To estimate the **Potential Peak Sales** for inavolisib (Itovebi) in the specified indication (endocrine-resistant, PIK3CA-mutated, HR-positive, HER2-negative, locally advanced or metastatic breast cancer) in the US, EU5 (France, Germany, 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 populations, pricing, and market penetration may not be fully available, I will outline a methodology based on reasonable assumptions and publicly available data as of my last update (October 2023). I will also note that exact figures may vary depending on real-world data, pricing negotiations, and market dynamics.

Step 1: Define the Target Patient Population

The indication for inavolisib is for adults with **endocrine-resistant, PIK3CA-mutated, HR-positive, HER2-negative, locally advanced or metastatic breast cancer** after recurrence on or after adjuvant endocrine therapy. Let's break this down:

- **HR-positive, HER2-negative breast cancer** accounts for approximately 60-70% of all breast cancer cases.

- **PIK3CA mutations** are present in about 30-40% of HR-positive, HER2-negative breast cancers.

- **Endocrine-resistant, advanced/metastatic cases** represent a subset of these patients, typically those who have progressed after initial endocrine therapy (e.g., tamoxifen or aromatase inhibitors).

- The focus is on **second-line or later treatment** in the metastatic setting.

We will estimate the **incident and prevalent cases** of metastatic breast cancer (MBC) in the specified geographies, refine for the specific subtype and mutation, and account for treatment eligibility.

Estimated Breast Cancer Prevalence and Incidence (2023)

Using data from sources like the World Health Organization (WHO), Globocan, and epidemiology studies:

- **US**: ~290,000 new breast cancer cases annually; ~43,000 deaths; prevalence of MBC ~150,000-170,000 patients.

- **EU5**: ~250,000 new cases annually; prevalence of MBC ~120,000-140,000.

- **China**: ~420,000 new cases annually; prevalence of MBC ~200,000-250,000.

- **Japan**: ~90,000 new cases annually; prevalence of MBC ~40,000-50,000.

Refine for Indication-Specific Population

- HR-positive, HER2-negative: ~65% of total breast cancer cases.

- PIK3CA-mutated: ~35% of HR-positive, HER2-negative cases.

- Metastatic, endocrine-resistant: ~30-40% of MBC patients progress to endocrine resistance and are eligible for second-line therapies.

Approximate eligible patient population (prevalent cases in MBC):

- US: 150,000 * 0.65 * 0.35 * 0.35 ≈ **12,000 patients**.

- EU5: 130,000 * 0.65 * 0.35 * 0.35 ≈ **10,300 patients**.

- China: 225,000 * 0.65 * 0.35 * 0.35 ≈ **18,000 patients**.

- Japan: 45,000 * 0.65 * 0.35 * 0.35 ≈ **3,600 patients**.

- **Total eligible patients**: ~44,000.

Step 2: Estimate Market Share and Treated Patients

The problem states a **20-30% share of treated patients**. Assuming inavolisib captures this share of the eligible population:

- At 20%: ~8,800 treated patients.

- At 30%: ~13,200 treated patients.

Step 3: Estimate Drug Pricing

Inavolisib is a targeted therapy for a niche population (PIK3CA-mutated breast cancer), so pricing will likely be in line with other targeted therapies for metastatic breast cancer (e.g., alpelisib, a PI3K inhibitor, or CDK4/6 inhibitors like palbociclib). Annual cost of therapy for such drugs typically ranges from $100,000 to $150,000 in the US, with lower prices in other markets due to healthcare system differences and negotiations.

Assumed annual cost per patient (hypothetical):

- **US**: $120,000.

- **EU5**: $80,000 (average, varies by country).

- **China**: $40,000 (lower due to pricing controls and generics competition).

- **Japan**: $90,000 (similar to US but with some discounts).

Step 4: Calculate Potential Peak Sales

Peak sales are calculated as (number of treated patients) * (annual cost per patient) in each geography. We will distribute the 20-30% market share proportionally based on patient population in each region.

At 20% Market Share (8,800 treated patients)

- US: 12,000 * 0.2 = 2,400 patients * $120,000 = **$288 million**.

- EU5: 10,300 * 0.2 = 2,060 patients * $80,000 = **$165 million**.

- China: 18,000 * 0.2 = 3,600 patients * $40,000 = **$144 million**.

- Japan: 3,600 * 0.2 = 720 patients * $90,000 = **$65 million**.

- **Total Peak Sales at 20%**: $288M + $165M + $144M + $65M = **$662 million**.

At 30% Market Share (13,200 treated patients)

- US: 12,000 * 0.3 = 3,600 patients * $120,000 = **$432 million**.

- EU5: 10,300 * 0.3 = 3,090 patients * $80,000 = **$247 million**.

- China: 18,000 * 0.3 = 5,400 patients * $40,000 = **$216 million**.

- Japan: 3,600 * 0.3 = 1,080 patients * $90,000 = **$97 million**.

- **Total Peak Sales at 30%**: $432M + $247M + $216M + $97M = **$992 million**.

Thus, **Potential Peak Sales** for inavolisib in this indication across the US, EU5, China, and Japan range from **$662 million to $992 million** annually, assuming 20-30% market share.

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

A 1% share corresponds to 1% of the eligible patient population (~44,000 patients) = **440 patients**.

- US: 12,000 * 0.01 = 120 patients * $120,000 = **$14.4 million**.

- EU5: 10,300 * 0.01 = 103 patients * $80,000 = **$8.2 million**.

- China: 18,000 * 0.01 = 180 patients * $40,000 = **$7.2 million**.

- Japan: 3,600 * 0.01 = 36 patients * $90,000 = **$3.2 million**.

- **Total $ Value of 1% Share**: $14.4M + $8.2M + $7.2M + $3.2M = **$33 million**.

Final Answer

- **Potential Peak Sales for inavolisib** in the specified indication across the US, EU5, China, and Japan (at 20-30% market share): **$662 million to $992 million annually**.

- **$ Value of 1% share of treated patients** in these geographies: **$33 million annually**.

Caveats and Assumptions

- Patient population estimates are based on approximate epidemiology data and may vary.

- Pricing is hypothetical and based on comparable therapies; actual pricing for inavolisib may differ.

- Market share (20-30%) assumes competitive dynamics with other therapies (e.g., alpelisib, CDK4/6 inhibitors).

- Peak sales assume stable market penetration and no major disruptions (e.g., generics, biosimilars, or new competitors).

- Currency fluctuations and healthcare reimbursement policies may impact final sales figures.

For more precise estimates, real-world data on pricing, market access, and patient uptake post-launch would be required. If you have additional data or specific assumptions, I can refine the calculations further.