



# GEISINGER

**Best Practices in  
Managing Patients With  
Chronic Obstructive  
Pulmonary Disease  
(COPD)**

# Geisinger Health System Case Study

## Organization Profile

Geisinger Health System is a physician-led, fully integrated healthcare system with more than 900 employed physicians (200 of whom are primary care providers [PCPs] seeing patients in 38 community clinics). The system serves more than 2.8 million residents throughout 43 counties in central and northeastern Pennsylvania. Geisinger Health System includes a multispecialty physician group practice, 2 tertiary/quarternary care hospitals, and an alcohol and chemical dependency center.

The system has built on its core competencies in redesigning systems of care using an electronic registry derived from a fully integrated Epic electronic health record (EHR) system. More than 3 million unique patient records are included in the EHR, and a Web portal allows patients to access the system.

## Project Summary

Geisinger's project focuses on improving the care of patients with COPD through the patient-centered medical home (PCMH) model. Managing patients with chronic diseases is a core function of the PCMH. In addition to completing initiatives such as redesigning primary care processes to incorporate COPD management, integrating care management into the primary care team, and measuring quality, Geisinger continues to enhance the program with a disease registry, best practices, continuity of care, and a focus on patients with a high risk of developing COPD.

## Program Goals and Measures of Success

Recognition that patients with COPD have been drivers of poor quality outcomes and increased cost of care led Geisinger to initially develop a system of care for these patients in 2005. The organization expanded into the PCMH model beginning in 2007, and in 2009 assembled a multidisciplinary workgroup to further enhance the COPD taxonomy and performance measures.

## Goals and objectives

The overall vision for the COPD program is to leverage the PCMH model to achieve better patient satisfaction, improved quality outcomes, and more efficient care.

Specific goals of the program are to

- Create a systemwide registry for patients with COPD
- Choose and implement best practices for the treatment of COPD
- Develop a continuum of care pathway for patients with COPD
- Address patients with a high risk of developing COPD

## Clinical standards

Geisinger is currently aligning COPD disease severity criteria in the EHR system to the standards of the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines.<sup>1</sup>

## Data collection and measurement

Individuals with a diagnosis of COPD were identified from data obtained from the EHR system. Pulmonary function test (PFT) data available in digitized form (BREEZESUITE™, Medical Graphics

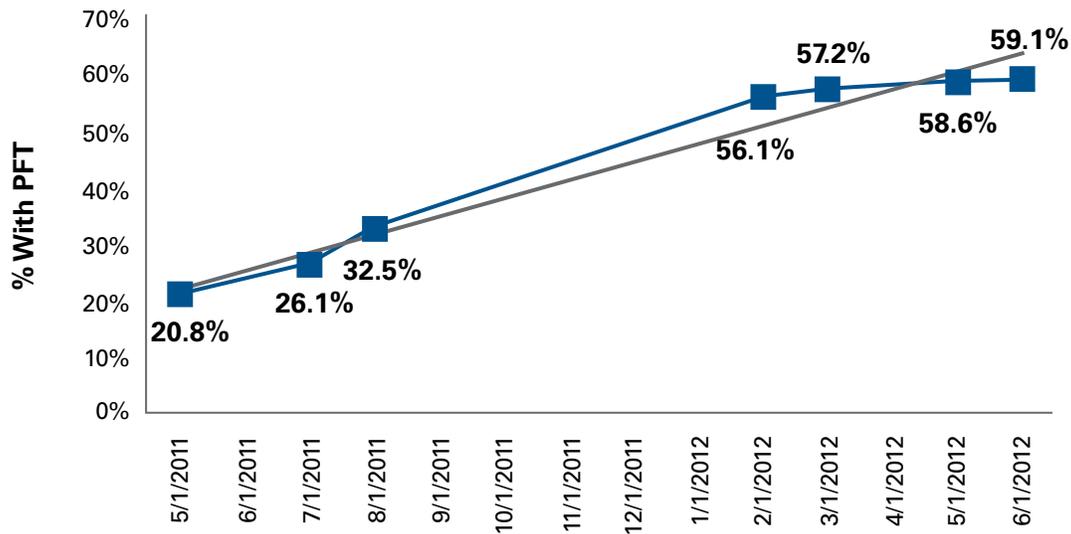
Corporation) from testing facilities within the Geisinger system were gathered on a common server and correlated with individual patient data from the EHRs via a centralized, multisource clinical decision intelligence system (CDIS) database. Whenever available, postbronchodilator spirometry results were used to corroborate and grade the severity of a diagnosis of COPD; prebronchodilator data were used in the cases when postbronchodilator data were not available. When more than one spirometry test result was obtained, the one with the lowest recorded forced expiratory volume in 1 second/forced vital capacity (FEV<sub>1</sub>/FVC) ratio and FEV<sub>1</sub> as percent predicted was included in the analysis. Additional PFT data that were obtained from labs outside of the Geisinger system were not included in the data analysis except to document whether spirometry had been performed, since these studies were not available in digitized form but were simply scanned into the EHR. (The latter were documented by manual chart review.)

