Cost containment of global monoclonal antibody drugs and cancer clinical trials via LLM focused reasoning

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Supplementary Dataset C30:

Article Reports 16-45

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3.5 Sonnet: 30 Reports Generated Separately February 7, 2025. (Pages 1-79)

Dataset Details 16,845 words beginning with "Clinical mAb Cancer Cost" on page 1 and ending with "End 30 Summaries" on page 79.

"Clinical mAb Cancer Cost" Begin 30 Summaries: Atezolizumab plus bevacizumab and chemotherapy as first-line therapy for cervical cancer: a cost-effectiveness analysis in the US, Lin Y. et al. 2024 Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Atezolizumab Combination Therapy for Cervical Cancer

Analysis Report

Executive Summary

This report analyzes the cost-effectiveness of adding atezolizumab (a monoclonal antibody) to standard bevacizumab plus chemotherapy (ABC therapy) compared to bevacizumab plus chemotherapy alone (BC therapy) for treating metastatic, persistent, and recurrent cervical cancer, based on research by Lin Y. et al.

The analysis found that while ABC therapy showed improved survival outcomes, it was not cost-effective at current US pricing levels. Key findings:

- ABC therapy had an incremental cost-effectiveness ratio (ICER) of "\$193,926.48/QALY" over a 20-year horizon
- This exceeded the US willingness-to-pay threshold of "\$150,000/QALY"
- A 10% reduction in atezolizumab price would make ABC therapy cost-effective at "\$121,531.24/QALY"
- Probabilistic analysis showed only 32.6% probability of ABC being cost-effective at current pricing
- Price reduction of 10% increased probability of cost-effectiveness to 58.6%

Technical Details

Methodology:

- Partitioned survival model using BEATcc clinical trial data
- 20-year lifetime horizon analysis
- US healthcare payer perspective
- 3% annual discount rate applied
- Primary outcome: Incremental cost-effectiveness ratio (ICER)

Key Cost Inputs:

- Atezolizumab per cycle: "\$10,072.20"
- Bevacizumab per cycle: "\$8,617.84"
- Pembrolizumab per cycle: "\$12,186.56"
- Cemiplimab per cycle: "\$11,178"
- Chemotherapy costs (per cycle):
- Carboplatin: "\$58.09"
- Cisplatin: "\$31.90"
- Paclitaxel: "\$36.53"
- Clinical Outcomes:
- Progression-free survival (PFS):
- ABC arm: 13.7 months
- BC arm: 10.4 months
- Overall survival (OS):

- ABC arm: 32.1 months

- BC arm: 22.8 months

Health State Utilities:

- Progression-free survival: 0.71
- Progressive disease: 0.58

Cost Results:

- BC arm total cost: "\$2,762,013.43"
- ABC arm total cost: "\$2,878,199.88"
- Incremental cost: "\$116,186.45"

Effectiveness Results:

- BC arm: 1.67 QALYs
- ABC arm: 2.27 QALYs
- Incremental effectiveness: 0.60 QALYs

Key Insights

- 1. Pricing Impact on Cost-Effectiveness
- Current atezolizumab pricing makes ABC therapy not cost-effective
- 10% price reduction would make it cost-effective
- Price of atezolizumab had the most significant impact on model results
- Shows importance of drug pricing in determining therapy adoption
- 2. Clinical Value vs Economic Value
- ABC therapy showed clear clinical benefits:
- 3.3 month PFS improvement
- 9.3 month OS improvement
- However, economic value does not justify current pricing
- Highlights disconnect between clinical and economic endpoints
- 3. Healthcare System Implications
- Findings support need for value-based pricing
- Results can inform coverage decisions and price negotiations
- Demonstrates role of economic analysis in therapy adoption
- Shows importance of balancing innovation with affordability

- 4. Policy Recommendations
- Consider price reduction of 10% for atezolizumab
- Implement value-based pricing mechanisms
- Continue economic evaluation of novel therapies
- Balance access to innovative treatments with system sustainability

The analysis demonstrates that while ABC therapy provides meaningful clinical benefits, its cost-effectiveness could be improved through pricing adjustments. A modest 10% reduction in atezolizumab price would make this therapy economically viable while maintaining innovation incentives. This highlights the importance of appropriate drug pricing in enabling access to novel cancer therapies while ensuring healthcare system sustainability.

The results provide valuable insights for payers, providers, and policymakers in making coverage and reimbursement decisions. They also illustrate how economic analysis can help optimize resource allocation in cancer care while promoting both innovation and affordability.

Atezolizumab plus bevacizumab and chemotherapy versus bevacizumab plus chemotherapy for metastatic cervical cancer: a cost-effectiveness analysis, Cai H. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the article:

Cost-Effectiveness Analysis of Atezolizumab in Metastatic Cervical Cancer Treatment

Executive Summary

This report analyzes the economic implications of adding atezolizumab, a monoclonal antibody immunotherapy, to standard bevacizumab plus chemotherapy treatment for metastatic cervical cancer, based on research by Cai H. et al. The analysis evaluated cost-effectiveness from the Chinese healthcare system perspective using data from the BEATcc clinical trial.

Key findings:

- Total costs were "\$128,179.56" for atezolizumab combination therapy versus "\$42,065.89" for standard therapy

- Atezolizumab therapy provided an incremental gain of 1.17 quality-adjusted life years (QALYs) at an additional cost of "\$86,113.67"

- The incremental cost-effectiveness ratio (ICER) was "\$73,601.43" per QALY, exceeding China's willingness-to-pay threshold of "\$39,855.79"

- Price reduction of 38% (to "\$1,764" per 1,200mg) would be needed for atezolizumab to achieve cost-effectiveness

The analysis concluded that despite clinical benefits, atezolizumab combination therapy is not currently cost-effective for metastatic cervical cancer treatment in China at existing price levels.

Technical Details

Model Structure and Parameters:

- Partitioned survival model with three health states: progression-free disease, progressive disease, and death
- 10-year time horizon with 3-week treatment cycles
- Log-logistic distribution used to model progression-free and overall survival
- Body surface area assumption of 1.64m2 for dosing calculations
- Discount rate of 5% applied

Cost Inputs:

- Drug costs per mg:
- Atezolizumab: "\$3.88"
- Bevacizumab: "\$1.60"
- Paclitaxel: "\$0.24"
- Cisplatin: "\$0.22"
- Carboplatin: "\$0.086"
- Other costs per cycle:
- Best supportive care: "\$337.50"
- Follow-up: "\$55.60"
- Laboratory examinations: "\$92.50"
- Abdominal CT: "\$105.90"

Utility Values:

- Progression-free disease: 0.85
- Progressive disease: 0.52
- Adverse events:
- Anemia: 0.38
- Neutropenia: 0.20
- Diarrhea: 0.11
- Hypertension: 0.10

Key Insights

Economic Impact:

1. The substantial cost differential of "\$86,113.67" between treatment arms was primarily driven by the high acquisition cost of atezolizumab

2. Sensitivity analyses revealed:

- Atezolizumab drug cost was the most influential factor affecting cost-effectiveness
- No parameter variations within $\pm 25\%$ brought ICER below the WTP threshold
- At WTP threshold of "\$39,855.79", probability of cost-effectiveness was only 0.10%

3. Price considerations:

- Current atezolizumab pricing makes combination therapy economically unfeasible
- 38% price reduction needed to achieve cost-effectiveness
- Similar findings reported in US market analyses of immunotherapy combinations

Policy Implications:

1. Need for innovative pricing strategies or risk-sharing agreements to improve access

- 2. Importance of considering:
- Value-based pricing approaches
- Patient assistance programs
- Negotiated volume-based discounts

3. Broader economic context:

- Rising costs of cancer immunotherapies creating healthcare system pressures
- Need to balance clinical benefits with sustainable healthcare spending
- Role of health technology assessment in coverage decisions

This analysis provides important economic evidence to inform policy decisions regarding atezolizumab coverage and reimbursement for metastatic cervical cancer treatment. While clinical benefits are demonstrated, achieving cost-effectiveness will require significant price reductions or innovative payment models.

The findings align with other economic analyses of cancer immunotherapies, highlighting the ongoing challenge of balancing treatment access with healthcare system sustainability. Future research examining real-world cost-effectiveness and alternative pricing strategies would be valuable for informing policy.

Cost-effectiveness analysis of bevacizumab combined with lomustine in the treatment of progressive glioblastoma using a Markov model simulation analysis, Chen Z. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the article:

Cost-Effectiveness Analysis of Bevacizumab + Lomustine for Progressive Glioblastoma

Executive Summary

This report analyzes a 2024 cost-effectiveness study by Chen Z. et al. examining bevacizumab (BEV) plus lomustine (LOM) combination therapy versus LOM monotherapy for progressive glioblastoma in China. Using Markov modeling, the authors found that while BEV+LOM improved progression-free survival, the incremental cost-effectiveness ratio (ICER) of "\$84,071.12" per quality-adjusted life year (QALY) exceeded China's willingness-to-pay threshold of "\$35,906" per QALY. The analysis concluded that BEV+LOM is not cost-effective as first-line treatment under current conditions, though it may still benefit some patients if supported by drug assistance programs.

Technical Details

Study Design and Model Parameters:

- Markov model comparing BEV+LOM vs LOM monotherapy
- Based on multicenter randomized Phase III trial data
- Three health states modeled: progression-free survival (PFS), progressive disease (PD), and death
- Monthly cycle length with 10-year time horizon
- 5% annual discount rate for costs and utilities
- Chinese healthcare system perspective

Cost Inputs (USD):

- BEV cost: "\$209.50" per 100mg standard dose
- LOM cost: "\$3.25" per dose
- Total treatment cost per patient:
- BEV+LOM: "\$23,650.98"
- LOM alone: "\$2,646.70"
- Incremental cost: "\$21,004.28"

Clinical Outcomes:

- Median PFS:

- BEV+LOM: 4.2 months

- LOM alone: 1.5 months

- Median overall survival:

- BEV+LOM: 9.1 months

- LOM alone: 8.6 months

Quality of Life Utilities:

- PFS state: 0.89 QALY

- PD state: 0.74 QALY

- Total QALYs gained:

- BEV+LOM: 0.51

- LOM alone: 0.26

- Incremental gain: 0.25 QALYs

Key Insights

Cost-Effectiveness Analysis:

1. While BEV+LOM demonstrated improved progression-free survival, the ICER of "\$84,071.12" per QALY exceeds typical thresholds for cost-effectiveness in China's healthcare system.

2. The high cost of bevacizumab ("\$209.50" per 100mg dose) is the primary driver of the unfavorable cost-effectiveness ratio, even after price negotiations with China's national medical insurance system.

3. Sensitivity analyses confirmed the model's robustness, with the ICER remaining above "\$35,906" per QALY across various parameter adjustments.

Policy Implications:

1. Current pricing makes BEV+LOM financially unsustainable as a standard first-line treatment option in China without additional support mechanisms.

2. Drug assistance programs and targeted insurance coverage may help make this therapy accessible for specific patient populations who could benefit most.

3. The analysis highlights the need to consider both clinical benefits and economic constraints when establishing treatment guidelines for rare but serious conditions like progressive glioblastoma.

Market Access Considerations:

1. Unlike the US market where bevacizumab is approved for recurrent high-grade gliomas, European regulators have not approved this indication, reflecting ongoing debate about its value proposition.

2. The study's findings suggest that even after price negotiations, innovative cancer therapies face significant market access challenges in developing healthcare systems.

3. Future research should explore real-world evidence from Chinese patients to better understand the therapy's value in local clinical practice.

This analysis provides important insights for policymakers and clinicians regarding the economic implications of expanding access to novel targeted therapies in resource-constrained healthcare systems. While BEV+LOM offers meaningful clinical benefits for some patients with progressive glioblastoma, its current cost structure poses challenges for broad implementation in China's healthcare system without additional financial support mechanisms.

Cost-effectiveness analysis of continuing bevacizumab plus chemotherapy versus chemotherapy alone after first progression of metastatic colorectal cancer, Li Y. et al. 2024

Here is a 4-page report analyzing the cost analysis study of bevacizumab in colorectal cancer treatment:

Executive Summary

This report analyzes a 2024 cost-effectiveness study by Li Y. et al. examining bevacizumab plus chemotherapy versus chemotherapy alone as second-line treatment for metastatic colorectal cancer (mCRC) in China. The authors conducted a comprehensive economic evaluation using clinical data from the ML18147 trial to assess whether continuing bevacizumab after disease progression is cost-effective from the Chinese healthcare system perspective.

Key findings:

- Adding bevacizumab to second-line chemotherapy increased costs by "\$22,761.62" while providing a modest survival benefit of 0.12 quality-adjusted life years (QALYs)

- The resulting incremental cost-effectiveness ratio (ICER) was "\$188,904.09" per QALY gained, substantially exceeding China's willingness-to-pay threshold of "\$38,201" per QALY

- Even with biosimilar versions, bevacizumab would need a 60.75% price reduction from "\$222.88" to "\$87.49" per 100mg to become cost-effective

- The analysis revealed bevacizumab plus chemotherapy had a 0% probability of being cost-effective at current prices

Technical Details

Study Design and Methodology:

- Partitioned survival model using ML18147 trial data comparing bevacizumab plus chemotherapy vs chemotherapy alone

- Three health states: progression-free survival (PFS), progressive disease (PD), and death
- Costs and utilities discounted at 5% annually
- Model inputs included drug costs, adverse event management, follow-up care, and health utilities
- Probabilistic and one-way sensitivity analyses conducted
- Subgroup analyses performed across 16 patient populations

Key Model Parameters:

- Base drug costs per unit:
- Bevacizumab: "\$222.88" per 100mg
- Irinotecan: "\$6.30" per 40mg
- Oxaliplatin: "\$39.94" per 50mg
- 5-fluorouracil: "\$10.03" per 250mg
- Folinate: "\$3.66" per 300mg
- Health state utilities:
- PFS: 0.78
- PD: 0.66
- Treatment patterns:
- 59% received oxaliplatin-based chemotherapy
- 41% received irinotecan-based chemotherapy
- 55% received subsequent fruquintinib therapy

Cost Analysis Results:

- Total costs:
- Bevacizumab + chemotherapy: "\$30,789.03"
- Chemotherapy alone: "\$8,027.41"
- Incremental cost: "\$22,761.62"
- Effectiveness:
- Incremental QALYs gained: 0.12
- Incremental life-years gained: 0.16

Key Insights

- 1. Economic Impact
- The high cost of bevacizumab remains the primary barrier to cost-effectiveness
- Even biosimilar versions would require a 24.29% price reduction from "\$149.78" to "\$113.40" to achieve cost-effectiveness
- The analysis suggests resources may be better allocated to more affordable interventions
- 2. Clinical Considerations
- Modest survival benefit (0.12 QALYs) must be weighed against substantial cost increase
- Treatment may be more cost-effective in specific subgroups:
- Male patients
- Those with PFS >9 months on first-line therapy
- Patients with good performance status
- 3. Policy Implications
- Current pricing makes bevacizumab continuation unlikely to be cost-effective in China
- Findings support need for:
- Price negotiations
- Development of biosimilars
- Patient selection criteria
- Value-based pricing strategies
- 4. Future Considerations
- Potential for cost-effectiveness may improve with:
- Further price reductions through centralized procurement
- Increased biosimilar competition
- Better patient selection criteria
- Real-world evidence to validate clinical benefit

The analysis provides robust evidence that continuing bevacizumab after progression in mCRC exceeds conventional cost-effectiveness thresholds in China. While the treatment provides clinical benefit, substantial price reductions would be needed to achieve economic value. These findings can inform coverage decisions and pricing negotiations while highlighting the importance of appropriate patient selection for costly targeted therapies.

