

More Frequent Hemoglobin (Hb) Measurements and Erythropoiesis-Stimulating Agent (ESA) Titrations Are not Associated with Increased Time in Target Hb Range

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Introduction

- The advent of the new economic bundling rules, and changes in Food and Drug Administration label guidelines for ESAs have renewed the focus on current physician practices to achieve greater control of patients' Hb levels by more frequent measurement and more precise ESA dose titrations.
- One large retrospective analysis found increasing Hb measurements and ESA dose titration frequency decreased patient variability around the facility-level Hb mean.¹
- However, a second study found that targeting a narrow Hb range may result in frequent ESA dose titrations, and may be an important driver of Hb cycling, resulting in potentially dangerous large fluctuations in Hb levels.²
- Recently, a program which limited titration opportunities to once every other month was shown to produce higher proportion of patients in range for Hb.³
- The issue remains controversial.
- The treatment of anemia in patients is always ultimately determined by physicians, who often closely monitor and may adjust ESA treatments frequently to best meet the needs of their patients.

Objective

 We conducted a retrospective database analysis of patient data to quantify the frequency of ESA dose titrations and Hb measurements and their association with keeping patients within the Hb range defined by the Centers for Medicare & Medicaid Quality Incentive Program (QIP) requirements in place at the time of the study (10–12 g/dL).

Methods

- We assessed data from prevalent (≥ 120 days), adult (> 18 years old) hemodialysis patients dialyzing at large dialysis center clinics ≥ 3 times/week between 1/1/2009 and 12/31/2010 (Table 1).
- Physician practice patterns for dose titration were defined as a difference of > 10% between any of:
- The mean dose of 2 consecutive stable periods (≥ 3 doses during which the dose did not change more than 10%);
- The mean dose of a stable period and next/previous dose in a transition (non-stable) period; or
- 2 consecutive doses within a transition period.
- Time in Hb target range was defined as total patient-time in range/total patient-time based on the individual Hb value for each patient.
- Time was calculated as time from current test to the next test. Time was assigned to in range or out of range depending on the result of the current test.
- Assessments of associations used Pearson product-moment correlation (adjusted for mean body mass index (BMI), age, and vintage per physician and race, vascular access, and comorbidities based on the percent of patients served by the physician or facility).

