

HIMSS Davies Ambulatory Award Application

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Applicant Organization: White River Family Practice (WRFP)

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Core Item: **Return on Investment**

Specific NPSG and/or NPP goals addressed:

NPSG:

- Improve accuracy of patient identification.
- Improve safety of using medication.

NPP:

- Engage patients and families in managing health and making decisions about care.
- Improve health of the population.
- Ensure patients receive well-coordinated care within and across all healthcare organizations, settings, and levels of care.

Executive Summary

White River Family Practice, an ambulatory independent primary care practice in northern New England, implemented an electronic health record (EHR) in 2010. Funding for this endeavor was obtained through a combination of grants, operating income, and pay-for-performance incentive monies. EHR implementation has been extraordinarily successful with demonstrable improvements in practice finances and quality care, assisting WRFP to certify as a Patient Centered Medical Home (PCMH) and optimally position the practice to participate in Accountable Care Organizations (ACO's) as well as other potential healthcare reforms.

1. Background and Local Problem

White River Family Practice is staffed with six family physicians, three family nurse-practitioners (ARNP's), and a support staff of 14. The practice provides care to approximately 10,000 patients most of whom reside in surrounding communities in Vermont and New Hampshire. All six physicians are faculty members of the Geisel School of Medicine at Dartmouth, and the practice is a teaching site for medical students. Slightly over half our patients are insured by one of three major commercial insurers, and an additional third are covered by either Medicare or Medicaid. Our mission is to “provide high quality, state-of-the-art primary medical care to our community of patients with compassion, professionalism, and excellent communication.”

As healthcare information technology became more sophisticated and widespread, the practice committed to an integrated electronic health record (EHR) in 2009 as the logical next step in the provision of safe, efficient, quality medical care. Our goals included enhancing our ability to provide guideline recommended care to all patients and managing population healthcare more effectively while not disrupting the harmony of the physicians' partnership in the process.

For years, the philosophy of WRFP has been to provide national guideline-recommended care to patient populations as the “background hum” of primary care without detracting from the close, attentive, and personal relationship so essential to quality medical care. The practice has developed staff and workflows to increase our provision of this care – both in health maintenance and management of chronic disease – woven into the fabric of acute care contacts. To this end, WRFP has been developing itself as a clinical microsystem, defined as “a small group of people who work together on a regular basis to provide care to discrete subpopulations of patients” and having “clinical and business aims, linked processes, a shared information environment, and [producing] performance outcomes.”(1)

However, our legacy paper medical records could not support our function as a clinical microsystem and we were repeatedly frustrated in our intention to systematically provide quality primary care to our patients in accordance with our philosophy. We recognized all the inefficiencies inherent in a paper medical record system: duplicated testing, inability to locate or respond to critical information, lack of knowledge of a patient's current overall health state, etc., and we expected an electronic system – properly implemented – could satisfactorily address these and other issues.

When federal funding became available from the CMS Medicare and Medicaid EHR Incentive Programs, WRFP realized the opportunity to implement a fully integrated electronic health record (EHR) and apply that to improve both the value of clinical care provided to each patient and our ability to manage population health care.

2. Design and Implementation

WRFP was fortunate to be assisted by the [Vermont Information Technology Leaders](#) (VITL), Vermont's Regional Extension Center of the Office of the National Coordinator for Health

1. Nelson E.C. BPB, Godfrey M.M. Quality By Design: A Microsystems Approach. San Francisco: Jossey-Bass; 2007.

Information technology (ONC), which works with Vermont health care providers in adopting and using health information technology to improve patient care. WRFP qualified for a grant from VITL to help defray the cost of EHR acquisition detailed in section 6 below. VITL also specified certain EHR systems as eligible for grant support, simplifying WRFP's search process.

At the outset of our EHR implementation, a Gantt chart was developed documenting the projected timeline of critical steps involved. (Appendix 1) WRFP comprised a team of physicians and support staff to represent each work area of the practice. This team attended system demonstrations and visited area practices using EHR's under consideration. Semi-finalist vendors were invited to the practice to demonstrate their product to our entire office. Our last step involved sending a delegation of physicians and office manager to the corporate headquarters of our finalist to assess their readiness to develop a strategic partnership with WRFP. After considering alternatives, WRFP elected to host the chosen program on site and contracted for the necessary server hardware, secure office wireless network, backup and recovery system, and workstations with SymQuest, an area IT support company.

