HIMSS Davies Ambulatory Award Application

- COVER PAGE -

Applicant Organization: White River Family Practice (WRFP)
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Core Item: **Clinical Value**
Specific NPSG and/or NPP goals addressed:

NPP:
- Improve health of the population.
- Safety: improve liability and eliminate errors wherever and whenever possible.
- Remove waste and achieve effective, affordable care.

Executive Summary:

While using paper medical records White River Family Practice (WRFP), a rural independent ambulatory care practice in northern New England, recognized the need to improve its systematic provision of guideline-recommended clinical care without losing our close and personal connection with individual patients during their office visits. Achieving the benefits of guideline-recommended care for a population of patients pre-supposes that the practitioner has access to continuously current and available knowledge of each patient's status with respect to specific care elements for that patient (given age, gender, and any existing chronic health conditions), as well as the ability to deliver certain services (e.g., immunizations, referrals for retinal examinations in diabetic patients, cancer screening) to attain specific targeted clinical goals for the populations served. WRFP committed to improve the overall clinical value of our interactions with patients through the implementation of an electronic health record (EHR) system, and to become 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) This Case Study outlines important aspects of our transformation and initial EHR application leading to sustained improvement in the value of the clinical care provided to our patients around four identified priority care elements; our transformation has also contributed significantly to WRFP's certification as a Level III Patient Centered Medical Home.

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

1. Background Knowledge

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 Vermont and New Hampshire. (Appendix 1) All six physicians are faculty members of the Geisel School of Medicine at Dartmouth, and the practice serves as a teaching site for medical students. 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."

Using paper medical records, WRFP physicians became aware that patients seen for incidental or acute care needs were not systematically being offered or receiving national guideline-recommended care. Additionally, the physicians realized that patients were being recalled for laboratory analyses necessitated for monitoring and treatment of existing chronic conditions without regard to the possibility that those patients had recently been to the office or were scheduled to return soon for another reason, contributing to patient dissatisfaction, scheduling backlogs, and inefficiencies.

WRFP providers share responsibility for the provision of guideline-recommended care to the affected patient populations, and our office personnel are engaged in the provision of care such that individual providers are not solely responsible to manage and provide all preventive services. However, despite revising our care processes, training our staff, and developing standing orders and protocols in recognition of our shared responsibility for patient care, our efforts to "update everyone" on elements of national guideline-recommended care had proven a daunting task. Many patients still were not receiving care for which they were candidates, a situation common to many primary care systems in the United States. (2) Recognizing these inefficiencies, the safety concerns inherent in paper medical records, and the opportunity to systematically improve clinical care, WRFP elected to invest in an integrated EHR system.

2. Local problem being addressed and Intended Improvement

Prior to the implementation of our EHR, guideline-recommended care was provided if the patient made an appointment to specifically receive that care (e.g., immunizations, cancer screening studies, etc.) or if the provider identified a specific need by a review of the patient's paper chart during the visit - while simultaneously attending to the patient's acute-care request(s). An audit of a sample of our patients' paper records revealed that (1) we could not readily identify what proportion of our patients were current with respect to any particular guideline (and therefore could not identify that population of patients for whom care was indicated), and (2) our patients were not systematically receiving guideline-recommended care. Significant causes of this were considered to be the high number of potentially applicable health maintenance recommendations or guidelines, our lack of current clinical information readily available in paper medical records regarding each specific patient's status with respect to the guideline(s) of interest, and the difficulty prioritizing among the applicable recommendations during limited appointment time.

2. McGlynn EA, Asch SM, Adams J, Keesey J, Hicks J, DeCristofaro A, et al. The quality of health care delivered to adults in the United States.[see comment]. N Engl J Med. [Research Support, Non-U.S. Gov't Research Support, U.S. Gov't, Non-P.H.S.]. 2003 Jun 26;348(26):2635-45.

While continuing to develop as a clinical microsystem, in 2009 WRFP began planning the acquisition and implementation of an integrated electronic health record to improve our provision and documentation of guideline-recommended care, our medication management, and our population health surveillance.

