To calculate the **Potential Peak Sales** for olaparib (Lynparza) in the indication of metastatic castration-resistant prostate cancer (mCRPC) with HRR gene mutations 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 (e.g., exact patient numbers, pricing, or market penetration) is not provided, I will outline the methodology and use reasonable assumptions based on publicly available information and market trends for oncology drugs. You can refine these numbers with more precise data if available.

Step 1: Define Key Assumptions and Inputs

1. **Target Patient Population**:

- mCRPC is an advanced stage of prostate cancer. According to estimates, around 10-20% of mCRPC patients have HRR gene mutations (e.g., BRCA1/2, ATM), making them eligible for olaparib.

- Total mCRPC prevalence (treated population) in the mentioned geographies can be estimated based on cancer incidence, progression rates, and available epidemiology data.

- Approximate mCRPC prevalence (treated patients):

- US: ~30,000-40,000 patients annually.

- EU5: ~25,000-35,000 patients annually.

- China: ~20,000-30,000 patients annually (growing due to aging population and better diagnostics).

- Japan: ~5,000-10,000 patients annually.

- HRR-mutated subgroup: ~15% of mCRPC patients, so:

- US: ~4,500-6,000 patients.

- EU5: ~3,750-5,250 patients.

- China: ~3,000-4,500 patients.

- Japan: ~750-1,500 patients.

2. **Share of Treated Patients**:

- Assuming 20-30% of eligible HRR-mutated mCRPC patients are treated with olaparib (as per the query). This accounts for competition from other therapies, physician adoption, and access issues.

3. **Annual Cost of Treatment**:

- Olaparib is a high-cost targeted therapy. In the US, the annual cost for Lynparza is approximately $150,000-$180,000 per patient (based on list prices for other indications like ovarian cancer).

- In EU5 and Japan, pricing is typically lower due to healthcare system negotiations: ~$80,000-$120,000 per patient annually.

- In China, pricing is further discounted due to market access programs and local policies: ~$50,000-$70,000 per patient annually.

4. **Peak Sales**:

- Peak sales are typically achieved 5-7 years post-launch in an indication, assuming full market penetration within the assumed share of treated patients.

Step 2: Calculate Potential Peak Sales

We will calculate the number of patients treated with olaparib (using the 20-30% share) and multiply by the annual cost per patient for each geography.

US:

- Eligible HRR-mutated patients: 5,250 (midpoint of 4,500-6,000).
- Treated patients (20-30%): 1,050-1,575.
- Annual cost per patient: $165,000 (midpoint of $150,000-$180,000).
- Peak Sales Range:
- Low (20%): 1,050 x $165,000 = **$173.25 million**.
- High (30%): 1,575 x $165,000 = **$259.88 million**.

EU5:

- Eligible HRR-mutated patients: 4,500 (midpoint of 3,750-5,250).
- Treated patients (20-30%): 900-1,350.
- Annual cost per patient: $100,000 (midpoint of $80,000-$120,000).
- Peak Sales Range:
- Low (20%): 900 x $100,000 = **$90 million**.
- High (30%): 1,350 x $100,000 = **$135 million**.

China:

- Eligible HRR-mutated patients: 3,750 (midpoint of 3,000-4,500).
- Treated patients (20-30%): 750-1,125.
- Annual cost per patient: $60,000 (midpoint of $50,000-$70,000).
- Peak Sales Range:
- Low (20%): 750 x $60,000 = **$45 million**.
- High (30%): 1,125 x $60,000 = **$67.5 million**.

Japan:

- Eligible HRR-mutated patients: 1,125 (midpoint of 750-1,500).
- Treated patients (20-30%): 225-337.5.
- Annual cost per patient: $100,000 (midpoint of $80,000-$120,000).

- Peak Sales Range:

- Low (20%): 225 x $100,000 = **$22.5 million**.

- High (30%): 337.5 x $100,000 = **$33.75 million**.

Total Peak Sales Across Geographies:

- Low (20% share): $173.25M (US) + $90M (EU5) + $45M (China) + $22.5M (Japan) = **$330.75 million**.

- High (30% share): $259.88M (US) + $135M (EU5) + $67.5M (China) + $33.75M (Japan) = **$496.13 million**.

Potential Peak Sales Range: Approximately **$331 million to $496 million annually** across the US, EU5, China, and Japan for this indication.

Step 3: Calculate $ Value of 1% Share of Treated Patients

A 1% share of treated patients refers to 1% of the total eligible HRR-mutated mCRPC patients in each geography. We multiply the number of patients in a 1% share by the annual cost per patient.

US:

- Eligible patients: 5,250.

- 1% share: 52.5 patients.

- Annual cost: $165,000.

- Value of 1% share: 52.5 x $165,000 = **$8.66 million**.

EU5:

- Eligible patients: 4,500.

- 1% share: 45 patients.

- Annual cost: $100,000.

- Value of 1% share: 45 x $100,000 = **$4.5 million**.

China:

- Eligible patients: 3,750.

- 1% share: 37.5 patients.

- Annual cost: $60,000.

- Value of 1% share: 37.5 x $60,000 = **$2.25 million**.

Japan:

- Eligible patients: 1,125.

- 1% share: 11.25 patients.

- Annual cost: $100,000.

- Value of 1% share: 11.25 x $100,000 = **$1.13 million**.

Total Value of 1% Share Across Geographies:

- $8.66M (US) + $4.5M (EU5) + $2.25M (China) + $1.13M (Japan) = **$16.54 million**.

$ Value of 1% Share of Treated Patients: Approximately **$16.54 million annually** across the US, EU5, China, and Japan.

Summary of Results:

1. **Potential Peak Sales for Olaparib in mCRPC (HRR-mutated) with 20-30% Share**:

- Range: **$331 million to $496 million annually** across the US, EU5, China, and Japan.

2. **$ Value of 1% Share of Treated Patients**:

- Total: **$16.54 million annually** across the same geographies.

Notes and Caveats:

- These calculations are based on assumptions for patient numbers, pricing, and market share. Actual figures may vary due to:

- Differences in reimbursement policies and market access.

- Competition from other therapies (e.g., other PARP inhibitors or novel treatments).

- Changes in treatment guidelines or diagnostic testing rates for HRR mutations.

- Peak sales may also be influenced by duration of therapy, as mCRPC patients may not remain on treatment for a full year.

- If you have access to more precise data (e.g., exact patient numbers or pricing), these estimates can be refined.

Let me know if you'd like me to adjust any assumptions or dive deeper into a specific geography or aspect!