Anemia in CKD not On HD

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Intruduction

- Anemia in CKD is associated with decreased quality of life
- Increased risk of cardiovascular disease and mortality

Iimori S, Naito S, Noda Y et al Nephrology 2015

Mechanisms of CKD-related anemia

- Including relative erythropoietin deficiency
- Decreased red cell life span
- Abnormal iron metabolism
- Chronic inflammation
- Metabolic abnormalities
- Effects of medications such as renin angiotensin system inhibitors

Babitt JL, Lin HY. Mechanisms of anemia in CKD. J Am Soc Nephrol 2012;

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ORIGINAL ARTICLE

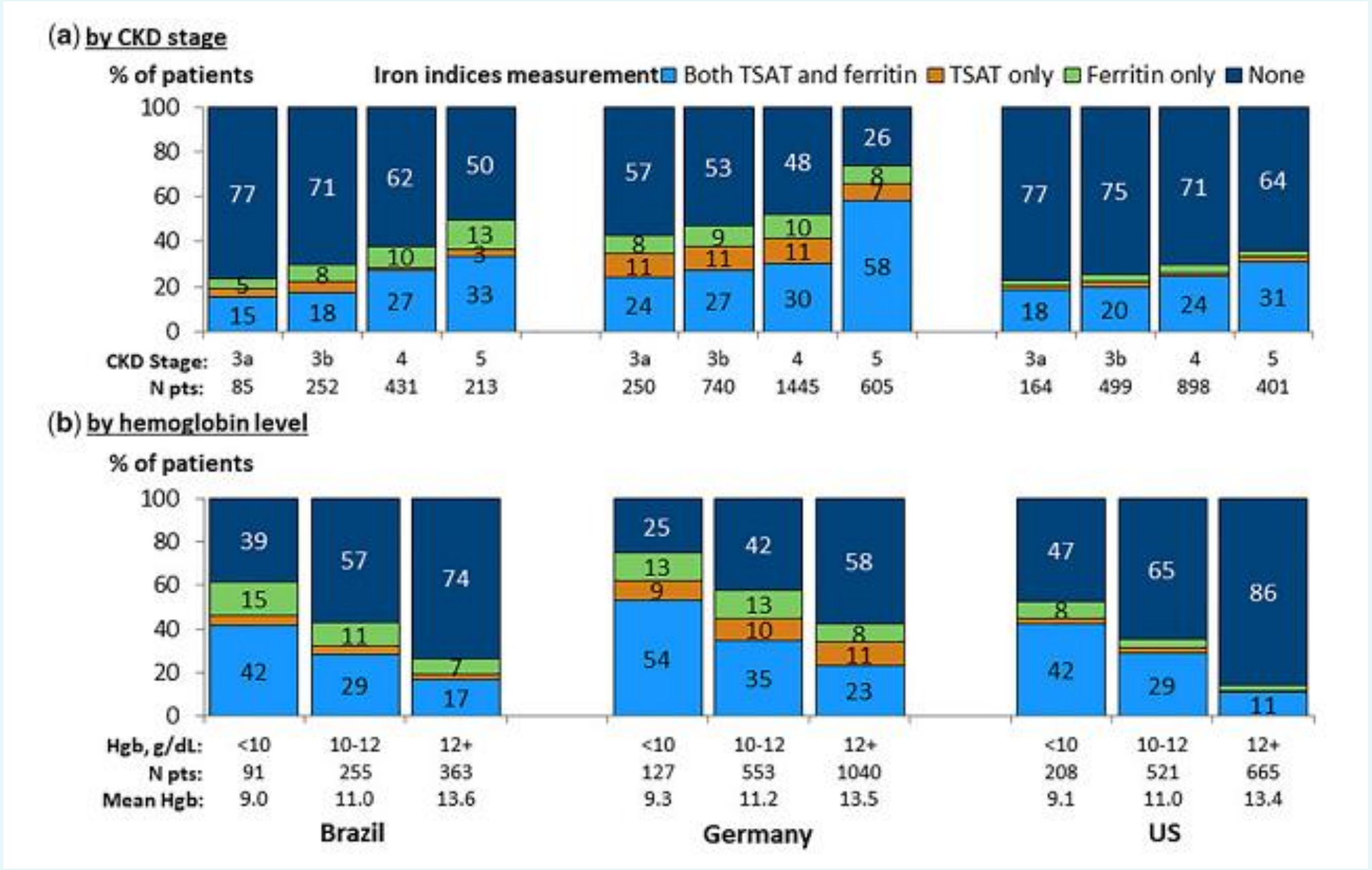
Anemia and iron deficiency among chronic kidney disease Stages 3–5ND patients in the Chronic Kidney Disease Outcomes and Practice Patterns Study: often unmeasured, variably treated