After reviewing multiple available national health maintenance guidelines, WRFP focused on the work of the National Commission on Prevention Priorities (NCPP) and selected a core set of four preventive services from among those applicable to our patient population and/or considered by the NCPP to have the most potential value. (3) Aspirin chemoprophylaxis for appropriate patients and tobacco-use screening and intervention (both of which received NCPP's highest priority) were chosen from among the NCPP recommendations. We selected adult pneumococcal immunization (a proxy measure of our adult immunizations) as a third metric. As our fourth measure, we chose to begin structured documentation of alcohol-use screening, reasoning that – although we thought we were asking patients about this behavior in the course of health-maintenance visits – we could not prove it to ourselves, and we are aware of the high prevalence of alcohol-use disorders in our society. WRFP then committed to the implementation of our EHR to facilitate our systematic delivery of these four priority care elements in the management of our patient populations' healthcare, while also optimizing the EHR to enable the continued provision of excellent individualized healthcare in the context of patient visits.

3. Design and Implementation

Using a Gantt chart to represent our projected timeline, WRFP defined a systematic approach to the selection and implementation of our EHR. We worked closely with Vermont Information Technology Leaders (VITL), a 501(c)(3) non-profit organization that assists Vermont health care providers with adopting and using health information technology to improve patient care. Our EHR selection process involved vendor presentations as well as site visits to regional ambulatory care practices using systems under consideration.   A critical requirement of our choice was a robust registry capability to monitor real-time care-delivery (clinical decision support) and to enable comparative reporting of care delivered to discrete patient populations. The final step in our selection process involved a presentation of our practice and goals to senior representatives of our chosen vendor at their corporate headquarters. This was a valuable exercise in gauging their capacity to fulfill our EHR requirements and laying the foundation for a productive relationship between senior leaders of both organizations for the future.

Computer literacy assessments of all staff were conducted, and basic computer training sessions were held as needed. With our chosen vendor identified, our planning centered on the formation of an "EHR Group" (EHRG) made up of three physicians, our office manager, our clinical nursing leader, and representatives of our front office, billing, medical assistant, and medical records personnel. This group met weekly for one hour in preparation for our transformation to an electronic health record (and these meetings continued well past system "Go Live").

3. Maciosek MV, Coffield AB, Edwards NM, Flottemesch TJ, Goodman MJ, Solberg LI, et al. Priorities among effective clinical preventive services: results of a systematic review and analysis.[see comment]. Am J Prev Med. [Research Support, Non-U.S. Gov't Research Support, U.S. Gov't, P.H.S. Review]. 2006 Jul;31(1):52-61.

Meetings were devoted to anticipating potential issues in the transformation, proposing solutions to those problems, responding to – and correcting – a developing set of process maps of approximately two-dozen key office functions, and learning our selected EHR's use with respect to their individual office responsibilities. Minutes of these weekly meetings were distributed to all office staff, and EHRG members were responsible for disseminating group decisions as well as representing their constituencies' concerns at subsequent EHRG meetings. In many instances, real-time corrections were implemented during these meetings with respect to our developing process maps of key office functions as well as configuration of important aspects of the EHR to support provision and documentation of our selected priority guideline care elements. EHRG members networked with other practices to identify best practices, particularly with regard to the migration of selected clinical information from paper records to the electronic environment and great care was devoted to detailed mapping of reference lab analyses to the correct fields in the EHR so that patients' historic lab results would migrate correctly into the EHR through our lab interface.

Serial presentations were made to all office members regarding organization and function as a clinical microsystem, the implementation of standing orders for all staff, and the rationale for focusing on our initially-selected four key components of national guideline-recommended care.

4. How was Health IT Utilized?

After revision of our relevant process maps, the patient rooming process was defined to include tobacco use screening and documentation in structured data fields by our Medical Assistants (MA's) at each patient appointment. In addition, patients had been notified of the EHR implementation in advance and were asked to bring all medications to their first appointment in the electronic environment; our MA's then conducted precise medication reconciliation to facilitate safe medication management, and patients' use of any antithrombic medications including OTC aspirin was identified and recorded in structured fields.

Standing orders to our MA staff were revised to include the responsibility to ascertain a patient's eligibility to receive an adult pneumococcal immunization (with reference to WRFP's immunization protocol based on the Advisory Council on Immunization Practices), and to offer to provide that immunization to any eligible patient (as well as document the administration within the EHR).

