Application for the Davies Recognition Program

Independent Primary Care Practices

Section A: Identifiers

1. Name and Title of Submitter: Jeffrey D. Cooper MD, FAAP

2. Practice Name: Cooper Pediatrics

3. Address: 3645A Howell Ferry Rd

4. City: Duluth   State: GA   Zip Code: 30096

5. Telephone: (678) 473-4738   Fax: (678) 473-4739

6. E-Mail: jeff@cooperpediatrics.com   Website: www.cooperpediatrics.com

7. Number of physicians in practice: One

8. Number of FTEs (list by staff category): 2.25 providers; 12 staff

   a. Nurse practitioners: 1.5   (2 part-time, each at 30 hours per week)
   b. Physician's Assistant: .75   (1 part-time, 30 hours per week)
   c. Nurses: 5   (4 full time, 2 part time)
   d. Office Manager: 1
   e. Office Support Staff: 5
   f. Student Office Assistant: .5 (part -time)

9. Annual Number of Patient Encounters: 18,172 (2002)

10. Names of EHR Implementation Team

    a. Mark Copenhaver, VP of Product Development, JMJ Technologies
    b. Charles (Chuck) Webster, MD, VP of Medical Informatics, JMJ Technologies

Section B
Cooper Pediatrics: An Independent Primary Care Practice

I. The Organization

Cooper Pediatrics is a one-site solo-practice located in Duluth, GA in the Greater Atlanta area.   I founded this primary care practice in 1992 at another location. I currently work with a Physician's Assistant and two Nurse Practitioners. All three are part-time. The Office Manager is supported by a staff of five, a receptionist, exit clerk, and three billing specialists. One part-time student assistant scans documents into the EHR. My office has a staff to provider ratio of 3.67. The average full-time employee (FTE) to doctor ratio of a pediatric practice is 3.79.[1]

My practice currently serves 12,431 active patients from all social classes–from the indigent to the wealthy–from all over North Georgia. Medicaid patients make up about 10% of the practice. I deployed an Electronic Health Record (EHR) on Dec. 4, 1995, which has been in use and evolving over the past eight years. Eighteen months after going on-line my office stored our paper charts off-site. Except for scanning and storing documents, I have a paperless office.

The office performs the following services: Well Child Care, Immunizations, Hearing Screenings, Vision Screenings, Minor Injury Management, Sick Visits, and Daycare/School forms.

II. Management

In 1995 I was not in the market for an EHR and I knew little about the technology. That Fall, however, a colleague gave me a demonstration of a newly-developed EHR, EncounterPRO® by JMJ Technologies. I asked if I could chart an encounter myself. I then charted a fictitious encounter of a child with pneumonia. It took 30 seconds to chart the physical exam, diagnosis, and write four prescriptions. I immediately knew that the EHR would save me unbelievable amounts of time—and time is really the issue. Time is the only thing a physician has to sell. I decided to take the risk and deploy the EHR in my office.

A. Business Objectives. My business objectives were specific: to reopen my closed practice of 3,500 active patients and begin to accept new patients and to continue to grow the business. I expected to:

1. **Increase Billings**. Using paper charts, my gross billings in 1994 were $490,000.

2. **Increase Revenues**. My revenues in 1994 were $419,706.

3. **Increase Physician Profits**. My profits in 1994 were $150,883.

4. **Increase charges per visit**. I anticipated increasing my charges by capturing all applicable charges and by not missing immunization opportunities. My average charge per visit in 1995 was $50. My immunization rate was 90%.

5. **Increase number of patient visits per day**. In 1995 my office saw an average of 45 patients per day.

6. **Increase patient volume**. In 1995 my total number of active patients was 3,500. My practice was closed to new patients.

7. **Increase staff**. At the time I installed the EHR I had a staff of 7 plus 1 full time nurse practitioner. The FTE staff to provider ratio was 3.54.

8. **Track total operating cost as a percentage of total medical revenue**. In 1994 my total operating costs (expenses) were $268,823, 64% of my total medical revenues.

9. **Eliminate chart pulls**. The average number of chart pulls per day was 60. I employed three persons to pull and re-file paper charts.

10. **Decrease charting time**. Paper charting took an average of four minutes per encounter, including prescription writing.

