The NextGen product suite, including the QSI Electronic Dental Record was recently purchased by the Illinois Primary Health Care Association for implementation at 30 of its member organizations.
Largest client (number of connected sites and number of users in one organization):	• Largest client (number of connected sites and number of users in one organization): Currently the largest (single) client supported by QSI has 450+ active locations utilizing the QSI dental practice management solution. The largest (single) client utilizing both the electronic dental record and practice management solution has 165+ active locations and adds at least one new office location per month.
Can the application be offered on an ASP basis?	• Yes; the large practice sites reference above deliver the QSI applications to their remote sites in an ASP mode. QSI has also offered a limited ASP solution. Further discussion required to determine requirements.
Pricing Methodology:	• See below.
Maintenance:	• QSI annual maintenance typically is about 19% of license costs.

Pricing:

Description	QTY	Unit List Price	Extended Price
SOFTWARE			
Provider License Fee			
QSI Dental Solution (EDR) - Clinical Provider License/s -1 Provider license = 5 workstation/s license/s	1	$10,000	$10,000
QSI Dental Solution (EDR) - Clinical Mid-Level Provider License/s - 1 Mid -Level Provider license = 5 workstation/s license/s	1	$7,000	$7,000
Practice License Fee			
Practice License Fee for (EDR) [QSI CPS Application Software -Server/Site & Network License/s]	1	$20,000	$20,000
THIRD PARTY SOFTWARE			
Dental Digital X-Ray			
Dental Digital X-Ray Software Primary License - 1 User	1	$1,695	$1,695
Dental Digital X-Ray Software Each Additional User	1	$175	$175
SERVICES			
QSI Hours for Dental (EDR) Implementation Services			
H/W - FS-Installation	1	$225	$225
Client / Project Management	1	$225	$225
Training, Set-up & Testing	1	$225	$225
X-Ray Integration & testing	1	$225	$225
HARDWARE			
Dental Digital X-Ray Hardware			
Digital X-Ray - Reader			
Digital X-Ray Reader	1	$11,948	$11,948
Digital X-Ray Reader Accessories			
Imaging Plates SIZE 0, 6 pcs./per box	1	$143	$143
Imaging Plates SIZE 1, 6 pcs./per box	1	$143	$143

Imaging Plates SIZE 2, 6 pcs./per box	1	$143	$143
Imaging Plates SIZE 3, 6 pcs./per box	1	$167	$167
Disp Bags w/ Plate Covers SIZE 0, 500 pcs./per box	1	$95	$95
Disp Bags w/ Plate Covers SIZE 1, 500 pcs./per box	1	$95	$95
Disp Bags w/ Plate Covers SIZE 2, 500 pcs./per box	1	$95	$95
Disp Bags w/ Plate Covers SIZE 3, 500 pcs./per box	1	$95	$95
Dental Digital Imaging			
QAIC899 USB Advanced Camera (Intra-oral only)	1	$1,360	$1,360
(QAIC928) USB Cable - (AIC930) Holder Package	1	$90	$90
QWIC500 Camera Barriers, 500 per box	1	$156	$156
Scanners / Electronic Signature			
Scanner (w/ print server & Transparency Adaptor)	1	$2,000	$2,000
Scanner, V-Strobe XP-300	1	$399	$399
Signature Station/s (Each Station includes Signature Pad & Software)	1	$575	$575

NNOHA HIT Committee Evaluation Highlights:

The QSI product offering had many features considered best practice/state-of-the-art by the HIT Committee. In particular, the product offered the most robust integration of key data elements between the electronic dental and medical records when demonstrated with the company's EHR product, NextGen.

QSI's many strengths include: user friendliness; voice activated periodontal charting, billing, patient care, and treatment planning: training and support: security and tracking; and reporting. The system has user-definable fields throughout the application that are fully reportable. There is thorough training and support, federal and state regulation monitoring, and an understanding of FQHCs' Migrant Healthcare, Homeless Healthcare, and government payers.