Within the EHR database, 17,277 individuals had COPD listed as an active, provider-made diagnosis on their problem list, which is a list of the patient’s active diagnoses. Defining as an *active ambulatory patient* only those who had at least 1 completed office encounter in the Geisinger system within the prior 2 years of the index date, 13,256 individuals were identified as having COPD by the end of the first year of the initiative. Of these, 7016 individuals also had PFT (52.9%) measured in any lab (Geisinger and non-Geisinger combined), representing a 57.9% increase in the proportion that had spirometry performed since the initiative began (baseline total of 4443 individuals). Of the active patients with COPD, 9268 received care from a Geisinger PCP or advanced practitioner (69.9% of the total number of active patients) and 5431 (58.6%) of these active patients have undergone spirometry testing.

## Outcomes

The percentage of patients with PFT (including spirometry) increased from 20.8% in the spring of 2011 to 57.9% in the spring of 2012 (Figure 1).

**Figure 1—COPD clinic patients with PFT tests**



## Population Identification

Patients with COPD are identified through reports from the health plan, from data in the EHR, by review of records from emergency department visits and hospital stays, and by referral from the patient’s primary care office.

Originally, Geisinger’s EHR used ICD-9 taxonomy for the problem list, which could be nonspecific and confusing. In 2009, a multispecialty taskforce was created to review the COPD naming conventions in the EHR and make recommendations for improvement.

The former ICD-9 COPD diagnoses in the EHR are automatically being changed to the new, clearer COPD taxonomy (Table 1). This encourages more consistent use of the correct diagnosis, more accurate clinical reporting, and the ability to drive automation in the EHR based on the proper clinical circumstance.

**Table 1**

Current EHR Display Name	New EHR Display Name
SIMPLE CHR BRONCHITIS	Chronic Bronchitis
MUCOPURUL CHR BRONCHITIS	Chronic Bronchitis w/ productive cough
OBSTRUC CHRONIC BRNCH W/O EXAC	Chronic Bronchitis, Obstructive
OBST CHRNIC BRNCH W/ ACUT EXAC	COPD Exacerbation
OBSTRUC CHRON BRONCHITIS W/ACUTE BRONCHITIS	Acute Bronchitis w/ COPD
CHRONIC BRONCHITIS NEC	Tracheobronchitis, Chronic
CHRONIC BRONCHITIS NOS	COPD with Chronic Bronchitis
EMPHYSEMATOUS BLEB	Emphysematous bleb
EMPHYSEMA NEC	COPD with Emphysema
CHRONIC AIRWAY OBSTRUCTION NEC	COPD, Severity not known
New Custom Code	COPD, Mild
New Custom Code	COPD, Moderate
New Custom Code	COPD, Severe
New Custom Code	COPD, Very Severe
RESPIRATORY FAILURE ACUTE	Respiratory Failure, Acute
OTHER PULMONARY INSUFFICIENCY, NOT ELSEWHERE CLASSIFIED	Pulmonary Insufficiency
ACUTE RESPIRATORY DISTRESS SYNDROME, ADULT	Acute Respiratory Distress Syndrome
CHRONIC RESPIRATORY FAILURE	Respiratory Failure, Chronic
New Custom Code	COPD, Chronic Resp Fail, O2 below 89% at rest
New Custom Code	COPD, Chronic Resp Fail, pCO2 over 44 at rest
RESPIRATORY FAILURE ACUTE & CHRONIC	Respiratory Failure, Acute on Chronic

Internal subcoding of ICD-9 496 was incorporated into the EHR to align the severity of COPD with current GOLD standards (ie, mild, moderate, severe, and very severe as ICD-9 496-B, -C, -D, and -E, respectively); “severity to be determined” (ICD-9 496-A) was used if spirometric data were not available. Other potential COPD-related diagnoses were rendered unapparent when the diagnosis “COPD” was entered to minimize provider use of other synonymous terms. Severity assignment was made by the provider, or by central assignment using spirometric data when available.