11. **Make more productive use of chart storage space.** Paper chart occupied approximately 40 square feet of office space.

12. **Eliminate transcription costs**. My transcription costs were minimal.

13. **Decrease patient total wait time**. Office wait time from check-in to check-out was one hour.

14. **Decrease drug refill time**. Average drug refill turnaround time was one hour.

15. **Decrease telephone call turnaround time**. Average telephone call turnaround was one hour.

    B. Project Organization: Roles and Responsibilities. I made the initial decision regarding purchase and implementation. The Office Manager was responsible for installation, the training schedule, and maintenance. The Lead Nurse was responsible for ongoing staff education on updates, training new staff members, and reporting hardware and software issues to the Office Manager. In such a small office, ultimately the solo pediatrician is responsible for ensuring success.

III. Implementation

C. Product. The EHR system is EncounterPRO® from JMJ Technologies in Atlanta, Georgia (www.jmjtech.com). EncounterPRO is the only EHR, of which I am aware, that is based on a workflow management system.[2] This allows me to customize and streamline collaboration among providers and staff in ways that greatly improve practice efficiency. For example, while I am in the exam room with the patient, in addition to documenting, I am also directing and delegating. Staff members can prepare for procedures such as vaccines, aerosols, and injections before I even leave the room. We usually pass each other, me on the way out, they on the way in. I go immediately to the next patient, while they immediately perform their procedures. I don't have to find them and I don't have to tell them what to do. The EHR's workflow management system takes care of that for me.

Functionality. The EHR's data sets include problem lists, procedures, medical and nursing diagnosis, medication lists, allergies, demographics, diagnostic test results, radiology results, health maintenance alerts, and E&M coding. The clinical and patient narratives can be captured by free text, template-based text, dictation, or voice recognition. I use structured data entry with some free text.

Results Management. The EHR manages laboratory, radiology, and referral reports. It supports images, waveforms, scanned documents, pictures, and sounds. It also keeps track of tests for which no results have come back. It generates reports of tests still open, and reports regarding who was supposed to do something that is overdue.

Order Entry and Management. The CPOE system encompasses electronic prescription writing, lab orders, X-Ray orders, nursing entries (Vitals Screen), and referrals. All orders are highly configurable and can be part of the workflow. Buttons can be placed on any screen to order items automatically. For instance, the workflow can either bring up pick lists or automatically order labs and tests. Each assessment can have its own configurable order list.

Decision Support. The EHR instantly calculates drug dosages based on weight, instantly plots growth charts, and allows for documentation of developmental milestones at well and/or sick visits. Updates to various standards (such as growth charts) are applied to all historical data, thus picking up new "abnormalities" without my having to review and re-plot every single measurement in every chart. The EHR alerts me to allergies and due or overdue immunizations.

Communication. The EHR has an internal messaging system that allows for increased communication among members of the healthcare team. It creates TO-DO items for the providers that are attached to both the history of the TO-DO item and the patient's chart. Messages are routed through workflow or by selecting specific recipients.

Messaging also allows me to delay a procedure. For example, I can send myself a message to call a patient in two days to check on his/her progress.

Automatic alerts also provide for communication to colleagues outside of the medical record about special problems. Examples of such alerts in my practice include duplicate name alert, "Child participating in Emory study on new vaccine X" alert, and "Last bill was returned. Please get new address and phone number" alert.

   Patient Support. The EHR has a patient take-home report that includes all care instructions, a summary of all labs or tests ordered by the doctor, and a list of all medications and instructions. (I also understand that the upgrade to EncounterPRO that I will be receiving sometime this Fall will include extensive patient education workflow capabilities.)

   Administration. The EHR is integrated with a billing/scheduling system that supplies information about appointments, schedules and patient demographics. It also has a third-party interface showing the front office staff which specialists and labs are covered by what insurance companies.

   Reporting. Structured data permits queries against open and closed assessments, drug history, family history, etc. For example, I can keep track of what percent of my patients are immunized at any given time. During a vaccine recall in 1999 I was able to obtain the name of every patient who had received the vaccine—a task that would have taken days manually. Later, when another drug was discontinued by the FDA, I was able to locate the patients almost immediately to change their prescriptions.

