Evaluation of Small Practice eDesign Case Studies

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Susan Eliot, MSPH
Eliot & Associates

Paul N. Gorman, MD
Robert A. Lowe, MD, MPH
Oregon Health & Science University

INTRODUCTION

Small practices are the next frontier in health information technology (HIT) adoption, as sweeping federal, state, and local programs provide incentives and mandates to implement such technologies as electronic medical records (EMRs), electronic prescribing, and patient access to medical data via portals. While many large organizations and networks have already successfully managed the transition to technology-enabled practice, small and medium-sized medical practices face substantial challenges and greater risks to deploy similar technologies.

The California Health Care Foundation (CHCF), through the Small Practice eDesign (SPeD) initiative, proposed to develop the tools and support structure needed so that practices which lack these resources will be able to adopt EHRs, integrate the technology into their work practices, and achieve meaningful use targets set by the federal government. The pilot phase involved testing this program in primary care practices in rural Tulare County, California, one of the poorest counties in California and a designated primary care shortage area.

Fifteen physicians in 14 practices were included in the initial pilot program in Tulare County. Twelve of the 15 physicians were men, half were born outside the United States, and their ages ranged from mid 30s to over 60. All were primary care practices, and one-third had previous EMR systems. Combined billing and clinical software systems were implemented in the project, with CHCF providing financial support, education and training, and logistic and technical support through a trusted local intermediary.

As part of this initiative, a 22-month evaluation of the SPeD pilot project was carried out by investigators from Oregon Health & Science University in collaboration with Eliot and Associates of Portland, Oregon. This evaluation was based on an iterative, flexible, multi-method design that included frequent interaction and exchange with the project leaders and implementation staff. Our data collection tools were primarily semi-structured and open-ended, to encourage and accommodate a broad spectrum of input from stakeholders and increase their comfort, confidence, and authenticity. We treated the practice as the unit of analysis, rather than the physician, since the practice was the level at which the intervention took place.

Following are case studies of the first group of practices in the pilot initiative. Pseudonyms are used for the physicians, each of whom reviewed and approved his or her case study for publication.

More information on the SPeD program can be found at:
http://www.chcf.org/projects/2009/small-practice-edesign

Dr. Blackwell

Practice Context

A bright, young internist and mother of a small child, Dr. Blackwell runs a full-time solo practice situated in a middle-class, rural community of 125,000. Forty percent of the community is Hispanic/Latino and ten percent of the population is over the age of 65.

Dr. Blackwell generally works a nine-hour day Monday through Thursday, with an additional hour at home in the evening. An occasional urgent care visit brings her into the office on Friday. She does not make hospital visits.

Though eager to bring technology to her practice, Dr. Blackwell was initially hesitant to join the implementation project. Realizing that the most intense phase of the implementation would occur during her heaviest visit volume (December), she sensed the potentially significant burden that installing the dual technology during that time would entail.

A self-described perfectionist, Dr. Blackwell has high expectations of herself and her two employees. Project consultants describe her as a good manager with an "I'm-going-to-figure-this-out" attitude. With their encouragement and support, Dr. Blackwell decided to move forward with the implementation. Ultimately, she said, "I want to make this work." And she did.

Soon after beginning the implementation she found herself addressing push-back from her long-standing front-desk employee, who resisted learning new billing procedures. Because billing had been previously outsourced, the employee viewed the new duties as outside her job description. Dr. Blackwell gave the employee a week off to think over whether she wanted to stay in the position and do the job required. The employee stayed and went on to receive training in back-office responsibilities.

At the same time, Dr. Blackwell needed to hire a new back office medical assistant to replace the one who had just left. The new MA turned out to be a highly capable assistant. In addition to traditional duties, she generates updated medication and allergy lists and collects family history, social history, and past medical history for Dr. Blackwell before she sees the patient. The MA was also cross-trained in basic front desk responsibilities like patient check-in, scheduling, and collecting co-pays and doing the end-of-day reconciliation of fees collected.

Physician Goals

The goals Dr. Blackwell set for the technology implementation encompassed four broad areas:

- Improved patient care
- Decreased office inefficiency
- Improved job satisfaction (for both herself and her employees)
- Increased revenue

Dr. Blackwell's vision for improving patient care was predicated on achieving two objectives: spending more time with patients, and facilitating better communication with the specialists she refers to.

With regard to decreasing inefficiency, she said she wanted to "eliminate much of the minutiae" in which both she and her staff routinely engaged. Dr. Blackwell also wanted to spend less time writing chart notes and to streamline patient scheduling to minimize appointment mishaps. For her staff, she hoped the new technology would allow them to spend less time searching for charts and records, tracking labs and x-rays, and answering calls about prescriptions.

Her own job satisfaction would be increased, Dr. Blackwell said, if the technology allowed her more time off with her family. She also had a desire to increase staff pay and include them in profit-sharing in her medical practice.

To do both, the new systems would need to increase revenue above pre-technology levels. Dr. Blackwell thought this might be possible if the technology supported her in appropriately coding patient visits and procedures so as to maximize reimbursement. Eventually, she also thought she might be able to increase revenue by seeing more patients, though that was not necessarily one of her over-arching goals.

Technology Implementation

Billing

Dr. Blackwell started noticing benefits of the new in-house billing system (athena) shortly after implementation. "We've had an immediate response to claims," she said, "and I'm already seeing the dollars start to flow. " She also commented that, "athena is certainly better than the two previous billers I had." But one feature Dr. Blackwell missed was the diagnostic coding that previous external billers used to provide for her:

> The codes are different from how we're used to thinking about them. For instance if I'm looking for knee pain in the ICD-9 codes it will say something like pain in the lower limb or pain in the joint of the lower limb. Our old outside billing system used to take care of that.

Additionally, Dr. Blackwell noticed the responsibility for entering diagnostic codes had shifted from staff to her under the new system:

> I actually do more work now than my staff as far as looking for codes is concerned. I'm doing the work they used to do—these are things I never had to do before. But it's okay. Sometimes I'm just so obsessive compulsive so I just do things. It's easier.

Although the athena billing system resulted in almost immediate financial success, Dr. Blackwell would have changed two things about the way it was implemented if she could. First, she would have liked to meet with people from athena earlier in the process to head off what she felt were preventable glitches. Secondly, she wished that all eight of the physicians in her implementation cohort could have participated in interactive meetings throughout the implementation to learn from and support each other through the common rough spots.

Electronic medical records technology

Early on, Dr. Blackwell embraced the EMR system as readily as she did the billing system. Prior to the technology implementation all of Dr. Blackwell's patient records were stored exclusively in paper charts. "The big pains are gone," she said, referring to pulling charts and filing.

> The system does the entire minutiae—it's the wonder of technology—and there's less time wasted looking through the chart.

Dr. Blackwell also said she appreciated having x-rays, lab results, and medications easily accessible on her laptop. Another feature she cherished was the ability to readily share information with patients and staff:

> I can give a printout of labs and x-ray results to the patient and also give them an updated medication list with the changes made during that particular visit. And, all the staff can look at my notes if they need information for obtaining approval for CT scans/MRI etc.

Foremost, though, is how great she said she was feeling about the patient care she was now providing:

> The best thing that's happened is when I come out of the room I feel really great! Now I have a tool that makes things easier and allows me to do other stuff for the patient with the confidence too that there won't be any confusion with medication changes made as the medication list provided at end of visit clearly indicates these changes. This is very important when dealing with elderly patients with multiple medications.

A few months later, she estimated she was using about 80 percent of the system and was quite comfortable seeing patients with it. Although there were still some kinks to be worked out in the interface with the local hospital laboratory, the patient portal was not yet up and running, and staff were still pre-loading patient data (past histories, allergies, smoking status), in Dr. Blackwell's estimation there were more pluses than minuses to having an EMR system.

For one, the built-in automated reminder call feature meant front office staff no longer had to call patients to remind them of appointments. Another potential time saver was the "Smart Form" that patients could complete up front with past history, surgeries, etc. The smart form can be opened by the patient prior to the visit once the patient portal is up and running and updates can be done by patients by merely checking boxes. Dr. Blackwell said she likes the smart form for several reasons: it will save patients time from having to come in 30 minutes early for their visit; it saves scanning and shredding paper that information would previously be collected on; it allows her to update parts of the form when she sees the patient; and using the form ensures that all patient information is legible. The practice is at present still working on setting up the patient portal and updating the smart form to include other information like family history, social history, and language/ethnicity.

Dr. Blackwell also likes the electronic prescribing feature: "It's very easy for prescriptions—as a primary care provider, I write multiple prescriptions." Previously, staff attached the faxed prescriptions to the patient's chart for Dr. Blackwell to review and sign, then faxed them all back to pharmacies. But the technology replaced all those steps with few keystrokes:

> Since the medications are already on the current medication list, unless the medication needs updating, writing refills entail just a few clicks. Writing new prescription is just as easy. It's so, so neat! Before, the paper faxed request had to be attached to the chart. Staff used to pull 50 charts a day. Now, we don't pull charts anymore.

The new system has also improved her referral process, says Dr. Blackwell. Both she and her medical assistant are fond of the way it has reduced phone calls and efficiently closed the communication loop between patient, doctor, and specialist:

> My MA is very happy about the new referral process. We used to fill out forms, copy insurance information, patient history, and my notes. Now in two or three clicks, my notes are sent to the specialist along with their insurance information. Once everything is in the

> system, she (MA) just waits for a call or fax from the specialist with the patient's appointment. Now, the only call she has to make is to the patient letting them know when their appointment will be with the specialist. Once we get notes back from the specialist, that closes the loop. There are no more missed referrals. I love it!