CKDopps (Chronic Kidney Disease Outcomes and Practice Patterns Study)

- International prospective cohort study
- International variation in anemia assessment and management practices in CKD
- CKD clinics in Brazil, France, Germany and the USA.
- From 1 January 2013 until 13 April 2018

CKDopps (Chronic Kidney Disease Outcomes and Practice Patterns Study)

- The study sample was comprised of 6766 CKD Stages 3–5ND
- patients from 135 CKD clinics across the four countries
- Nondialysis patients with eGFR <60 mL/min/1.73 m2
- The hemoglobin measurement
- Iron status was assessed
- Anemia treatment with erythropoiesis stimulating agents


(a) by CKD stage
% of patients
Iron indices measurement
Both TSAT and ferritin
TSAT only
Ferritin only
None
100
80
60
40
20
0
77
5
15
71
8
18
62
10
27
50
13
3
33
57
8
11
24
53
9
11
27
48
10
11
30
26
8
7
58
77
18
75
20
71
24
64
31
CKD Stage: 3a 3b 4 5 3a 3b 4 5 3a 3b 4 5
N pts: 85 252 431 213 250 740 1445 605 164 499 898 401
(b) by hemoglobin level
% of patients
100
80
60
40
20
0
39
15
42
57
11
29
74
7
17
25
13
9
54
42
13
10
35
58
8
11
23
47
8
42
65
29
86
11
Hgb, g/dL: <10 10-12 12+ <10 10-12 12+ <10 10-12 12+
N pts: 91 255 363 127 553 1040 208 521 665
Mean Hgb: 9.0 11.0 13.6 9.3 11.2 13.5 9.1 11.0 13.4
Brazil
Germany
US

