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Initiating a Pro-Active Care Modality Paradigm to Vulnerable Populations: Utilizing the Patient-Centered Medical Home Model for Incarcerated Male Inmates with Asthma

Matt L. Pimentel

School of Nursing and Health Studies, University of Missouri-Kansas City, Kansas City, USA
Email: matt_pim2004@yahoo.com

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Abstract

Incarcerated male inmates in the California Department of Corrections & Rehabilitation (CDCR) have poorer outcomes of management of chronic care conditions such as asthma, hypertension, and diabetes than the rest of the general population. The aim of this program is to promote healthy measurable outcomes of inmates with asthma at the Correctional Training Facility, Soledad, one of the 33 facilities that constitute CDCR. Inmates are split into provider-care teams per their CDCR number and followed in the nine clinics at the facility. These inmates were identified, tracked, educated, and followed up using the Patient-Centered Medical Home (PCMH) model. The education and assessments were geared through the Transtheoretical Model (TTM) to determine the readiness of teaching modalities. This program included peer-to-peer education between inmates, group education by the nurse instructor, and RN/PCP (primary care provider) intervention visits. An asthma action plan and severity indexing determined the specific protocols that were followed for this population. Inmates took ownership of their individual health problems, and custody and medical staff worked collaboratively to facilitate timely visits to the clinic and safety concerns of medication accessories. The goal of this program was to decrease unexpected deaths due to asthma to zero per year. A secondary goal was to decrease the number of Treatment & Triage Area (TTA) visits for signs and symptoms of exacerbated asthma by 95%. Outcomes were measured by tracking the number of key indicators, including registered nurse/primary care provider (RN/PCP) visits, assessments and diagnostics tool measurements, subjective control tests, and number of TTA visits.

Subject Areas

Nursing

Keywords

Inmates, CDCR, Asthma, PCMH, TTM, Healthy Outcomes, Teaching, Chronic Care

1. Introduction

Asthma is a chronic disease that affects twenty-two million people in the United States and is the most common chronic disease worldwide [1] [2]. Asthma is a chronic disease of the airway characterized by hyperresponsiveness of the lungs in which the breathing passages become narrower, which manifests into recurrent episodes of shortness of breath, coughing or wheezing. The disease affects 6.7% of the American population, 10.3% of those below the poverty line; is higher in females 8.1% versus males 6.2%, and higher in African-Americans 9.2% as to Caucasians 6.9%, and to Hispanics at 3.9% [3]. Like all chronic diseases, asthma has the potential to be controlled and maintained by individuals who are cognizant of their situation and who take action to promote wellness [4]. Proper asthma control and risk severity indexing that is evaluated by healthcare professionals has shown significantly decreased morbidity and mortality and facilitates healthy lifestyles for individuals [5]. A vast study incorporating insurance claims proclaims that over 70% of asthma patients have shown signs of poorly controlled asthma over three years [6] [7]. Moreover, physicians usually underestimate asthmatic's symptomology and overestimate the degree of control of the disease [8]. Disenfranchised populations, such as the homeless, war veterans, immigrants, and incarcerated inmates, have poorer health outcomes when compared to the general population [9].

2. Target Population

The population of focus is the incarcerated male inmates with asthma at the Correctional Training Facility, Soledad (CTF), one of the 33 state institutions that make up the California Department of Corrections and Rehabilitation (CDCR). The focus of this study are individuals that have a diagnosis of asthma and have a prescription for short-acting bronchodilation agents (SABA) such as Albuterol or a long-acting bronchodilation agent (LABA) such as Salmeterol, or an inhaled corticosteroid (ICS) such as fluticasone. Incarcerated inmates usually have poorer health outcomes, lower incidents of health care regimen compliance and higher morbidity and mortality than the general population [10]. More specifically, asthma prevalence in American prisons is 8.5% as compared to 7.5% of the general population [11]. In 2005, a federal receivership was appointed by the Ninth Circuit Court of Appeals to mandate and constitutionally guarantee

health care to the State of California's approximately one hundred and seventy-six thousand inmates. At its worst, there was one unexpected inmate death per week, and the State did not have a reasonable plan of action to improve healthcare. Moreover, State healthcare workers and administrators had limited knowledge and ability to formulate a quality care program for these individuals [12].

3. Context

In February 2009, the health care team at CTF decided to implement a variant of the chronic care model to focus on the pro-active sense of healthcare rather than episodic care in our setting. Heretofore, the focus of care was strictly reactionary; our practitioners focused on the symptomology of our patients rather than the cause of the disease process.