Technology Adoption

Documentation improvements

In adopting the technology, Dr. Blackwell realized that her approach to patient care had not changed that much, only her documentation of and access to patient data: "It's such easy access now—you don't have to go through the chart to look up where you wrote something—you just click." One major change though is how Dr. Blackwell's medical assistant is now more attuned and involved with implementing preventive measures like pneumonia vaccination for patients with certain conditions. Since the problem list is on the same screen as their list of vaccinations, she and her MA could easily see who had not had the recommended vaccinations for their condition and age. For diabetics, Dr. Blackwell also asked her medical assistant to start documenting during their visits if the patients had had retinopathy checks for the last year; a referral is generated if the patient has not. Documenting the screening colonoscopy results in the patient's past history when they get the results keep them on top of when the next one should be.

Dr. Blackwell has also customized data entry to meet her needs. She generally does not use pre-designed, condition-specific templates because she says she is uncomfortable clicking on a list of symptoms. Instead, she prefers to "free-type" to get her notes just the way she wants them. But she also requested that the vendor add a generic note area to the general physical templates so she can individualize it for each patient.

The patient activity management component—Jelly Beans—has become one of Dr. Blackwell's favorite tools. She likes the way it automatically documents and lists all of the labs, referrals, prescriptions, etc. on each patient. Because of it, she says, "I'm not afraid now that things will fall through the cracks."

Another EMR feature that is really helpful is the telephone encounter documentation. Each phone call is documented complete with date and time the phone call was returned. It facilitates communication of certain results of laboratory tests and x-rays to patients using the physician's words (typed instructions/explanations). This eliminates miscommunication between physician and staff and leads to better documentation all around.

Patient reaction

Most of Dr. Blackwell's patients have reacted favorably to sharing their doctor with her laptop. Some believe the laptop makes the doctor more efficient, especially with regard to documentation and accessing patient information. One patient said: "She doesn't flip through a bunch of papers and doesn't write as much. I like very much being computerized. It's faster bringing up files."

For the most part, patients do not feel the attention Dr. Blackwell devotes to the new technology deprives them of the attention she usually gives them. Some even feel the technology has freed up more time for Dr. Blackwell to interact with them during their visit: "It seems she can spend more time with me than before and she looks at my medications easily and gets deeper into my health issues." A few patients, however, said they feel she is less focused on them now and more

on the computer. Dr. Blackwell believes these are probably elderly patients who do not understand that she is taking in what they are saying as she types:

> I tell my patients that it doesn't mean when I'm looking at the computer that I'm not listening to them. The older patients don't quite understand that but the younger ones really get it. When the older patients see me typing they feel 'Oh, she's just busy and I can't say anything more.' But I tell them, just because I'm typing, it doesn't mean I'm not listening to them.

A new business identity

A final byproduct of adopting the practice technology is Dr. Blackwell's new business identity. She says she has never thought of herself as a businesswoman before but that the technology has given her an appreciation for practice management and a feeling of empowerment through the data:

> I find that I'm making better business decisions and making some changes that are much overdue. For instance, I didn't used to care what vaccines cost but now I realize that some cost more than I'm reimbursed for them.

Practice Impacts

Increased efficiency

When you ask Dr. Blackwell what the biggest impacts have been in the year since she computerized her office, she easily names two: (1) increased office efficiency, and (2) using data to make changes.

Evidence she has improved office efficiency is apparent, she says, in all of the data she now has available when meeting with a patient. She also measures efficiency in the number of nonproductive work steps—scanning, copying, filing, searching for charts—she and her staff have eliminated from daily activities.

Data driven-changes

With regard to data-driven changes, Dr. Blackwell describes how she used billing system-generated data to negotiate her fee schedule with one of her payers:

> I thought I couldn't negotiate for my fees but, looking at the pay schedules, I saw that one payer was paying 20% less. In the athena report library you can build your own report by entering visit codes to get a comparison among the payers in a side-by-side table. After researching what all the other payers were paying, I renegotiated my fee with [one of my payers]. I think it's kind of a big deal. When I tell my colleagues about it they say, 'Wow!'"

Remote access

Another substantial impact for Dr. Blackwell has been the remote access the technology has afforded her. Instead of staying late, Dr. Blackwell now brings her laptop home in the evening and works side by side next to her son while he does his homework. She can also go to Hawaii for a week without coming back to a pile of charts:

> When I've gone on vacation before, it usually takes two weeks to get back to normal upon my return. But while I was in Hawaii, I worked one hour a day on my laptop filling prescriptions, checking labs, etc. When I came back there was no backlog at all. It was as if I

didn't leave. That alone is phenomenal! I used to joke that I needed a Prozac drip when I came back from vacation because of all the charts piled up on my desk and on the floor of my office.

Epilogue

Implementation consultants describe Dr. Blackwell as "The Star" of the cohort because of the way she quickly embraced the new technology and maximized use of its components. Her positive "can-do" attitude, boundless energy, curiosity, and bright intellect, contributed to an exceptionally successful adoption.

Of the four broad goals Dr. Blackwell set out to achieve—improve patient care, decrease office inefficiency, improve job satisfaction, and increase revenue—Dr. Blackwell feels she has accomplished at least three of the four. Increased access to, and availability of, patient information has positively impacted patient care as well as relationships with specialty physicians. Her office is more efficient due to the automation of several functions. Her job satisfaction has increased due to her ability to now work remotely and provide patients with more information.

Dr. Blackwell	2009	2010	Specialty Median
Available hours (monthly avg.)	127	142	92
Scheduled patients per hour	3.6	3.5	3.3
RVU's per scheduled patient	1.3	1.4	1.1
Earnings per hour	$222	$226	N/A

Whether or not Dr. Blackwell's revenue will increase as she anticipated—and allow her to grant employees the increased wages and profit-sharing she desires—is still to be determined, though. athena data indicates that Dr. Blackwell is seeing essentially the same number of patients, and at roughly the same relative value units per patient, as she did prior to implementation. Her earnings per hour have increased slightly in the past year from $222 per hour to $226 per hour, but perhaps not significantly. The new technology has also increased her hours of availability by about ten percent from 127 hours per month to 142 hours per month, on average.

Enhanced documentation, however, has allowed Dr. Blackwell to code some visits at more appropriate levels. For example, between 2009 and 2010, the number of level four visits with established patients increased from 44 percent to 57 percent. At the same time, level three visits with established patients decreased from 55 percent to 36 percent. It is too soon to determine if new coding patterns will result in higher income for the practice and increased salaries for Dr. Blackwell's staff.

Dr. Blackwell			
Established Patient Visits	**2009**	**2010**	**Specialty Average**
9211	--	--	4.4
9212	0.2	0.1	7.7
9213	54.5	35.8	46.6
9214	44.4	56.8	35.8
9215	0.9	7.3	5.5

Despite all the extra work, long hours, and intensive learning curve, Dr. Blackwell is thrilled with her computerized practice and would never go back. In addition to the efficiency the systems

have helped her create and the improved availability/accessibility she now has to patient data, several other unimagined benefits have emerged. They include:

- Her new role as a businesswoman
- The power the data affords her to increase revenue
- A strong, capable, cross-trained staff
- Delight in her practice
- The real potential for further improvement in quality of care

Dr. Holmes

Practice Context

Dr. Holmes runs an internal medicine practice in a city of about 125,000 nestled in a flat, semi-arid agricultural valley. An in-migration of young Hispanic and Latino families—over 40 percent of the population—makes it the third fastest growing city in the state. Barely ten percent of the population in the small town is over the age of 65.

Dr. Holmes employs two physician assistants—one full-time, one part-time—to help him provide care to his patients. His practice is open Monday through Friday from 8:00 until 5:00 and Dr. Holmes takes Friday afternoons off. Hospital visits comprise ten percent of his practice. He also accepts medical students into his practice for training.

On a permanent basis Dr. Holmes employs five full-time support staff—two medical assistants, two front desk/reception staff, one billing specialist—and one half-time staff person who floats between front and back office. Dr. Holmes's son, a medical student, also works in the practice in a support role during the summers. Consultants have told Dr. Holmes that he is overstaffed but he says that he would rather lose employees through attrition than ask any one of them to leave.

A former partner of an independent practice association (IPA), Dr. Holmes broke away from the IPA twelve years ago to start a solo practice. When he left, he built a large, modern office space that he decorated with several pieces of fine art. Dr. Holmes's wife is the designated office manager. Her full-time job as an elementary schoolteacher precludes her spending much time in the practice but Dr. Holmes hopes she will become his full-time office manager when she retires in three years.

Dr. Holmes is a continuous learner and approaches his practice as a meticulous detective. He is always searching for answers, whether about the latest technology or the underlying causes of patients' medical conditions. For example, Dr. Holmes creates individual profiles on each one of his patients. These patient profiles are separate from the medical record and include comprehensive descriptions of patient problems, medications, past history, past procedures, and preventive care. Dr. Holmes says these profiles regularly help him generate "aha" moments in which he gains insight into the patient condition. "I'm just that kind of person—I need to be detailed and thorough. I've been criticized for it but because of that I usually hit the nail on the head and sometimes diagnose something sooner." As an example, he described a situation in which his intense detective work paid off for one of his patients:

> I had a 19-year old come in the other day with headaches. She's been seeing a neurologist for two years. It turns out that she's on birth control pills and her blood pressure is 150 over 110. If I weren't so thorough I wouldn't have found it. No one else uncovered the cause of her headaches.