Cost-effectiveness analysis of immune checkpoint inhibitors combined with targeted therapy and chemotherapy for HPV/HIV-related cervical cancer, Liang Y. et al. 2024

Cost Analysis Report: Monoclonal Antibody Therapies for HPV/HIV-Related Cervical Cancer

Executive Summary

This report analyzes the cost-effectiveness of immune checkpoint inhibitors (monoclonal antibodies) combined with targeted therapy and chemotherapy for treating HPV/HIV-related cervical cancer, based on research by Liang Y. and Ma A. The study compared three treatment regimens:

- Bevacizumab with chemotherapy (BC)

- Atezolizumab with bevacizumab and chemotherapy (ABC)

- Pembrolizumab with bevacizumab and chemotherapy (PBC)

Key findings show that while monoclonal antibody therapies significantly improved survival benefits, they were not cost-effective compared to standard care under the US healthcare payer perspective with a willingness-to-pay threshold of "\$100,000 to \$150,000" per QALY.

Technical Details

Cost Analysis

- Base treatment costs:

- BC: "\$272,377"
- ABC: "\$715,472"
- PBC: "\$694,239"

Effectiveness Metrics

- Quality-adjusted life years (QALYs):
- BC: 2.05 QALYs
- ABC: 2.85 QALYs
- PBC: 3.18 QALYs

Incremental Cost-Effectiveness Ratios (ICERs)

- ABC vs BC: "\$553,995" per QALY
- PBC vs BC: "\$372,151" per QALY

Safety Costs

Severe adverse event (SAE) costs:

- BC: "\$6,189"
- ABC: "\$7,603"
- PBC: "\$13,640"

Sensitivity Analysis Results

Major factors affecting cost-effectiveness:

- Drug prices
- Utility values
- Hazard ratio values for overall survival and progression-free survival
- Quality of life measures in progression-free and progressed disease states

Key Insights

1. Survival Benefits vs Cost-Effectiveness

- While PBC showed the highest effectiveness with 3.18 QALYs, followed by ABC with 2.85 QALYs, neither treatment was cost-effective compared to standard BC therapy under current US healthcare thresholds.

- 2. Safety Profile Considerations
- BC demonstrated the best safety profile with lowest SAE costs at "\$6,189"
- ABC showed moderate SAE costs at "\$7,603"
- PBC had the highest SAE costs at "\$13,640"

3. Economic Implications

- The high cost of monoclonal antibody therapies significantly exceeds current willingness-to-pay thresholds
- BC remains the most cost-effective option despite lower effectiveness
- Price reductions in monoclonal antibodies would be necessary to achieve cost-effectiveness

4. Clinical Practice Impact

- Treatment decisions must balance improved survival benefits against substantially higher costs
- Current pricing structures limit accessibility of these potentially beneficial therapies
- Further research needed to optimize treatment protocols and reduce costs while maintaining efficacy

The analysis by Liang Y. and Ma A. demonstrates that while monoclonal antibody therapies offer significant clinical benefits, their high costs present substantial barriers to widespread adoption under current US healthcare payment structures.

Cost-effectiveness analysis of trifluridine/tipiracil combined with bevacizumab vs. monotherapy for third-line treatment of colorectal cancer, Huang, L. et al. 2024

Here is a 4-page report analyzing the cost analysis of monoclonal antibody therapy in cancer treatment based on the article:

Cost Analysis Report: Bevacizumab Combination Therapy in Colorectal Cancer

Executive Summary

This report analyzes the cost-effectiveness of combining bevacizumab (a monoclonal antibody therapy) with trifluridine/tipiracil compared to trifluridine/tipiracil monotherapy for third-line treatment of colorectal cancer, based on a study by Huang L. et al. The analysis was conducted from the perspective of the Chinese healthcare system using data from the SUNLIGHT Phase III clinical trial.

Key findings:

- The combination therapy showed improved clinical efficacy but at substantially higher costs
- The incremental cost-effectiveness ratio (ICER) exceeded the willingness-to-pay threshold
- Drug costs and progression-free survival utility values had the greatest impact on cost-effectiveness
- At the current pricing, the combination therapy does not demonstrate economic advantage over monotherapy

Technical Details

Study Design

- Dynamic Markov model with 4-week cycles over 10-year simulation period
- Based on SUNLIGHT Phase III trial data
- Three health states: progression-free survival (PFS), progressed disease (PD), and death
- Direct medical costs and quality-adjusted life years (QALYs) analyzed
- Willingness-to-pay threshold set at \$37,647 per QALY (¥268,200)

Cost Analysis

Treatment costs per regimen:

- Combination therapy: \$117,674 (¥838,492.74)
- Monotherapy: \$50,153 (¥357,396.97)
- Incremental cost: \$67,521 (¥481,095.78)

Clinical Benefits:

- Combination therapy: 2.45 QALYs
- Monotherapy: 1.54 QALYs
- Incremental benefit: 0.91 QALYs

ICER Analysis:

- Calculated ICER: \$74,024 per QALY (¥527,577.36)
- Exceeds willingness-to-pay threshold of \$37,647 per QALY
- 50% probability of being cost-effective at \$69,341 threshold (¥494,000)

Sensitivity Analyses

One-way sensitivity analysis showed drug costs and PFS utility values as key drivers of cost-effectiveness. Probabilistic sensitivity analysis with 10,000 Monte Carlo simulations confirmed the robustness of the base case findings.

Cost Components Evaluated:

- Direct medical costs
- Adverse event management
- Follow-up care
- Supportive care
- End-of-life care

Key Insights

Economic Implications

- 1. The addition of bevacizumab provides clinical benefits but at substantial cost increase:
- 0.91 additional QALYs gained
- \$67,521 incremental cost per patient
- ICER exceeds acceptable threshold by nearly 2-fold
- 2. Key factors driving unfavorable economics:
- High acquisition cost of bevacizumab
- Increased adverse event management costs
- Limited long-term survival benefits
- 3. Market Access Considerations:
- Current pricing makes widespread adoption challenging

- Price reductions needed for economic viability
- Alternative payment models may need exploration

Healthcare System Impact

- The combination therapy demonstrates improved efficacy but is not cost-effective at current pricing
- Implementation would significantly increase healthcare expenditure
- Resource allocation decisions need to balance clinical benefits with economic constraints
- Further real-world evidence needed to validate economic modeling assumptions

Future Considerations

- 1. Potential strategies to improve cost-effectiveness:
- Price negotiations for bevacizumab
- Patient subgroup identification
- Alternative dosing schedules
- Value-based payment models
- 2. Areas requiring additional research:
- Long-term survival data
- Quality of life impacts
- Indirect cost implications
- Real-world effectiveness

The analysis suggests that while the bevacizumab combination therapy shows promising clinical benefits, its current pricing makes it economically challenging to implement broadly in the Chinese healthcare system. Alternative pricing strategies or payment models may need to be explored to make this therapy more accessible to patients who could benefit from it.

Cost-effectiveness of immune checkpoint inhibitors as a first-line therapy for advanced hepatocellular carcinoma: a systematic review, Gong H. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Immune Checkpoint Inhibitors for Advanced Hepatocellular Carcinoma

Executive Summary

This systematic review evaluated the cost-effectiveness of immune checkpoint inhibitors (ICIs) as first-line therapy for advanced hepatocellular carcinoma (HCC). The analysis included 17 full economic evaluations comparing various ICI regimens published between 2021-2024. Key findings indicate that most ICI treatments are not cost-effective compared to tyrosine kinase inhibitors (TKIs) from social, healthcare system, payer and patient perspectives, primarily due to high drug costs despite improved survival benefits.

The review found that atezolizumab plus bevacizumab prices ranged from "\$3,885.42" to "\$9,419.16" per 1,200 mg dose. Sintilimab was priced between "\$166.57" to "\$656" per 100 mg across studies. These high costs were major drivers of unfavorable cost-effectiveness results in most analyses.

Only 5 of the 17 studies concluded that specific ICI regimens were cost-effective, while 10 studies found ICIs were not cost-effective compared to standard TKI therapy. Geographic variations were observed, with some regimens being cost-effective in China but not in the US, highlighting the impact of regional pricing and willingness-to-pay thresholds on economic assessments.

Technical Details

Methodology:

- Systematic review of 17 complete economic evaluations
- Databases searched: Scopus, Web of Science, PubMed, Embase, Cochrane Central
- Studies evaluated ICIs as first-line treatment for advanced HCC
- Quality assessment using CHEERS checklist
- Cost analyses converted to US dollars

Model Structures:

- 11 studies used partitioned survival models with three health states:
- * Progression-free survival
- * Progressive disease
- * Death
- 6 studies employed three-state Markov models
- Time horizons ranged from 5 years to lifetime
- Discount rates: 2.5-5%

Key Economic Parameters:

- Drug costs were consistently most influential
- Hazard ratios for progression-free and overall survival
- Utility values for different health states

- Body weight
- Subsequent treatment costs
- Discount rates
- Percentage of patients receiving subsequent therapy

Geographic Considerations:

- US studies used thresholds of "\$69,375" to "\$150,000" per QALY
- Chinese studies used 1-3x GDP per capita ("\$11,101" to "\$37,653" per QALY)
- French threshold: "\$133,775" per QALY
- Thai threshold: "\$4,678" per QALY

Key Insights

Cost Drivers:

- 1. Drug pricing was the primary factor affecting cost-effectiveness:
- Atezolizumab: "\$3,885.42" to "\$9,419.16" per 1,200 mg
- Sintilimab: "\$166.57" to "\$656" per 100 mg
- Higher costs in US vs China impacted regional cost-effectiveness
- 2. Clinical factors influencing results:
- Improved survival benefits were insufficient to offset high costs
- Utility values varied by health state and country
- Body weight impacted dosing and total costs
- Subsequent therapy patterns affected overall costs
- 3. Geographic variations:
- Same regimens showed different cost-effectiveness by region
- Impact of local pricing and reimbursement systems
- Varying willingness-to-pay thresholds by country
- Different healthcare system perspectives
- 4. Potential solutions identified:
- Reduced drug dosing could improve cost-effectiveness
- Price reductions of 30-70% would make some ICIs cost-effective
- Patient assistance programs may help in certain markets
- Biosimilars could reduce costs while maintaining benefits

5. Limitations noted:

- Limited country-specific utility data
- Indirect treatment comparisons may affect accuracy
- Model structure uncertainty impacts results
- Different cost-effectiveness thresholds affect conclusions

The analysis demonstrates that while ICIs show clinical benefits for advanced HCC, their high costs make them generally not cost-effective under current pricing. Geographic variations in drug costs and willingness-to-pay thresholds create regional differences in economic value. Future considerations should focus on pricing strategies, biosimilar development, and patient assistance programs to improve access while maintaining financial sustainability.

Cost-utility analysis of atezolizumab combined with bevacizumab for unresectable hepatocellular carcinoma in Thailand, Sriphoosanaphan S. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Executive Summary

This report analyzes the cost-utility evaluation of atezolizumab plus bevacizumab (A+B) combination therapy compared to best supportive care (BSC) for unresectable hepatocellular carcinoma (uHCC) in Thailand (Sriphoosanaphan S. et al.). The study found that while A+B demonstrated superior clinical benefits, its high cost poses significant economic challenges in the Thai healthcare setting. Key findings include:

- Lifetime treatment cost of "\$48,669" for A+B versus "\$3,313" for BSC
- Incremental cost-effectiveness ratio (ICER) of "\$54,589" per quality-adjusted life year (QALY) gained
- Required budget impact of "\$8.2 to \$27.9 million" over 5 years for implementation
- Drug costs constitute approximately 85% of total direct medical costs for A+B therapy

Technical Details

Methodology:

- Three-state Markov model examining progression-free, progressed, and death states
- Societal perspective with lifetime horizon
- 3% annual discount rate for costs and outcomes
- Local Thai cost and utility data applied
- All costs adjusted to 2023 values using consumer price index

Key Cost Parameters:

- A+B monthly drug cost: "\$6,135"
- BSC monthly cost: "\$489"
- A+B administration cost per month: "\$21"
- Direct non-medical monthly costs:
- Travel: "\$5"
- Additional food: "\$2"
- Caregiver productivity loss: "\$3"

Clinical Parameters:

- Hazard ratio for overall survival (A+B vs BSC): 0.40
- Hazard ratio for progression-free survival: 0.34
- Utility scores:
- Progression-free state: 0.89
- Progressed state: 0.58

Budget Impact Analysis:

- Based on projected access rates increasing from 15% to 41% over 5 years
- Year 1 budget requirement: "\$8.2 million"
- Year 5 budget requirement: "\$27.9 million"
- Patient numbers expected to increase from 224 to 625 cases

Sensitivity Analyses:

- Most influential variables:
- 1. Hazard ratio for overall survival
- 2. Hazard ratio for progression-free survival
- 3. Drug cost of A+B
- 6% reduction in A+B cost would decrease ICER by 9%
- Zero probability of being cost-effective at current Thai willingness-to-pay threshold of "\$4,678" per QALY
- 60% probability of being cost-effective at higher threshold of "\$60,819" per QALY

Key Insights

Economic Barriers:

- 1. High Treatment Costs
- 15-fold higher lifetime cost for A+B compared to BSC ("\$48,669" vs "\$3,313")
- Drug costs represent 85% of total direct medical costs

- Current pricing makes A+B not cost-effective under Thai threshold

- 2. Budget Impact Challenges
- Substantial funding required for implementation ("\$8.2 to \$27.9 million" over 5 years)
- Growing patient population will increase financial burden
- Limited healthcare resources in Thai setting
- 3. Potential Solutions
- Price negotiations needed but may not be sufficient alone
- Consider managed entry agreements/risk-sharing arrangements
- Target specific patient subgroups most likely to benefit
- Explore alternative financing mechanisms
- 4. Clinical Considerations
- Superior efficacy demonstrated despite economic challenges
- Modified albumin-bilirubin (mALBI) grade could help identify optimal candidates
- Patient selection strategies may improve cost-effectiveness
- Real-world evidence needed to validate economic projections

This analysis highlights the complex balance between clinical benefits and economic sustainability in implementing novel cancer therapies in resource-limited settings. While A+B shows promising clinical outcomes, its current pricing creates significant access barriers in the Thai healthcare system. Strategic approaches combining pricing negotiations, patient selection, and innovative funding mechanisms may help bridge this gap.

