# #3586 Patient Preferences for Multiple Myeloma (MM) Treatment: A Discrete Choice Experiment


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## BACKGROUND

- The growing importance of patient preferences in treatment decision-making in oncology is evidenced by the expanding role of patient-reported experiential data in both regulatory and reimbursement considerations of value
- While recent introduction of new treatments for multiple myeloma (MM) have demonstrated longer time to progression and improved survival, regimen options still vary with respect to efficacy, safety, and dosing
- Therefore, patients and providers must consider the trade-offs inherent in making treatment decisions within a increasingly complex context
- Understanding and weighing benefit-risk is particularly salient for MM, given the number of new treatment options available
- However, a lack of evidence exists describing patient reported preferences within the context of currently available regimens; very few studies in MM, with most examining attributes and levels of treatments that are of primary relevance to the patient, but are clinically implausible given current treatment landscape[1-3]
- To address this gap, this study examined patient preferences for hypothetical MM treatments in early lines of therapy with the goal of ***conducting a study that both reflects patients in the real world and is clinically appropriate***

## STUDY OBJECTIVES

- To describe how MM patients on early lines of therapy (first-line (FL), second-line (1PL), and third-line (2PL)) weigh different aspects of treatment, such as efficacy, tolerability, time, and aspects related to quality of life when evaluating treatment options; specific factors examined both individually (regimen attributes) and holistically (regimen profiles) to identify preferences, and compared across patients differing in early LOT

## METHODS

### Design

- A sequential mixed methods design, incorporating both qualitative and quantitative phases, to develop interview guide, survey structure, with content informed by existing studies, clinical considerations, current treatments available/guidelines (NCCN), and expert clinical input
- Qualitative phase identified content and language, via semi-structured interviews, to elucidate how patients understand and construct treatment-related factors; results used to inform content and language, and validate sections of the online survey; structure of the survey: Sociodemographic Characteristics & Overall Health; MM Diagnosis, Treatment History, and Patient-Provider Communication; Quality of Life (i.e., FACT-MM); Choice Model Exercise
- Discrete Choice Experiment (DCE) methodology designed to assess preferences & willingness to accept tradeoffs among hypothetical treatments that varied on levels of specific attributes – presented with a series of pairs of hypothetical treatment profiles (no drug names shown) and asked to choose between them
  - The design included multiple hypothetical scenarios/choice exercises combining 6 attributes, with 2-3 levels per attribute (Table 1)
- The study received exemption status by the Pearl Internal Review Board (Indianapolis, IN)

### Sample & Data Collection Methods

- Patients were recruited from online research panels, advocacy partnerships, patient communities, and physician referrals
- Patients aged 18 years or older with MM were invited to participate if they met the following eligibility requirements:
  - Self-reported physician diagnosis of MM
  - Self-reported currently receiving MM treatment as FL, 1PL, or 2PL
  - Not currently participating in a clinical trial
- Qualitative Phase
  - Total of 21 patients participated in 30-45 min phone interviews, 04/2018-05/2018
- Quantitative Phase
  - Pilot testing of the online survey consisted of cognitive interviewing (n=4), 60 min interviews 05/2018
  - A total of 200 patients completed the 30 min online survey, 04/2018-08/2018 (respondents were purposively selected to reflect 50% FL and 50% 1PL/2PL in the final sample)

### Analysis

***Phase I: Qualitative***

- All interviews were audio recorded and transcribed for Content Analysis; thematic analysis via coding enabled systematic identification of emerging key themes from textual data; descriptive statistics were used to examine all themes for differences and similarities according to patients' current line of therapy (FL/1PL/2PL)
- Results of the qualitative phase not reported here

***Phase II: Quantitative***

- Descriptive statistics were reported for patient characteristics and treatment attribute ratings among patients with MM
- DCE data were analyzed using a hierarchical Bayesian model
  - The underlying model was a conditional logit choice-probability model that used effects coding for attribute levels
  - The hierarchical nature of the model accounted for two levels: 1) higher level – individuals' preference weights were described by a multivariate normal distribution and 2) lower level – individuals' preference weights were determined by a multinomial logistic model
  - In order to compare the relative preference of attributes, differences in preference weights between the most and least preferred level of an attribute were calculated, with the differences contributing to overall utility values; relative ranges enable calculation of percentages, providing importance values that total 100%; of note, these Importance measures are ratio-scaled, but they are also relative[4]