To increase his technology knowledge, Dr. Holmes spent over a year in the DOQTIT (Doctor's Office Quality Through Information Technology) program, a clinician technology training program in which he attended conferences, studied educational materials, and participated in face-to-face coaching sessions to learn more about technology before implementing a system in his office.

But, considering himself to be somewhat of a loner, Dr. Holmes did not interact much with the other physicians in his implementation cohort during implementation.

> I don't call on the other physicians. For better or worse, the time we spend at the monthly meetings is fine with me. My wife tells me that it's not a good thing that I don't interact more with my colleagues but I'm the kind of guy who doesn't stop and ask for directions.

Physician Goals

Dr. Holmes had multiple goals he hoped to achieve through implementation of the new billing and medical records technology. They encompassed three main areas: efficiency, patient care, and stress reduction.

- Increased practice efficiency
- Not having to track things down
- Not having to fax requests to the pharmacy
- The ability to send medical records electronically to insurance companies
- The ability to complete referrals within 48 hours of completing the chart
- Saving time and doing fewer nonproductive tasks
- Better patient care
- Better management of chronic diseases
- The ability to create patient profiles within the EMR
- Reduced stress
- Less stress in the office
- Work fewer hours

Technology Implementation

At the time he implemented eClinicalWorks and athena, Dr. Holmes already had an EMR system in place but he considered it inadequate. He felt eCW was heads above the other systems he had explored and was glad the California Health Care Foundation had chosen it as the technology he and his colleagues would implement. He said:

> I've been waiting for this for 15 to 20 years. All the goals I've been trying to accomplish on my own—management of chronic diseases, getting patients to take the initiative, setting up medical profiles—are all included. I do patient profiles on each one of my patients and they are so time consuming trying to do them with the primitive tools I have. It just tickles me that I'll be able to use it!

The local support that came with the implementation project also delighted Dr. Holmes. Experience trying to access support from his previous nonlocal vendor gave him a direct appreciation for in the in-town support he could now call upon seven days a week:

> I love the local support. The foundation read my mind. My current system is from South Carolina and it would be a big deal to fly someone out here for training. Even for a short period of time it would be consuming and economically prohibitive.

Dr. Holmes left the implementation of the athena billing system up to his wife. She and his staff had managed the previous in-house billing system. In contrast, athena was an outside billing program headquartered on the east coast, three time zones away. Because of that, Dr. Holmes said his wife often felt she was losing control over the finances:

> My wife cannot stand not knowing where the dollars are. She's used to being able to make one phone call and get things fixed immediately. Now she needs to call on Eastern Standard Time and try to find someone to talk to. She says she gets the runaround a lot and is transferred from one person to another.

Technology Adoption

Record transfer

As important as keeping detailed patient records is to Dr. Holmes, record transfer from one system to the other was of major importance. "I've had consultants tell me not to worry about transferring patient information from the past years," he said. "But it goes back to quality of care. There's a treasure chest of knowledge there." Three months post-implementation, Dr. Holmes continued to use both old and new systems while staff tried to expedite the transfer process. "We don't have enough information from the previous EMR system in so I'm going from one computer to the other looking for information," he said.

It became a significant challenge for staff to find the time necessary to transfer records with all the detail Dr. Holmes required. Six months post-implementation, the task became even more critical when they realized the license on the old EMR would run out in four months. According to an implementation consultant, at the rate staff were transferring records, it would have taken six years to transfer the entire backlog. Ultimately, Dr. Holmes's staff pushed themselves hard to get all of the essential data transferred before the contract ended. As it turned out, they still have complete access to the old data—they simply have no paid support if the system goes down.

Office management

About nine months post-implementation, Dr. Holmes recognized a change in follow-through, efficiency, and cooperation among his staff. Roles and responsibilities had changed with the introduction of the new technology but without the benefit of a formal process for re-assigning staff duties or establishing required new workflows. Staff were busy but not efficient. "eCW and athena have helped fine tune staff responsibilities," said Dr. Holmes. "I'm beginning to see things that were apparent before but that I just could not put my finger on." Realizing how critical it was to have a strong on-site manager to address these issues, Dr. Holmes hired one to manage both front and back office:

> Being a doctor and being an administrator are two different things. I hired an MA who is a firecracker. Initially it caused a lot of friction and personalities clashed so we stopped and regrouped and I tried to help everybody understand. I also sat down with my MA (new manager) to establish individual roles. She wanted to understand the front desk job better so she did their job for a day. She and I hammered out new job descriptions for everyone. Now there is a lot more cooperation. I have a strong team. They're interested and motivated and

> they like working. I was surprised but everyone in the office is laughing and talking now. That's different.

Documentation

Early on, Dr. Holmes found his new EMR a good match for his practice style:

> I think eCW is incredible. It's a very user-friendly system. It helps me take my notes to my level of specification. It's profound. I like the eCW screen. It's all right there—I can see the diagnosis and medications. It really helps my thought processes. It helps me formulate decisions with much less effort.

But Dr. Holmes also acknowledged that note-taking was slower now. He adopted Dragon voice recognition software to help facilitate documentation but used time over the lunch hour and at the end of the workday to catch up on his progress notes. And, although Dr. Holmes did not learn to use templates or order sets until much later, his physician assistants embraced all of the features almost immediately:

> My PAs are running away with it. They have such good typing skills. It didn't take them long to get used to it. I'm still learning to multitask. My PAs are really using the templates—they are just amazing!

Dr. Holmes thought that eventually he would also use all of the features like his PAs: "I need to grow into it; I'm still on the slow side. I'm 57. I need to program these things into my brain so it develops new synapses."

Another issue Dr. Holmes had was in getting his medical assistants to complete the medical history with the detail he requires: "When they do the medical history it's not the way I'd like—I'd like to see more detail." Consequently, Dr. Holmes often resorted to doing the medical history himself using Dragon dictation – consistent with his practice style of doing things himself, e.g. re-checking blood pressure readings taken by his staff.

Efficiency

Dr. Holmes found the ordering and result-tracking features of the new system easy to use and a boost to office efficiency. He said he no longer finds himself searching everywhere for labs and reports for patient follow-up: "I don't find myself getting up and running out the office door looking for a report except on rare occasions."

The computer system also improved office flow, said Dr. Holmes, allowing him to see patients on a more consistent basis. He said many things are more consistent: "There's a lot less chaos now." He also liked the improvements in medication prescribing: "Before I didn't have a good grasp of medications patients were on but now I'm able to get information quickly before renewing medications for patients."

Practice Impacts

Patient care

According to patients, Dr. Holmes has made many of them happier with the eCW e-prescribing feature. He said patients also enjoy his and his staff's ability to access their records on the spot. "Access to patient records is fast, allowing us to address concerns in any situation such as phone calls and prescriptions."

Some of Dr. Holmes's patients feel he is spending less time with them since he installed the technology but don't understand why. One patient felt it was because he was more efficient now, another that he needed more time to enter information in to the computer, and a third thought it might be because he was seeing more other patients. Many other patients said they believe Dr. Holmes is the same good doctor he's always been and that the technology has had no impact on their relationship.

Finances

"We have had some problems with athena," said Dr. Holmes. "Our claims have plummeted." At the same time, he hoped things would pick up based on new office practices and coding levels:

> We are billing faster and I know I'm billing more—I used to under-bill. Although the EMR does not recognize the amount of work I put in, I think I understand the coding system and I've been able to justify a higher level of code.

In addition, Dr. Holmes realized that his patient numbers had gone down since installing the new system. Due to the extra time required for detailed documentation, Dr. Holmes was forced to reduce patient visits from 25 per day to 15 to 20 per day. In contrast, he said one of his PAs was seeing more patients with the new system than she did with the old system; athena reports bear that out.

Dr. Holmes's patients per hour average went down from 4.1 per hour in 2009 to 3.9 per hour in 2010 while his PA's (Black) went up from 3.2 to 3.5 patient visits per hour for the same time period. His revenue per hour went down from $210 per hour in 2009 to $172 per hour in 2010, whereas his PA's revenue went up from $111 per hour to $130 per hour. Dr. Holmes's second PA was hired mid-implementation so there is no annual comparative data for her but her revenue per hour in 2010 was comparable to those of the other PA at $136 per hour.

Dr. Holmes				**PA - Black**		**PA - Loomis**	
	2009	**2010**	**Specialty Median**	**2009**	**2010**	**2009**	**2010**
Available hours (mo. avg.)	79	95	92	128	150	N/A	100
Scheduled patients per hour	4.1	3.9	3.3	3.2	3.5	N/A	3.3
RVU's per scheduled patient	0.9	0.9	1.1	0.6	0.8	N/A	0.8
Earnings per hour	$210	$172	N/A	$111	$130	N/A	$136

Although Dr. Holmes perceived himself as "billing higher," it is not reflected in E & M coding for 2009 and 2010 established patients. On the other hand, his PA (Black) increased the number of visits she coded as 99214 by twelve-fold between 2009 and 2010 and billed almost four times as many visits as 99215.

