Medicare Savings Resulting from Reductions in Prevalence of Respiratory Tract Infections among the Elderly

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Background

- Respiratory tract infections (RTIs, including upper RTI, lower RTI, and community-acquired pneumonia) pose substantial morbidity and mortality risks among people aged ≥65 years; particularly those with asthma and those aged ≥85 years¹
- Little is known about the economic burden of RTIs among these patients

Objective

- Estimate the prevalence of RTIs, describe the excess economic burden of RTIs (from Medicare perspective), and estimate the corresponding value of a reduction in RTI prevalence among Medicare enrollees:
- 1) Aged 65–84 years with asthma, and
- 2) Aged ≥85 years
- For this purpose, RTI patients and non-RTI patients (controls) were identified using a 5% random sample of Medicare beneficiaries (Standard Analytical Files)

Methods

Prevalence Estimation

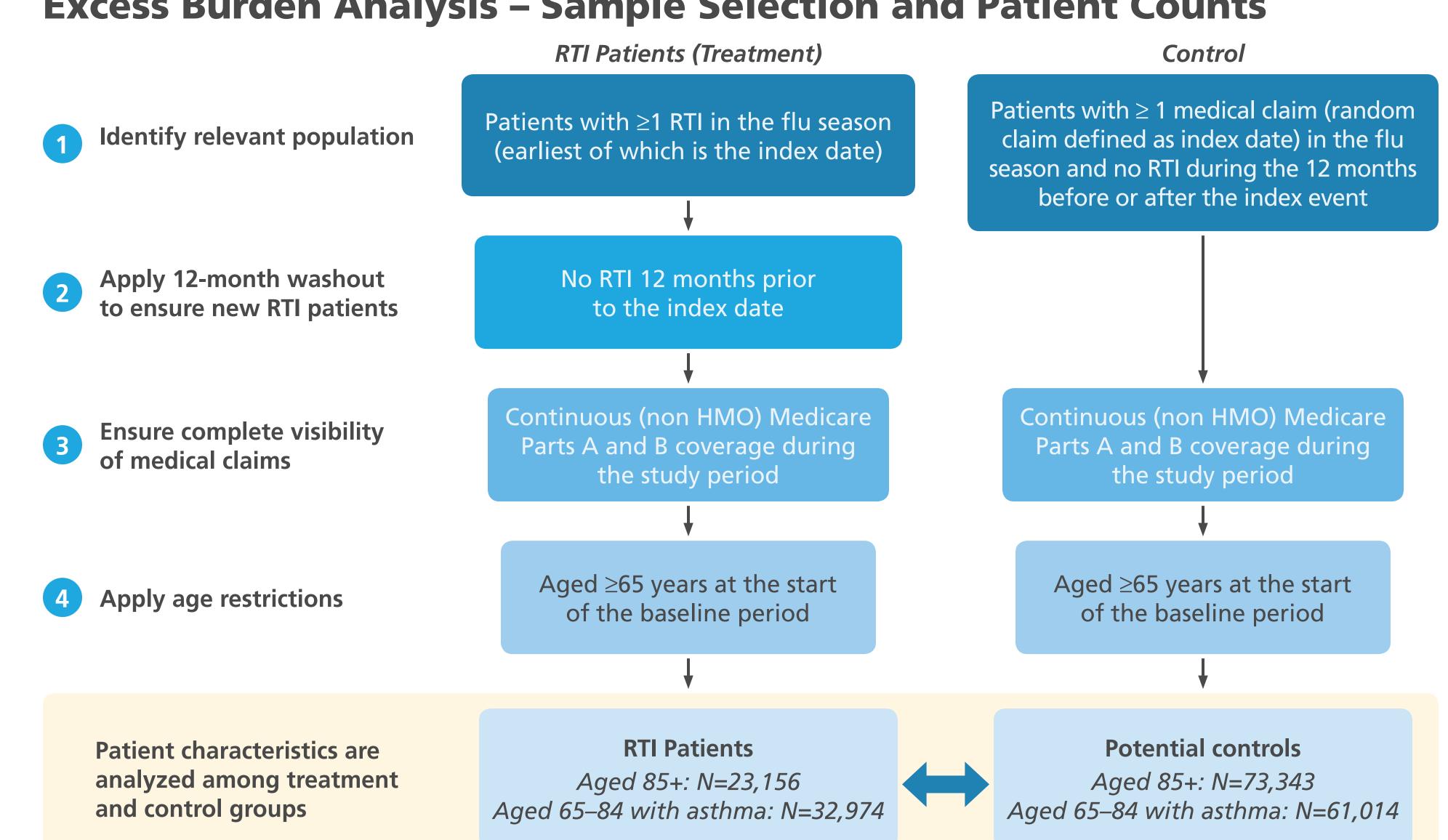
Cohort Definitions (during 2014–2015 flu season, as defined by the CDC²):