The findings underscore the broader challenge of implementing expensive but effective cancer treatments in developing economies. Future research should focus on identifying predictive biomarkers and patient characteristics that could optimize patient selection and improve the cost-effectiveness profile of A+B therapy.

Monoclonal antibody biosimilars for cancer treatment, Broer L. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the provided article:

Executive Summary

This analysis examines the economic landscape of monoclonal antibody (mAb) biosimilars in cancer treatment, based on a comprehensive review by Broer L. et al. The authors highlight how high prices of original mAb therapies burden healthcare systems and limit global access. Key findings include:

- Development costs of biosimilars remain high due to complex manufacturing and extensive analytical requirements
- Modest 40-46% price reductions seen in European markets like Germany and Poland for biosimilars
- Potential for up to 69% cost savings with increased biosimilar adoption based on rheumatology experience
- Multiple barriers exist including development costs, patent challenges, and implementation hurdles

- Solutions proposed include streamlined approval pathways, improved patent policies, and standardized clinical requirements

The analysis suggests that while biosimilars offer significant cost-saving potential, realizing these benefits requires addressing multiple economic and regulatory challenges.

Technical Details

Development & Manufacturing Economics:

- Complex manufacturing and analytical assessment drive high development costs
- Current biosimilar development timeline of 8-10 years versus 10-12 years for originators
- Development costs estimated at "\$200-300 million" versus "\$2-3 billion" for originators (Strategies in Regulated Markets)

Market & Pricing Analysis:

- Price reductions in Europe vary significantly:
- 46% reduction in Poland
- 40% reduction in Germany
- 10% increase in UK
- 5% increase in Norway

Patent Considerations:

- Patent duration typically 10 years in EU, 12 years in US
- Example of pembrolizumab:
- Over 100 patent applications with 53 granted
- 8-year patent extension
- Estimated "\$137 billion" additional drug costs
- Projected "\$18 billion" annual global sales by 2024

Implementation Costs:

- Education and training requirements for healthcare providers
- System changes needed for tracking and documentation

- Infrastructure investments for storage and handling
- Monitoring and pharmacovigilance programs

Key Insights

- 1. Development Cost Challenges
- High development costs remain primary barrier to biosimilar market entry
- Regulatory requirements drive significant portion of costs
- Opportunities exist to reduce costs through:
- Streamlined approval pathways
- Reduced clinical trial requirements
- Improved analytical methods
- 2. Market Access & Pricing
- Wide variation in price reductions across markets
- Cost savings potential not fully realized
- Need for:
- Better budget allocation systems
- Flexible pricing models
- Improved reimbursement policies
- 3. Patent Impact
- Complex patent landscape delays market entry
- Multiple patent extension strategies used by originators
- Need for reformed patent policies balancing innovation and access
- 4. Implementation Considerations
- Success requires stakeholder education and engagement
- System-wide changes needed for adoption
- Cost-benefit analysis must include implementation factors
- 5. Global Access
- Significant disparities in availability between regions
- Need for:
- Country-specific approaches
- Support for developing markets
- International cooperation

6. Future Outlook

- Growing biosimilar pipeline but gaps remain
- Continued evolution of regulatory frameworks
- Increasing focus on cost-effectiveness
- Emergence of new pricing models

The analysis reveals that while biosimilars offer significant potential for cost reduction in cancer treatment, realizing these benefits requires addressing multiple interconnected economic challenges. Success will require coordinated effort across stakeholders including regulators, manufacturers, healthcare providers, and payers.

The authors conclude that key priorities should include:

- Streamlining development and approval processes
- Reforming patent policies
- Improving implementation support
- Expanding global access
- Developing sustainable pricing models

Progress in these areas could help unlock the full cost-saving potential of biosimilars while maintaining quality and expanding access to critical cancer therapies.

This economic analysis provides important insights for stakeholders working to optimize the value proposition of biosimilars in cancer care. The findings suggest that while challenges remain, there are clear opportunities to improve the cost-effectiveness of these important therapies through targeted policy and practice changes.

Sintilimab plus chemotherapy with or without bevacizumab biosimilar IBI305 in EGFRmutated non-squamous NSCLC patients who progressed on EGFR TKI therapy: A Chinabased cost-effectiveness analysis, Peng J. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Sintilimab Combination Therapies for EGFR-Mutated NSCLC ## Executive Summary

This report analyzes the cost-effectiveness study by Peng J. et al. comparing two sintilimab-based combination therapies versus chemotherapy alone for EGFR-mutated non-small cell lung cancer (NSCLC) patients who progressed after tyrosine kinase inhibitor (TKI) treatment in China. The analysis evaluated:

- 1. Sintilimab plus chemotherapy
- 2. Sintilimab plus IBI305 (bevacizumab biosimilar) and chemotherapy
- 3. Chemotherapy alone (control)

The study found that sintilimab plus chemotherapy was cost-effective with an incremental cost-effectiveness ratio (ICER) of "\$15,329.11" per quality-adjusted life year (QALY), while sintilimab plus IBI305 and chemotherapy exceeded cost-effectiveness thresholds with an ICER of "\$53,266.32" per QALY. These findings have important implications for treatment selection and healthcare resource allocation.

Technical Details

Study Design

- 10-year Markov model with 21-day cycles
- Based on ORIENT-31 clinical trial data
- Willingness-to-pay (WTP) threshold range: "\$15,289.34" to "\$38,223.34" per QALY
- Costs reported in 2022 US dollars

Cost Analysis Results

Base Case Costs:

- Chemotherapy alone: "\$21,322.48"
- Sintilimab + chemotherapy: "\$27,287.22"
- Sintilimab + IBI305 + chemotherapy: "\$42,036.20"

Incremental Costs vs Chemotherapy:

- Sintilimab + chemotherapy: "\$5,964.73"
- Sintilimab + IBI305 + chemotherapy: "\$20,713.72"

Effectiveness Results

Quality-Adjusted Life Years (QALYs):

- Chemotherapy alone: "1.64024"
- Sintilimab + chemotherapy: "2.02936"
- Sintilimab + IBI305 + chemotherapy: "2.02912"

Incremental QALYs vs Chemotherapy:

- Sintilimab + chemotherapy: "0.38911"
- Sintilimab + IBI305 + chemotherapy: "0.38887"

Sensitivity Analyses

The deterministic sensitivity analyses showed:

- Sintilimab + chemotherapy remained cost-effective across model input variations
- Sintilimab + IBI305 + chemotherapy exceeded WTP threshold in most scenarios
- Health utility values and overall survival hazard ratios had significant impact on results

Probabilistic sensitivity analysis demonstrated:

- Higher probability of cost-effectiveness for sintilimab + chemotherapy vs sintilimab + IBI305 + chemotherapy across WTP thresholds from "\$0" to "\$200,000" per QALY

Key Insights

- 1. Cost-Effectiveness Findings:
- Sintilimab + chemotherapy provides good value at "\$15,329.11" per QALY
- Adding IBI305 substantially increases costs without proportional benefits
- Results consistent across patient subgroups and sensitivity analyses

2. Economic Implications:

- Significant cost difference between combinations ("\$27,287.22" vs "\$42,036.20")
- Similar effectiveness between combinations (2.02936 vs 2.02912 QALYs)
- Addition of IBI305 adds "\$14,748.98" in costs with minimal QALY benefit
- 3. Healthcare Policy Considerations:
- Findings support use of sintilimab + chemotherapy as preferred option
- Results applicable specifically to Chinese healthcare system context
- Cost-effectiveness thresholds based on China's GDP per capita
- 4. Study Limitations:
- Model projections limited to 10-year time horizon
- Health utility values from literature rather than direct measurement
- Focused only on Chinese healthcare system perspective
- Did not include comparison to other treatment options

The analysis provides strong economic evidence supporting sintilimab plus chemotherapy without IBI305 as a cost-effective treatment option for EGFR-mutated NSCLC patients who have progressed on TKI therapy in China. The addition of IBI305 substantially increases costs without meaningful improvements in effectiveness, making it difficult to justify from a cost-effectiveness perspective.

These findings can help inform clinical decision-making and healthcare policy regarding optimal treatment selection for this patient population while considering both clinical benefits and economic sustainability within healthcare systems.

Cost-effectiveness of one-year adjuvant trastuzumab therapy in treatment for early-stage breast cancer patients with HER2+ in Vietnam, Nguyen A. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the article:

Executive Summary

This cost-effectiveness analysis evaluated one-year adjuvant trastuzumab therapy for early-stage HER2-positive breast cancer patients in Vietnam compared to chemotherapy alone. The study found that trastuzumab therapy was not cost-effective at current pricing levels in Vietnam, with an incremental cost-effectiveness ratio (ICER) of "\$22,845" per quality-adjusted life year (QALY) gained according to Nguyen A.Q. et al. This exceeded Vietnam's cost-effectiveness threshold of 1x GDP per capita ("\$3,600") by 6.3 times and 3x GDP per capita ("\$10,800") by 2.1 times.

The analysis determined that for trastuzumab to become cost-effective at the 3x GDP per capita threshold, the price would need to be reduced by 54-56% for standard vial usage or by 38% if vial-sharing protocols were implemented. The high cost of trastuzumab was identified as the primary barrier to cost-effectiveness in Vietnam's resource-constrained healthcare system.

Technical Details

Methodology:

- Markov model analyzing lifetime costs and effectiveness
- Societal perspective used for analysis
- Treatment comparators: One-year adjuvant trastuzumab + chemotherapy vs. chemotherapy alone
- Key clinical inputs derived from N9831, NSABP B-31, HERA, and BCIRG 006 trials
- Local cost and utility data used to reflect Vietnam context

- 3% annual discount rate applied to costs and outcomes
- Exchange rate: 1 USD = 22,745 VND

Cost Inputs:

- One-year trastuzumab therapy cost per patient: "\$34,618"
- Chemotherapy (paclitaxel) cost: "\$1,412"
- Other direct medical costs: "\$1,188"
- Direct non-medical costs: "\$252"

Effectiveness Results:

- Additional life years gained: 3.09 per patient
- Additional QALYs gained: 1.61 per patient
- Total population health gain: 15,618 life years or 8,113 QALYs

Cost Results:

- Incremental cost per patient: "\$39,062"
- Total population incremental cost: "\$185,363,845"
- ICER: "\$22,845" per QALY gained

Sensitivity Analyses:

- One-way sensitivity analysis showed results most sensitive to:
- * Transition probabilities from disease-free state with cardiac events
- * Trastuzumab pricing
- * Hazard ratios for recurrence and metastasis
- Probabilistic sensitivity analysis confirmed base case findings
- 0% probability of cost-effectiveness at 1x GDP threshold
- 2% probability at 3x GDP threshold with vial sharing

Key Insights

- 1. Economic Impact
- Current trastuzumab pricing makes therapy financially unsustainable in Vietnam
- Total population cost impact equals 0.053% of Vietnam's 2020 GDP
- Social health insurance covers 60% of trastuzumab costs, leaving significant patient burden
- 2. Cost Reduction Requirements
- Price reductions needed for cost-effectiveness:

- * 54-56% reduction without vial sharing
- * 38% reduction with optimal vial sharing
- Current Herceptin prices:
- * 150mg vial: "\$684"
- * 440mg vial: "\$2,005"
- Cost-effective prices at 3x GDP threshold:
- * 150mg vial: "\$423"
- * 440mg vial: "\$1,241"
- 3. Implementation Considerations
- Vial sharing could improve cost-effectiveness but faces logistics challenges:
- * Requires concurrent patient treatment
- * Needs centralized drug dispensing systems
- * Not feasible at all treatment centers
- Alternative strategies suggested:
- * Negotiating lower trastuzumab prices
- * Evaluating biosimilar options
- * Optimizing vial sharing where possible
- * Considering shorter treatment durations
- 4. Policy Implications
- Evidence supports need for policy intervention on pricing
- Options for improving access while maintaining sustainability:
- * Price negotiations with manufacturers
- * Expanded use of biosimilars
- * Enhanced drug distribution systems
- * Updated treatment protocols
- Results provide concrete targets for price negotiations

The analysis demonstrates that trastuzumab therapy, while clinically effective, faces significant economic barriers to implementation in Vietnam's healthcare system. Substantial price reductions or systematic changes in drug distribution would be needed to achieve cost-effectiveness by local standards. These findings can inform policy decisions regarding coverage and access while highlighting the need for innovative solutions to improve the affordability of novel cancer therapies in resource-constrained settings.

Cost-utility and budget impact analysis of neoadjuvant dual HER2

targeted therapy for HER2-positive breast cancer in Sri Lanka, Gunasekara A. et al. 2024

Here is a 4-page report summarizing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Utility Analysis of Dual HER2-Targeted Therapy for Breast Cancer in Sri Lanka Executive Summary

This study evaluated the cost-effectiveness and budget impact of using dual HER2-targeted therapy versus single HER2-targeted therapy for HER2-positive breast cancer treatment in Sri Lanka. The analysis compared five different treatment strategies combining trastuzumab, pertuzumab, and lapatinib in the neoadjuvant (pre-surgery) and adjuvant (post-surgery) settings.

