

*Establishing an Electronic Medical Record System for the Underserved in the District of Columbia: Building Safety Net Capacity and Strengthening Infrastructure within the Health Care Delivery System*

**Project Narrative**

**1. Project Purpose.** There are pockets of communities in the District of Columbia that for various reasons (economic, cultural, and social) have inadequate access to the many health care facilities and resources available in the surrounding tri-state area. Many of these communities in fact qualify as federally designated medically underserved areas. Over time various organizations have developed community-based clinics to address the unmet health care needs of these neighborhoods. In 1997, 10 of these clinics joined forces through the establishment of the Non-Profit Clinic Consortium (NPCC). The clinics realized their commonality of effort in accessing scarce funding and medical resources to provide the health care required by the poor and medically underserved patients they target. The focus of the consortium (now made up of 13 clinic members) is on collectively keeping abreast of legislation and regulation that impacts their communities, and on achieving efficiencies and economies of scale possible through joint effort.

The NPCC is interested in achieving effective and efficient deployment of scarce provider resources. This requires establishing and adopting processes that reduce provider time spent on unnecessary administrative tasks, such as locating medical records and record documentation (such as lab and diagnostic results); reading entire medical records to identify patient medical history; recording and re-recording patient identification information on the various forms used in the medical encounter. Clearly the less time spent on such activities, the more time that is available for direct patient care. Clinically, issues that are of importance include reducing duplication of service and unnecessary procedures; and having real-time access to the medical history information needed to ensure continuity and comprehensive care.

Proposed Solution: The project proposed herein involves the technology transfer of an award-winning computerized medical record system implemented in the Veterans' Administration Medical Center in Washington, DC. Furthermore, wireless communication will be adopted and piloted to determine how it can facilitate the conduct of home visits. The technology will create an integrated information system among three of the 13 clinic members of NPCC targeted for this initial project, and the DOH Public Health Laboratory. We envision that future funding can be pursued to expand the project to include other NPCC clinics, as well as the various other partners integral in the delivery of care offered by these clinics.

The electronic medical record system will help the Consortium in effecting efficiencies, providing quality patient care and improving upon delivery mechanisms. For instance, current problem areas include the creation of medical homes for recording of client information, and the cross-site and cross-workstation sharing of information, e.g., labs, pharmacy, nutrition, progress notes, claims, etc. The use of an electronic record system will facilitate appointment scheduling and general case management tracking capacities, enhance communication among service providers, and ensure continuity of care across many providers and levels of care. Too often there is an inability to easily transfer information about diagnoses or treatment for patient requiring specialty or tertiary care and then convey the outcomes back to the patient's medical

home. This proposal provides opportunities to develop a secure medical record system and to build the infrastructure needed to support the District's health care safety net providers.

The electronic medical record facilitates searching for patient information. The software provides a complete electronic patient record that combines text and image data, and information from progress notes, procedures and diagnostic procedures and laboratory tests. The technology also allows for remote access of medical information, proving useful to those facilities that provide offsite services to their clients. The fact that various providers can access a patient's complete medical history from a single workstation allows for effectiveness in addressing patients' health problems. This facilitates timely access to the complete array of medical information, thereby allowing for faster diagnosis and treatment. Information is coordinated and integrated, thus supporting a coordinated system of health care. Furthermore, this project creates a uniform platform across clinics that can be used to secure exchange of information.

Outcomes. An evaluation strategy has been outlined to help monitor expected outcomes from this technology transfer project. Organizational indicators will measure outcomes in terms of processes (access to complete medical records, patient tracking across facilities, access to test/procedure results), provider affects (provider satisfaction, provider productivity, provider time spent on administrative activities), and patient satisfaction (waiting time for appointment, satisfaction with provider communication). (See Appendix A for sample evaluation questions.)