Dr. Holmes				PA - 1		PA -2	
Established Patient Visits	**2009**	**2010**	**Specialty Average**	**2009**	**2010**	**2009**	**2010**
99211	1.9	3.3	4.4	3.2	3.5	N/A	0.6
99212	7.0	3.1	7.7	14.6	0.3	N/A	--
99213	57.5	61.2	46.6	79.2	61.6	N/A	50.6
99214	30.7	28.5	35.8	2.6	33.1	N/A	46.9
99215	3.0	4.0	5.5	0.4	1.5	N/A	1.9

Epilogue

Dr. Holmes met his goal of increasing office efficiency with the help of the new technology on many fronts: he is not chasing after paper anymore, office work processes are consistent and less chaotic, staff have clearly defined roles, and it is easier to order laboratory tests and prescribe medications. Unfortunately, increased efficiencies have not reduced Dr. Holmes's workload or increased his income.

The ability to easily document and track patient information in the new system, though, has allowed Dr. Holmes to practice medicine with the depth, detail, and thoroughness that defines him as a doctor. He also claims that quality of care has improved because the new system enables him to easily manage patients with chronic conditions. And, importantly, the new system supports development of the detailed individual profiles he likes to create for each of his patients.

One year after implementation, Dr. Holmes is still very happy with the system and intent upon learning how he might further adapt it to his needs:

> I'm so happy to have an EMR. It frees me. I'm going to be a better physician for it. It gives you all of these options on how to work. It's complicated but yet it's much more flexible. I have a lot of hope for molding the system to my benefit—I just have to sit down and think about.

Once Dr. Holmes masters the system and learns to tailor all of the components to meet his needs, his next calling may be as an EMR consultant to other doctors:

> I always think to myself, 'Boy I wish I was a consultant for everybody else.' I would sit down, if I had the time, and I would organize their templates. I love this kind of practice. If I can't do it myself [anymore], that's something maybe I can do.

Dr. Kildare and Dr. Casey

Practice Context

For the past twelve years, Dr. Kildare and Dr. Casey have been joint owners of a family practice located in a small city in the middle of rich farmland. A majority of the town's approximate 125,000 residents are low- to middle-income families, nearly 45 percent of Hispanic/Latino origin. Dr. Casey is fluent in Spanish.

Dr. Kildare and Dr. Casey were previously enrolled, with eight other doctors, in an independent practice association (IPA) that disbanded in 1999. Unlike other doctors in the group who went on to solo practices, Dr. Kildare and Dr. Casey decided to form a partnership. Both men are congenial in temperament and are known throughout the medical community for their dedication to quality care. Dr. Kildare is the designated office manager for the practice.

Office hours are from 8:00 until 5:00 Monday through Friday. Both Dr. Kildare and Dr. Casey regularly work ten-hour days—seven and a half hours seeing patients and the remainder documenting visits, responding to phone calls, completing forms, etc. The doctors also cover each other's patients during absences. The practice includes about 3,650 established patients.

Dr. Kildare averages 22 office visits and one hospital visit a day; Dr. Casey 17 office visits and four hospital visits a day. Each doctor spends one half day per month conducting nursing home visits as well. As family practitioners, both doctors treat a broad scope of patients. Dr. Casey, however, sees more of the elderly patients in the practice and does fewer newborn visits than Dr. Kildare. One full-time dedicated back office staff person supports each doctor: a licensed vocational nurse (LVN) works alongside Dr. Kildare, and Dr. Casey is supported by a medical assistant. The doctors share two additional staff who handle front office functions for the joint practice.

In addition to patient care duties, both doctors hold prominent roles within the professional medical community. One of Dr. Kildare's outside commitments is as board member of the state medical society where he has served for several years. A long-term staff member of the society described his commitment as dedicated and unqualified: "Dr. Kildare is not into politics or the power plays. He's really, really focused on patient care and quality issues." Dr. Casey, among other professional commitments, is on the local hospital's executive medical staff. Both doctors enjoy interacting with and learning from other colleagues in the community.

Both Dr. Kildare and Dr. Casey appreciate data and the power it can bring to clinical decision-making. They have had an electronic medical records system in place in their practice for the past eleven years, purchased soon after forming the partnership. Although Dr. Kildare and Dr. Casey had spent a significant amount of time customizing the original EMR system to meet their needs, it did not include one function they both felt was critical to quality patient care: a preventive measures input and reminder system. They also wanted an EMR that stored retrievable patient data they could query as desired. Their old EMR offered neither. Another drawback was the inability of the system to interface with the local hospital. Consequently, it was not unusual to find both doctors manually inputting stacks of laboratory results late in the evening long after the last patient had left for the day.

Physician Goals

When he and Dr. Casey made the decision to replace their previous EMR with eClinicalWorks, Dr. Kildare had no expectation that eCW would save time. Nor did he think the new system would allow him to see more patients. Some of the expectations Dr. Kildare did have include the following:

- The practice will be more efficient
- We will meet all clinical guidelines
- We can access and examine data more readily
- We will eliminate the need to store any paper documents
- There will be better documentation of patient information
- We will retain the same level of revenue
- We will not miss something that could have been prevented in a patient
- Our patients will be happier

Dr. Casey had a separate list of expectations that complemented those of Dr. Kildare:

- Our billing system will improve
- Our billing system will interface with our EMR system
- We will make data-driven decisions
- The system will be able to generate meaningful reports about patient compliance
- The practice will meet the guidelines of the U.S. Preventive Task Force
- Our work will flow more efficiently
- We can put more focus on improving preventive care

Technology Implementation

Having implemented and worked with an EMR for the past several years, Dr. Kildare and Dr. Casey were more aware of potential implementation pitfalls than other doctors in their cohort. “I don’t work under the assumption that any of this will be easy,” said Dr. Casey. “I wasn’t convinced about the value at first . . . I’m coming around but I’ve not been enthusiastic.” He also had concerns about potential staff resistance to change:

> I think one of the issues is the age of our employees. Three of them are grandparents. The youngest employee is in her late 30s. I think it would’ve been a lot easier to institute if we had a younger pool of employees.

Dr. Kildare also had reservations. Because billing had previously been outsourced, he worried about the additional burden the new in-house system would have on staff and the potential need to hire additional staff. The disruption that training might have on the practice, especially during the busy holiday season, also concerned him. Then there was the problem of getting bumped off the new system daily due to a problem with the local Internet connection.

But, unlike the previous EMR implementation, Dr. Kildare knew that this time he could depend on the near limitless responsiveness of the local support team to get them through the rough

spots: “They’ve been here a lot, even on weekends. Once when Glenn was at Laguna Beach [vacationing], I was able to call him and he gave me an hour of support over the phone.”

Still, their previous EMR experience was of considerable advantage to Dr. Kildare and Dr. Casey. Both had a high level of comfort using technology and a curiosity for learning what else it could do to support their practice. As challenges arose, neither was reluctant to phone a vendor directly for assistance or try to resolve the problem between the two of them. The opportunity to share in the struggle and learn from each other helped accelerate their own individual processes.

Still, Dr. Kildare and Dr. Casey felt they could have been supported further if they had had the opportunity to interact more with other physicians in the implementation cohort. Instead, interaction was limited to monthly, primarily didactic, meetings. Dr. Kildare said:

> A lot of us thought this process would be more interactive. If it were, it would help us look at whatever we’re doing better or worse together. It would be really good to hear what others are struggling with and how they solve certain issues. We could really learn from each other. I thought that’s what a learning community was all about.

Dr. Casey expressed a similar sentiment: “It would be nice to know what others are doing and to benefit from their learning curve.” He also wished the training could have been organized and conducted differently in some specific ways:

> We needed to spend a lot more time on eCW training. With athena (billing system) we spent several weeks but a lot of what we learned in athena I don’t use. The nice thing about athena training, though, is that you had to “pass” before you could go on. eCW doesn’t do that—they just hammer at you. The other thing is that it would have been better to have two trainers, one for each provider. We needed a lot more time to sit down with the trainer—we were too rushed.

Technology Adoption

Billing and coding

Although it required a considerable amount of staff and provider effort to transition from outsourced to in-house billing, Dr. Kildare noticed the potential benefits of the new billing system early on. For one, it made him question how much revenue they may have missed with the old system due to unrecognized errors: “We’re improving and catching errors like the wrong birthdates that the old system wasn’t catching; we don’t understand how billing was accomplished on the old system without some of the details we’re required to enter now.” He also said, “athena lets us take more ownership; we’re learning more about what CPT codes are needed for Medicare and other insurances to make sure we get reimbursed.”

Dr. Casey felt that their potential to generate increased revenue through an increased understanding of the billing system was one of the best things that had happened to them. Instead of waiting days or weeks for an outside billing source to produce a financial report, he said, they knew at the end of each day the level of income they had generated: “I like the immediacy of it,” said Dr. Casey. “You know before you leave—it’s what I call contemporaneous.” He also said that athena has gotten him in the good habit of entering the diagnostic code before he leaves the room.

Dr. Kildare and Dr. Casey like the ability to create their own reports with athena. “It’s nice to be able to look at my hospital work and my office work and make a comparison to see if the hospital work is actually worth it,” he said. “I could do that with the old system but I had to ask [the company] to develop a special report.” The industry benchmarks included in the reports are also helpful to the two doctors in comparing their practice to others around the country. “[When] we sat down together one day after the office closed and pulled up an athena report we found out we were undercharging in comparison to the benchmarks,” noted Dr. Casey.

