



# Patterns of Anemia Management in Patients Undergoing Peritoneal Dialysis

## Introduction

- Anemia is a common complication of end stage renal disease.
- The mainstays of anemia treatment are erythropoietic stimulating agents (ESAs), iron, and red blood cell transfusions.
- ESAs are effective in increasing hemoglobin levels and decreasing the need for red blood cell transfusions.
- Intravenous (IV) iron is used as a necessary adjunct therapy to prevent and correct iron deficiency as well as to improve ESA effectiveness.
- Most data on anemia management comes from hemodialysis (HD) patients. There is little data in peritoneal dialysis (PD) patients, who account for approximately 7% of individuals undergoing renal replacement therapy in the U.S. This percentage is likely to grow due to reimbursement changes under the Prospective Payment System.
- This study aimed to describe anemia management trends in PD patients between 2007 and 2011, and compare these trends with contemporaneous HD patients.

## Methods

### Study Population

- The study cohort consisted of prevalent PD patients 18 years or older with Medicare as primary payer who were dialyzing during 2007-2011.
- Quarterly patient cohorts were created; patients were required to have received at least 3 consecutive months of PD prior to enrollment into each quarterly cohort.
- Patient characteristics and comorbidities were defined during the 3 months of the preceding quarter.

### Study Follow-Up and Outcomes

- Follow-up began on the first day of each quarter and continued until: death, kidney transplantation, switch to HD, loss to follow-up, or last day of the quarter.
- ESA use, IV iron use, red blood cell transfusion, and hemoglobin values were evaluated during the follow-up period.
- ESAs and IV iron use were assessed from Part A outpatient claims, and transfusions were assessed from Parts A and B claims.

### Hemodialysis Comparison Cohorts

- Quarterly HD cohorts were created comparably in order to compare anemia management between PD and HD patients.

## Results

- The final cohort consisted of 17,842 PD and 256,942 HD patients in '11Q4.
- The percentage of PD patients with any Epoetin alfa (EPO) use decreased from 66.4% to 62.3% between '07Q1 and '08Q1, increased to its highest level (71.7%) in '10Q2, and declined to 64.0% in '11Q4 (Figure 1)
- The mean EPO dose declined among both PD and HD patients, in early '08 and again in '10Q4 (Figure 2).
- The percentage of PD patients with any Darbepoetin alfa (DPO) use was 6.7% in '07Q1, increased to its highest level (10.3%) in '08Q2, and declined to 6.2% in '11Q4 (Figure 3).
- Changes in mean DPO dose were similar to trends in EPO dose, with continual declines for both PD and HD patients starting in mid-2010 (Figure 4).
- The percentage of PD patients with IV iron use was 18.8% in '07Q1, increased to 37.8% in '11Q3, and decreased slightly to 35.6% in '11Q4. Percent of HD patients receiving IV iron was much higher, consistently at > 70% (Figure 5).
- For PD patients, mean iron doses were fairly constant between '07Q1 and '10Q1 when they began to rise and then fall in '11Q2. For HD patients, doses were constant between '07Q1 and '10Q4 with declines starting in '11Q1 (Figure 6).

Figure 1. Percent of patients receiving EPO

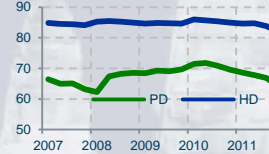


Figure 2. Mean EPO dose among EPO users (units per 30 outpatient days)

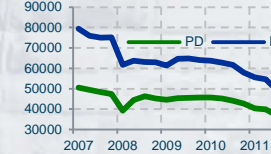


Figure 3. Percent of patients receiving DPO

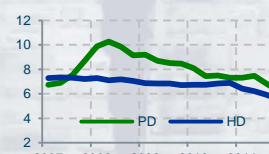


Figure 4. Mean DPO dose among DPO users (mcg per 30 outpatient days)

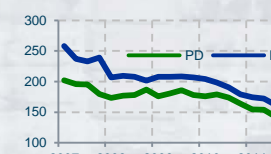


Figure 5. Percent of patients receiving IV iron

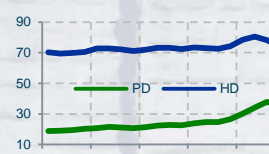


Figure 6. Mean iron dose among iron users (mg per 30 outpatient days)

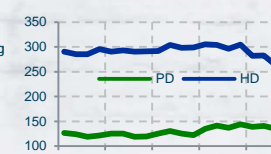


Figure 7. Mean hemoglobin level among ESA users (g/dL)

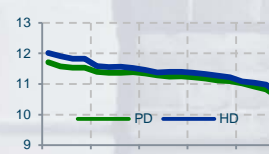
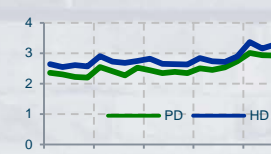


Figure 8. Transfusion rate (Per 100 patient-months)



- Among ESA users, mean hemoglobin level in PD patients decreased 1.1 g/dL (or 9.4%) from 11.7 g/dL in '07Q1 to 10.6 g/dL in '11Q4 (Figure 7).
- Between '07Q1 and '11Q4, the transfusion rate in PD patients increased 15% from 2.36 transfusions per 100 patient-months in '07Q1 to 2.91 in '11Q4. Among HD patients the transfusion rate was slightly higher than that for PD patients, increasing 26% over the time period (Figure 8).

## Conclusions

- The transfusion rate increased in 2011, broadly corresponding to a decrease in hemoglobin below 11 g/dL in both PD and HD.
- PD patients experienced a greater rise in IV iron use compared to HD patients.
- Declines in overall ESA use and dose were observed.
- These trends may be the result of evolving clinical guidelines and changes in cost structures.