

# How to Improve Patient Outcomes for Chronic Diseases and Comorbidities

By Ann Tinker

Previously healthcare professionals were focused almost exclusively on treating acute episodes, such as helping an a diabetic in insulin shock. Today there is much greater focus on working with patients to manage their chronic conditions and prevent problems from occurring in the first place.

One of the biggest changes to affect the healthcare industry in the last few years is the movement toward [population health management](#). Previously healthcare professionals were focused almost exclusively on treating acute episodes, such as helping an asthma patient who comes to the hospital emergency department in respiratory distress or a diabetic in insulin shock. Today there is much greater focus on working with patients to manage their chronic conditions and prevent problems from occurring in the first place.

The new focus on preventative medicine is an improvement in care and significantly benefits patients with chronic conditions. We've all seen the statistics:

- Forty-five percent of Americans ([133 million](#)) have at least one chronic condition.<sup>[1]</sup>
- Chronic diseases are responsible for seven out of 10 deaths in the U.S., killing more than 1.7 million Americans each year.
- [More than 75 percent](#) of the \$2 trillion spent on public and private healthcare in 2005 went toward chronic diseases.<sup>[2]</sup>

Yet what makes treating chronic conditions (and efforts to manage population health) so challenging is that chronic conditions often don't exist in isolation. In fact, [one in four adults](#) in the U.S. today have two or more chronic conditions,<sup>[3]</sup> while more than half of older adults [have three or more](#) chronic conditions.<sup>[4]</sup> And the likelihood of these types of comorbidities occurring [goes up as we age](#).<sup>[5]</sup> Given the current state of America's population, where [10,000 Americans will turn 65](#) each day from now through the end of 2029,<sup>[6]</sup> it is reasonable to expect the overall number of patients with comorbidities will increase greatly.

## When Comorbidities Collide

Managing comorbidities is challenging. Even though one condition may contribute or be connected to another, the treatments may conflict. Take obesity, for example. In the U.S., obesity is often characterized as an epidemic. Research from the Centers for Disease Control and Prevention (CDC) shows: [more than one-third of adult Americans](#) (35.7 percent) are obese.<sup>[7]</sup>

Our bodies are amazingly complex organisms with many interdependent systems. If you change one area, such as using surgery to treat obesity, it may result in an unexpected change elsewhere, such as creating an electrolyte imbalance.

Treatment for morbid obesity often leads to extreme measures, such as gastric bypass surgery. Yet obesity is often a contributor to many other chronic conditions, such as hypertension, high blood pressure, and diabetes. If the physician treating the obesity finds one of the other comorbid conditions, he or she might recommend a different course of action.

Then there's the domino effect from altering the human body. Our bodies are amazingly complex organisms with many interdependent systems. If you change one area, such as using surgery to treat obesity, it may result in an unexpected change elsewhere, such as creating an electrolyte imbalance. Because of the comorbid conditions, what appeared to be the proper treatment for one condition may have generated new health problems.

This example demonstrates the challenges we face, especially when treating older patients. Comorbidities can impact treatment choices, medication regimes, and even lifestyle changes the patient needs to make to return to a healthy state.

Let's look at that morbidly obese person again. All the additional weight puts a tremendous amount of pressure on his or her joints, which may increase their risk for fractures, or they may need a complete knee or hip replacement. If, for example, the patient gets a knee replacement, they may have a slower healing process due to the comorbid condition. They will be taking medications to help with recovery, which could conflict with the medications used to treat other conditions. The recovery process itself could have an effect on other conditions, such as a patient who also has high blood pressure isn't able to get the amount of exercise required to help manage that condition.

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## Need for Coordination

What it all points to, especially when working with older adults, is a greater need for care coordination to achieve a clarity of care that isn't present when looking solely at one chronic condition.

Take a patient with diabetes, hypertension, and is extremely overweight. He or she will likely have a primary care physician who may refer them to an endocrinologist to deal with the diabetes, an orthopedist to help with joint pain, and a gastroenterologist to help with the GI absorption after the weight-control surgery. All of these highly specialized professionals are looking at the primary condition the patient is coming to them for, but each treatment needs to be balanced with the other treatments and health concerns.

All of these comorbidities add layers of complexity. What might have been a simple, clear-cut treatment plan now needs more coordination, more integration, and the ability to track additional levels of patient complications. These complications can include potential interactions from adding new drugs to a treatment regimen. The impact can often be severe — and even life-threatening.

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At the population level, an EDW can help you understand the population you're targeting in order to improve the quality of care being delivered. It can help you stratify not just individual conditions but also the prevalence of how often they appear together.

## Chronic Conditions Getting Worse

These issues are going to continue growing in importance over the next few years; in many cases the trends show an overall increase in chronic diseases. Currently, the top [10 health problems in America](#) are:<sup>[8]</sup>

- Heart disease
- Cancer
- Stroke
- Respiratory disease
- Injuries
- Diabetes
- Alzheimer's disease
- Influenza and pneumonia
- Kidney disease
- Septicemia

Notice anything about the list? Many of these conditions are chronic illnesses and can be prevented or controlled. In addition, many are — or can be — interrelated. For example, two of the recommendations to reduce the chance of heart disease, certain types of cancer (such as colon), stroke, diabetes, and kidney disease are to eat a healthy diet and get more exercise.