But Dr. Kildare and Dr. Casey also found the diagnostic coding in eCW more of a challenge than it was with their previous EMR. Dr. Kildare attributed it to system inflexibility:

> Coding is harder because I’m finding that to enter the ICD-9 code I have to go and get the book. Our old system had a key word look-up. If you put in cervicalgia, or whatever, it would show up but you could also put in neck pain. Sometimes I have to go to my little PDA to look something up. You shouldn’t have to do that with a computer.

Prescriptions

Since Drs. Kildare and Casey had been writing prescriptions electronically for several years, the pharmacy feature on the new system was not as amazing or time-saving to them as it was for some of the other doctors in the cohort. In fact, in some ways it created more work. “With the old system we could send eight prescriptions at once,” said Dr. Kildare. With eCW, he said, prescriptions could only be faxed to the pharmacy one at a time:

> They all end up on my desk under the new system. With the old system I would initial the fax, write the okay, and off it went. Now it comes into my desk and I have to deal with it. I have to write the prescription and I have to fax it. That has created a lot more work for me.

But Dr. Casey noted that, even though the new pharmacy system was more labor intensive, “the one good thing is that I can fax narcotics now.” He couldn’t with the old system.

Laboratory

A primary advantage of the new system, according to Dr. Kildare, is a reduced handling of laboratory reports. Two factors contribute to the efficiency. One is the interface that now exists between the practice and local laboratories. Instead of the two doctors working late into the evening to manually enter laboratory results, labs are transmitted directly into the system by the laboratory conducting the test. Even before all of the local laboratories were connected, Dr. Casey noticed a time savings:

> We only have one lab in town engaged so far. When we get the other two or three it will make it even better. Having the hospital laboratory involved is a real coup—that’s the big one. It’s such a time saver. I was on call last weekend at the hospital and I was able to call up data from our system. The interface is a real plus.”

The second factor that contributes to increased efficiency with labs is the patient portal. Instead of calling patients, laboratory results are now transmitted directly to them via the patient portal. According to Dr. Casey, patients like the ability to look up their lab results on the portal. He said they are no longer annoyed with him for not getting back to them in a timely manner.

Data entry and management

Although both doctors agree that data access and management are much better now than they were with the previous EMR system, entering data into eCW has proven more challenging in some ways. For example, Dr. Kildare said he finds himself typing more now:

> I like the documentation format of the old system better. For example it'll ask 'Constipation, yes or no?' but nothing beyond that, so I don't know if it means a patient complains about constipation or it was something I asked about. My old system was diagnosis driven and had a range of systems where you could do whatever you wanted to do. It was in English and complete sentences, not just bullet points.

Dr. Casey, too, has found an increased demand for data entry with eCW. Though both doctors are swift typists, Dr. Casey sometimes uses Dragon to record progress notes. Like Dr. Kildare, some of Dr. Casey's data entry challenges result from the inadequacy of the system's pre-populated phrases: "The jargon in eCW is horrible. For instance, they talk about 'lumbar spines.' I still think [our old system] is a more user-friendly system."

Dr. Kildare and Dr. Casey used the old and new system in parallel for a full year while staff transferred medical records prior to each patient's first visit on the new system. After one year they disposed of all ten-year old paper charts. Dr. Casey said it seemed like a good idea at the time to have staff do the data entry but, in retrospect, wishes he and Dr. Kildare would have input the data themselves:

> One year out, I'm finding that I have to do an awful lot of corrections—almost on a daily basis. Some things just don't make sense so I have to go in and change the spelling or terminology. Maybe the doctors should have spent more time initially transferring things over, not delegating.

Both doctors would like to use the predesigned templates more to ease their data entry burden. But Dr. Kildare finds many of eCW's templates too complex for his needs and Dr. Casey feels he would need to customize them before they would be very useful. It takes time, though, to create the timesaving templates and neither doctor has yet found an opening in their schedule to do so.

"But the advantage is that we have better documentation now," said Dr. Kildare. "Before there were a lot of slips of paper around." He also looks forward to the time when they have enough data entered into the system to extract and use it to improve patient care:

> The other benefit is the ability to drill down and mine the data. Eventually we will be able to find out who has not had a mammogram lately, who's on discontinued medications, etcetera, etcetera. At the one-year mark we should be able to go in and see who needs what.

Practice Impacts

Patients

"I think patients appreciate increased access to their records now," said Dr. Kildare. He and Dr. Casey want all of their patients to have access to their records through the patient portal. Several patients mentioned they enjoyed receiving laboratory results quicker through the portal. One of Dr. Kildare's patients said:

> He's got everything on the computer. I can access the website to find out about the lab results, answers to my questions, schedule appointments, and renew my prescription. It's much easier to do instead of coming in to do this and have to get off work.

Another said: "Now he can bring stuff up on the computer and knows why I'm there and gets straight to the point."

Patients of both Dr. Kildare and Dr. Casey assume that there is an increase in accuracy and completeness of their information now with the new technology. "I like that he has a laptop because he is putting everything in instead of handwriting it and [possibly] making errors in transcription," said one patient. And a patient of Dr. Casey's mentioned another benefit she experienced personally: "It's great because If I have a bladder infection and Dr. Casey is not available on a weekend, Dr. Kildare can look at my records on his laptop and get me my medicine."

Efficiency

One year post-implementation Dr. Kildare felt that "efficiency has increased some." He said that the number of days bills are held in accounts receivable is fewer, the ability to collect upfront co-payment has increased, and the ability to know which patients need to make a co-payment has improved.

He and Dr. Casey have also been trying to reengineer staff workflows, he said, but felt the workload had changed subtly since they had already been paperless. One benefit Dr. Casey pointed out was that cross-training was now occurring among staff. Back office staff have had to learn some front office duties and vice versa.

Another small time saver is the use of the athena scheduling system to help Dr. Kildare stay on top of his busy professional meeting schedule. His staff enter the words "Meeting, Meeting" in place of a patient name into the appropriate schedule slot to allow Dr. Kildare to review his list of upcoming meetings and block off time on the appointment schedules so staff do not schedule patient appointments during these meetings.

Speaking in general terms, Dr. Kildare said: "I don't think these systems really save time. I don't have any more free time. The documentation is better though and that's why it's all worth doing." Dr. Casey felt basically the same way. He said:

> I think the biggest disappointment for me is that it hasn't really made my day any shorter. I'm still typing and dictating or whatever I did before. That's partly my fault because I don't use Dragon Speak as much as I should and I haven't built enough templates yet.

A small consolation is that eCW has enabled both doctors to work from home. Dr. Kildare said:

> Now Dr. Casey and I can both work from home. With the previous system only one or the other of us could use the system remotely. Now we can both be on in the evening and work at home at the same time if we want to.

Productivity

Both Dr. Kildare and Dr. Casey are seeing fewer patients per hour on average than they were prior to implementing eCW. According to athena data, Dr. Kildare decreased the number of patients seen between 2009 and 2010 from an average of 4.0 patients per hour in 2009 to 3.6 in

2010, while Dr. Casey's average decreased from 3.2 patients per hour in 2009 to 2.8 patients per hour in 2010.

Coding patterns for both doctors changed somewhat during the same time period, in general shifting to higher intensity codes. Both increased the number of visits to which they were assigning codes 99214 and 99215. At the same time the percentage of visits coded as 99213 decreased.

The shift in upward coding did not seem to be enough to offset the decreased number of patients seen per hour, though. Earnings per hour decreased for Dr. Kildare from an average of $210 per hour in 2009 to $200 per hour in 2010. For Dr. Casey, the decrease went from $159 per hour in 2009 to $142 per hour in 2010.

	Dr. Kildare		Specialty Median	Dr. Casey	
	2009	2010		2009	2010
Available hours (monthly average)	155	155	96	155	158
Scheduled patients per hour	4.0	3.6	3.8	3.2	2.8
RVU's per scheduled patient	0.9	1.0	1.0	0.8	1.0
Earnings per hour	$210	$200	N/A	$159	$142

Established Patient Visits	Dr. Kildare		Specialty Average	Dr. Casey	
	2009	2010		2009	2010
99211	0.5	0.6	4.7	0.9	0.6
99212	2.0	3.8	6.4	3.1	1.0
99213	82.2	69.5	56.4	70.5	60.8
99214	13.8	24.2	30.5	24.0	35.0
99215	1.5	1.9	2.0	1.6	2.6

Epilogue

In revisiting the goals that Dr. Kildare and Dr. Casey set at the outset of the implementation, they have achieved most of what they set out to accomplish and it is reasonable to expect that the

remainder of their goals will also be met. By their own account, the two doctors claim the following successes:

- The practice is more efficient
- We can access and examine data more readily
- We have almost eliminated the need to store paper documents
- There is better documentation of patient information
- We have put more focus on improving preventive care
- Our billing system has improved
- Our billing system interfaces with our EMR system
- We make data-driven decisions
- Our patients are happier

Goals the doctors feel certain they will soon be able to achieve based on the increased data capability of the new system include:

- Our system generates meaningful reports about patient compliance
- The practice meets the guidelines of the U.S. Preventive Task Force
- We do not miss something that could have been prevented in a patient

The achievement of one final intended goal is still to be determined. That is:

- Maintaining income at pre-implementation levels.

