To estimate the **Potential Peak Sales** for alpelisib (Vijoice) in the indication of PIK3CA-related overgrowth spectrum (PROS) in 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 based on available data, assumptions, and market analysis. Since specific patient numbers and pricing data for PROS are not publicly available in detail for alpelisib, I will outline the methodology and make reasonable assumptions.

Step 1: Define the Target Population (PROS Patients)

PIK3CA-related overgrowth spectrum (PROS) is a rare genetic condition characterized by overgrowth of various body parts due to mutations in the PIK3CA gene. The prevalence of PROS is not well-documented, but it is considered extremely rare. We can estimate the potential patient population based on general rare disease prevalence and expert estimates.

- **Prevalence of PROS**: Literature suggests PROS affects fewer than 1 in 1,000,000 individuals. For estimation, let's assume a prevalence of **1 in 1,000,000**.

- **Population in Target Geographies** (approximate 2023 estimates):

- US: 330 million

- EU5 (Germany, France, Italy, Spain, UK): 320 million

- China: 1,400 million

- Japan: 125 million

- **Total Population**: ~2,175 million

- **Estimated PROS Patients** (1 in 1,000,000):

- US: ~330 patients

- EU5: ~320 patients

- China: ~1,400 patients

- Japan: ~125 patients

- **Total Patients**: ~2,175 patients

Step 2: Estimate the Treatable Population

Not all diagnosed patients may require systemic therapy, and access to treatment varies by region due to healthcare systems, diagnosis rates, and affordability. Let's assume:

- **Diagnosis Rate**: 50% of patients are diagnosed (rare diseases are often underdiagnosed).

- **Treatment Eligibility**: Of diagnosed patients, 50% have severe manifestations requiring systemic therapy (as per FDA approval criteria).

- **Diagnosed and Treatable Patients**:

- US: 330 * 0.5 * 0.5 = ~83 patients

- EU5: 320 * 0.5 * 0.5 = ~80 patients

- China: 1,400 * 0.5 * 0.5 = ~350 patients

- Japan: 125 * 0.5 * 0.5 = ~31 patients

- **Total Treatable Patients**: ~544 patients

Step 3: Estimate Market Share

The query assumes a **20% to 30% share of treated patients** for alpelisib. Since alpelisib is one of the first targeted therapies approved for PROS, it may initially have a higher market share, but competition, pricing, and access will influence penetration. For peak sales estimation, we will use the midpoint of **25% market share**.

- **Treated Patients with Alpelisib** (25% share):

- US: 83 * 0.25 = ~21 patients

- EU5: 80 * 0.25 = ~20 patients

- China: 350 * 0.25 = ~88 patients

- Japan: 31 * 0.25 = ~8 patients

- **Total Treated Patients**: ~137 patients

Step 4: Estimate Annual Cost of Therapy

Alpelisib is a specialty drug for a rare disease, so pricing is expected to be high, similar to other orphan drugs. For reference, alpelisib (Piqray) for breast cancer costs approximately **$15,000 to $20,000 per month** in the US (before discounts/rebates). For PROS (Vijoice), pricing may differ, but we assume a similar range due to rarity and lack of competition. Let's assume an annual cost of **$180,000 per patient** in the US and Japan, and adjust for lower pricing in EU5 and China due to healthcare negotiations and affordability.

- **Annual Cost per Patient** (assumed):

- US: $180,000

- EU5: $120,000 (lower due to price negotiations)

- China: $60,000 (significantly lower due to market access and pricing controls)

- Japan: $180,000 (similar to US, adjusted for healthcare system)

Step 5: Calculate Potential Peak Sales

Peak sales are calculated by multiplying the number of treated patients by the annual cost per patient in each geography.

- **Peak Sales Calculation** (25% market share):

- US: 21 patients * $180,000 = **$3.78 million**

- EU5: 20 patients * $120,000 = **$2.4 million**

- China: 88 patients * $60,000 = **$5.28 million**

- Japan: 8 patients * $180,000 = **$1.44 million**

- **Total Peak Sales**: **$12.9 million per year**

For the range of 20% to 30% market share:

- At **20% share**: Total treated patients = ~109 → Peak Sales = **$10.3 million**

- At **30% share**: Total treated patients = ~163 → Peak Sales = **$15.5 million**

Thus, **Potential Peak Sales Range**: **$10.3 million to $15.5 million annually**, with a midpoint of **$12.9 million**.

Step 6: Calculate $ Value of 1% Share of Treated Patients

A 1% share of treated patients corresponds to 1% of the total treatable population (~544 patients) = ~5.44 patients.

- **Value of 1% Share**:

- US: (83 * 0.01) * $180,000 = 0.83 patients * $180,000 = **$0.15 million ($150,000)**

- EU5: (80 * 0.01) * $120,000 = 0.8 patients * $120,000 = **$0.096 million ($96,000)**

- China: (350 * 0.01) * $60,000 = 3.5 patients * $60,000 = **$0.21 million ($210,000)**

- Japan: (31 * 0.01) * $180,000 = 0.31 patients * $180,000 = **$0.056 million ($56,000)**

- **Total Value of 1% Share**: **$0.512 million ($512,000)**

Final Answer

- **Potential Peak Sales for Alpelisib in PROS (20%-30% market share)**:

- Range: **$10.3 million to $15.5 million annually**

- Midpoint (25% share): **$12.9 million annually**

- **$ Value of 1% Share of Treated Patients**:

- US: **$150,000**

- EU5: **$96,000**

- China: **$210,000**

- Japan: **$56,000**

- Total: **$512,000**

Caveats and Assumptions

1. **Prevalence Data**: PROS prevalence is an estimate; actual numbers may vary.

2. **Diagnosis and Treatment Rates**: These are assumptions based on rare disease trends.

3. **Pricing**: Costs are approximated based on alpelisib's pricing for other indications and adjusted for regional differences.

4. **Market Share**: Assumes no major competition at peak sales; future entrants could reduce share.

5. **Access and Reimbursement**: Varies widely, especially in China, potentially impacting sales.

If more specific data on PROS prevalence, pricing, or market dynamics is available, these estimates can be refined further.