P1059

Cost Per Response Analysis of Repository Corticotropin Injection versus Other Late-Line Treatments for Multiple Sclerosis Relapses in Adults

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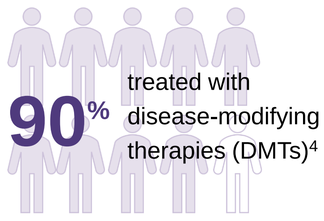
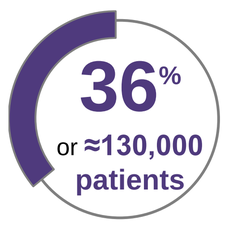
BACKGROUND

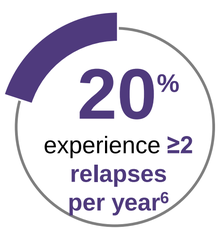
- Multiple Sclerosis (MS) is an autoimmune, inflammatory, demyelinating disease of the central nervous system, characterized by **relapsing-remitting disease**[1,2]





experience relapses despite treatment[5]

Patients with MS may experience **multiple relapses per year**



- Relapses may lead to
  - residual deficits,
  - poor recovery, and
  - progressive disability
- Further, relapses have a **high cost burden** and **adversely impact health-related quality of life** and **functional ability**[7-12]

- Treatment guidelines suggest corticosteroids as first-line agents for managing MS relapses[13]
  - However, not all patients **tolerate or respond effectively to corticosteroids**
  - Other late-line MS relapse treatment options include Acthar® Gel (repository corticotropin injection [RCI]), plasmapheresis (PMP), or intravenous immunoglobulin (IVIg)[14]
- There is a **lack of evidence comparing the cost per response of these late-line treatments** for the resolution of MS relapses

OBJECTIVE

To estimate the cost per response of MS relapse treatment with RCI versus PMP/IVIg among patients with acute exacerbations of MS (≥1 relapse per year) from a payer perspective

METHODS

- **Sample**: Patients who experienced ≥2 MS exacerbations
- **Treatments**: RCI and PMP/IVIg
- **Average annual cost of care: (Figure 1)**
  - **Data source**: Truven Health Analytics MarketScan® Commercial Claims and Encounters Databases between July 1, 2007 and December 31, 2012[15]
  - Costs included MS-related inpatient, outpatient, and medication costs
  - Adjusted for number of relapses prior to index date, days between exacerbations, comorbid diabetes without complications, year of index exacerbation, and number of outpatient services, hospitalizations, and medications in the 6 months prior to the index exacerbation
  - Costs were inflated to 2019 USD using medical consumer price index
- **Response rate: (Table 1)**
  - **Data sources**: Humana Comprehensive Health Insights Database® (January 1, 2008 through July 31, 2015)[6] and HealthCore Integrated Research Database℠ (January 1, 2006 through November 30, 2016)[16]
- **Response**: No additional relapse treatments or procedures within 30 days
  - **Relapse**: defined using established claims-based methodology which included an inpatient or outpatient claim with a diagnosis of MS followed by receipt of a relapse treatment or procedure (RCI, PMP, or IVIg)[17]
- **Cost per response**: Designed to compare annual cost of care per patient achieving MS relapse resolution

$$\frac{Average\ annual\ cost\ of\ care}{Percent\ patients\ with\ resolved\ relapse}$$

- **Sensitivity analysis**: A one-way deterministic sensitivity analysis was also performed to assess the impact of model inputs on the results for cost per response
- **Model assumptions:**
  - Population across the studies were assumed to be homogeneous for the diagnosis of MS
  - Annual cost of care assumes that patients are treated with intravenous methylprednisolone for the initial relapse and subsequently treated with RCI or PMP/IVIg for the next relapse