QSI also provides a mechanism for customers to influence the addition of new product features and functions. All statistics and reports are easily accessed by location of treatment, provider, or combination thereof. Tracking and reporting modules are efficient and include a dental lab-tracking module. UDS reporting can be performed, and QSI shows a proficient understanding of billing for FQHCs, Medicaid, and sliding fee scales. QSI meets TJC standards, follows HL7 protocols for information exchange, and is HIPAA compliant for secure information exchange. Geographically disparate sites can be linked by one database and QSI can be run on thin client technologies. QSI claims to be "vendor neutral in terms of integrating digital radiography, a characteristic viewed favorably by the HIT Committee.

QSI has few weaknesses overall, although the Committee did not feel that provider scheduling templates were as robust as needed. Finally, it should be noted again that many of the outstanding features of the product are available only if integrated with the NextGen practice management system.

Appendix C:

Key Requirements for Dental Health Centers

Key:

● = Fully Supported
◉ = Partially Supported
○ = Not Supported

Requirement	Dentrix Enterprise	PracticeWorks	EagleSoft	QSI [6]
Usability and Navigation				
1. The system has user-definable fields throughout the application that are fully reportable.	◉	◉	◉	●
2. Drop down menus are available for data entry, progress notes, treatment plans with spell check and choices displayed alphabetically or most frequently used.	○	●	◉	◉
3. System provides the ability to designate certain fields as required data entry fields that prevent the user from continuing until data is entered (e.g. PAIN ASSESSMENT; VITAL SIGNS).	●	◉	◉	●
4. Error detection/correction employed and smart data entry features available to enhance accuracy of data by editing date ranges, numeric vs. alphanumeric, valid number range, etc.	◉	◉	◉	●
5. The patient chart/record /scanned and digital image can be accessed in 5 seconds or under.	◉	◉	●	●

---

[6] QSI was evaluated as a fully integrated product with the QSI EMR, NextGen. Some functionality may be lost when used with another EMR.

Requirement	Dentrix Enterprise	PracticeWorks	EagleSoft	QSI [6]
Training and Support				
6. Vendor monitors federal and state regulations and incorporates necessary forms and features to support them as part of maintenance fees.	◉	◉	◉	◉
7. Trainers and account managers understand the requirements of FQHCs, Migrant Healthcare, Homeless Healthcare and government payers.	●	○	○	●
8. A user group has been established with regular meetings and specific tracks for Health Center users.	●	○	○	●
Care Management and Treatment Planning				
9. A Dental Lab tracking module is available that interfaces with the Appointment module indicating the patient's next scheduled appointment and allowing dental staff to enter by patient dual identifiers and location.	○	●	●	◉
10. The system has an integrated recare / recall system capable of generating multi-lingual patient reminders.	●	●	●	●
11. Built in ability to create treatment completion reports and user defined outcome measures.	◉	◉	◉	◉

Requirement	Dentrix Enterprise	PracticeWorks	EagleSoft	QSI
Productivity Measurement and Support				
12. The system calculates unduplicated patients for UDS reporting.	●	○	○	●
Billing				
13. Ability to support FQHC/Medicaid requirements to bill by an encounter rate (individual procedures roll up to an encounter rate).	●	○	○	●
14. Ability to calculate a sliding scale fee for service based on federal poverty guidelines.	●	◉	◉	●
15. Supports secure electronic billing to governmental payers.	◉	◉	●	●
Integrates Records Among Sites that are Geographically Disparate				
16. One database links geographically disparate sites.	●	○	◉	●
Meets The Joint Commission Standards (formerly JACHO)				
17. Meets TJC requirements for medication reconciliation between health records.	○	○	○	◉
18. Meets TJC standards for dual patient identifiers to prevent clinical errors.	◉	◉	◉	◉
19. Meets TJC standards for authentication and authorization when logging on to the system.	●	◉	◉	●