At meetings between the nursing staff, health care manager, physicians, & custody staff, a project paradigm involving qualitative and quantitative goals were proposed. We agreed upon qualitative & quantitative goals. The qualitative goals were to 1) promote teamwork, 2) encourage a cultural change between the nursing staff and the inmate patients, and 3) to achieve optimal clinical outcomes for our inmate/patients. The quantitative goals are to 1) keep the number of deaths related to asthma to zero, 2) to reduce the number of clinic visits for signs and symptoms of asthma exacerbation by 75%, and 3) decrease the number of patient send-outs to the hospital for uncontrolled asthma exacerbation by 95%. These quantitative categories would be measured at the end of each month for the next nine months.

4. Intervention Literature Review

The intervention utilized in this program is the Patient-Centered Medical Home (PCMH) model of healthcare promulgated by the NCQA (National Committee for Quality Assurance). The major thrust of this program is to provide quality, competent care with measurable outcomes for patient illnesses rather than relying on episodic methods that have proven to be costly to the healthcare system [13]. The PCMH has six core elements or components: self-management, delivery system design, decision support, clinical information systems, health care organization, and community. The PCMH is a specific paradigm of care that is physician-led; it focused on individuals' well-being rather than reacting to acute health problems. This program attempts to move away from the traditional acute reaction of the medical model, which focuses on immediate and acute signs and symptoms and attempts to promote equilibrium within individuals by fostering a collaborative focus between patients and providers [14].

The PCMH was cleaved from an earlier concept promoted by the American Academy of Pediatrics in the late 1960s in which the concept of "medical home" was authored. As time progressed, this model manifested into the PCMH [15]. As the elemental systems of PCMH were described above, the core edicts for the

direction of care are personalized physician (or provider), physician-directed medical practice, whole-person orientation, coordinated care, quality/safety, and enhanced access [16]. (See Appendix B).

There is a paucity of long-term clinical literature review on this model due to its lack of long-term usage and its enormous financial and informational requirements of implantation. That being said, some studies have shown plausibility with implementing at least most of the core elements. Researchers postulated successful outcomes in large-scale organizations that can facilitate education, best practice standards, heavy monetary influence, and investment in electronic medical recordkeeping [17]. Additionally, the authors portend that large initial investments into system upgrades, a greater focus on information technology improvements, and initial access to care visits with patients, would be structurally sound for large healthcare providing entities.

5. Framework Literature Review

Reference [18] promulgated that stages of change matching vis-à-vis the TTM (Transtheoretical Model) and individualized care can increase medication compliance with another chronic care disease, hypertension. The authors postulated that individuals that were in stages before the action stage, such as pre-contemplation and contemplation stages, could be guided to preparation and action stages within a six to eighteen-month time frame with computerized action plans that focused on an individual's plan of care. These results show promise in that randomized individuals in pre-action stages can progress forward with stage-specific steps. One could make an argument that many vulnerable populations that do not have many of the socio-economical advantages of the above participants, who are at the preparation or action stages, may progress just as successfully.

Reference [19] stated similar results in other chronic diseases like diabetes. They continue that individualized plans of care, self-exploration, & pro-active interventions that were stage-specific to the changing concept, produced higher compliance of lifestyle enhancements and healthy outcomes for the patients. Moreover, readiness for the change and the environment of the change were germane to the program's success. Self-efficacy was strong due to strong feedback from the healthcare provider and stage-specific interventions.

No healthcare paradigm or behavior change model is perfect, but it is worth investigating models and paradigms that can be intertwined with certain populations for success. The focus is to facilitate positive patient care, healthy living, and to institute change in a prison environment that needs to be humane.

6. Theoretical Framework

The theoretical framework that provided a basis of working knowledge and direction is the Transtheoretical Model (TTM) propagated by Prochaska and colleagues. This paradigmatic model involves a number of core constructs, stages of

change, and processes of change that identify individuals' readiness to alter their lifestyle [20]. In essence, individuals or groups fall into one of six categories or stages: pre-contemplation, contemplation, preparation, action, maintenance, and termination. From one extreme, pre-contemplation, individuals are not even focused on any sort of change or knowledge thereof within the next six months. Termination is a completion, and a model of self-efficacy since the individuals have complete confidence of not relapsing into prior behavior or action [21]. Stage change is neither static nor linear; relapsing into a previous or less active stage is a problematic concern for health educators [22].

