

Premature Death as a Major Driver of Total Societal Cost of Guillain-Barré Syndrome in the United States

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Introduction

- Guillain-Barré Syndrome (GBS) is an immune-mediated, life-threatening acute polyradiculoneuropathy and the most common cause of acute flaccid paralysis in the US.¹
- Most GBS cases, even mild, require hospitalization for monitoring, if not treatment. Around 30% require ICU admission and 25% require mechanical ventilation.^{2,3} 10+% are left with severe disability.²
- An estimated 3-11% of all GBS patients die; 2.8-4.8% within six months and 3.9% within one year.²⁻⁵ Among those ventilator-dependent, up to 20% die, typically from respiratory insufficiency.² Mortality predictors include older age, greater disability at admission, and mechanical ventilation.⁶
- GBS carries substantial economic burden: direct costs (hospitalization, rehabilitation) and indirect costs (lost productivity, premature death).
- A 2008 analysis using 2004 data found that 60% of total GBS costs were attributable to premature mortality; as such, contemporary estimates of the economic cost of premature death are needed.⁷

Objective

- Estimate the indirect societal cost of premature deaths among US patients hospitalized with GBS.

Methods

- GBS incidence and mortality rates from a claims analysis (commercial closed claims and Medicare Fee-for-Service (FFS) 5% Standard Analytic Files (SAFs), 2017–2023) were projected to the 2025 US population aged <65 and ≥65 years.
 - GBS hospitalization incidence per 100,000: 1.97 (95% CI 1.91–2.03) for <65 years; 4.17 (95% CI 3.71–4.60) for ≥65 years.
- Excess mortality was determined by using all-cause mortality among patients with GBS compared to the Centers for Disease Control and Prevention (CDC) Life Tables age-adjusted mortality.
- Value of a Statistical Life (VSL) was applied to excess deaths ≤12 months post-hospitalization to estimate premature mortality cost.
- Premature deaths were multiplied by the US Department of Health and Human Services (HHS) single, age-agnostic central VSL estimate (\$14.0M in 2025 United States Dollars (USD)).^{8,9}
- An age-specific VSL based on expected future quality-adjusted life years (QALYs) and value per QALY was also explored (**Figure 1**).
 - Assigned as \$738,853/QALY when inflated to 2025 USD (central estimate).¹⁰
 - Expected future QALYs for the <65 and ≥65 populations were 17.95 and 9.39 years, respectively.¹¹

Results

- Characteristics of projected US GBS patients are shown in **Table 1**.

Table 1. Population Characteristics

Characteristic	<65 Years		≥65 Years	
	Value	Source	Value	Source
Number of GBS Cases				
Projected to 2025 total US population	5,411	Calculated*	2,641	Calculated*
Mean Age (years)	45.2	Claims Analysis**	70.0	Claims Analysis**
Average Life Expectancy (years)	78.4	NCHS US Mortality ¹²	78.4	NCHS US Mortality ¹²

*Number of GBS cases calculated from incidence rates (Claims Analysis) and US population
**Data on file; claims analysis has been submitted for publication
KEY: GBS – Guillain-Barre syndrome; NCHS – National Center for Health Statistics; US – United States.