Figure 1: Annual cost of care for RCI versus PMP/IVIg

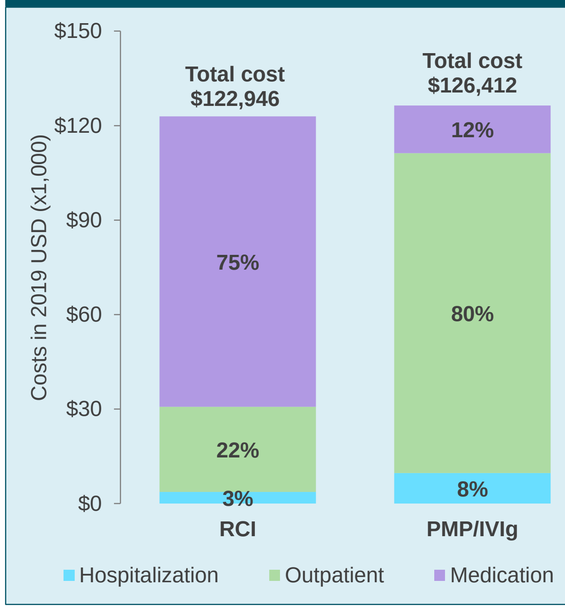


Table 1. Weighted response rates for patients treated with RCI and PMP/IVIg

Data source	Response rate	
	RCI	PMP/IVIg
Humana Comprehensive Health Insights Database[6]	96.9% (189 / 195)	45.9% (112 / 244)
HealthCore Integrated Research Database[16]	78.3% (188 / 240)	56.0% (89 / 159)
Average response rates	**86.6% (377 / 435)**	**49.9% (201 / 403)**

RESULTS

Base case results (Figure 2)

- The base case annual cost per RCI response ($141,970) was **lower** than that with PMP/IVIg ($253,331)

Sensitivity analysis results (Figure 3)

- The cost per response for RCI was sensitive to the response rate and annual cost of care
  - *Cost per response*, range: $126,879 - $157,019 for change in response rate from 96.9% to 78.3%, respectively
  - *Cost per response*, range: $124,090 - $161,450 for change in average annual cost of care from $107,462 to $139,816, respectively
- RCI had a lower cost per response compared with PMP/IVIg with changes in annual cost of care and response rate

Figure 2: Base case cost per response

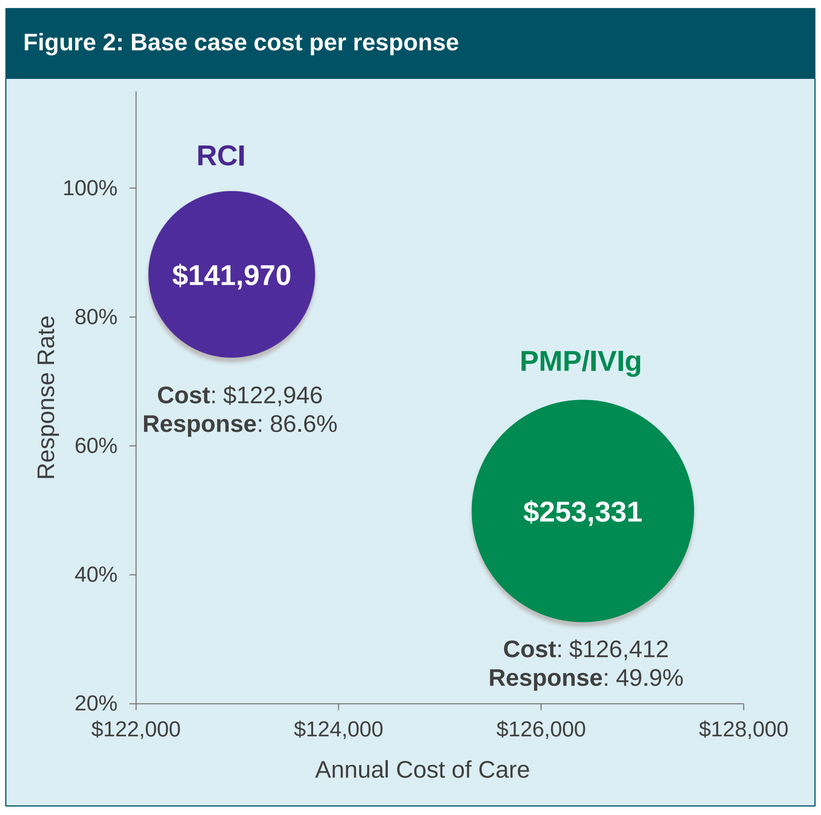
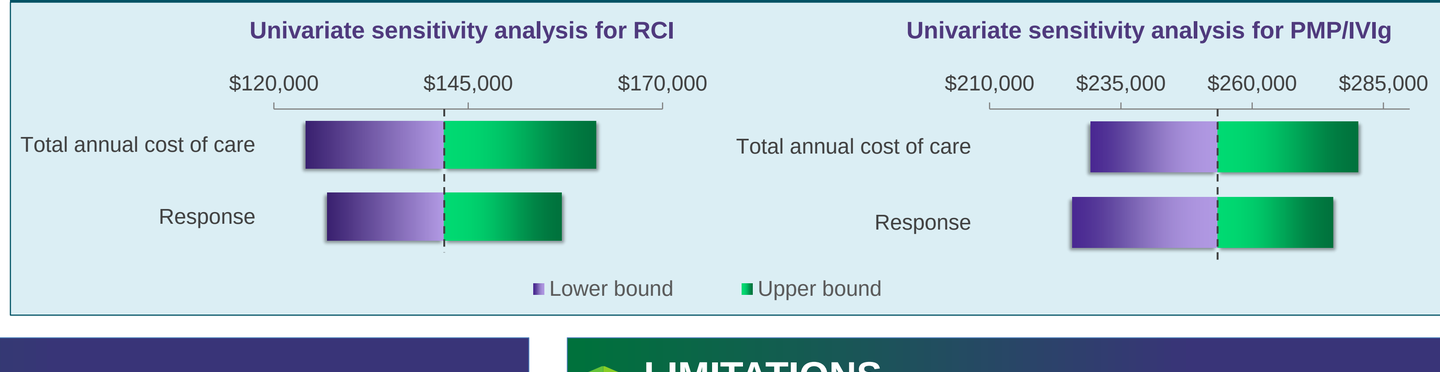