Key findings:

- Adding pertuzumab to trastuzumab therapy showed improved health outcomes but higher costs

- Strategy with neoadjuvant pertuzumab+trastuzumab followed by adjuvant trastuzumab required "\$5,600" per QALY gained

- A 25% cost reduction in neoadjuvant treatment would be needed to make dual therapy cost-effective at Sri Lanka's GDP per capita threshold of "\$3,815"

- First-year budget impact ranged from "\$0.82 million" to "\$17.64 million" depending on coverage level and regimen

Technical Details

Study Design:

- Five-state Markov model with lifetime horizon examining transitions between:
- Event-free state
- Locoregional recurrence
- Metastasis
- Remission
- Death

Treatment Strategies Analyzed:

- 1. Neoadjuvant trastuzumab+chemo followed by adjuvant trastuzumab (comparator)
- 2. Neoadjuvant pertuzumab+trastuzumab+chemo followed by adjuvant trastuzumab
- 3. Neoadjuvant lapatinib+trastuzumab+chemo followed by adjuvant trastuzumab
- 4. Neoadjuvant pertuzumab+trastuzumab+chemo followed by adjuvant pertuzumab+trastuzumab
- 5. Neoadjuvant lapatinib+trastuzumab+chemo followed by adjuvant lapatinib+trastuzumab

Cost Parameters:

- Direct medical costs included:
- Medications
- Hospitalization
- Clinic visits
- Diagnostics
- Procedures
- Direct non-medical costs included:
- Transportation
- Caregiver expenses
- Food during hospital visits

All costs were converted to 2021 values using consumer price index and exchange rate of 194.78 LKR = "\$1"

Health Outcomes:

- Quality-adjusted life years (QALYs)
- Life years (LYs) gained
- Transition probabilities between health states
- Utility values for each health state

Key Insights

Cost-Effectiveness Results:

- Strategy 2 (neoadjuvant pertuzumab+trastuzumab followed by trastuzumab):
- Incremental cost per QALY: "\$5,600"
- Would require 25% cost reduction to meet threshold
- Strategy 3 (neoadjuvant lapatinib+trastuzumab followed by trastuzumab):
- Incremental cost per QALY: "\$2,716"
- Most cost-effective option but had efficacy uncertainties
- Strategy 4 (dual therapy in both phases):
- Highest health outcomes but also highest costs
- Incremental cost per QALY: "\$12,127"
- Not cost-effective even with substantial price reductions

Budget Impact:

- At 20% coverage:
- Strategy 2: "\$5.88 million" first year
- Strategy 3: "\$0.82 million" first year
- Strategy 4: "\$22.27 million" first year
- At 60% coverage:
- Strategy 2: "\$17.64 million" first year
- Strategy 3: "\$2.47 million" first year
- Strategy 4: "\$66.80 million" first year

Implementation Considerations:

- Dual therapy shows clinical benefits but high costs for Sri Lanka's healthcare system
- Price negotiations needed to improve cost-effectiveness
- Options to consider:
- Managed entry agreements
- Risk-sharing arrangements
- Special access schemes
- Compulsory/voluntary licensing

Economic Implications:

- Recent economic challenges in Sri Lanka affect affordability
- Currency depreciation impacts medication costs
- Need for creative financing solutions to expand access
- Focus on most cost-effective regimens initially
- Consider partial coverage or targeted patient populations

In summary, while dual HER2-targeted therapy demonstrates improved outcomes, the high costs present significant implementation challenges for Sri Lanka's public healthcare system. A combination of price reductions, innovative financing, and careful patient selection would be needed to make these treatments more widely accessible in a cost-effective manner.

Economic evaluation of trastuzumab in HER2-positive early breast cancer in Indonesia: A cost-effectiveness analysis, Khoirunnisa S. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Trastuzumab in HER2-Positive Early Breast Cancer in Indonesia

Executive Summary

This report analyzes the economic evaluation conducted by Khoirunnisa et al. examining the cost-effectiveness of trastuzumab plus chemotherapy compared to chemotherapy alone for HER2-positive early breast cancer treatment in Indonesia from a healthcare payer perspective. The analysis used a Markov model with a lifetime horizon to project costs and health benefits.

Key findings include:

- Base case analysis showed total lifetime costs of "\$33,744" for trastuzumab plus chemotherapy versus "\$22,720" for chemotherapy alone, with incremental cost of "\$11,024" per patient

- Treatment with trastuzumab resulted in higher quality-adjusted life years (QALYs) and life years gained (LYG), with incremental cost-effectiveness ratios (ICERs) of "\$6,842" per QALY and "\$5,510" per LYG

- Age-based subgroup analysis found trastuzumab was most cost-effective in patients <40 years old, with an ICER of "\$4,912" per QALY

- At Indonesia's willingness-to-pay threshold of 3x GDP per capita ("\$4,788" x 3), trastuzumab plus chemotherapy was deemed cost-effective with 96% probability in sensitivity analyses

Technical Details

Model Structure and Inputs:

- Markov model with 4 health states: disease-free, locoregional recurrence, metastasis, and death
- Cycle length of 1 year with 50-year (lifetime) horizon
- Baseline cohort characteristics based on HERA trial: median age 49 years
- Trastuzumab dosing: 8mg/kg loading dose followed by 6mg/kg maintenance every 3 weeks for 1 year
- Cost inputs derived from Indonesia's Health and Social Security Agency 2020 reimbursement data
- Utility values sourced from published Thai study due to lack of Indonesia-specific data

Key Model Parameters:

- Trastuzumab cost per vial: "\$384" per 440mg
- Annual health state costs:
- * Disease-free (1st year): "\$9,080"
- * Disease-free (subsequent): "\$2,550"

- * Locoregional recurrence: "\$3,416"
- * Metastatic: "\$3,356"

Sensitivity Analyses:

- One-way sensitivity analysis identified discount rates and hazard ratio for disease-free survival as most influential parameters

- Probabilistic sensitivity analysis with 1,000 Monte Carlo simulations showed robust cost-effectiveness
- Scenario analysis examining 11-year treatment effect duration yielded similar ICERs ("\$5,655" per LYG, "\$7,023" per QALY)

Key Insights

- 1. Cost-Effectiveness by Age Group
- Treatment most cost-effective in women <40 years old:
- * ICER: "\$4,912" per QALY
- * Incremental QALYs: 3.63
- * Incremental cost: "\$17,853"
- Less favorable but still cost-effective in older age groups:
- * Age >60: ICER "\$6,348" per QALY
- * Incremental QALYs: 1.80
- * Incremental cost: "\$11,453"
- 2. Implementation Considerations
- Current restriction of trastuzumab to 6 months in metastatic setting may warrant review given favorable economics of
- 1-year treatment
- Availability of biosimilars could further improve cost-effectiveness through lower acquisition costs
- Results support potential value-based coverage decisions incorporating patient age
- 3. Limitations and Future Research Needs
- No Indonesia-specific clinical trial data relied on international studies
- Utility values from Thailand may not fully reflect Indonesian population
- Did not include societal costs like productivity losses
- Further research needed using real-world evidence from Indonesian setting
- Additional exploration of heterogeneity by hormone receptor status and tumor characteristics warranted

The analysis provides robust evidence supporting the cost-effectiveness of trastuzumab in the Indonesian healthcare system, particularly for younger patients. Results can inform coverage decisions and resource allocation while highlighting areas needing additional research to optimize treatment delivery.

The report maintains focus on economic findings without including patient-identifying information and uses exact monetary values as cited in the original article. All currency values are presented in USD with \$ notation as specified.

<u>The burden of systemic therapy administration route in treating HER2-positive</u> <u>breast cancer (for patients, healthcare professionals, and healthcare system): a</u> <u>systematic literature review, Landeiro L. et al. 2024</u>

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Monoclonal Antibody Cancer Cost Analysis Report

Executive Summary

This systematic literature review examined the economic and resource utilization impacts of subcutaneous (SC) versus intravenous (IV) administration routes for HER2-positive breast cancer treatments, particularly focusing on trastuzumab and pertuzumab. The analysis included 25 studies evaluating healthcare resource utilization, costs, and stakeholder preferences across multiple countries.

Key findings demonstrate that SC administration offers significant cost advantages compared to IV administration through:

- Reduced healthcare professional (HCP) time and resource utilization
- Lower chair/facility time requirements
- Decreased indirect costs related to patient time and productivity
- Improved patient and healthcare provider satisfaction
- Potential for home administration reducing facility burden

The economic benefits were consistent across different healthcare systems and payment models, suggesting SC administration represents an opportunity for cost optimization while maintaining treatment efficacy.

Technical Details

Healthcare Resource Utilization

Time savings with SC vs IV administration:

- HCP time reduction ratio (SC:IV): 1:2 to 1:6
- Chair time reduction ratio (SC:IV): 1:2 to 1:13
- Preparation time reduction ratio (SC:IV): 1:3
- Administration time reduction ratio (SC:IV): 1:3 to 1:19

Direct Cost Analysis

Cost ratios (SC:IV) for key categories:

Consumables:

- Per treatment cycle: 1:2 to 1:4
- Full treatment course (17-18 cycles): 1:2 to 1:4

Healthcare Professional Costs:

- Per treatment cycle: 1:2 to 1:5
- Full treatment course: 1:2 to 1:5

Facility/Structural Costs:

- Outpatient clinic costs ratio: 1:9

Total Direct Costs:

- Per patient episode: 1:3 to 1:4
- Full treatment course: 1:1 to 1:20 depending on setting

Indirect Cost Analysis

Patient-Related Costs:

- Lost productivity ratio (SC:IV): 1:3 to 1:25
- Time off work ratio (SC:IV): 1:3
- Travel/transportation time ratio (SC:IV): 1:6 to 1:18

Key Insights
- 1. System-Wide Economic Impact
- Budget impact analyses demonstrate significant cost savings potential with SC administration
- Kashiura et al. showed 5-year cost savings of up to "\$176,859,259.46" for early breast cancer and "\$6,307,656.20" for metastatic breast cancer in the Brazilian private healthcare system
- Cost advantages persist across different healthcare systems and payment models
- 2. Resource Optimization
- SC administration reduces facility resource requirements by 40-60%
- Enables more efficient patient throughput and capacity utilization
- Particularly beneficial in resource-constrained settings
- 3. Patient-Centric Benefits
- Over 85% of patients prefer SC administration
- Primary drivers: reduced time commitment and improved comfort
- Potential for home administration improving accessibility
- 4. Healthcare Provider Advantages
- Reduced preparation and administration time
- Lower risk of medication errors
- Improved workflow efficiency
- Greater provider satisfaction with SC administration
- 5. System Adaptation Considerations
- Initial investment may be required for SC administration training and protocols
- Need for patient education and support systems
- Regulatory and reimbursement framework adjustments may be necessary
- Fixed dosing with SC may require careful patient selection and monitoring

The comprehensive analysis demonstrates that SC administration of monoclonal antibodies for HER2-positive breast cancer offers substantial economic advantages while maintaining clinical efficacy and improving patient experience. The cost benefits span direct healthcare costs, indirect patient costs, and system-wide resource utilization. Implementation challenges exist but appear manageable given the significant potential benefits.

This analysis supports broader adoption of SC administration routes for appropriate patients, potentially leading to more efficient and cost-effective cancer care delivery while improving patient satisfaction. Healthcare systems should consider these findings when making treatment delivery decisions and allocating resources for cancer care.

The data suggests that transitioning eligible patients to SC administration could generate meaningful cost savings while potentially improving treatment accessibility and patient experience. However, individual healthcare system characteristics and patient factors should guide specific implementation strategies.

Comparative cost-effectiveness of first-line pembrolizumab plus chemotherapy vs. chemotherapy alone in persistent, recurrent, or metastatic cervical cancer, Lin Y. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the article:

Executive Summary

This analysis examines the cost-effectiveness of using pembrolizumab in combination with chemotherapy and bevacizumab as first-line treatment for persistent, recurrent, or metastatic cervical cancer in China. Based on data from the KEYNOTE-826 trial, the researchers conducted a comprehensive economic evaluation comparing this combination therapy against standard chemotherapy treatment.

Key findings:

- The pembrolizumab combination therapy provided an additional 1.18 quality-adjusted life years (QALYs) compared to standard treatment over 5 years

- Total incremental cost was "\$134,502.57"
- Resulting incremental cost-effectiveness ratio (ICER) was "\$114,275.67" per QALY
- Even with charitable pricing discount of 41.4%, the ICER remained at "\$52,765.69" per QALY
- Both ICERs exceeded China's willingness-to-pay threshold of "\$35,268.94" per QALY

The analysis suggests that while pembrolizumab combination therapy shows clinical benefits, its high cost makes it not cost-effective as a primary treatment strategy in China at current pricing levels. However, targeted price adjustments for patients with PD-L1 Combined Positive Score (CPS) ≥10 could potentially improve both therapeutic and economic outcomes.

Technical Details

Methodology:

- Partitioned survival model constructed using KEYNOTE-826 trial data
- 5-year time horizon with 3-week cycles (86 cycles total)

- Three health states modeled: progression-free, progressive disease, and terminal
- Annual discount rate of 5% for costs and health outcomes
- Log-Logistic distribution used for modeling survival rates

Cost Inputs:

- Pembrolizumab: "\$2,458" per 100mg
- Paclitaxel: "\$22" per 30mg
- Cisplatin: "\$3" per 30mg
- Bevacizumab: "\$159" per 100mg

Health State Utilities:

- Progression-free survival: 0.76
- Progressive disease: 0.52
- Death: 0

- Grade ≥3 adverse events: -0.28 disutility

Model Assumptions:

- Average body surface area: 1.62 m²
- Average weight: 59 kg
- Bevacizumab usage: 63.6% in pembrolizumab group, 62.5% in control group

Sensitivity Analyses:

- One-way deterministic sensitivity analysis with $\pm 20\%$ parameter ranges
- Probabilistic sensitivity analysis using Monte Carlo simulation with 10,000 iterations
- Gamma distribution for costs
- Beta distribution for utilities

Key Insights

- 1. Economic Impact:
- Base case analysis showed pembrolizumab combination therapy increased costs by "\$134,502.57" with 1.18 additional QALYs
- Even with 41.4% charitable pricing discount, incremental cost remained "\$62,105.26"
- Both scenarios exceeded China's WTP threshold of "\$35,268.94" per QALY
- 2. Subgroup Analysis:

Most favorable cost-effectiveness seen in:

- Patients under 65 years (3.22% probability)
- PD-L1 CPS ≥10 (16.20% probability)
- Non-metastatic disease at diagnosis (15.78% probability)
- Concurrent bevacizumab use (6.20% probability)
- 3. Market Context:
- Pembrolizumab pricing in mainland China ("\$2,458" per 100mg) is lower than:
- * US pricing ("\$4,800" per 100mg)
- * Hong Kong pricing ("\$3,594" per 100mg)
- Domestic PD-1 inhibitor pricing significantly lower:
- * Camrelizumab: "\$353" per 200mg
- * Toripalimab: "\$147" per 100mg
- * Sintilimab: "\$148" per 100mg
- 4. Policy Implications:
- Results suggest need for targeted pricing strategies rather than across-the-board reductions
- PD-L1 CPS testing could help identify patients most likely to benefit economically
- Integration into national medical insurance coverage could improve accessibility
- Price negotiations may be necessary to achieve cost-effectiveness thresholds

The analysis demonstrates that while pembrolizumab combination therapy offers clinical benefits for cervical cancer treatment, its current pricing structure presents economic challenges in the Chinese healthcare context. Targeted price adjustments and patient selection based on PD-L1 status could help optimize both clinical and economic outcomes.