Every work area of the practice contributed detailed maps of critical workflows to be adapted once the EHR was established. Well before product acquisition, the practice established a working group of physicians and staff to begin planning the implementation. The group considered other "best practices" and devoted considerable time to deciding what specific information would be migrated to the EHR – and whether that information should be entered as structured data, imported as scanned documents, or brought forward in some other format. Once our pre-load protocol was established, staff began preparing the electronic records for those patients whose appointments were already scheduled, and we also established the protocol by which we would pre-load clinical information for upcoming appointments after Go Live.

WRFP educated our patients of the coming transition with flyers and posters. The practice invested in dedicated on-site EHR training from the vendor both for practice management (PM) and clinical documentation, and initiated the PM portion three months before going live with the clinical components to give support staff adequate time to become comfortable in their roles. At clinical Go Live, we slowed our schedule by 50% for two weeks but scheduled extra patient contact hours to maintain our normal accessibility. We also identified three of our six physicians to become "super users." These individuals developed "cheat sheet" training aids for the remaining providers to facilitate their developing comfort in EHR use during their first clinical days on the system, and both physician and support staff "super-users" have continued to act as resources to the practice in the years since implementation.

3. How was Health IT Utilized?

All patient scheduling and practice management was done exclusively in the EHR beginning January, 2010. Three months later, WRFP began using the system for all patient encounters and clinical documentation. WRFP elected to fully commit to using the EHR from "Go-Live" to facilitate gaining rapid familiarity with system use. Notes are entered by keyboard or voice-activated dictation. Paper records were retired to off-site storage once the agreed-upon clinical information contained therein had been migrated into our electronic system.

All lab and imaging requests as well as referrals are entered electronically. Lab orders and results flow between the practice and our commercial reference lab through an interface which we established prior to clinical Go-Live. Certain lab results (defined by the practice) which return from area hospitals are entered as structured data by our staff. Image results are scanned as documents, attached to the structured value assigned to that particular image, and assigned to the ordering practitioner (or on-call practitioner depending on availability) for action and follow-up.

The practice enabled our EHR's secure electronic Patient Portal in February, 2011. As of May, 2013, approximately 58% of our patients are web-enabled. Practitioners post lab results with secure messaging to these patients through the portal, and patients can view essential personal health information there as well.

Internal office messaging is done electronically. Messages from patients flow through the office as telephone encounters in the EHR or through the system's Patient Portal.

Visit summaries and Care Plans produced using the EHR are printed for patients at departure.

Our practice has begun using another secure electronic portal (VITLdirect) provided by the Vermont Information Technology Leaders (VITL) to transmit and receive patient documentation between WRF and outside practices sharing in the care of our patients (e.g., transmission of records of dilated retinal examinations in the care of diabetic patients). WRF is also participating in the development of an interface for the real-time transmission of immunization information to the Vermont State Health Department's database.

WRF's extensive use of the EHR's registry function in population health management was a critical contribution to our attestation to Meaningful Use in years 1 & 2, and our high level certification as a Level III Patient Centered Medical Home (by NCQA 2011 standards).

4. Value Derived

RETURN ON INVESTMENT

White River Family Practice ROI Summary		
Capital Expenses EMR, 2009-2013	\$311,264	
EMR Operating Expense, 2009-2013	\$88,173	
Total Investment		\$399,437
Increase in Revenue, 2011-2013	\$433,917	
Other EMR-Related Revenue, 2009-2013	\$460,268	
Total Revenue		\$894,185
	ROI	223.86%

EHR REVENUE (Detail, 2009 – 2013)**I. Paper Chart Cost Savings (2010 - 2013)**

a. Reduction in Transcription costs.	\$173,783
b. Malpractice reductions. (Negotiating at time of application)	-
c. Reduction in paper chart supplies.	None
d. Reduced need for paper chart space and storage.	Space used for new services.

II. Staffing Savings (2009 - 2013)

a. Reduction in overtime hours paid.	None
b. Reduction in staff-to-provider ratio.	None
c. Reduction in billing costs.	\$145,945

III. Increase in Revenue (2011 – 2013)

a. Increased collections for providers.	No Change
b. PQRI incentives (CMS)	\$ 9,647
c. Grants or other pay-for-performance monies (Anthem)	\$ 22,446
d. E-Rx Incentive (CMS)	\$ 12,081
e. CMS Meaningful Use Year 1	\$ 108,000
f. CMS Meaningful Use Year 2	\$ 72,000
g. Vermont Blueprint & Community Health Team	\$ 199,043
h. Other Incentives (VITL HIEN & ePrescribe)	\$ 10,700
i. Reduction in A/R relative to monthly billings. (Reduction in AR occurred with transition to electronic claims submission, independent of implementation of EHR.)	No Change