   Technology, application and user interfaces. EncounterPRO is a client-server application that runs on Microsoft Windows® 2000 Server and Microsoft SQL Server™ 2000. The EHR fully interfaces with the GE Centricity practice management system I use. (A lab interface will be available from the vendor in Fall 2003.) The user interfaces are akin to the touchscreen-oriented systems in restaurants: one screen at a time, with only the most relevant data displayed and options presented (although, of course, a user can always jump out of a particular screen sequence to accomplish an arbitrary task), and the sequences can be tweaked to make such occurrences infrequent. The document scanning system operates on the concept of a "holding area," separating the process of acquiring a file from the process of placing that file into a patient's chart. Scanning into a file can be done by any unskilled person.

   Practice role in managing technology. The technology has had very few issues that require "management." Over the past year we have upgraded several pieces of equipment. We have installed flat touchscreens with Wyse's solid state terminals in all the exam rooms and workstations. We have also upgraded the RAM on the server, several related support software products, and the backup mechanism. This upgrade of seven-year-old hardware was scheduled over the course of a year to accommodate the practice's cash flow. The upgrade is almost complete at this point.

D. System Implementation. Initially we installed a server, a lab computer, and client-servers in six exam rooms. Installation took about two days.

Training. The staff had minimal computer experience. The staff and I were trained in three groups (providers, nurses, and administrative personnel) for a total of four hours on a Saturday. We went live on Monday, Dec. 4, 1995. The EHR was so easy to use that we considered ourselves proficient on the system in two weeks. We did not experience any significant downtime after we went on-line or significant losses of office productivity.

Rollout Approach. We took an incremental approach to converting the paper records. We brought the paper record to the exam room with the patient for the first three to four months so that we could see the most recent history (i.e. what antibiotic was the child on last and how long ago was that?). During this period if a child had a chronic illness we would document that in the EMR. Later we stopped bringing the charts to the exam room but left them in the office. During this time the staff used any down time to key in vaccine data. After 18 months we moved the paper records to off-site storage, thus freeing up the space for accounting services.

Process Redesign. Let me emphasize that the point of the workflow management system is to automate the business processes according to my personal way of doing business. The EHR in my office is minimally redesigned.

E. Current State. Our system has evolved into a network featuring an upgraded Dell Server and both thin and fat clients. All of the exam rooms as well as several other computers in the office are thin clients. In fact, the computers in exam rooms 1-6 are the original hardware installed in 1995. I have set up a hardware upgrading schedule so that I can budget improvements over time.

Intended Users. Intended users for the EHR includes the physician, nurses, and all staff members—the entire practice. In addition, for a few months, as a business experiment, I added a Nurse Practitioner who exclusively did house calls. Using a laptop-deployed EHR, she was able to dial into the medical record from any location. She then had instant access to each patient's history. Her charting was done in real time and was instantly available to me in the office. Her services were not profitable and were thus discontinued.

Uses of the EHR. The multiple uses of the EHR are described above.

Clinical Decision Support in Routine Use. The clinical decision support tools in routine use are discussed above. They include integrated and aggregated displays of patient data (SOAP Screen and Summary Screen), rules-based prompting (allergy alerts, immunization alerts, and automatic screen sequencing), and note templates.

IV. Value

F. Success In Meeting the Business Objectives. In January 1996 I reopened my closed practice. Over the next six months we added 600 new patients. The practice has continued to grow and now serves more than 12,000 active patients.

Productivity Increases

1. **Increased Billings**. In 1996 my gross billings increased $200,000 without adding any staff. In 1997 my billings increased another $130,000. In 1998 I posted gross billings of $1.25 million. In 2002 my gross billings were $2,468,610.93, an increase since 1994 of 404%. In 1995 I was working with one nurse practitioner. Since that time I have added a part-time physician assistant and two part time practitioners. Some of the additional revenues are the result of the new personnel. I am able to supervise their work and direct their treatment plans much more aggressively than would be possible with a paper record. My collection ratio was 80% before the EHR and has been constant throughout the years.

2. **Increased Revenues.** Revenues went from $419,706 in 1994 to $1,557.329.10 in 2002, for an increase of 271%. (See chart below).