For the current study, we focused on the preparation stage, or preparatory action to be expected in the next thirty days and the action stage, or changed behavioral action that has just occurred in the previous thirty days. Disenfranchised populations have a lower self-efficacy rate in changed behavioral actions, and we gave extended instruction and encouragement from health care providers to promote compliance [23].

Specific processes of change from the TTM that are addressed are consciousness-raising, self-reevaluation, and helping relationships. Consciousness-raising involved the Primary Care Team (PCT), who teach the patients the trigger events of asthma, deleterious effects of smoking, and medication compliance. RNs & LVNs focus on patients' self-reevaluation of their current chronic care issue. Considering the incarcerated setting, the team educated healthy behaviors and discussed scenarios where they are in control of their chronic disease. The PCT focused on helping relationships between themselves and the patients. Though always focusing on patient confidentiality, correctional counselors, correctional officers, and other correctional staff provided a non-judgmental, caring outlook concerning healthcare situations.

Moreover, peer-to-peer (between inmates) education, group dynamics, teaching about medication compliance, asthma spacer usage, and trigger assessments were introduced and performed at the clinics in each of the inmate housing units. These activities were coordinated by the RN. Although self-efficacy is a pertinent component of TTM, the team was cognizant of the institutional setting and regularly promoted the benefits of being in full control of one's individual chronic disease.

7. Program

The PCMH employs a physician-led team that collaborates with other disciplines to provide optimal care to CDCR inmates at CTF-Soledad. The PCMH core elements (See Appendix A) are not only focused on self-management and community support but is geared toward intensive information technology design that recommends computerized access of records and to interface with an array of electronic data at each PCT workspace. Due to the archaic systems integrated into many of CDCR's facilities, this is a long-term goal instead of the here-and-now. That being said, the core features of the PCMH (See Appendix B)

can be implanted without the heavy investment in information technology. Each inmate, per their number subset, had a specific physician or provider who led the team collaboratively. The concept of the whole person was integrated insofar that acute, chronic, and preventative care would be addressed. Quality assurance was devised by committees and additional supervisors to monitor proper plan rollout and monitoring. Moreover, inmate care encompassed enhanced access by having longer hours at the clinics and Saturday and Sunday opportunities for scheduled appointments [24].

Per the institution's records, approximately 522 inmates have a diagnosis of asthma out of a current population of 6545 as of April 11, 2009 (J. Anderson, personal communication, March 24, 2009).

A chronic care team was formed or Primary Care Team (PCT), which included a (PCP) primary healthcare provider (physician, nurse practitioner, or physician's assistant), one RN, one provider line LVN, one medication-pass LVN and one office technician (OT). Every incarcerated male in CDCR has an institution identification number, like A12345. For the purpose of providing primary care to the inmates, they were segregated by their last two numbers of their CDCR number, and further divided by where they live at CTF's three facilities: north, south, or central. Due to budget and manageability constraints, each PCT was aggregated as one team per approximately 654 inmates. Ergo, the teams were split as ten clinics and ten teams throughout the prison structure. There was a chronic care champion RN to oversee and track daily flow and manage the input of key indicators. There was a supervising nurse that oversaw the program and facilitated weekly meetings with the chronic care champion RN, director of nurses, the chief medical officer, a custody captain, a psychologist, a rank-and-file LVN, and an OT.

To initiate the process, pharmacy profiles were pulled for the key indicator medications and the patients with asthma were identified and segregated into one of the respective ten PCTs. The PCT's objective was to stratify patients with asthma into severity indexes and measurements of asthma control and to determine what medication regimen to begin or continue, signify a specific action plan, and initiate ownership of their health problems. This ownership entailed action plans that the inmates helped fill out and carry with them at all times. It was one page, simple schematic that delineated asthma control and symptoms into good, fair and bad. Each section was guidelines on what specific activity to do when symptoms or control was not optimal.

The TTM played a vital role in the next step of the process. Inasmuch as these patients had prescriptions for these medications and had not overly inundated the TTA (Treatment & Triage Area) for emergency care visits, it was assumed that most of the population is in the action stage. Reference [18] stated that the recognition of good medication compliance and providing positive affirmation to disenfranchised populations, will fortify and strengthen overall medical compliance. Moreover, these patients were educated by the RN on proper medica-

tion utilization, including usage and ownership of a spacer. Spacers allow for the complete inhalation of the short-term beta-agonist (SABA) product for increased effectiveness [25]. Also during this RN visit, asthmatic triggers and family history were addressed along with emergency room or TTA visits in the past six months. A subjective tool that measures asthma severity per the patient called an ACAT was used. The ACAT (Asthma Control Action Test) is similar to the proprietor ACT (Asthma Control Test) which has a high correlation between score response and asthma control [26]. This ACAT score provided initial guidance for the RN to provide education to the patient but also to gauge the potential deleterious chronic state the patient may be presenting.

