ORIGINAL ARTICLE

Access to Diagnostics and Treatment for People With Metastatic EGFR-Positive NSCLC: Lessons From Project PRIORITY

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ABSTRACT

Introduction: The treatment landscape for people diagnosed with EGFR-mutated (EGFR-m) NSCLC has rapidly evolved, yet there remains limited self-reported information about the lived experience. In this paper, we describe the clinical characteristics and treatment experiences of people living with EGFR-m lung cancer from Project PRIORITY, a patient-driven study.

Methods: An online survey was distributed among the EGFR Resisters community between April 2019 and January 2020. The survey captured participants' demographics and lung cancer risk factors, diagnostic and treatment pathways, and prevalence of side effects. Descriptive statistics were used and included subgroups based on residency and cancer stage.

Results: Of the 425 participants, most were female (67%), under 60 years old (53%), and resided in the United States (74%). The most frequently reported symptom at diagnosis was cough (54%), though 18% reported no symptoms. In addition, 89% reported receiving at least one tyrosine kinase inhibitor (TKI); osimertinib was the most prescribed first-line TKI for stage IV participants diagnosed after 2017. Participants residing in the United States were more likely to have access to advanced diagnostic (next-generating sequencing) and newer treatments such as osimertinib. Just under half of the sample (47%) had experienced progressive disease and were no longer on first-line treatment.

Conclusion: The TKI era has been practice changing; however, little is understood from the perspective of people living with EGFR-m NSCLC. This paper is the first to explore this and found it is possible to have people self-report complex health information about their lung cancer. In addition, although most participants were diagnosed after osimertinib became guideline-recommended treatment, disparities in treatment were identified.

Keywords: EGFR mutation; Non–small cell lung cancer; NSCLC; Patient experience; Online survey; Treatment

Introduction

The treatment landscape for patients diagnosed with EGFR-mutant NSCLC (EGFR-m NSCLC) has rapidly evolved in the past two decades. Mutations in the EGFR gene were the first targetable alterations discovered in

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NSCLC.[1,2] In the United States, the introduction of tyrosine kinase inhibitors (TKIs) has resulted in remarkable improvements in overall survival and progression-free survival for people with EGFR-m NSCLC.[3]

Much of our knowledge about access to and experience with EGFR-m NSCLC–targeted therapies comes from clinical trials, which may not fully capture the broader patient experience. To advance our understanding of patient outcomes outside of clinical trials, researchers have used real-world data sets to describe the clinical characteristics[4] of those diagnosed with EGFR-m NSCLC, and descriptive effectiveness studies of TKIs, which include studying the overall survival of patients receiving guideline-concordant care.[5] These studies advance our understanding of the receipt of clinical care. Nevertheless, such studies are typically single-institution or health system-based and are limited by geographical catchment area. Patient-centered information, such as treatment preferences and patient-reported side effects are rarely included, which are essential when considering the quality of life of people living with NSCLC. Patient-reported data provide an opportunity to comprehensively study patient experiences.

Despite our increased understanding of EGFR-m NSCLC biology and therapies, no large international patient-reported registry or study has described the experience of individuals living with this disease. As people with EGFR-m NSCLC have access to advanced therapies and are living longer, it is critical for clinicians to understand the patients' lived experiences, specifically, the types and sequence of therapies received across different treatment settings and the side effects experienced and reported by patients. Project PRIORITY (Patient Reported Initiative on Resistance, Incidence, Treatment studY), a patient-founded study, aimed to address these issues. Herein, we report the initial Project PRIORITY findings, focusing on the diagnostic pathways, treatments received, and patient-reported side effects.

Materials and Methods

Project PRIORITY

Project PRIORITY was a collaboration between the EGFR Resisters—a global, grassroots, patient-driven community dedicated to changing EGFR-m lung cancer into a chronic disease—and LUNGevity Foundation—a nonprofit dedicated to affecting quality of life and survivorship of all people diagnosed with having lung cancer by accelerating research into more effective treatments and providing community, support, and education. Project PRIORITY was initiated in April 2019 with a longitudinal survey that closed in January 2020. The objective was to understand members of the EFGR Resisters community's lived experiences with respect to the following three domains: demographics and risk factors, diagnostic and treatment pathways, and the effects that affect daily life.

Study Design

The development of the survey included input from patients and caregivers from the EGFR Resisters, three medical oncologists, and a regulator. A pilot test of the survey with 10 members of the EGFR Resisters community was conducted before the survey launched. Participants completed the survey online. The final survey was distributed through the EGFR Resisters' closed Facebook group and through social media using the Qualtrics platform. People in the EGFR Resisters group also received newsletters with survey information and e-mail invitations to participate in the survey.

Inclusion criteria were a diagnosis of EGFR-m lung cancer of any stage and age above 21 years (patient or caregiver or people who identified as both patient and caregiver). People whose lung cancer did not have an EGFR mutation were excluded. Patients were invited to self-report their experiences and caregivers were invited to complete the survey on their patient's behalf. All participants were required to provide explicit online consent before proceeding with the survey. Once a participant initiated the survey, they could access it for 7 days from the same electronic device. Participants who provided an e-mail address were invited to complete a follow-up survey 6 months after completing the first survey. The study was determined as exempt by the Advarra institutional review board (IRB #[Pro00033245]). The study was funded by the EGFR Resisters and LUNGevity Foundation.