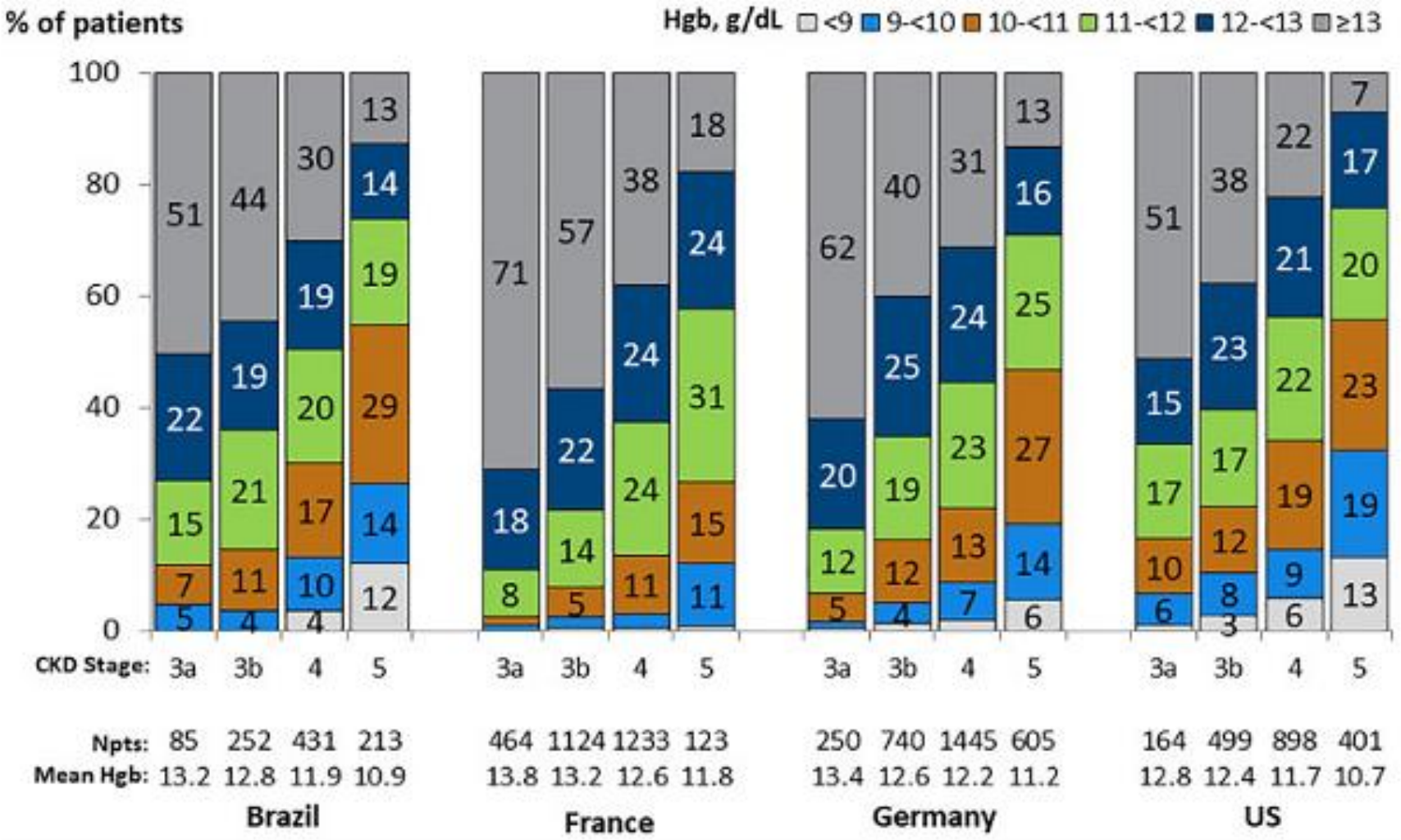
