

CHAPTER 5

MANAGEMENT OF ANAEMIA IN PATIENTS ON DIALYSIS

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SECTION 5.1: TREATMENT FOR ANAEMIA IN PATIENTS ON DIALYSIS

The use of Erythropoiesis Stimulating Agents (ESAs) has been mostly $\geq 90\%$ since 2014. Higher percentage (93%) of patients on haemodialysis received ESAs compared to 86% of patients on peritoneal dialysis. ESA subsidy for patients in NGO centres has been introduced by the Ministry of Health since 2009. The percentage of patients receiving blood transfusion have reduced significantly both for HD (8%) and PD (4%) in 2023.

Percentage of patients receiving oral iron was 51% in HD patients and 68% in PD patients respectively. In 2023, 45% of HD patients received parenteral iron compared to 14% in PD patients.

Table 5.1.1: Treatment for anaemia, HD patients 2014-2023

| Year | Number of patients | % on ESAs | % received blood transfusion | % on oral iron | % received parenteral iron |
|------|--------------------|-----------|------------------------------|----------------|----------------------------|
| 2023 | 52760 | 93 | 8 | 51 | 45 |
| 2022 | 50402 | 93 | 8 | 46 | 51 |
| 2021 | 49822 | 92 | 8 | 42 | 48 |
| 2020 | 47832 | 93 | 8 | 41 | 46 |
| 2019 | 44779 | 91 | 8 | 44 | 34 |
| 2018 | 41796 | 84 | 8 | 45 | 37 |
| 2017 | 40260 | 88 | 9 | 46 | 39 |
| 2016 | 36505 | 92 | 12 | 52 | 37 |
| 2015 | 33953 | 93 | 13 | 53 | 38 |
| 2014 | 31353 | 92 | 12 | 54 | 38 |

Table 5.1.2: Treatment for anaemia, PD patients 2014-2023

| Year | Number of patients | % on ESAs | % received blood transfusion | % on oral iron | % received parenteral iron |
|------|--------------------|-----------|------------------------------|----------------|----------------------------|
| 2023 | 8100 | 86 | 4 | 68 | 14 |
| 2022 | 7578 | 85 | 5 | 65 | 16 |
| 2021 | 7181 | 84 | 4 | 58 | 16 |
| 2020 | 6474 | 84 | 6 | 52 | 18 |
| 2019 | 5884 | 85 | 7 | 46 | 16 |
| 2018 | 5389 | 80 | 8 | 48 | 18 |
| 2017 | 5021 | 81 | 8 | 51 | 19 |
| 2016 | 4564 | 84 | 13 | 65 | 15 |
| 2015 | 4235 | 82 | 15 | 67 | 17 |
| 2014 | 3644 | 83 | 18 | 71 | 20 |

In 2023, the percentage of patients on ESAs among HD centres varied. The variation in percentage of patients using ESAs among HD centres at the 5th centile has remained stable for the past 10 years. However, at the 95th centile, the percentage of patients on ESA has remained at 100% over the last 10 years (Table 5.1.3). The median usage of ESAs is at 94% to 95% for the last 10 years. For PD patients at the 5th centile, there have been a great variation in ESA utilisation over the years (18 -76%). (Table 5.1.4).

Table 5.1.3: Variation in Erythropoiesis-Stimulating Agents (ESAs) utilisation (% patients) among HD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|----|--------|----|--------------------------|-----|
| 2023 | 914 | 59 | 82 | 91 | 95 | 99 | 100 | 100 |
| 2022 | 857 | 54 | 81 | 90 | 95 | 98 | 100 | 100 |
| 2021 | 818 | 0 | 79 | 89 | 94 | 98 | 100 | 100 |
| 2020 | 782 | 51 | 81 | 90 | 94 | 98 | 100 | 100 |
| 2019 | 757 | 15 | 67 | 88 | 95 | 99 | 100 | 100 |
| 2018 | 739 | 0 | 58 | 80 | 88 | 93 | 100 | 100 |
| 2017 | 722 | 0 | 69 | 84 | 90 | 95 | 100 | 100 |
| 2016 | 696 | 21 | 80 | 89 | 94 | 98 | 100 | 100 |
| 2015 | 671 | 0 | 80 | 90 | 95 | 98 | 100 | 100 |
| 2014 | 644 | 63 | 81 | 89 | 94 | 98 | 100 | 100 |

