CADTH | pCODR PAN-CANADIAN ONCOLOGY DRUG REVIEW

pan-Canadian Oncology Drug Review
Final Economic Guidance Report

Ixazomib (Ninlaro) for Multiple Myeloma

July 5, 2019

DISCLAIMER

Not a Substitute for Professional Advice

This report is primarily intended to help Canadian health systems leaders and policymakers make well-informed decisions and thereby improve the quality of health care services. While patients and others may use this report, they are made available for informational and educational purposes only. This report should not be used as a substitute for the application of clinical judgment in respect of the care of a particular patient or other professional judgment in any decision making process, or as a substitute for professional medical advice.

Liability

pCODR does not assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information, drugs, therapies, treatments, products, processes, or services disclosed. The information is provided "as is" and you are urged to verify it for yourself and consult with medical experts before you rely on it. You shall not hold pCODR responsible for how you use any information provided in this report.

Reports generated by pCODR are composed of interpretation, analysis, and opinion on the basis of information provided by pharmaceutical manufacturers, tumour groups, and other sources. pCODR is not responsible for the use of such interpretation, analysis, and opinion. Pursuant to the foundational documents of pCODR, any findings provided by pCODR are not binding on any organizations, including funding bodies. pCODR hereby disclaims any and all liability for the use of any reports generated by pCODR (for greater certainty, "use" includes but is not limited to a decision by a funding body or other organization to follow or ignore any interpretation, analysis, or opinion provided in a pCODR report).

FUNDING

The pan-Canadian Oncology Drug Review is funded collectively by the provinces and territories, with the exception of Quebec, which does not participate in pCODR at this time.

INQUIRIES

Inquiries and correspondence about the pan-Canadian Oncology Drug Review (pCODR) should be directed to:

pan-Canadian Oncology Drug Review
154 University Avenue, Suite 300
Toronto, ON
M5H 3Y9

Telephone: 613-226-2553
Toll Free: 1-866-988-1444
Fax: 1-866-662-1778
Email: info@pcodr.ca
Website: www.cadth.ca/pcodr

TABLE OF CONTENTS

DISCLAIMER ii
FUNDING ii
INQUIRIES iii
TABLE OF CONTENTS iv
1 ECONOMIC GUIDANCE IN BRIEF 1
1.1 Submitted Economic Evaluation 1
1.2 Clinical Considerations 2
1.3 Submitted and EGP Reanalysis Estimates 4
1.4 Detailed Highlights of the EGP Reanalysis 5
1.5 Evaluation of Submitted Budget Impact Analysis 8
1.6 Conclusions 8
2 DETAILED TECHNICAL REPORT 9
This section outlines the technical details of the pCODR Economic Guidance Panel's evaluation of the economic evidence that is summarized in Section 1. Pursuant to the *pCODR Disclosure of Information Guidelines*, this section is not eligible for disclosure. It was provided to the pCODR Expert Review Committee (pERC) for their deliberations.
3 ABOUT THIS DOCUMENT 10
REFERENCES 11

1 ECONOMIC GUIDANCE IN BRIEF

1.1 Submitted Economic Evaluation

The economic analysis **submitted to pCODR by Takeda Canada Inc** examined the cost-effectiveness of ixazomib in combination with lenalidomide and dexamethasone (ILd) for patients with multiple myeloma (MM) who have received at least one prior therapy.

Table 1. Submitted Economic Model

Funding Request/Patient Population Modelled	*Adult patients, with a diagnosis of MM who had measurable, but not necessarily symptomatic, disease defined by elevated serum M-protein, urine M-protein, serum free light chain levels and who had an ECOG performance status ranging from 0 – 2, inclusive. All patients had received either 1 or 2 or more prior therapies.*
Type of Analysis	*CUA & CEA*
Type of Model	*Partitioned-survival*
Comparator	*Lenalidomide and dexamethasone (Ld)* *Carfilzomib + lenalidomide and dexamethasone (CLd)* *Daratumumab + lenalidomide and dexamethasone (DLd)* *Daratumumab + bortezomib and dexamethasone (DVd)* *Other comparators included in scenario analyses of 2nd line or more population only:* *Pomalidomide + dexamethasone (PomDex)* *Carfilzomib + dexamethasone (CarDex)*
Year of costs	*2018*
Time Horizon	*25 years; 1-week cycle length*
Discounting	*1.5% for both costs and effects*
Perspective	*Government*
Ixazomib	Costs $2,964.65 per 4mg. At the recommended dose of 4mg on days 1, 8 and 15, ixazomib costs: • $317.64 per day • $8893.95 per 28 day cycle.
Lenalidomide	Costs $8,904 per pack (25mg per capsule and 21 capsules per pack). At the recommended dose of 25 mg administered daily on days 1 – 21, lenalidomide costs: • $318.00 per day • $8904.00 per 28 day cycle
Dexamethasone	Costs $30.00 per pack (2mg per capsule and 50 capsules per pack). At the recommended dose of 40 mg administered on days 1, 8, 15, 22, dexamethasone costs: • $1.63 per day • $45.60 per 28 day cycle
Daratumumab	Costs $2,392.08 per 400 mg. At the recommended dose of 16mg/kg administered on days 1, 8, 15, 22 (cycles 1 & 2), daratumumab costs: • 1366.90 per day • $38273.28 per 28 day cycle At the recommended dose of 16mg/kg administered on days 1 & 15 (cycles 3 – 6), daratumumab costs: • $683.45 per day

