To estimate the **Potential Peak Sales** for ramucirumab (CYRAMZA) in the indication of first-line treatment of metastatic non-small cell lung cancer (NSCLC) with EGFR exon 19 deletions or exon 21 (L858R) mutations 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 numbers, pricing, and market penetration may not be fully available in real-time, I will outline the methodology and use reasonable assumptions based on publicly available data and market trends up to October 2023. The final figures are illustrative and should be validated with up-to-date market research or proprietary data.

Step 1: Define the Target Patient Population

Ramucirumab is approved for first-line treatment of metastatic NSCLC with specific EGFR mutations (exon 19 deletions or exon 21 L858R mutations). These mutations account for approximately **10-15% of NSCLC cases** in Western populations (US, EU5) and a higher proportion, around **30-40%, in Asian populations** (China, Japan) due to genetic differences.

Estimated NSCLC Incidence and Target Population

- **NSCLC Incidence (2023 estimates based on historical data and trends):**

- US: ~200,000 new cases/year (85% of all lung cancer cases are NSCLC).

- EU5: ~300,000 new cases/year.

- China: ~800,000 new cases/year (largest lung cancer burden globally).

- Japan: ~100,000 new cases/year.

- **Proportion of Metastatic NSCLC (Stage IV at diagnosis):** Approximately 40-50% of NSCLC cases are metastatic at diagnosis.

- **Proportion with EGFR Mutations (exon 19 del or L858R):**

- US/EU5: ~12% of NSCLC cases.

- China/Japan: ~35% of NSCLC cases.

- **Eligible Patients (Metastatic + EGFR Mutations):**

- US: 200,000 * 0.45 (metastatic) * 0.12 = ~10,800 patients/year.

- EU5: 300,000 * 0.45 * 0.12 = ~16,200 patients/year.

- China: 800,000 * 0.45 * 0.35 = ~126,000 patients/year.

- Japan: 100,000 * 0.45 * 0.35 = ~15,750 patients/year.

- **Total Eligible Patients Across Geographies:** ~10,800 (US) + 16,200 (EU5) + 126,000 (China) + 15,750 (Japan) = **168,750 patients/year**.

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

- Ramucirumab is used in combination with erlotinib, competing with other EGFR-targeted therapies like osimertinib (Tagrisso), which is often the standard of care for first-line EGFR-mutant NSCLC. Market penetration will depend on clinical differentiation, pricing, and reimbursement.

- Given the 20%-30% share assumption:

- **Low End (20%):** 168,750 * 0.20 = **33,750 treated patients/year**.

- **High End (30%):** 168,750 * 0.30 = **50,625 treated patients/year**.

Step 3: Estimate Annual Treatment Cost per Patient

Ramucirumab's pricing varies by region due to differences in healthcare systems, negotiations, and purchasing power. Below are approximate annual costs based on historical data and market reports (assuming a full year of treatment):

- **US:** ~$150,000/year per patient (high due to list pricing and limited discounts).

- **EU5:** ~$80,000/year per patient (lower due to negotiated pricing and health technology assessments).

- **China:** ~$30,000/year per patient (significant discounts due to national reimbursement drug list negotiations and generics competition).

- **Japan:** ~$100,000/year per patient (similar to US but with some cost controls).

Step 4: Calculate Potential Peak Sales

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

Low End (20% Share):

- **US:** 33,750 * 0.2 * $150,000 = **$1.013 billion**.

- **EU5:** 33,750 * 0.2 * $80,000 = **$0.540 billion**.

- **China:** 33,750 * 0.2 * $30,000 = **$0.203 billion**.

- **Japan:** 33,750 * 0.2 * $100,000 = **$0.338 billion**.

- **Total Peak Sales (20% Share):** $1.013B + $0.540B + $0.203B + $0.338B = **$2.094 billion**.

High End (30% Share):

- **US:** 33,750 * 0.3 * $150,000 = **$1.519 billion**.

- **EU5:** 33,750 * 0.3 * $80,000 = **$0.810 billion**.

- **China:** 33,750 * 0.3 * $30,000 = **$0.304 billion**.

- **Japan:** 33,750 * 0.3 * $100,000 = **$0.506 billion**.

- **Total Peak Sales (30% Share):** $1.519B + $0.810B + $0.304B + $0.506B = **$3.139 billion**.

Potential Peak Sales Range: $2.1 billion to $3.1 billion annually across the US, EU5, China, and Japan.

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

A 1% share of treated patients corresponds to 1% of the total eligible patient population (168,750 patients/year), i.e., **1,687.5 patients/year**.

- **US:** 1,687.5 * (10,800/168,750) * $150,000 = **$16.2 million**.

- **EU5:** 1,687.5 * (16,200/168,750) * $80,000 = **$12.9 million**.

- **China:** 1,687.5 * (126,000/168,750) * $30,000 = **$37.8 million**.

- **Japan:** 1,687.5 * (15,750/168,750) * $100,000 = **$15.7 million**.

- **Total Value of 1% Share:** $16.2M + $12.9M + $37.8M + $15.7M = **$82.6 million**.

$ Value of 1% Share of Treated Patients: $82.6 million annually.

Summary of Results

1. **Potential Peak Sales for Ramucirumab in NSCLC (EGFR Mutations, First-Line):**

- **Range:** $2.1 billion (20% share) to $3.1 billion (30% share) annually across the US, EU5, China, and Japan.

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

- **Total:** $82.6 million annually across the specified geographies.

Key Assumptions and Caveats

- **Patient Population:** Based on estimated NSCLC incidence, metastatic proportion, and EGFR mutation prevalence. Actual numbers may vary based on updated epidemiology data.

- **Market Penetration:** Assumes 20%-30% share, which may be optimistic given competition from osimertinib and other therapies. Real-world uptake depends on clinical outcomes, guideline inclusion, and payer decisions.

- **Pricing:** Annual treatment costs are approximations and may differ due to discounts, rebates, or changes in reimbursement policies.

- **Treatment Duration:** Assumes a full year of treatment; actual duration may be shorter or longer based on progression-free survival and patient response.

For precise figures, consult primary market research, sales forecasts from Eli Lilly, or analyst reports (e.g., EvaluatePharma, GlobalData).