- Aged ≥85 years: Patients aged 85 and older on October 1, 2014
- Aged 65–84 years with asthma: Patients aged 65–84 on October 1, 2014, with ≥1 prior diagnoses for asthma in claims history

Prevalence Estimation:

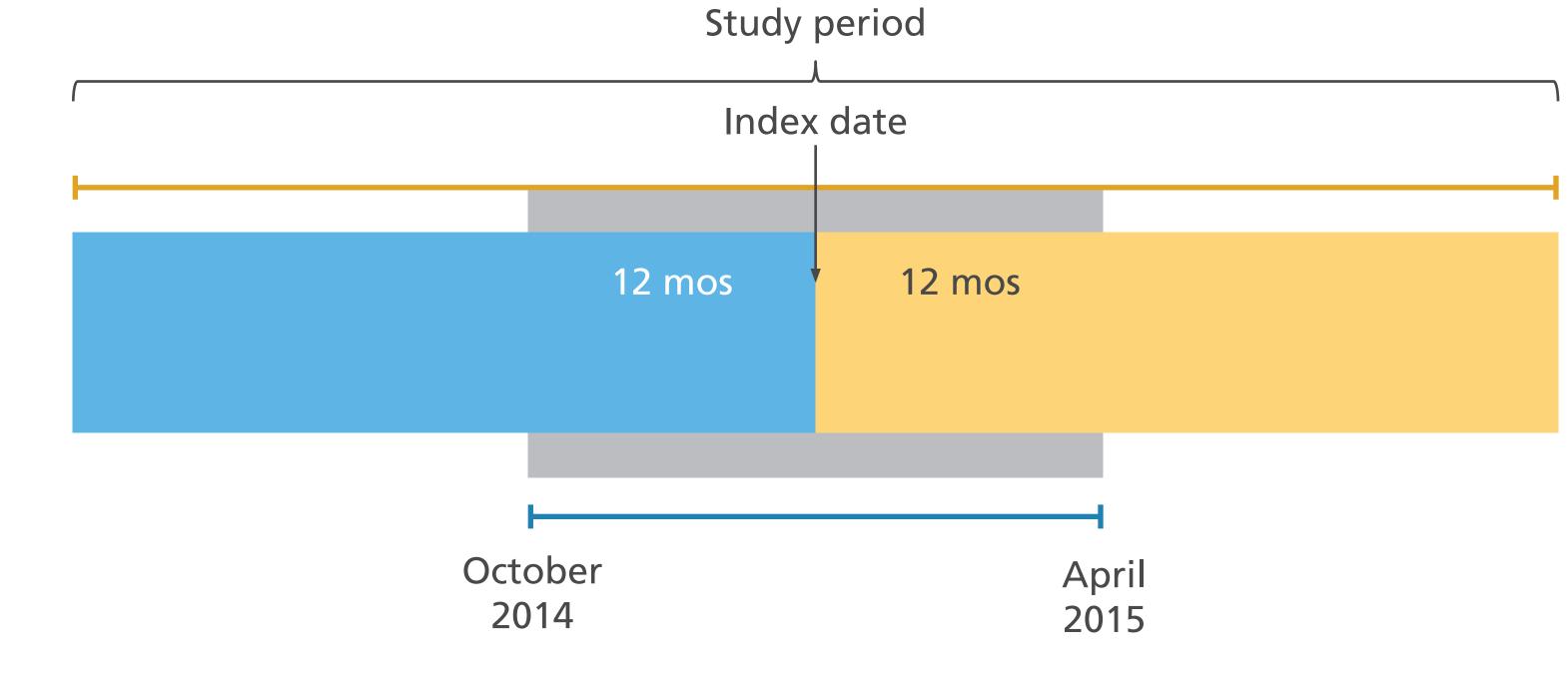
- Proportion of enrollees in each cohort with:
- ≥1 month of Medicare eligibility in October, 2014–April, 2015, and
- ≥1 RTI diagnosis during this time period
- The prevalence of RTIs in the 2014–2015 flu season was estimated as:
- 23.4% among those aged ≥85, and
- 32.6% among patients aged 65–84 years with asthma