Figure 5.1.3: Variation in ESAs utilisation (% patients) among HD centres, 2023

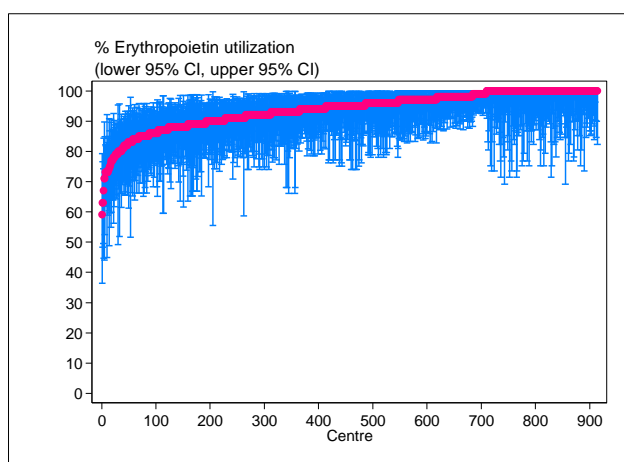


Figure 5.1.4: Variation in ESAs utilisation (% patients) among PD centres, 2023

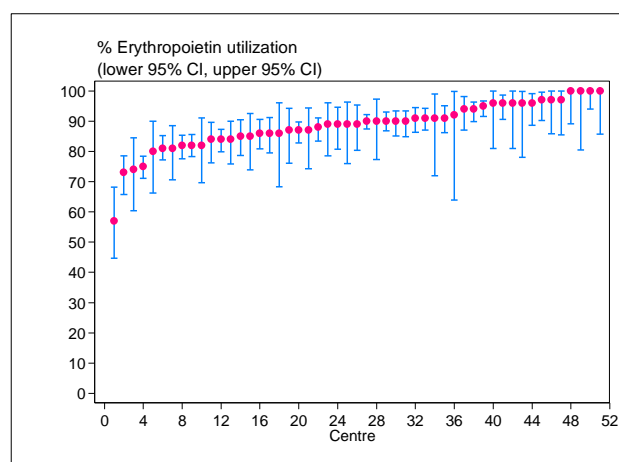


Table 5.1.4: Variation in ESAs utilisation (% patients) among PD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|------|--------|----|--------------------------|-----|
| 2023 | 51 | 57 | 74 | 84 | 89 | 95 | 100 | 100 |
| 2022 | 50 | 71 | 76 | 82 | 86.5 | 93 | 100 | 100 |
| 2021 | 47 | 57 | 73 | 82 | 88 | 95 | 100 | 100 |
| 2020 | 43 | 66 | 69 | 83 | 90 | 94 | 100 | 100 |
| 2019 | 40 | 5 | 18 | 81.5 | 89 | 94 | 100 | 100 |
| 2018 | 40 | 14 | 29 | 69 | 80 | 88 | 98.5 | 100 |
| 2017 | 38 | 40 | 64 | 76 | 81 | 90 | 97 | 100 |
| 2016 | 37 | 73 | 73 | 80 | 84 | 93 | 100 | 100 |
| 2015 | 35 | 69 | 72 | 77 | 87 | 95 | 100 | 100 |
| 2014 | 32 | 59 | 64 | 81 | 88 | 94 | 100 | 100 |

Since 2014, the median weekly dose of epoetin for HD patients has remained at 5000 units. In 2023, the minimum and maximum weekly ESA dose was at 2000 IU and 10,000 IU respectively. The median weekly epoetin dose in PD patients was slightly less compared to HD patients at 4000 units per week. In 2023, the minimum and maximum weekly ESA dose for PD patients was at 2000 units and 7000 units respectively. This variation is significantly less as compared to HD patients (Table 5.1.5 & 5.1.6).

The median monthly dose for pegylated epoetin beta was 130mcg and 170mcg for HD and PD patients respectively. Similarly, for darbepoetin alfa, the median monthly dose was 100mcg and 130mcg for HD and PD patients respectively. It is observed that the dose used of long-acting ESA was higher in PD patients compared to HD patients. This is probably due to low usage of parenteral iron in PD patients.

Table 5.1.5(a): Variation in mean weekly Epoetin alfa & beta dose (u/week) among HD centres, 2019-2023

| Year | Number of centres | Mean | SD | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|------|------|------|-------------------------|------|--------|------|--------------------------|-------|
| 2023 | 794 | 5097 | 1218 | 2109 | 3353 | 4276 | 4977 | 5806 | 7395 | 9947 |
| 2022 | 751 | 5066 | 1241 | 1971 | 3385 | 4228 | 4895 | 5711 | 7295 | 9611 |
| 2021 | 720 | 4927 | 1181 | 2000 | 3406 | 4092 | 4784 | 5569 | 7130 | 10087 |
| 2020 | 699 | 4873 | 1178 | 1952 | 3130 | 4116 | 4702 | 5577 | 7000 | 9524 |
| 2019 | 741 | 4828 | 1113 | 2000 | 3226 | 4073 | 4680 | 5500 | 6842 | 8864 |
| 2018 | 719 | 4992 | 1170 | 2000 | 3273 | 4200 | 4788 | 5685 | 7195 | 9227 |
| 2017 | 716 | 5138 | 1202 | 1583 | 3585 | 4313 | 4933 | 5862 | 7435 | 9500 |
| 2016 | 687 | 5275 | 1347 | 1143 | 3597 | 4423 | 5070 | 6027 | 7551 | 18000 |
| 2015 | 666 | 5388 | 1322 | 1139 | 3612 | 4480 | 5227 | 6161 | 7727 | 9769 |
| 2014 | 630 | 5222 | 1252 | 1184 | 3500 | 4381 | 5130 | 5956 | 7596 | 9272 |

Table 5.1.5(b): Variation in mean monthly Pegylated epoetin beta dose (mcg/month) among HD centres, 2019-2023

| Year | Number of centres | Mean | SD | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|------|----|-----|-------------------------|-----|--------|-----|--------------------------|-----|
| 2023 | 255 | 153 | 64 | 75 | 91 | 114 | 133 | 171 | 280 | 504 |
| 2022 | 240 | 150 | 66 | 77 | 90 | 110 | 130 | 170 | 286 | 505 |
| 2021 | 223 | 151 | 66 | 66 | 88 | 107 | 129 | 175 | 300 | 480 |
| 2020 | 219 | 147 | 63 | 62 | 86 | 107 | 129 | 171 | 263 | 466 |
| 2019 | 167 | 132 | 57 | 71 | 84 | 104 | 118 | 142 | 216 | 685 |

Table 5.1.5(c): Variation in mean monthly Darbepoetin alfa dose (mcg/month) among HD centres, 2019-2023

| Year | Number of centres | Mean | SD | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|------|----|-----|-------------------------|----|--------|-----|--------------------------|-----|
| 2023 | 109 | 102 | 26 | 49 | 62 | 84 | 98 | 118 | 148 | 200 |
| 2022 | 100 | 103 | 32 | 50 | 67 | 83 | 94 | 116 | 162 | 255 |
| 2021 | 87 | 98 | 29 | 48 | 64 | 79 | 91 | 111 | 146 | 243 |
| 2020 | 80 | 94 | 27 | 40 | 52 | 80 | 91 | 109 | 150 | 172 |
| 2019 | 51 | 88 | 28 | 45 | 55 | 70 | 83 | 98 | 124 | 218 |

Figure 5.1.5(a): Variation in mean weekly Epoetin alfa & beta dose (u/week) among HD centres, 2023

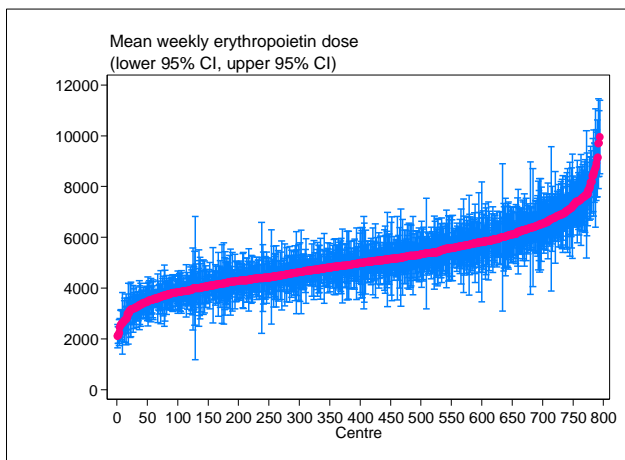


Figure 5.1.5(b): Variation in mean monthly Pegylated epoetin beta dose (mcg/month) among HD centres, 2023