The EHR's Clinical Decision Support (CDSS) and Practice Alerts were optimized to facilitate real-time awareness of each patient's status with respect to national guideline-recommended care (including our four identified priority elements). Now any care provided during a patient contact updates that patient's CDSS system immediately. Clinical care ordered but not yet provided now registers in the EHR as "pending" and updates the patient's CDSS dashboard when the results are received into the EHR and reviewed by the practitioner.

Virtually all medication management is now done through ePrescribing. Exceptions to this are prescriptions for controlled drugs which are entered electronically but printed to specialized paper for the requisite hand delivery or fax to area pharmacies. All other prescriptions are

transmitted electronically to those pharmacies equipped to receive them, or by fax to those which are not.

One of the EHRG physicians developed the process for recording smoking cessation interventions (SCI) in structured fields, and distributed instructional handouts with screenshots of applicable steps to all providers with personalized instruction where needed.

Providers were then encouraged to document recommendations to use aspirin in appropriate patients, to use our defined procedure to document efforts at smoking cessation intervention, and to inquire about alcohol use (initially at any adult health maintenance visit and any acute care visit for college-bound young adults, but later broadened to include any adult patient's visit at least once a year).

To assess the effect of EHR implementation on the provision of these four priority clinical care elements, serial registry searches of WRFP performance on each measure were done by one WRFP physician for presentation to the practice in graphical form.

5. Value Derived/Outcomes

As the practice transitioned to document clinical care in our EHR, one EHRG physician extracted weekly data of each provider's performance with respect to the provision of our four identified high-priority care elements, as well as the performance of WRFP overall on these measures. We chose this approach as the best measure of our office performance in the provision of care to the eligible population(s), reasoning that successful process changes should result in a higher proportion of eligible patients receiving the care in question each week (month) as compared to preceding period.

WRFP patients are encouraged to identify a particular provider as his / her primary care practitioner (PCP).   However, a patient might be seen by any of our nine providers for incidental care, and we reasoned that any indicated care element should be offered or provided to an eligible patient regardless of which specific provider might be involved in the encounter. Thus practice-wide graphs of our aggregate performance on the provision of our four high-priority care elements were considered to be the most appropriate indicators of progress.

The practice uses control charts displaying data over time to identify significant change ("special cause variation") in office performance. (4)   Graphs on the following pages document the improvements obtained through our organizational changes and deployment of our EHR on all four identified priority clinical care measures. The graphs use a program in statistical process control (SPCXL, Sigmazone) to depict our average (green line) performance at baseline (labeled 2/20/11) and the upper and lower bounds of statistically significant difference in our performance (red lines). Each data point on each graph represents the per cent of eligible patients seen that week (or month for adult pneumococcal immunizations) who received the indicated priority care element.