**Table 1. Regimen Attributes and Levels**

| | CLINICALLY DEFINED/ PRESENTED AS | PATIENT UNDERSTANDS UNDERLYING CONSTRUCT AS | WORDED IN SURVEY AS | LEVELS* |
|---|---|---|---|---|
| **Overall Survival** | | | | |
| 1 | OS | *The value of extended (or fuller) life expectancy/life span* | The treatment will extent your life expectancy by | 2 years<br>4 years<br>6 years |
| **Progression Free Survival** | | | | |
| 2 | PFS | *The value of extended symptom maintenance/reduction living* | The treatment can bring about and maintain a remission in your multiple myeloma (is under control) for | 9.5 months<br>1.5 years<br>2.5 years<br>3.5 years |
| **Dosing and Administration** | | | | |
| 3 | Frequency of Dosing in first year of treatment | *The value/burden of actual experience of taking/dosing (including number of times have to travel, time commitment each session, where taking treatment, opportunity costs, how fits into life/other-competing priorities)* | You will need to go to the hospital or outpatient center for treatment | 21 times over the course of 1 year<br>39 times over the course of 1 year<br>78 times over the course of 1 year |
| 4 | Dosing Duration/Administration | | Your treatment will take | less than 2 hours to receive it each time<br>2 to less than 5 hours<br>5 or more hours |
| 5 | Setting for Administration | | You will take your treatment regimen | At Home<br>In the Outpatient Clinic or Hospital |
| **Adverse Events** | | | | |
| 6 | Grade 3/4 AE (including Infusion Reactions) | *Tolerability* | Your chance of experiencing a serious side effect of the treatment that requires immediate medical attention is | less than 45%<br>46% to 55%<br>more than 55% |

## RESULTS

- Overall, participants had a mean age of 60.4 years, were predominantly male (57.5%), White (65.0%); mean time since diagnosis was 43.1 months (Table 2)
- Of those employed (32.5%), over half report being on temporary leave of absence (17.5%); more patients in later LOTs report low income (FL: 5.0%, 1PL: 17.4%, 2PL: 29.0%)
- Over 30% of FL, 1PL, and 2PL participants report receiving monotherapy for treatment