Cost-effectiveness Analysis in the New Era of Treatment Strategies in Metastatic Urothelial Carcinoma Based on Checkmate-901 and EV302/Keynote-A39, Rieger C. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Monoclonal Antibody Treatments for Metastatic Urothelial Carcinoma Analysis Report

Executive Summary

This report analyzes the cost-effectiveness of monoclonal antibody-based treatments for metastatic urothelial carcinoma (mUCa) based on research by Rieger C. et al. The study evaluated three treatment approaches:

- 1. Standard of care (SoC) with gemcitabine/cisplatin
- 2. Gemcitabine/cisplatin + nivolumab
- 3. Enfortumab vedotin + pembrolizumab (EV+P)

The analysis found that while EV+P demonstrated superior clinical outcomes with nearly doubled quality-adjusted life years (QALYs), its high cost of "\$1,228,455" per patient makes it cost-ineffective under current pricing. Gemcitabine/cisplatin + nivolumab showed moderate clinical benefit at "\$597,802" per patient, emerging as potentially cost-effective in Germany but not the US. The standard of care remained the least expensive at "\$458,006" per patient.

Technical Details

Methodology:

- Markov transition model with 30-year lifetime horizon
- 3-week cycle length
- Monte Carlo simulation with 10,000 iterations
- Willingness-to-pay (WTP) thresholds analyzed at "\$50,000", "\$100,000", and "\$150,000"

Cost Analysis:

- Drug costs per treatment cycle (US pricing):
- Gemcitabine/cisplatin: "\$140"
- Avelumab (800mg): "\$7,518"
- Enfortumab (100mg): "\$14,045"
- Nivolumab (360mg): "\$11,226"
- Pembrolizumab (200mg): "\$11,337"

Clinical Outcomes:

- 1. Standard of Care:
- Cost: "\$458,006"
- QALYs: 1.21
- 1-year progression-free survival: 21.6%
- 1-year overall survival: 61.4%
- 2. Gemcitabine/cisplatin + nivolumab:
- Cost: "\$597,802"
- QALYs: 1.71
- 1-year progression-free survival: 46.2%

- 1-year overall survival: 70.2%
- Incremental cost-effectiveness ratio (ICER): "\$281,142"
- 3. EV+P:
- Cost: "\$1,228,455"
- QALYs: 2.31
- 1-year progression-free survival: 50.7%
- 1-year overall survival: 78.2%
- ICER: "\$700,408"

Key Insights

- 1. Cost-Effectiveness Analysis:
- At standard WTP threshold of "\$100,000":
- * EV+P would require 82% price reduction to be cost-effective in US
- * Gemcitabine/cisplatin + nivolumab would require 48% price reduction
- * Standard of care remains most cost-effective option
- 2. Clinical Value vs Economic Reality:
- EV+P demonstrates superior clinical outcomes:
- * Nearly doubles QALYs compared to standard of care
- * Highest progression-free and overall survival rates
- * However, current pricing makes it economically unsustainable
- 3. Regional Economic Variations:
- Significant cost differences between US and European markets
- US drug costs approximately two-thirds higher than German prices
- Creates different cost-effectiveness profiles across regions
- 4. Future Considerations:
- Need for:
- * Patient selection optimization through biomarker development
- * Price reduction strategies for novel therapies
- * Balance between clinical benefit and economic sustainability
- * Long-term adverse event monitoring
- * Quality of life impact assessment

The analysis suggests that while monoclonal antibody treatments offer significant clinical benefits for mUCa patients, current pricing structures create substantial barriers to widespread adoption. Future strategies should focus on optimizing patient selection and developing more sustainable pricing models to improve access to these effective therapies.

This comprehensive analysis provides valuable insights for healthcare systems, payers, and providers in making evidence-based decisions about mUCa treatment options while considering both clinical and economic factors.

Cost-effectiveness analysis of pembrolizumab plus chemotherapy versus chemotherapy in untreated advanced pleural mesothelioma in the Chinese healthcare system, Lang W. et al. 2025

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Pembrolizumab Plus Chemotherapy for Advanced Pleural Mesothelioma

Executive Summary

This report analyzes the cost-effectiveness of combining pembrolizumab (a PD-1 targeting monoclonal antibody) with chemotherapy versus chemotherapy alone for treating advanced pleural mesothelioma, based on data from Lang W. et al.'s economic analysis in the Chinese healthcare system. The key findings show that while adding pembrolizumab provided clinical benefits, it was not cost-effective for the overall population or epithelioid subtype at current pricing, with ICERs exceeding China's willingness-to-pay threshold of "\$38,042.49" per QALY. However, the combination therapy was cost-effective specifically for patients with non-epithelioid histology, with an ICER of "\$33,917.61" per QALY.

Technical Details

Study Design:

- Markov state-transition model using IND227 phase 3 trial data
- 10-year time horizon
- Chinese healthcare system perspective
- 5% annual discount rate
- Exchange rate: $1 = \frac{1}{2}7.0467$

Cost Inputs:

- Pembrolizumab cost per cycle: "\$4,654.66"
- Pemetrexed cost per cycle: "\$143.53"
- Cisplatin cost per cycle: "\$35.03"
- Nivolumab cost per cycle: "\$3,279.69"
- Bevacizumab cost per cycle: "\$496.69"
- Laboratory tests: "\$120.96"
- CT scans: "\$268.88"
- End-of-life care: "\$1,460.30"

Health Outcomes:

- Pembrolizumab + chemotherapy: 0.99 QALYs
- Chemotherapy alone: 0.77 QALYs
- Incremental QALY gain: 0.23

Cost Results:

- Pembrolizumab + chemotherapy total cost: "\$35,560.57"
- Chemotherapy alone total cost: "\$17,360.94"
- Incremental cost: "\$18,199.63"

Cost-Effectiveness Results:

Overall Population:

- ICER: "\$80,557.23" per QALY
- INHB: -0.25 QALYs
- INMB: "-\$9,605.00"

Non-epithelioid Subgroup:

- ICER: "\$33,917.61" per QALY
- INHB: 0.05 QALYs
- INMB: "\$2,085.28"

Epithelioid Subgroup:

- ICER: "\$99,536.73" per QALY

- INHB: -0.29 QALYs
- INMB: "-\$11,127.42"

Key Insights

- 1. Differential Value by Histology:
- The addition of pembrolizumab showed markedly different cost-effectiveness based on mesothelioma histology
- Non-epithelioid patients derived greater clinical benefit, making the higher treatment costs economically justifiable
- The combination was not cost-effective for epithelioid patients despite clinical improvements
- 2. Price Sensitivity:
- Pembrolizumab's cost was the key driver of cost-effectiveness
- Price reductions through negotiations could improve economic value
- The analysis suggests current pricing exceeds sustainable thresholds for broad adoption
- 3. Healthcare System Implications:
- Results support histology-based patient selection for pembrolizumab use
- Findings can inform coverage and reimbursement policies
- Demonstrates need for biomarker-driven precision medicine approaches
- 4. Economic Modeling Insights:
- Robust sensitivity analyses validated base case findings
- Probabilistic simulations showed 69.41% likelihood of cost-effectiveness in non-epithelioid patients
- Model framework can be adapted for other healthcare systems

The analysis provides evidence for selective use of pembrolizumab based on mesothelioma histology from an economic perspective. While clinical benefits were observed across patients, the substantial cost impacts require careful patient selection to optimize healthcare resource allocation. The findings support coverage for non-epithelioid patients while suggesting current pricing may be unsustainable for broader use without additional discounts or precise biomarker-based targeting.

Cost-effectiveness of first-line enfortumab vedotin in addition to pembrolizumab for metastatic urothelial carcinoma in the United States, Li A. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the article:

Cost Analysis Report: First-Line Enfortumab Vedotin plus Pembrolizumab for Metastatic Urothelial Carcinoma

Executive Summary

This report analyzes the cost-effectiveness of combining enfortumab vedotin (EV) with pembrolizumab as first-line treatment for metastatic urothelial carcinoma (mUC), based on research by Li A. et al. The study evaluated lifetime

costs and effectiveness from a U.S. payer perspective, comparing the combination therapy against standard chemotherapy.

Key findings:

- The combination therapy provided an additional 2.10 life years and 1.72 quality-adjusted life years (QALYs) compared to chemotherapy

- The incremental cost was "\$962,240.8" per patient
- The incremental cost-effectiveness ratio (ICER) was "\$558,973" per QALY
- At a willingness-to-pay threshold of "\$150,000" per QALY, the combination therapy was not deemed cost-effective

Technical Details

Study Design and Methodology

The researchers developed a Markov model to compare lifetime costs and effectiveness between:

- 1. EV plus pembrolizumab combination therapy
- 2. Standard chemotherapy (cisplatin/carboplatin plus gemcitabine)

Model parameters included:

- 3-week cycle length
- Lifetime duration
- 3% annual discount rate for costs and outcomes
- Direct medical costs only

Cost Components

Drug costs were based on 2023 Medicare average sale prices:

- EV: "\$131.52" per mg
- Pembrolizumab: "\$55.73" per mg
- Carboplatin: "\$0.072" per mg
- Cisplatin: "\$0.404" per mg
- Gemcitabine: "\$0.044" per mg
- Avelumab: "\$9.236" per mg

Administration costs:

- First hour: "\$144.39"
- Additional hours: "\$31.10"

Adverse event management costs ranged from "\$255.51" to "\$45,332" depending on the condition.

Clinical Outcomes

The model projected:

- EV + pembrolizumab: 4.221 life years, 3.254 QALYs
- Chemotherapy: 2.121 life years, 1.533 QALYs
- Incremental benefit: 2.10 life years, 1.721 QALYs

Total costs:

- EV + pembrolizumab: "\$1,493,868"
- Chemotherapy: "\$531,627.2"
- Incremental cost: "\$962,240.8"

Key Insights

Economic Implications

- 1. Cost-Effectiveness Analysis
- ICER per life year: "\$458,390.1"
- ICER per QALY: "\$558,973"
- 0% probability of being cost-effective at "\$150,000"/QALY threshold
- Would require approximately "\$820,000"/QALY threshold for 80% probability of cost-effectiveness
- 2. Price Sensitivity
- Reducing EV price to "\$20" per mg would achieve 50% probability of cost-effectiveness
- Reducing EV price to "\$15" per mg would achieve 75% probability of cost-effectiveness
- 80% reduction in both EV and pembrolizumab prices needed for 75% cost-effectiveness probability
- 3. Subgroup Analysis
- Cisplatin-ineligible patients showed better cost-effectiveness (ICER: "\$536,135.5"/QALY)
- Cisplatin-eligible patients had higher ICER ("\$563,128.5"/QALY)

Market Access Considerations

1. Healthcare System Impact

- Current pricing likely unsustainable for public healthcare systems
- Drug costs approximately 2.78 times higher in U.S. versus other countries
- Medicare negotiation authority through Inflation Reduction Act may help reduce costs
- 2. Policy Implications
- Price reductions needed for viable integration into public healthcare
- Value-based pricing discussions warranted
- Balance needed between innovation incentives and affordability
- 3. Limitations
- Single clinical trial data source (EV-302)
- Extrapolation of short-term data for long-term outcomes
- Utility values from literature rather than trial data
- Not all adverse event costs included

This analysis demonstrates that while EV plus pembrolizumab shows significant clinical benefit, substantial price reductions would be needed to achieve conventional cost-effectiveness thresholds in the U.S. healthcare system.

Cost-effectiveness of immunotherapies for advanced squamous non-small cell lung cancer: a systematic review, Cheng M. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Immunotherapies for Advanced Squamous Non-Small Cell Lung Cancer: A Systematic Review

Executive Summary

This systematic review examined 15 studies published through June 2023 analyzing the cost-effectiveness of immune checkpoint blocking (ICB) therapies for treating lung squamous cell carcinoma (LSCC). The analysis revealed several key findings regarding monoclonal antibody economics:

- Nivolumab monotherapy demonstrated superior cost-effectiveness compared to standard chemotherapy in 4 out of 5 studies examining this comparison

- Pembrolizumab combination therapy emerged as the most cost-effective option among imported ICB therapies, though locally developed Chinese alternatives showed better cost-effectiveness in that market

- Cost-effectiveness varied significantly by region, with an average willingness-to-pay threshold of

"\$39,275.25/QALY" for Chinese studies versus "\$102,000/QALY" for non-Chinese studies

- Treatment benefits generally outweighed costs, even in cases deemed not cost-effective, with ICB therapies

consistently showing higher costs but greater benefits in terms of life years and quality-adjusted life years gained

Technical Details

Methodology:

The researchers conducted a systematic review of studies from major medical databases through June 2023, focusing on pharmacoeconomic analyses of ICB treatments for LSCC. Key evaluation metrics included:

- Incremental cost-effectiveness ratios (ICERs)
- Cost per quality-adjusted life year (QALY) gained
- Cost per life year gained (LYG)
- Total costs and benefits

Key Study Findings:

Nivolumab Monotherapy vs. Chemotherapy:

- Hu et al. showed ICER of "\$31,537/QALY"
- Rothwell et al. demonstrated ICER of "\$33,134/QALY"
- Chaudhary et al. found ICERs of "\$140,753/QALY" for Canadian patients and "\$568,895/QALY" for Swedish patients
- Gao et al. reported increased costs of "\$198,862/QALY" and "\$181,623/LY"

Pembrolizumab Studies:

- Chouaid et al. showed ICER of "\$84,097/QALY" vs platinum agents
- Liu et al. found incremental cost of "\$3,449" with added 0.22 QALYs vs monotherapy
- Insinga et al. demonstrated ICER of "\$86,293/QALY" for combination therapy

Chinese Market Analysis:

- Zhou et al. showed ICER of "\$18,369/QALY" for toripalimab combination
- Zhang et al. found ICER of "\$32,237/QALY" for toripalimab
- Li et al. reported ICER of "\$96,230.83/QALY" for sugemalimab
- Shao et al. showed incremental cost of "\$6,347.81" with 0.47 QALYs gained for camrelizumab

Key Insights

- 1. Regional Market Dynamics
- Non-Chinese markets showed higher cost-effectiveness thresholds and greater acceptance of imported ICB therapies
- Chinese market demonstrated better cost-effectiveness with locally developed alternatives
- Treatment adoption decisions heavily influenced by regional willingness-to-pay thresholds
- 2. Treatment Strategy Implications
- Nivolumab established as cost-effective monotherapy option in most markets
- Combination therapy with pembrolizumab showed strong cost-effectiveness profile
- Locally developed Chinese ICBs emerging as economically viable alternatives
- 3. Economic Considerations
- Higher costs of ICB therapies generally offset by improved survival outcomes
- Drug pricing remains crucial factor in cost-effectiveness determinations
- Regional market conditions and healthcare systems significantly impact economic viability
- 4. Future Directions
- Need for more comprehensive cost-effectiveness data on newer ICB therapies
- Opportunity for expanded analysis of combination therapy approaches
- Importance of considering regional market conditions in treatment decisions

The analysis reveals that while ICB therapies generally carry higher costs, their improved efficacy often justifies the investment from a health economics perspective. Regional market conditions and willingness-to-pay thresholds play crucial roles in determining cost-effectiveness, with particularly promising results seen for locally developed alternatives in the Chinese market. These findings suggest a need for market-specific approaches to ICB therapy implementation while maintaining focus on clinical outcomes.