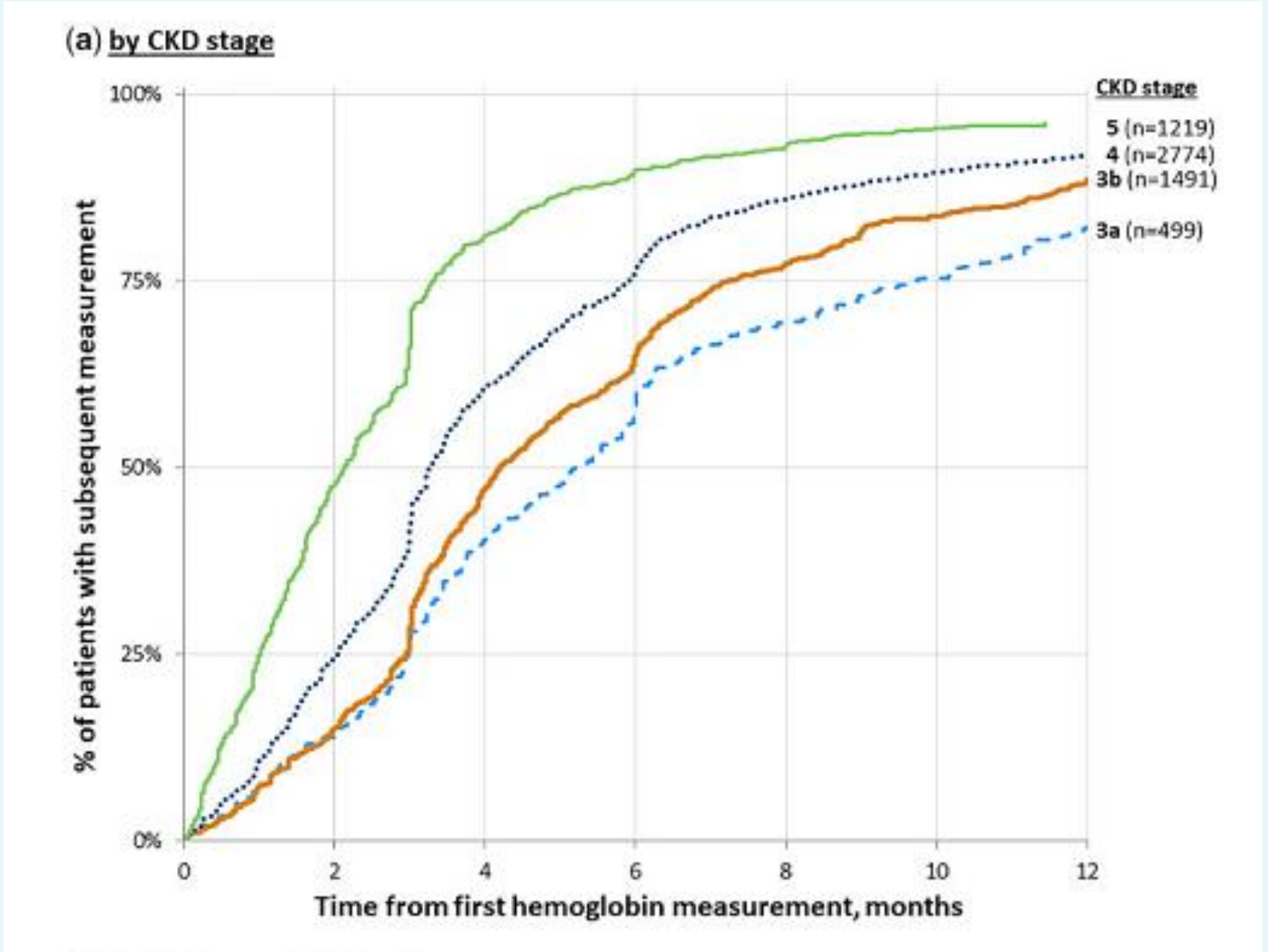