Survey

The first survey (supplementary online information), the focus of this manuscript, included 41 multiple-choice and open-ended questions related to the participant's experience of lung cancer, 20 questions about the impact of lung cancer on quality of life, 42 questions specific to EGFR-m lung cancer, and 10 demographic questions. Data included in this report were collected from April 2019 to February 2020. Because the survey was also available to participants outside of the United States and the definition of race and ethnicity is country specific, we did not capture this information through the survey.

Statistical Analysis

All analyses included all available data, and missing is denoted where appropriate. Descriptive statistics are presented using percentages and means. As a global study, data were collectively analyzed from all participants, and by subgroups of participants in the United

States (US) and outside of the United States (ex-US). A granular approach to location was not taken due to the small number of participants in each individual county. Additional subgroup analyses were carried out based on drug classes, treatment lines, and disease stages. Side effect analyses were restricted to patient-reported symptoms (i.e., caregivers were excluded due to the inclusion of unobservable symptoms). Stata version 18[6] and R version 4.3.2[7] were used to analyze the data.

Results

Clinical and Demographics Characteristics

The first survey was completed by 425 participants (US n = 313; ex-US n = 112). A small group (n = 62) dropped out at various points during the survey. Overall, most participants were female (67%) and under the age of 60 years (53%). Among U.S. participants, most were female (69%), aged 60 years and under (50%), diagnosed before 2018 (57%), reported adenocarcinoma histology (91%), and diagnosed at stage IV (80%). Among ex-U.S. participants, most were also female (59%), aged 60 years and under (62%), diagnosed in 2018 or later (62%), reported adenocarcinoma histology (96%), and diagnosed at stage IV (75%; Table 1). Unless noted, all findings in subsequent discussion refer to the overall sample.

Diagnostic Trajectory

A small proportion, (18%) of the sample, reported no symptoms at diagnosis. Specifically, half (50%) of the 36 participants diagnosed with having stage I/II had no symptoms and were diagnosed as an incidental finding secondary to another health issue, compared with 15% of the 382 participants diagnosed incidentally at an advanced stage. For participants with cancer-related symptoms present at diagnosis regardless of stage, cough was the most common presenting symptom at 54% overall (stage I/II 30%, stage III 60%, and stage IV 53%) and followed by shortness of breath at 36% overall (stage I/II 33%, stage III 29%, and stage IV 37%).

Of the 397 participants (93%) who had biomarker testing at diagnosis, 53% received results within 2 weeks of testing and 75% reported that their doctor waited for the results before starting treatment (US 50% <2 wk and 74% waited; ex-US 62% <2 wk and 77% waited). Regarding next-generation sequencing (NGS) testing at diagnosis, 33% of participants reported NGS of a tumor sample (US 39%; ex-US 18%) and 28% indicated that they did not know whether NGS had been performed. Furthermore, 38% reported NGS from a plasma-derived circulating tumor DNA (i.e., liquid biopsy) sample (US 42%; ex-US 25%) and 18% reported that they did not know whether liquid biopsy NGS had been performed.

Treatment

Years of diagnosis ranged from 2000 to 2019, with 20% of participants diagnosed in 2019. Of the 425 participants, 396 (93%) provided treatment information. Most participants (89%) reported receiving at least one TKI during their treatment. Overall, osimertinib was the most frequently prescribed first-line treatment for people with stage IV disease (36%) followed by erlotinib (29%) (most frequent US osimertinib 35%; most frequent ex-US erlotinib 38%) (Fig. 1*A*). Looking at TKI use between 2013 and 2019, we observed a decrease over time in use of first- and second-generation TKIs as osimertinib became available (Fig. 1*A*). This pattern was less pronounced for ex-US participants (Fig. 1*B* and *C*).

More than half of the sample (53%) with stage IV disease were on their first treatment line when surveyed. To explore treatment sequencing for participants with stage IV disease who started their treatment on a TKI, we investigated treatment transitions (n = 105) (Fig. 2) in a subgroup with at least one treatment change. In this subgroup, most participants started on erlotinib (67%), or afatinib (26%). Of the 101 participants who did not receive first-line osimertinib and changed treatment, 62% received second-line osimertinib. For this subgroup, over half of the participants were diagnosed before the approval of first-line osimertinib (2018 in the United States).

Side Effects

For participants surveyed who were receiving first-line osimertinib, the most common mild side effects included fatigue (64%), muscle cramps (42%), diarrhea (34%), and skin rashes and other skin conditions (34%). Moderate or severe symptomatic side effects reported were diarrhea (36%) and followed by skin rashes (32%). The least common moderate or severe symptomatic side effects were edema (1%) and vomiting (1%) (Table 2). In the entire sample, 29% reported being hospitalized at some point due to symptoms or side effects or both associated with their disease or treatment.