This same interrelationship, however, also means: more effort needs to be made to understand how to deal with comorbidities rather than treating each chronic disease in isolation. But treating all conditions simultaneously requires a way of coordinating and analyzing data from multiple sources.

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## Seeing the Big Picture

An [enterprise data warehouse](#) (EDW) can help overcome the current limitations. Rather than relying on one set of information, such as electronic health records (EHR) or claims data, an EDW can aggregate data from multiple systems to provide a larger view of populations as well as individual patients.

This [story from Texas Children's Hospital](#) provides a good example of what an EDW can do at the patient level. It describes how a five-year-old patient had three visits in six months to the emergency department at Texas Children's Hospital for uncontrolled asthma. At first, the clinical team cast a critical eye on her mother for not following the plan she'd been given for controlling it.

Upon further investigation, however, it was discovered her mother was confused because she had six different treatment plans from six different physicians. That incident, and others like it, drove Texas Children's Hospital to institute an EDW that created one view of all the recommended treatments and medications, making it easier to coordinate the providers and get them on the same page. Now imagine how much more complex and confusing it might've been for her mother if her daughter had diabetes and/or another condition on top of her asthma.

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At the [population level](#), an EDW can help you understand the population you're targeting in order to improve the quality of care being delivered. It can help you stratify not just individual conditions but also the prevalence of how often they appear together. As a result, the clinical team is not limited to developing evidence-based best practices for treating patients with diabetes, but they can also develop best practices for those who also have hypertension or coronary artery disease.

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## Delivering Quality Improvement in Comorbidities

In looking at a particular disease as part of a quality improvement project, there are three key areas of focus: the disease itself; the workflow to determine how to create efficiencies and improvements in how the care is delivered; and patient safety as well as adverse areas. Patient safety is one of the most important areas where an EDW can affect issues around comorbidities.

For example, one complication hospitals try to avoid during a prolonged stay is skin breakdowns. If a patient comes to the hospital with good skin integrity, the hospital is expected to preserve it — and can be penalized by the Centers for Medicare and Medicaid Services (CMS) if they don't. To help with this issue, the hospital needs to know which patients are most at-risk for skin breakdowns so they can take steps to avoid it.

In looking at the data for populations that developed this condition, patterns begin to emerge. Patients who have had a stroke, no matter the cause, may be unable to reposition or turn themselves. If the care team isn't made aware of this condition, they may not realize the need to turn the patient periodically — or use a bed that shifts the patient's position.

Even if the stroke wasn't severe, very heavy or very thin patients may not move much during their hospital stay. A heavy patient may find it easier to remain stationary than expend the effort to turn. A very thin patient with little padding between the skin and bones may be reluctant to turn to different positions as well. You have to look beyond the core condition to see what other factors may play into it.

There are all sorts of correlations like these between seemingly unrelated conditions that can have a profound effect on the quality of care. By integrating data from a variety of sources, an enterprise data warehouse can help you uncover the relationships to provide a more robust picture of the individual — and various populations.

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## Keeping the Dominoes Standing

Unaccounted-for comorbidities can create a domino effect that can quickly make a bad situation worse. The key is to become aware of the potential relationships between conditions and their effects before treatment is prescribed and administered so you can make better decisions.

An EDW provides you with the ability to look across all the data for comorbid populations, helping you establish best practices that will yield the best outcomes while creating the fewest downstream issues.



## About the Author

Ann Tinker joined Health Catalyst in June of 2012 as Vice President for Customer Engagements. Prior to coming to Catalyst, she worked for GE Healthcare IT on the GE/Intermountain Healthcare partnership product called Qualibria as Product Manager and Customer Liaison. Ann worked PRN (on-call) for LDS Hospital in the Post Anesthesia Care Unit (PACU) as a staff RN for the past 6+ years. Before GE, Ann was employed at 3M HIS business based in Salt Lake City working in a variety of positions from sales support, implementation, development, marketing, and product management for both U.S. and international products and prior to then worked for Intermountain Healthcare for 10+ years in Critical Care and Nursing Administration. Ann has a bachelor's degree in nursing from Brigham Young University and a master's from the University of Washington.

## Resources

- 1 <http://www.cdc.gov/chronicdisease/overview/index.htm>
- 2 <http://www.fightchronicdisease.org/sites/fightchronicdisease.org/files/docs/>
- 3 [http://www.cdc.gov/pcd/issues/2013/12\\_0203.htm](http://www.cdc.gov/pcd/issues/2013/12_0203.htm)
- 4 <http://www.uptodate.com/contents/managing-multiple-comorbidities>
- 5 <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2536650/>
- 6 <http://www.pewresearch.org/daily-number/baby-boomers-retire/>
- 7 <http://www.cdc.gov/obesity/data/adult.html>
- 8 <http://www.livestrong.com/article/36536-top-health-problems-america/>

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