**Table 2. Study Sample Characteristics**

| Patient Characteristics | | Total (N=200) | Line of Therapy: FL (n=100) | Line of Therapy: 1PL/2PL (n=100) | | Post Front-line: 1PL (n=69) | Post Front-line: 2PL (n=31) |
|---|---|---|---|---|---|---|---|
| Age | Mean, SD | 60.4, 9.3 | 57.8, 9.2 | 63.0, 8.7 | ** | 61.5, 8.5 | 66.5, 8.3 |
| | 18-64 | 68.0% | 82.0% | 54.0% | | 65.2% | 29.0% |
| | 65+ | 32.0% | 18.0% | 46.0% | | 34.8% | 71.0% |
| Gender | Male | 57.5% | 61.0% | 54.0% | | 50.7% | 61.3% |
| | Female | 42.5% | 39.0% | 46.0% | | 49.3% | 38.7% |
| Employment Status | Employed (full time, part time) | 15.0% | 19.0% | 11.0% | | 11.6% | 9.7% |
| | Employed, on temp leave of absence | 17.5% | 23.0% | 12.0% | | 17.4% | 0.0% |
| | Not/Retired/Other | 67.5% | 58.0% | 77.0% | | 71.0% | 90.3% |
| Race/Ethnicity* | African American/Black | 26.0% | 30.0% | 22.0% | * | 30.4% | 3.2% |
| | White | 65.0% | 57.0% | 73.0% | | 62.3% | 96.8% |
| Primary Health Insurance | Insurance coverage through employer | 40.5% | 52.0% | 29.0% | ** | 33.3% | 19.4% |
| | Individual insurance/coverage purchased directly | 17.0% | 16.0% | 18.0% | | 24.6% | 3.2% |
| | Medicare/Medicare Advantage | 35.5% | 25.0% | 46.0% | | 34.8% | 71.0% |
| Secondary Health Insurance | Yes | 39.5% | 27.0% | 50.0% | ** | 40.6% | 71.0% |
| Comorbidities >10% | Anxiety/depression | 15.0% | 12.0% | 18.0% | | 17.4% | 19.4% |
| | Hypertension | 20.5% | 17.0% | 24.0% | | 26.1% | 19.4% |
| Overall General Health | Poor/Fair | 36.5% | 33.0% | 40.0% | | 44.9% | 29.0% |
| | Good/Very good/Excellent | 63.5% | 67.0% | 60.0% | | 55.1% | 71.0% |
| **Clinical & Treatment Characteristics** | | | | | | | |
| Time since MM Dx (months) | Mean, SD | 43.1, 52.4 | 28.2, 39.5 | 58.1, 59.4 | ** | 49.3, 47.2 | 77.3, 77.3 |
| | Median (range) | 24 (3, 304) | 9 (3, 183) | 31 (3, 304) | | 28 (3, 304) | 41 (7, 278) |
| Prior SCT | Yes | 39.0% | 29.0% | 49.0% | ** | 44.9% | 58.1% |
| Regimens | Monotherapy | 30.5% | | 36.6% | | 36.0% | 38.7% |
| | Combination | 69.5% | | 64.1% | | 65.0% | 61.2% |
| | Doublet | 31.0% | | 31.3% | | 32.0% | 29.0% |
| | Bortezomib-based | 14.0% | | 9.2% | | 10.0% | 6.5% |
| | Lenalidomide-based | 10.5% | | 13.0% | | 14.0% | 9.7% |
| | Other | 6.5% | | 9.2% | | 8.0% | 12.9% |
| | Triplet: Most frequently used | | | VRd: 29.5% | | None more than 5% | Dara-based: 16.1% |
| | Quad+ | 2.1% | | 2.0% | | 2.0% | 3.2% |
| | Received Maintenance Therapy | 34.4% | | 39.5% | | 29.0% | 19.0% |

*p<0.05; **p<0.01; ***p<0.0001

- An improvement in OS from 2y to 6y was most important to patients [difference in preference weight = 4.31 – (-5.08) = 9.39)] whereas reducing treatment duration from >5h to <2h was least important [difference in preference weight = 0.75 – (-0.86) = 1.61] (Figure 1)
- Example of calculated trade-offs: On average, for an increase in OS of 1m, PFS would need to increase by 1.09m to be of equal value:
  - OS 2y to 6y = 9.39, 9.39/48 = 0.19563 unit increase/month; PFS 9.5m to 3.5y = 2.82+2.99 (Figure 1)=5.81, 5.81/32.5m = 0.17877 unit increase/month; 0.19563/0.17877 = 1.09 months
- Additional examples include: an increase in PFS from 9.5m to 1.5y was more valued than an increase in OS from 4y to 6y – patients valued increases in PFS almost twice as much as increases in OS between these periods; reducing the frequency of treatment annually from 78 to 21 yields 1.34 times as much utility as decreasing treatment duration from >5h to <2h
- Improving OS from 2 to 6 years was more than twice as important to patients as decreasing the risk of serious side effects from > 55% to < 45% (Figure 1); Improving PFS from 9.5 months to 3.5 years was more than twice as important as differences in dosing frequency, treatment setting, and treatment duration