Care Team and Support

Participants reported the composition of their current care team (n = 413). There was no difference in the composition of care teams based on where a participant was receiving treatment (US versus ex-US). When asked about who diagnosed their lung cancer, a third of the participants reported that a pulmonologist diagnosed their disease. Most participants reported an immediate

Table 1. Clinical and Demographic Characteristics of Project PRIORITY Participants

Variable	U.S. Resident (n = 313)	Ex-U.S. Resident (n = 112)	Overall (n = 425)
Age			
65 y and under	208 (66%)	86 (77%)	294 (69%)
66 y and over	57 (18%)	13 (12%)	70 (16%)
Missing	48 (15%)	13 (12%)	61 (14%)
Sex			
Female	217 (69%)	66 (59%)	283 (67%)
Male	47 (15%)	33 (29%)	80 (19%)
Other	1 (<1%)	0	1 (<1%)
Missing	48 (21%)	13 (12%)	61 (14%)
Marital status			
Married or domestic partnership	223 (71%)	82 (73%)	305 (72%)
Single, never married	15 (5%)	9 (8%)	24 (6%)
Divorced	24 (8%)	4 (4%)	28 (7%)
Widowed	4 (1%)	3 (3%)	7 (2%)
Prefer not to answer	0	1 (<1%)	1 (<1%)
Missing	47 (15%)	13 (12%)	60 (14%)
Employment status			
Work part-time	67 (21%)	9 (8%)	38 (9%)
Work full-time	29 (9%)	40 (36%)	107 (25%)
Retired	114 (36%)	35 (31%)	149 (35%)
Other	56 (18%)	15 (14%)	71 (17%)
Missing	47 (15%)	13 (12%)	60 (14%)
Country of residence			
United States of America	265 (85%)	N/A	265 (62%)
United Kingdom	N/A	23 (20%)	23 (6%)
Australia	N/A	22 (20%)	22 (5%)
Canada	N/A	11 (10%)	11 (3%)
Other	N/A	43 (38%)	43 (10%)
Missing	48 (15%)	13 (12%)	61 (14%)
Year of diagnosis			
Before 2018	178 (57%)	43 (38%)	221 (52%)
2018–2020	135 (43%)	69 (62%)	204 (48%)
Current stage at time of survey			
Stage I	2 (1%)	2 (2%)	4 (1%)
Stage II	4 (1%)	3 (3%)	7 (2%)
Stage III	8 (3%)	7 (6%)	15 (3%)
Stage IV	253 (81%)	92 (82%)	345 (81%)
No evidence of disease	26 (8%)	5 (4%)	31 (7%)
Do not know	14 (4%)	3 (3%)	17 (4%)
Missing	6 (2%)	0	6 (1%)
Metastatic sites at diagnosis[a]			
Both lungs	58 (23%)	27 (32%)	85 (25%)
Lining of the lung	69 (27%)	31 (37%)	100 (30%)
Lymph nodes	111 (44%)	31 (37%)	142 (42%)
Bones	139 (55%)	37 (44%)	176 (53%)
Brain	96 (38%)	15 (18%)	111 (33%)
Liver	43 (17%)	13 (15%)	56 (17%)
Adrenal glands	16 (6%)	4 (5%)	20 (6%)
Central nervous system	10 (4%)	1 (1%)	11 (3%)
Lymphangitic spread	10 (4%)	3 (4%)	13 (4%)
Other	15 (6%)	4 (5%)	19 (6%)
Lines of treatment			
1	139 (44%)	64 (57%)	203 (48%)
2	79 (25%)	28 (16%)	107 (25%)
3 or more	75 (25%)	14 (3.4%)	93 (21%)
Do not know	4 (1%)	1 (1%)	5 (1%)
Missing	16 (5%)	5 (4%)	21 (5%)

[a]Includes only participants reporting stage IV disease at diagnosis. All data were rounded to the nearest whole number due to which some column totals may be 99% or 101%.
N/A, not applicable.