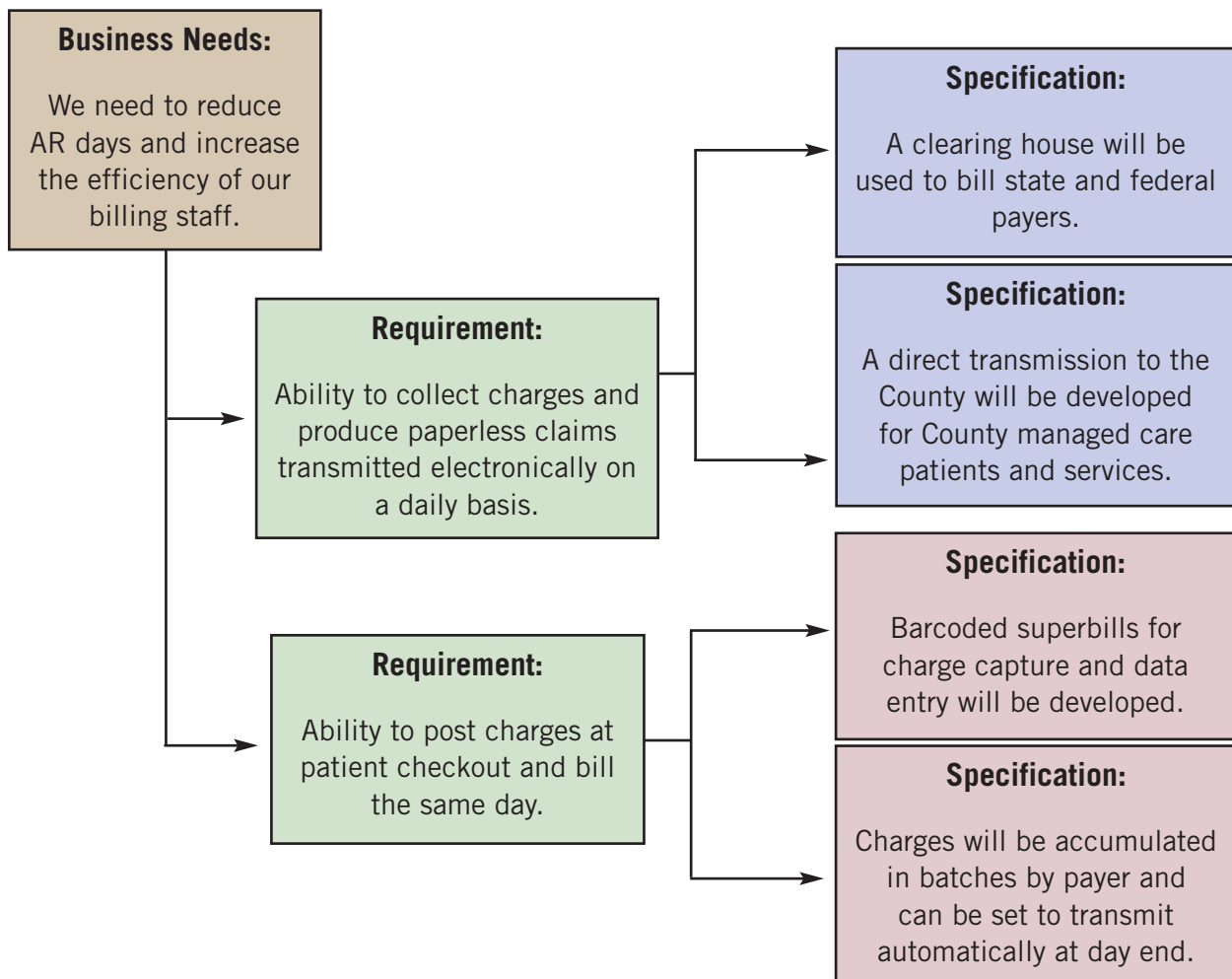| Requirement	Dentrix Enterprise	PracticeWorks	EagleSoft	QSI
Integration with PM / EHR Systems				
20. Ability to interface demographic information from medical practice management system using HL7 Protocols, including one time population of database.	●	○	○	●
21. Ability to receive diagnoses, allergies, and medication lists interfaced from EHR.	◉	○	○	●
22. Database is exportable / importable or has interchangeability so that other applications can use the data.	◉	◉	◉	●
Technical Requirements				
23. Ability to run the application on thin client technologies.	●	○	○	●
24. The system is HIPAA and TJC compliant for security and privacy, with well-documented backup and restoration procedures.	●	●	●	●
25. Access to the database for reporting purposes is made available through a commercially available reporting tool.	●	◉	◉	●