4. Carey RG. Improving Healthcare With Control Charts: Basic and Advanced SPC Methods and Case Studies. Milwaukee, Wis:: ASQ Quality Press; 2003.
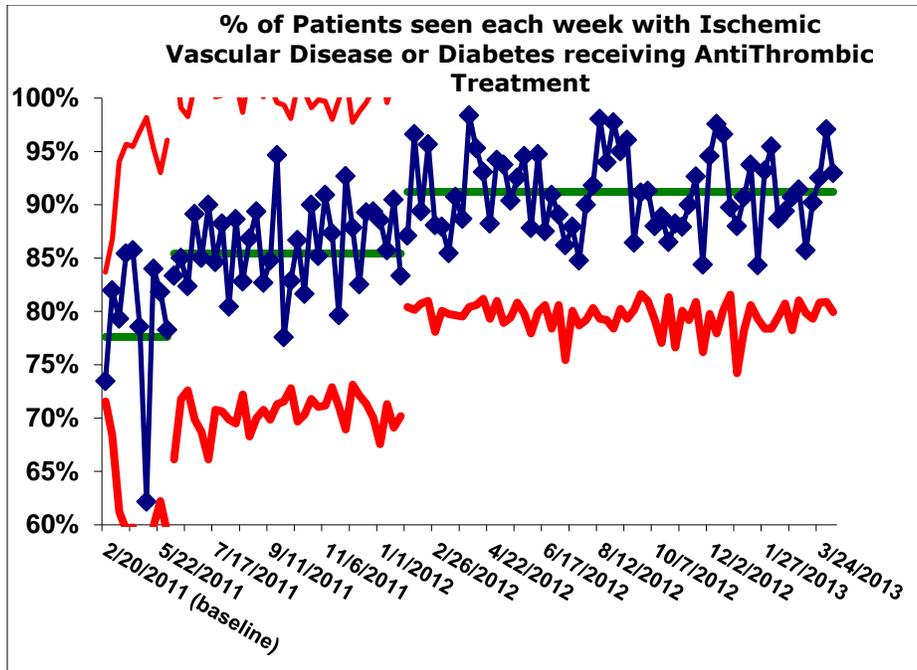
Figure 1: Improvement in the percent of patients seen each week with diabetes or ischemic vascular diseases who are taking antithrombic medication (from an average of ~77% with high variability in early 2011 to an average of ~92% with less variability by 2013).
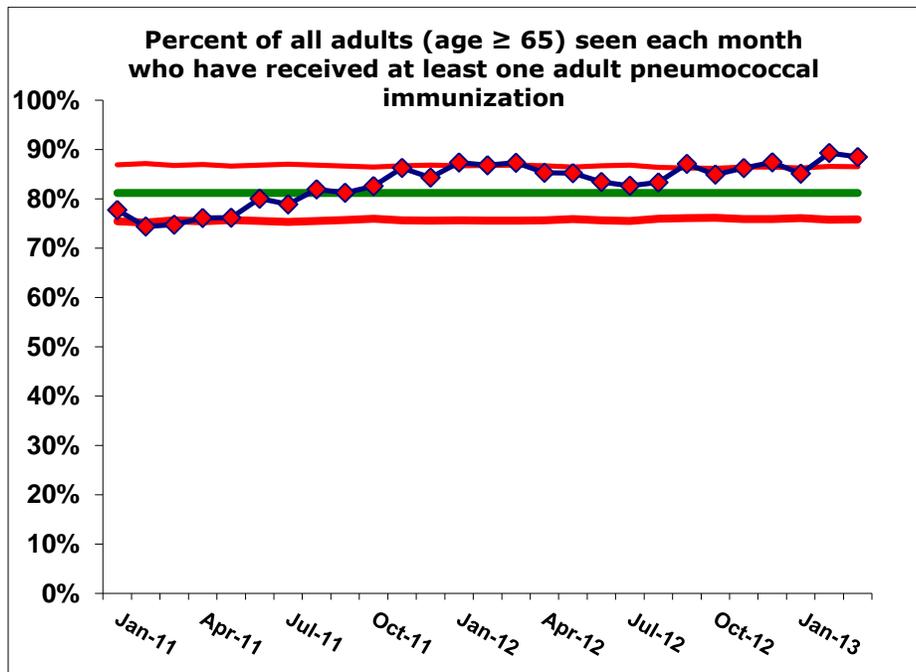