	1994(Before EHR)	2002 (After EHR)	% Increase
Billings	$490,000	$2,468,610.93	404%
Revenue	$419,706	$1,557,329.10	271%
Expenses	$268,823	$1,253,013	375%
Profit	$150,883	$304,316	102%

3. **Increased Physician Profits**. My profits in 1995 were $150,883. In 2002 my profits were $304,316, an increase of 102%. (See chart)

4. **Increased charges per visit** In 1995 my average charges per visit were $50; today my average charges per visit are $135.84, an increase of 171 %. My revenues per patient in 2002 were $84.81.

5. **Increased number of patient visits per day.** In 1995 my office saw 45 patients per day with two providers and an office staff of 7. With 3.25 providers and an office staff of 12, we now serve an average of 73 patients per day, an increase of 62%. Several times, under special circumstances in the winter, my office has charted as many as 200 encounters in one day. In 1995 I was seeing about six patients per hour with two supporting nurses. Now, at the height of the flu season, I can see eight to ten patients per hour. I can see more children per hour while actually increasing preventive services like screenings and vaccines—thus improving healthcare and increasing revenue at the same time. Increased office hours account for some of the increase in patient visits per day. In 1995 my office was open for 40 hours per week; it is now open 50 hours.

6. **Increased Patient Volume**. In 1995 my active patient count was around 3,500. By 1998 my patient count reached 7,500. Our office now serves 12,431 patents, an increase since 1995 of 255%. The total number of office encounters rose from 9,932 in 1996 to 18,134 in 2002, an increase of 83%. (See chart below). So far this year office encounters between 1/1/2003 and 8/14/2003 totaled 11,651.
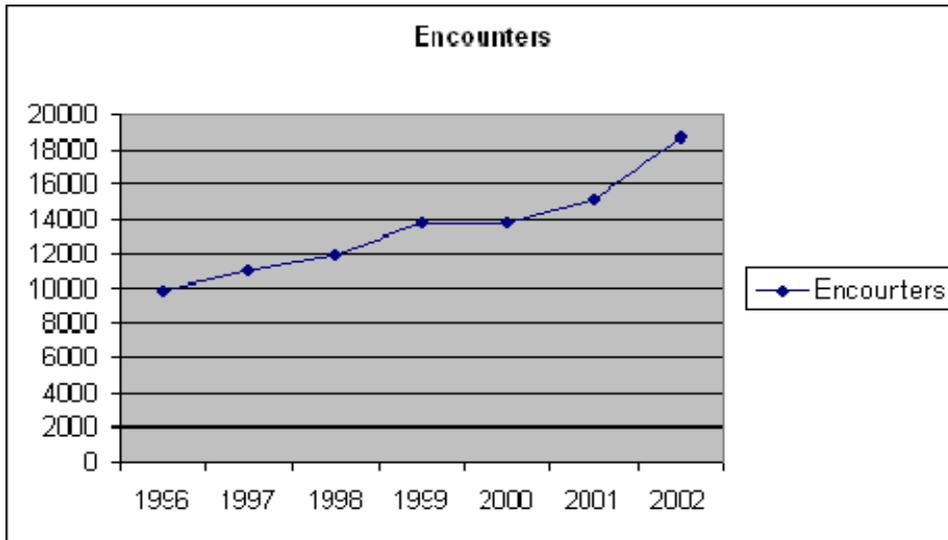
7. **Increased staff**. At the time I installed the EHR I had one full-time nurse practitioner and a staff of 7 with an FTE ratio of 3.5. Currently I have three physician extenders and a staff of 12 with an FTE ratio of 3.67.

8. **Track Total operating cost as a percentage of total medical revenue**. Growth under my business model increased the total operating cost as a percentage of total medical revenue. In 1994 my total operating cost was 64% of my total medical revenues. In 2002, with the addition of the physician extenders, the percentage was 80%. In 2002 I also had the expense of quadrupled rent costs on my new building ($10,000 per month).

9. **Eliminate chart pulls**. The average number of chart pulls per day went from 60 in 1995 to zero. The three filing clerks were reassigned to other tasks. Paper charts are now stored in accordance by law where they are accessible within 24 hours.