Excess Burden Analysis – Sample Selection and Patient Counts



Methods (continued)

Excess Burden Analysis – Periods of Analysis



Diagnosis period

Patients with an RTI diagnosis during the 2014–2015 flu season were identified, with the date of each patient's first RTI diagnosis in this timeframe defined as the index date. The index date for the control group was randomly assigned to ensure similar timing distribution

Baseline period

Patient characteristics in the 12 months prior to the index date were assessed to create RTI and control groups with comparable characteristics

Follow-up period

Resource use and costs of RTI and control groups were compared for 12 months post-index

Excess Burden Analysis – Propensity Score Matching and Outcomes

Propensity score matching:

- To provide an unbiased estimation of the excess costs due to RTI, RTI patients in each target population were matched to patients in the non-RTI control target population using a "greedy" matching method based on a propensity score³ (within ¼ std. dev.) estimated with the following variables:
- Demographics (age, gender, year of index date, geographic region, race)
- Charlson Comorbidity Index⁴ (CCI)
- Baseline healthcare resource use (HRU), any use as well as number of days/visits
- Baseline healthcare costs

- All-cause HRU and total medical costs during the 12 months post-index were estimated for RTI and matched control patients
- Excess medical costs due to RTI, in conjunction with 2014–2015 RTI prevalence estimates, were used to estimate the value of reduction in RTI prevalence (i.e., cost offsets from a Medicare perspective) for a single flu-season year
- Several hypothetical reductions in RTI prevalence were considered, ranging from 25%–65%

Results

Post-Match Baseline Characteristics

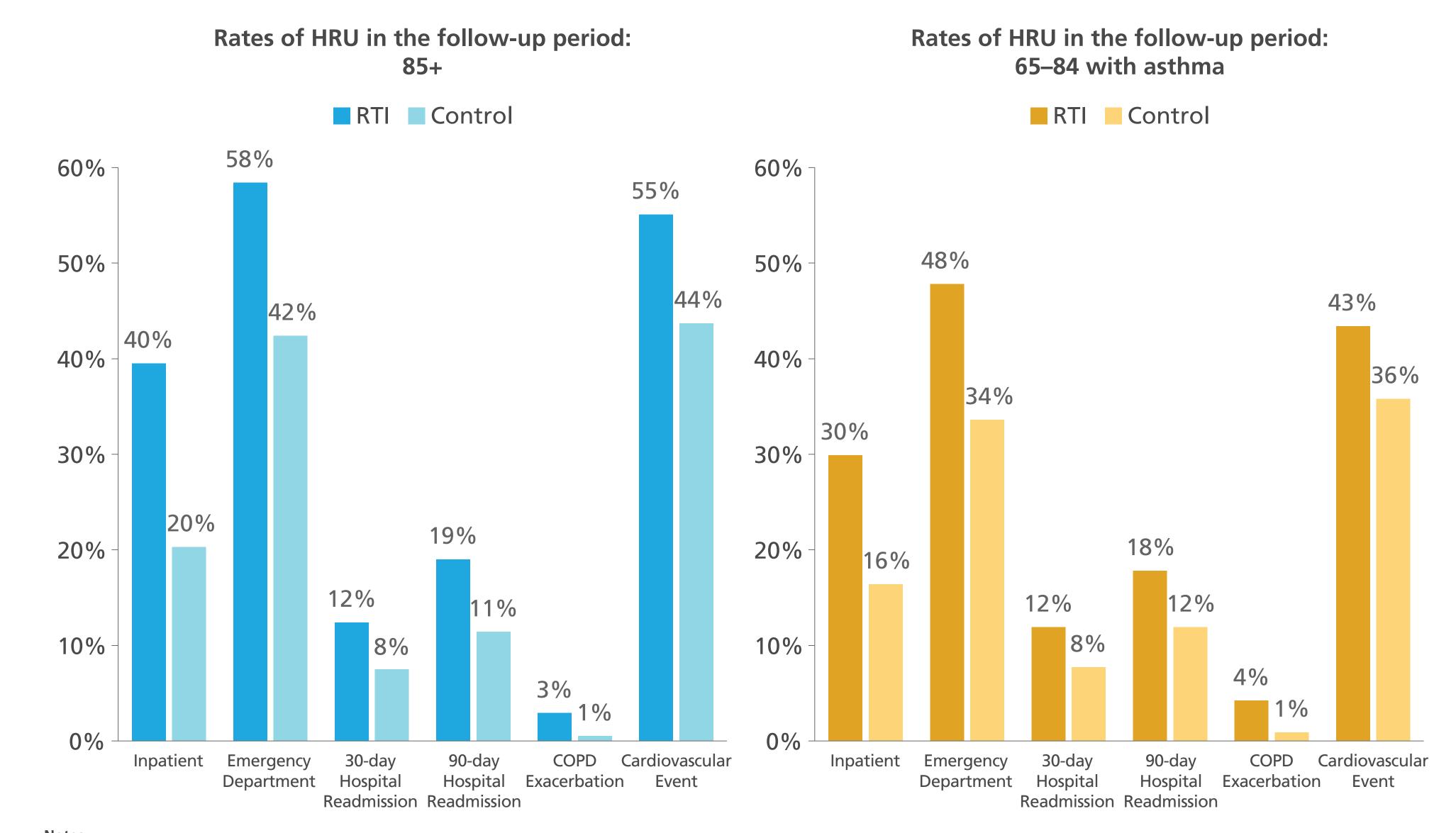
After matching, baseline characteristics of RTI patients and control patients were aligned Select baseline characteristics among post-match RTI and control patients