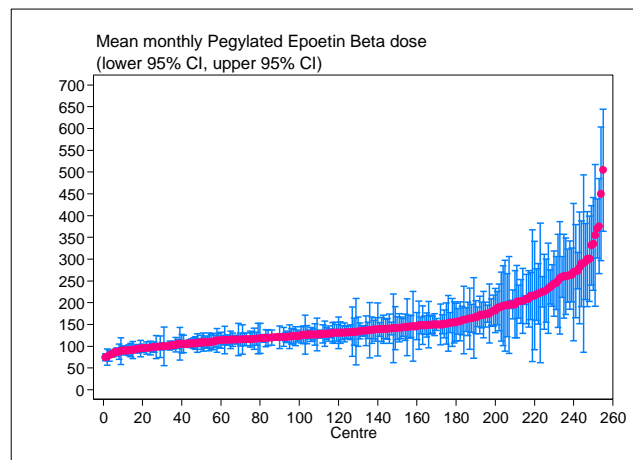


Figure 5.1.5(c): Variation in mean monthly Darbepoetin alfa dose (mcg/month) among HD centres, 2023

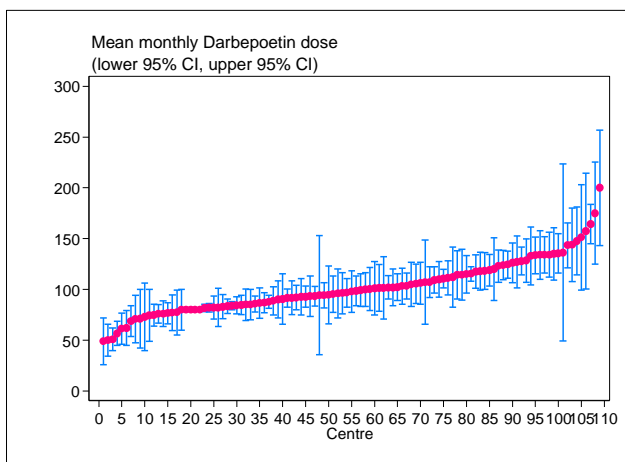


Table 5.1.6(a): Variation in mean weekly Epoetin alfa & beta dose (u/week) among PD centres, 2014-2023

| Year | Number of centres | Mean | SD | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|------|------|------|-------------------------|------|--------|------|--------------------------|------|
| 2023 | 47 | 4187 | 995 | 2240 | 2694 | 3478 | 4089 | 4842 | 5904 | 6909 |
| 2022 | 47 | 4065 | 793 | 2083 | 2273 | 3571 | 4182 | 4559 | 5191 | 5678 |
| 2021 | 44 | 4042 | 725 | 2000 | 3000 | 3640 | 3926 | 4497 | 5316 | 5513 |
| 2020 | 41 | 4089 | 793 | 2500 | 2900 | 3700 | 3917 | 4704 | 5594 | 5671 |
| 2019 | 36 | 4010 | 722 | 2286 | 2910 | 3656 | 3818 | 4388 | 5500 | 5559 |
| 2018 | 35 | 4248 | 693 | 3083 | 3300 | 3662 | 4095 | 4831 | 5713 | 5899 |
| 2017 | 36 | 4420 | 829 | 2200 | 3250 | 3904 | 4338 | 4939 | 6160 | 6293 |
| 2016 | 35 | 4714 | 821 | 3333 | 3353 | 4095 | 4737 | 5018 | 6667 | 6722 |
| 2015 | 34 | 4707 | 1075 | 2000 | 2875 | 4114 | 4610 | 5380 | 6465 | 7057 |
| 2014 | 31 | 4683 | 1096 | 1784 | 2453 | 4031 | 4509 | 5380 | 6324 | 7056 |

Table 5.1.6(b): Variation in mean monthly Pegylated epoetin beta dose (mcg/month) among PD centres, 2019-2023

| Year | Number of centres | Mean | SD | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|------|----|-----|-------------------------|-----|--------|-----|--------------------------|-----|
| 2023 | 34 | 185 | 62 | 77 | 103 | 137 | 171 | 228 | 292 | 304 |
| 2022 | 30 | 189 | 70 | 103 | 104 | 130 | 171 | 243 | 323 | 325 |
| 2021 | 28 | 181 | 57 | 99 | 101 | 135 | 170 | 226 | 260 | 308 |
| 2020 | 24 | 178 | 63 | 98 | 124 | 133 | 156 | 214 | 300 | 380 |
| 2019 | 18 | 155 | 40 | 106 | 106 | 123 | 137 | 183 | 239 | 239 |

Table 5.1.6(c): Variation in mean monthly Darbepoetin alfa dose (mcg/month) among PD centres, 2019-2023

| Year | Number of centres | Mean | SD | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|------|----|-----|-------------------------|-----|--------|-----|--------------------------|-----|
| 2023 | 10 | 124 | 31 | 80 | 80 | 98 | 128 | 139 | 180 | 180 |
| 2022 | 13 | 119 | 31 | 73 | 73 | 104 | 120 | 135 | 182 | 182 |
| 2021 | 12 | 124 | 40 | 64 | 64 | 92 | 125 | 149 | 206 | 206 |
| 2020 | 12 | 123 | 53 | 42 | 42 | 86 | 122 | 148 | 229 | 229 |
| 2019 | 7 | 100 | 29 | 36 | 36 | 100 | 111 | 118 | 120 | 120 |

Figure 5.1.6(a): Variation in mean weekly Epoetin alfa & beta dose (u/week) among PD centres, 2023

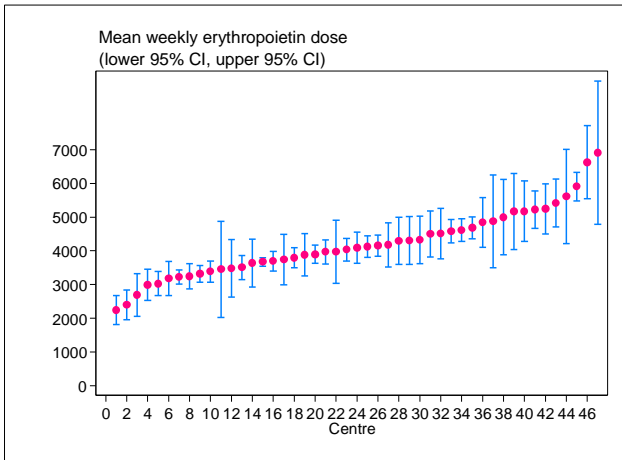


Figure 5.1.6(b): Variation in mean monthly Pegylated epoetin beta dose (mcg/month) among PD centres, 2023

