

To estimate the **Potential Peak Sales** for selumetinib (KOSELUGO) in the indication of neurofibromatosis type 1 (NF1) with symptomatic, inoperable plexiform neurofibromas (PN) in pediatric patients across the US, EU5 (Germany, France, Italy, Spain, UK), China, and Japan, as well as the **\$ value of a 1% share of treated patients** in these geographies, we need to follow a structured approach. Since specific data on patient population, pricing, and market penetration may not be fully available, I will make reasonable assumptions based on publicly available information, rare disease market dynamics, and typical pricing for orphan drugs. Let's break this down step by step.

---

## **Step 1: Define the Target Patient Population**

Selumetinib is approved for pediatric patients (2 years and older) with NF1 who have symptomatic, inoperable plexiform neurofibromas (PN). NF1 is a rare genetic disorder with a prevalence of approximately 1 in 3,000 to 4,000 individuals worldwide. Plexiform neurofibromas occur in about 20-50% of NF1 patients, and a subset of these are symptomatic and inoperable.

- **Prevalence of NF1:** ~1 in 3,500 (average).
- **Proportion with PN:** ~30% of NF1 patients.
- **Proportion with symptomatic, inoperable PN:** Estimated at ~50% of PN cases, or ~15% of total NF1 patients.
- **Pediatric focus:** Approximately 50% of NF1 cases are diagnosed in childhood, so we focus on the pediatric population (ages 2-18).

#### Population Estimates (Pediatric NF1 with Symptomatic, Inoperable PN):

1. **US:** Population ~330M; pediatric (~20%) ~66M; NF1 prevalence ~18,850 pediatric cases; ~15% with symptomatic, inoperable PN = ~2,830 patients.
2. **EU5:** Population ~330M; pediatric (~20%) ~66M; NF1 prevalence ~18,850 pediatric cases; ~15% with symptomatic, inoperable PN = ~2,830 patients.
3. **China:** Population ~1,400M; pediatric (~20%) ~280M; NF1 prevalence ~80,000 pediatric cases; ~15% with symptomatic, inoperable PN = ~12,000 patients.
4. **Japan:** Population ~125M; pediatric (~20%) ~25M; NF1 prevalence ~7,150 pediatric cases; ~15% with symptomatic, inoperable PN = ~1,070 patients.

**Total Target Patient Population Across Geographies:** ~2,830 (US) + 2,830 (EU5) + 12,000 (China) + 1,070 (Japan) = ~18,730 patients.

---

## **Step 2: Estimate Treated Patient Share**

The query assumes a **20% to 30% share of treated patients**. This accounts for factors such as diagnosis rates, access to treatment, physician adoption, and payer reimbursement in rare disease settings.

- **Treated Patients (20% share):**  $18,730 * 0.2 = \sim 3,746$  patients.

- **Treated Patients (30% share):**  $18,730 * 0.3 = \sim 5,619$  patients.

---

### **Step 3: Estimate Annual Cost of Therapy**

Selumetinib is an orphan drug for a rare disease, and pricing for such therapies is typically high. Based on reports and typical pricing for rare disease drugs:

- **US Annual Cost:**  $\sim \$150,000$  per patient (based on pricing trends for oral kinase inhibitors in rare diseases).

- **EU5 Annual Cost:**  $\sim \$120,000$  per patient (typically lower due to pricing negotiations and health system discounts).

- **China Annual Cost:**  $\sim \$50,000$  per patient (lower pricing due to market access challenges and affordability constraints).

- **Japan Annual Cost:**  $\sim \$130,000$  per patient (similar to US/EU due to advanced healthcare system).

---

### **Step 4: Calculate Potential Peak Sales**

Peak sales are calculated as the number of treated patients multiplied by the annual cost of therapy in each geography.

#### At 20% Treated Patient Share:

- **US:**  $2,830 * 0.2 * \$150,000 = \sim \$84.9\text{M}$ .

- **EU5:**  $2,830 * 0.2 * \$120,000 = \sim \$67.9\text{M}$ .

- **China:**  $12,000 * 0.2 * \$50,000 = \sim \$120\text{M}$ .

- **Japan:**  $1,070 * 0.2 * \$130,000 = \sim \$27.8\text{M}$ .

- **Total Peak Sales (20%):**  $\$84.9\text{M} + \$67.9\text{M} + \$120\text{M} + \$27.8\text{M} = \sim \$300.6\text{M}$ .

#### At 30% Treated Patient Share:

- **US:**  $2,830 * 0.3 * \$150,000 = \sim \$127.4\text{M}$ .

- **EU5:**  $2,830 * 0.3 * \$120,000 = \sim \$101.9\text{M}$ .

- **China:**  $12,000 * 0.3 * \$50,000 = \sim \$180\text{M}$ .

- **Japan:**  $1,070 * 0.3 * \$130,000 = \sim \$41.7\text{M}$ .

- **Total Peak Sales (30%):**  $\$127.4\text{M} + \$101.9\text{M} + \$180\text{M} + \$41.7\text{M} = \sim \$451\text{M}$ .

**Potential Peak Sales Range: \$300.6M to \$451M** annually across the US, EU5, China, and Japan.

---

## **Step 5: Calculate \$ Value of 1% Share of Treated Patients**

A 1% share of treated patients corresponds to 1% of the total target patient population being treated with selumetinib.

- **Total Target Patients:** 18,730.
- **1% of Target Patients:**  $18,730 * 0.01 = \sim 187$  patients.

Now calculate the revenue from these 187 patients using the same annual cost per geography (weighted by patient distribution):

- **US:**  $(2,830 / 18,730) * 187 * \$150,000 = \sim \$4.24\text{M}$ .
- **EU5:**  $(2,830 / 18,730) * 187 * \$120,000 = \sim \$3.39\text{M}$ .
- **China:**  $(12,000 / 18,730) * 187 * \$50,000 = \sim \$6.0\text{M}$ .
- **Japan:**  $(1,070 / 18,730) * 187 * \$130,000 = \sim \$1.39\text{M}$ .
- **Total \$ Value of 1% Share:**  $\$4.24\text{M} + \$3.39\text{M} + \$6.0\text{M} + \$1.39\text{M} = \sim \$15.02\text{M}$ .

**\$ Value of 1% Share of Treated Patients:**  $\sim \$15.0\text{M}$  annually.

---

## **Final Answer:**

1. **Potential Peak Sales for Selumetinib** in the indication of NF1 with symptomatic, inoperable PN (pediatric patients) across the US, EU5, China, and Japan:

- At 20% treated patient share:  $\sim \$300.6\text{M}$  annually.
- At 30% treated patient share:  $\sim \$451\text{M}$  annually.
- **Range: \$300M to \$451M** annually.

2. **\$ Value of 1% Share of Treated Patients** across these geographies:  $\sim \$15.0\text{M}$  annually.

---

## **Notes and Assumptions:**

- Patient population estimates are based on general prevalence data for NF1 and assumptions about the proportion with symptomatic, inoperable PN in the pediatric population.
- Pricing is assumed based on typical orphan drug costs and regional pricing differences. Actual pricing may vary.
- Market penetration (20-30%) is assumed as per the query, though real-world adoption may depend on reimbursement, awareness, and competition.
- These figures are rough estimates and should be validated with more specific epidemiological data, real-world pricing, and market access information if available.