APPENDIX D:

GUIDELINES FOR DEVEOPING GOOD REQUIREMENTS

From Planning to Procurement: Needs, Requirements and Specifications

As an organization begins the planning process for a new system, it identifies needs and capabilities, two factors of the rationale for purchasing the new system. They also form the basis of developing requirements. Needs are translated into business requirements, i.e., what we want the system to do. Specifications (provided by the vendor's solution/product) describe how the system fulfills the requirement.

An Example: Needs – Requirements – Specifications

Business Needs:

We need to reduce AR days and increase the efficiency of our billing staff.

Requirement:

Ability to collect charges and produce paperless claims transmitted electronically on a daily basis.

Specification:

A clearing house will be used to bill state and federal payers.

Specification:

A direct transmission to the County will be developed for County managed care patients and services.

Requirement:

Ability to post charges at patient checkout and bill the same day.

Specification:

Barcoded superbills for charge capture and data entry will be developed.

Specification:

Charges will be accumulated in batches by payer and can be set to transmit automatically at day end.
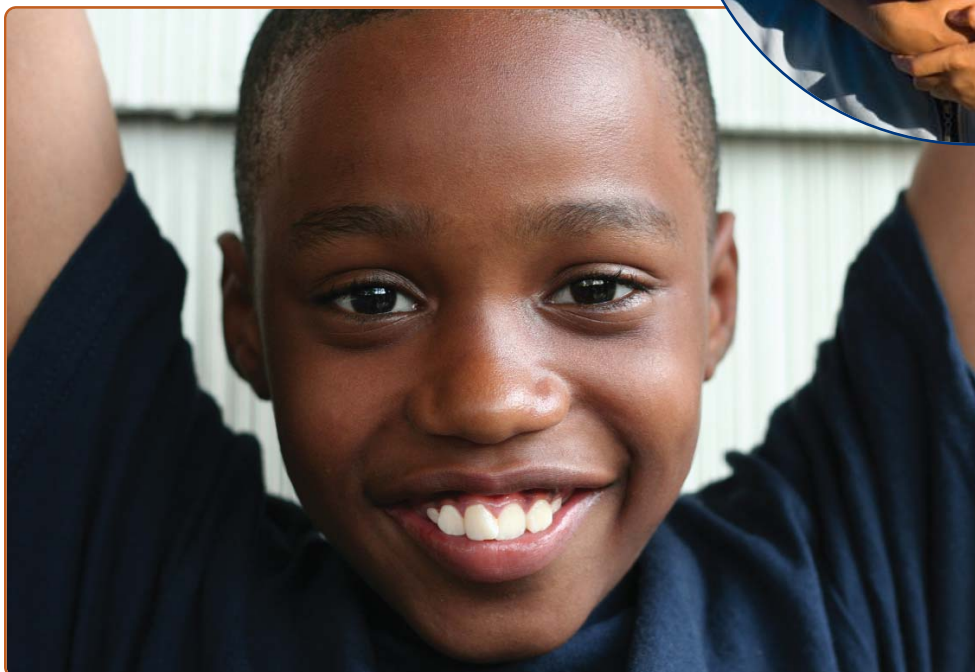
Importance of Good Requirements

➢ Identifying business requirements forms the foundation for selecting or designing the technical solution.

➢ Requirements provide a checklist and a set of standards to use when evaluating systems and solutions.

– Scenario-based demonstrations

– Site visits

– Attached to the contract for warranty purposes an performance based milestone payments

Guidelines for Good Requirements

Requirements should be categorized as:

1. **Essential/Core —** Implies that the system will not be acceptable unless the requirement is provided.