	• $19136.64 per 28 day cycle At the recommended dose of 16mg/kg administered on day 1 (cycles 7+), daratumumab costs: • $341.73 per day • $9568.32 per 28 day cycle
Carfilzomib	Costs $1,533.00 per 60mg. At the recommended dose of 20-27mg/m^2 for cycle 1 administered on days 1, 2, 8, 9, 15, 16, carfilzomib costs: • $328.57 per day • $9199.98 per 28 days At the recommended dose of 27mg/m^2 for cycle 2-12 administered on days 1, 2, 8, 9, 15, 16, carfilzomib costs: • $328.57 per day • $9199.98 per 28 days At the recommended dose of 27mg/m^2 for cycle 13 up to 18 administered on days 1, 2,15, 16, carfilzomib costs • $219.05 per day • $6133.32 per 28 day cycle
Bortezomib	Costs $1,402.42 per 3.5mg. At the recommended dose of 1.3 mg/m^2 administered on days 1, 4, 8, 11, bortezomib costs: • $200.35 per day • $5609.68 per 28 day cycle
Pomalidomide	Costs $500.00 per 4mg. At the recommended dose of 4 mg administered every day on days 1-21, pomalidomide costs: • $$375.00 per day • $10,500.00 per 28 day cycle
Model Structure	The model was developed as a standard partitioned-survival model and was comprised of three health states: progression-free survival, progressed and death.
Key Data Sources	*Tourmaline-MM1 trial (efficacy and quality of life)* *Network meta-analysis for efficacy data for all other relevant comparators*
The cost of drugs listed above do not include wastage. Drug wastage included in submitted base case and EGP re-analysis.	

1.2 Clinical Considerations

According to the pCODR Clinical Guidance Panel (CGP), this comparison of ILd to Ld may be appropriate depending on the anticipated place of therapy of ILd (2nd line, 3rd line or beyond) as well as the specific sequence of agents that are reimbursed by jurisdictions. The CGP noted that different province may have differing sequences of agents available to patients depending on what prior therapy patients may have received. Relevant issues identified included:

- *There may be a net clinical benefit in adding ILd for the treatment of relapsed and refractory myeloma with 1 or 2 or more prior lines of therapy.*
- *Data to inform this assessment was based on one high-quality randomized controlled trial demonstrating a clinically and statistically significant benefit in progression-free survival as compared to lenalidomide plus dexamethasone, a previous standard of care. There are no head-to-head clinical trials comparing ILd to other currently relevant standards of care.*
- *ILd has a manageable toxicity profile and a convenient oral route of administration.*
- *There is currently insufficient evidence to support the use of ILd in the first line setting.*

- *There is insufficient data to know the appropriate sequencing of available, reimbursed drugs in Canada for the second line setting. There have been no randomized controlled trials to determine whether there is a preference for a particular proteasome inhibitor (ie. Ixazomib, carfilzomib or daratumumab) or whether or not ixazomib is equivalent or superior to carfilzomib or daratumumab. Additionally, sequencing of agents is restricted based on the sequence of agents patients would have already received, which are provincially determined.*
- *Based on a manufacturer submitted network meta-analysis, the results from the NMA demonstrated that ILd was associated with significantly improved PFS and OS than Ld and Pom-Dex. Additionally, DVd and DLd were reported to be superior to ILd in terms of PFS but not OS. Furthermore, no differences in PFS and OS was reported between ILd, CLd, and Cd.*
- *Based on clinical opinion, the CGP agree that the preferred 2nd line choice is either DVd or DLd, followed by CLd as 3rd line. This means that ILd is unlikely be used as 2nd line, as this would disqualify the use of a daratumumab combination in the later line. Additionally, ILd may not be used in 3rd line as patients may have progressed on both lenalidomide and bortezomib, making them ineligible for this therapy.*
- *The added value of ILd in this context is its convenience as an oral therapy. This is especially applicable to patients who cannot travel to receive IV therapy.*