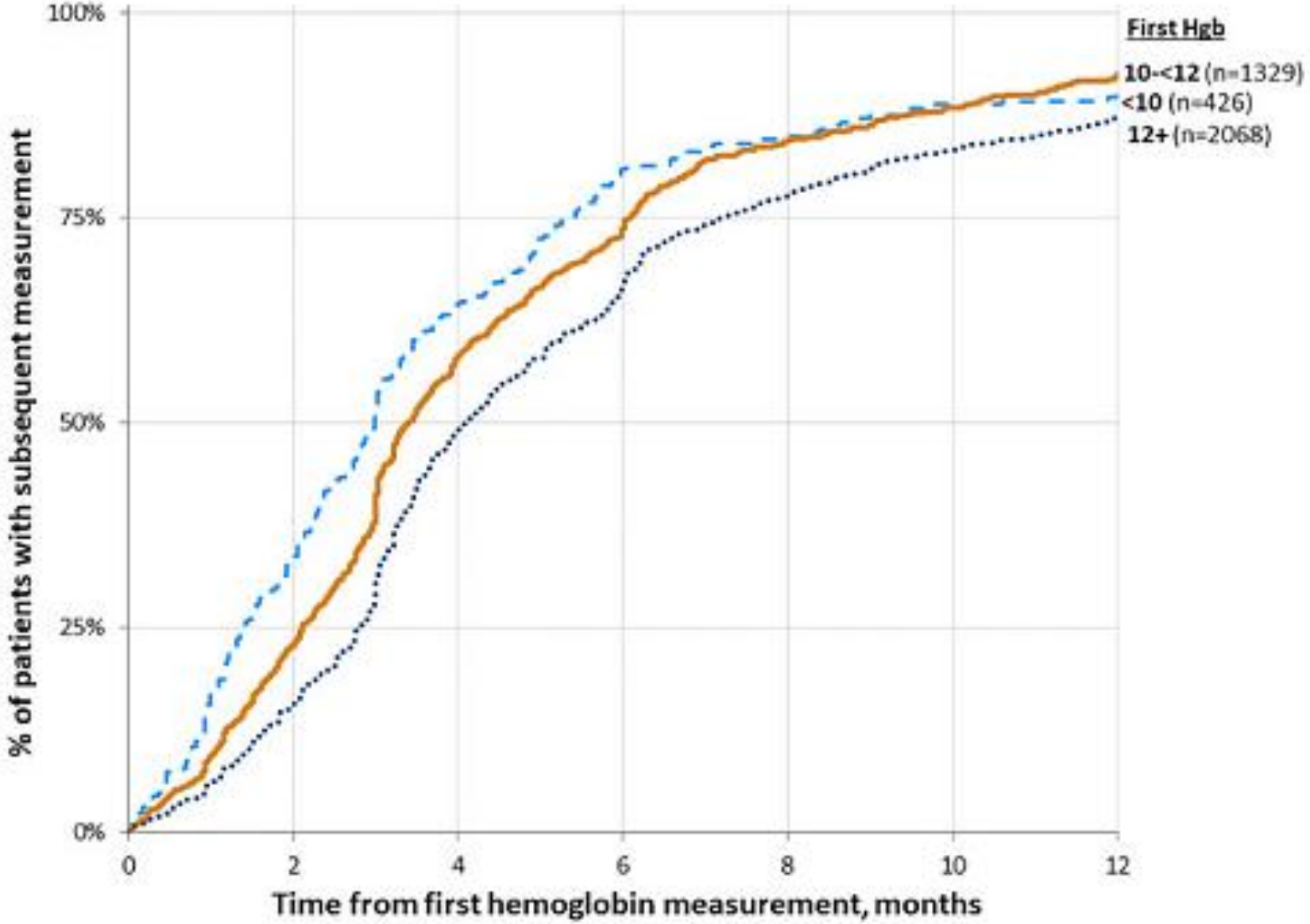


