Patient Preferences on Drug Product Design Attributes Among UK Lung Cancer Patients

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Objective

To assess experiences and preferences regarding drug product attributes among patients with lung cancer in the United Kingdom (UK) using a multi-method approach.

Background

- The use of oral anticancer medications has increased in cancer therapy¹, especially for treatment of advanced non-small cell lung cancer (NSCLC).
- With the shift to oral medication from intravenous therapy, patients gain increased flexibility about when and how they take their medication.
- However, when the treatment delivery interaction between the patient and the healthcare provider is removed, the risk of nonadherence increases.²
- We believe that the physical attributes of the medication as well as the complexity of the dosing regimen can play a role in adherence to taking oral anticancer medication in lung cancer patients.
 Insights into patient preferences can allow drug product formulation scientists to design more patient-centric medications, which may promote an increase in adherence, which in turn would lead to more beneficial health outcomes.³

Methods

- Inclusion Criteria:
- $_{\circ}$ Over the age of 18 years
- Confirmed diagnosis of oncogene-driven lung cancer
- $_{\circ}$ Be a resident of the UK
- The full study was conducted in three stages:
- Patient advisory board members completed a quantitative online survey to understand their preferences.
- 2. A virtual patient advisory board was conducted.
- 3. An extrapolation study was conducted in which the quantitative online survey was distributed to a larger group of patients who met the eligibility criteria to confirm the results of the advisory board.
- Patients were recruited to participate in the advisory board and extrapolation survey by three patient organizations in the UK:
- Roy Castle Lung Cancer Foundation
- ALK Positive Lung Cancer (UK)
- EGFR Positive UK.
- Online Survey Preceding the Advisory Board
- The survey was developed by the study team and representatives from the patient organizations.
 The survey included three object-case (Case 1) best-worst scaling (BWS) exercises⁴.

- Each best-worst scaling exercise was analyzed separately. A BWS score for each item in each exercise by counting the number of times the item was chosen as Best minus the number of times the item was chosen as Worst and dividing the difference by the number of times the item appeared in the exercise.
- $_{\circ}$ $\,$ Higher scores indicate greater importance, preference, or desirability for that item.
- $_{\circ}$ The survey also included background questions that were analyzed with frequency and percentages.
- Advisory Board
 - The advisory board participants attended a virtual meeting to review and discuss the survey results to gather patient feedback on their experience with lung cancer medication and to elicit patient preferences regarding the drug-product attributes of oral lung cancer therapies.
 - The advisory board was co-facilitated by two authors (BH, JC) following a semi-structured discussion guide and utilized participatory methods during the session⁵.
- Extrapolation Survey
- To confirm that the survey responses from advisory board participants are generalizable to the population of people with oncogene-driven lung cancers in the UK, the survey was administered to additional members of the patient communities.

Figure 1. Example of a BWS Question for the Medication Modality Exercise

Please make two selections, your most preferred way and your least preferred way to take a lung cancer medication. Assume everything else, such as how well they work, and side effects are the same.



- In a Case 1 BWS exercise, participants are presented with a series of approximately 8-12 questions with a set of 3-5 items and respondents are asked to indicate which item in the set is best and worst (Figure 1). The questions are designed by an experimental design.
- The BWS exercises in the survey included 27 items, separated into 3 groups:
- medication appearance (8 items)
- medication instructions (6 items)
- medication modality (13 items)

Least Preferred Way		Most Preferred Way		
\bigcirc	4 small tablets, once a day	\bigcirc		
\bigcirc	1 large tablet, twice a day	\bigcirc		
\bigcirc	Syrup, twice a day	\bigcirc		
\bigcirc	1 dissolvable tablet, once a day	\bigcirc		

Results

Descriptive Statistics (Table 1)

- A total of 43 patients were surveyed (advisory board participants (n=8); online survey respondents (n=35)).
- 40% were aged 55-64 and most were female (74%).
- Most patients had experience taking tablets (67%) or capsules (37%) and limited experience with infusions (23%) or injections (5%).
- Oncologists were the most common source of drug product information and blister packs were the most preferred packaging type.