Summary of registered clinician input relevant to the economic analysis
Registered clinicians considered the following:

- *Ld has been the most common second-line therapy in myeloma. They also noted that carfilzomib and daratumumab are desirable but availability of these treatments at this time is limited.*
- *20% to 60% of the patient population would be defined by the reimbursement request however the number of patients eligible for ILd will vary amongst the provinces, depending on what treatments are publicly funded in each province for relapsed multiple myeloma.*
- *ILd offers patients the convenience of oral proteasome inhibitor treatment.*
- *ILd would be appropriate for patients in whom Ld would be considered at time of at least first the first relapse or later. They noted that ILd may displace pomalidomide plus dexamethasone, which is currently the preferred third line therapy, or would be preferred over CLd.*
- *ILd would be an excellent second-line regimen for patients relapsing after ASCT who have received 4-6 cycles of cyclophosphamide plus bortezomib plus dexamethasone (CyBorD) as induction therapy, particularly if they are high-risk. Also, elderly patients treated with VMP who have high-risk disease would benefit from this regimen at the time of first relapse.*

Summary of patient input relevant to the economic analysis
Patients considered disease control, prolonged life and remission as well as fewer side effects as important factors in new treatment combinations. Patient input indicated that the majority of side effects were tolerable. Patients indicated that the oral administration route is practical.

Summary of Provincial Advisory Group (PAG) input relevant to the economic analysis
PAG considered the following factors (enablers or barriers) important to consider if implementing a funding recommendation for ixazomib which are relevant to the economic analysis:

Enablers

- Ixazomib is an oral medication, which has lower administration costs and can be delivered to patients more easily.

Barriers

- Potential for incremental costs due to drug wastage with dose adjustments.
- Increase monitoring for adverse events, such as rash and diarrhea.
- Number of prevalent patients with multiple myeloma who have received at least one prior therapy, leading to a potentially large budgetary impact.

1.3 Submitted and EGP Reanalysis Estimates

Table 2. ***Submitted Estimates, deterministic****

Estimates (range/point)	Ld	CLd	DVd	ILd	DLd
TOTAL LY	5.08	6.05	5.75	5.94	7.04
Progression-free	1.55	2.08	3.88	1.96	3.37
Post-progression	3.53	3.98	2.87	3.98	3.67
TOTAL QALY	3.34	3.97	3.80	3.93	4.73
Progression-free	1.07	1.40	1.96	1.36	2.37
Post-progression	2.13	2.60	1.88	2.60	2.40
TOTAL COSTS	$319,879	$515,264	$573,580	$593,249	$663,429

***breakdown of QALY's and LY's gain in the progression free and post-progression states was not provided for probabilistic results**

Table 3. ***Reanalysis Estimates, deterministic****

Estimates (range/point)	Ld	CLd	DVd	ILd	DLd
TOTAL LY	4.92	5.31	5.21	5.43	5.62
Progression-free	1.55	1.96	2.88	1.96	3.37
Post-progression	3.37	3.47	2.33	3.47	2.26
TOTAL QALY	3.13	3.41	3.44	3.50	3.82
Progression-free	1.14	1.50	2.09	1.45	2.50
Post-progression	2.06	1.98	1.42	2.12	1.38
TOTAL COSTS	$326,998	$502,946	$564,976	$596,300	$643,408

***breakdown of QALY's and LY's gain in the progression free and post-progression states was not provided for probabilistic results**

The main assumptions and limitations with the submitted economic evaluation were:

- *Time horizon*: The submitted base case time horizon was 25 years. In consultation with the CGP, this time horizon was deemed to be too long given that, in this indication, patients are pre-treated and the median age of the population in the Tourmaline MM-1 trial was 66 years. Furthermore, though previous CADTH reviews for relapsed multiple myeloma have used a time horizon of 10 years, in those reviews patients had received 2 or more therapies. For this review, eligible patients included those who have received 1 or 2 or more prior therapies. Based on this, the EGP explored a time horizon of 15 years in scenario analyses, and incorporated as the best case analysis.
- *Utilities:* Data from TMM1 was converted into utilities using UK tariff values. This may not be generalizable to the Canadian population. The submitter did not state whether

Canadian tariffs were considered or not available. Further, the CGP expressed that the utility values used in the submitted base case (TMM1 source) were not reflective of this patient population as the values were too high and there was not enough difference in the health states between pre and post-progression. The submitter provided an alternate utility value set (TA338) taken from a NICE report of patients treated with pomalidomide for relapsed and refractory multiple myeloma. The use of this set of utility values was explored in a sensitivity analysis (SA) and was used in the EGP's best case analysis.