Figure 2: Improvement in the percent of eligible patients with documented adult pneumococcal immunizations.
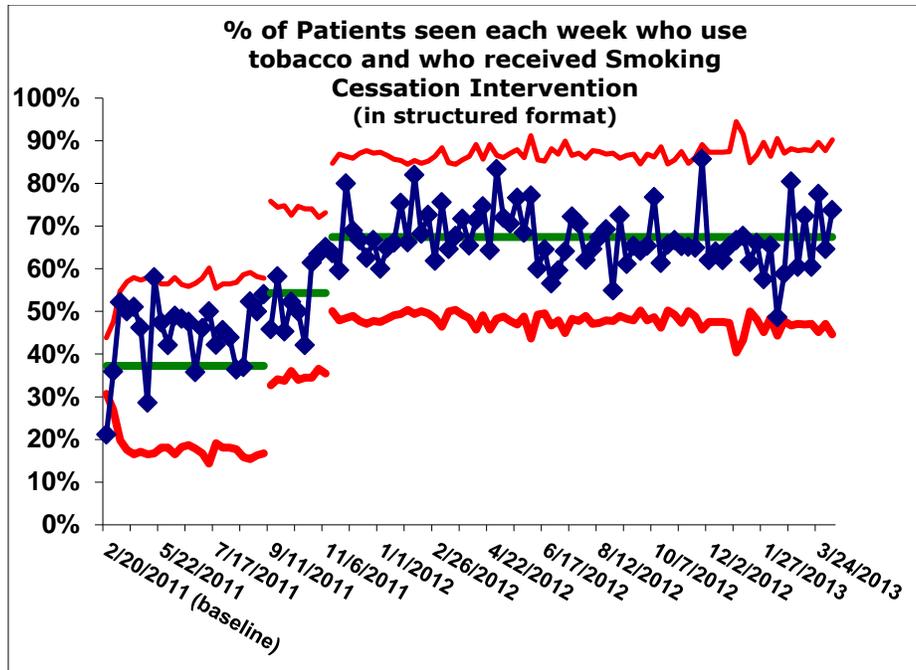
Figure 3: Improvement in the percent of tobacco users seen each week who received formal Smoking Cessation Intervention during the visit (rising from an average of < 40% to ~68%).
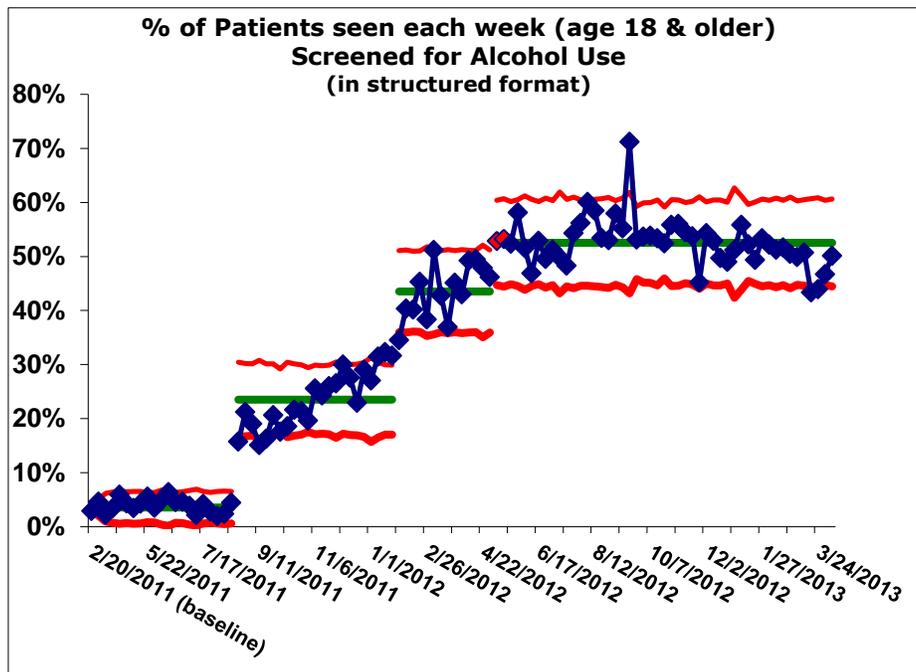

Figure 4: Increase in percent of adults who were screened for abuse of alcohol using the structured questions of Audit C. (We have experienced patients who, when screened, elected to forego the original purpose of their scheduled visit in favor of a discussion of their alcohol use.)

These graphs are posted in our work spaces and distributed with commentary to individual providers, enabling regular feedback on the degree to which we are achieving our goals. WRFP providers and staff regularly review our performance on these four measures with a focus on driving continued improvement. Providers have also held periodic "pizza-dinner" training sessions emphasizing the use of our CDSS system, and responding to provider questions or concerns with real-time configuration of appropriate new structured fields in the EHR program.

Our chosen four priority interventions are measures of the *process* of care; obviously we are most interested in *outcomes* (e.g., what decline in vascular events was observed as a consequence of ensuring antithrombic medication use, or how many smokers quit tobacco use). We elected to begin our efforts to improve our clinical value by measuring care processes recognizing that a change in outcomes will require a longer period of observation, and obtaining reliably improved care processes will ultimately contribute to improved health outcomes.

Our documented improvement in the systematic provision of high-priority clinical care to eligible patient populations was an integral part of our successful application to be certified as a Level III Patient Centered Medical Home (by NCQA 2011 standards) in September, 2012.