IV. Other Revenue (2009 – 2013)

a. VITL Reimbursement 2009 – 2010 (Grant)	\$ 140,000
b. Other Reimbursements 2010 - 2011	\$ 540

TOTAL RETURN (2009 – 2013).....\$ 894,185

In addition, there are non-monetary benefits to our EHR implementation. WRFP practitioners now have access to complete patient medical records whether in-office, or after-hours using a virtual private network (VPN). On call practitioners can respond to hospital and emergency room information requests during nights and weekends through remote electronic access to our patients' medical records.

The office space formerly used to store voluminous paper medical records is now opened for other critical office functions and services.

Through planning, organizational commitment, and leadership, WRFP was able to implement the EHR while experiencing only transient slowing in operations. The minimal decline in patient visits (attributable to extending some patient visit durations as a PCMH) has been more than offset by the higher level of E&M coding as chronic disease management is thoroughly documented in the EHR.

WRFP uses control charts to display critical financial and clinical practice metrics over time, and employs a statistical process control (SPC) program from [Sigmazone](#) (SPCXL) to generate these plots. The program automatically calculates the average performance over the time period in question (green line), as well as the upper and lower bounds of statistically significant variation (red lines), and highlights data points which vary significantly from the underlying performance in red dots. (See below.)

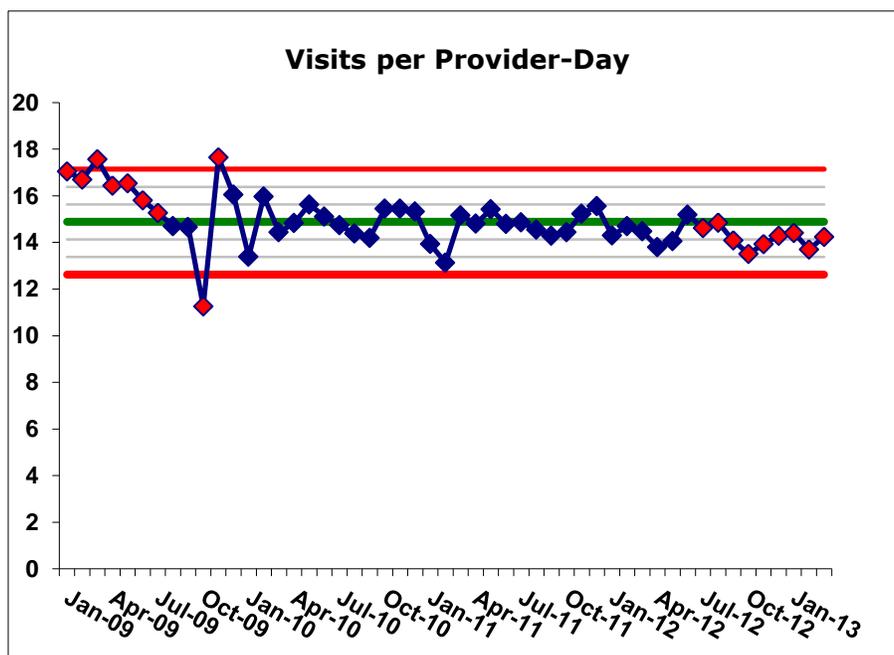


Figure 1: There has been a gradual decline in Visits per Provider-Day. A WRFP provider with relatively high volume retired in late 2009. The slight (but significant) decline commencing in the summer of 2012 was caused by our decision to extend visit duration for patients with certain chronic diseases as we certified to become a PCMH.