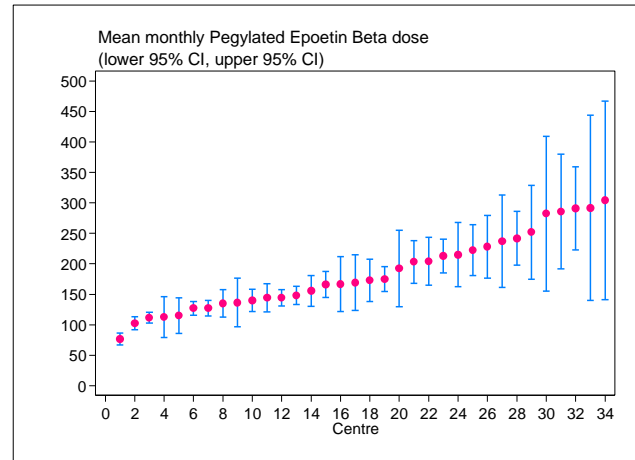
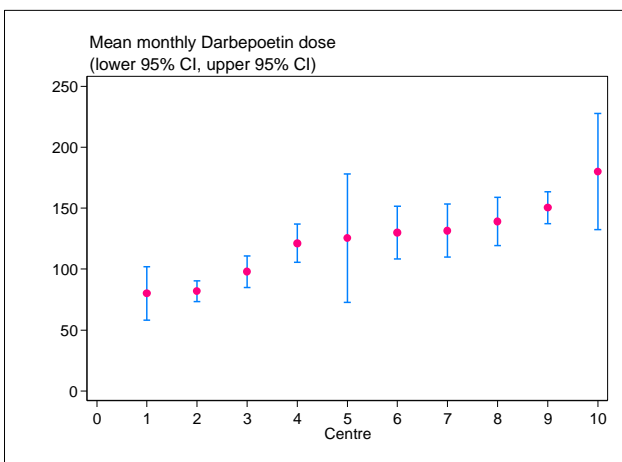


Figure 5.1.6(c): Variation in mean monthly Darbepoetin alfa dose (mcg/month) among PD centres, 2023

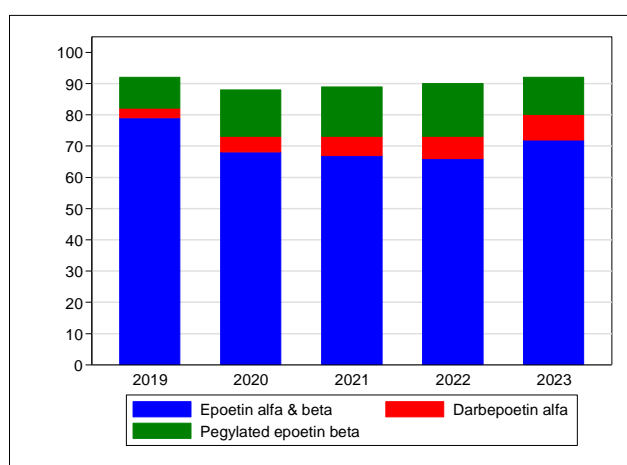


It is observed that the use of short acting ESA initially has shown a reduction from 2019 to 2022 but increased to 72% in 2023. The use of long acting ESA namely Darbepoetin alfa has increased steadily over the years. This is also noted in Pegylated epoetin beta over the past 4 years except in 2023 (Table 5.1.7).

Table 5.1.7: Use of erythropoiesis-stimulating agents in patients receiving dialysis, 2019-2023

| Year | Number of patients | % on Epoetin alfa & beta | % Darbepoetin alfa | % Pegylated epoetin beta |
|------|--------------------|--------------------------|--------------------|--------------------------|
| 2023 | 61494 | 72 | 8 | 12 |
| 2022 | 59953 | 66 | 7 | 17 |
| 2021 | 58878 | 67 | 6 | 16 |
| 2020 | 56254 | 68 | 5 | 15 |
| 2019 | 52521 | 79 | 3 | 10 |

Figure 5.1.7: Use of erythropoiesis-stimulating agents in patients receiving dialysis, 2019-2023



The median requirement of blood transfusion in HD and PD centres was at 6% and 4% respectively in 2023. Over the past 10 years, variation in the use of blood transfusion among HD and PD centres has reduced. For the past 5 years, the variation in blood transfusion usage was 0% to 24% in HD patients and 0% to 33% in PD patients. (Table 5.1.8 & 5.1.9).

Table 5.1.8: Variation in use of blood transfusion (% patients) among HD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|----|--------|----|--------------------------|-----|
| 2023 | 914 | 0 | 0 | 3 | 6 | 11 | 23 | 92 |
| 2022 | 854 | 0 | 0 | 3 | 6 | 11 | 21 | 55 |
| 2021 | 818 | 0 | 0 | 2 | 6 | 11 | 23 | 46 |
| 2020 | 781 | 0 | 0 | 3 | 6 | 11 | 24 | 64 |
| 2019 | 760 | 0 | 0 | 2 | 6 | 11 | 22.5 | 50 |
| 2018 | 741 | 0 | 0 | 2 | 6 | 12 | 24 | 87 |
| 2017 | 723 | 0 | 0 | 3 | 7 | 14 | 27 | 60 |
| 2016 | 696 | 0 | 0 | 6 | 12 | 18 | 33 | 82 |
| 2015 | 670 | 0 | 0 | 6 | 12 | 19 | 33 | 80 |
| 2014 | 642 | 0 | 0 | 6 | 11 | 19 | 33 | 63 |

Figure 5.1.8: Variation in use of blood transfusion (% patients) among HD centres, 2023

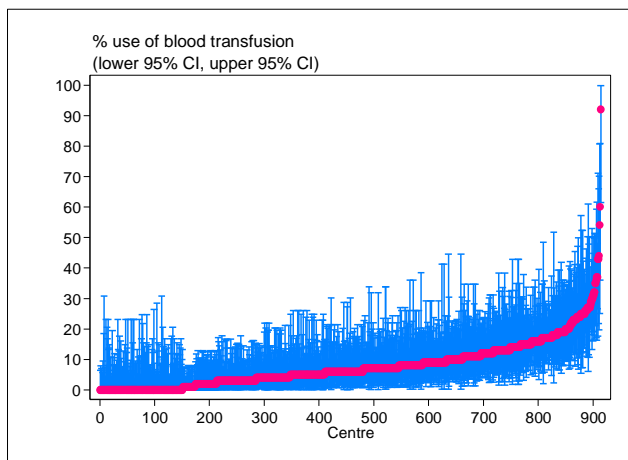


Figure 5.1.9: Variation in use of blood transfusion (% patients) among PD centres, 2023