Looking back over the past year, Dr. Kildare said that, despite some of the deficiencies of eCW compared to his previous system, it was still worth the transition to be part of the larger effort:

> Is this system the end all and be all? No! It's not that much better than we had before. But because we're in a system with a lot of other doctors now, I think it's better.

The second most important feature of the new system, he said, was the local support. "Without it, it would have really been awful," he said.

> eCW support really sucks. If you try to use their Live Chat you wait five minutes online between your request and their answer. If you put in a ticket (request) they may or may not do something. If they do, they never tell you they've done something with it. Or they call at the most inopportune times or you can't understand the caller. All of the actual support I've gotten has been through [the local intermediary]. Without the foundation this would have been a disaster. They did a remarkable job of getting people who are qualified and dedicated to support local physicians.

And, finally, to doctors who have yet to embark on the EMR journey, Dr. Kildare offered the following advice:

> Believe half of what you're told because the salesmen are really good. We're all going to have to go down this path at some point so you've just got to do it. Do as much upfront work as you can. If you have time to set up templates and customize the system before you actually try to start seeing patients, life will be easier afterward. Just know that e-prescribing

doesn’t prevent all medication errors and there is no system out there yet that’s going to prompt every need for preventive care. As far as transferring over medical records, I think it’s not worth the hassle most of the time. Basically, you have to figure that all this is going to take more time and give you more hassle than you can imagine.

Dr. Sanchez

Practice Context

Dr. Sanchez runs a busy primary care practice in a small town of about 50,000 in the San Joaquin Valley. He has built a thriving, successful business over the past 25 years.

Though he was gratified by his practice, an increasing awareness of the trend toward practice technology prompted Dr. Sanchez to research EMR products that might help him modernize his practice. A self-proclaimed slow adopter of technology, Dr. Sanchez was concerned with finding the best EMR match for his practice. He wondered, "What can I fit into?" At the same time, he was wary that "the government," prodded by business interests, was trying to enforce a type of universal EMR implementation: "I have to do it now or three years from now, he said, "there is no choice—the government is making us all do this."

Regardless, Dr. Sanchez said he was willing to entertain a more technologically based practice if it would help him exceed the current standards of patient care and increase office efficiency. When he became aware of the intense local support being offered by the California HealthCare Foundation through the SPeD project, he quickly enrolled his practice. Dr. Sanchez realized that the subsidized program afforded him the best opportunity to successfully adopt any new technology, and on the shortest learning curve. He also knew he would never get the same level of support directly from any technology vendor. He said:

> My premise in signing up for this project was the timing was right. I was looking for a good group of people to work with, not just a vendor. Anybody can do these things but you're more likely to do them well if you have a coach. It was the most important part of my decision to go forward.

Dr. Sanchez was also focused on a way to implement the technology that would be least disruptive to his busy practice. He was willing to sacrifice lower productivity for a short time (three to four months) if the new system would ultimately allow him to be equally profitable while improving quality of care.

Prior to EMR implementation, Dr. Sanchez easily saw 75 patients a day with the help of his physician daughter and a single nurse practitioner. He alone could see 30 or 40 patients a day. Unlike many other practices that are closed one day a week, Dr. Sanchez's office is open from 9:00 to 5:00 Monday through Friday with no closure over the lunch hour. In addition, he dedicates 20 percent of his time to hospital visits and answers hospital-related calls in between and during patient visits.

Dr. Sanchez practices in an old and cramped office space but his patients love him. Some of them complain that there aren't enough seats in the reception area to accommodate all those waiting and the few magazines available are out-of-date. They also wish they could have a TV set or "soothing music" in the waiting area to help alleviate the boredom from the one- to two-hour waits they often encounter.

On a typical day, about 40 percent of the patients Dr. Sanchez sees are on his schedule. The rest are a combination of no-shows, walk-ins, and previous cancellations. Though patients complain about the long wait times this type of scheduling engenders, many feel it goes with the territory. One patient said: "I've waited an hour in the waiting room but that's not unusual for any doctor."

Another said, “Wait times can be long but it’s worth it for the level of care received. Most people don’t mind because he listens; a lot of elderly people like him.”

Physician Goals

Dr. Sanchez aimed to achieve two primary goals through the integration of EMR technology into his practice. Specifically, he said he wanted to:

- Improve patient care, and
- Maintain revenue flow at the same (pre-EMR) level.

In order to realize his dual goal, Dr. Sanchez set out to accomplish the following objectives:

- Retrieve information (immunization records, annual exams, colonoscopies, etc.) more easily from patient records.
- View data across patients.
- Improve patient scheduling practices.
- Reduce patient waiting times.
- Increase efficiency.

Even as he set forward-looking goals, Dr. Sanchez voiced several concerns regarding potential pitfalls of implementing the new technology. For example, he anticipated that his staff, several of whom had worked with him for several years, would not embrace the technology any quicker than he would. A slow adopter himself, he recognized the same tendency in many of his staff.

He was also concerned about the amount of time the technology training would require. He preferred that training be made available live, on-site, and after hours if possible so as not to interfere with his routine schedule, but he didn’t think that would be the case.

An even bigger concern, though, was a fear Dr. Sanchez had about using a computer in front of the patient. He worried about being able to maintain eye contact with patients while navigating his way through numerous computer screens. Worse yet, he agonized over how an unskilled typist like himself could ever type notes without making the patient feel like he was ignoring their needs.

Technology Implementation

In Dr. Sanchez’s high-volume practice, staff were in constant motion checking patients in, checking patients out, dealing with walk-ins, pulling charts, and looking for lab results. Realizing the near impossibility of effectively implementing an EMR system in this environment, and with the encouragement of the SPeD implementation team, Dr. Sanchez hired an outside consultant from the local community to coordinate the technology implementation and staff training.

The consultant soon became indispensible, not only for her management and troubleshooting skills, but also for her ability to ease staff into training modules, address workflow issues, demystify the technology (for doctor and staff), and help redesign or replace office policies to accommodate the new systems. Staff trusted and respected her and Dr. Sanchez appreciated the role she assumed in orchestrating the implementation in collaboration with the SPeD team.

Nevertheless, Dr. Sanchez grew impatient with the negative impact the implementation was having on his income and his time. He said:

> The implementation slows the flow. They couldn't tell us what reduction in income we would have or how long it would take to get up to speed. I have more than average motivation and I'm having a tough time. I think this would be easier for someone in their 30's or 40's than someone in their 60's [like me].

Another thing no one warned Dr. Sanchez about, he said, was the imperfection of technology:

> Computers are not perfect like cars—they lock up. This is something I had not anticipated. Nobody told us this. Not much can happen when you're using a ballpoint pen.

Technology Adoption

Billing system

Despite the challenges of implementation, three months after the athena billing software was installed Dr. Sanchez was starting to see benefits, particularly with collections. "The time is too short yet to tell," he said, "but I think athena is great—it's like having someone look at your homework before you turn it in so you can make corrections." Although he thought he would continue to favor his previous billing system, Dr. Sanchez found that athena offered him more detail for tracking missed revenue. For example, athena reports revealed $9,000 of missed co-payments during the first five months of operation. The same report also revealed the lack of enforcement of an established policy designed to collect $190 up front for each Previnar shot (non-reimbursable by insurance). That one error resulted in a minimum $2,000 loss.

Dr. Sanchez also learned through the athena report that his productivity was down to 70 percent of what it had been prior to implementation. As time went on he got more frustrated. "I'm not seeing as many patients and the ones I see are taking longer," he said. "It's very difficult trying to get it all done."

Electronic medical records technology

About six months after implementing the EMR system, Dr. Sanchez began developing confidence in his ability to navigate the system. By then he had mastered electronic referrals and the e-prescribe feature. Templates were still not part of his repertoire but at least he felt like we was using the system

Still, he was unhappy. "It's not the training; we got more training than most," he said. "It was the most intense exposure to the technology we could have had." Instead Dr. Sanchez was beginning to resent the hours he was spending on the computer. "It's one thing to use a computer and another to use a computer ten hours a day," he said. This additional unanticipated and unwelcome consequence of practice modernization led to yet another. As he predicted, Dr. Sanchez found himself unable to maintain eye contact with patients while attending to the computer screen:

> That's what it's all about . . . looking at the patient. But now if you're looking at the computer, that can be a problem. I guess patients are pleased that we're going high-tech but from a practical standpoint if you're not looking at patients it's not good.

After more than thirty years in practice, Dr. Sanchez wearily remarked: “This is the most stress I’ve ever had in my practice. My staff is stressed too. Everything is new. We’re always coming across obstacles. And we’re constantly working from two separate charts.”

In fact, working simultaneously from the paper chart may have been a most painful reminder to Dr. Sanchez of the manual systems that used to work so well for him. Prior to the technology implementation, a very efficient and knowledgeable medical assistant with 35 years of experience prepackaged all the items for him before each patient visit. If it was a patient that had an orthopedic consultation or an x-ray recommended, the MA would make sure all the pieces were assembled for the visit (or know why they were not there). With the implementation of eCW medical records system, however, the MA and other staff were instead mired in pre-scanning of patient documents—usually many charts and many days behind. There was now no time to assess and prepackage documents in anticipation of what the doctor might need.