End Users/Beneficiaries. The end users for this project are three NPCC clinics serving low income District communities that have historically have been medically underserved, while simultaneously evidencing high rates of morbidity and mortality--too often for preventable health conditions. (See Appendix B which summarizes key health indicators for District communities.) The Community Medical Care Clinic (located in Ward 5) provides care to low-income recipients. The center offers family practice primary care that provides clinic care and preventive health services to individuals from birth to seniors. Providers see most patients in clinic, but make home calls to the elderly and high-risk patients. The second clinic is the Family & Medical Counseling Services, Inc. (located in Ward 8). It provides services to families and individuals with limited and fixed income. The clinic offers counseling/therapy, alcohol and other drug abuse prevention and treatment services, and a continuum of care for those at risk for HIV. The third facility is the Mary's Center for Maternal and Child Care (located in Ward 1). This clinic is located in a predominantly Latino community, but serves the multi-cultural population residing in every Ward of the District. Prenatal and pediatric care is provided--as well as other ancillary services needed by the community, such as teen pregnancy prevention and planning; HIV testing and prevention; and a housing program to prevent homelessness.

Patients are the ultimate beneficiaries of the adoption of the CPRS. Experience has shown that such automation maximizes patient safety as more complete information is available in medical records, and searching/review is facilitated allowing providers to make informed health care decisions. The literature notes that providers spend more time with patients in health education activities. Furthermore, for patients who use services across facilities, the new technology and sharing of information creates a seamless community of providers.

**2. Innovative Factors.** This project will apply various innovations as follows:

- Effect a technology transfer of an award winning electronic medical record technology
- Modify the medical record system to meet the needs of community-based providers
- Build upon the technological infrastructure of the 3 clinics involved in the project
- Build upon existing partnerships in the District to effectuate the first community-based integrated information system in the District
- Pilot the use of wireless technology in home care field activities.

Expanding Core Functions. The joint effort between DOH and the NPCC takes advantage of the missions of both organizations. The DOH as the District's public health organization has as its core functions responsibility for assessment, public policy development and assurance. Taking a lead on this project aligns with responsibility DOH has for creating and enhancing partnerships among the District's health care providers—and for promoting policy that creates efficiencies in resource utilization. NPCC's mandate to strengthen the position of its member clinics also aligns with this project in that the implementation of the project in three of its sites provides the opportunity to undertake a comprehensive pilot that tests the use of an electronic medical record system in differing treatment modalities and services, as well as the wireless technology being proposed. Overall, the NPCC sites include health centers, homeless shelters, and patient homes; and varying services including pediatric, maternal and mental health care services. The inclusion of the DOH Public Health Laboratory provides the testing ground for the ancillary service component of a medical record. The future expansion to other partners, potentially including Howard University, Children's Hospital, etc. would expand the breadth and scope of the project and the ability to provide a continuum of care in a low cost and effective manner.

Best Practice Outcomes. The implementation of an electronic medical record system represents a reengineering activity for the general medical record industry—and the literature documents the effectiveness of such technology. For instance, it is noted that physicians spend as much as 38% of their time searching for data and that information is missing 81% of the time from medical records (with an average of 3.7 pieces missing per visit). Studies have found that 60% of physicians have prescribing errors that can be avoided by computerizing the ordering process. Furthermore, facilities that have successfully implemented electronic record technology have seen a 75% reduction in medical records staff—allowing for the focus of such resources on ensuring the quality of data, rather than the manual handling and routing of information. Savings are also achieved through the decreased need for physical storage space. Perhaps most noticeable is the instantaneous sharing and transmission of information among providers—a factor that leads to high quality care. It is clear that the manual records preclude the simultaneous sharing of data; and involve considerable amount of duplicate data entry. Consider the time saving alone possible merely by not having to hand write patient identification information on all forms included in the medical records, i.e. progress notes, prescriptions, lab and specialty service forms, appointment slips, etc.

New Organizational Relationships. The electronic medical record technology allows for true integration of effort among community-based facilities. Although the NPCC clinics have operated as a consortium for several years, it is clear that a more concerted organizational relationship occurs when a medical record technology links facilities. Clearly patients use

services across health care facilities—the capacity to share information on such clients can ensure that continuity of care is provided among the participating sites.

**3. Diffusion Potential.** The key outcome expected from the implementation of this project is identification of the electronic medical record system as a best practice model that is replicated across the District’s providers. The various partners included in this project support the expansion of this project beyond the pilot sites. The NPCC objective is to expand an effective system to its member clinics, all of which are located in historically underserved communities of the District. (See Appendix C for full listing of NPCC members.)