FIGURE 3: Hemoglobin distribution, by country and CKD stage. Patients could contribute once for each CKD stage experienced during the study for (a). First hemoglobin (Hgb) for each stage was taken if there were multiple measures.


(a) by CKD stage
100%
75%
50%
25%
0%
% of patients with subsequent measurement
0
2
4
6
8
10
12
Time from first hemoglobin measurement, months
CKD stage
5 (n=1219)
4 (n=2774)
3b (n=1491)
3a (n=499)

(b) by first hemoglobin level



Conclusion

- Anemia management in patients with nondialysis CKD treated in nephrology clinics identified substantial clinic- and country-level variation in prevalence of anemia and iron deficiency, frequency of anemia Monitoring and treatment
- High proportion of patients without measurement of iron parameters
- IDA who are not treated with iron or ESA
- Especially in the USA and Brazil.
- Anemia monitoring and treatment are a ripe area for quality improvement in CKD care.

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Association of Pre-End-Stage Renal Disease Hemoglobin with Early Dialysis Outcomes

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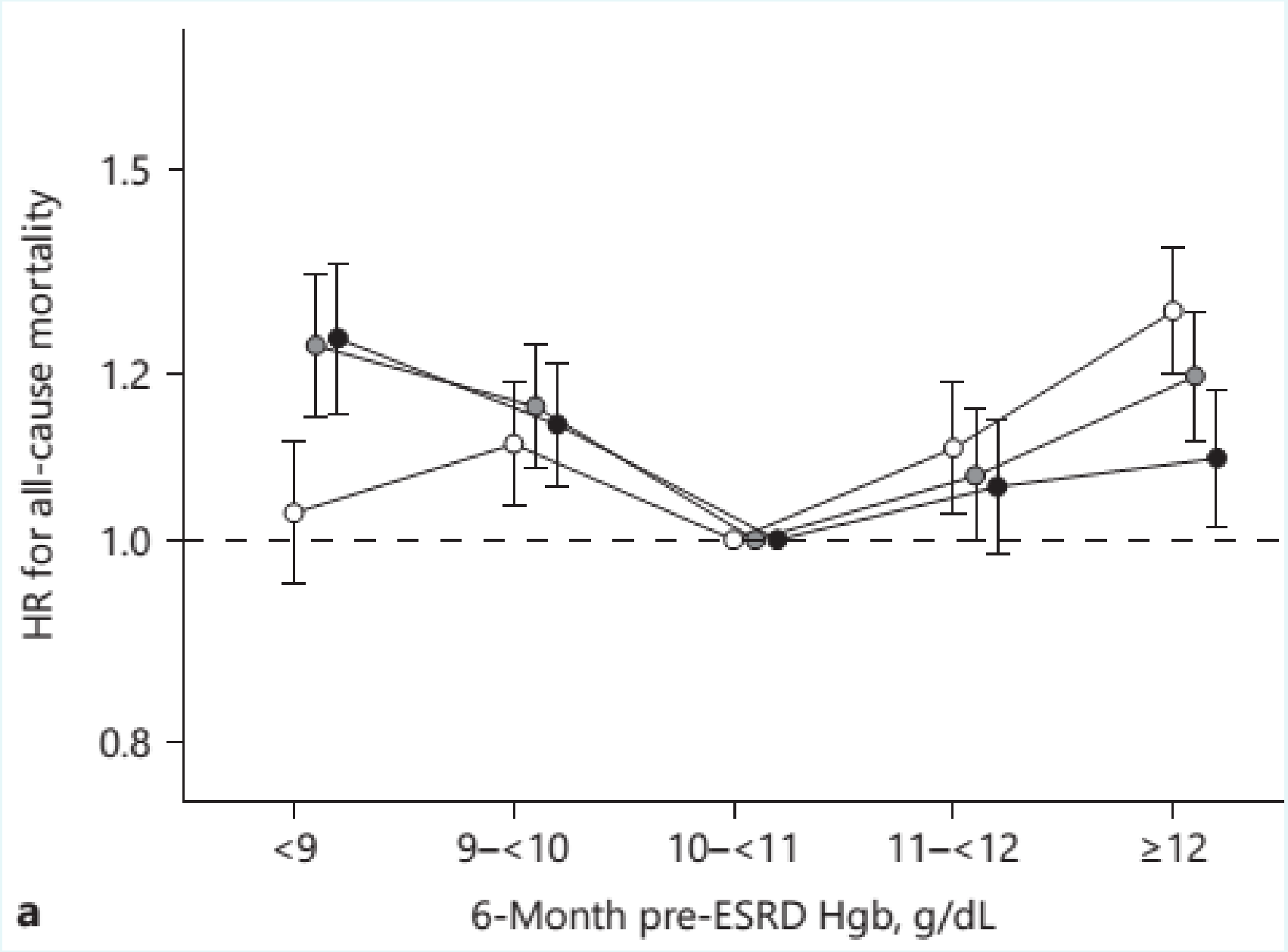
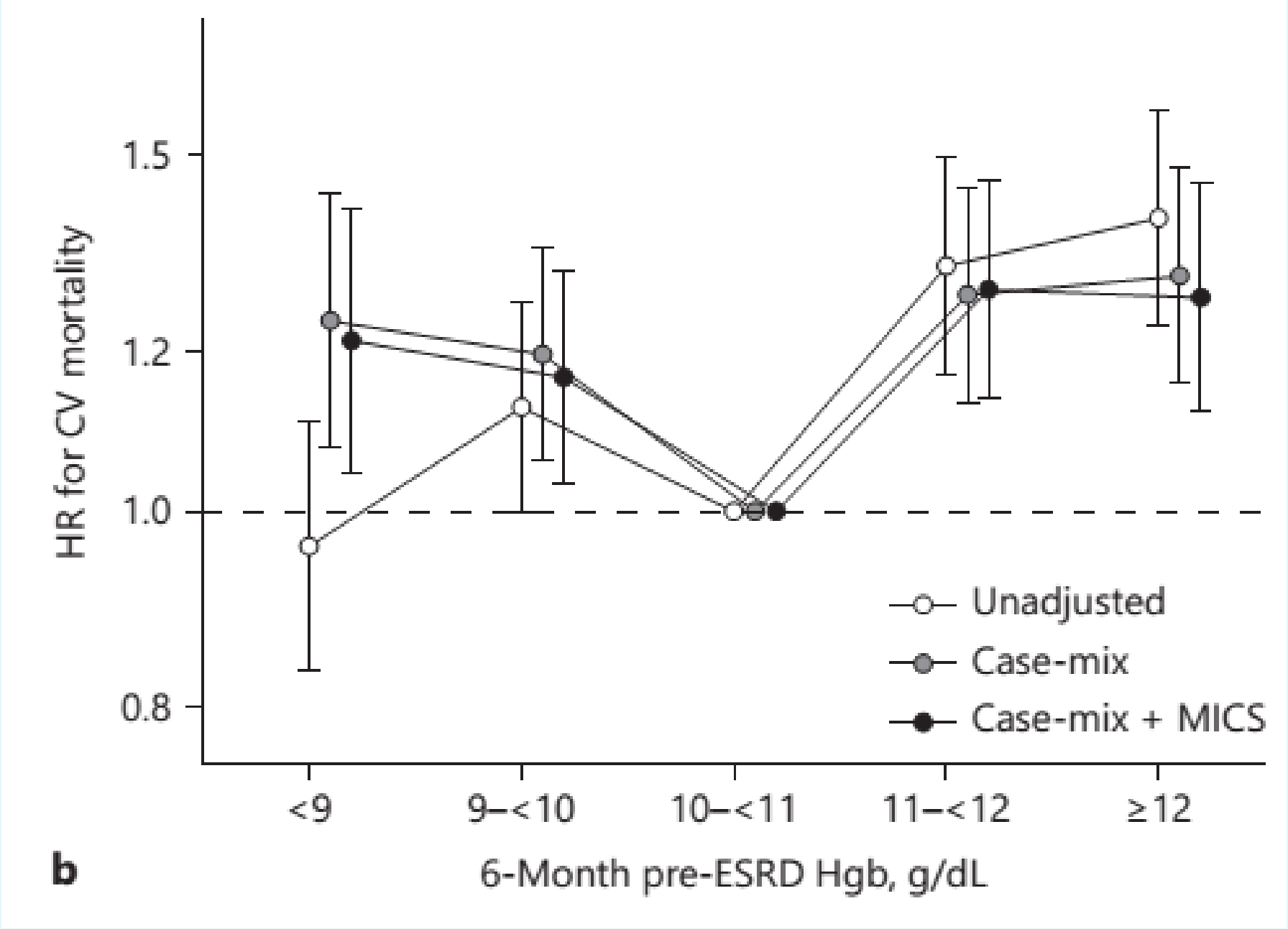
INTRUDUCTION