The results provide valuable guidance for healthcare decision-makers weighing treatment options while considering both clinical and economic factors. The success of locally developed alternatives in certain markets also suggests potential pathways for improving treatment accessibility through market-specific drug development and pricing strategies.

Cost-effectiveness of pembrolizumab versus chemotherapy in patients with platinumpretreated, recurrent or metastatic nasopharyngeal cancer, Nie J. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Pembrolizumab for Nasopharyngeal Cancer Treatment

Executive Summary

This report analyzes the cost-effectiveness of pembrolizumab monoclonal antibody therapy compared to standard chemotherapy for treating platinum-pretreated, recurrent or metastatic nasopharyngeal cancer (NPC) based on the economic analysis by Nie et al. The study utilized data from the KEYNOTE-122 clinical trial to evaluate costs, quality-adjusted life years (QALYs), and incremental cost-effectiveness ratios (ICERs) from a Chinese healthcare system perspective.

Key findings:

- Pembrolizumab treatment cost "\$39,710.96" per patient compared to "\$2,734.55" for chemotherapy
- Pembrolizumab provided an additional 0.09 QALYs at an incremental cost of "\$36,976.41"
- The ICER was "\$422,535.53" per QALY gained, significantly exceeding China's willingness-to-pay threshold
- Even with potential price reductions of 60%, pembrolizumab remained not cost-effective
- Only through a philanthropic drug donation program did the ICER decrease to acceptable levels

The analysis demonstrates that at current pricing, pembrolizumab is not a cost-effective treatment option compared to standard chemotherapy for this indication in China, despite its clinical benefits.

Technical Details

Model Structure and Assumptions:

- Partitioned survival model with 5-year time horizon
- Three health states: progression-free survival, progressed disease, and death
- 21-day treatment cycles matching the KEYNOTE-122 trial
- 5% discount rate applied to costs and outcomes
- Base case analysis used body surface area of 1.72 m2

Treatment Costs:

Pembrolizumab: "\$5,327.90" per cycle

Chemotherapy options:

- Capecitabine: "\$36.39" per cycle
- Gemcitabine: "\$44.16" per cycle
- Docetaxel: "\$31.22" per cycle

Additional Costs:

- Anemia management: "\$6,562.68"
- Neutrocytopenia treatment: "\$475.32"
- Imaging/surveillance: "\$207.25"
- Laboratory tests: "\$11.89"
- Terminal care: "\$1,460.30"

Health Utilities:

- Progression-free survival: 0.76
- Progressed disease: 0.35

Clinical Outcomes:

- Pembrolizumab vs Chemotherapy:
- Overall survival: 3.96 vs 3.93 life years
- Quality-adjusted survival: 2.82 vs 2.73 QALYs
- Incremental QALY gain: 0.09

Economic Results:

- Base Case Analysis:
- Total cost pembrolizumab: "\$39,710.96"
- Total cost chemotherapy: "\$2,734.55"
- Incremental cost: "\$36,976.41"
- ICER per life year: "\$1,232,547.00"
- ICER per QALY: "\$422,535.53"

Sensitivity Analyses:

- Pembrolizumab cost was the most influential factor
- No scenario achieved acceptable cost-effectiveness except drug donation
- 60% price reduction still yielded ICER of "\$159,516.60"
- Different discount rates (3-8%) maintained ICERs above "\$410,285.33"

Key Insights

- 1. Pricing and Access Barriers:
- Current pembrolizumab pricing makes it unaffordable in China
- Even substantial discounts may not achieve cost-effectiveness
- Alternative access programs like drug donation may be necessary

- Inclusion in national reimbursement negotiations could help reduce costs

- 2. Clinical Value vs Economic Impact:
- Pembrolizumab shows modest survival benefits (0.09 QALYs)
- Better safety profile and quality of life improvements noted
- High cost creates significant economic burden on healthcare system
- Value proposition needs reassessment for broader adoption
- 3. Policy Implications:
- Need for innovative pricing and reimbursement models
- Potential role for risk-sharing agreements
- Importance of early health technology assessment
- Balance between innovation access and sustainability
- 4. Future Considerations:
- Identification of patient subgroups with better cost-effectiveness
- Development of predictive biomarkers
- Integration with other therapeutic approaches
- Real-world evidence generation to confirm value

This analysis highlights the ongoing challenge of providing access to innovative cancer therapies while maintaining healthcare system sustainability. While pembrolizumab offers clinical benefits for NPC patients, its current pricing structure prevents it from being a cost-effective option in China. Creative solutions involving multiple stakeholders will be needed to address this access barrier.

The findings emphasize the importance of considering both clinical and economic factors when evaluating new cancer treatments. They also demonstrate how regional economic conditions and healthcare system constraints impact the real-world value proposition of novel therapies. Future work should focus on identifying strategies to optimize the use of expensive treatments like pembrolizumab while ensuring financial sustainability.

Enfortumab vedotin plus pembrolizumab as a first-line treatment for advanced urothelial carcinoma: a cost-effectiveness analysis from China based on the EV-302 trial, You M. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Executive Summary

This report analyzes the cost-effectiveness of enfortumab vedotin plus pembrolizumab (EV-PEMB) as first-line treatment for advanced urothelial carcinoma (UC) in China, based on data from the EV-302 clinical trial. The key findings show that EV-PEMB provided superior clinical outcomes but at substantially higher costs compared to standard chemotherapy:

- EV-PEMB achieved 3.22 quality-adjusted life years (QALYs) at a total cost of "\$375,420.24" per patient

- Standard chemotherapy achieved 1.70 QALYs at "\$23,369.67" per patient
- The incremental cost-effectiveness ratio (ICER) was "\$232,256.16" per QALY gained

- At China's willingness-to-pay threshold of "\$38,133" per QALY, EV-PEMB had 0% probability of being cost-effective

The analysis indicates that substantial price reductions of approximately 87% for both drugs would be needed to achieve cost-effectiveness in China's healthcare system.

Technical Details

Study Design

- Markov model with three health states: progression-free survival (PFS), progressive disease (PD), and death
- 21-day cycles over 15-year time horizon
- Based on EV-302 phase III trial data comparing EV-PEMB vs. chemotherapy
- Chinese healthcare system perspective
- 5% annual discount rate applied to costs and utilities

Key Cost Inputs

- Enfortumab vedotin: "\$1,593.2" per 30mg
- Pembrolizumab: "\$2,548.8" per 100mg
- Gemcitabine: "\$48.1" per 1000mg
- Carboplatin: "\$9.2" per 100mg
- Cisplatin: "\$7.1" per 10mg

Clinical Inputs

- Median treatment duration:
- EV: 7 months
- Pembrolizumab: 8.5 months

- Chemotherapy: 4.1 months

Utility Values

- PFS state: 0.84
- PD state: 0.80

- Disutility for grade ≥3 adverse events: 0.28

Key Insights

Economic Impact

- 1. The high cost differential between EV-PEMB and chemotherapy ("\$352,050.58") is driven by:
 - Higher drug acquisition costs
 - Longer treatment duration
 - Extended survival requiring more cycles of therapy
- 2. Price sensitivity analysis showed EV-PEMB would only become cost-effective if prices were reduced to:
 - "\$208.7" for enfortumab vedotin (13.1% of current price)
 - "\$333.9" for pembrolizumab (13.1% of current price)

Subgroup Analysis

The analysis identified certain populations where EV-PEMB showed relatively better economic value, though still not reaching cost-effectiveness thresholds:

- ECOG performance status = 0: ICER "\$177,113.39"
- Low PD-L1 expression: ICER "\$196,413.28"
- Cisplatin-ineligible patients: ICER "\$195,743.27"
- Mild renal impairment: ICER "\$198,087.78"

Policy Implications

- 1. Access & Reimbursement
- Current pricing makes widespread adoption challenging in China's healthcare system
- Substantial price negotiations would be needed for inclusion in national reimbursement lists
- Alternative payment models may need to be considered
- 2. Value Optimization
- Targeting high-response subgroups could improve cost-effectiveness

- Shorter treatment durations may help reduce total costs while maintaining benefits
- Real-world evidence needed to validate trial-based economic projections

The analysis provides important economic evidence for healthcare providers, payers and policymakers regarding the value proposition of EV-PEMB in advanced UC treatment. While the therapy shows clear clinical benefits, achieving cost-effectiveness will require significant price reductions or innovative payment approaches in the Chinese healthcare context.

This comprehensive economic assessment can inform pricing strategies, reimbursement decisions, and clinical practice guidelines as EV-PEMB enters the Chinese market. Further research on optimizing patient selection and treatment duration may help improve the therapy's value proposition.

Immune checkpoint inhibitors as the secondline treatment for advanced esophageal squamous cell carcinoma: a cost-effectiveness analysis based on network meta-analysis, Yang X. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Immune Checkpoint Inhibitors for Advanced Esophageal Cancer Treatment

Executive Summary

This analysis examines the cost-effectiveness of five immune checkpoint inhibitor (ICI) monoclonal antibodies sintilimab, tislelizumab, camrelizumab, nivolumab, and pembrolizumab - as second-line treatment for advanced esophageal squamous cell carcinoma (ESCC) in China. Based on a network meta-analysis of 5 clinical trials involving 1,797 patients, the study found that sintilimab was the most cost-effective option at China's willingness-to-pay threshold of "\$38,223.34" per quality-adjusted life year (QALY) (Yang X. et al.). Key findings include:

- Sintilimab had an 84.4% probability of being cost-effective compared to other ICIs

- Tislelizumab and camrelizumab showed superior clinical benefits but higher costs
- Nivolumab and pembrolizumab were dominated due to higher costs and lower QALYs

- Price reductions of 64.6% for camrelizumab or 16.9% for tislelizumab would make them cost-effective alternatives to sintilimab

Technical Details

Methodology:

- Network meta-analysis of 5 clinical trials (ATTRACTION-3, ESCORT, KEYNOTE-181, ORIENT-2,

RATIONALE-302)

- Three-state Markov model with 10-year time horizon
- States: Progression-free survival (PFS), Progressive Disease (PD), Death
- Costs included drugs, hospitalization, follow-up, and adverse event management
- Utilities derived from published literature

Drug Costs (per unit):

- Camrelizumab 200mg: "\$383.08"
- Sintilimab 100mg: "\$160.57"
- Nivolumab 240mg: "\$3,436.02"
- Tislelizumab 100mg: "\$204.80"
- Pembrolizumab 100mg: "\$2,663.95"

Cost-Effectiveness Results:

- Sintilimab: "\$9,662.47" total cost, 0.953 QALYs
- Tislelizumab: "\$11,054.76" total cost, 0.971 QALYs, ICER "\$75,472.65/QALY" vs sintilimab
- Camrelizumab: "\$15,696.50" total cost, 0.987 QALYs, ICER "\$175,681.92/QALY" vs sintilimab
- Nivolumab: "\$44,120.77" total cost, 0.861 QALYs (dominated)
- Pembrolizumab: "\$52,885.34" total cost, 0.867 QALYs (dominated)

Key Insights

Market Access Implications:

- Sintilimab, tislelizumab and camrelizumab are included in China's National Reimbursement Drug List (NRDL) with significant price reductions (64-85%)
- Nivolumab and pembrolizumab are not listed in NRDL, resulting in substantially higher patient costs
- Study results support potential inclusion of sintilimab for ESCC indication in future NRDL updates

Clinical Value Considerations:

- All ICIs demonstrated superior efficacy vs chemotherapy in clinical trials
- Camrelizumab and tislelizumab achieved highest rankings for PFS and OS
- Minimal differences in QALYs gained between different ICIs (range: 0.861-0.987)
- Adverse event profiles and management costs were comparable between agents

Economic Drivers:

- Drug acquisition costs were the primary driver of cost differences

- Health state utilities and survival hazard ratios were most influential parameters
- Price reductions could make tislelizumab and camrelizumab cost-effective alternatives
- Medicare reimbursement status significantly impacts patient access and affordability

Limitations:

- Lack of head-to-head clinical trials necessitated indirect treatment comparisons
- Model assumed identical post-progression treatment across arms
- Only serious adverse events were included in cost calculations
- Some trials included non-Asian populations, potentially affecting applicability
- Biomarker status and patient subgroups not considered in analysis

This comprehensive analysis provides valuable insights for healthcare decision makers regarding the cost-effectiveness of different ICI options for advanced ESCC treatment in China. The findings suggest sintilimab offers the best value at current prices, while highlighting opportunities for other agents to become cost-effective through price adjustments. Ongoing assessment of real-world evidence and outcomes will be important to validate these model-based projections.

Cost-effectiveness of immune checkpoint inhibitors in treating metastatic urothelial cancer, Yang L. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Immune Checkpoint Inhibitors in Metastatic Urothelial Cancer Treatment

Executive Summary

This study by Yang L-Y. et al. examined the cost-effectiveness of immune checkpoint inhibitors (ICIs) used in different treatment sequences for metastatic urothelial carcinoma (mUC). The analysis compared three treatment approaches: chemotherapy alone, first-line ICI combined with chemotherapy, and chemotherapy followed by second-line ICI therapy. Key findings showed that first-line ICI combination therapy demonstrated better cost-effectiveness compared to subsequent ICI therapy, with comparable survival outcomes. The median lifetime cost after metastatic UC diagnosis was "\$31,221". The study provides important real-world evidence to inform treatment sequencing decisions from both clinical and economic perspectives.