2. **Beneficial/Desirable —** Implies that the requirement would enhance the system but, if absent, would not make it unacceptable

3. **Optional —** Implies that the requirement may or may not be worthwhile, depending on cost/benefit analysis.

Characteristics of Good Requirements

Characteristics	Importance
Prioritized	• The requirements are usually prioritized according to their importance to the solution, i.e. 1) High (Essential/Core) 2) Medium (Beneficial/Desirable) 3) Low (Optional)
Unambiguous	• The requirement can be interpreted only one way. • Avoid statements like: "The system is easy to use" or "The system automatically" does something.
Verifiable	• Meeting the requirement can be verified through testing of the system or configuration. A test can be created to prove the correct functioning and implementation of each requirement. • Requirements provide the basis for system acceptance testing and the development of test objectives and scripts.
Organized, Traceable and Uniquely Identified	• The origin and author of each requirement is clear. Each requirement is individually numbered according to a scheme that identifies the functional component it relates to. • Example: DD01, DD02 = Dental Director's Requirements DH01, DH02 = Dental Hygienist's Requirements • Requirements for each module or functional area should be developed and "owned" by a manager in that area (not by IT staff alone).
Consistent	• The requirement, or subset of requirements, does not conflict with other requirements. • When several owners develop requirements, it's important to have someone to check for conflicts and inconsistencies.

Correct in Scope	• The requirement represents something required of the solution to be built or configured. • Example: "All patients must sign a Notification of Privacy Policies form." vs. "The system will enable tracking of patients who have not signed the Notification of Privacy Policies form."
Design Independent	• The requirements are focused on "what", not "how". This is the basic difference between requirements and specifications. • Allow the software experts (i.e., the vendors) to design creative solutions based on the capabilities of their product.
Concise and Complete	• Everything the system is supposed to do is captured in the requirements. • All things being equal, shorter is better.
Understandable by All	• The requirements are written in a way that allows them to be understood by all stakeholders in the project. • Avoid using jargon or terminology that is foreign to certain groups of users and can be intimidating.
Standards-Based	• The requirements and subsequent specifications should take into account industry standards and protocols for interoperability wherever applicable • HL-7, DICOM, HIPAA, etc.

Importance of Clear Specifications

Requirements and specifications overlap in some ways; however, functional specifications should describe in detail how the requirement will be satisfied. For all core requirements, functional specifications should be documented in writing by the vendor and demonstrated to the selection team's satisfaction. Written specifications and the vendor's response to the defined requirements should be attached to the purchase contract. The vendor's account manager or implementation manager and the "owner" of each set of requirements should work to develop the functional specifications. This process is iterative and time-consuming but critical to a strong contract in the following ways:

- Builds relationships and provides an indication of the depth of vendor's resources
- Helps functional owners visualize using the system and the reengineering required
- Helps to balance the complexity/flexibility trade-off of many applications

For custom-developed features, reports or interfaces, a screen mockup or other working prototype should be developed for sign-off. For features and functions that are to be delivered in a future release of the software, ask for a firm delivery or range, (i.e., first quarter of 2004) with penalties or maintenance credits for late delivery. This helps to protect against future non-performance or delayed upgrades. Developing functional specifications before the contract is signed can unearth potential "show stoppers", help manage expectations, provide a verifiable basis for system testing and provide a solid measure of risk management.

Appendix E:

Sources of Information / Additional Resources

1. ADA Website

http://www.ada.org/prof/prac/tools/software/vendor.asp

The American Dental Association provides an online directory of dental practice management software. The information is gathered from a questionnaire done by the Department of Dental Informatics and is based on ADA Technical Report 1004 – Computer Software Performance for Dental Practice Software. The report is a checklist of features and functions which help dentists and dental practice managers determine specific software requirements and priorities. It was introduced in 2004 and is updated as the industry changes. Each vendor is evaluated in four categories: clinical, financial, scheduling and general. The directory currently incorporates forty vendor responses into one location on the ADA website.