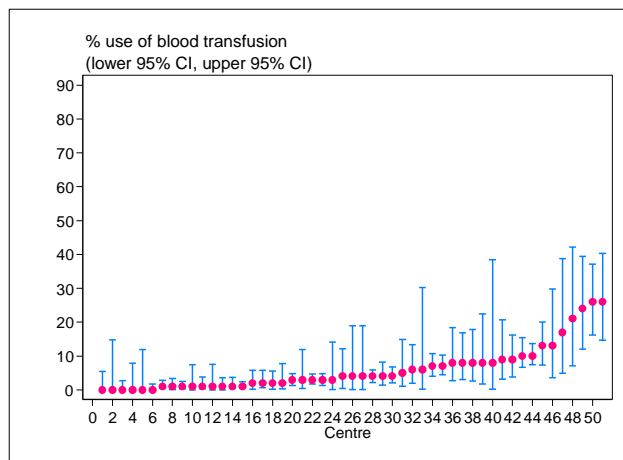


Table 5.1.9: Variation in use of blood transfusion (% patients) among PD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|-----|--------|----|--------------------------|-----|
| 2023 | 51 | 0 | 0 | 1 | 4 | 8 | 24 | 26 |
| 2022 | 50 | 0 | 0 | 2 | 4 | 9 | 33 | 43 |
| 2021 | 47 | 0 | 0 | 2 | 3 | 8 | 24 | 40 |
| 2020 | 43 | 0 | 0 | 2 | 5 | 8 | 15 | 27 |
| 2019 | 40 | 0 | 0 | 2.5 | 5 | 8 | 18 | 38 |
| 2018 | 39 | 0 | 0 | 2 | 5 | 9 | 23 | 24 |
| 2017 | 38 | 0 | 0 | 3 | 4.5 | 9 | 26 | 29 |
| 2016 | 37 | 0 | 0 | 7 | 10 | 17 | 28 | 29 |
| 2015 | 35 | 3 | 3 | 9 | 14 | 17 | 33 | 59 |
| 2014 | 31 | 0 | 4 | 10 | 18 | 23 | 39 | 47 |

SECTION 5.2: IRON STATUS ON DIALYSIS

The median serum ferritin for HD and PD patients not on ESAs was at 280 ng/ml and 480 ng/ml respectively in 2023. The target ferritin for HD and PD patients is ≥ 200 ng/ml. 59% of HD patients and 80% of PD patients achieved their target (Table 5.2.1 & 5.2.2).

The median serum ferritin for HD and PD patients on ESAs was at 500 ng/ml and 570 ng/ml respectively in 2023. 80% of HD patients and 88% of PD patients achieved their target (Table 5.2.3 & 5.2.4).

80% and 90% of HD and PD patients not on ESA achieved target transferrin saturation of $>20\%$ respectively (Table 5.2.5 & 5.2.6). For those on ESA, 83% and 88% of HD and PD patients achieved this target respectively (Table 5.2.7 & 5.2.8).

Table 5.2.1: Distribution of serum ferritin without ESAs, HD patients 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients <200 ng/ml | % Patients 200-500 ng/ml | % Patients ≥ 500 ng/ml |
|------|--------------------|-------|-------|--------|-------|-------|-----------------------|--------------------------|-----------------------------|
| 2023 | 3266 | 442.3 | 487.3 | 276.5 | 104.3 | 604.7 | 41 | 28 | 31 |
| 2022 | 3229 | 415.4 | 472 | 247.1 | 97.3 | 562.3 | 44 | 28 | 28 |
| 2021 | 3532 | 424.5 | 485 | 247 | 97.1 | 580.7 | 44 | 27 | 29 |
| 2020 | 3240 | 410 | 441.6 | 254.1 | 105.7 | 566.1 | 42 | 29 | 29 |
| 2019 | 3444 | 496.7 | 499.4 | 343 | 142.1 | 678.8 | 34 | 30 | 36 |
| 2018 | 5856 | 525.9 | 517.3 | 358 | 159.8 | 722 | 30 | 32 | 38 |
| 2017 | 4328 | 505.6 | 495.7 | 346.3 | 155 | 685.4 | 32 | 32 | 36 |
| 2016 | 2486 | 503.5 | 523 | 324.8 | 136.4 | 697.2 | 34 | 30 | 36 |
| 2015 | 2043 | 473.3 | 494.7 | 314.4 | 120.9 | 642.9 | 38 | 28 | 35 |
| 2014 | 1954 | 460.1 | 468.8 | 312 | 121.7 | 643 | 38 | 29 | 34 |

Figure 5.2.1: Cumulative Distribution of serum ferritin without ESAs, HD patients 2014-2023

