

Diabetes disease progression among a Medicare Advantage population: A retrospective analysis

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Background

Diabetes is a progressive disease that is increasing in both prevalence and cost. Worldwide, it is estimated that 470 million people will have diabetes by 2030;¹ in the US, Medicare spending is projected to account for 50% of direct diabetes health care costs in 2034.² When poorly managed, diabetes can lead to a wide range of complications, such as cardiovascular disease — inclusive of heart disease and stroke, visual impairment, lower extremity conditions — including peripheral arterial disease, ulcer/inflammation/infection, acute hyperglycemic episodes, renal disease, and neuropathy. According to the Centers for Disease Control and Prevention, approximately half of people aged 65 years or older with diabetes have a cardiovascular disease complication.³ Visual impairment is less common — affecting 1 in 5 elderly persons — and has been on a steady decline since 2004. Lower extremity conditions collectively affect 15.6 / 1,000 older persons with diabetes, and can ultimately result in amputation.³ Acute hyperglycemic crises are serious events which can lead to death, and diabetes is the leading cause of end stage renal disease, accounting for 44% of new cases in 2007. Accordingly, diabetes-related complications have been shown to negatively impact quality of life.⁴ Progression from pre-diabetes to diabetes is reported to occur at an annual rate of 5-10%, but the rate of progression from uncomplicated diabetes to diabetes with complications is unknown.¹

Objective

To quantify progression of diabetes from uncomplicated diabetes to diabetes with complications and describe the frequency of health care resource utilization.

Methods

Study Design: Retrospective, observational, descriptive study

Data Source: This study was conducted using administrative claims data from Humana Inc., a health care company insuring over 2.8 million Medicare Advantage members, 1.2 million group fully-insured members, 1.1 million individual fully-insured members, and 3.9 million Medicare Part D members (2nd quarter 2014).

Inclusion and Exclusion Criteria:

- This study was limited to people with Medicare Advantage health insurance through an individual plan. Capitated members were excluded. Members had to be continuously enrolled from January 2010 through December 2012.
- Individuals with either (A) 1 inpatient admission, 1 emergency department visit, or 2 physician visits with a diagnosis of diabetes , or (B) 1 pharmacy claim for a diabetes medication, between January 1 2008 and December 31 of 2010 were eligible for inclusion. ICD-9 codes 249.xx, 250.xx, 357.2, 362.xx, and 648.xx were used to identify diabetes.
- The baseline study cohort was restricted to patients with uncomplicated diabetes based on the Centers for Medicaid and Medicare Services Hierarchical Condition Categories (HCC). HCC 19 indicates uncomplicated diabetes.

Outcomes:

- The study cohort was followed for three consecutive years. All outcomes were reported for the period of January through December in each year of 2010 (baseline), 2011, and 2012.
- The primary endpoint was the development of a diabetes-related complication identified by ICD-9 codes. Complications were identified using HCC 15-18 for renal, neurologic, peripheral circulatory, acute, and ophthalmologic complications.
- Secondary endpoints included the mean annual number of inpatient admissions per 1000 persons, the mean annual number of emergency department visits per 1000 persons, per member per month (PMPM) medical costs (plan + patient paid), mean diabetes complications severity index (DCSI) score, and percent of people participating in Humana clinical programs .
- Secondary endpoints were reported for the cohort overall and stratified by complicated and uncomplicated diabetes.

Statistical analyses:

- Descriptive statistics were used in reporting outcomes.