Select Baseline Characteristics	85+		65–84 with asthma	
	RTI n=23,096	Non-RTI controls n=23,096	RTI n=32,133	Non-RTI controls n=32,133
Demographics				
Age, mean	88.9	88.7*	74.4	74.7*
Male, %	33.2%	33.3%	35.5%	35.7%
White, %	90.5%	90.6%	87.7%	87.7%
CCI, mean	2.3	2.3	2.1	2.2
HRU, any				
Inpatient, %	27.3%	27.3%	21.2%	21.1%
ED, %	48.9%	49.5%	38.4%	38.4%
Outpatient, %	99.5%	99.6%*	99.6%	99.6%
HRU, number of				
Inpatient days, mean	2.3	2.3	1.9	1.8
ED visits, mean	1.2	1.2	0.9	0.9*
Outpatient visits, mean	25.3	25.1*	25.7	25.7*
All-cause healthcare costs, mean	\$13,866	\$13,567*	\$12,437	\$12,347*

Note: "HRU, number of" was calculated conditionally among those with a claim for each place of service in the baseline period

Post-Match Outcomes - HRU

RTI was associated with higher rates of HRU during follow-up in both cohorts



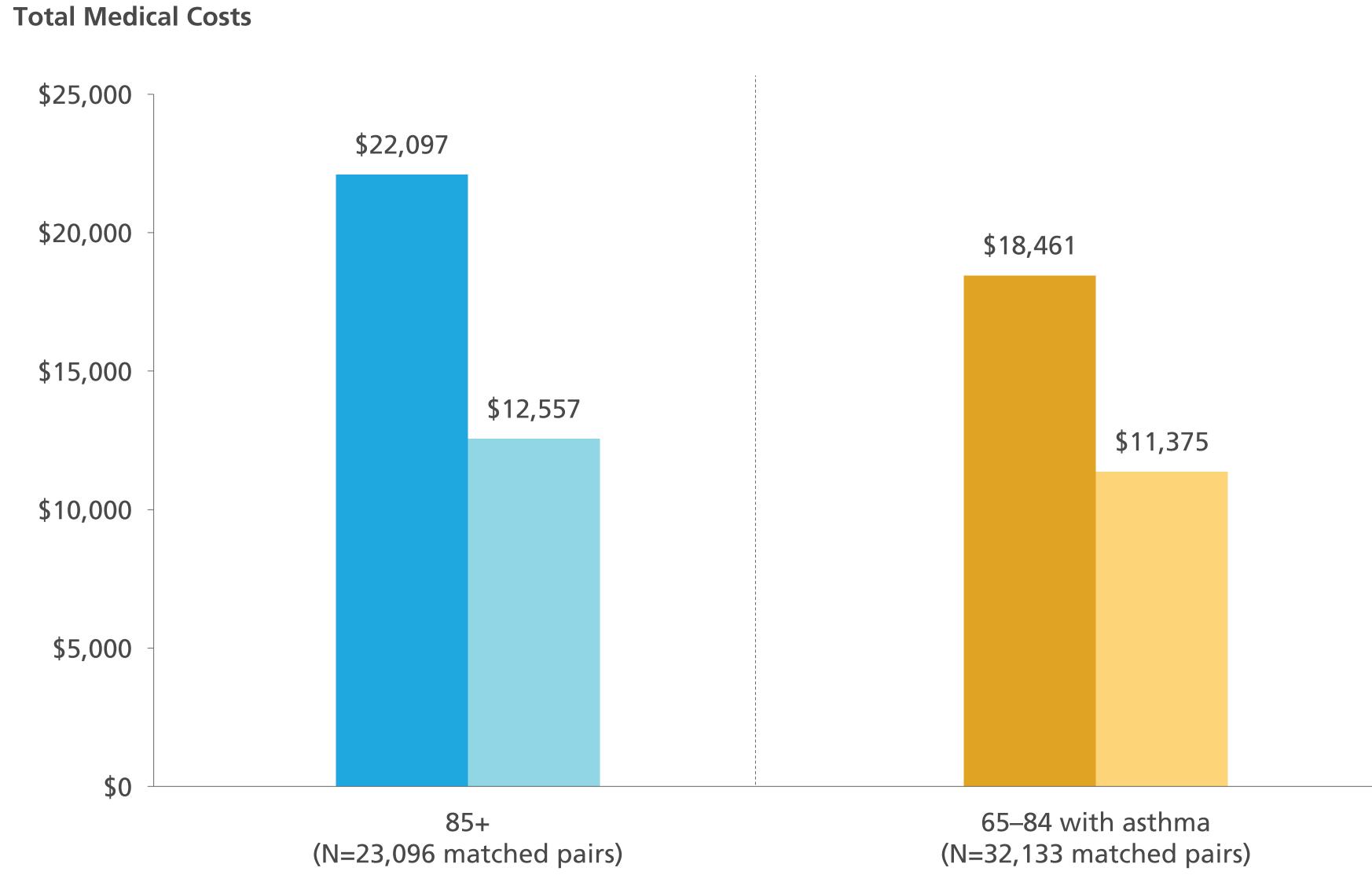
[1] Proportion of hospital readmissions was calculated conditionally among those with an inpatient visit during the follow-up period. [2] All differences are statistically significant at p<0.05.

Results (continued)