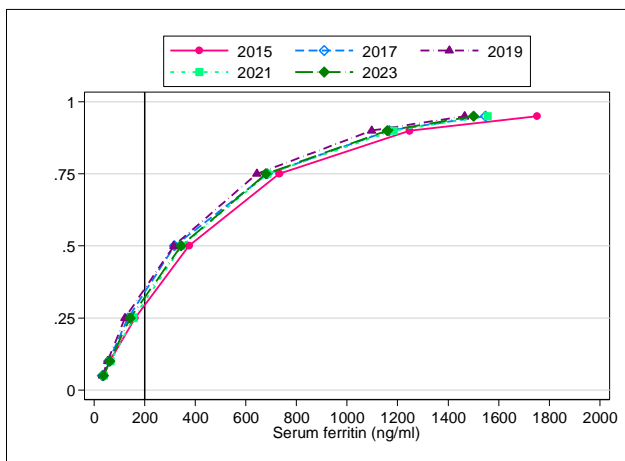


Figure 5.2.2: Distribution of serum ferritin without ESAs, PD patients 2014-2023

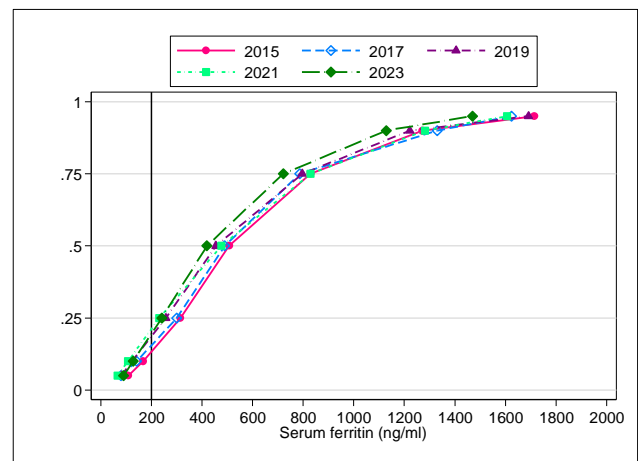


Table 5.2.2: Distribution of serum ferritin without ESAs, PD patients 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients <200 ng/ml | % Patients 200-500 ng/ml | % Patients ≥500 ng/ml |
|------|--------------------|-------|-------|--------|-------|-------|-----------------------|--------------------------|-----------------------|
| 2023 | 891 | 600.4 | 471.4 | 484.8 | 252.3 | 839 | 19 | 32 | 48 |
| 2022 | 881 | 561.7 | 465 | 427.7 | 233.9 | 748.2 | 21 | 36 | 43 |
| 2021 | 893 | 596.1 | 492.5 | 462 | 245.7 | 801.7 | 20 | 33 | 47 |
| 2020 | 851 | 583.2 | 481.5 | 443.5 | 225.9 | 784.5 | 22 | 33 | 45 |
| 2019 | 719 | 541.6 | 421 | 419.2 | 240.3 | 720.8 | 20 | 38 | 41 |
| 2018 | 913 | 632 | 549.7 | 487 | 247.8 | 819.7 | 20 | 31 | 49 |
| 2017 | 785 | 621.6 | 557.1 | 475.8 | 230.5 | 829 | 20 | 32 | 48 |
| 2016 | 592 | 652.5 | 566.7 | 515.3 | 266 | 826.6 | 18 | 30 | 52 |
| 2015 | 609 | 606.4 | 528.9 | 454.6 | 256.7 | 796.2 | 19 | 35 | 46 |
| 2014 | 476 | 579.5 | 471.8 | 440.6 | 244.5 | 775.5 | 17 | 37 | 45 |

Table 5.2.3: Distribution of serum ferritin on ESAs, HD patients 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients <200 ng/ml | % Patients 200-500 ng/ml | % Patients ≥500 ng/ml |
|------|--------------------|-------|-------|--------|-------|-------|-----------------------|--------------------------|-----------------------|
| 2023 | 46813 | 642.9 | 545.2 | 502.7 | 246.7 | 867.3 | 20 | 30 | 50 |
| 2022 | 44179 | 598.8 | 514.6 | 465.8 | 224.9 | 804.5 | 22 | 31 | 47 |
| 2021 | 43156 | 613.4 | 542.9 | 463 | 217.8 | 839.7 | 23 | 30 | 47 |
| 2020 | 41716 | 606.6 | 530.2 | 459.8 | 217.2 | 831.8 | 23 | 31 | 47 |
| 2019 | 38013 | 629 | 546.8 | 477.1 | 227.3 | 864.7 | 22 | 30 | 48 |
| 2018 | 32453 | 639.8 | 548.1 | 487.9 | 239.7 | 876 | 21 | 30 | 49 |
| 2017 | 32036 | 657.7 | 550.1 | 511.2 | 249 | 905.4 | 20 | 29 | 51 |
| 2016 | 29249 | 689.2 | 572.9 | 535.6 | 271.2 | 946 | 18 | 29 | 53 |
| 2015 | 26775 | 647.7 | 529.3 | 513.2 | 260 | 882 | 19 | 30 | 51 |
| 2014 | 24566 | 654.9 | 534.7 | 513.1 | 266.7 | 887 | 18 | 31 | 51 |

Figure 5.2.3: Cumulative distribution of serum ferritin on ESAs, HD patients 2014-2023

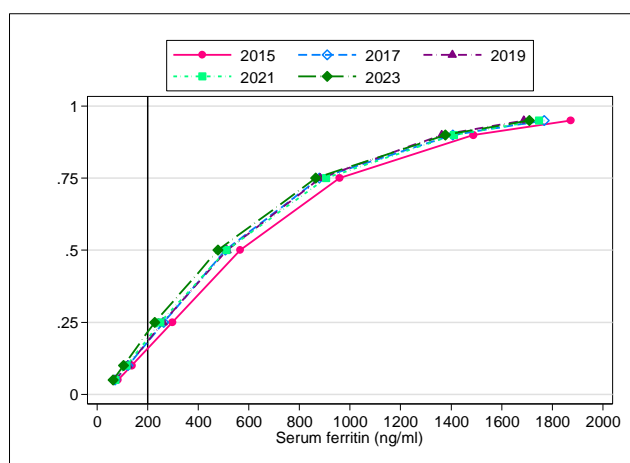


Figure 5.2.4: Cumulative distribution of serum ferritin on ESAs, PD patients 2014-2023