Data from 4879 active patients with COPD who had spirometry performed in a Geisinger lab were used for further analysis since they were available in a digitized form rather than as scanned

reports. Of these, 3093 (63.4%) spirometry results supported the diagnosis of COPD using the GOLD criteria (ie,  $FEV_1/FVC < 0.70$ ), whereas 1786 (36.6%) had normal spirometry, or data that supported apparent restrictive physiology.

The 3093 individuals who had obstructive physiology demonstrated by spirometry had the severity of COPD assigned using the GOLD criteria<sup>1</sup>: 1749 (56.5%) had mild or moderate disease severity, whereas 1344 (43.5%) had severe or very severe disease.

Mild:	308 (10.0%)	( $FEV_1 >80\%$ predicted)
Moderate:	1441 (46.5%)	( $FEV_1 >50\%$ to $<80\%$ predicted)
Severe:	1048 (33.9%)	( $FEV_1 >30\%$ to $<50\%$ predicted)
Very Severe:	296 (9.6%)	( $FEV_1 <30\%$ predicted)

## COPD registry

The development of a systemwide COPD registry is one of the main goals for the current program. Key steps in this development include

1. Linking databases, including the Geisinger EHR and all PFT sites, and generating lists of patients with COPD who have and have not undergone PFTs
2. Standardizing PFT lab procedures
3. Educating staff at PFT sites

## The Intervention

### Pursuing best practices

Geisinger’s workgroup for best practices is looking to implement COPD screening for high-risk patients, looking to ensure that patients are receiving appropriate medications, considering better avenues for smoking cessation, evaluating improved technology for daily screening of patients with severe COPD or who have frequent exacerbations to provide better up-front care for COPD exacerbations and prevent hospitalizations, and also working on advanced directives and improved palliative care in patients closer to end of life.

### Program modifications

Geisinger’s nurse care managers are “medical home nurses.” They are registered nurses (RNs) based in the clinics and thus accessible to providers and patients on a continual basis throughout the day. This is different from many insurance plans’ chronic disease case managers, who are not embedded in the clinic and may not always communicate directly with the physician. Each Geisinger primary care clinic has at least 1 RN and may have more depending upon the total number of high risk Medicare and GHP patients. Each nurse care manager serves an average of approximately 80 to 140 patients.

After identification, patients with COPD are assessed to determine if they need active care management—frequent follow-up from a nurse care manager on a daily, weekly, or other determined basis. Patients in care management are educated about COPD. A new online video resource can be provided for patients to view at home to learn more about COPD. Patients are provided a COPD self-management action plan that includes a COPD rescue kit. This rescue kit often includes a course of prednisone and an antibiotic for the patient to take at the first sign of worsening symptoms. The patient is then instructed to contact the care manager for further guidance. Care managers have dedicated phone lines to bypass the busy front office lines and are available 24 hours a day, 7 days a week to respond to the needs of physicians on call. The care manager facilitates access to the primary care or specialty office and can help arrange needed testing or other services.

A critical part of the care manager's role is managing transitions of care. Readmission following a hospitalization is reduced by a phone call to the patient by the care manager within 72 hours after discharge. The care manager makes sure the patient understands the reason for hospitalization, performs a medication reconciliation, helps facilitate upcoming appointments, reviews warning signs, and provides the patient with a contact number to call if these warning signs develop. All patients discharged from the hospital are also expected to make a primary care office appointment within 7 days for assessment, review of medications, and confirmation of treatment plan. Geisinger measures the percentage of patients who are called by the nurse care manager within 72 hours of hospital discharge and the number of patients seen within 7 days, and its staff and providers are incentivized to adhere to these standards.

### **Staff education**

Emphasizing the importance of spirometry assessment in the care of patients with COPD has been a systemwide educational effort. The use of spirometry across Geisinger Health System has increased by 25% in the past year, driven mainly by greater adoption by the PCPs.

Systemwide training on the clinical use and performance of spirometry was accomplished by the combination of on-site technical training and in-person and online CME education courses. PFT interpretation with alignment to current GOLD standards for the grading of COPD severity was facilitated by centralizing the interpretation process in the Thoracic Medicine Department, and by training and credentialing a small group of participating PCPs.

Continued efforts centered on spirometry include obtaining equipment for each primary care office, training of staff in the proper testing technique, incorporation of test results into the patient's EHR, and alerts to prompt staff to obtain spirometry results.

### **Encouraging smoking cessation**

To promote smoking cessation, Geisinger provides a smoking cessation booklet and has nurse case managers (different from medical home nurses) who help with smoking cessation education for Medicare and Geisinger Health Plan patients, as well as education for other chronic conditions.