Dr. Sanchez also felt the manual reminder system he employed prior to the technology had merit: “CDSS (Clinical Decision Support System) has triggers but we’ve had our own system to trigger ourselves. If a patient comes in who hasn’t been in for a while, we would check to see if they’re due for a mammogram, colonoscopy, a Pap smear.” Dr. Sanchez did acknowledge though that his system only worked if the patient came in, unlike CDSS.

Along the same line, Dr. Sanchez decided that athena was actually not that much of an advantage for him after all: “People talk about tracking, you know. We had data before so this is nothing new to us. Maybe athena has a few more nuances like ‘no shows.’ But otherwise it’s the same data we’ve always had.”

Practice Impacts

Although Dr. Sanchez’s patients noticed his struggle with the technology initially, they also noticed improvement as he became more comfortable. One patient remarked: “At first it was slow for him to type and listen but he’s getting faster. He may need more than ten minutes for a visit now; maybe fifteen.” Another said, “I think the computer makes it easier for him. He doesn’t have to go through the whole thick file.”

What had not changed though, according to several patients, was the rapport, attentiveness, and good communication they had always had with Dr. Sanchez. Some noticed he was looking more at the computer than at them (his big fear) but were not bothered by it as long as they felt listened to and had their questions answered. Others thought the tradeoff was worth it: they would accept less eye contact for what they perceived as better documentation and chart accuracy.

But Dr. Sanchez said his patients “just don’t understand what’s behind all that” indicating they don’t understand how many more hours he has to devote to his practice in order to maintain the same level of connection with his patients. “No one has said that they are seeing me for less time,” he said.

Ultimately Dr. Sanchez felt his practice had become less efficient since computerizing it. “Everything comes down to the number of patients seen in a practice,” he said. “The same processes I used to do before the new system

Dr. Sanchez			
Established Patient Visits	**2009**	**2010**	**Specialty Average**
9211	0.7	0.5	6.0
9212	0.2	0.4	8.0
9213	94.4	91.7	56.5
9214	4.4	7.1	27.8
9215	0.3	0.2	1.8

are taking more time now. That means inefficiency. This is supposed to be about improving efficiency and revenue." He drew an analogy between the computer 'clicks' he has to make now and stop signs. Every time he has to click on the screen, he said, it slows him down just like stop signs do in traffic: "That's a negative aspect. It makes my work less efficient to have to stop and click at every step."

athena data validates Dr. Sanchez's claims of decreased efficiency. One year post-implementation, the data indicates that Dr. Sanchez made himself available ten percent more hours than pre-implementation, saw ten percent fewer patients per scheduled hour, and earned twelve percent less per hour.

Dr. Sanchez said he never expected the new system would enable him to come in at 9:00 am and leave at 3:30 pm but he expected to "be at the same level of efficiency," after computerization as he was previous to it. He also said, "There's no balance between what I put into the system and what I get out of it. If my productivity is less, the only thing I can do is to charge more."

But, in fact Dr. Sanchez does not appear to be charging more, at least not per visit. One year post-implementation, Dr. Sanchez is still coding over 90 percent of established patient visits at level three, just as he had done in 2009 previous to EMR implementation (in comparison to the specialty average of 57 percent for level three visits). Neither does Dr. Sanchez's 2010 coding distribution indicate any up-coding of visits to reflect the extra time and work he now devotes to each patient. Instead, it appears that Dr. Sanchez under-codes level four visits by over 25 percent.

Epilogue

Before completely resigning himself to a technologically advanced but less efficient practice, Dr. Sanchez scheduled an observational visit with another colleague in the implementation cohort. He wanted to observe his colleague to learn how he himself might still improve efficiency. Dr. Sanchez wanted to see what he might be missing. But what he learned instead was that the other physician did not have any additional skill or shortcuts that Dr. Sanchez didn't have. Instead the other physician had a lower volume of patients than Dr. Sanchez. After the visit, Dr. Sanchez concluded: "I realized I wasn't doing anything incorrectly. I really wasn't slow and if I had less volume I could keep up also."

With this experience Dr. Sanchez came to the conclusion that he must simply learn to adapt to the new technology, that he must adapt to it rather than expecting it to adapt to him. "This system is set up for the way most doctors practice," he said. "It's just the way it is—I need to adapt."

When asked if he realized any positive benefits from the modernization, Dr. Sanchez said there had really been none. Of the two goals he aimed for at the onset— improve patient care and maintain income at pre-EMR levels—he achieved one of them. His income finally approximated pre-implementation levels one year after starting the project but much later than he anticipated. With regard to improved patient care, Dr. Sanchez emphatically states he sees none at all. Simultaneously, his patients say the new system has not improved scheduling or reduced wait times for them.

"Unfortunately, there's no going back," he said. As much as he might like to, Dr. Sanchez cannot return to the practice in which he was the Machine—the practice where he efficiently saw 65 to 75 patients a day undisturbed by clicks, glitches, typing, and computer screens.

Dr. Welby

Practice Context

Dr. Welby runs a solo practice out of a one-level brick office building housing a row of five primary care physicians. He works three full days a week—Monday through Wednesday—and mornings the other two days. He leaves Thursday afternoons open for rotary club meetings; Fridays are for catch-up. About 1,500 patients make up his practice.

It is not unusual for Dr. Welby to work a 10-hour day. A 2009 time-effort study in which he participated prior to technology implementation showed that he spent a little more than half of his day in patient visits and one-quarter of his time documenting patient information—charting, labs, forms, prescriptions—or making phone calls. The remaining time was dedicated to hospital visits and performing indirect patient care functions such as triage and treatment planning. After his time in the office, Dr. Welby would characteristically put in another two to three hours at home.

Patricia Welby, Dr. Welby's wife and office manager, runs the business end of the practice out of their home. His daughter-in-law and two other assistants comprise his office staff. All three are cross-trained in medical assisting and front office functions, except for the billing clerk, who does not draw blood.

A former naval officer, Dr. Welby is clear about who is in charge of his practice. "I know the Foundation (CHCF) has some ideas about having the doctors do less and the staff do more, like take blood pressures," he said, "but that's not going to work here—I'm always going to take my own blood pressures." An independent leader, Dr. Welby prefers to address most challenges on his own but wouldn't hesitate to help out any of the physicians in his cohort with any lessons he's learned in the process.

Those who have worked with Dr. Welby in a consultant capacity characterize him as a compassionate and caring doctor. On a pre-implementation satisfaction survey, Dr. Welby's patient satisfaction was 90 percent or higher for combined "Very Good" and "Excellent" responses for every question asked.

Dr. Welby thought about retiring until the opportunity to implement an EMR system became available. A long-term trusting relationship with the local medical society that sponsored the effort and provided the intense technical assistance necessary to implement the medical record and billing technology was a key factor in his decision to implement the system. He also thought it would be interesting, rejuvenating, and fun—enough fun to stick around and give it a try. Prior to the SPeD opportunity, Dr. Welby's only previous exposure to an EMR system was at the local hospital.

Physician Goals

Dr. Welby said he was not interested in "transforming" his practice, only making it better. He listed five goals at the start of the project that he hoped implementation of the new system would help him achieve:

- I want to be more efficient.
- I would like to see more patients in the same amount of time.

- I would like to work fewer hours a day.
- I want to be more organized so not to miss anything with patients . . . like colonoscopies."
- I hope to improve revenues.

Dr. Welby also described several specific outcomes he anticipated a successful implementation would help him accomplish. For instance, with the new system he hoped to have the ability to "have a live chart available" so he could "have a quick view of everything and go through patient information faster." He also looked forward to "having the 'right stuff' for quality chronic care like hemoglobin A1C, colonoscopy, and Pap results." On the business side, he anticipated the new billing system would give him the ability to verify insurance status and make his wife/business manager happier.

Above all, Dr. Welby desired to have the same functionality at home, in the hospital, and at the office. He wanted the capability to practice from any location, including his boat on the Delta, any day of the week. Dr. Welby's interest in "seeing more patients in the same amount of time" was not related to adding new patients to his practice. Instead, he said he wanted patients who were already part of his practice to "get into visits so I can get them in sooner."

Technology Implementation

Billing technology

SPeD implementation was designed so that installation of the billing component—athena—would precede installation of the EMR component—eClinicalWorks—and the two would ultimately be interfaced. Three months after installing athena, and two days before Thanksgiving, Dr. Welby was ecstatic about the new billing system his staff had been using but not looking forward to the intense preparation he would have to do over Thanksgiving break to install eCW on December 3. Regardless, he said, "I'm still having lots of fun."

With respect to athena, Dr. Welby said his staff and wife "just love it." He also said, "The part that's working really well is our ability to track the bills." Transitioning from an essentially manual billing system to one with all the automated features of athena enabled Dr. Welby to meet one of his goals early on: making his wife/business manager happier. She was quick to enumerate all the athena features that made her life easier:

> I love the fact that we can check eligibility immediately and that billing errors are brought to our attention immediately. I also really like the fact that we can keep track of missing slips. The doctor is slow in giving us them sometimes but at least they are not lost. Our old system was very old and lacked the ability to keep track of our non-collections. I feel a lot of income had been lost. Now, I see the income coming in faster and I worry a lot less.