- *Overall survival data: ILd vs Ld:* Overall survival data at the latest analysis show no significant difference in overall survival between ILd and Ld. In the submitted base case, the overall survival curve was fully parametrized, that is, the selected curve was used for the entire time horizon (see **Error! Reference source not found.**). The selected curve o ver predicts the overall survival of ILd throughout the time horizon and appears to show a difference in overall survival, when in reality, there was no difference demonstrated through the trial. In order to account for this, without selecting a new parametric curve, the EGP chose to use the KM data until 48 months and a parametric tail until the end of the time horizon. This approach reflects the lack of survival difference during the trial follow-up period. The EGP recognizes that there is no evidence to demonstrate a difference in overall survival between ILd and Ld post 48 months. Therefore, the EGP selected a conservative assumption, recognizing that subsequent treatments may impact survival, as demonstrated by sensitivity analyses provided by the submitter.
    - Feedback was received from the submitter regarding the EGP's decision to remove the predicted OS benefit with ILd. The submitter commented that such an analysis, being conducted in the context of a sequential analysis ignores the results of the NMA informing the relative effectiveness of comparators. The EGP clarified that the intent of this re-analysis was not to present a pair-wise analysis. Removing the predicted OS benefit with ILd impacts the comparison between ILd vs Ld; the NMA is still used to inform the remaining comparators. The intent of exploring a reduced predicted OS benefit was to explore the lack of demonstrated overall survival benefit, as evidence in the clinical trial, between ILd and Ld.
- *Sequencing:* The base case compared ILd to Ld, DLd, DVd, and CLd; most of these comparators are considered 2nd line treatment options as of the time of this review. The funding request for ILd is broad (after at least one line of prior therapy for relapsed/refractory myeloma) and algorithms for myeloma treatments are dynamic. In discussion with CGP, the EGP confirmed that:
    - ILd is not considered a replacement to any other therapy, but an additional option to existing options
    - Myeloma is considered a chronic disease and requires long term treatment with the use of available agents in a variety of sequences
    - the comparators submitted in the base case do not represent all potential treatment comparators, especially in later lines of therapy.
    - As such, appropriate comparators to ILd include pomalidomide-dexamethasone (POMDEX) and carfilzomib-dexamethasone (Cd). To account for this variety of potential treatment sequences (i.e. ILd as 2nd line, ILd as 3rd line), scenario analyses were conducted by the EGP to explore estimates of using ILd versus other comparators in later lines of therapy (**Error! Reference source not found.** & REF _Ref5794841 \h * MERGEFORMAT **Error! Reference source not found.**).

1.4 Detailed Highlights of the EGP Reanalysis

The EGP made the following changes to the submitted economic model:

- Time horizon: The submitted base case time horizon was 25 years. In consultation with the CGP, this time horizon was deemed to be too long given that in this indication,

patients are pre-treated and the median age of the population in the Tourmaline MM-1 trial was 66 years of age. Previous CADTH reviews for relapsed myeloma have used a time horizon of 10 years where patients had received 2 or more prior therapies. As patients in this reimbursement request could have received 1, 2 or more prior therapies, a time horizon of 15 years was deemed reasonable.

- Utilities: The CGP expressed that utility values used in the submitted base case from the TMM1 were not reflective of this patient population. Specifically, they felt that the utilities were too high in general (reflecting better health than expected) and that there was not enough difference in the health states between pre and post-progression. The submitter provided alternate utility values taken from TA338, a NICE report of patients treated with pomalidomide for relapsed and refractory multiple myeloma. The CGP confirmed that this utility value was appropriate for this patient population and better reflected the expected quality of life of these patients.
- Overall survival data (KM curve until 48 months): Overall survival data at the most recent data cut showed no significant difference in overall survival between ILd and Ld. In the submitted base case analysis, the overall survival curve was fully parametrized and the selected curve over-predicted overall survival for ILd in comparison to Ld over the entire time horizon. The EGP elected to use the KM curve up until 48 months to remove this over prediction of overall survival; at 48 months, the parametrized Weibull curve is then used.