- Evaluation the impact of pre-ESRD hemoglobin (Hgb) and pre-ESRD Hgb slope on post-ESRD mortality and hospitalization outcomes
- Anemia management may impact early post-ESRD outcomes
- The study included 31,472
- 12-month post-ESRD all-cause and cardiovascular mortality and hospitalization


HR for all-cause mortality
1.5
1.2
1.0
0.8
<9
9–<10
10–<11
11–<12
≥12
6-Month pre-ESRD Hgb, g/dL
a


HR for CV mortality
1.5
1.2
1.0
0.8
Unadjusted
Case-mix
Case-mix + MICS
<9
9–<10
10–<11
11–<12
≥12
6-Month pre-ESRD Hgb, g/dL
b

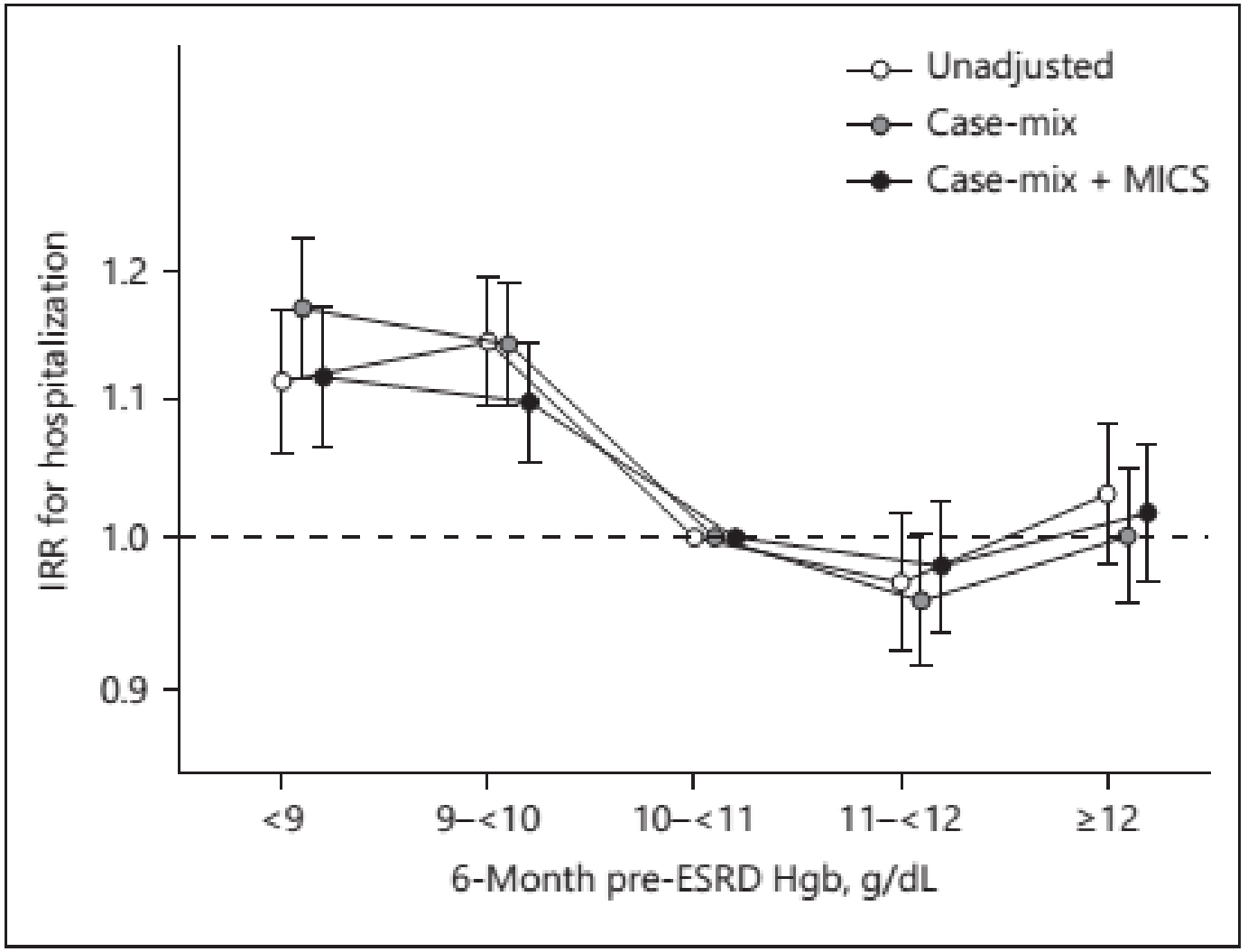


Fig. 2. Association of 6-month pre-end stage renal disease (ESRD) hemoglobin (Hgb) with 12-month hospitalization count in 31,472 veterans transitioning to ESRD. IRR, incidence rate ratio.

Result and coclosion

- Similarly, Hgb exhibited a U-shaped association with CV mortality

- Only lower Hgb was associated with a higher hospitalization rate

- ***Conclusions:*** **Lower and higher pre-ESRD Hgb levels are associated with a higher risk of early post-ESRD mortality**

DEFINITION of anemia

Anemia is defined by the World Health Organization (WHO)

1. Hb <1 3.0 g/dL for adult males and postmenopausal women

2. Hb <1 2.0 g/dL for premenopausal women

EPIDEMIOLOGY

- National Health and Nutrition Examination Survey (NHANES)
- The prevalence of anemia increased
  - 1 percent among patients with an estimated GFR (eGFR) of 60
  - 9 percent at an eGFR of 30 mL/min
  - 33 to 67 percent at an eGFR of 1 5 mL/min

Astor BC, Muntner P, Levin A, et al. Arch Intern Med 2002

The initial evaluation

- CBC
- RBC indices
- Reticulocyte count
- Serum iron
- Total iron-binding capacity (TIBC)
- Percent transferrin saturation (TSAT)
- Serum ferritin
- Serum folate and vitamin B1 2 levels
- Testing for occult blood in stool

Monitoring

- **Patients without anemia**
  - **eGFR) ≥45 mL/min** monitor annually
  - **eGFR <45 mL/min/1 .73 m** least twice yearly
- **Patients with anemia but not on an ESA**
  - **eGFR) ≥45 mL/min** every 6 m if anemia is progressive every 3 m
  - **eGFR <45 mL/min/1 .73 m** every 3 m

Monitoring

- **Patients treated with an ESA**
- On starting ESA or increasing dose
  - Measure the Hb every two to four weeks
  - Every three months thereafter
- **Patients treated with iron**
  - Iron assessment status every three months

TREATMENT

1. Iron
2. ESA
3. Rarely RBC transfusions

Erythropoiesis-stimulating agent

- Hb <1 0 g/dL
- TSAT is >25 percent
- Ferritin >200
- **Dosing**
  - The initial epoetin dose = 50 to 1 00 units/kg/week
  - 4000 or 1 0,000 units subcutaneously once weekly
  - 1 0,000 to 20,000 units subcutaneously every other week

Target hemoglobin value

- Nondialysis CKD patients Hb levels between 1 0 and 1 1 .5 g/dL
- Do not target Hb concentration >1 3 g/dL

Thanks for your attention