To estimate the **Potential Peak Sales** for the drug combination "nivolumab + ipilimumab" in the indication of unresectable or metastatic hepatocellular carcinoma (HCC) in the US, EU5 (Germany, France, Italy, Spain, UK), China, and Japan, as well as the **$ value of 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, I will outline the methodology and make reasonable assumptions based on publicly available information and typical market dynamics for oncology drugs. I will also assume a 20% to 30% market share of treated patients as provided in the query.

Step 1: Define the Indication and Target Population

- **Indication**: First-line treatment of adult patients with unresectable or metastatic hepatocellular carcinoma (HCC).

- **HCC Overview**: HCC is the most common type of primary liver cancer and is often diagnosed at an advanced stage (unresectable or metastatic). It is a high unmet need area with significant incidence in regions like China (due to high prevalence of hepatitis B), followed by the US, EU5, and Japan.

Estimated Annual Incidence of HCC (Unresectable/Metastatic):

- **US**: ~42,000 new HCC cases annually (2023 estimate, American Cancer Society). Approximately 60-70% are unresectable/metastatic at diagnosis (~25,000-29,000 patients).

- **EU5**: ~60,000 new HCC cases annually across Europe, with ~70% unresectable/metastatic (~42,000 patients).

- **China**: ~410,000 new HCC cases annually (highest global burden due to hepatitis B prevalence). ~70% unresectable/metastatic (~287,000 patients).

- **Japan**: ~40,000 new HCC cases annually, with ~70% unresectable/metastatic (~28,000 patients).

Total Target Population (Unresectable/Metastatic HCC):

- US: ~27,000 patients

- EU5: ~42,000 patients

- China: ~287,000 patients

- Japan: ~28,000 patients

- **Total**: ~384,000 patients annually across these geographies.

Step 2: Estimate Treated Patient Population

Not all eligible patients receive treatment due to factors like access, cost, comorbidities, or late diagnosis. For advanced HCC, treatment rates vary by region:

- **US**: ~70% of eligible patients receive systemic therapy.

- **EU5**: ~60-70% of eligible patients receive systemic therapy.

- **China**: ~30-40% due to cost and access barriers.

- **Japan**: ~70% due to advanced healthcare infrastructure.

Estimated Treated Patients (assuming midpoint of ranges):

- US: 27,000 × 70% = ~19,000 patients

- EU5: 42,000 × 65% = ~27,300 patients

- China: 287,000 × 35% = ~100,450 patients

- Japan: 28,000 × 70% = ~19,600 patients

- **Total Treated Patients**: ~166,350 patients annually.

Step 3: Estimate Market Share for Nivolumab + Ipilimumab

Assuming a market share of **20% to 30%** of treated patients (as per the query), we calculate the range of patients treated with nivolumab + ipilimumab:

- **20% Share**:

- US: 19,000 × 20% = 3,800 patients

- EU5: 27,300 × 20% = 5,460 patients

- China: 100,450 × 20% = 20,090 patients

- Japan: 19,600 × 20% = 3,920 patients

- **Total**: 33,270 patients

- **30% Share**:

- US: 19,000 × 30% = 5,700 patients

- EU5: 27,300 × 30% = 8,190 patients

- China: 100,450 × 30% = 30,135 patients

- Japan: 19,600 × 30% = 5,880 patients

- **Total**: 49,905 patients

Step 4: Estimate Annual Cost of Therapy per Patient

Nivolumab (Opdivo) and ipilimumab (Yervoy) are premium-priced immunotherapies. Costs vary by region due to pricing differences, discounts, and healthcare systems. Annual cost estimates (based on typical oncology drug pricing and treatment duration for HCC, often 1 year or until progression):

- **US**: ~$150,000–$200,000 per patient per year for the combination.

- **EU5**: ~$100,000–$150,000 per patient per year (lower due to negotiated pricing).

- **China**: ~$50,000–$80,000 per patient per year (significant discounts or tiered pricing; access programs).

- **Japan**: ~$120,000–$160,000 per patient per year (similar to EU5 but with unique pricing mechanisms).

Midpoint Annual Cost Assumptions:

- US: $175,000

- EU5: $125,000

- China: $65,000

- Japan: $140,000

Step 5: Calculate Potential Peak Sales

Peak sales are calculated by multiplying the number of treated patients (at 20% and 30% market share) by the annual cost per patient in each region.

Peak Sales at 20% Market Share:

- US: 3,800 patients × $175,000 = **$665 million**

- EU5: 5,460 patients × $125,000 = **$682.5 million**

- China: 20,090 patients × $65,000 = **$1,305.9 million**

- Japan: 3,920 patients × $140,000 = **$548.8 million**

- **Total Peak Sales (20%)**: **~$3.20 billion**

Peak Sales at 30% Market Share:

- US: 5,700 patients × $175,000 = **$997.5 million**

- EU5: 8,190 patients × $125,000 = **$1,023.8 million**

- China: 30,135 patients × $65,000 = **$1,958.8 million**

- Japan: 5,880 patients × $140,000 = **$823.2 million**

- **Total Peak Sales (30%)**: **~$4.80 billion**

Potential Peak Sales Range: **$3.2 billion to $4.8 billion annually** across the US, EU5, China, and Japan.

Step 6: Calculate $ Value of 1% Share of Treated Patients

A 1% share of treated patients corresponds to 1% of the total treated patient population in each region. We multiply this by the annual cost per patient to estimate the revenue associated with a 1% share.

1% of Treated Patients:

- US: 19,000 × 1% = 190 patients

- EU5: 27,300 × 1% = 273 patients

- China: 100,450 × 1% = 1,004.5 patients

- Japan: 19,600 × 1% = 196 patients

$ Value of 1% Share:

- US: 190 patients × $175,000 = **$33.25 million**

- EU5: 273 patients × $125,000 = **$34.13 million**

- China: 1,004.5 patients × $65,000 = **$65.29 million**

- Japan: 196 patients × $140,000 = **$27.44 million**

- **Total $ Value of 1% Share**: **~$160.11 million**

Final Answer

1. **Potential Peak Sales for Nivolumab + Ipilimumab in Unresectable/Metastatic HCC** (assuming 20% to 30% market share):

- **Range**: **$3.2 billion to $4.8 billion annually** across the US, EU5, China, and Japan.

- **Breakdown by Region (20% / 30%)**:

- US: $665M / $997.5M

- EU5: $682.5M / $1,023.8M

- China: $1,305.9M / $1,958.8M

- Japan: $548.8M / $823.2M

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

- **Total**: **~$160.11 million**

- **Breakdown by Region**:

- US: $33.25M

- EU5: $34.13M

- China: $65.29M

- Japan: $27.44M

Notes and Caveats

- These estimates are based on assumptions for patient numbers, treatment rates, market share, and pricing. Actual figures may vary due to competition (e.g., other therapies like atezolizumab + bevacizumab for HCC), reimbursement policies, and market access challenges.

- Pricing in China is particularly variable due to government negotiations and volume-based procurement programs.

- Peak sales typically occur several years after launch, factoring in market penetration and adoption rates.

- The analysis assumes a steady state of treated patients annually and does not account for potential changes in incidence or treatment paradigms over time.

If more specific data (e.g., exact pricing or patient access numbers) is available, these estimates can be refined further.