About the ADA Standards Committee on Dental Informatics (ADA SCDI)

The ADA develops standards for dental informatics through the ADA Standards Committee on Dental Informatics (SCDI). The scope of the SCDI is:

> *To promote patient care and oral health through the application of information technology to dentistry's clinical and administrative operations; to develop standards, specifications, technical reports, and guidelines for: components of a computerized dental clinical workstation; electronic technologies used in dental practice; and interoperability standards for different software and hardware products which provide a seamless information exchange throughout all facets of healthcare.*

The SCDI is comprised of 60 voting members from 60 organizations (19 consumers, 21 producers, and 20 general interest) from the profession, dental industry, academia, and the government. In 2001, the SCDI was reorganized into four subcommittees and 14 working groups working on the development or revision of 26 technical reports or specifications. The actual standards development occurs in its 14 working groups. The subcommittees are grouped according to the following general subject matters: Dental Informatics Architecture and Devices, Electronic Dental Records, Informatic Component Interoperability in Dentistry, and Electronic Dissemination of Dental Information. The working groups, organized under the subcommittees, address specific topics and provide an opportunity for all interests to participate in the development of voluntary consensus standards.

For information about ADA SCDI meetings, ADA SCDI membership and to view proposed ANSI/ADA specifications and technical reports that are available for review and comment, please visit: http://www.ada.org/scdi

2. University of Pittsburgh Department of Dental Informatics

http://www.dental.pitt.edu/informatics/

The Center for Dental Informatics conducts research on computer applications in dental practice, education and research. CDI is part of the Center for Biomedical Informatics/School of Medicine. The CDI also participates in dental informatics standards development through the ADA/ANSI Standards Committee for Dental Informatics (SCDI). . The Guidelines are intended to promote quality in educational software and they do so in two ways. First, developers can use them to ensure that their products are of high instructional quality during development and evaluation of their products. Second, end users can compare educational software programs with the Guidelines to recognize quality products. The Guidelines are applicable to any domain, not just the dental or medical one. The CDI is also active in other working groups of the SCDI, especially those related to the data architecture and the content of electronic health records.

Dr. Titus K. Schreyer is the Associate Professor and Director of the Center of Dental Informatics. Dr. Schleyer and other faculty and staff have published numerous articles on the subject of dental information technology and a list of these articles is posted on the University's website. To view the list, please visit: http://www.dental.pitt.edu/informatics/reprint_service.php

3. Tides CCI Publication: Healthcare Technology Resource Guide (Sample Contract)

http://www.communityclinics.org/content/general/detail/804

A resource guide, with documents and tools for managing healthcare technology projects, is available to CHCs through the Tides Community Clinic Initiative website. Of particular usefulness is Chapter 5, which contains an annotated sample vendor licensing agreement and a practical "Contract Negotiations Primer: The Do's and Don'ts of Software Licensing".

4. NNOHA Website

http://www.nnoha.org/

The National Network for Oral Health Access website is a resource for Health Center dental providers. The site hosts an electronic version of the *Guide to the Future: Using HIT to Improve Oral Health Access and Outcomes*. NNOHA's website also includes background information on the network, membership information, contact information and conference and event details. Resources for dental providers include a dental forms library, dental operations manuals, the Oral Health Collaborative library, and developing Practice Management and Workforce resources.

Appendix F:

Glossary

ANSI (American National Standards Institute) — The U.S. standards organization that establishes procedures for the development and coordination of voluntary American National Standards.

ANSI X12 (also known as EDI – Electronic Data Interchange) — This is a standard format used for transmitting business data, developed by the Data Interchange Standards Association. The parties who exchange EDI transmissions are referred to as trading partners. Data that is transmitted often includes what would usually be contained in a typical business document or form.

Clinical Decision Support — Computer programs designed to assist physicians and other health professionals with decision-making tasks, linking health observations (signs and symptoms) with health knowledge (best practices and current research) to influence choices made by clinicians to improve care.

