To estimate the **Potential Peak Sales** for tucatinib (Tukysa) in the indication of RAS wild-type HER2-positive unresectable or metastatic colorectal cancer (mCRC) 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. Since specific data on patient populations, pricing, and market penetration may not be publicly available in full detail, I will outline the methodology and use reasonable assumptions based on available data and industry standards. The final numbers are estimates and should be validated with primary market research or proprietary data.

Step 1: Define the Target Patient Population

Tucatinib is approved for RAS wild-type, HER2-positive unresectable or metastatic colorectal cancer (mCRC) that has progressed after standard chemotherapy. Let's break this down:

- **Colorectal Cancer Incidence and Prevalence**: According to global cancer statistics (e.g., GLOBOCAN 2020), colorectal cancer is one of the most common cancers worldwide. We will estimate the number of mCRC patients in each region.

- **HER2-Positive mCRC**: Approximately 3-5% of colorectal cancer patients are HER2-positive (based on studies like the HERACLES trial and others).

- **RAS Wild-Type**: About 50-60% of colorectal cancer patients are RAS wild-type (non-mutated KRAS/NRAS).

- **Second-Line or Later Treatment**: Tucatinib is indicated for patients who have progressed after first-line therapies, so we assume it targets second-line or later patients, which is typically 30-50% of mCRC patients.

Using these percentages, we can estimate the eligible patient population in each geography.

Estimated mCRC Incidence (New Cases per Year)

- **US**: ~150,000 new colorectal cancer cases/year; ~20-25% are metastatic at diagnosis, and ~50% progress to metastatic disease. So, ~50,000-60,000 mCRC patients/year.

- **EU5**: ~200,000 new cases/year; similar metastatic rates, ~70,000-80,000 mCRC patients/year.

- **China**: ~550,000 new cases/year; ~150,000-180,000 mCRC patients/year.

- **Japan**: ~50,000 new cases/year; ~15,000-20,000 mCRC patients/year.

Eligible Population for Tucatinib

- HER2-positive: 3-5% of mCRC $\rightarrow$ Take 4% as an average.

- RAS wild-type: ~55% of mCRC.

- Second-line or later: ~40% of mCRC patients progress to this stage.

Eligible population = Total mCRC patients × 4% (HER2+) × 55% (RAS wild-type) × 40% (2L+).

- **US**: 50,000 × 0.04 × 0.55 × 0.40 = ~440 patients/year.

- **EU5**: 75,000 × 0.04 × 0.55 × 0.40 = ~660 patients/year.

- **China**: 165,000 × 0.04 × 0.55 × 0.40 = ~1,450 patients/year.

- **Japan**: 17,500 × 0.04 × 0.55 × 0.40 = ~154 patients/year.

- **Total**: ~2,704 patients/year.

This is the **incident population** (newly eligible patients each year). Since mCRC patients may survive 1-2 years in later lines, the **prevalent population** (total treatable at any given time) could be 1.5-2x the incident population. Let's assume a factor of 1.8:

- **Total Prevalent Eligible Population**: 2,704 × 1.8 = ~4,867 patients.

Step 2: Treatment Rate and Market Share

- **Treatment Rate**: Not all eligible patients receive targeted therapies due to access, cost, or clinical decisions. Assume 70% of eligible patients are treated with targeted therapies in the US, EU5, and Japan, and 40% in China (due to cost and access barriers).

- **Market Share**: The query assumes a 20-30% share of treated patients for tucatinib. We will use 25% as the midpoint for peak sales estimation.

Treated Patients with Tucatinib (Peak Penetration)

- **US**: 440 (incident) × 1.8 (prevalence) × 70% (treatment rate) × 25% (market share) = ~139 patients/year.

- **EU5**: 660 × 1.8 × 70% × 25% = ~208 patients/year.

- **China**: 1,450 × 1.8 × 40% × 25% = ~261 patients/year.

- **Japan**: 154 × 1.8 × 70% × 25% = ~49 patients/year.

- **Total Treated Patients with Tucatinib**: ~657 patients/year.

Step 3: Pricing and Annual Cost per Patient

Tucatinib's pricing is based on its use in other indications (e.g., HER2+ breast cancer). In the US, the annual cost of Tukysa is approximately $200,000-$250,000 per patient (based on reported figures and typical pricing for oncology drugs). Pricing in other regions is typically lower due to healthcare systems and negotiations:

- **US**: $225,000/year.

- **EU5**: $150,000/year (average, varies by country).

- **Japan**: $150,000/year.

- **China**: $75,000/year (due to significant price reductions and access programs).

Step 4: Calculate Potential Peak Sales

Peak sales = Number of treated patients × Annual cost per patient.

- **US**: 139 patients × $225,000 = **$31.3 million**.

- **EU5**: 208 patients × $150,000 = **$31.2 million**.

- **China**: 261 patients × $75,000 = **$19.6 million**.

- **Japan**: 49 patients × $150,000 = **$7.4 million**.

- **Total Peak Sales**: **$89.5 million/year**.

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

First, calculate the total treated patients (not just tucatinib's share) in each region (using the 70% or 40% treatment rate from Step 2):

- **US**: 440 × 1.8 × 70% = ~554 treated patients.

- **EU5**: 660 × 1.8 × 70% = ~832 treated patients.

- **China**: 1,450 × 1.8 × 40% = ~1,044 treated patients.

- **Japan**: 154 × 1.8 × 70% = ~194 treated patients.

- **Total Treated Patients**: ~2,624 patients.

Now, 1% of treated patients:

- **US**: 554 × 1% = 5.54 patients → 5.54 × $225,000 = **$1.25 million**.

- **EU5**: 832 × 1% = 8.32 patients → 8.32 × $150,000 = **$1.25 million**.

- **China**: 1,044 × 1% = 10.44 patients → 10.44 × $75,000 = **$0.78 million**.

- **Japan**: 194 × 1% = 1.94 patients → 1.94 × $150,000 = **$0.29 million**.

- **Total $ Value of 1% Share**: **$3.57 million**.

Final Answers

1. **Potential Peak Sales for Tucatinib (25% Market Share)**:

- **US**: $31.3 million

- **EU5**: $31.2 million

- **China**: $19.6 million

- **Japan**: $7.4 million

- **Total**: **$89.5 million/year**

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

- **US**: $1.25 million

- **EU5**: $1.25 million

- **China**: $0.78 million

- **Japan**: $0.29 million

- **Total**: **$3.57 million**

Notes and Caveats

- These estimates are based on assumptions for patient population, treatment rates, market share, and pricing. Real-world data may differ due to competition (e.g., other HER2-targeted therapies), reimbursement policies, and regional variations in access.

- Peak sales are assumed to occur after market penetration stabilizes (typically 3-5 years post-launch).

- Pricing in China and EU5 may vary significantly based on negotiations and local policies.

- The indication (RAS wild-type HER2+ mCRC) is a niche segment, so the total market size is relatively small compared to broader oncology indications.