Moreover, RNs provided education regarding the disease and answered any questions the inmates had regarding their healthcare issues. Paperwork entailed an initial asthma assessment, an ACAT form, an asthma action plan (that gives instructions on what to do when asthma is controlled, questionable, or out of control), and a picture page of asthma medications for inmate recognition. A chronic care checklist was utilized to track each inmate and was placed in an accordion-type file.

After the initial RN assessment, inmates were educated (a pass to move around the institution for a specific reason) for a provider visit to assess severity indexing and control of asthma. The stratification of asthma severity levels was: intermittent, mild persistent, moderate persistent, and severe persistent. This indexing was calculated by the number of symptoms per week, nocturnal symptoms and forced expiratory volume in one second (FEV1). The FEV1 is determined by the pulmonary function test performed by the RN during the initial visit by the hand-held Schiller SP-2 machine. Once this was determined, an algorithm is consulted to determine which medications and what configuration is prescribed, though the provider makes the final decision. The LVN provided education and medications from the pharmacy to the inmate at the end of this PCP visit. This regimen could include a short-term burst of prednisone therapy, an inhaled corticosteroid (ICS), long-term action beta-agonists (LABA) medications, or combination medications such as Advair or Symbicort.

Additionally, at the beginning of each morning shift, the PCTs collaborated into a short meeting that discussed and coordinated the day's events. The day's educated inmates were discussed amongst the team along with an appropriate action plan. Nurses from the TTA and R&R (receiving and release-the part of the prison where new inmates arrive from other CDCR facilities or county jails) disseminated their daily paperwork to each team to assist with new arrivals of potential asthmatics and emergency visits in the prior day.

Inmates have a form called a CDCR 7362, a requisition for healthcare, which they may fill out and turn into boxes that are located throughout the prison. Every day, an RN reviewed and troubleshoot problems that were stated on these forms. This last link attempts to fill the cracks of coverage that inmates may fall through.

8. Outcomes/Evaluation

Outcomes and evaluation were a data triangulation of information gleaned from a number of key indicators that were determined before the paradigm change. For instance, the lead key indicator was, "No patient at CTF-Soledad will experience an asthma episode that will result in death, require an emergency department visit, hospitalization or TTA visit after June 1, 2009." Subsequently, other outcomes such as completion of education of inmates and PCP visits in a fourteen-day frame which was monitored, indicated, tracked, and investigated by the nursing supervisor. Another key indicator was the amount of TTA visits per month that are asthma-related. A long-term indicator of health access was the number of CDCR 7362 forms received on a monthly basis. Since this is a complaint form, a decrease in the amount received per month may correlate with a more intense, pro-active healthcare access format. In essence, the control of the asthmatics symptoms, the self-realization that these patients can be responsible for their care, the peer-to-peer education, and the focus on improved outcomes was of utmost importance.

9. Barriers/Challenges/Solutions/Limitations

There are a number of barriers to providing humane, quality, and evidence-based practice, primary care to this population. The most obvious is the safety, security of the facility at all times, and of the approximately six thousand, five hundred and fifty five inmates, one thousand, one hundred and nineteen correctional officers (CO), three hundred health care professionals and five hundred and twenty four ancillary staff that were present every day (J. Anderson, personal communication, March 24, 2009). The custody staff had a number of programs that they must coordinate and monitor for the inmates on every given day. Not only is healthcare constitutionally guaranteed for the inmates, but also access to many other programs is guaranteed by the courts. Some instances are the right to feeding at certain times of the day, access to the law library a certain amount of hours a week, formalized education, canteen, yard time, specialty appointments, and medication access times. Therefore, many different activities are happening in a controlled environment with dangerous and manipulative criminals. Many other variables were addressed and realized at all times, such as fog count, loss of tools, finding of contraband, potential riots, and other emergencies that can delay and halt access to care at any given moment of the day. These situations are why the enhanced access edict from the PCMH model was imperative so the nursing supervisor could promote and advocate healthcare access and scheduling at all times.

A potential limitation to this study may have been the increased attention given to this population may have assuaged more dramatic high-acuity visits. It is not uncommon to feel validated if their concerns are addressed proactively, rather than reactively.