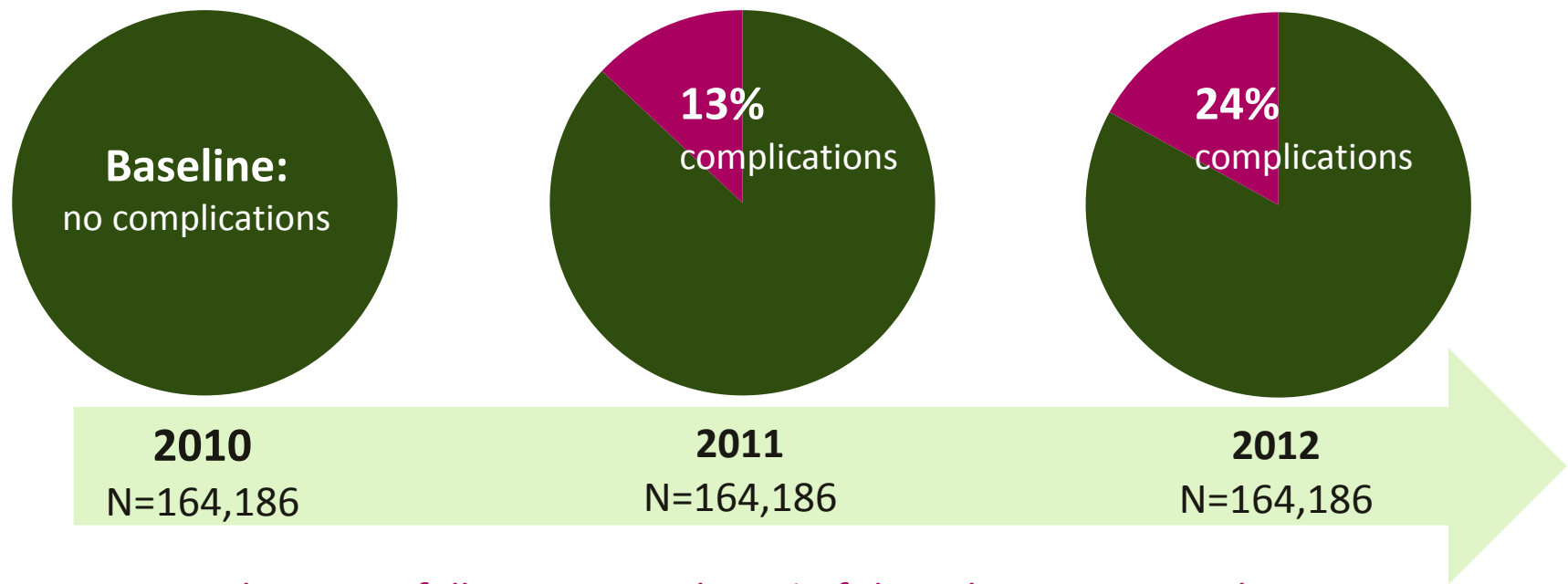
Humana

Results

Table 1. Demographics

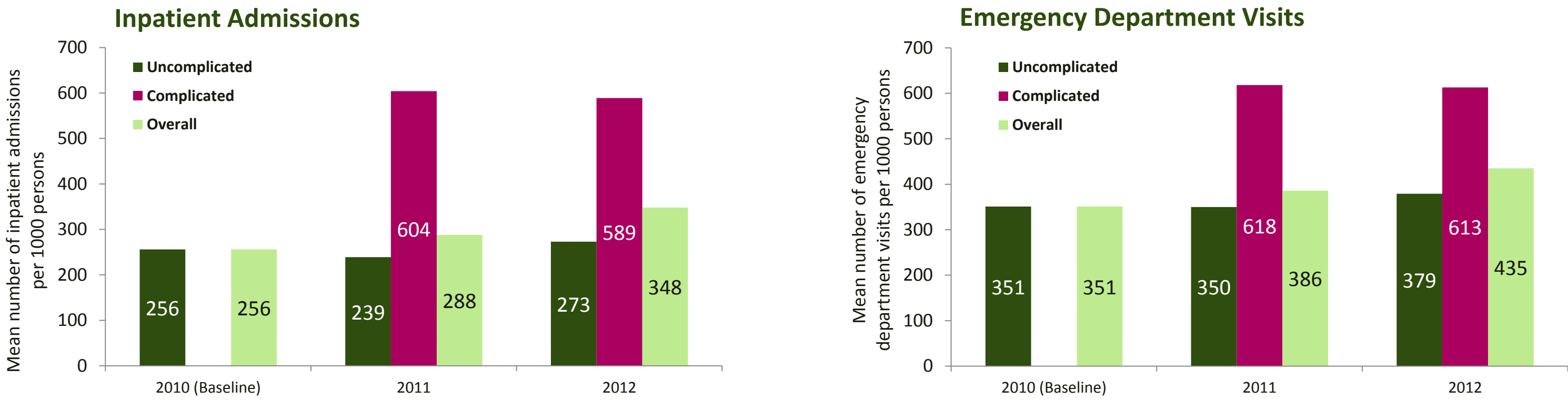
Characteristic	2012
N	164,186
Age	
Mean	71.8 years
Gender, n (%)	
Male	78,619 (47.9%)
Female	85,567 (52.1%)

Figure 1. Progression to Diabetes with Complications



During the 2 year follow-up period, 24% of the cohort progressed to diabetes with complications.

Figure 2. Mean Annual Health Care Resource Utilization per 1,000 Person by Complication Status



There was a trend towards increased inpatient admissions (36% increase) and emergency room visits (24% increase).

Table 2. Secondary Endpoints by Year and Complication Status

Year	PMPM Medical Costs (plan + patient paid)	Mean DCSI Score	Humana Clinical Program Participation
2010 (Baseline)	\$590	1.07	6%
2011	\$654 complicated \$1,176 uncomplicated \$574	1.59 complicated 3.03 uncomplicated 1.36	15% complicated 22% uncomplicated 14%
2012	\$759 complicated \$1,178 uncomplicated \$627	1.78 complicated 2.90 uncomplicated 1.43	19% complicated 28% uncomplicated 16%

In this descriptive analysis, PMPM medical costs and DCSI scores doubled in the group with complications vs. the group that did not develop complications (2011 and 2012).

Conclusions

- In this Medicare Advantage population, 24% of the cohort population progressed to diabetes with complications over 2 years of follow-up.
- There was an increasing trend in the number of inpatient and emergency room visits, which corresponded to the development of diabetes-related complications in the study cohort.
- Costs, disease severity and clinical program participation increased over time and was most pronounced in the sub-set of the population with diabetes-related complications.

Implications

- MA plans are increasingly challenged to manage population health. A deeper understanding of disease progression will lead to more sophisticated population health management strategies and improved health outcomes.
- Interventions which slow the progression of diabetes could significantly improve the health and well-being of people with diabetes, and may lower cost and utilization overall for the healthcare system.

Limitations

- This study only reported trends over time and did not report association or causation.
- This study relied on claims data. Complications which were not coded were not captured and may represent an underestimation of the true incidence.
- Reported plan plus patient paid PMPM costs did not include pharmacy costs.
- The cohort included individuals insured through Medicare Advantage by a single health plan and may not be generalizable to younger individuals or the general population.

References

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