

To estimate the **Potential Peak Sales** for ribociclib (Kisqali) in the adjuvant treatment of HR-positive, HER2-negative stage II and III early breast cancer at high risk of recurrence 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 exact patient numbers, pricing, and market penetration data are not provided, I will outline the methodology and use reasonable assumptions based on publicly available data and industry standards. The final numbers are illustrative and should be validated with specific market research or proprietary data.

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

- **Indication:** Adjuvant treatment for HR-positive, HER2-negative stage II and III early breast cancer at high risk of recurrence.

- **Epidemiology:** Breast cancer is one of the most common cancers globally. HR-positive, HER2-negative accounts for ~60-70% of all breast cancer cases. Stage II and III represent ~30-40% of early breast cancer cases, and "high risk of recurrence" further narrows this to a subset (often ~20-30% of stage II/III based on clinical criteria like node involvement or tumor size).

- **Geographies:** US, EU5, China, Japan.

Using approximate incidence rates for breast cancer and adjusting for the specific indication:

- **US:** ~280,000 new breast cancer cases/year (2023 estimate). ~60% HR+/HER2- (~168,000), ~35% stage II/III (~58,800), ~25% high risk (~14,700 patients/year).

- **EU5:** ~250,000 new cases/year. ~60% HR+/HER2- (~150,000), ~35% stage II/III (~52,500), ~25% high risk (~13,125 patients/year).

- **China:** ~420,000 new cases/year. ~60% HR+/HER2- (~252,000), ~35% stage II/III (~88,200), ~25% high risk (~22,050 patients/year).

- **Japan:** ~90,000 new cases/year. ~60% HR+/HER2- (~54,000), ~35% stage II/III (~18,900), ~25% high risk (~4,725 patients/year).

**Total target incident patients/year (high risk, stage II/III, HR+/HER2-):**

- US: ~14,700

- EU5: ~13,125

- China: ~22,050

- Japan: ~4,725

- **Total:** ~54,600 patients/year.

Since adjuvant therapy is given over a finite period (e.g., 2-3 years for CDK4/6 inhibitors like ribociclib per recent trials such as NATALEE), the **prevalent population** eligible for treatment at any given time is ~2-3x the annual incidence:

- **Total prevalent patients:** ~54,600 \* 2.5 = ~136,500 patients.

## **Step 2: Estimate Market Share (20%-30% of Treated Patients)**

- Ribociclib competes with other CDK4/6 inhibitors (e.g., palbociclib, abemaciclib) and standard therapies. Assuming a 20%-30% market share among treated patients (as provided in the query):

**- Treated patients with ribociclib (peak share):**

- 20% share:  $136,500 * 0.20 = \sim 27,300$  patients.

- 30% share:  $136,500 * 0.30 = \sim 40,950$  patients.

**Breakdown by geography (proportional to prevalence):**

- US:  $\sim 40\%$  of total patients (14,700/54,600 incidence)  $\rightarrow$  20% share =  $\sim 10,920$  patients; 30% share =  $\sim 16,380$  patients.

- EU5:  $\sim 36\%$  of total patients (13,125/54,600)  $\rightarrow$  20% share =  $\sim 9,750$  patients; 30% share =  $\sim 14,625$  patients.

- China:  $\sim 16\%$  of total patients (22,050/54,600)  $\rightarrow$  20% share =  $\sim 3,528$  patients; 30% share =  $\sim 5,292$  patients.

- Japan:  $\sim 8\%$  of total patients (4,725/54,600)  $\rightarrow$  20% share =  $\sim 2,100$  patients; 30% share =  $\sim 3,150$  patients.

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

- Ribociclib (Kisqali) pricing varies by region. It is often used in combination with an aromatase inhibitor (e.g., letrozole). Based on available data:

- **US:**  $\sim \$15,000/\text{month}$  for Kisqali (based on wholesale acquisition cost), or  $\sim \$180,000/\text{year}$ . Combination with letrozole adds minimal cost ( $\sim \$500/\text{year}$ ).

- **EU5:** Pricing is lower due to negotiations; assume  $\sim \$60,000\text{--}\$80,000/\text{year}$  per patient.

- **Japan:** Similar to EU5,  $\sim \$60,000\text{--}\$80,000/\text{year}$ .

- **China:** Significantly lower due to market access programs and generics; assume  $\sim \$20,000\text{--}\$30,000/\text{year}$ .

For simplicity, assume average annual cost per patient (weighted by region):

- US:  $\$180,000$

- EU5:  $\$70,000$

- China:  $\$25,000$

- Japan:  $\$70,000$

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

**Peak Sales at 20% Share:**

- US:  $10,920 \text{ patients} * \$180,000 = \sim \$1.97 \text{ billion}$

- EU5:  $9,750 \text{ patients} * \$70,000 = \sim \$0.68 \text{ billion}$

- China:  $3,528 \text{ patients} * \$25,000 = \sim \$0.09 \text{ billion}$

- Japan: 2,100 patients \* \$70,000 = ~\$0.15 billion
- **Total (20% share):** ~\$2.89 billion

**Peak Sales at 30% Share:**

- US: 16,380 patients \* \$180,000 = ~\$2.95 billion
- EU5: 14,625 patients \* \$70,000 = ~\$1.02 billion
- China: 5,292 patients \* \$25,000 = ~\$0.13 billion
- Japan: 3,150 patients \* \$70,000 = ~\$0.22 billion
- **Total (30% share):** ~\$4.32 billion

**Potential Peak Sales Range: \$2.9 billion to \$4.3 billion annually** across US, EU5, China, and Japan.

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

- Total treated patients: 136,500
- **1% of treated patients:** 1,365 patients

**Breakdown by geography:**

- US: 1% of 27,300 (total at 20%) = ~546 patients \* \$180,000 = ~\$98.3 million
- EU5: 1% of 24,375 (total at 20%) = ~488 patients \* \$70,000 = ~\$34.2 million
- China: 1% of 8,820 (total at 20%) = ~88 patients \* \$25,000 = ~\$2.2 million
- Japan: 1% of 5,250 (total at 20%) = ~53 patients \* \$70,000 = ~\$3.7 million
- **Total \$ value of 1% share:** ~\$138.4 million

## **Final Answer**

- **Potential Peak Sales for Ribociclib (20%-30% share of treated patients): \$2.9 billion to \$4.3 billion annually** across US, EU5, China, and Japan.

- US: \$1.97B - \$2.95B
- EU5: \$0.68B - \$1.02B
- China: \$0.09B - \$0.13B
- Japan: \$0.15B - \$0.22B
- **\$ Value of 1% Share of Treated Patients: ~\$138.4 million annually** across these geographies.
- US: ~\$98.3M
- EU5: ~\$34.2M
- China: ~\$2.2M
- Japan: ~\$3.7M

## **Caveats**

- These estimates are based on assumptions about patient populations, pricing, and market share. Real-world data on treatment duration (e.g., 2 vs. 3 years), adherence, and competitive dynamics (e.g., abemaciclib's established role in adjuvant setting via monarchE trial) may affect outcomes.
- Pricing in China and EU5 can vary widely due to reimbursement and access programs.
- Peak sales may take several years to achieve post-launch in the adjuvant setting.

For more precise figures, consult specific market research reports (e.g., EvaluatePharma, GlobalData) or Novartis's financial projections for Kisqali in this indication.