6. Lessons Learned

Beyond the challenge of selecting and implementing an appropriate EHR (no small task in itself), WRFP confronted a number of other challenges.

One initial challenge was to identify leaders from among each work area of our office staff who would enthusiastically embrace the transition to an electronic record and capably represent their colleagues as new office processes were defined in an electronic environment. Each EHRG staff member was paid for her time to attend our weekly meetings outside of patient-care time. The physicians and senior administrative staff modeled accountability to the group in meeting attendance and deliverance of any "homework" assigned at a prior meeting. The group also periodically celebrated our interval progress during the implementation process to help maintain the esprit de corps.

Every source with whom we spoke regarding EHR implementation emphasized the importance of actually mapping our key care processes before imposing an electronic record system on our office. EHRG members documented their existing workflows on paper to be formally charted by one of our EHRG physicians using Microsoft Visio. These process maps were invaluable as we designed new workflows adapted to the EHR and they were important in training staff to function in an electronic environment. Similarly, every advisor recommended emphasizing initial *and ongoing* training on use of the EHR program; WRFP committed to receive intensive training before going live with the system, and EHRG members continued to train colleagues after the vendor's training staff departed.

Our graphs show improvement – and the capacity to do better. WRFP physicians do not believe the programmed indications for adult pneumococcal immunization in our EHR are consistent with the recommendations of the Advisory Council on Immunization Practices (ACIP); partly as a consequence of this, our reported performance on this care element seems to lag. (In addition, patients may receive this immunization elsewhere and we have not yet been successful at

systematically capturing that information.) Regarding both tobacco and alcohol use in patients, we have found that regularly highlighting our current performance and revisiting the correct means to document relevant care is necessary to maintain gains.

Most importantly, we learned that awareness of any gap between our current performance and our target(s) is essential before steps can be undertaken to close that gap, and that measurement of ongoing performance with regular feedback is necessary to refine processes and continue improvement. WRFP physicians and our office manager have attended the EHR vendor's national users group meeting each of the three years since product acquisition and our participation at those meetings has been telling. In year one, we were intent on learning as much as possible from the vendor's representatives. In the second year, we were more intent on networking to learn from other "super-users" of the EHR. In the most recent year, WRFP attendees prepared and conducted training sessions for other users at that national conference.

7. Financial Considerations

WRFP was fortunate to be included in VITL's grant process before that aspect of VITL was discontinued. Our practice's readiness to engage health IT solutions in pursuit of improved population health was a factor in being identified as a grant recipient, significantly alleviating potential financial stresses in EHR implementation. VITL provided a list of pre-approved EHR's which were considered eligible for grant support allowing us to narrow our search. VITL also provided valuable assistance during our implementation process, consulting on key aspects of planning and preparation, and periodically convening meetings of representatives of other Vermont practices undergoing a similar transformation for group learning.

WRFP also recognized the fortuitous timing of available federal funds from the CMS Medicare and Medicaid EHR Incentive Programs ("Meaningful Use"), and our EHR implementation was timed to take full advantage of any incentive payments for which we might become eligible.

Capital funding was required during the transition (more fully detailed in the ROI Core Case Study). Minimal funding from operating sources has been required (e.g., compensating employees for weekly one-hour meetings). Periodic replacement of hardware has been funded through income from operations. One specific unfunded cost of our quality improvement effort has been the physician-management time required to shepherd the program (e.g., extract the data and prepare and distribute graphical reports).

Significant new WRFP income has been realized following the EHR implementation from a number of sources. In some cases, the EHR has facilitated documentation of appropriate clinical care which substantiates a higher E&M code. WRFP has successfully attested to Meaningful Use in years 1 & 2, and additional incentive payments from the Vermont Blueprint for Health have been realized due to our certification as a Level III Patient Centered Medical Home. Patients are grateful to receive national guideline-recommended care routinely with any contact with WRFP regardless of their intent to specifically schedule this care, and they routinely express appreciation for the office's organization as a clinical microsystem. And lastly, providers are more confident that indicated guideline-recommended care has not been missed during an office appointment through inattention.

Appendix 1: White River Family Practice patient distribution in Vermont and New Hampshire.