10. **Decreased charting time**. Charting decreased from an average of four minutes (including prescription writing) to less than one minute, a reduction of 75%. Furthermore, during the charting process, patient service codes are automatically entered into the billing system, eliminating the time-consuming task of having to manually check and key in billing codes. The total amount of time I spend in the exam room is six minutes (2002, 2003). This has remained fairly constant since 1996, from a high in 2001 of 7 minutes and a low in 1997 of 5 minutes. With less

than one minute for charting, this gives me additional quality time with my patient.

11. **Make more productive use of chart storage room.** I have no chart storage area in my new office.

12. **Elimination of transcription costs**. After installation of the EHR my already low my transcriptions costs decreased to zero.

Quality of Care Improvements

13. **Decreased patient total wait time**. In 1995 office wait time from check-in to check-out was one hour. That has been reduced to an average of 35 minutes over all encounters, a decrease of 42%. Since 1996 this wait-time has been stable, reaching a peak of 38 minutes in 1999 and a low of 33 minutes in 2000.

14. **Decreased drug refill time**. Drug refill turnaround time decreased from one hour to 20 minutes or less, a reduction of 75%. The elimination of pulling paper charts accounts for much of this improvement.

15. **Decreased telephone call turnaround time**. Average telephone call turnaround decreased from one hour to less than 20 minutes, a reduction of 75%. Again, the elimination of pulling paper charts accounts for much of this improvement. In 2002 my practice had 7,455 telephone encounters.

Physician/Patient Satisfaction. We no longer do delayed charting in my practice. I stop seeing patients every day at 4:30 pm. I am a pediatrician who works 26 hours a week and made $304,316 in 2002. My physician extenders work 30 hours per week. Patients are in and out of my office in 35 minutes.

Transformed Processes. I selected an EHR with a workflow system that automates the processes of the office. This workflow conforms to the business processes of my office. The templates are configurable to my preferences. These processes have indeed been transformed to an electronic mode, but they have not been reengineered. I did not have to change my routines to accommodate the EHR, it was configured to meet my needs and preferences.

Improved quality of care, process efficiency, productivity, customer service. Improvements in each of these areas are discussed above. In addition, My quality review scores have increased from 90% in 1995 to 97% in 1996 and have remained at that level for every review since.

In 1995 my immunization rate was 90%; today my immunization rate is 99%. More than 99% of my two-year-old patients are up-to-date on their immunizations.

I have always been very customer service oriented and the EHR allows me to offer better service than my competitors without raising my prices. Frequently a parent will tell me that they chose my practice because at their previous doctor they could never get an appointment, their wait was too long, the doctor always seemed rushed, or (my personal favorite) "they could never find my child's chart."

My EHR compresses the healthcare delivery sequence and allows us to minimize the waiting time at each step of the process. Thus, in my current office we need fewer exam rooms and a smaller waiting room than a comparably-sized practice using a paper chart. I'm not sure that I've squeezed out every efficiency from my EHR, but I'm working on it.

G. Costs and Benefits Offsetting Costs—The original cost of the system in 1995 was $20,000. At that time I estimated that my paper records cost $15 each to create, store, and maintain. Those savings alone offset $9,000 of the cost of the EHR in the first six months (600 new charts X $15.00). Using a very conservative estimate of $50/encounter and 22 business days/month, I realized that I could make up the other $11,000 by only adding 1.6 encounters/day or 8 encounters/week. In the last seven years we have created at least 8,931 new patient charts at a savings of $15.00 each. Since December 4, 1995, I estimate that I have saved $133,965.00 in just this one area alone.

The system paid for itself so quickly and generated so much additional income that I have been able to expand the office. In 2001 I moved into a much larger facility with 11 exam rooms. I estimate that since 1995 I have invested an additional $40,000.00 in upgrading and maintaining the system.

Benefits Offsetting Costs
- Charts are instantly accessible to multi-users in the office
- Pharmacy callbacks have been reduced to almost zero
- Cost of chart supplies, chart pulls, chart maintenance, and chart storage has been reduced to zero
- Billing code posting has been eliminated
- Office communications has increased dramatically between providers and staff, between staff members, and among providers, staff and patients. With instant messaging among staff members, door flags and light systems are no longer necessary.
- The ability to query patient data allows me to compare drugs for efficacy, check regulatory compliance (for example, state immunization compliance) and study medical data for outcomes.
- Patient safety has been increased by legible, computer-generated prescriptions, legible progress notes, allergy cross references, up to date summary level information and aggregated patient data.