Table 1. Descriptive statistics for advisory board participants and respondents who completed the extrapolation survey

		Advisory Board (N=8)		Extrapolation Survey (N=35)	
		No.	%	No.	%
Age	Under 35	0	0	0	0
	35 - 44	0	0	2	5.7
	45 - 54	2	25	9	25.7
	55 - 64	3	37.5	14	40
	65 - 74	3	37.5	8	22.9
	75 - 84	0	0	2	5.7
	85 or older	0	0	0	0
Gender*	Female	7	87.5	18	51.4
	Male	1	12.5	8	22.9
	Employed full-time	1	12.5	4	11.4
	Employed part-time	2	25	10	28.6
Employment	Retired	5	62.5	12	34.3
	Unemployed, on medical leave, or other employment status	0	0	7	20
E .1	White	7	87.5	33	94.3
Ethnicity	Another ethnicity	1	12.5	0	0
Belationship	Single	2	25	10	28.6
Status*	Married	6	75	23	65.7
	Did not obtain a University degree	1	12.5	9	25.7
Education*	Completed University or higher	6	75	23	65.7
	Core City: population and economic centres	4	50	4	11.4
	Other Cities: settlements with a population of more than 175.000	0	0	1	2.9
	Large Town: settlements with a population between 60.000 and 174.999	0	0	2	5.7
Community Setting	Medium Town: settlements with a population between 25,000 and 59,999	0	0	6	17.1
	Small Town: settlements with a population between 7,500 and 24,999	2	25	12	34.3
	Village or small community: settlements with a population of less than 7,500	2	25	9	25.7
Cancer Stage	Stage I-II	0	0	0	0
	Stage III	1	12.5	2	5.7
	Stage IV	7	87.5	33	94.3
Lung Cancer Medication Mode Experience	Tablet	7	87.5	24	68.6
	Capsule	2	25	14	40
	Self-injection	1	12.5	1	2.9
	Intravenous Injection	3	37.5	1	2.9
Sources used for information about medication taking	Oncologist	4	50	29	82.9
	Hospital / Oncology Nurse	2	25		51.4
	Pharmacist in hospital	1	12.5	15	42.9
	Information on the medication packaging	3	37.5	13	37.1
	Information leaflet inside the medication packaging	2	25	14	40
	Other nations	2	25	1- 1	+0 11 Д
	A leaflet provided by my bospital or pharmacy		12.5	1	11.4
	Websites	0	12.0	4	11.4
	Macmillan nurso	0	0	4	F 7
	Pharmagiat in my logal pharmagy	0	0	2	0.0
	CD A different dector Meaniller Ocution illine in t	0	0	1	2.9
	GF, A different doctor, iviacmilian Centre within hospital	0	0	0	0
Packaging	In a blister pack (where individual pills are pushed out through a metallic foil)	6	75	9 24	68.6
P. 0.0.01100	Neither	0	0	2	5.7

Appearance (Figure 2)

- Smoothness was the most important attribute and roughness was the least important attribute meaning that surface roughness is a highly undesirable attribute of solid oral dosage forms.
- A smooth surface was almost important as the most desirable dosage form.
- In the advisory board, patients stated that they want their medication to be as small as possible and have a smooth surface because these characteristics were associated with increased swallowability.

Figure 2. Best-Worst Scaling Scores – Medication Appearance



Instructions (Figure 3)

- Taking a solid oral dosage form once a day with breakfast was the least burdensome medication-taking requirement.
- Taking medication four times a day without food was the most burdensome.
- Advisory Board participants indicated that requirements for taking a medication with or without food can be difficult to implement, especially if the medication is taken more than once a day.
- Participants described food restrictions as making medication taking difficult, especially when medication must be taken 3 or more times each day, because some patients do not eat three meals each day or do not want to take medications with them when they go out during the middle of the day.

Figure 3. Best-Worst Scaling Scores – Medication Instructions



Modality (Figure 4)

- The most preferred mode of administration was a tablet once a day and the least preferred mode of administration was a subcutaneous injection given once a week (Figure 4).
- Anything once a day is preferred irrespective of the number of tablets/capsules.
- Advisory board participants confirmed this finding they wanted to minimize the impact of medication taking on their daily lives and confirmed that oral administration once a day was preferred.

Figure 4. Best-Worst Scaling Scores – Medication Modality



Attribute

Conclusions

- Increasing use of oral anticancer medications has become more prevalent in cancer therapy and provided greater flexibility and control to patients the attributes of solid oral dose formulations can impact patient acceptability and adherence.
- Drug developers should attempt to limit dosing of these medications to once daily, avoid surface roughness, and develop formulations that can be taken without regard to the timing of meals to the greatest extent possible.

Limitations

- The small sample limits the statistical power of the quantitative estimates from a patient preference study.
- Patients participating in both the advisory board and the extrapolation survey were, on average, highly educated, which may indicate the presence of selection bias and further limit the generalizability of the results.

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Disclosures/COIs:

JRC, LEB, AA, S-AD, CD, and BH are employees of Pfizer and hold stock or stock options in Pfizer Inc. MO-B was an employee of Pfizer when this study was conducted DM and AT have no conflicts to declare. DM and AT were paid consultants to Pfizer in connection with the development of this work.