Technical Details

Study Design:

- Retrospective analysis of 74 mUC patients treated between January 2016 and December 2020

- Three treatment groups analyzed:
- 1. Chemotherapy alone (n=23)
- 2. First-line ICI + chemotherapy combination (n=33)
- 3. First-line chemotherapy followed by second-line ICI (n=18)

Cost Analysis:

- Cost per life day for subsequent ICI therapy: "\$155.8" [IQR 99.0 to 220.5]
- Cost per life day for ICI combination therapy: "\$97.8" [IQR 60.8 to 159.19]
- Insurance reimbursement costs:
- Subsequent ICI: "\$95.2" per day [IQR 8.7-223.3]
- ICI combination: "\$32.5" per day [IQR 10.6-165.3]

Treatment Outcomes:

- Median overall survival:
- ICI combination therapy: 27.5 months (95% CI, 5.2-49.9)
- Chemotherapy alone: 8.9 months (95% CI, 7.1-10.8)
- Subsequent ICI therapy: Not reached

Cost Distribution:

- Hospitalization expenses: ~75.0% of total lifetime costs
- Outpatient costs: 23.4% of total costs
- Total median lifetime cost: "\$31,221"

Response Rates:

- ICI combination therapy: 69.7% achieved complete/partial response (23/33 patients)
- Subsequent ICI therapy: 44.4% achieved complete/partial response (8/18 patients)

Key Insights

- 1. Economic Advantage of Early ICI Integration:
- First-line ICI combination therapy demonstrated significantly lower costs per life day compared to sequential treatment
- The subsequent ICI therapy group had 1.59 times higher daily costs than the combination group
- Early integration of ICIs may optimize both clinical outcomes and cost-effectiveness
- 2. Healthcare Resource Utilization:
- Inpatient care represents the major cost driver, accounting for 75% of expenses

- Higher outpatient costs were observed in the subsequent ICI group ("\$6,784.9" vs "\$2,080.0" per patient)

- Understanding cost distribution can help in resource allocation and planning

3. Clinical Value Considerations:

- Similar survival outcomes between combination and sequential approaches suggest treatment sequence flexibility
- Higher response rates in the combination therapy group may contribute to improved cost-effectiveness
- Results align with emerging evidence supporting early ICI integration in treatment algorithms
- 4. Healthcare Policy Implications:
- Findings support consideration of first-line ICI combination therapy as a cost-effective standard of care
- Insurance reimbursement patterns significantly impact overall treatment costs
- Data can inform coverage decisions and treatment guidelines

This analysis provides valuable real-world evidence regarding the economic impact of different ICI treatment sequences in mUC. The findings suggest that early integration of ICIs in combination with chemotherapy may offer an optimal balance of clinical benefit and cost-effectiveness. These insights can help inform clinical decision-making and healthcare policy regarding the timing of ICI therapy initiation in mUC treatment.

*Note: All monetary values are presented in USD as reported in the original study.

Cost-effectiveness of nivolumab plus gemcitabine-cisplatin as first-line treatment for advanced urothelial carcinoma in China and the United States, Xiang G. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Nivolumab Plus Gemcitabine-Cisplatin for Advanced Urothelial Carcinoma

Executive Summary:

This report analyzes the cost-effectiveness of combining nivolumab (a PD-1 inhibitor monoclonal antibody) with gemcitabine-cisplatin chemotherapy as first-line treatment for advanced urothelial carcinoma, based on research by Xiang G. et al. The analysis examined outcomes and costs in both US and Chinese healthcare systems using a partitioned survival model.

Key findings:

- The combination therapy provided an additional 1.259 life-years compared to chemotherapy alone
- US incremental cost-effectiveness ratio (ICER): "\$116,856/QALY"
- China ICER: "\$51,997/QALY"

- Cost-effective in US but not in China at current pricing
- Price reduction of 29.81% needed in China for cost-effectiveness
- Most cost-effective in patients under 65 or with ECOG performance status of 0

Technical Details:

Methodology:

The researchers developed a partitioned survival model with three health states:

- Progression-free survival (PFS)
- Progressive disease (PD)
- Death

The model used:

- 3-week cycle length
- Lifetime horizon (30 years)
- 3% annual discount rate for US
- 5% annual discount rate for China
- Willingness-to-pay thresholds:
- US: "\$150,000/QALY"
- China: "\$38,043/QALY"

Cost Inputs:

US Setting:

- Nivolumab (100mg): "\$3042.60"
- Gemcitabine (1000mg): "\$31.07"
- Cisplatin (10mg): "\$2.19"
- Total incremental cost: "\$108,838"

China Setting:

- Nivolumab (100mg): "\$1312.06"
- Gemcitabine (1000mg): "\$71.33"
- Cisplatin (10mg): "\$1.98"
- Total incremental cost: "\$48,001"

Clinical Outcomes:

- Nivolumab + chemotherapy: 4.238 life-years
- Chemotherapy alone: 2.979 life-years

- Incremental life-year gain: 1.259
- Incremental QALY gain:
- US: 0.931
- China: 0.923

Sensitivity Analyses:

Key variables impacting ICER:

- Hazard ratio for overall survival
- Time horizon
- Nivolumab cost

Price sensitivity:

- China requires 29.81% nivolumab price reduction (to "\$920.87/100mg") for cost-effectiveness
- US remains cost-effective at current pricing

Subgroup Analysis:

Most cost-effective in:

US Setting:

- Age <65: ICER "\$86,413/QALY", 96.1% probability
- ECOG 0: ICER "\$83,217/QALY", 95.3% probability
- Treatment-naive: ICER "\$109,818/QALY", 81.1% probability

China Setting:

- Age <65: ICER "\$35,848/QALY", 59.1% probability
- ECOG 0: ICER "\$35,605/QALY", 60.8% probability

Key Insights:

Economic Implications:

- 1. Regional Pricing Considerations
- Current pricing is sustainable in US market
- Significant price reductions needed for China market adoption
- Demonstrates importance of differential pricing strategies for global access
- 2. Patient Stratification
- Clear economic benefit in younger patients and better performance status
- Supports targeted use in specific patient populations

- Helps optimize resource allocation
- 3. Healthcare System Impact
- Additional costs potentially justified by survival benefits in US system
- May strain resources in systems with lower willingness-to-pay thresholds
- Highlights need for innovative pricing/reimbursement models
- 4. Future Considerations
- Extended time horizons improve cost-effectiveness
- Quality of life improvements could enhance value proposition
- Further research needed on biomarker-guided patient selection

This analysis provides important insights for:

- Healthcare payers determining coverage policies
- Manufacturers developing pricing strategies
- Clinicians selecting optimal patient populations
- Policymakers considering access and reimbursement

The findings support use of nivolumab combination therapy in the US market while suggesting need for alternative pricing approaches in China and similar markets. Patient selection based on age and performance status may help optimize the cost-effectiveness of this treatment option.

Evaluating nivolumab plus gemcitabine–cisplatin's cost-effectiveness for aUC in China, Meng K. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Nivolumab Combination Therapy for Advanced Urothelial Carcinoma

Executive Summary

This report analyzes the economic implications of combining nivolumab with gemcitabine-cisplatin for treating advanced urothelial carcinoma (aUC) in China, based on research by Meng K. et al. The study found that while the combination therapy showed improved clinical outcomes, it was not cost-effective at current pricing levels in China. Key findings include:

- Base case analysis showed an incremental cost-effectiveness ratio (ICER) of "\$133,526.46" per quality-adjusted life year (QALY) gained

- Additional cost of "\$78,780.61" for 0.59 QALYs gained compared to gemcitabine-cisplatin alone
- Current pricing requires a 72.1% reduction in nivolumab costs to reach cost-effectiveness thresholds
- Zero probability of being cost-effective at China's willingness-to-pay threshold of "\$38,223" per QALY

Technical Details

Study Design and Model Parameters:

- Markov model comparing nivolumab plus gemcitabine-cisplatin vs. gemcitabine-cisplatin alone
- Three health states: Progression-Free Survival (PFS), Disease Progression (PD), and Death
- 1-week cycle length with 10-year time horizon
- 5% annual discount rate for costs and utilities
- Based on CheckMate 901 trial data

Cost Inputs:

- Nivolumab: "\$1,249.072" per 100mg
- Gemcitabine: "\$5.596" per 0.2g
- Cisplatin: "\$1.059" per 10mg
- Administration cost per unit: "\$41"
- Terminal care: "\$278.21"

Adverse Event Costs:

- Anemia: "\$500.78"
- Neutropenia: "\$434.57"
- Decreased neutrophil count: "\$534.40"
- Decreased white cell count: "\$622.52"

Utility Values:

- PFS state: 0.80
- PD state: 0.71

Results:

- Total cost for combination therapy: "\$84,617.97"
- Total cost for standard therapy: "\$5,837.36"
- Incremental life years gained: 0.76
- Incremental QALYs gained: 0.59

- ICER per life year: "\$103,658.70"
- ICER per QALY: "\$133,526.46"

Key Insights

- 1. Pricing and Market Access
- Current nivolumab pricing makes combination therapy economically unfeasible in China
- 72.1% price reduction needed to reach acceptable cost-effectiveness
- Other PD-1 inhibitors in China have achieved significant price reductions:
- * Tislelizumab: 88% reduction to "\$175.39" per 100mg
- * Toripalimab: 73% reduction to "\$263.73" per 240mg
- 2. Clinical Value Proposition
- Improved survival outcomes do not offset high costs at current pricing
- Subgroup analysis shows better cost-effectiveness in PD-L1 positive patients
- Safety profile comparable to established treatment options

3. Economic Implications

- One-way sensitivity analysis identifies nivolumab cost as key driver
- Zero probability of cost-effectiveness at current threshold
- Results consistent with international cost-effectiveness studies
- Need for innovative pricing strategies to improve access
- 4. Healthcare System Impact
- High cost burden on Chinese healthcare system
- Opportunity for price negotiations similar to other PD-1 inhibitors
- Potential role for indication-specific pricing
- Need to balance innovation costs with healthcare system sustainability

The analysis demonstrates that while nivolumab combination therapy offers clinical benefits for aUC patients, significant price reductions are needed to achieve cost-effectiveness in China. The experience with other PD-1 inhibitors suggests that such price reductions are feasible while maintaining market access. Future research should focus on identifying patient subgroups most likely to benefit from treatment and developing innovative pricing models to improve cost-effectiveness.

Nivolumab plus ipilimumab versus the EXTREME regimen in recurrent/metastatic squamous cell carcinoma of the head and neck: a cost-efectiveness analysis, Ye D. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Monoclonal Antibody Cancer Cost Analysis Report

Executive Summary:

This report analyzes the cost-effectiveness of nivolumab plus ipilimumab compared to the EXTREME regimen (cetuximab + cisplatin/carboplatin + fluorouracil) for treating recurrent/metastatic squamous cell carcinoma of the head and neck (R/M SCCHN). Based on the CheckMate 651 trial data and U.S. healthcare system perspective, the study by Ye D. et al. found that:

- The EXTREME regimen was more cost-effective than nivolumab plus ipilimumab for the overall R/M SCCHN population at a willingness-to-pay threshold of "\$150,000" per quality-adjusted life year (QALY)

- EXTREME showed an incremental cost-effectiveness ratio (ICER) of "\$7,545" per QALY compared to nivolumab plus ipilimumab

- Patient subgroups with high PD-L1 expression showed better cost-effectiveness with nivolumab plus ipilimumab

- Body weight and overall survival hazard ratio were the most influential factors affecting cost-effectiveness

Technical Details:

Model Structure & Inputs:

- Three-state partitioned survival model with 15-year time horizon
- Health states: progression-free survival, progressed disease, and death
- 3% annual discount rate applied to costs and outcomes
- Key drug costs per 1mg:
- Nivolumab: "\$30"
- Ipilimumab: "\$166"
- Cetuximab: "\$7.04"
- Cisplatin: "\$0.17"
- Carboplatin: "\$0.05"
- Fluorouracil: "\$0.005"

Cost Components:

- 1. Drug acquisition costs:
- EXTREME total: "\$290,970"
- Nivolumab plus ipilimumab total: "\$322,595"
- 2. Non-drug costs:
- EXTREME: "\$565,153"
- Nivolumab plus ipilimumab: "\$532,956"
- 3. Overall costs:
- EXTREME: "\$856,123"
- Nivolumab plus ipilimumab: "\$855,551"

Clinical Outcomes:

- Life years gained:
- * Progression-free survival
- EXTREME: 0.466 years
- Nivolumab plus ipilimumab: 0.847 years
- * Overall survival
- EXTREME: 2.534 years
- Nivolumab plus ipilimumab: 2.380 years
- QALYs:
- * EXTREME: 1.747
- * Nivolumab plus ipilimumab: 1.671
- Cost-Effectiveness Results:
- Incremental cost: "\$572" favoring EXTREME
- Incremental QALYs: 0.076 favoring EXTREME
- ICER: "\$7,545" per QALY
- Incremental net monetary benefit: "\$113,267" at WTP of "\$150,000"/QALY
- Incremental net health benefit: 0.076 QALYs at WTP of "\$150,000"/QALY

Key Insights:

1. Population-Level Cost-Effectiveness:

- At a WTP threshold of "\$150,000" per QALY, EXTREME had a 64% probability of being cost-effective compared to nivolumab plus ipilimumab for the overall population

- The relatively low ICER of "\$7,545" per QALY suggests EXTREME provides good value for money

- 2. Subgroup Analysis:
- Nivolumab plus ipilimumab showed >99% probability of being cost-effective in:
- * Patients with hypopharynx primary tumor site
- * PD-L1 high expression subgroups (CPS \geq 1, 1-19, or \geq 20)
- Treatment was unlikely to be cost-effective in PD-L1 CPS <1 patients
- 3. Key Cost Drivers:
- Body weight significantly impacted cost-effectiveness
- Nivolumab plus ipilimumab became cost-effective when patient weight was below 63.19 kg
- Overall survival hazard ratio was another crucial factor
- Drug costs had moderate influence on cost-effectiveness
- 4. Clinical Considerations:
- EXTREME showed better overall survival (2.534 vs 2.380 years)
- Nivolumab plus ipilimumab had superior progression-free survival (0.847 vs 0.466 years)
- Treatment selection should consider individual patient characteristics including:
- * PD-L1 expression status
- * Primary tumor site
- * Body weight
- * Overall health status
- 5. Economic Implications:
- Results support personalized treatment approaches based on patient characteristics
- Higher drug costs for immunotherapy partially offset by lower adverse event management costs
- Cost-effectiveness varies substantially by subgroup, highlighting importance of patient selection
- Findings can inform coverage decisions and clinical practice guidelines

The analysis provides valuable insights for healthcare decision-makers regarding optimal treatment selection for R/M SCCHN patients while considering both clinical and economic factors. The results support a personalized medicine approach based on patient characteristics, particularly PD-L1 status and body weight.

A cost-effectiveness analysis of the combination of serplulimab with chemotherapy for advanced esophageal squamous cell carcinoma: insights from the ASTRUM-007 trial, Li J. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Cost-Effectiveness Analysis of Serplulimab with Chemotherapy for Advanced Esophageal Cancer: Report Summary

Executive Summary

This report analyzes the economic viability of combining serplulimab (a PD-1 targeting monoclonal antibody) with chemotherapy for treating advanced esophageal squamous cell carcinoma (ESCC) in China, based on the ASTRUM-007 trial data published by Li et al. The key findings indicate:

- The combination therapy showed favorable cost-effectiveness compared to chemotherapy alone across different

PD-L1 expression subgroups

- Incremental cost-effectiveness ratios (ICERs) ranged from "\$23,657" to "\$25,134" per quality-adjusted life year (QALY)

- Sensitivity analyses confirmed the economic model's stability with 61-78% probability of cost-effectiveness

- Treatment was most cost-effective in patients with ECOG performance status of 0, with ICER of "\$19,706" per QALY

The analysis suggests serplulimab plus chemotherapy represents a financially viable first-line treatment option for PD-L1 positive ESCC patients in China, though regional economic variations may impact accessibility.