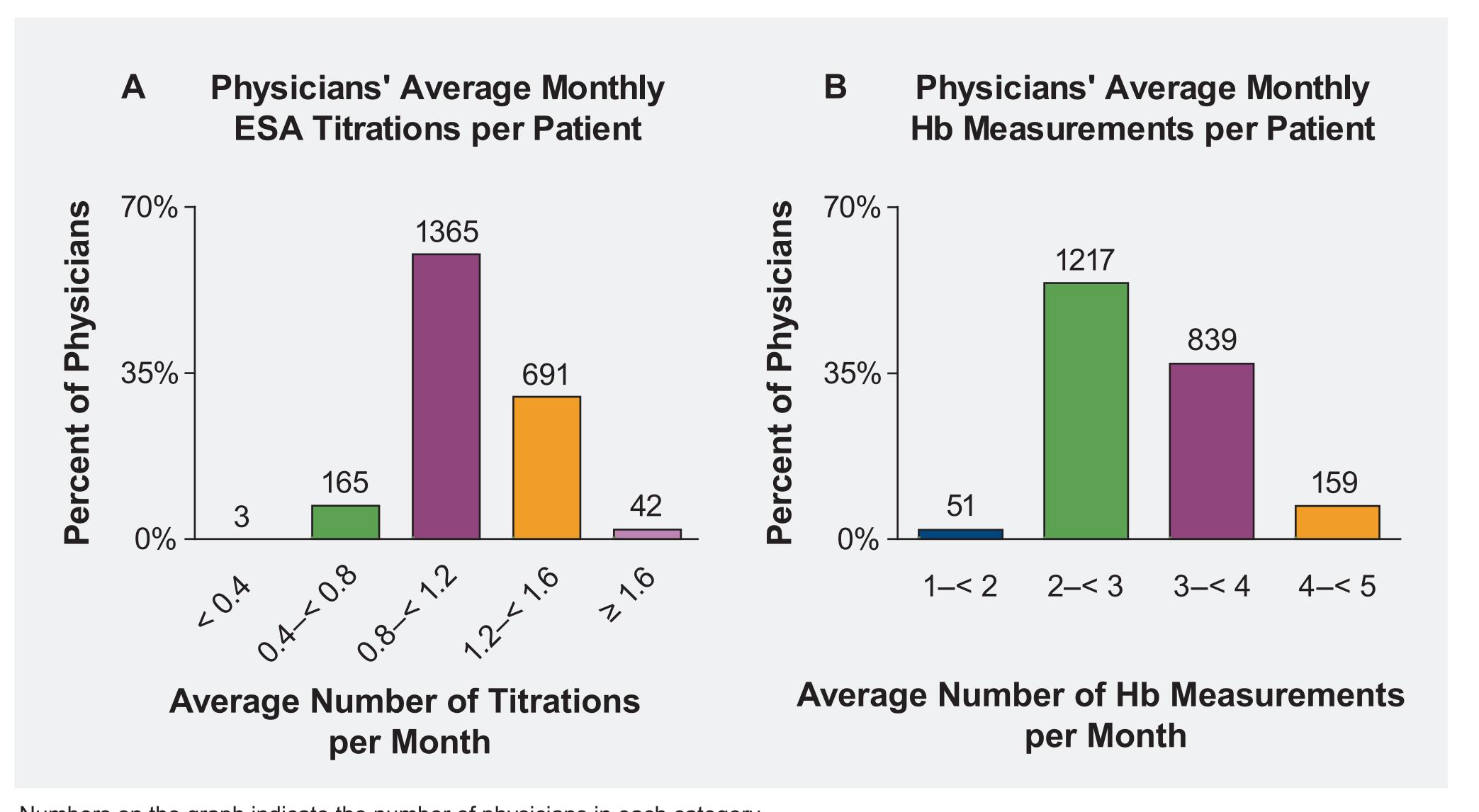
Results

Table 1. Demographics

Mean ± SD	Patients
N	81,464
Age (yr)	63.2 ± 14.7
Female	43.0%
Race and Ethnicity	
Caucasian	39.0%
African American	36.7%
Hispanic	16.0%
Asian, Pacific Islander	4.1%
Native American	1.3%
Unknown	0.8%
Patients with Diabetes	64.0%
Vintage (yr)	2.9 ± 3.6
BMI	28.0 ± 7.2

- For the 2,266 physicians assessed, the mean number of ESA dose titrations was 1.12 ± 0.23 per patient-month, and the mean number of Hb tests was 2.98 ± 0.64 per patient-month (Table 2 and Figures 1A and 1B).
- At the facility level, the mean ESA dose titrations was 1.13 ± 0.24 per patient-month, and the mean Hb tests was 3.02 ± 0.70 per patient-month (Table 3).

Figure 1. Physicians' Average Monthly (A) ESA Dose Titrations and (B) Hb Measurements per Patient



Numbers on the graph indicate the number of physicians in each category.