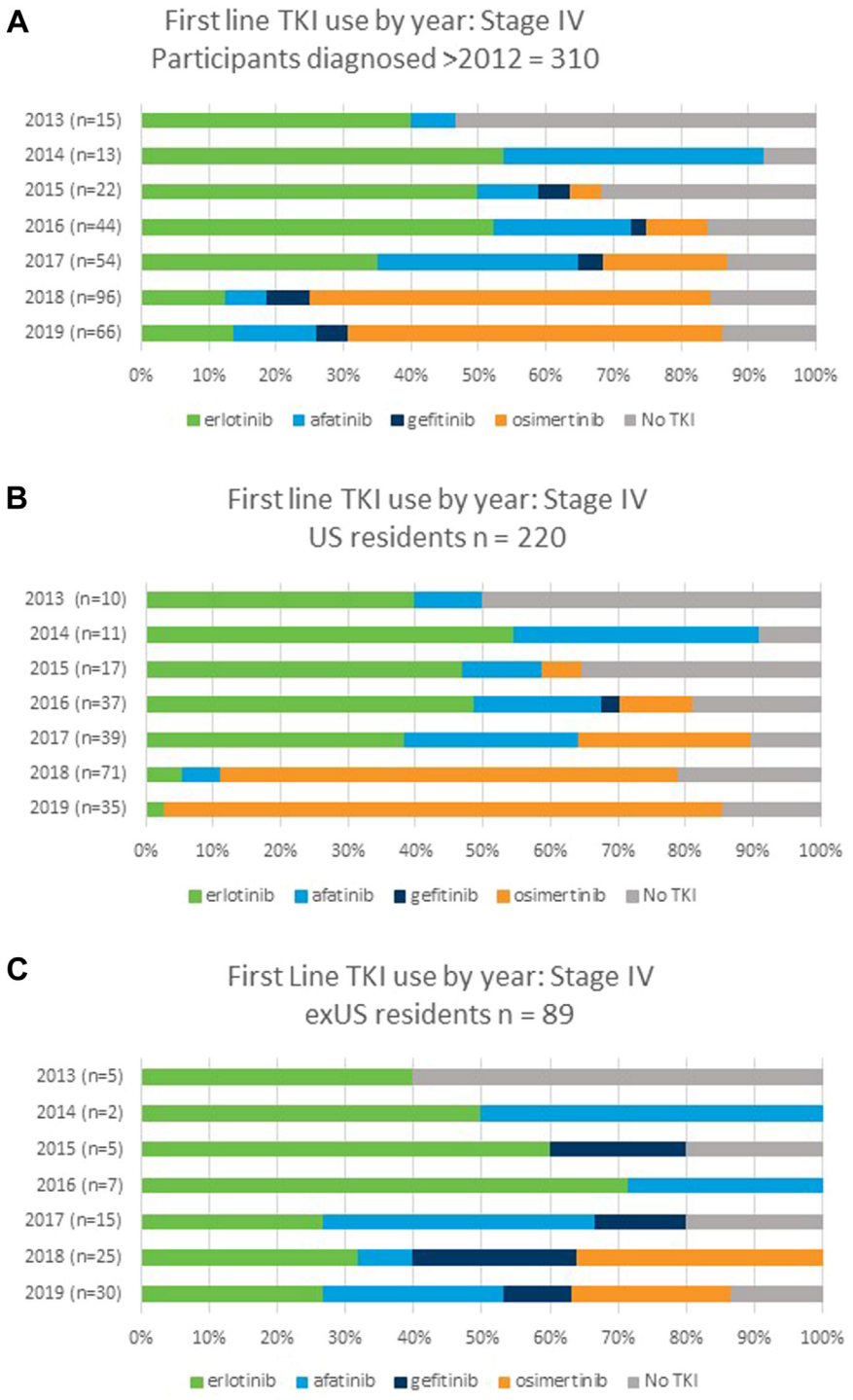

Figure 1. Tyrosine kinase inhibitor (TKI) therapy in EGFR positive Stage IV patients by location. (*A*) First-line TKI use in all participants with Stage IV disease. (*B*) First-line TKI use in US participants with Stage IV disease. (*C*) First-line TKI use in exUS participants with Stage IV disease.

referral to a medical oncologist. When asked about care team composition, nearly all participants (98%) reported having a medical oncologist (general [56%], thoracic [49%]) on their care team (US, 99%, ex-US; 95%) (Table 3). In addition, 32% of the participants reported that radiation oncologists were part of their care team (US, 37%; ex-US, 16%), reaffirming that radiation oncology continues to play a role in the management of metastatic NSCLC. Primary care physicians were included in the team by 31% of the participants (US, 33%; ex-US, 23%). We did not explicitly ask whether the care team was multidisciplinary; however,