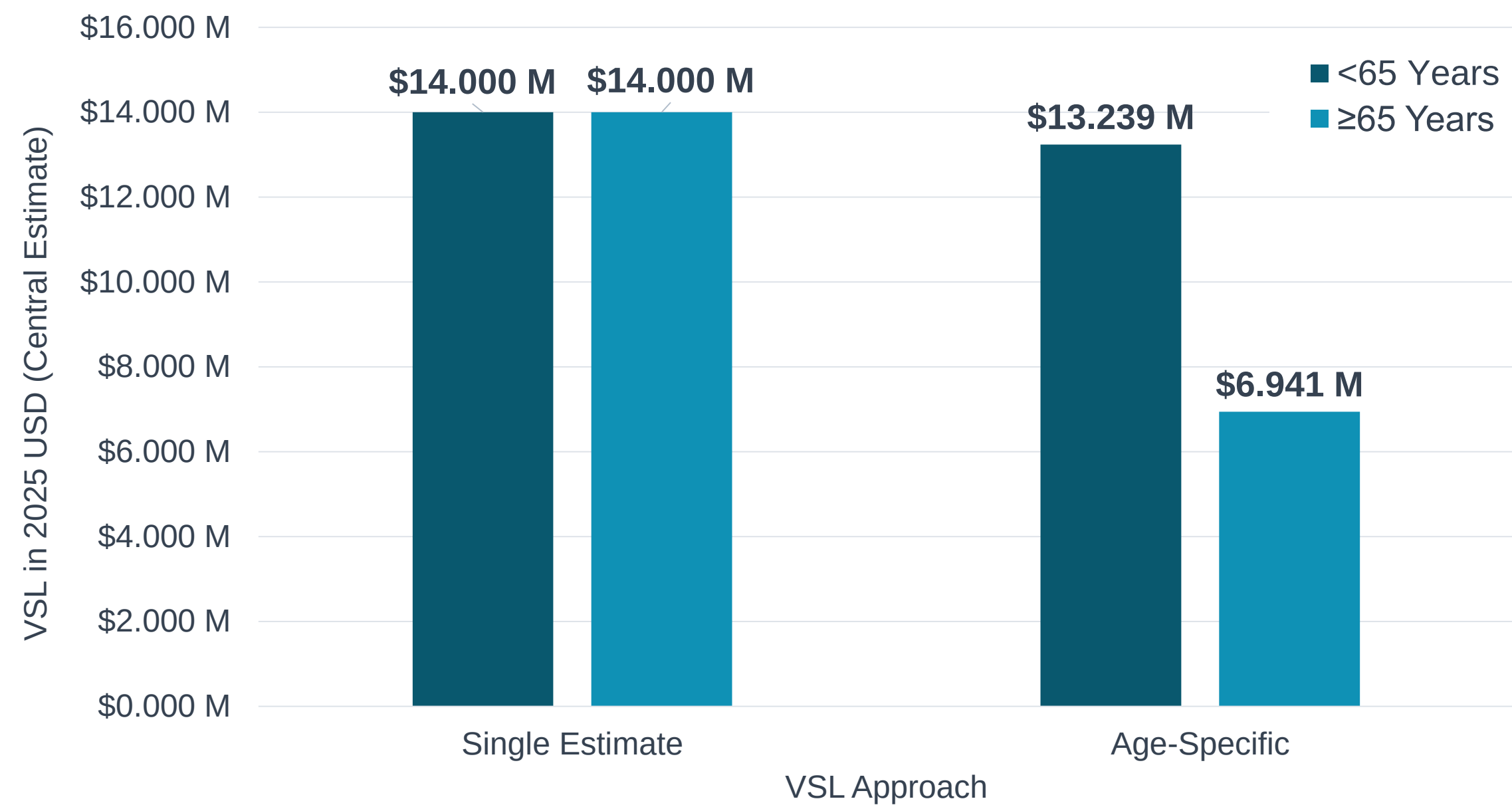
- Excess mortality ≤12 months post-hospitalization was 4.8% among patients <65 and 22.1% among patients ≥65 (**Table 2**).
 - This includes inpatient mortality rates of 1.8% and 7.7%, respectively.
 - Expected deaths in 2025: 261 (<65) and 584 (≥65) (**Table 2**).
- Using the age-agnostic VSL (\$14.0M):
 - Premature mortality costs of \$3.659B (<65) and \$8.180B (≥65) (**Figure 3**).
 - Total annual cost for deaths ≤12 months post-hospitalization: \$11.838B (**Figure 3**).
- Using age-specific central estimates for VSL (45-year-old: \$13.3M and 70-year-old: \$6.9M):
 - Premature mortality costs of \$3.463B (<65) and \$4.051B (≥65) (**Figure 3**).
 - Total annual cost for deaths ≤12 months post-hospitalization \$7.514B (**Figure 3**).

Table 2. Mortality Rates

Rate	<65 Years		≥65 Years	
	Value	Source	Value	Source
Background Mortality	0.28%	SSA Life Tables 2019 ¹³	1.90%	SSA Life Tables 2019 ¹³
In-Hospital Mortality (95% CI)	1.8% (1.4-2.1%)	Claims Analysis*	7.7% (4.9-10.6%)	Claims Analysis*
12-months since Hospitalization (95% CI)	5.1% (4.5-5.8%)	Claims Analysis*	24.0% (19.5-28.6%)	Claims Analysis*
GBS-Associated Excess Mortality				
In-Hospital Mortality	1.525%	Calculated**	5.798%	Calculated**
12-months since Hospitalization	4.835%	Calculated**	22.098%	Calculated**
Expected Deaths	261	Calculated***	584	Calculated***

