PHARMACY SYSTEMS OUTCOMES AND POLICY
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UIC

COST-EFFECTIVENESS OF ETRANACOGENE DEZAPARVOVEC FOR THE TREATMENT OF HEMOPHILIA B

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OBJECTIVES

- Etranacogene dezaparvovec (Etranadez) is a new gene therapy for hemophilia B.
- This study assessed the cost-effectiveness of Etranadez compared with Factor IX (FIX), in hemophilia B patients without inhibitors eligible for prophylaxis.
- A special consideration in this assessment was employing a cost offsets cap for the new therapy as the existing treatments come at exceptionally high costs.

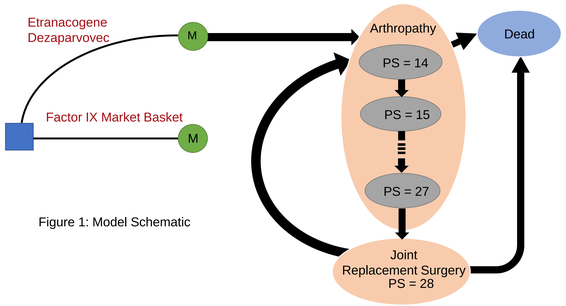

Figure 1: Model Schematic

METHODS

- Cost and QALY projections were performed using an evidence based semi-Markov model.
- Important assumptions included no mortality effects of the drugs and use of bleed rates and Pettersson Scores to proportionally project short term costs and QALY implications as well as model longer term consequences of bleeds on joints.
- The model also features projected declines in efficacy in the gene therapy and eventual discontinuation whereby patients reinitiate FIX prophylaxis.
- After receiving gene therapy, patients are projected to have slight QALY gains and large cost offsets due to the cost of FIX prophylaxis.
- We conducted a set of scenario analysis considering different cost, utility, bleed rate, and baseline PS.

METHODS (CONT.)

- In addition, as Etranadez is a one-time gene therapy, the analyses incorporated specific scenario analyses looking at optimistic and conservative long-term assumptions and at possible sharing of cost offsets between the manufacturer and society following ICER's High-Impact Single and Short-Term Therapies (SST) framework.
- To assess robustness of the result we also conducted one-way sensitivity analyses (OWSA) and probabilistic sensitivity analysis (PSA).

RESULTS

- Etranadez was associated with a lifetime QALY gain of 0.64 and cost savings of over $6 million in a conventional model as annual costs of factor IX therapy exceed $700,000 per year.
- When the model is constructed to cap annual cost offsets associated with the gene therapy to $150,000 per year Etranadez is not found to be cost effective at a price of $3.5 million.
- Instead, we found a value based price would be $2,958,000 at a willingness to pay of $150,000 per QALY. [Table 5]
- Sensitivity analyses results supported the robustness of the findings in the conventional model.
- Per cycle cost of FIX and per cycle utility gain in gene therapy arm has the maximum impact on the incremental cost and QALY respectively.

Table 1: Base case results

Treatment	Total Drug Cost	Total Cost	Bleeds	QALYs	Life Years	evLY
Etranacogene Dezaparvovec	$9,000,000	$9,954,000	182	17.96	27.13	17.96
Factor IX	$14,029,000	$15,797,000	247	17.32	27.13	17.32

Table 2: Incremental cost-effectiveness ratios

Treatment	Comparator	Cost per QALY Gained	Cost per Life Year Gained	Cost per evLY Gained	Cost per bleed averted
Etranacogene Dezaparvovec	Factor IX	Dominant	Undefined	Dominant	Dominant

RESULTS (CONT.)

- At market based cost offsets and with willingness to pay thresholds ranging from $50,000/QALY to $200,000/QALY, etranacogene dezaparvovec proved to be a cost-effective option in all simulations conducted during the probabilistic sensitivity analyses. [Table 6]

Table 3: Non-SST Scenario Analysis Results

Scenario	Cost/QALY
Extending duration of disutility from bleeds to 7 full days from 2 full days and 5 half days.	Dominant
Doubling the bleed rates for patients with arthropathy across all treatments.	Dominant
A scenario where patients enter at the age of 40 and with a PS of 20.	Dominant
Scenario where surgery returns patients to PS of 20.	Dominant
Scenario where all patients switch at a factor level of 5 IU/ml.	Dominant
Scenario with high AE cost in cycle 1.	Dominant

Table 4: SST Scenario Analysis Results

Scenario	Cost/QALY
Shared savings in which 50% of lifetime health care cost offsets from etranacogene dezaparvovec are assigned to the health care system instead of being assigned entirely to etranacogene dezaparvovec	Dominant
Cost-offset cap in which health care cost offsets generated by Etranacogene dezaparvovec are capped at $150,000 per year.	$1,779,000
Optimistic assumptions regarding the benefit of treatment, to be presented in conjunction with the full cost-offset analysis.	Dominant
Conservative assumptions regarding the benefit of treatment, to be presented in conjunction with the full cost-offset analysis.	Dominant
Zero net savings.	$5,902,000

Table 5: QALY-Based Threshold Analysis Results for Etranacogene Dezaparvovec

Treatment	Unit Price to Achieve $50,000 per QALY Gained	Unit Price to Achieve $100,000 per QALY Gained	Unit Price to Achieve $150,000 per QALY Gained	Unit Price to Achieve $200,000 per QALY Gained
$150,000 Cap Scenario	$2,894,000	$2,926,000	$2,958,000	$2,990,000
Shared Savings (50:50)	$5,066,000	$5,098,000	$5,130,000	$5,162,000
No Savings*	$258,000	$290,000	$322,000	$354,000
Full Cost-Offset Analysis	$9,875,000	$9,907,000	$9,939,000	$9,971,000

RESULTS (CONT.)

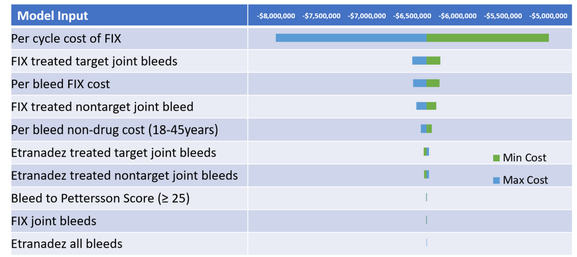

Figure 2: Tornado Diagram on Incremental Costs of Etranacogene Dezaparvovec versus FIX

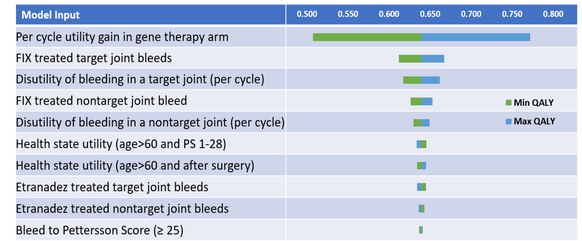

Figure 3: Tornado Diagram on Incremental QALY for Etranacogene Dezaparvovec versus FIX

Table 6: Probabilistic Sensitivity Analysis Cost per QALY Gained Results: Etranacogene Dezaparvovec Compared to Factor IX

Cost Effective at $50,000 per QALY Gained	Cost Effective at $100,000 per QALY Gained	Cost Effective at $150,000 per QALY Gained	Cost Effective at $200,000 per QALY Gained
100%	100%	100%	100%

CONCLUSION

- In considering the cost-effectiveness of Etranacogene dezaparvovec as a new therapy, special consideration should be given to the existing high costs of Factor IX and the impact of capping cost offsets associated with the new therapy.
- Capping cost offsets at $150,000 per year substantially changes the results.

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