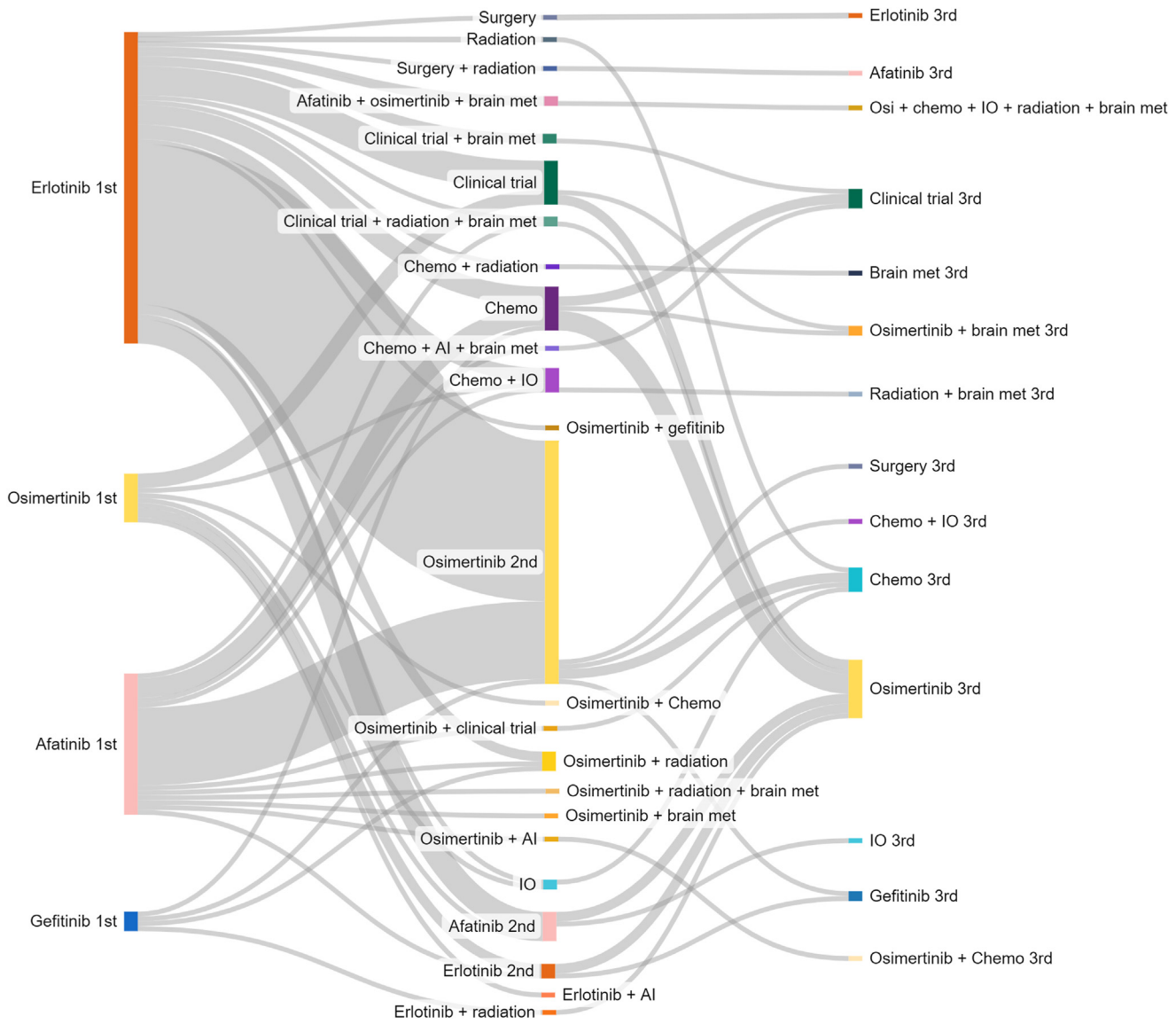

Figure 2. Treatment transitions from first- to second- and third-line therapy (n = 106), for participants with stage IV disease whose first-line treatment was tyrosine kinase inhibitor and with at least one additional line of therapy. The figure does not include the subgroup who was still on their first-line therapy at the time of taking the survey, but it does include treatment changes for those who completed the 6-month follow-up survey and reported a treatment change. AI, angiogenesis inhibitor; brain met, treatment for brain metastasis (inclusive of whole brain radiation, stereotactic radiation, etc.); chemo, chemotherapy; IO, immunotherapy.

46% reported having an oncologist plus at least one other health care professional as part of their team (US, 54%; ex-US 34%). Only 13% of the sample reported having a palliative care specialist involved (US, 16%; ex-US, 4%).

When asked about comfort level regarding discussing (1) symptoms, (2) worries or concerns, and (3) questions about future treatment with their care teams, most reported a high level of comfort for all three items. Furthermore, most patient participants (52%) reported that they made the decision together with their doctor, when asked about their role in decision-making regarding their current treatment. Similar portions of participants reported that they made the decision after considering their doctor's opinion (17%), their doctor made the decision after considering their opinion (16%), and their doctor made the decision with little or no input from them (15%). Less than 1% of the sample reported that they made the decision with little or no input from their doctor. More than half of the participants (63%) reported that the decision making was aligned with their preferences (US 63%; ex-US 63%).

More than half of the participants (60%) participated in a cancer support group (US, 60%; ex-US 59%). People

Table 2. Patient Only Reported Side Effect Symptoms–Subgroup of Patient Respondents on First-Line Osimertinib at Time of Survey, n = 86

Side Effect	Did Not Experience	Mild (Did Not Need Medication to Manage)	Moderate (Needed Medication to Manage)	Severe (Needed Urgent Medical Care to Control)	Missing
Constipation	55 (64%)	18 (21%)	5 (6%)	0	8 (9%)
Diarrhea	23 (27%)	29 (34%)	31 (36%)	1 (<1%)	2 (2%)
Mouth sores	39 (46%)	27 (31%)	13 (15%)	1 (<1%)	6 (7%)
Skin rashes (and other skin conditions)	25 (29%)	29 (34%)	25 (29%)	3 (3%)	4 (5%)
Difficulty in breathing	60 (70%)	14 (16%)	3 (3%)	0	9 (10%)
Nausea	53 (62%)	14 (16%)	12 (14%)	0	6 (7%)
Vomiting	67 (78%)	9 (10%)	1 (<1%)	0	9 (10%)
Swelling in your arms or legs (edema)	69 (80%)	6 (7%)	1 (<1%)	0	10 (12%)
Tiredness (fatigue)	19 (22%)	55 (64%)	5 (6%)	2 (3%)	5 (6%)
Headaches or feeling dizzy (other neurological symptoms)	49 (58%)	24 (28%)	5 (6%)	0	8 (9%)
Pain (any pain other than headaches)	49 (58%)	16 (18%)	12 (14%)	2 (3%)	7 (8%)
Muscle weakness	48 (56%)	27 (31%)	3 (3%)	1 (<1%)	7 (8%)
Change in vision	57 (67%)	19 (22%)	3 (3%)	1 (<1%)	6 (7%)
Muscle cramps	32 (37%)	36 (42%)	10 (12%)	1 (<1%)	7 (8%)
Other side effects	27 (31%)	7 (8%)	9 (10%)	1 (<1%)	42 (49%)