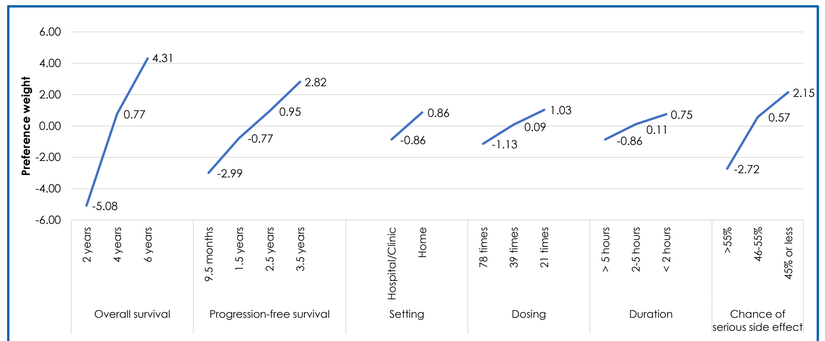


**Figure 1. Attribute Level Preference Weights**

- In the DCE, the most preferred treatment profile was Profile E (total mean preference weight=67.0), followed by Profile D (=61.5) (Table 3)
- Profile E had the highest OS and PFS, which suggests that patients would exchange a higher risk of side effects (46%-55%) and a longer duration of administration (>5 hours) for greater efficacy
- The least preferred treatment profile was Profile A (=49.2), which had the lowest OS and PFS levels and highest risk of side effects levels
- In the Fixed Choice Task, when efficacy (OS and PFS) were comparable, but differences in tolerability, 95% of participants preferred the treatment profile with a lower dosing frequency over a 1 year period (21x) despite a longer infusion time (>5h) compared to a treatment profile with higher dosing frequency (78x) and shorter infusion time (<2h)

**Table 3. Preferences for and Descriptions of Hypothetical Regimen Profiles**

| Descriptions of Hypothetical Regimen Profiles (DCE) | Profile A | Profile B | Profile C | Profile D | Profile E | Profile F | Profile G |
|---|---|---|---|---|---|---|---|
| **OS** | 2 years | 4 years | 4 years | 4 years | 6 years | 4 years | 2 years |
| **PFS** | 9.5 months | 1.5 years | 2.5 years | 1.5 years | 3.5 years | 1.5 years | 1.5 years |
| **Setting** | Outpatient clinic/hospital | Outpatient clinic/hospital | Outpatient clinic/hospital | Outpatient clinic/hospital | Outpatient clinic/hospital | Outpatient clinic/hospital | At home |
| **Dosing Freq** | 39 times | 78 times | 78 times | 21 times | 21 times | 39 times | 39 times |
| **Duration/Admin** | <2 hours | <2 hours | <2 hours | >5 hours | >5 hours | 2-<5 hours | <2 hours |
| **Tolerability** | >55% | >55% | >55% | <45% | 46-55% | >55% | 46-55% |
| **Preferences for Hypothetical Regimens in DCE** | | | | | | | |
| **OS** | 4.92 | 10.77 | 10.77 | 10.77 | 14.31 | 10.77 | 4.92 |
| **PFS** | 7.01 | 9.23 | 10.95 | 9.23 | 12.82 | 9.23 | 9.23 |
| **Setting** | 9.14 | 9.14 | 9.14 | 9.14 | 9.14 | 9.14 | 10.86 |
| **Dosing Freq** | 10.09 | 8.87 | 8.87 | 11.03 | 11.03 | 10.09 | 10.09 |
| **Duration/Admin** | 10.75 | 10.75 | 10.75 | 9.14 | 9.14 | 10.11 | 10.75 |
| **Tolerability** | 7.28 | 7.28 | 7.28 | 12.15 | 10.57 | 7.28 | 10.57 |
| ***Total mean(se) preference weight**** | ***49.2 (0.25)*** | ***56.0 (0.07)*** | ***57.8 (0.11)*** | ***61.5 (0.12)*** | ***67.0 (0.16)*** | ***56.6 (0.10)*** | ***56.4 (0.13)*** |
| ***95% CI*** | *48.69, 49.68* | *55.90, 56.18* | *57.54, 57.98* | *61.23, 61.70* | *66.69, 67.33* | *56.41, 56.81* | *56.17, 56.68* |