CPOE (Computerized Provider Order Entry) — A computer application that allows a physician's orders for diagnostic and treatment services (such as medications, laboratory, and other tests) to be entered electronically instead of being recorded on order sheets or prescription pads. The computer compares the order against standards for dosing, checks for allergies or interactions with other medications, and warns the physician about potential problems. Orders for pharmacy, laboratory, radiology, and treatment protocols are communicated over a computer network to the medical staff or to the departments/entities responsible for fulfilling the order.

CCR (Continuity of Care Record) — A standard specification being developed jointly by ASTM International, the Massachusetts Medical Society (MMS), the Health Information Management and Systems Society (HIMSS), the American Academy of Family Physicians (AAFP), and the American Academy of Pediatrics. It is intended to foster and improve continuity of patient care, to reduce medical errors, and to assure at least a minimum standard of health information transportability when a patient is referred or transferred to, or is otherwise seen by, another provider. The origins of the CCR stem from a Massachusetts Department of Public Health, three-page, NCR paper-based Patient Care Referral Form that has been in widespread use for many years in Massachusetts, and from other minimal data sets both electronic and paper-based. The CCR is being developed and enhanced in response to the need to organize a set of basic patient information consisting of the most relevant and timely facts about a patient's condition. Briefly, these include diagnoses, recent procedures, allergies, medications, recent care

provided, as well as recommendations for future care (care plan) and the reason for referral or transfer. The CCR will be created by a healthcare provider/clinician at the end of an encounter, or at the end of an episode of care, such as a hospital or rehabilitation stay. http://www.massmed.org/pages/ccrfaq.asp

Controlled Vocabulary — A system of terms, involving, e.g., definitions, hierarchical structure, and cross-references, which is used to index and retrieve a body of literature in a bibliographic, factual, or other database. An example is the *MeSH* controlled vocabulary used in *MEDLINE* and other *MEDLARS* databases of the NLM.

DSS (Decision Support System) — Computer tools or applications to assist physicians in clinical decisions by providing evidence-based knowledge in the context of patient specific data. Examples include drug interaction alerts at the time medication is prescribed and reminders for specific guideline-based interventions during the care of patients with chronic disease. Information is presented in a patient-centric view of individual care and also in a population or aggregate view to support population management and quality improvement.

DICOM (Digital Imaging and Communications in Medicine) — A widely used standard for representing and communicating radiology images and reports.

Disease Management — A systematic process of managing care of patients with specific diseases or conditions (particularly chronic conditions) across the spectrum of outpatient, inpatient, and ancillary services. The purposes of disease management may include: reduce acute episodes, reduce hospitalizations, reduce variations in care, improve health outcomes, and reduce costs. Disease management may involve continuous quality improvement or other management paradigms. It may involve a cyclical process of following practice protocols, measuring the resulting outcomes, feeding those results back to clinicians, and revising protocols as appropriate.

Disease Registry or Chronic Disease Management System (CDMS) — An electronic system used to capture, manage, and provide information on specific conditions to support organized care management for all of a practitioner's patients.

Document Image Management System (DIMS) — A computer system used to track and store electronic documents and/or scanned images of paper documents.

EHR (Electronic Health Record) — A real time patient health record with access to evidence-based decision support tools that can be used to aid clinicians in decision making. An EHR is a medical record or any other information relating to the past, present or future physical and mental health, or condition of a patient which resides in computers which capture, transmit, receive, store, retrieve, link, and manipulate multimedia data for the primary purpose of providing health care and health-related services. The EHR can also support the collection of data for uses other than clinical care, such as billing, quality management, outcome reporting, and public health disease surveillance and reporting. EHR records include patient demographics, progress notes, SOAP notes,

problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports. Also known as EMR, or Electronic Medical Record.

eRx (Electronic Prescribing) — A type of computer technology whereby physicians use handheld or personal computer devices to review drug and formulary coverage and to transmit prescriptions to a printer or to a local pharmacy. E-prescribing software can be integrated into existing clinical information systems to allow physician access to patient specific information to screen for drug interactions and allergies.

