

Proportion of patients with a chronic condition that have a potentially avoidable complication during a calendar year.

Background:

As part of the development of the Prometheus Payment model, we have developed and published in several peer-reviewed papers¹⁻⁴ the impact of potentially avoidable complications (PACs) on total cost of care. Potentially avoidable complications for patients with one or more chronic illness include events such as emergency department visits and hospitalizations. They are indicators of health system failure that cause gaps in quality of care. PACs can be categorized into three types:

- PACs related to the index condition. This would include any ED visit or hospitalization for a patient with a chronic illness (e.g. diabetes) that is due to a gap in care. An example would be a hospitalization for keto-acidosis in a diabetic patient.
- PACs related to comorbidities. This would include any ED visit or hospitalization for the co-morbid conditions of a patient with a chronic condition. For example, an ED visit for an asthma attack in a diabetic patient that also has mild asthma would be considered a potentially avoidable complication.
- PACs related to patient safety failures. These include any service related to patient safety issues such as adverse drug events, drug interactions, many kinds of avoidable infections etc. that would occur in a patient with chronic illness.

Taken as a whole, PACs occur at a very high frequency in commercially insured populations. The table below illustrates the results of a claims-based analysis on over 3 million plan members under the age of 65.

CONDITIONS	# of Patients	# of Patients with PACs	% of Patients w PACs
Diabetes	172,103	135,373	78.66%
CHF	14,818	13,275	89.59%
CAD	61,205	46,212	75.50%
HTN	250,484	169,573	67.70%
COPD	78,991	55,496	70.26%
Asthma	71,224	49,083	68.91%
Chronic Care Summary	648,825	469,012	72.29%

Measure Purpose and Accountability:

¹ François de Brantes, M.S., M.B.A., Amita Rastogi, M.D., M.H.A., and Michael Painter, J.D., M.D. Reducing Potentially Avoidable Complications in Patients with Chronic Diseases: The Prometheus Payment Approach. Health Services Research Journal, published online July 20 2010 DOI 10.1111/j. 1475-6773.2010.01136.x.

²de Brantes, D'Andrea, Rosenthal: Should health care come with a warranty? Health Aff (Millwood). 2009 Jul-Aug; 28(4):w678-87. Epub 2009 Jun 16;

³Rastogi, Mohr, et al: Prometheus payment model: application to hip and knee replacement surgery. Clin Orthop Relat Res. 2009 Oct; 467(10):2587-97. Epub 2009 Jun 23;

⁴de Brantes, Rosenthal, Painter: Building a bridge from fragmentation to accountability--the Prometheus Payment model. N Engl J Med. 2009 Sep 10; 361(11):1033-6. Epub 2009 Aug 19.

The purpose of this measure is to account for the quantity of events that occur in patients with chronic conditions and that could potentially be avoided through better care coordination and disease management. There are many delivery system reform initiatives under way in the country to improve ambulatory care quality, including patient-centered medical homes and accountable care organizations. Measuring PACs before, during and after these interventions would enable payers, providers and patients to better gauge the impact and success of the efforts.

Further, given the incidence of PACs, creating accountability around this measure would lead to a more systematic delivery system reform than what could be achieved by looking at more discrete measures. PAC rates for medical groups, health systems and health plans could help consumers differentiate the performance of these organizations.

Potential Impact:

In dollar terms, PACs for chronic conditions consume 30 cents out of every dollar spent in care for that condition. In addition, there is considerable variation in PAC rates between states and within states. Some delivery systems have been able to achieve very low rates compared to others, indicating that there is significant potential to reduce PAC rates overall and generate significant savings for the nation in addition to better care for patients.

Severity-Adjusted PAC rates:

We have created a severity-adjustment model using resource use as a surrogate measure for the degree of patient comorbidities and severity. Each patient in the user’s database is scored for the presence of risk factors using the predicted log coefficients from the reference model (that are used as weights) to generate a patient-level severity score and, subsequently, the population-level average severity score. The average severity score is compared to the reference database severity score to calculate a severity index, and this in turn helps severity-adjust the PAC rates. The table below illustrates how severity-adjusted PAC rates could be used to compare the performance of three hypothetical medical groups with different number of patients with diabetes, different average patient-severity scores, but the same PAC rates:

Diabetes Condition	Medical Group 1	Medical Group 2	Medical Group 3
Number of Patients	100	50	500
Average Severity Score	9.1946	11.5845	15.6823
Reference Severity Score	9.9392	9.9392	9.9392
Severity Index	0.9251	1.1655	1.5778
Non-adjusted PAC rates	80%	80%	80%
Severity Adjusted PAC rates	86%	69%	51%

While there are other measures of avoidable complications and hospitalizations, there is no other endorsed measure that takes such a comprehensive look at the

overall gaps in quality at the patient level and centered around the patient. For more information on the Prometheus model and PACs, go to <http://www.hci3.org>.