Reduced Use of Erythropoiesis-Stimulating Agents and Intravenous Iron With Ferric Citrate: A Managed Care Cost-Off Model

R Mutell*, MBA; J Rubin, MA; TC Bond, PhD; T Mayne, PhD
DaVita Clinical Research, Minneapolis, MN, USA

Introduction
• According to the 2011 US Renal Data System report for 2009, 17% of all patients with kidney disease received their first dialysis using private insurance coverage,1 while a 2008 Medicare beneficiary survey found that 7% of new dialysis patients begin treatment under an employer-provided health plan.2
• Ferric citrate is a phosphate binder currently in clinical development for the treatment of hyperphosphatemia in dialysis patients.3
• In clinical trials, patients treated with oral ferric citrate showed improvements in serum phosphorus levels, as well as increases in serum ferritin and saturated transferrin (TSAT) levels.3,4
• Physicians respond to increases in serum ferritin and TSAT levels by increasing serum ferritin and TSAT levels in dialysis patients.5

Methods
• The model assumed equivalent efficacy and cost neutrality between ferric citrate and other phosphate binder medications for the treatment of ESRD patients with hyperphosphatemia.
• The model cost estimates considered the number of dialysis sessions per month, number of ESRD patients enrolled in the health plan, cost of ESA, and proportion of ESRD patients on phosphate binder therapy.
• The model assumed equal efficacy and cost neutrality between ferric citrate and other phosphate binders. Model input values were derived from published sources6,7 as well as a database analysis from a large national dialysis provider.6

Results
• Monte Carlo simulation demonstrated that a provider serving 500 dialysis patients could save between $644,000 and $1,240,000 with ferric citrate, translating into monthly savings of between $53,650 and $103,306 for a plan serving 500 dialysis patients.

Conclusions
• The Monte Carlo simulations show (at 90% probability) that for each patient with ESRD, a managed care organization could save between $107.30 and $206.61 per ESRD patient per month with ferric citrate, translating into monthly savings of between $53,650 and $103,306 for a plan serving 500 dialysis patients.
• Simulations demonstrate (at 90% probability) that a provider serving 500 dialysis patients could save between $644,000 and $1,240,000 annually with the use of ferric citrate.

Acknowledgments
Our sincere appreciation is extended to the teammates in more than 1,600 DaVita clinics who work every day to take care of patients and also to ensure the extensive data collection on which our work is based. We thank DaVita Clinical Research (DCR), and acknowledge Donna Jensen, PhD, for editorial contributions. DCR is committed to advancing the knowledge and practice of kidney care.

References

Table 1: Input Parameters for the Managed Care Cost-Off Model

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population Inputs</td>
<td>Number of ESRD patients, % of ESRD patients on phosphate binders, number of dialysis sessions per month, cost of ESA, proportion of ESRD patients on phosphate binder therapy.</td>
</tr>
<tr>
<td>Utilization and Cost Inputs</td>
<td>Average number of ESA sessions per month, commercial reimbursement for ESA session, average session epoetin alfa dose per patient, epoetin alfa payment per unit, average dose per secon dialysis session per patient.</td>
</tr>
<tr>
<td>TSAT and Ferritin Imbalance</td>
<td>Average dose of ESA per patient, average dose of iron per patient, estimated cost of hemoglobin management, estimated cost of ESA.</td>
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</tbody>
</table>

Table 2: Monthly Savings With Ferric Citrate Versus Other Phosphate Binders

<table>
<thead>
<tr>
<th>Month</th>
<th>Monthly Savings</th>
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<tbody>
<tr>
<td>0</td>
<td>$0</td>
</tr>
<tr>
<td>1</td>
<td>$53,650</td>
</tr>
<tr>
<td>2</td>
<td>$103,306</td>
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</tbody>
</table>

Figure 1. Monte Carlo Simulations of Cost Savings Per Patient Per Month

Figure 2. Total Monthly Savings With Ferric Citrate Versus Other Phosphate Binders

Figure 3. Sensitivity Analysis

Considerations
• The data described here were generated using specific settings for the cost-off model. Potential managed care savings could be more or less, depending on these assumptions.
• Potential ESA-sparing dosing trends have not been measured since the June 2011 change to FDA-approved ESA labels, which suggest dosing to a target hemoglobin level of < 11 g/dL.

Abbreviations: PPPM—per patient per month

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International Society for Pharmacoeconomics and Outcomes Research (ISPOR), Washington, DC, June 21-23, 2012