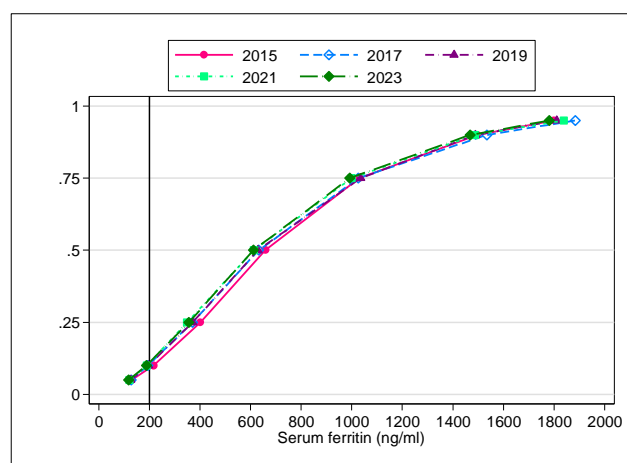


Table 5.2.4: Distribution of serum ferritin on ESAs, PD patients 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients <200 ng/ml | % Patients 200-500 ng/ml | % Patients ≥500 ng/ml |
|------|--------------------|-------|-------|--------|-------|--------|-----------------------|--------------------------|-----------------------|
| 2023 | 5837 | 703.8 | 532.7 | 571.5 | 328.8 | 920 | 12 | 31 | 57 |
| 2022 | 5428 | 705.1 | 533.3 | 569.7 | 314.6 | 938.8 | 13 | 31 | 56 |
| 2021 | 5180 | 700.2 | 521.1 | 571.8 | 322.9 | 942.7 | 12 | 31 | 56 |
| 2020 | 4791 | 721.8 | 527.4 | 587 | 327.7 | 994.1 | 11 | 30 | 59 |
| 2019 | 4406 | 741.2 | 549 | 610.8 | 355.3 | 992.2 | 11 | 29 | 60 |
| 2018 | 3700 | 735.7 | 543.7 | 605.2 | 349.7 | 978.9 | 11 | 29 | 60 |
| 2017 | 3466 | 750.2 | 559.1 | 612.1 | 348.7 | 999.5 | 11 | 29 | 60 |
| 2016 | 3230 | 774.3 | 572.8 | 634.5 | 374.7 | 1024.5 | 10 | 27 | 62 |
| 2015 | 2946 | 762.6 | 540.3 | 628.7 | 370.5 | 1034.6 | 10 | 27 | 62 |
| 2014 | 2604 | 758.9 | 548 | 627.8 | 368.2 | 1017.8 | 11 | 28 | 61 |

Table 5.2.5: Distribution of transferrin saturation without ESAs, HD patients, 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients ≥20 % |
|------|--------------------|------|------|--------|------|------|------------------|
| 2023 | 3255 | 31.1 | 13.6 | 29.1 | 21.7 | 37.8 | 79 |
| 2022 | 3252 | 30.3 | 13.1 | 28.4 | 21.2 | 36.9 | 79 |
| 2021 | 3573 | 30.2 | 13.4 | 28.1 | 21.1 | 36.5 | 78 |
| 2020 | 3315 | 30.1 | 13.4 | 27.9 | 20.9 | 36.5 | 78 |
| 2019 | 3416 | 29.4 | 13.4 | 26.9 | 20.5 | 35.3 | 77 |
| 2018 | 5932 | 29.4 | 13.9 | 26.8 | 20.1 | 35.3 | 75 |
| 2017 | 4384 | 29.6 | 14.1 | 26.7 | 20.2 | 35.7 | 76 |
| 2016 | 2629 | 30.9 | 14.2 | 28.4 | 21.3 | 37.5 | 79 |
| 2015 | 2150 | 31 | 14.3 | 28.4 | 21.3 | 37.2 | 79 |
| 2014 | 2053 | 31.5 | 14.2 | 28.7 | 22.1 | 38.2 | 81 |

Figure 5.2.5: Cumulative distribution of transferrin saturation without ESAs, HD patients 2014-2023

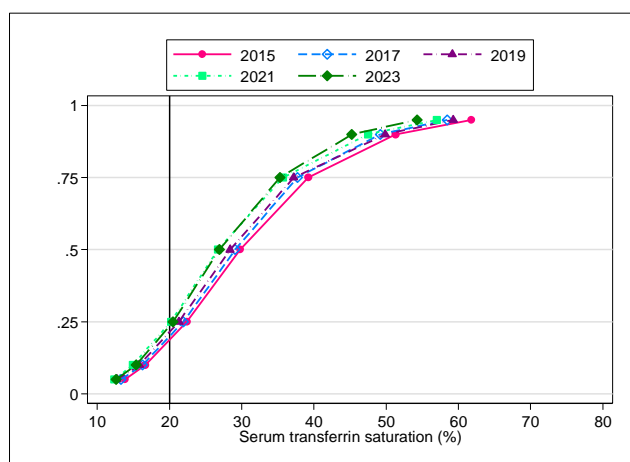


Figure 5.2.6: Cumulative distribution of transferrin saturation without ESAs, PD patients 2014-2023

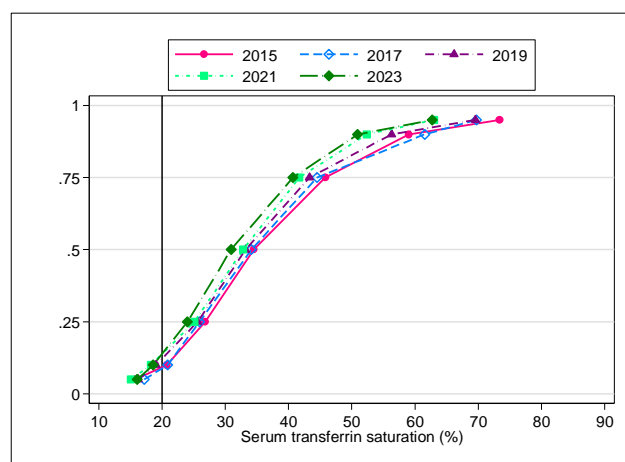


Table 5.2.6: Distribution of transferrin saturation without ESAs, PD patients, 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients ≥20 % |
|------|--------------------|------|------|--------|------|------|------------------|
| 2023 | 887 | 35.3 | 14 | 32.9 | 25.8 | 42.3 | 90 |
| 2022 | 900 | 35.2 | 14.8 | 32.3 | 24.9 | 42.3 | 89 |
| 2021 | 910 | 35.3 | 14.1 | 32.9 | 25.7 | 41.2 | 90 |
| 2020 | 870 | 33.9 | 14.5 | 31.4 | 24.3 | 40.1 | 88 |
| 2019 | 717 | 33.6 | 13.6 | 30.9 | 24 | 40.7 | 86 |
| 2018 | 924 | 33.3 | 14.2 | 30.8 | 23.2 | 39.5 | 86 |
| 2017 | 784 | 34.8 | 14.7 | 32.8 | 25.1 | 41.7 | 86 |
| 2016 | 626 | 37.3 | 15 | 34.7 | 27 | 43.8 | 93 |
| 2015 | 649 | 36.3 | 16.3 | 33.2 | 25.6 | 43.3 | 88 |
| 2014 | 517 | 36.3 | 16.5 | 34.2 | 23.7 | 44.2 | 87 |