Figure 3: Univariate sensitivity analysis of cost per response



LIMITATIONS

- Relapses were identified based on treatment-seeking behavior across two databases using an established claims-based algorithm; treatment received outside a healthcare visit was not addressed
- Unrestricted enrollment could underestimate unresolved relapses. PMP and IVIg may be administered as courses of therapy, which would also lead to an underestimation
- The total annual cost of care did not account for treatment convenience and compliance and the safety profile associated with each therapy

CONCLUSIONS

- Although average annual cost of late-line treatments is similar, the cost per response of RCI is lower than other late-line treatments
- Sensitivity analysis shows that RCI was still cost-saving compared to other late-line treatments
- These findings shed light on the importance of late-line treatment selection strategies for patients with acute exacerbations of MS
- Robust management of MS relapse should reflect timely resolution with appropriate treatment to minimize patient burden

REFERENCES

1. National Institute of Neurological Disorders and Stroke: www.ninds.nih.gov/disorders/multiple_sclerosis/detail_multiple_sclerosis.htm
2. Cook S.D. et al International CMSC Consensus Conference, 2012, Int. J. MS Care. 14, 105-104
3. Hersh CM, Fox RJ. Multiple sclerosis http://www.clevelandclinicmeded.com/medicalpubs/diseasemanagement/neurology/multiple_sclerosis/
4. Data on file: MS HCP Tracking Study Wave 7 Final Report – May 2017
5. Data calculations on file: Estimated ARR and percent patients relapsing from DMT PIs. Mallinckrodt Pharmaceuticals.
6. Nazareth T et al. 7th Joint ECTRIMS – ACTRIMS, Paris, France, October 25-28, 2017
7. Lublin FD et al. Neurology. 2003;61(11):1528-1532
8. Hirst C et al. J Neurol. 2008;255(2):280
9. Leray E et al. Brain. 2010;133(pt 7):1900-1913
10. Scott TF et al. J Neurol Sci. 2010;292(1-2):52-56
11. Mowry EM et al. Neurology. 2009;27(7):602-608
12. Ross AP et al. Int J MS Care. 2012;14(3):148-159
13. National Multiple Sclerosis Society, treating MS, managing relapses
14. Nickerson M et al BMC Neurology. 2013;13:119
15. Gold LS et al. Adv Ther. 2016;33(8):1279-92
16. Nazareth T et al. 7th Joint ECTRIMS, Berlin, Germany, October 10-12, 2018
17. Chastek et al J Med Econ. 2010;13(4):618-25

ACKNOWLEDGMENTS

Falcon Research Group (North Potomac, MD, USA) provided medical writing and editorial assistance

DISCLOSURES

George Wan and John Niewoehner are employees of Mallinckrodt; Ishveen Chopra was a paid consultant at Mallinckrodt Pharmaceuticals

POSTER PRESENTED AT
35th Congress of the European Committee for Treatment and Research in Multiple Sclerosis and 24th Annual Conference of Rehabilitation in Multiple Sclerosis | September 11-13, 2019 | Stockholm, Sweden