Table 2. Physician-Level Results

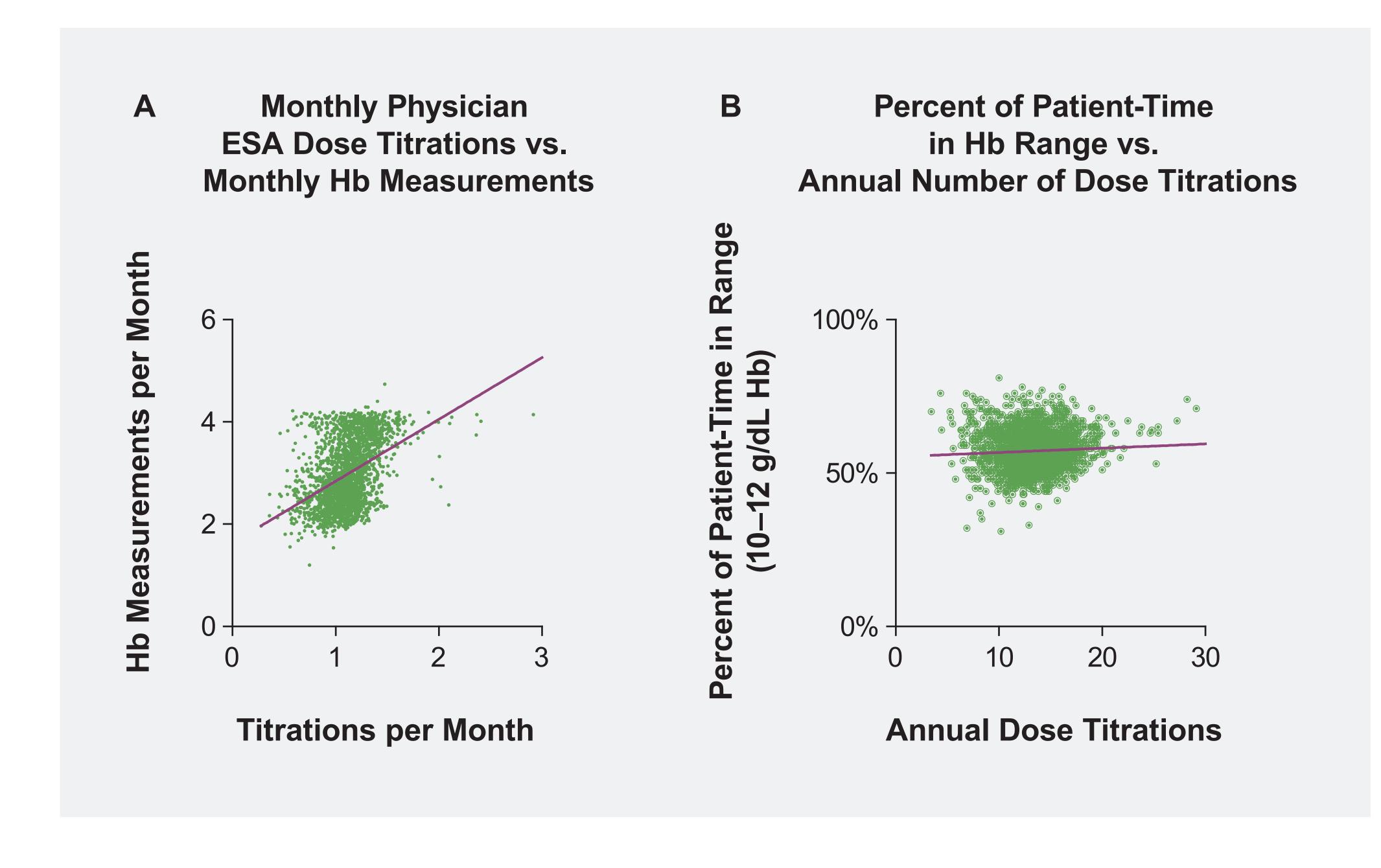
Physicians (n = 2,266)	Mean ± SD	Median
ESA Dose Titrations per Patient-Month	1.12 ± 0.23	1.12
Hb Measurements per Patient-Month	2.98 ± 0.64	2.87
Annual % of Patient-Time in 10–12 g/dL Range	57.2 ± 6.1%	56.7%

Table 3. Facility-Level Results

Facilities (n = 1,336)	Mean ± SD	Median
ESA Dose Titrations per Patient-Month	1.13 ± 0.24	1.12
Hb Measurements per Patient-Month	3.02 ± 0.70	2.86
Annual % of Patient-Time in 10–12 g/dL Range	57.1 ± 5.8%	56.5%

- At the physician level, after adjustment for case mix factors, the frequency of Hb measurements was associated with ESA dose titrations (r = 0.47; p < 0.0001).
 Unadjusted data shown in Figure 2A.
- The adjusted association between annual ESA dose titrations and achievement of time in 10–12 g/dL Hb range was negligible (r = 0.07; p = 0.0005).
 Unadjusted data is shown in Figure 2B.

Figure 2. Scatter Plot of (A) Monthly Hb Measurements vs. Monthly ESA Dose Titrations vs. and (B) Percent of Patient-Time in Hb Range vs. Annual Dose Titrations



Conclusions

- The majority (> 50%) of physicians titrate patients' ESA dose at least once per month; > 95% measure Hb at least twice per month.
- The mean percent of patient-time in target Hb range annually was 57.2% ± 6.1% among physicians, and 57.1% ± 5.8% at the facility level.
- There was a strong significant association between titration frequency and Hb testing frequency at both the physician and facility level (r = 0.47; p < 0.0001 for both).
- The association between dose titration frequency and time in the 10-12 g/dL Hb range (QIP target at time of study) was significant (r = 0.07; p = 0.0042) but very small at the physician level, and not significant at the facility level (p = 0.1192), adjusted for race, vascular access, comorbidities, age, vintage and BMI.
- There was no significant association between Hb testing frequency and time in Hb target range at either level.
- These associations demonstrate the need to assess current Hb testing and ESA dose titration practices.

References

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