Additionally, the average reading and comprehension are at the seventh-grade level, and the median age is thirty-seven years-old for inmates at CDCR [27].

Thus, it was necessary to gear education materials and structure in a pre-high school setting for adults. Moreover, the nursing supervisor and director of nursing needed to continuously educate his or her staff on proper education techniques, appropriate material review and, first and foremost, staff safety.

10. Implementation

On April 6, 2009, we implemented change for the care of approximately 522 inmates diagnosed with asthma out of a total institution population of 6455 inmates:

1) Chronic care focus vis-à-vis the PCMH; we fostered collaborative medical partnerships.

2) Increased electronic monitorization of inmates via Excel spreadsheets.

3) Nine Primary Care Teams consisted of a provider, a registered nurse, licensed vocational nurses (1 for medication distribution + 1 for provider assistance), and an office technician for data entry. A Clinical Champion RN and a Supervising Nurse ensured success by checking follow-up of patient care through auditing and quality assurance meetings held bi-weekly.

4) Inmates were segregated into teams per their last two numbers of their CDCR number; inmate/patients had the same team members at all times.

5) Pharmacy profiles were accumulated for key asthmatic medications; individuals with COPD were excluded from this process.

6) During the initial RN visit, and later by the provider visit, patients had their severity indexed by observation and stated symptomology; the degree of control was identified, this determined the appropriate asthma medication matrix of medication dispensement (SABA, LABA, ICS, combination, etc.).

7) Patients used a self-diagnostic tool similar to the ACT (Asthma Control Tool) for baseline and continued subjective measurement of symptoms.

8) Patients took ownership of their plan by assisting with a one-page action plan that they carried on their person, instructing them what to do when they had asthmatic conditions.

9) Preparation & Action Stage modalities were utilized by focused education with patients that want to control their symptoms and live a healthier life. Peer-to-peer education techniques were also utilized.

10) Emergent, urgent, routine, 30, 60, & 90-day follow-ups were determined by severity, along with peak flow, full vital signs, assessments, and plans of action at each visit. FEV1 is measured every year.

11) Morning meetings were performed before each clinic day to focus and/or troubleshoot our patients' specific complaints.

These five-hundred and twenty-two persons were chosen as all those that had an asthma diagnosis at the prison; those with COPD were excluded. Our outcomes are the three goals delinated in the forthcoming paragraph.

All RN & LVN staff members were oriented to the new procedure two weeks prior to the implementation of the April 6, 2009, roll-out. On-the-job training, individual teachings, small group formats, and the monthly nursing meetings

with powerpoint presentations, were utilized to educate our nursing staff. The Chief Physician & Surgeon and the Chief Medical Officer instructed the providers on their duties for this project.

11. Goals of the Program

1) Decrease asthma deaths to zero per month.

2) Decrease the number of TTA visits of patients exhibiting signs of asthma exacerbation by 95%, year-over-year.

3) Decrease outside-to-hospital for asthmatic exacerbations to no more than one per month.

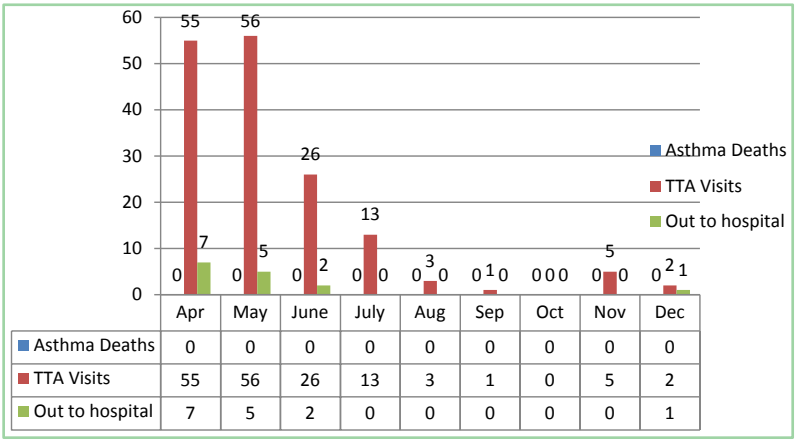
12. Discussion

As seen in Figure 1, the results from this program have shown a dramatic decrease in TTA visits (Treatment & Triage Area-a facility designated in the institution that functions similar to an emergency room in a hospital). The institution was averaging forty-three asthmatic TTA visits per month, showing a high of fifty-six visits for May 2009. Then, a dramatic shift down to twenty-six in June, thirteen in July, three in August, and only one for the month of September. Moreover, we had no TTA visits in October, five in November, and two in December 2009. We theorize that colder months may have led to increasing visits. In April 2009, we had seven inmates out to the hospital for asthmatic concerns; it has been zero up until we had one patient leaving to the hospital in December 2009. Moreover, the overall goal of no asthmatic deaths at the institution has continued until December 2009 (see Figure 1).