Table 4. ***EGP Reanalysis Estimates, probabilistic, 5,000 simulations***

Intervention	Total Costs (95% CI)	Δ costs*	Total LYs (95% CI)	Δ LYs*	Total QALYs (95% CI)	ΔQALYs*	ICER vs Ld	Sequential analysis
Ld	$333,313 ($309,853, $358,044)	----	4.91 (4.45, 5.38)	----	3.12 (2.84, 3.43)	----	----	-----
CLd	$503,710 ($463,138, $545,581)	$170,397	5.30 (4.60, 6.01)	0.39	3.36 (2.93, 3.81)	0.24	$709,988/ QALY	$709,988/QALY
DVd	$566,251 ($524,681, $613,542)	$323,939	5.19 (4.22, 6.30)	0.28	3.32 (2.69, 4.03)	0.20	$1,619,695 /QALY	Dominated**
ILd	$603,769 ($549,803, $665,085)	$270,456	5.43 (4.91, 5.98)	0.52	3.50 (3.17, 3.83)	0.38	$711,726/ QALY	$208,433/QALY
DLd	$644,720 ($595,647, $695,175)	$310,957	5.61 (4.64, 6.55)	0.70	3.70 (3.11, 4.33)	0.58	$536,133/ QALY	$204,755/QALY

***versus Ld**
****DVd costs more and is less effective than CLd**

The following table highlight analyses conducted by the EGP (probabilistic, discounted, 5,000 iterations). Given that the addition of ILd would not occur in a setting where only Ld is funded, best practice guidelines dictate that a sequential analysis should be conducted. In a sequential analysis, the ICER is calculated between the least costly comparator (e.g. DVd) and the next most costly comparator (e.g. ILd). All comparators are also compared to a common comparator, the least costly (e.g. Ld).

1.5 Evaluation of Submitted Budget Impact Analysis

Scenario analyses of the budget impact included:

- Decreasing the proportion of patients eligible for public coverage by 20%. This decreased the cost savings of the 3-year budget impact.
- Based on feedback from the CGP, a revised market share for the treatment-funded scenario was explored where ILd would only have a 5% uptake each year, resulting in an increase in market share of CLd and DLd. This change in the market share results in an incremental 3-year total budget impact, no longer representing a cost savings.

Key limitations of the BIA model include the comparators and the sequencing. The current comparators included in the BIA include regimens not currently funded in Canada (notably, daratumumab plus dexamethasone) and exclude other comparators that are relevant and were included in the cost-effectiveness analysis above (notably, daratumumab plus bortezomib plus dexamethasone). Further, daratumumab triplet regimens are likely to dominate the second-line setting, which then impact treatments in the 3rd line setting and beyond. If this implementation was seen (daratumumab triplet in the second line setting), it would displace all other treatments and greatly decrease the market share of ixazomib plus lenalidomide plus dexamethasone. The EGP also noted difficulty in determining the BIA given the variety of treatment options currently available. Due to this, it is very difficult to estimate the market share of all available agents in the new treatment-funded scenario without proposing separate 2nd and 3rd line/beyond algorithms, as treatments received in the 1st/2nd line setting will impact on what is received after. The CGP also stated there are challenges in determining the proper sequencing of agents nationally given that jurisdictions have different restrictions on agent patients are able to access in subsequent lines based on agents they have already received. Ixazomib in combination with lenalidomide and dexamethasone was acknowledged by the CGP as providing an option for patients who are intolerant or cannot access other therapies in the 2nd line due to geographic limitations.

1.6 Conclusions

The EGP's best estimate of ΔC and ΔE for ILd when compared to Ld is:

- $711,726/QALY
- The cost of ILd is $603,759 (95% CI: $549,803 - $665,085), resulting in an incremental cost of $270,456 (ΔC). *The main factor that influences ΔC is the population included (1 or more prior therapies versus 2 or more prior therapies).*
- The clinical effect of ILd is 3.50 (95% CI: 3.17 – 3.83), resulting in an incremental effect of 0.38 (ΔE). *The main factor that influence ΔE is the population included (1 or more prior therapies versus 2 or more prior therapies).*

Overall conclusions of the submitted model:

- *There is no head-to-head clinical trial comparing ILd to current relevant comparators.*
- *The cost-effectiveness relied on an NMA, which has limitations.*
- *Overall survival of ILd versus Ld did not demonstrate a significant difference in overall survival.*
- *ILd may be considered an additional treatment to a pool of currently funded treatment regimens.*
- *Results of the cost-effectiveness analysis should be interpreted with caution in the context of the limitations/assumptions.*

2 DETAILED TECHNICAL REPORT

This section outlines the technical details of the pCODR Economic Guidance Panel's evaluation of the economic evidence that is summarized in Section 1. Pursuant to the *pCODR Disclosure of Information Guidelines*, this section is not eligible for disclosure. It was provided to the pCODR Expert Review Committee (pERC) for their deliberations.