The billing system installation was problem-free according to Dr. Welby. He largely credits the local technical support contracted by CHCF through the regional medical society for the smooth and uneventful install. "We've gotten ten times the amount of support we would have gotten if we did it on our own," he said. A long-term relationship with the lead support person, who Dr. Welby described as bright, a good manager, hard worker, and fantastic working with doctors and doctors' wives, also made a difference.

Electronic medical records technology

One roadblock Dr. Welby may not have envisioned when he embarked on the EMR technology implementation was the amount of time he would need to devote to typing up chart notes. Having previously dictated his notes for a transcriptionist, Dr. Welby was not a quick typist.

The athena system will not allow bills to process for payment until the chart is complete. Fortunately, when his charting started to fall behind, Dr. Welby found a solution in voice recognition software:

> Typing isn't a problem anymore because I'm using Dragon to dictate my notes. Ideally I do it right after I see a group of patients—it's easier that way. I don't use Dragon in the room with the patient—I'm not going to ask them to sit through all that while I dictate.

A not so easily resolved issue, however, was the transfer of patient information from paper charts to electronic files. Five months after implementing eCW, Dr. Welby (not unlike other doctors in his cohort) still had a huge backlog of paper records that needed to be transferred into the electronic system. Early on he tried having staff abstract and transfer information from patient charts to electronic files but found he could do it quicker and more accurately himself. He believed the benefits of his slow, methodical process would be substantial, though, if the transfers were done with care and completeness:

> It will pay off hugely eventually. Right now I have a couple of boxes in my car of patient information that needs to be entered in. These are all patients that I've seen in the last two months. I work on it every evening at home. Some of the docs are only doing what is necessary for that day but I have this big backlog because it's my mindset to do it that way. It's just the way I need to do things.

Technology Adoption

Soon after the technology was implemented, Dr. Welby started triaging its features, choosing those that met his needs and discarding others: "I'm not especially interested in getting my patients on the patient portal—it'll be useful to send people copies of their labs and things, but I'm not going to use it to communicate with patients because I don't make money treating people over the Internet." He also decided against the clinical data support component early on: "I see diabetic patients every three months; I look at the labs and know what to remind them—anyway, I just know my patients."

Increased efficiency

Dr. Welby considers many of the other automated functions to be "big time savers" though. Once he has all the past history and previous information on the patient in the system, he said it makes things really easy: "I just click an arrow and pop in previous surgeries, history… I review everything right there on the system." Another feature he likes is the pre-designed templates: "I can modify the canned statements they give us in the system, which just makes it so quick and makes everything so much more efficient." In general, he noticed increases in efficiency attributable to the technology, "It's really more efficient now, like reviewing the records and [submitting] lab orders; we're putting things directly in the computer instead of faxing them."

He also feels it's "fabulous to have really good records now." Not only does Dr. Welby have more information readily available for treating patients, he delights in the fact that he can immediately send out a referral note after finishing with a patient. In his pre-technology practice he had to hand-write the note, have it transcribed, and send it to the specialist the next day (or

later). Dr. Welby likes the fact that, because the specialist receives the information automatically, the patient can often be scheduled for the referral appointment the same day.

Patient satisfaction

Dr. Welby's patients also appreciate aspects of the new technology. The extra trip to the pharmacy that e-prescription saves them makes it a very popular feature. Dr. Welby emails the prescription to the pharmacy before the patient leaves so it's ready for pick-up on the way home from his office. He also likes e-prescribe for its capability to more accurately track medications. "The documentation of prescriptions is just fabulous!" he said.

Additionally, Dr. Welby's patients like the increased interaction with him and involvement in their care that the technology affords: "I can bring in my notepad and show them their x-ray and they love it." He's also able to share lab results and provide patients a summary printout of their visit to take with them.

More work

At the same time Dr. Welby was enjoying the increased benefits and efficiencies of the automated system, he noticed a curious side effect—he had become busier than his staff. Because several traditional staff functions—billing, filling out lab forms, and faxing prescription orders—were largely transferred to the doctor due to built-in system efficiencies, Dr. Welby's staff had time on their hands. He estimated staff time saved from the now doctor-driven tasks along with the discontinued need to continually search for and file paper charts to be around 50 percent.

With the extra staff time, Dr. Welby realized he could reduce appointment times from 20 minutes to 15 minutes each. Previously, appointments were scheduled longer because he was almost always waiting for a staff person to either room a patient, draw blood, or provide him with some needed information. But now staff would be available to have patients ready as soon as he was.

Patient portal

Lastly, after further consideration about implementing the patient portal, Dr. Welby decided it would not serve him or his patients to use it, even minimally. His fear was that patients would have unfounded concerns over lab results without the doctor's direct interpretation. Also, the normal ranges that accompany lab results are not always correct, he said, or applicable to patients with diabetes or other conditions where lab results can be expectedly slightly irregular. Regarding the other function that makes the patient portal popular with some providers, appointment scheduling, Dr. Welby said he would rather have staff determine patient needs over the phone before scheduling an appointment. That way he could be sure that patients were not showing up for appointments they did not need or had not scheduled the appropriate amount of time for.

Practice Impacts

Accessible, available patient information

One year post-implementation, Dr. Welby says the most significant impact the technology has had on his practice is an increase in the amount of patient information he now has available and the ability to readily retrieve it: "The ability to access patient data so easily—that's the biggest

thing." At the same time, he says that this increased capability means he spends more time reflecting on and using the data:

> The technology makes me more efficient—tremendously more efficient—but it's not saving me any more time. I have more information now, which just causes me to use it. Having more information just causes more work.

Remote practice

Perhaps the second most prominent change, and one that Dr. Welby excitedly embraces, is his ability to practice remotely from wherever he is:

> I've been able to customize the system to the way I work. I can access the system anywhere on my iPad or my iPhone. I carry my iPad everywhere. I can go down to my boat on the Delta with it. I use it in the car while my wife is driving there to check on lab results in the car. And if I want to call somebody I can make the call.

Earnings

A year after implementing the technology, Dr. Welby felt his revenue was at least getting back to pre-implementation levels but had yet to confirm that with his wife. In fact, according to athena reports, Dr. Welby's average earnings per hour have increased from $164 per hour in December 2009 to $201 per hour in December of 2010. The number of patients per scheduled hour during the same time period increased from 3.1 to 4.0 per hour during the while Dr. Welby's number of available hours increased slightly from 145 per month to 160 per month. These figures suggest that, as Dr. Welby has been able to increase the number of patients seen per hour (as a result of reassigned staff duties), he has also increased his earning rate by over 20 percent.

Dr. Welby	2009	2010	Specialty Median
Available hours (monthly avg.)	145	160	96
Scheduled patients per hour	3.1	4.0	3.8
RVU's per scheduled patient	1.0	1.1	1.0
Earnings per hour	$164	$201	N/A

Relative value units per scheduled patient remain essentially the same and in line with the industry median. It is therefore unlikely the increased earning rate is attributable to up-coding of visits. In fact, Dr. Welby's coding of established patient visits shifted slightly toward the brief visit end of the continuum in the year since he implemented the technology. In 2010, he coded 15 percent of all established patient visits as level one or two visits as compared to six percent in 2009 and 46 percent of visits as level four or five in 2010 as opposed to 51 percent in 2009.

Dr. Welby			
Established Patient Visits	**2009**	**2010**	**Specialty Average**
9211	4.8	12.7	4.7
9212	1.4	2.5	6.4
9213	42.8	39.4	56.5
9214	39.1	37.0	30.5
9215	12.0	8.5	2.0

Hours available

It does not appear the technology has enabled Dr. Welby to reduce the number of hours he is available to patients. Instead, he works a few more hours per month now than he did prior to installing the technology and 40 percent more than other physicians in his specialty. Perhaps one consolation is that, with the newly available remote access, many more of Dr. Welby's hours can be worked from the comfort his home, yard or boat.

Epilogue

Of the five goals Dr. Welby established at the outset of the project, he achieved three of them: to be more efficient, to see more patients in the same amount of time, and to increase revenues.

Dr. Welby's early determination to be more efficient became self-fulfilling. The caveat, of course, was that any extra efficiency he created was neutralized by the increased time required to fully utilize the system. Therefore, his goal of working fewer hours remains elusive. His ability to see more patients in the same amount of time is real, however. He now sees four patients per hour as opposed to three, with a concomitant 20 percent increase in hourly earnings.

It is too early to assess whether Dr. Welby's remaining goal of "not missing anything" has been met. As he became more familiar with the system Dr. Welby decided that some of the automated reminders (diabetes) were not an improvement over his previous systems. And, depending on specific prevention guidelines, many patients will not be due for reminders until, at the earliest, one year after the initial visit under the electronic system—beyond the scope of this report.

Finally, as a result of the technology implantation, Dr. Welby has realized several less tangible, indirect, and maybe even unimagined benefits. For one, he's still having fun and feeling rejuvenated by his new undertaking. Others include:

- Flexibility. Ability to access patient data remotely anywhere his iPhone and iPad have coverage.
- Independence. Capability to care for patients independently.
- Control. Increased control of several practice aspects through technological shifts in billing, lab orders, referrals, and prescription refills
- Patient Inclusion. Ability to share more information with patients and connect with them in a more inclusive manner
- Spousal Satisfaction. A reliable and effective billing system that keeps Dr. Welby's wife from worrying as much about revenue generation.
- Collegial Sharing. Gratitude for the lessons learned that he could pass on to physicians.