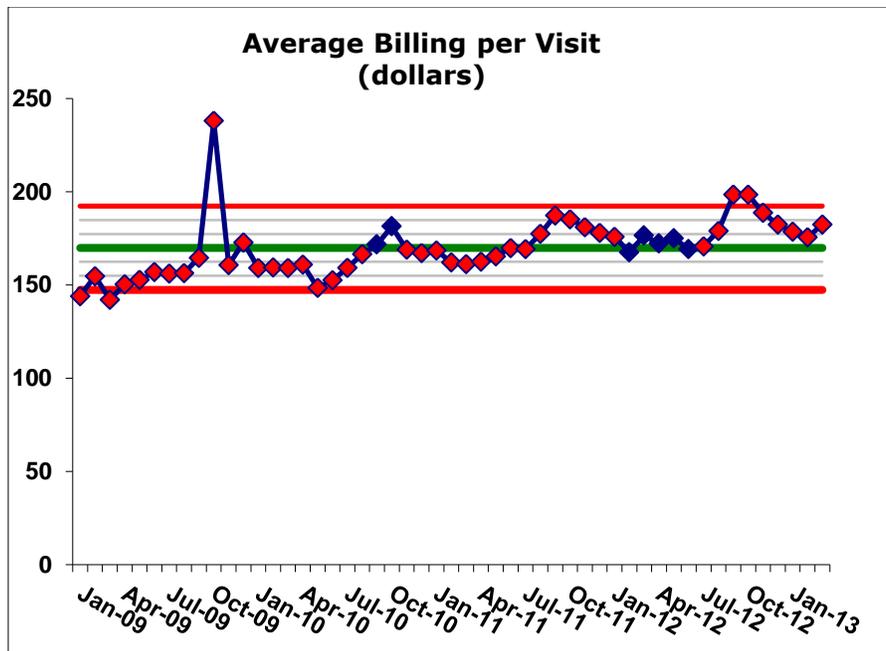


Figure 2: Total charges divided by patient visits, averaged by month. The gradual increase in average charges/visit is a reflection of the ability to substantiate higher levels of care in the EHR and more efficiently coordinate care for patients with multiple co-morbidities.

WRFP has used clinical decision support and registry functions to achieve demonstrable improvement in individual and population health management and this capability has proven critical to realizing significant income from federal Meaningful Use incentive payments and pay-for-performance programs as a PCMH.

5. Lessons Learned

Successful implementation of an EHR is a tremendous organizational challenge – but very achievable. Clearly defined goals and a timeline are essential. Involve stakeholders and opinion leaders representing every facet of the office from the beginning. Their views of important office processes are essential as workflows are adapted to the EHR. Empower staff to help redesign these workflows.

Don't scan everything while migrating from paper records to the EHR. Some information (e.g., critical allergies and some – but probably not all – laboratory results) deserves to be brought forward as structured (and searchable) data. Some records can be scanned and placed in folders (decide how to organize these “folders” before long!); many older paper medical records will not be useful and can be stored elsewhere.

Anticipate experiencing a transient slowing in operations while the staff and providers become comfortable with new workflows. Declines in patient visits should be offset by the higher level of E&M coding as chronic disease management is thoroughly documented in the EHR. However, return on investment is critically dependent on how quickly the practice returns to typical patient-visit volume. To that end, investing time and resources to learn the chosen EHR system up front will expedite the office's return to pre-EHR patient volumes, obviating the need to spend late nights trying to catch up.

Likewise, when something isn't working correctly in your EHR, try to fix it on the spot. If that is not possible, make a note of it and return to fix the problem as soon as you can. Tolerating inefficiency or system dysfunction fosters development of bad habits or "work-arounds." If allowed, these bad habits will become your new standard, decreasing your efficiency of EHR use and delaying realization of maximal return on investment.

If your EHR enables templates for routine documentation, try not to generate a bunch up front. It is very difficult to avoid this temptation – but becoming accustomed to using your EHR to document how you actually provide patient care and then developing a template based on that reality will save you many false starts.

As soon as possible, begin using your EHR to improve some aspect of your office function or patient care. Implementing an electronic health record is a big investment and you want it to start paying off by visibly closing some gap(s) in practice performance as soon as possible.

There will be uncompensated time spent by practice leaders (physicians and management). That is one of the costs of staying current with technology in medicine. Successful EHR implementation is an organizational leap in pursuit of the Triple Aim of better health, better care, and lower cost - and it's worth it.

6. Financial Considerations

White River Family Practice's capital investment in EHR technology (2010 – 2013) was \$217,836. WRFP was fortunate to qualify for and be awarded a VITL grant of \$140,000 to defray some of the up-front cost of EHR acquisition. WRFP drew on a \$70,000 line of credit (repaid completely during our first year of EHR use) for the remaining capital required during implementation so that the practice did not rely excessively on operating income for start-up expenses. Operating expenses (2009 – 2013) dedicated to system monitoring, consulting, and travel totaled \$129,007.