At DOH there are various opportunities to expand upon this project. The Medical Assistance Administration (MAA) with oversight of the Medicaid program has contracts with managed care organizations--the potential success of the pilot would provide an incentive to consider expansion of the system to such providers. MAA also has oversight of the EPSDT and the CHIPS programs, both of which offer direct patient care, and which could benefit from an electronic medical record system. Additional opportunities for diffusing the technology are possible within DOH. The Department has various partnerships with District providers in the provision of maternal and child health services, chronic care, and substance abuse and prevention services—all of which include direct patient care and thus can benefit from the advanced medical record technology. In terms of Laboratory services, the successful implementation of the laboratory component of the electronic medical record system will allow the DOH Public Health Laboratory to expand electronic laboratory processing across all District providers.

Cost-Effectiveness. The electronic medical record technology has proven to be successful in creating efficiencies in the health care delivery environment. The VA Medical Center, for one, documents the success it achieved with the adoption of the technology. The VA boasts that complete charts, as evidenced by percent of records with progress notes, increased dramatically by 100%, and that it realized a reduced risk of losing radiology and CT films. They note that additional provider time is available for patient education, since workstations in the physician’s office allows the provider to review with the patient the displays pertinent to treatment. The VA indicates that it no longer uses paper charts in any clinics, and wards are virtually paperless. In fact, the only complaint it can point to comes from residents who leave the VA medical center and go to other facilities that do not have such technology.

There is also evidence from the Medical Records Institute (MRI) in Massachusetts that electronic health records provide efficiencies. In May 2000, MRI conducted a survey to identify electronic health records trends and usage. This survey indicated that 69% of facilities were able to share data among sites in their healthcare delivery system; 66% achieved reduced healthcare delivery costs; and there was general improvement in clinical documentation. The survey also identified trends in adopting the electronic medical records technology. Almost half (40%) the facilities surveyed indicated they would be implementing electronic records systems; yet almost 60% cited lack of adequate funding and resources as the major barrier to implementing such technology. The fact that the electronic medical record software is in the federal domain makes it particularly attractive to public agencies, other organizations funded by governmental funds, and facilities operating with scarce resources. The medical record technology transfer is free of charge from the VA, and thus represents major savings over the purchase of new software—and considerable

savings over that required for developing new software. Furthermore, the VA also commits to providing technical assistance in the implementation of the systems integration involved in this project. (See Appendix H for Letter of Support.)

The modified technology that will result from this project will meet the needs of the various partners in the project—and given the diversity of the pilot partners will produce a product that can be used by various providers found not only in the District but throughout the health care provider community. Although there is an initial outlay of funds for tailoring the software so that it meets the information needs of non-hospital organizations, it is clear that diffusing the technology will create major cost savings and impact upon the quality of care, and the effective use of scarce provider resources throughout the District.

Sharing Information. This project incorporates various diffusion activities. A publication and a presentation will be prepared for the American Public Health Association. Furthermore, throughout the project, sessions will be held demonstrating the technology. Groups will include clinic providers and staff; and District health partners, providers, health policy groups, and stakeholders. We envision the interest of the Veterans' Administration in promoting how its technology can enable change in clinics serving underserved communities--and in the VA's further support of expanding the use of the technology. Leadership proposed for this project will participate in such demonstrations. Additional sharing of information will occur from train-the-trainer sessions that build competency in using and understanding the technology's capacities.

**4. Project Feasibility.** The major component of the project outlined herein involves the technology transfer of the Integrated Computerized Patient Record System (CPRS) and the subsequent modification of the technology. This system, implemented by the VA in 1997, has been demonstrated to key DOH managers, all of which see the utility of adopting the software for the Department. The fact that the system has been successfully used in a large medical facility (and in fact, is an award-winning technology), and that providers are satisfied with the technology played a decisive role in the selection of the technology. Furthermore, the technology transfer would be free of charge to DOH and its partners. The system has met the needs of a large medical institution and has proven the capacity required to accommodate an expansion beyond the 3 sites included in this project.

CPRS. CPRS incorporates the key components of a medical record in an easy to use interface that can be accessed remotely. The software includes the electronic versions of the major forms included in the paper copy of a medical record, including notes, consults, discharge summary, and reports. Furthermore, X-rays, MRIs, CT scans, and other pathology and diagnostic information and images can be scanned and then zoomed, contrast enhanced and panned. Providers can view information or add to the data presented. Icons are available that can direct the provider to DOH, internet, intranet, data sources for drug info (PDR), medical dictionary, etc. In essence, CPRS provides a more manageable, reliable and easy to use real-time access medical record system than that afforded by conventional manual systems.