Note: Two participants reported none of the side effects listed. All data were rounded to the nearest whole number due to which some column totals may be 99% or 101%.

joined these support groups to (1) learn about the latest information on lung cancer (85%); (2) meet fellow patients with lung cancer and caregivers (73%); and (3) get emotional support (67%).

Discussion

Project PRIORITY is the first descriptive study of real-world data reported by people diagnosed with EGFR-m NSCLC and their caregivers. The sample reflects the younger, female demographic of the EGFR-m NSCLC population.

Most people diagnosed with having EGFR-m NSCLC either present with symptoms or their cancer is incidentally diagnosed on imaging performed outside of lung cancer screening due, in part, to the low tobacco exposure history of this population.[8,9] In 2019, when our study was conducted, National Comprehensive Cancer Network guidelines recommended that all newly diagnosed people with EGFR-m NSCLC receive osimertinib as first-line treatment.[10] Although many in our sample received guideline-concordant care, we observed that after the approval of first-line osimertinib in 2018 in the United States and Europe, gaps in accessing osimertinib appeared. In the U.S. subgroup, though osimertinib became the dominant first-line TKI, not every patient diagnosed in 2018 or after received first-line osimertinib in the United States. Furthermore, this shift was not observed in the ex-US subgroup, even though half of those participants resided in European countries. For people residing outside the United States, there can be a lag in regulatory approval or payer coverage[11] for newer therapies such as osimertinib. It is unclear from our study where the access barrier was. It is important to note that the EGFR-m NSCLC standard of care has not changed dramatically since the survey, making our study findings relevant.

In our sample, more than half the participants did not receive NGS-based tissue or liquid testing. This information was self-reported, and a sizable group did not report that they had NGS testing, possibly because participants were not informed of the specific test by their care team; therefore, the prevalence of NGS may be underestimated. Nevertheless, most of the sample was recently diagnosed at the time of the study. Thus, our findings suggest that payer coverage for NGS, mandated by a 2019 National Coverage Decision,[12] may not be the sole determinant of NGS uptake. One limitation is that no information on other types of testing (e.g., polymerase chain reaction) was collected. Recent real-world research reports have revealed that access to advanced diagnostics followed by matching to appropriate targeted treatment leads to superior outcomes in patients with metastatic NSCLC. Indeed, this has been found

Table 3. Interactions With Health Care Providers

Care Team Composition	U.S. Resident (n = 313)	Ex-U.S. Resident (n = 112)	Overall (n = 425)
HCP who diagnosed lung cancer			
Pulmonologist	105 (34%)	38 (34%)	143 (34%)
Oncologist	87 (28%)	33 (29%)	120 (28%)
Primary care doctor or nurse practitioner	71 (23%)	16 (14%)	87 (20%)
Surgeon	53 (17%)	16 (14%)	69 (16%)
Emergency room doctor	48 (15%)	16 (14%)	64 (15%)
Radiologist	16 (5%)	6 (5%)	22 (5%)
Other	30 (10%)	11 (10%)	41 (10%)
Do not know	4 (1%)	1 (1%)	5 (1%)
Immediate referral to oncologist after diagnosis			
Yes	280 (89%)	91 (81%)	371 (87%)
Specialties involved in current care			
General oncologist	174 (56%)	63 (56%)	237 (56%)
Thoracic oncologist	160 (51%)	46 (41%)	206 (48%)
Radiation oncologist	116 (37%)	18 (16%)	134 (32%)
Thoracic surgeon	34 (11%)	10 (9%)	44 (10%)
General surgeon	3 (1%)	0	3 (1%)
Primary care physician	103 (33%)	26 (23%)	129 (30%)
Palliative care	50 (16%)	4 (4%)	54 (13%)
Other	22 (7%)	6 (5%)	28 (7%)
Missing	9 (3%)	3 (3%)	12 (3%)
Multidisciplinary team (current)[a]			
Yes	166 (53%)	37 (33%)	222 (52%)
Comfort Level With Care Team	**U.S. Patients Only (n = 260)**	**Ex-U.S. Patients Only (n = 81)**	**Total[b] (n = 341)**
Do you feel comfortable talking to your treating doctor about your symptoms? (On a scale of 1 to 5, where 1 = very comfortable and 5 = not at all comfortable, select one.)			
1. Very comfortable	174 (67%)	42 (52%)	216 (63%)
2. ■■■	41 (16%)	16 (20%)	57 (17%)
3. ■■■	15 (6%)	8 (10%)	23 (7%)
4. ■■■	6 (3%)	7 (9%)	13 (4%)
5. Not at all comfortable	16 (6%)	5 (6%)	5 (6%)
Missing	8 (3%)	3 (4%)	11 (3%)
Do you feel comfortable talking to your doctor about your worries and concerns? (On a scale of 1 to 5, where 1 = very comfortable and 5 = not at all comfortable, select one.)			
1. Very comfortable	126 (48%)	28 (35%)	154 (45%)
2. ■■■	65 (25%)	19 (23%)	84 (25%)
3. ■■■	32 (12%)	13 (16%)	45 (13%)
4. ■■■	10 (4%)	14 (17%)	24 (7%)
5. Not at all comfortable	19 (7%)	4 (5%)	23 (7%)
Missing	8 (3%)	3 (4%)	11 (3%)
How well does your doctor answer questions about future treatments and worries? (On a scale of 1 to 5, where 1 = very well and 5 = not well at all, select one.)			
1. Very well	135 (52%)	24 (30%)	159 (47%)
2. ■■■	56 (22%)	22 (27%)	78 (23%)
3. ■■■	31 (12%)	14 (17%)	45 (13%)
4. ■■■	16 (6%)	11 (14%)	27 (8%)
5. Not well at all	16 (6%)	8 (10%)	24 (7%)
Missing	6 (2%)	2 (2%)	8 (2%)