EHR INVESTMENT (Detail, 2009 – 2013)

I. EHR Software (2009 – 2013)

a. EHR software (licenses for providers, users and enterprise).	\$ 47,621
b. EHR training at implementation	\$ 24,000
c. EHR-related software (scanning, voice recognition, report writer, etc.)	\$ 3,643
d. IMO (CPT search engine)	\$ 585
e. Interface (reference lab)	\$ 850
f. EHR and EHR-related software maintenance/support.	\$ 68,960

II. Hardware (2009 – 2013)

a. Computer hardware	\$ 133,357
b. Computer tablets (second set)	\$ 29,808
c. Wiring	\$ 2,440

III. Additional Costs (2009 – 2013)

b. Ancillary costs related to training (travel, temporary classrooms, etc.)	\$ 4,025
c. Network technical support	\$ 58,800
d. Server software (SQL, Windows, backup software, faxing software, etc.)	\$ 1,360
e. One time implementation costs (scanning, temporary services, data migration from legacy information system)	\$ 9,000
f. Business Analysis Plan	\$ 9,000
g. Consulting on EHR transition	\$ 5,988

TOTAL INVESTMENT..... \$399,437

ROI (2009 – 2013) = 223.86%

White River Family Practice experienced this four-year return on our investment estimating costs and revenues for the remaining months of 2013. In the coming years, some expenses associated with our EHR will recur (e.g., support fees and hardware replacements) and the evolving landscape of healthcare finance (e.g., MU funding, pay-for-performance funding from the Vermont Blueprint, ACO’s) will affect the revenue attributable to our implementation. WRFPP committed to the thoughtful application of information technology to the provision of sophisticated individual and population healthcare, considering it to be a requirement of twenty-first century medicine in the United States, and the practice is fully satisfied with our evolution.

Appendix 1: White River Family Practice Timeline for implementation of our integrated electronic health record (EHR). This chart was made into a wall-size poster for display in the practice’s lunchroom so all staff could monitor progress.

ID	Task Name	Start	Finish	Duration	May 2009		Jun 2009		Jul 2009		Aug 2009		Sep 2009		Oct 2009		Nov 2009		Dec 2009		Jan 2010		Feb 2010		Mar 2010		Apr 2010					
					5/3		6/7		7/5		8/2	8/9	9/6											1/3		2/7		3/7		4/4		
1	Identify Vendor of Choice (VOC)	5/1/2009	8/31/2009	17.4w	[Blue bar]																											
2	3 in-depth demo's for search team	5/1/2009	6/25/2009	8w	[Red bar]																											
3	Wish list generation from all departments ("Must haves," "Would be great ifs," and "Cannot tolerates")	5/1/2009	7/9/2009	10w	[Blue bar]																											
4	Decision about clinical data migration from paper charts to EHR	5/1/2009	8/20/2009	16w	[Blue bar]																											
5	Team meeting to narrow choices	6/29/2009	7/3/2009	1w	[Red square]																											
6	Schedule and have two in-depth, full office demo's	7/6/2009	7/31/2009	4w	[Red bar]																											
7	Analysis of documentation, point list of +&-s, reference checks, site visits	7/13/2009	8/14/2009	5w	[Blue bar]																											
8	Complete site visits (preferably two visits to contenders)	8/3/2009	8/14/2009	2w	[Blue bar]																											
9	Final demo (if necessary) to address "preliminary" conclusions	8/14/2009	8/27/2009	2w	[Blue bar]																											
10	Selection of VOC identified	8/28/2009	9/3/2009	1w	[Blue bar]																											
11	VOC contract negotiation	9/3/2009	9/16/2009	2w	[Blue bar]																											
12	Develop process maps of all key office processes	9/1/2009	12/21/2009	16w	[Blue bar]																											
13	Software and hardware installation	9/16/2009	9/29/2009	2w	[Blue bar]																											
14	Practice Management Migration	9/29/2009	1/1/2010	13.8w	[Blue bar]																											
15	Preload and Scan selected clinical documents	1/1/2010	3/25/2010	12w	[Blue bar]																											
16	Practice management EHR Go-Live	1/1/2010	1/1/2010	.2w	[Blue vertical bar]																											
17	Develop Quick-reference documentation for EHR Clinical Use	1/1/2010	4/1/2010	13w	[Blue bar]																											
18	Intensive EHR training for all clinical users	3/15/2010	3/31/2010	2.6w	[Blue bar]																											
19	Clinical Go Live	4/1/2010	4/1/2010	.2w	[Blue vertical bar]																											
20	Celebrate Accomplishments	4/15/2010	4/15/2010	.2w	[Blue vertical bar]																											
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