| Description of Hypothetical Regimens (Fixed Choice) | | OS[1] | PFS[2] | Setting[3] | Dosing Freq[4] | Duration Admin[5] | Tolerability[6] |
|---|---|---|---|---|---|---|---|
| **Fixed Choice Task 1** | Profile X | 4 years | 1.5 years | Outpatient clinic or hospital | 21 times/1 year | >5 hours | <45% |
| | Profile Y | 4 years | 1.5 years | Outpatient clinic or hospital | 78 times/1 year | <2 hours | >55% |
| **Fixed Choice Task 2** | Profile X | 6 years | 3.5 years | Outpatient clinic or hospital | 21 times/1 year | >5 hours | 46-55% |
| | Profile Y | 4 years | 2.5 years | Outpatient clinic or hospital | 78 times/1year | <2 hours | >55% |

| Preference for Hypothetical Regimens (Fixed Choice) | | Overall (N=200) | Front-line (n=100) | 1PL (n=69) | 2PL (n=31) |
|---|---|---|---|---|---|
| **Fixed Choice Task 1** | Profile X | 95.0% | 95.0% | 92.8% | 100.0% |
| | Profile Y | 5.0% | 5.0% | 7.2% | 0.0% |
| **Fixed Choice Task 2** | Profile X | 96.0% | 96.0% | 97.1% | 93.5% |
| | Profile Y | 4.0% | 4.0% | 2.9% | 6.5% |

[1]Overall Survival attribute response options: 2 yrs, 4 yrs, 6 yrs; [2]Progression Free Survival attribute response options: 9.5 mos, 1.5 yrs, 2.5 yrs, 3.5 yrs; [3]Setting for treatment attribute response options: At home OR In outpatient clinic/hospital; [4]Dosing frequency attribute response options: 21 times, 39 times, 78 times over 1 yr; [5]Duration of Administration attribute response option: <2 hrs, 2 to <5 hrs, >5 hrs; [6]Tolerability attribute response options: <45%, 45%-55%, >55%

*p-value <0.001 reflects preferences differ across treatment profiles (ANOVA test)*

## CONCLUSIONS

- Patients place higher importance on OS and PFS than other treatment attributes, and may be willing to accept an increase in the risk of serious side effects and reduced convenience in exchange for greater efficacy; over a short term, increases in PFS may be more valued than OS
- When OS and PFS are comparable, but differences in tolerability, more frequent dosing may be more important to patients than infusion time
- Further, results indicate that patient preferences for MM treatments may vary by LOT, illustrating the possible dynamic nature of treatment decision-making – i.e., what is important to patients in determining preference may change over time and by treatment experience

## LIMITATIONS

- As is typical in surveys, the self-reported nature of the data may have introduced reporting bias; generalizability may be limited by sampling approaches – e.g., respondents without Internet or computer access were not able to participate in the study
- DCE methodology is restricted to a limited number of attributes and levels that can be included; selected set of attributes may not reflect all aspects of a treatment that influence patient preference (e.g., physician recommendation and cost)

## KEY INSIGHTS & IMPLICATIONS FOR PRACTICE

- Patients in early lines of therapy place the highest value on efficacy; however, preferences for treatment options do not appear to be stable as currently assumed, but instead reflect changes in what patients may value over time and lived experience
- Patients may consider the convenience of a therapy more holistically – e.g., convenience is not simply "chair-time," but rather may be thought of in terms of total time requirements of a treatment regimen, i.e., including frequency of outpatient visits
- This study provides insight into how MM patients value and assess meaningful "benefit-risk" when making treatment decisions, which can be useful for facilitating physician-patient communications and shared decision making


**REFERENCES**

1. Mulbacher et al, 2008.; 2. Mulbacher et al, 2011.; 3. Postmus et al, 2018.; 4. Hauber et al, ISPOR 2018.



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**DISCLOSURES**

Conflict-of-interest disclosure: C.M. is employed by Janssen Scientific Affairs, LLC (JSA) and E.M.M. is employed by and has stock in JSA; JC was employed by JSA at the time of study conduct; M.J. C-M, M.M. and N.A. are employed by Kantar Health and provided research consulting services to JSA; and N.R provided research consulting services to JSA


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