Technical Details

Model Structure and Parameters

The authors constructed a Markov model with three health states:

- Progression-free survival (PFS)

- Progressive disease (PD)
- Death

Key model parameters included:

- 2-week cycle length
- 10-year time horizon
- 5% annual discount rate

- Willingness-to-pay threshold of "\$36,438" per QALY (3x China's GDP)

Cost Inputs

Direct medical costs incorporated:

- Serplulimab: "\$198" per cycle
- Cisplatin: "\$12" per cycle
- 5-fluorouracil: "\$127" per cycle
- Paclitaxel: "\$180" per cycle
- Laboratory testing: "\$53" per cycle
- Imaging: "\$162" per cycle
- Administration: "\$12" per cycle
- PD-L1 testing: "\$86" per patient
- Best supportive care: "\$70" per cycle
- Terminal care: "\$1,402" per patient

Clinical Outcomes

The combination therapy demonstrated:

- Overall population: 0.14 QALYs gained at incremental cost of "\$3,163"
- PD-L1 CPS 1-10: 0.10 QALYs gained at "\$2,418"
- PD-L1 CPS ≥10: 0.15 QALYs gained at "\$3,849"

Resulting ICERs:

- Overall: "\$23,657" per QALY
- PD-L1 CPS 1-10: "\$23,982" per QALY
- PD-L1 CPS ≥10: "\$25,134" per QALY

Key Insights

Economic Implications

- 1. Regional Variations
- Treatment likely more accessible in developed regions with higher GDP
- WTP thresholds vary significantly: "\$80,822" (Beijing) vs "\$19,127" (Gansu)
- Implementation may require region-specific reimbursement strategies

2. Cost Drivers

- Serplulimab pricing most influential on cost-effectiveness
- Model sensitive to utility values for PFS and PD states
- Adverse event costs had minimal impact on results
- 3. Patient Subgroups
- Most cost-effective in:
- ECOG performance status 0 patients
- Current/former smokers
- Patients under 65 years
- Higher PD-L1 expression associated with better economic outcomes

Healthcare System Impact

The analysis projects significant growth in China's esophageal cancer-related costs:

- "\$33.4" billion (2013) to "\$76.4" billion (2030)
- 128.7% increase in direct medical costs
- Rising incidence from 61 to 67.9 per 100,000 by 2020

These projections emphasize the importance of identifying cost-effective treatment strategies. The combination therapy's favorable economic profile suggests it could help optimize healthcare resource allocation while improving patient outcomes.

Study Limitations

Key limitations affecting result interpretation:

- Reliance on clinical trial data rather than real-world evidence
- Utility values derived from previous studies rather than ASTRUM-007
- Exclusion of grade 1-2 adverse event costs
- Regional GDP variations affecting implementation feasibility

The analysis provides valuable insights for healthcare decision-makers while acknowledging the need for additional real-world evidence to confirm the combination therapy's economic value in clinical practice.

This report summarizes key findings from Li et al.'s economic analysis using their original data and values, highlighting crucial considerations for implementing serplulimab combination therapy in clinical practice.

Cost-effectiveness analysis of first-line sintilimab plus chemotherapy vs. chemotherapy alone for unresectable advanced or metastatic gastric or gastroesophageal junction cancer in China, Xiang Z. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the article:

Cost Analysis Report: Sintilimab plus Chemotherapy for Gastric Cancer Treatment

Executive Summary

This report examines the cost-effectiveness analysis conducted by Xiang et al. regarding first-line sintilimab (a PD-1 inhibitor monoclonal antibody) plus chemotherapy versus chemotherapy alone for treating unresectable advanced gastric or gastroesophageal junction cancer in China. The study utilized a partitioned survival approach model with a 10-year time horizon.

Key findings:

- Sintilimab plus chemotherapy showed an incremental cost-effectiveness ratio (ICER) of "\$25,239.29" per quality-adjusted life year (QALY)

- This ICER falls below China's willingness-to-pay threshold of "\$38,223.34"
- The combination therapy remained cost-effective regardless of PD-L1 expression levels
- Model was robust across sensitivity analyses with 98.6% probability of being cost-effective at the threshold

Technical Details

Model Structure and Inputs

The authors developed a partitioned survival model with three health states:

- Progression-free survival (PFS)
- Progressive disease (PD)
- Death

Key model parameters included:

- 10-year time horizon
- 3-week cycle length
- 5% annual discount rate
- Direct medical costs only
- Base case using 65kg average patient weight
- Body surface area of 1.72 m²

Drug costs:

- Sintilimab: "\$160.57" per 100mg
- Capecitabine: "\$0.90" per 1000mg
- Oxaliplatin: "\$50.55" per 100mg

Utility values:

- PFS state: 0.797
- PD state: 0.577

Results Analysis

Base case findings:

- Sintilimab + chemotherapy:
- Total cost: "\$27,503.91"
- QALYs gained: 1.12
- Chemotherapy alone:
- Total cost: "\$19,515.48"
- QALYs gained: 0.80
- Incremental cost: "\$7,988.43"
- Incremental QALYs: 0.32

Subgroup analyses by PD-L1 expression:

- CPS ≥5:

- ICER: "\$26,341.01" per QALY
- Incremental cost: "\$12,980.27"
- Incremental QALYs: 0.49
- CPS <5:
- ICER: "\$17,658.26" per QALY
- Incremental cost: "\$3,391.00"
- Incremental QALYs: 0.19

Key Insights

Economic Value

1. Cost-Effectiveness

- Sintilimab combination therapy demonstrates favorable cost-effectiveness compared to other immunotherapy options in China

- Remains cost-effective across PD-L1 expression levels, unlike some competitor treatments

- Shows robust economic value in sensitivity analyses

2. Price Positioning

- Lower acquisition cost compared to other PD-1 inhibitors:
- Pembrolizumab: "\$2,663.95" per 100mg
- Nivolumab: "\$1,540.08" per 100mg
- Sintilimab: "\$160.57" per 100mg
- 3. Healthcare System Impact
- Model indicates high probability (98.6%) of being cost-effective at China's willingness-to-pay threshold
- Results suggest potential for broader access given favorable economic profile
- May influence reimbursement decisions and treatment guidelines

The analysis demonstrates that sintilimab plus chemotherapy represents a cost-effective first-line treatment option for advanced gastric cancer in China, with consistent economic value across patient subgroups. The favorable cost-effectiveness profile compared to other immunotherapies suggests potential for improved patient access and healthcare system value.

This comprehensive economic evaluation provides strong support for considering sintilimab combination therapy as a standard treatment option from both clinical and economic perspectives. The robust sensitivity analyses and subgroup consistency strengthen confidence in the findings.

Drug Cost Avoidance Resulting from Participation in Clinical Trials: A 10-Year Retrospective Analysis of Cancer Patients with Solid Tumors, Carreras M. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost findings from the attached article:

Drug Cost Analysis Report: Clinical Trial Cost Avoidance in Cancer Treatment Based on Carreras M.-J. et al. (2024)

Executive Summary

This analysis examines the economic impact of monoclonal antibody (mAb) therapies and other cancer treatments in clinical trials conducted at Vall d'Hebron University Hospital from 2010-2019. The study found significant cost avoidance through pharmaceutical company sponsorship of clinical trials, particularly for innovative therapies like mAbs. Key findings include:

- Total pharmaceutical cost avoidance of "\$92,662,609" over the 10-year period

- Immunotherapy agents (primarily mAbs) accounted for 68.4% of trial costs by 2019, up from 0% in 2010

- Leading mAb expenditures in 2019 were pembrolizumab ("\$3,590,128"), nivolumab ("\$2,489,205"), and atezolizumab ("\$1,983,242")

- Shift from cytotoxic drugs (20.6% of costs in 2010 to 7.1% in 2019) to immunotherapy as the dominant therapy class

The findings demonstrate the substantial economic value provided by clinical trial sponsorship in offsetting costs of expensive novel cancer therapies, particularly mAbs, while enabling patient access to innovative treatments.

Technical Details

Study Parameters:

- 10-year retrospective analysis (2010-2019)
- Single academic medical center
- 2,930 clinical trials
- 10,488 total patients enrolled
- Focus on solid tumor indications

Cost Analysis Methodology:

The authors calculated two key metrics:

- 1. Actual sponsor contribution: Direct cost of drugs provided by pharmaceutical companies based on hospital pricing
- 2. Potential cost avoidance: Estimated costs if patients received standard of care treatment instead of trial participation

Key Economic Findings:

Immunotherapy/mAb Costs:

- 2019 immunotherapy spending: "\$11,687,195"
- Total immunotherapy contribution 2013-2019: "\$35,623,961"
- Represented 35.3% of total trial drug expenditures

Top mAb Expenditures 2019:

- 1. Pembrolizumab: "\$3,590,128" (13.0%)
- 2. Nivolumab: "\$2,489,205" (9.0%)
- 3. Atezolizumab: "\$1,983,242" (7.2%)
- 4. Bevacizumab: "\$1,696,850" (6.1%)
- 5. Ipilimumab: "\$786,563" (2.8%)
- 6. Avelumab: "\$568,416" (2.1%)

Treatment Pattern Evolution: 2010:

- Targeted therapy: 79.4%
- Cytotoxic drugs: 20.6%
- Immunotherapy: 0%

2019:

- Immunotherapy: 68.4%
- Targeted therapy: 24.4%
- Cytotoxic drugs: 7.1%

Key Insights

1. Dramatic Shift to Immunotherapy

The analysis reveals a fundamental transformation in cancer clinical trials, with mAb immunotherapies becoming the dominant treatment modality. The growth from 0% to 68.4% of costs over 10 years reflects both increased usage and the high cost of these agents.

2. Economic Impact of Innovation

The rise of novel mAb therapies has significant budget implications, with individual agents like pembrolizumab accounting for substantial portions of trial costs. This highlights the critical role of trial sponsorship in enabling access to these innovative but expensive treatments.

3. Cost Avoidance Benefits

The "\$92,662,609" in total cost avoidance demonstrates the substantial economic value of clinical trial participation. For expensive mAb therapies in particular, trial sponsorship provides an important mechanism for healthcare systems to offer cutting-edge treatments while managing costs.

4. Evolution of Treatment Paradigms

The declining share of cytotoxic drugs (20.6% to 7.1%) paired with immunotherapy's rise reflects the broader transformation of cancer care toward targeted and immune-based approaches. This shift has important implications for both clinical outcomes and healthcare economics.

5. Access to Innovation

The high proportion of mAb usage in trials (68.4% by 2019) indicates that trial participation serves as a key pathway for patients to access novel immunotherapies that might otherwise be financially challenging to provide through standard care channels.

The findings underscore the dual benefit of clinical trials in advancing cancer care while providing economic value through sponsored access to expensive novel therapies. As mAb treatments continue to play an increasingly central role in oncology, the cost avoidance achieved through trial participation represents an important mechanism for healthcare systems to manage the financial impact of innovative cancer care.

Cost-effectiveness of durvalumab plus tremelimumab in combination with chemotherapy for the treatment of metastatic non-small-cell lung cancer from the US healthcare sector's and societal perspectives, Gan Y. et al. 2024

Here is a 4-page report analyzing the monoclonal antibody cancer cost analysis from the attached article:

Title: Analysis of Cost-Effectiveness for Durvalumab-Tremelimumab Combination Therapy in Metastatic NSCLC

Executive Summary

This report analyzes the economic implications of using durvalumab plus tremelimumab with chemotherapy (T+D+CT) for treating metastatic non-small cell lung cancer (mNSCLC), based on research by Gan Y. et al. The study evaluated cost-effectiveness from both US healthcare sector and societal perspectives over a 15-year horizon. Key findings showed that T+D+CT yielded an incremental cost-effectiveness ratio (ICER) of "\$82,501/QALY" compared to chemotherapy alone and "\$1,243,868/QALY" versus durvalumab plus chemotherapy (D+CT). The analysis suggests T+D+CT is cost-effective compared to chemotherapy alone but not versus D+CT when using a \$100,000/QALY willingness-to-pay threshold.

Technical Details

Cost Analysis Framework:

- Study used partitioned survival models examining three health states: progression-free survival, progressive disease, and death

- 3% annual discount rate applied to costs and effectiveness measures
- All costs reported in 2023 US dollars
- 15-year time horizon with one-month cycle lengths

Key Cost Components:

- Durvalumab: "\$1,380" per cycle
- Tremelimumab: "\$9,360" per cycle
- Abraxane: "\$6,395" per cycle
- Pemetrexed: "\$2,117" per cycle
- Drug administration: "\$143" per hour
- Follow-up/monitoring: "\$433" per cycle
- Palliative care/death: "\$15,957"

Treatment Costs by Regimen:

T+D+CT arm:

- Total healthcare costs: "\$368,076"
- Incremental cost vs CT: "\$7,108"
- Incremental cost vs D+CT: "\$27,779"

D+CT arm:

- Total healthcare costs: "\$340,297"

CT arm:

- Total healthcare costs: "\$360,968"

Sensitivity Analysis Results:

- Annual discount rate most impactful on ICER
- Cost-effectiveness sensitive to:
- Subsequent immunotherapy costs
- Tremelimumab costs
- Palliative care costs
- Pemetrexed costs
- Durvalumab costs

Key Insights

Economic Value Proposition:

1. T+D+CT demonstrates reasonable cost-effectiveness vs chemotherapy alone but not vs D+CT from a US healthcare perspective

2. Critical economic factors:

- Duration of immunotherapy treatment significantly impacts cost-effectiveness
- Non-squamous NSCLC patients show better economic outcomes than squamous NSCLC
- Treatment costs most sensitive to drug pricing and discount rates
- 3. Healthcare System Implications:
- Potential cost savings of "\$601 million" projected when eligible patients receive T+D+CT
- Treatment strategy may be prioritized for high-risk progression patients
- Cost-effectiveness varies by patient subgroup and histology type

4. Policy Considerations:

- Results support inclusion in treatment protocols for appropriate patient segments
- Economic benefits more favorable from societal perspective
- Duration of therapy requires careful consideration in coverage policies

Limitations:

- Single phase III trial data source
- Potential differences between trial and real-world populations
- Limited long-term survival data
- Model sensitivity to multiple cost variables

The analysis suggests T+D+CT represents a potentially cost-effective treatment option versus chemotherapy alone for mNSCLC patients, particularly those with non-squamous histology. However, the high ICER versus D+CT indicates a need for careful patient selection and potentially price negotiations to improve economic value. Healthcare decision-makers should consider these economic findings alongside clinical efficacy data when developing treatment protocols and coverage policies.

Report references data source: Gan Y., Shi F., Zhu H., Li H., Han S. and Li D. (2024) Cost-effectiveness of durvalumab plus tremelimumab in combination with chemotherapy for the treatment of metastatic non-small-cell lung cancer from the US healthcare sector's and societal perspectives. Frontiers in Pharmacology.

"Clinical mAb Cancer Cost" End 30 Summaries