3 ABOUT THIS DOCUMENT

This Economic Guidance Report was prepared by the pCODR Economic Guidance Panel and supported by the pCODR Myeloma Clinical Guidance Panel and the pCODR Methods Team. This document is intended to advise the pCODR Expert Review Committee (pERC) regarding resource implications and the cost-effectiveness of ixazomib (Ninlaro) for relapsed or refractory multiple myeloma. A full assessment of the clinical evidence of ixazomib (Ninlaro) for relapsed or refractory multiple myeloma is beyond the scope of this report and is addressed by the relevant pCODR Clinical Guidance Report. Details of the pCODR review process can be found on the pCODR website (www.cadth.ca/pcodr).

pCODR considers it essential that pERC recommendations be based on information that can be publicly disclosed. Information included in the Economic Guidance Report was handled in accordance with the *pCODR Disclosure of Information Guidelines*. There was no non-disclosable information in the Economic Guidance Report provided to pERC for their deliberations.

This Final Economic Guidance Report is publicly posted at the same time that a pERC Final Recommendation is issued. The Final Economic Guidance Report supersedes the Initial Economic Guidance Report. Note that no revisions were made in between posting of the Initial and Final Guidance Reports.

The Economic Guidance Panel is comprised of economists selected from a pool of panel members established by the pCODR Secretariat. The panel members were selected by the pCODR secretariat, as outlined in the pCODR Nomination/Application Information Package and the Economic Guidance Panel Terms of Reference, which are available on the pCODR website (www.cadth.ca/pcodr). Final selection of the pool of Economic Guidance Panel members was made by the pERC Chair in consultation with the pCODR Executive Director. The Economic Guidance Panel is editorially independent of the provincial and territorial Ministries of Health and the provincial cancer agencies.

REFERENCES

1. pan-Canadian Oncology Drug Review manufacturer submission: Ninlaro (ixazomib as ixazomib citrate), 4 mg capsule. Oakville (ON): Takeda Canada Inc; 2018 Nov 29.
2. Moreau P, Masszi T, Grzasko N, et al. Oral ixazomib, lenalidomide, and dexamethasone for multiple myeloma. *N Engl J Med*. 2016;374(17):1621-1634.
3. Sikander Ailawadhi, Maral DerSarkissian, Mei Sheng Duh, Marie-Hélène Lafeuille, George Posner, Stephen Ralston, Erin Zagadailov, Abbie Ba-Mancini, Robert Rifkin. Cost Offsets in the Treatment Journeys of Patients With Relapsed/Refractory Multiple Myeloma. Clinical Therapeutics, Volume 41, Issue 3, 2019, Pages 477-493.e7
4. Xavier Armoiry, Martin Connock, Alexander Tsertsvadze, Ewen Cummins, G. J. Melendez-Torres, Pam Royle, Aileen Clarke1 Ixazomib for Relapsed or Refractory Multiple Myeloma: Review from an Evidence Review Group on a NICE Single Technology Appraisal. PharmacoEconomics (2018) 36:1073–1081
5. Josh J. Carlson, Gregory F. Guzauskas, Richard H. Chapman, Patricia G. Synnott, Shanshan Liu, Elizabeth T. Russo, Steven D. Pearson, Elizabeth D. Brouwer, and Daniel A. Ollendorf, Cost-effectiveness of Drugs to Treat Relapsed/Refractory Multiple Myeloma in the United States. Journal of Managed Care & Specialty Pharmacy Vol. 24, No. 1 January 2018
6. Sarah Hollmann, Daniel Moldaver, Nik Goyert, Daniel Grima, and Eric M. Maiese. A U.S. Cost Analysis of Triplet Regimens for Patients with Previously Treated Multiple Myeloma. Journal of Managed Care & Specialty Pharmacy Vol. 25, No. 4 April 2019