Note: All data were rounded to the nearest whole number due to which some column totals may be 99% or 101%.
[a]Multidisciplinary was defined as oncologist plus at least one other specialty.
[b]For analysis in health care provider communication, we restricted the sample to patients only (i.e., excluded caregivers).
HCP, health care provider.

specifically for EGFR-m NSCLC where comprehensive biomarker testing plus access to an EGFR TKI leads to the best outcome.[13] In addition, first-line osimertinib provides the best progression-free survival as compared with first- and second-generation EGFR TKIs in real-world studies.[14] Despite emerging evidence of the impact of first-line osimertinib outside of clinical trials, our study highlights that global disparities in access to testing and treatment continue to persist.

When compared with the rates of investigator-assessed adverse events for first-line osimertinib reported in the FLAURA trial,[15] Project PRIORITY participants reported experiencing a higher incidence of side effects. It is important to note that a direct FLAURA trial to Project PRIORITY study participant comparison cannot be made because trial adverse events are physician reported whereas our study relied on patient-reported severity. Although care should be taken in interpreting differences between the trial population and our sample, our analysis reveals that the prevalence of side effects tends to be higher in real-world populations who have self-reported their side effects as compared with clinical trial participants, a finding not unique to Project PRIORITY.[16] Nevertheless, it is well documented that clinicians tend to underreport symptomatic side effects compared with patients.[17–19] These discrepant findings emphasize the importance of the collection of patient-reported side effects. Another noteworthy point is the high prevalence of mild side effects such as fatigue, muscle cramps, diarrhea, and skin rashes and other skin conditions that can have a dramatic impact on the quality of life of people living with EGFR-m NSCLC. Though mild side effects do not require medical attention, they prevent people from enjoying their day-to-day activities.

Strengths

The study's strengths include a participatory approach facilitated by a patient advocacy group, ensuring patient-driven and patient-led research. People with EGFR-m NSCLC were consulted from study design through analysis and dissemination to guarantee the data collection, study conduct, analysis, and synthesis incorporated aspects that resonated with the community. In addition, these data were patient and caregiver reported, capturing critical clinical information and patient-reported outcome data that describe the person's complete experience (e.g., their experience of side effects) and preferences (e.g., use of palliative care if appropriate and medically recommended) that are missed by other sources of data, such as medical claims and electronic health records. Furthermore, given that the sample largely consisted of patients associated with patient advocacy groups, participants are more likely to be knowledgeable about their disease, including stage, testing, and detailed treatment information. Finally, this prospective survey's electronic dissemination led to a somewhat global data set with varying degrees of representation, which avoided challenges associated with combining international and domestic clinical data sets.

Limitations

Owing to U.S. data collection laws, we faced restrictions in our description of certain characteristics of the ex-US subgroup. The ex-US group (27% of the total sample) included a heterogeneous group of countries (with the United Kingdom, Canada, and Australia comprising the major part) with different access to treatment issues that could not be explored within individual countries. Given the survey was in English and despite our best efforts, we do not have a large sample of patients and caregivers from East Asia where the prevalence of EGFR-m lung cancer is more than 50% of the population of metastatic NSCLC.[20] Furthermore, the sample may have been biased by self-selection, as to learn of this study participants had to be health literate and be connected to the internet, and be aware of online lung cancer and EGFR communities. We acknowledge that this creates a nonrepresentative sample, as is often the case with online surveys. It is indeed hard to control for lack of representation when doing online surveys. Clinic-based sampling with targeted outreach to specific communities may solve this issue but have methodological issues, such as geographical bias. Regardless, in our sample, there was still likely to be a mix of participants familiar with medical jargon and those who were less aware, which may have limited our reporting on some of the more complex treatment questions asked. Last, the survey captured the year of diagnosis, and we stratified our analysis based on this information. It is hard to rule out completely recall bias for side effects of earlier lines of therapy even in this well-informed group.