Security and privacy are both issues that are adequately addressed in the CPRS system and in this project. The required encryption is built-in, and software has the ability to give only qualified persons the authorization needed to allow data entry. Training and governance issues

are also being addressed as key security components. An MD electronic signature allows for providers to sign-off on prescriptions, lab requests, etc. It should be noted that DOH has considerable experience with assuring data security and privacy--as the Department maintains major databases with patient and client identifiable information. At present, both the SCHS and MAA agencies have the lead in DOH in keeping abreast of HIPAA regulations and developing initiatives that ensure the Department's compliance with the new requirements. Furthermore, MUMPS software incorporates key HIPAA regulations.

Technical Approach. Each site included in this project will be equipped with the hardware and software needed to adopt the CPRS technology. This equipment will be distributed to the providers and administrative staff with responsibility for medical record maintenance. The project will also pilot the use of wireless technology at one of the NPCC clinics (Mary Center) in concert with the medical record technology—a component that will prove useful in providing home based services. Wireless technology has proven effective for use where office space is limited and does not easily accommodate desktop equipment--and where providers often rotate throughout clinic space in the provision of care. The project will test the ease of use of Palm Pilots and laptop computers. Palm Pilots with e-mail and wireless modems will be used; laptop computers will help with gathering home visit data in an unobtrusive manner.

VA CPRS technology will fit very well with DOH as an extension of existing infrastructure. Each of the participating NPCC primary care clinics will have T-1 lines connected point to point with the Department of Health Data Center. The Electronic Patient Record System database will be housed at the DOH Data Center at 825 North Capital St, NE. Software architecture will be MUMPS medical software with Windows NT. Connectivity will follow the hardware and software architecture currently used in the DOH-Wide Area Network (WAN) which meets standards of the DC Office of Chief Technology Officer. Please refer to Appendix D figures 1, 2, 3 and 4 that address: underlying infrastructure (figure 1); site connectivity (note 3 clinics will be added to this figure connecting to DOH) in an Intranet design (figure 2); domains and firewall security (figure 3); and remote site connectivity protocol speeds (figure 4).

Sustainability. The project will require resources to sustain the successful system. As such, DOH will take the lead to identify funding of ongoing costs, including technical support, help desk activities, training, and maintenance contracts. One option is the reallocation of resources. The literature documents the considerable cost savings achieved in facilities that adopt such technology. For instance, it is noted that staff costs related to medical records retrieval/maintenance will decrease, as will the need for resources that would have been allocated to storage of hard copy documents and microfilming.

Applicant qualifications. In the District of Columbia, DOH is one agency that has made remarkable headway in establishing an information technology infrastructure. In 1998, a multimillion-dollar funding allotted by the District's Financial Responsibility and Management Assistance Authority provided the seed resources required to establish a state of the art technological infrastructure in DOH. The SCHS, a federally designated agency, has been the lead DOH agency responsible for developing and implementing this project. Accomplished activities include: management and oversight of complete program; purchased hardware and software; ordered and installed T1 lines and cabling to effect connectivity; provided core training

throughout the department; developed an Information Technology Strategic Plan to guide activities and continued enhancement of DOH's IT infrastructure; and developed a charge back system to provide baseline resources required to maintain the infrastructure enhancements. More recently a document outlining a strategy for integrating information systems was completed--outlining the goals of such activities, including the objective of creating community partnerships in data integration activities. (See Appendix E for DOH Policy Statement on Information Technology Integration.) The variety of talent and experience available to SCHS makes it uniquely qualified to undertake the effort outlined in this proposal. Also, the SCHS has established relationships with key contractors--many critical to the success of the information technology infrastructure now in place in DOH. It is worth noting that dignitaries from throughout the District, and from abroad (including China and Japan) have demonstrated interest in the systems accomplishment and toured the facilities with teams of their health officials.

