eAppendix

eAppendix Table of Contents

1. Supplemental description of analytic methods
2. eAppendix Table 1: Spending for IV Iron Claims, by Formulation
3. eAppendix Table 2: Change in Average Claim Spending Before, During, and After the Shortage Period on Iron Dextran and Ferric Carboxymaltose
4. eAppendix Figure 1: Percent of spending on IV iron in HOPD vs. office over time
5. eAppendix Figure 2: Percent of utilization on IV iron in HOPD vs. office over time
6. eAppendix Figure 3: Percent of utilization on IV iron including iron administration procedures with $0 payment
7. eAppendix Figure 4: Percent of utilization on IV iron including iron administration procedures with $0 payment, narrowed to formulations with less than 15% of market share
8. eAppendix Figure 5: Number of Beneficiaries Receiving IV iron, by Formulation
Supplemental Description of Analytic Methods
To build the primary analytic file, we applied the following inclusion and exclusion criteria:

- Identify claim lines in the Outpatient and Carrier files with a HCPCS code for ferric carboxymaltose (J1439), iron dextran (J1750), iron sucrose (J1756), ferric gluconate (J2916), or ferumoxytol (Q0138 and Q0139) during the period of 1/1/15 through 12/31/16
- Drop claims:
  - Associated with a Maryland hospital
  - Associated with a critical access hospital
  - Where Medicare was not the primary payer
- Drop IV iron claim lines where:
  - Spending ≤$0 or a missing value
  - ≤0 units or a missing value
- 160,456 claims (168,843 claim lines) for 46,113 beneficiaries met our inclusion criteria

To create key explanatory variables, we:

- Assigned hospital outpatient vs. physician office status based on claim type
- Multiplied the units variable by the mgs assigned to the HCPCS code to convert units to mgs (for example, the units for iron gluconate are multiplied by 12.5 to convert to mgs)
- Calculated Part B expenditures by summing values from the payment variables from the carrier and outpatient claim files: line NCH payment amount, line beneficiary Part B deductible amount, line coinsurance amount, revenue center provider payment amount, revenue center beneficiary payment amount, revenue center blood deductible amount, revenue center cash deductible amount, and revenue center coinsurance/wage adjust coinsurance amount
**eAppendix Table 1. Spending for IV Iron Claims, by Formulation**

<table>
<thead>
<tr>
<th>HCPCS</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1439 (Ferric carboxymaltose)</td>
<td>$779</td>
<td>$782</td>
<td>$788</td>
<td>$834</td>
<td>$226</td>
</tr>
<tr>
<td>J1750 (Iron dextran)</td>
<td>$26</td>
<td>$73</td>
<td>$238</td>
<td>$127</td>
<td>$121</td>
</tr>
<tr>
<td>J1756 (Iron sucrose)</td>
<td>$42</td>
<td>$50</td>
<td>$53</td>
<td>$47</td>
<td>$17</td>
</tr>
<tr>
<td>J2916 (Iron (or ferric) gluconate)</td>
<td>$23</td>
<td>$23</td>
<td>$26</td>
<td>$24</td>
<td>$27</td>
</tr>
<tr>
<td>Q0138 and Q0139 (Ferumoxytol)</td>
<td>$404</td>
<td>$432</td>
<td>$447</td>
<td>$456</td>
<td>$137</td>
</tr>
</tbody>
</table>

Spending by unique claim (not adjusted for quantity of drug dispensed). Data are from the authors’ analysis of a 20% nationally random sample of Medicare Part B fee-for-service (FFS) claims. Std. Dev., standard deviation; HCPCS, Healthcare Common Procedure Coding System.
**eAppendix Table 2.** Change in Average Claim Spending Before, During, and After the Shortage Period on Iron Dextran and Ferric Carboxymaltose

<table>
<thead>
<tr>
<th></th>
<th>Iron Dextran</th>
<th></th>
<th>Ferric Carboxymaltose</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Change in Average Claim Spending</td>
<td>95% CI</td>
<td>P-value</td>
<td>Change in Average Claim Spending</td>
</tr>
<tr>
<td>Shortage vs. Pre-Shortage</td>
<td>-$7.05</td>
<td>-$8.12 to -$5.99</td>
<td>&lt;0.001</td>
<td>$89.73</td>
</tr>
<tr>
<td>Post-Shortage vs. Shortage</td>
<td>$2.54</td>
<td>$1.55 to $3.52</td>
<td>&lt;0.001</td>
<td>$35.49</td>
</tr>
<tr>
<td>Post-Shortage vs. Pre-Shortage</td>
<td>-$4.52</td>
<td>-$5.60 to -$3.44</td>
<td>&lt;0.001</td>
<td>$125.21</td>
</tr>
</tbody>
</table>

Comparison of mean claim spending for periods before (January-June 2015), during (January-June 2016), and after (January-June 2017) a period of national iron dextran shortage. Data are from the authors’ analysis of a 20% nationally random sample of Medicare Part B fee-for-service (FFS) claims. CI, confidence interval.
**eAppendix Figure 1.** Percent of Spending on IV Iron in HOPD vs. Office Over Time

Medicare Part B spending by practice type. Data are from the authors’ analysis of a 20% nationally random sample of Medicare Part B fee-for-service (FFS) claims scaled to represent 100% FFS spending. IV, intravenous; HOPD, hospital outpatient department.
**eAppendix Figure 2.** Percent of Utilization of IV Iron in HOPD vs. Office Over Time

Medicare Part B utilization of intravenous iron by practice type. Data are from the authors’ analysis of a 20% nationally random sample of Medicare Part B fee-for-service (FFS) claims scaled to represent 100% FFS utilization. IV, intravenous; HOPD, hospital outpatient department.
Market share by formulation when including procedures with a $0 payment ($0 payments were most often due to bundled payments such as for intravenous iron with hemodialysis). Data are from the authors’ analysis of a 20% nationally random sample of Medicare Part B fee-for-service (FFS) claims. IV, intravenous.

When we include claims with $0 payment for the IV iron administration, iron sucrose accounts for a large portion of the market share in each month. The trend in iron dextran usage decreasing from the pre-shortage period to the shortage period and ferric carboxymaltose usage increasing from the pre-shortage period to the shortage period is consistent with the findings we present in the body of the manuscript. This can be better visualized in Appendix Figure A4 (below), where we focus on formulations with less than 15% of market share.
**eAppendix Figure 4.** Percent of utilization on IV iron including iron administration procedures with $0 payment, narrowed to formulations with less than 15% of market share

[Graph showing utilization of IV iron with different formulations]

Data are from the authors’ analysis of a 20% nationally random sample of Medicare Part B fee-for-service (FFS) claims. IV, intravenous.
eAppendix Figure 5. Number of Beneficiaries Receiving IV Iron, by Formulation

Monthly number of unique Medicare Part B beneficiaries with a claim for each IV iron formulation. Data are from the authors’ analysis of a 20% nationally random sample of Medicare Part B fee-for-service (FFS) claims. IV, intravenous.