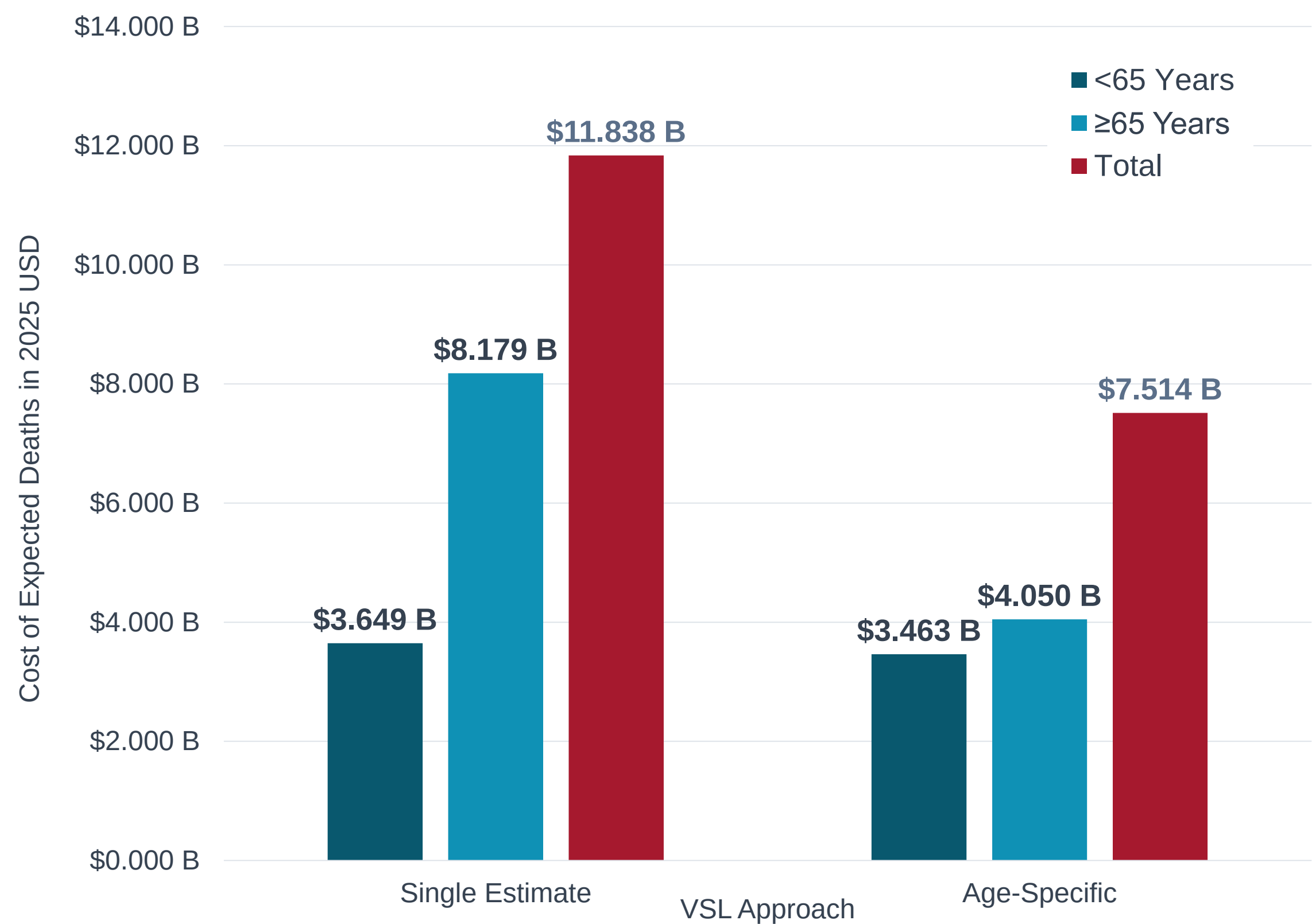
*Data on file; claims analysis has been submitted for publication
**Calculated by subtracting background mortality from mortality reported among GBS population
***Expected deaths calculated by applying the mortality rates to the patient populations
KEY: CI – confidence interval; GBS – Guillain-Barre syndrome; SSA – Social Security Administration

Figure 1. Results of Age-agnostic, Single Estimate VSL Approach (Millions, 2025 USD)



KEY: USD – United States dollar; VSL – value of statistical life.

Figure 3. Total Cost of Expected Deaths (Billions, 2025 USD)



KEY: USD – United States dollar; VSL – value of statistical life.

Limitations

- The use of VSL estimates to assign economic value to lost lives in clinical contexts has well-documented limitations; however, VSL remains a widely accepted approach for estimating indirect costs associated with premature mortality at a population level due to lack of suitable alternatives.
- Claims data have inherent limitations for case identification and mortality estimation. This is particularly relevant for the <65 years (commercial) population which rely on an observational algorithm rather than the direct link to social security death records available for the ≥65 years (Medicare) population. This introduces the potential for right-censoring and underestimation of mortality among the <65 population.

CONCLUSIONS

- GBS has a sizeable impact on patients and care partners, and although considered a rare disease, its substantial impact results in significant cost to society.
- Estimated total mortality costs were robust regardless of VSL method used (\$11.838B from single estimate approach and \$7.514B from age-specific estimate approach).
- Although the majority of GBS patients eventually recover, the increased all-cause mortality risk associated with a GBS hospitalization in the years following discharge results in substantial societal burden, especially in patients aged ≥65 years.
- Effective treatments which reduce mortality from GBS may reduce societal burden due to premature death.

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