Conclusion

In this study, we describe the experiences of people with EGFR-m NSCLC from their perspective. We found that, despite many recently diagnosed participants, disparities in accessing guideline-concordant treatment exist. Our findings highlight disparities in access to care and current treatments even in a highly engaged patient population. Furthermore, given the nature of our study sample, it is highly likely that findings from our study, such as lack of access to advanced diagnostics and heterogeneity in care team composition, are amplified in the larger metastatic NSCLC community. To our knowledge, this is the first paper outlining patient experience in

the era of multiple TKIs for EGFR-m NSCLC. Our hope is that this study lays the foundation for hypothesis development for future research and encourages integration of the perspectives of people living with lung cancer in future medical data collection.

CRediT Authorship Contribution Statement

Jill Feldman: Conceptualization, Funding acquisition, Project administration, Methodology, Writing - review and editing.

Ivy Elkins: Conceptualization, Funding acquisition, Project administration, Methodology, Writing - review and editing.

Zofia Piotrowska: Methodology, Writing - review and editing.

Bellinda L. King-Kallimanis: Data curation, Formal analysis, Visualization, Writing - original draft, Writing - review and editing.

Tendai Chihuri: Formal analysis, Writing - review and editing.

Carly Johnson: Formal analysis, Writing - original draft, Writing - review and editing.

Alecia Clary: Formal analysis, Writing - original draft, Writing - review and editing.

Teri Kennedy: Conceptualization, Funding acquisition, Project administration, Methodology.

Upal Basu Roy: Conceptualization, Project administration, Methodology, Data curation, Writing - review and editing.

Disclosure

Ms. Feldman reports receiving consulting fees not related to the project from Janssen, Blueprint Medicine, and EQRx. Ms. Elkins reports receiving consulting fees not related to the project from AstraZeneca, Janssen, Bayer, Black Diamond, Blueprint Medicines, Daiichi Sankyo, Gilead, and Mirati. Dr. Piotrowska reports receiving grant support paid directly to their institution and not related to the project from the following: Novartis, Takeda, Spectrum, AstraZeneca, Tesaro and GlaxoSmithKline, Cullinan Oncology, Daiichi Sankyo, AbbVie, Janssen, and Blueprint Medicines. They received consulting fees not related to the project from the following: Merck, Bayer, AstraZeneca, Janssen, Takeda, Blueprint Medicines, Daiichi Sankyo, Cullinan Oncology, C4 Therapeutics, Taiho, Boehringer Ingelheim, Sanofi, Guardant Health, Jazz Pharmaceuticals, and Genentech. They received honoraria for educational events not related to the project from the following: Eli Lilly and Janssen. They received travel support not related to the project from the following: Janssen and AstraZeneca. They report participating on a Data Safety Monitoring Board for Genentech, not related to the project and directly paid to their institution. Dr. King-Kallimanis reports receiving grant support directly paid to their institution and not related to the project from the following: AstraZeneca, Boehringer Ingelheim, Bristol Myers Squibb, Jazz Pharma, Genentech, Eli Lilly, Janssen, Takeda, Daiichi Sankyo, Blueprint Medicines, Janssen, Amgen, Seagen, and Manta Cares. They report receiving consulting fees from Eli Lilly, Bristol Myers Squibb, AbbVie, and Shionogi. They report participating on a Data Safety Monitoring Board for IQVIA and Gilead, not related to the project and directly paid to their institution. Dr. Chihuri reports receiving grant support directly paid to their institution and not related to the project from the following: Amgen, AstraZeneca, Blueprint Medicines Corporation, Boehringer Ingelheim, Bristol Myers Squibb, Eli Lilly and Company, G1 Therapeutics, Inc., Genentech, Inc., Janssen, LP, Jazz Pharmaceuticals, Merck Sharp & Dohme LLC, Novartis, and Takeda. Ms. Johnson reports receiving payment for manuscript writing services from LUNGevity Foundation. Dr. Clary reports receiving payment for manuscript writing services from LUNGevity Foundation. Dr. Basu Roy reports receiving grant support directly paid to their institution and not related to the project from the following: AstraZeneca, Boehringer Ingelheim, Bristol Myers Squibb, Jazz Pharma, Genentech, Eli Lilly, Janssen, Takeda, Daiichi Sankyo, Blueprint Medicines, Janssen, and Amgen. They received consulting fees and travel support from Eli Lilly not related to the project.

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Supplementary Data

Note: To access the supplementary material accompanying this article, visit the online version of the *JTO Clinical and Research Reports* at www.jtocrr.org and at https://doi.org/10.1016/j.jtocrr.2024.100782.

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