Anticipated and Actual Return. My return has been far beyond what I anticipated. My gross billings have increased more than 400 percent. In 2002, the revenue per FTE of primary-care-only groups was $197,607.[3] My revenue per full-time providers—

physicians plus extenders--(3.25 FTE) was $479,178, 125% higher than the national norm.

IV.   Lessons Learned

Critical Success Factors
- Simultaneously accomplishing office tasks yields *huge* time savings. *Everyone* involved in the encounter saves time, effectively doubling and tripling the benefits.
- The automated workflow follows the physician's manual workflow; the processes were *minimally* reengineered.
- Any reengineering must simplify processes as much as possible.
- "Dynamic short lists" or templates are configurable to the preferences of each practice and to the preferences of each physician.
- Charting is easy to use. A long learning curve will doom a busy practice.
- The EHR system is quicker than paper at the point of use. The physician is the most expensive employee in the office and if he/she is taking longer to chart on the computer than on paper, the system will fail.

Reasons why I was successful
- The workflow of the EHR conformed to the workflow of my office
- I incorporated the EHR into the business processes of my office.
- My staff and I enthusiastically embraced the EHR.
- I recognized the time-savings and revenue-increasing potential of the EHR.
- I expanded on the capability of the product by recognizing new ways to utilize the EHR.
- The vendor gave me unqualified support.

What I wish I had known beforehand
- There were examples of hardware maintenance issues that I did not know about such as blocked exhaust fans and overheated storage rooms—problems that were easily overcome. I and a few of my nurses can now replace power supplies and dismantle computers for disposal when required.
- Some computers are noisy. Terminal servers are quiet.
- A cartoon displayed on the touchscreen helps to eliminate potential security issues.

What I think is important
- I cannot stress this point enough: *time is the issue*: Time is the only thing a physician has to sell. The EHR *must* save a physician time.
- The primary key to successfully automating workflow in the physician's office is communication: getting the right amount of information to the right people at the right time so that they can make good decisions.
- Physicians will engage in data entry when the process is both rapid and simple.

- The EHR allows me to offer better service than my competitors while keeping my prices the same.
- A paperless office with thin clients yields a quiet, uncluttered environment.
- Reducing the time spent on paperwork allows the physician to increase the time available for patient interaction
- Going home on time—with no delayed charting—greatly increases physician satisfaction.
- Touchscreens in the exam rooms have created no security issues.
- Using a computer in the exam room at the point of care adds to patient satisfaction.
- TO-DO lists allow for easy supervision of physician extenders.
- Physician Extenders allow my office to see more patients per day; however, in general they see fewer patients per hour.
- Annual upgrades allow me to benefit from a continually evolving and improving EHR.

Final Thoughts

In reviewing the latest publication by the IOM, "Key Capabilities of an Electronic Health Record System," the fact that there has been "little if any migration to electronic records" in "small practice settings" astounds me[4]. My solo-practice provides proof that the migration to an electronic information system improves safety, the quality of healthcare delivery, patient and physician satisfaction, and billings.

The IOM predicts that it will take seven years for most providers to migrate from paper records to a comprehensive EHR system.[5] I disagree. More and more positive ROI data is finding its way into the journals. The bottom line is crystal clear: in terms of operating a small business, how can a physician afford *not* to automate his practice?

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[1] National Association of Healthcare Consultants (NAHC), *2000 Statistical Report*.

[2] Cooper, J. D., Copenhaver, J. D. & Copenhaver, C.J. (2001). Workflow in physician practices. In J. M. Kiel (Ed.), *Information Technology for the Practicing Physician* (pp.22-34). New York; Springer-Verlag New York, Inc.

[3] *Better-performing groups use benchmarking to improve practices*. (2003). Retrieved June 12, 2003, from Medical Group Management Association Web site: www.mgma.com/press/betterperform.cfm

[4] Tang, Paul C. *Key Capabilities of an Electronic Health Record System: Letter Report*, Institute of Medicine, July 31, 2003.

[5] Tang, p. 11.

Biography: Dr. Jeffrey D. Cooper received his undergraduate degree in Music and his Doctorate of Medicine from Emory University. After a pediatric residency at Emory, he entered private practice. He is board certified by the ABP and a Fellow of the AAP.