### **Workflow and staffing changes**

Consistent, reliable, high-quality care requires workflow redesign to incorporate the needed aspects of care into a team-based practice. An EHR can help to "hardwire" these changes in place but is not sufficient to achieve improved outcomes without process redesign. Steps that are not necessary are eliminated from the redesign and work that can be automated is embedded in the EHR. Care is delegated to appropriate healthcare team members, taking maximum advantage of their education, training, and professional licensure. Patients are educated and activated to be participants in their treatment plans.

Geisinger focused on 3 steps in team-based practice redesign

1. If care can be provided outside the office setting, the workflow should be designed and resources identified to make this happen.
2. If care needs to be provided in an office encounter, it should be delivered by a nonprovider if that person's education and training are appropriate. This approach takes advantage of the medical assistants and nurses who are vital members of Geisinger's medical home team.
3. If care needs to be performed by a provider, it should be optimized with tools in the EHR to make it as efficient and reliable as possible.

Practice redesign has improved care for patients with COPD in all 3 areas. One success story for care provided outside the office is the influenza and pneumococcal immunization campaign.

Each August, the organization sends a letter to each patient with COPD informing him or her that the primary care office staff is “reserving” a flu shot for them. Patients are asked to call and schedule their influenza vaccine, and if they do not, the call center contacts them to get it scheduled. Patients who have access to their electronic records through the patient portal get the message electronically and can schedule their influenza vaccine online. An alert in the EHR prompts the nurse to give the vaccine if a specific patient is in need. This alert appears at all encounters for that patient to take advantage of the opportunity to provide the needed vaccine whenever the patient is in the office.

Another process redesign that takes advantage of the call center is the Chronic Disease Return Program. Patients with COPD who have not been seen in more than 6 months are overdue for a primary care appointment. These patients are sent a letter asking them to schedule and are contacted by phone if necessary. Patients who still do not schedule are brought to the attention of the primary care office, which can continue attempts to bring the patient in for care.

In the office setting, delegating care to other team members whenever possible allows the physician to spend more time on complex medical decision making and goal setting with patients. An example of this redesign is having the nurse (or medical assistant) take the smoking history and offer brief smoking cessation advice at each encounter. The “nurse rooming tool” is used by every nurse at every visit at every primary care office in the system. The standardized workflow includes a prompt to review the smoking history with the patient and document it easily along with the vital signs. For patients who smoke, the nurse is prompted at each visit to give basic advice on quitting and to refer the patient to additional smoking cessation resources.

## **Leadership Involvement and Support**

Developing a PCMH model requires a commitment of organizational leaders to support primary care practices through an extensive change process. Systems of care for chronic disease require a team-based reorganization that is not included in the training of many physicians. Quality measurement is often not accepted by physicians and staff as accurate or actionable. Achieving the open access necessary for success involves extensive reorganization of scheduling templates and procedures.

Incorporating the nurse care manager into the primary care practice is critical to success, but is difficult with the fiscal restraints on many primary care practices. A change in the reimbursement mechanism to pay for this increased primary care infrastructure requires working with health plans, government agencies, or grant-funding sources for funding.

### **Program champions**

Director Thoracic Medicine

Associate Director

Pulmonary Critical

Department Director of Community Practice, Schuylkill County

Associate Chief Quality Officer

Chief Innovation Officer

Intermediate Innovation Analyst

Director of Operations

Director of Ambulatory Redesign

E-Health Lead System Analysis

## Lessons Learned

### Challenges

- It is challenging to define COPD using standard EHR taxonomies
- It is difficult to develop a smoking cessation program due to lack of funding and patient motivation to stop smoking

### Lessons

A systemwide initiative to identify individuals with COPD, to confirm the diagnosis, and stratify its severity using spirometry has had initial success using the following strategies: increased access and a systematic approach to enhance the reliability of the performance and interpretation of spirometry; alignment of COPD severity within the EHR using accepted criteria (GOLD); and a team approach to implementation of the initiative that included representation of primary and subspecialty pulmonary care, personnel representing Information Technology and Innovation departments, and participation of Geisinger's health insurance plan. Even when spirometric data were obtained, the provider-based diagnosis of COPD was often incorrect using GOLD criteria, underscoring the need to stress properly interpreted PFT data as a criterion for inclusion in a registry of COPD patients. It also indicates that pulmonary function testing beyond spirometry may be needed to support or refute the clinical impression of COPD.

## **Reference:**

1. Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease; revised 2011. <http://www.goldcopd.org/>. Accessed June 19, 2012.



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