The NPCC partner also brings considerable expertise to the project. NPCC will play a major role in project evaluation activities, given that it has provided evaluation expertise in a number of venues--most recently working on conference program evaluations for the DC Hospital Association and Income Maintenance Administration. NPCC staff is skilled in several types of evaluation and is capable of assembling an evaluation team for content, process, or outcome evaluations, pre- and post-test or other methodologies, as needed. (Appendix F includes resumes of key project staff from both DOH and NPCC.)

Budget, Implementation, Schedule and Timeline. The budget supporting this project includes the various costs required to tailor the CPRS technology, and to purchase the hardware, software and technical assistance required for implementing and successfully completing project activities (see Budget section). This project will be implemented over a two-year timeframe (See Appendix G.)

**5. Community Involvement/Partnerships.** The NPCC and its three participating member clinics will be the principle direct users of the technology. These clinics will have responsibility for securing their staffs' participation in the various joint application design (JAD) sessions that focus on the piloting and tailoring of the technology. Efforts will be made to document the process for future integration and build-out of other clinics and participating partner access. In addition, clinic staff will attend training sessions and have input on system implementation.

DOH will have responsibility for project management and generally ensuring the success of the project. DOH will also take the lead in providing the technical assistance required to develop, implement, and evaluate the project, and will identify, purchase and install the various technology required to support the project's implementation.

The project envisions that clinics using the Public Health Laboratory will be able to use the electronic medical record technology to process patients' lab tests (e.g., blood, sputum, urine testing). The inclusion of the DOH Public Health Laboratory in this project will provide the opportunity to pilot the laboratory component of the medical record technology and address the various challenges that can occur--thus positioning the Public Health Laboratory to play a key role in future expansion of the technology to other sites. In a later phase of the project (for which funding sources will be identified), the DOH Medical Assistance Administration will provide the technical assistance needed to assess and determine the capacity and transferability of the

Medicaid claims processing function of the medical record technology, so such billing can be facilitated.

Joint Efforts. The project outlined herein is not an initial joint effort for DOH and NPCC. In March of 2000, DOH collaborated with the NPCC in an initiative of the Community Voices Collaborative (a Kellogg Foundation initiative). Eleven District-based nonprofit agencies worked to develop strategies to better health care service. Part of that initiative included planning for integrated and shared management information systems throughout the District. This group sought to bring together the initial agencies and organizations that would form an alliance to prepare a request for proposal for a shared information system. A firm was engaged to develop the blueprint for the integrated system—and top experts in the region presented the opportunities for such systems. Since that time, DOH and the NPCC have sought to identify a funding source for these information technology integration strategies.

DOH has not functioned as a traditional Department of Health that only provides monitoring, surveillance and oversight. Rather the Department serves as a direct service provider as well, and therefore other partnerships exist between DOH and the NPCC in the delivery of direct patient care. The NPCC clinics offer a broad array of primary care and wrap around services, some of which are integrated into DOH services, such as breast and cervical cancer screening, maternal and child health, and Ryan White HIV/AIDS care and screening programs. Many of these collaborations have been in place for many years.

Support for End Users. The three clinics included in this proposal have been briefed on project opportunities and strategy and have documented their support of this project. (See Appendix H for Letters of Support.) Project activities and support have been expanded to accommodate the resources the clinics will need to undertake the additional effort the project will entail. In this regard, the project includes a line item for an onsite medical records technician. Training sessions and centrally located technical assistance will be provided for clinic-based staff.

**6. Evaluation.** This project includes various evaluation activities--the major one involving a pre- and post-test evaluation instrument that contains key indicators for the successful implementation of this project. In addition, periodic evaluations of key project activities will be undertaken to ensure end-user input and efficient and effective implementation of activities. Providers and administrative staff will have opportunities to assess the technology, the effectiveness of the JAD sessions, and the utility of the training sessions. The JAD and training sessions will include a pre and post-session questionnaire, comparing what users expect/suggest/obtained from sessions. The technology evaluation instrument will focus on pre- and post-technology process activities, including identifying where efficiencies and quality of care are affected by the technology. Patients will be surveyed to identify whether any measurable differences exist in the care they receive. (Appendix D contains sample questions.) The survey instrument will be pre-coded as much as possible to facilitate data analysis. A Likert 1-to-5 rating scale will be incorporated to enable correlation analysis. Open-ended questions will be included to elicit users' issues. Briefing reports outlining survey findings will be prepared and shared--and activities modified as indicated by the input generated in the evaluations.