Post-Match Outcomes - Costs

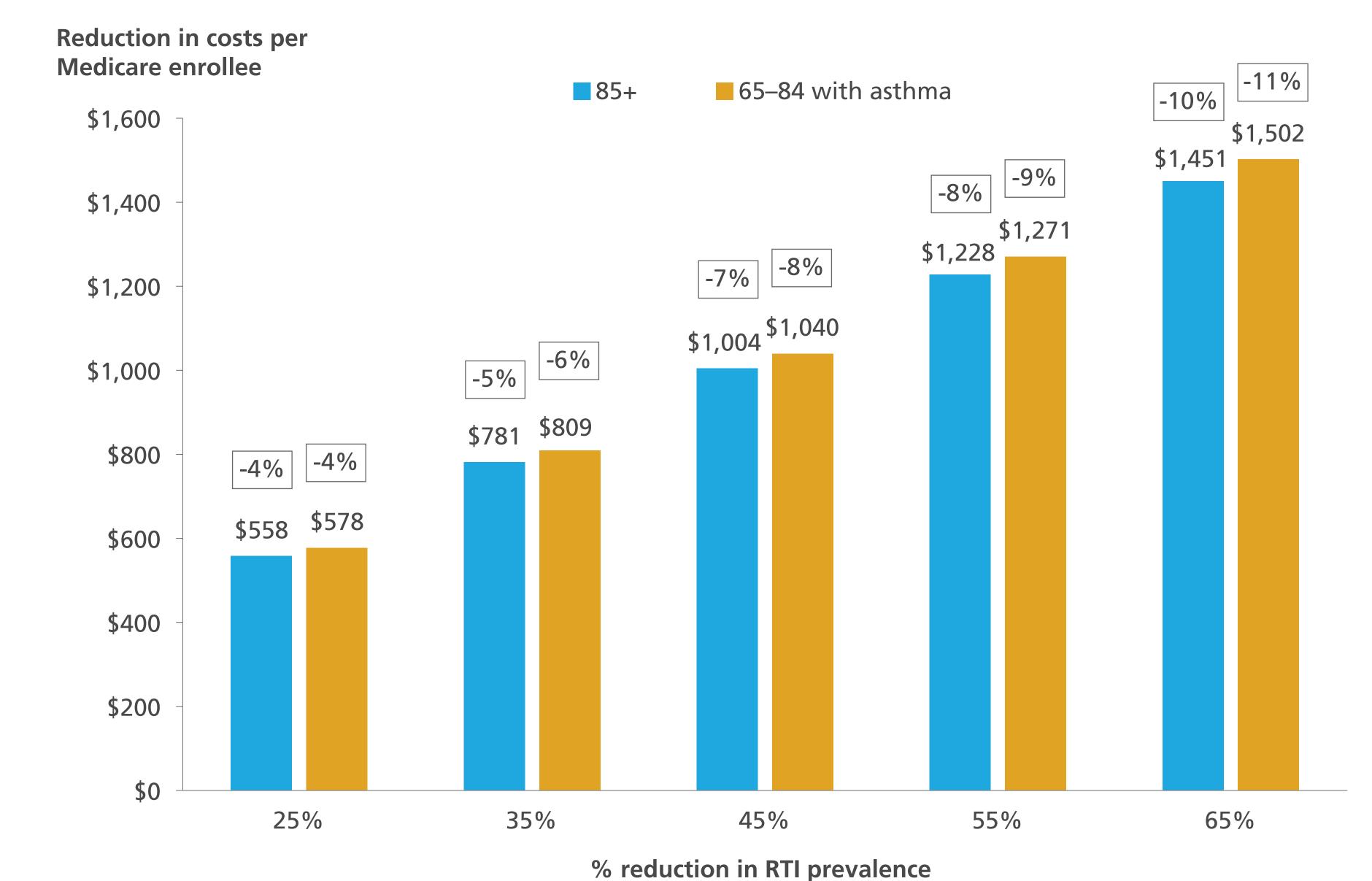
Among the two cohorts, annual follow-up costs among patients with RTI were 175% and 162% higher than the annual costs of those with no RTI, depending on





Estimated value of reduction inRTI prevalence – Medicare perspective

Reductions in RTI prevalence in a given flu-season by 25% to 65% correspond to 4% to 11% reduction in total medical costs per Medicare enrollee (\$558 - \$1,502)



Limitations

- The prevalence estimates are limited to diagnoses of RTI captured in the claims data and may under-represent the true rate of RTI, particularly the milder forms such as URTI
- Costs do not include prescription drug use or medical services covered by other payers (e.g., Medicare/Medicaid dual eligibility), nor over-the-counter medications, as such data were not available
- Costs also do not include other potential indirect costs associated with RTI, such as additional caregiver expenses
- While the propensity score matching analysis controlled for observable differences across patient cohorts, it cannot account for unobserved heterogeneity
- Findings are limited to two subsets of beneficiaries enrolled in fee-for-service Medicare (65–84 years old with asthma and ≥85 years old) with no indication of RTI during the year preceding the 2014–2015 flu-season and implications of RTI among other subgroups of elderly beneficiaries are not known
- Relatedly, findings may not generalize to populations other than fee-for-service Medicare (e.g., covered by Managed Medicare)

Conclusions

- Approximately 1 in 3 Medicare enrollees aged 65-84 years with asthma and 1 in 4 enrollees aged ≥85 years have an RTI each year
- The annual HRU and total medical costs are estimated to be 2 times higher in patients with an RTI relative to similar patients who do not
- These findings suggest that potential reductions in RTI prevalence among the elderly could result in substantial savings to Medicare. However, additional research is warranted to understand the burden of RTI among other 'at-risk' populations

References

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Disclosures

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