The nursing staff played a vital role in this endeavor since teaching modalities, one-on-one interactions, group teachings, and peer-to-peer education was introduced and flourished. Albeit slowly, the electronic tracking of inmates' severity and control of asthma, was eventually achieved by staff via excel spreadsheets. In essence, the adept teaching methodology along with a cogent and flexible healthcare model was germane to the optimal control of the chronic care disease of asthma.

Some recommendations would be to continue this study and encompass other chronic care diseases like hypertension, diabetes, and Hepatitis C. Moreover, attempt to bring in as many people as possible to help facilitate future similar projects.

One of the main ingredients for success was the continual teaching of staff by increasing the "buy-in" of the project by rewarding and praising compliance. Moreover, utilizing data monitoring capabilities to track patients' physical location, along with physiological symptoms, enabled progress. Finally, having a management team that was supportive of the cause and goals, maintaining quality assurance and implementation meetings on a routine basis, and of course, a positive working relationship with subordinates, facilitated success. Finally, this was a one-year project to determine the efficaciousness of a program of this magnitude.



	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Asthma Deaths	0	0	0	0	0	0	0	0	0
TTA Visits	55	56	26	13	3	1	0	5	2
Out to hospital	7	5	2	0	0	0	0	0	1

Figure 1. Number of asthma deaths, TTA visits, and out of hospital visits from April to December 2009.

13. Conclusion

Asthma is deadly, though a very manageable chronic care illness that affects many individuals at CTF-Soledad. Using tenants of the PCMH model, inmate patients may see improved outcomes and greater access to care that a few years ago, would not have been a possibility. The Transtheoretical Model was utilized to determine which stage of change these patients are in and to follow them up appropriately and as needed to facilitate growth of the individual and compliance with the medication program. Healthy outcomes led to healthy patients in the CDCR system that one day may be released into general society. It is best to incorporate teaching in a cogent and educationally sound environment to promote success for possible future release of these individuals. As evidenced by this study, TTA visits and "out to the hospital", visits were dramatically cut during this change of approach. Undoubtedly, money was saved with this endeavor, but most importantly, patient harm was abated, patients took ownership of their chronic disease, and the staff worked collaboratively to increase patient healthiness goals.

Clinical Relevance

The adept teaching methodology, along with a cogent and flexible healthcare model is germane to the optimal control of chronic care diseases.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix A

Component or Elements of the PCMH Model

Elements	Definitions
Self-Management	To empower patients to participate in their own care and to improve their healthy lifestyle. Education, goal-setting, feedback and lifestyle changes are emphasized.
Delivery System Design	Examines the most effective way to streamline care to the patients. Looks for efficiency concerning planned visits, coordination of care and delivery of services.
Decision Support	Teams create specific data fields and the utilization of standardized forms so clinical guidelines can be followed.
Clinical Information Systems	Providing an electronic database for ease of use and to be technologically sound and system secure in its respective area. Needs to interface with multiple programs and programs need to be user-friendly.
Health Care Organization	Providing a cogent and concise hierarchy to facilitate proper care to patients. Providing quality assurance parameters and to provide meetings regularly with senior staff members.
Community	Utilizing the entire collaborative discipline that is available to facilitate quality health care.

(National Committee for Quality Assurance, 2009).

Appendix B

Core Features of the PCMH Model

Features	Definitions
Personal Physician	Every patient will have a continuous relationship with a physician.
Physician Directed Medical Practice	Physician directed team that works collaboratively with all disciplines to facilitate quality healthcare.
Whole Person Orientation	Assumption of acute, chronic, and preventative care; disease management services and end of life care.
Integrated Care	Collaboration with public health, mental & behavioral health services. Coordination through registry tracking systems.
Quality & Safety	Key indicators are monitored; standards and guidelines are revised and instituted. Patient participation is encouraged.
Enhanced Access	Utilizing the entire collaborative discipline that is available to facilitate quality health care.

(Robert Graham Center, 2014).