

To estimate the **Potential Peak Sales** for nivolumab (Opdivo) in the indication of completely resected esophageal or gastroesophageal junction (GEJ) cancer with residual pathologic disease post-neoadjuvant chemoradiotherapy, as well as the **\$ value of 1% share of treated patients** in the US, EU5 (Germany, France, Italy, Spain, UK), China, and Japan, we need to follow a structured approach. Since specific data on patient population, pricing, and penetration rates may not be fully available, I will make reasonable assumptions based on publicly available information, oncology market trends, and the nature of the indication. Here's the step-by-step analysis:

---

## **\*\*Key Assumptions and Methodology\*\***

1. **Indication Scope:** Nivolumab is approved as an adjuvant therapy for esophageal or GEJ cancer patients with residual disease after neoadjuvant chemoradiotherapy. This is a niche indication within esophageal cancer, as it applies only to patients with completely resected tumors and residual pathologic disease.
2. **Patient Population:** Esophageal cancer incidence varies by region, with higher rates in East Asia (e.g., China) compared to the US and EU. Only a subset of patients will qualify for adjuvant therapy post-resection (estimated 20-30% of resected patients have residual disease and received neoadjuvant therapy).
3. **Market Penetration:** Assuming a 20-30% share of treated patients as given in the query.
4. **Pricing:** Nivolumab is a high-cost immunotherapy. Annual treatment cost per patient in the US is approximately \$100,000–\$150,000 (based on typical PD-1 inhibitor pricing). Pricing in EU5 is typically 60-80% of US prices, while in Japan and China, it may be 50-70% due to pricing controls and negotiations.
5. **Treatment Duration:** Adjuvant therapy is often given for 6-12 months, so we assume a 1-year treatment duration for peak sales estimation.
6. **Peak Sales Timing:** Peak sales are typically achieved 5-7 years post-launch after market penetration stabilizes.

---

## **\*\*Step 1: Estimate Eligible Patient Population\*\***

Esophageal cancer incidence and the proportion of patients eligible for adjuvant therapy vary by region. Below are rough estimates based on epidemiology data (e.g., GLOBOCAN, SEER, and regional cancer statistics):

- **US:** ~18,000 new cases/year. ~30% undergo resection, and of those, ~25% have residual disease post-neoadjuvant therapy. Eligible patients: ~1,350.
- **EU5:** ~45,000 new cases/year. Similar resection and residual disease rates. Eligible patients: ~3,375.
- **China:** ~300,000 new cases/year (highest global incidence). ~30% resection, ~25% residual disease. Eligible patients: ~22,500.
- **Japan:** ~25,000 new cases/year. ~30% resection, ~25% residual disease. Eligible patients: ~1,875.

Total eligible patients across regions: ~29,100.

---

## **\*\*Step 2: Estimate Treated Patients with 20-30% Market Share\*\***

Assuming nivolumab captures 20-30% of eligible patients:

- **20% share:** ~5,820 treated patients.
- **30% share:** ~8,730 treated patients.

Regional breakdown:

- **US:** 270-405 patients (20-30% of 1,350).
- **EU5:** 675-1,013 patients (20-30% of 3,375).
- **China:** 4,500-6,750 patients (20-30% of 22,500).
- **Japan:** 375-563 patients (20-30% of 1,875).

---

## **\*\*Step 3: Estimate Annual Treatment Cost per Patient\*\***

Based on pricing benchmarks for PD-1 inhibitors like nivolumab:

- **US:** \$120,000/year.
- **EU5:** \$90,000/year (75% of US price).
- **China:** \$60,000/year (50% of US price, reflecting price negotiations and generics/biosimilars).
- **Japan:** \$80,000/year (67% of US price, reflecting pricing controls).

---

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

Peak sales are calculated as (Number of treated patients) × (Annual treatment cost per patient) for each region.

#### **At 20% Market Share:**

- **US:** 270 patients × \$120,000 = **\$32.4M.**
- **EU5:** 675 patients × \$90,000 = **\$60.8M.**
- **China:** 4,500 patients × \$60,000 = **\$270.0M.**
- **Japan:** 375 patients × \$80,000 = **\$30.0M.**
- **Total Peak Sales (20%):** **\$393.2M.**

#### **At 30% Market Share:**

- **US:** 405 patients × \$120,000 = **\$48.6M.**
- **EU5:** 1,013 patients × \$90,000 = **\$91.2M.**
- **China:** 6,750 patients × \$60,000 = **\$405.0M.**
- **Japan:** 563 patients × \$80,000 = **\$45.0M.**
- **Total Peak Sales (30%): \$589.8M.**

Thus, **Potential Peak Sales** for nivolumab in this indication across the US, EU5, China, and Japan range from **\$393M to \$590M**, depending on the 20-30% market share assumption.

---

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

1% of the eligible patient population is ~291 patients (1% of 29,100). Using the same regional distribution and pricing:

- **US:** 13.5 patients × \$120,000 = **\$1.62M.**
- **EU5:** 33.75 patients × \$90,000 = **\$3.04M.**
- **China:** 225 patients × \$60,000 = **\$13.50M.**
- **Japan:** 18.75 patients × \$80,000 = **\$1.50M.**
- **Total \$ Value of 1% Share: \$19.66M.**

Thus, the **\$ value of 1% share of treated patients** across these geographies is approximately **\$19.7M.**

---

### **\*\*Final Answer\*\***

#### **1. Potential Peak Sales for Nivolumab in this Indication:**

- At 20% market share: **\$393 million.**
- At 30% market share: **\$590 million.**
- Range: **\$393M to \$590M** across the US, EU5, China, and Japan.

#### **2. \$ Value of 1% Share of Treated Patients: \$19.7 million** across the US, EU5, China, and Japan.

**Note:** These estimates are based on assumptions about patient populations, pricing, and market penetration. Real-world data (e.g., exact patient numbers, competitive landscape, reimbursement policies, and treatment duration) could significantly alter these figures. For precise calculations, primary data from Bristol-Myers Squibb, market research reports, or regional health authorities would be required.