HIE (Health Information Exchange) — Provides the capability to electronically move clinical information between disparate health care information systems to facilitate access to and retrieval of clinical data, thereby helping to provide safer, timely, efficient, effective, equitable patient-centered care. Also know as a regional health information organization (RHIO). The notion of HIE is the precursor to RHIO and is used interchangeably when discussing RHIOs.

HIT (Health Information Technology) — The application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of health care information, data, and knowledge for communication and decision making.

HL7 (Health Level 7) — An ANSI standard for healthcare specific data exchange between computer applications. HL7 messages are used for interchange between hospital and physician record systems and between EMR systems and practice management systems; HL7 Clinical Document Architecture (CDA) documents are used to communicate documents such as physician notes and other material.

Informatics or Information Science — The study of information. It is often, though not exclusively, studied as a branch of Computer Science and Information Technology (IT) and is related to database, ontology and software engineering. Informatics is primarily concerned with the structure, creation, management, storage, retrieval, dissemination and transfer of information. Informatics also includes studying the application of information in organizations, on its usage and the interaction between people, organizations and information systems.

Interoperability — The ability of various HIT products to exchange information safely and securely, and to preserve the meaning of the data that is being shared.

NHII (National Health Information Infrastructure) — Often used synonymously with NHIN. NHII came before NHIN and is an acronym that encompasses all of the necessary components needed to make EHRs interoperable. NHIN, as the name suggests, refers to both the physical and national network needed for interoperability to occur.

NHIN (Nationwide Health Information Network) — Describes the technologies, standards, laws, policies, programs and practices that enable health information to be shared among health decision makers, including consumers and patients, to promote improvements in health and healthcare. The development of a vision for the NHIN began more than a decade ago with publication of an Institute of Medicine report, "The Computer-Based Patient Record." The path to a national network of healthcare information is through the successful establishment of RHIO.

Office of the National Coordinator for Health IT (ONCHIT) — Provides counsel to the Secretary of HHS and Departmental leadership for the development and nationwide implementation of an interoperable health information technology infrastructure.

PHR (Personal Health Records) — Electronic tools that offer a comprehensive view of personal health information, including information patients generate themselves, information from doctors (diagnoses and test results), and information from pharmacies and insurance companies, which allow patients to access, use, share, and coordinate their personal health information or the health information of someone they are caring for. This may include:

- Personal identification, including name, birth date, and social security number
- People to contact in case of emergency

- Names, addresses, and phone numbers of your physician, dentist, and other specialists
- Health insurance information
- Living wills and advance directives
- Organ donor authorization
- A list and dates of significant illnesses and surgeries
- Current medications and dosages
- Immunizations and their dates
- Allergies
- Important events, dates, and hereditary conditions in your family history
- A recent physical examination
- Opinions of specialists
- Important tests results
- Eye and dental records

- Correspondence between you and your provider(s)
- Permission forms for release of information, operations, and other medical procedures

RHIO (Regional Health Information Organization) — A multi-stakeholder organization that enables the exchange and use of health information, in a secure manner, for the purpose of promoting the improvement of health quality, safety and efficiency. Officials from the U.S. Department of Health and Human Services (HHS) see RHIOs as the building blocks for the National Health Information Network (NHIN). When complete the NHIN will provide universal access to electronic health records.[7]

---

[7] Sources:
- California HealthCare Foundation Glossary: http://www.chcf.org/documents/chronicdisease/HITGlossary.pdf
- US National Library of Medicine – National Institute of Health HIT Glossary: http://www.nlm.nih.gov/nichsr/hta101/ta101014.html
- Selected Health Information Technology Terms: http://www.pinellashealth.com/RHIO/Terminology_Master.pdf

National Network for Oral Health Access
PMB: 170
7476 East 29th Avenue
Denver , CO 80238
Phone: (303) 957-0635
Fax: (866) 316-4995
www.nnoha.org