Table 5.2.7: Distribution of transferrin saturation on ESAs, HD patients, 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients ≥20 % |
|------|--------------------|------|------|--------|------|------|------------------|
| 2023 | 46326 | 31.7 | 13.5 | 29.1 | 22.5 | 37.7 | 83 |
| 2022 | 43922 | 31.1 | 13.3 | 28.6 | 22.1 | 37.1 | 82 |
| 2021 | 43117 | 30.9 | 13.5 | 28.4 | 21.9 | 36.9 | 82 |
| 2020 | 41744 | 30.3 | 13.5 | 27.7 | 21.3 | 36.3 | 79 |
| 2019 | 38308 | 30.5 | 13.6 | 27.8 | 21.4 | 36.4 | 80 |
| 2018 | 32901 | 30.2 | 13.3 | 27.6 | 21.3 | 36.1 | 80 |
| 2017 | 32300 | 30.3 | 13.3 | 27.8 | 21.4 | 36.2 | 80 |
| 2016 | 30639 | 30.4 | 13.4 | 27.8 | 21.5 | 36.1 | 80 |
| 2015 | 27649 | 30.6 | 13.6 | 28 | 21.6 | 36.4 | 81 |
| 2014 | 24808 | 31.3 | 13.8 | 28.6 | 22.1 | 37.3 | 82 |

Figure 5.2.7: Cumulative distribution of transferrin saturation on ESAs, HD patients 2014-2023

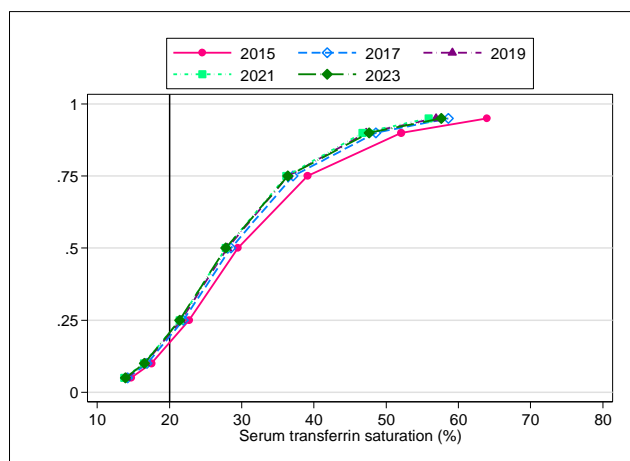


Figure 5.2.8: Cumulative distribution of transferrin saturation on ESAs, PD patients 2014-2023

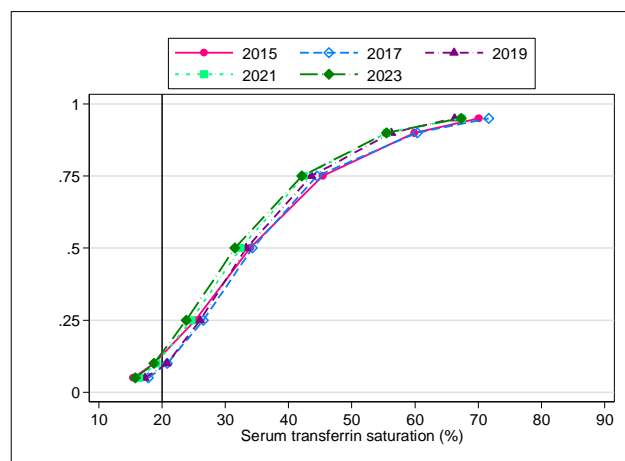


Table 5.2.8: Distribution of transferrin saturation on ESAs, PD patients, 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients ≥20 % |
|------|--------------------|------|------|--------|------|------|------------------|
| 2023 | 5844 | 34.9 | 14.5 | 32.3 | 24.7 | 42.2 | 88 |
| 2022 | 5524 | 35.1 | 15 | 32.2 | 24.7 | 42 | 88 |
| 2021 | 5148 | 35 | 15 | 31.8 | 24.7 | 41.8 | 88 |
| 2020 | 4804 | 34.3 | 15.1 | 31.1 | 23.9 | 41.5 | 85 |
| 2019 | 4467 | 34.8 | 15.5 | 31.5 | 23.8 | 42.1 | 87 |
| 2018 | 3818 | 34.4 | 15 | 31.3 | 24 | 41.1 | 87 |
| 2017 | 3417 | 35.3 | 15.4 | 32.4 | 24.6 | 42.4 | 88 |
| 2016 | 3264 | 36 | 15.3 | 33 | 25.1 | 43 | 90 |
| 2015 | 2963 | 36.4 | 14.9 | 33.3 | 26 | 43.6 | 91 |
| 2014 | 2487 | 36.9 | 15.8 | 33.7 | 25.8 | 44 | 92 |

There was a wide variation in ferritin levels ranging from 200 to 1000 ng/ml between HD centres in 2023. A similar trend was seen in the PD centres, 280 ng/ml to 800 ng/ml (Table 5.2.9(a) & 5.2.10(a)). At the median, the proportion of patients with the serum ferritin 200-500ng/ml was 30% and 34% for HD and PD patients respectively. (Table 5.2.9(b) & 5.2.10(b)).

The median transferrin saturation was 30% for HD and 32% for PD patients. (Table 5.2.9(c) & 5.2.10(c)). The median proportion of patients on ESA with transferrin saturation >20% was 85% for HD patients and 88% in PD patients. (Table 5.2.9(d) & 5.2.10(d)).

Table 5.2.9(a): Variation in serum ferritin among patients on ESAs, HD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-------|-------------------------|-------|--------|-------|--------------------------|--------|
| 2023 | 891 | 72 | 210.2 | 368.4 | 500.7 | 677.3 | 1050.8 | 2201.3 |
| 2022 | 830 | 69 | 189.8 | 322.4 | 468.1 | 626.4 | 908.3 | 1893.2 |
| 2021 | 788 | 68.8 | 190.6 | 325.1 | 472 | 634.3 | 989.7 | 1846.2 |
| 2020 | 760 | 58 | 185.5 | 321.6 | 452.7 | 616.1 | 970.3 | 2066.9 |
| 2019 | 728 | 47 | 197.7 | 335.6 | 468.4 | 638.1 | 1075.3 | 1952.3 |
| 2018 | 692 | 55.2 | 182.9 | 337.5 | 476.5 | 646.3 | 1044.1 | 1817 |
| 2017 | 672 | 42.8 | 199 | 363.8 | 496.8 | 668.2 | 1073.2 | 2345.8 |
| 2016 | 655 | 105.5 | 232 | 389.1 | 527.6 | 720.5 | 1067.6 | 1638.9 |
| 2015 | 619 | 62.8 | 207.4 | 375 | 511.1 | 661.7 | 923.5 | 1318 |
| 2014 | 585 | 124.3 | 230 | 368.2 | 499.3 | 653.4 | 968.4 | 1483.6 |

Figure 5.2.9(a): Variation in serum ferritin among patients on ESAs, HD centres 2023

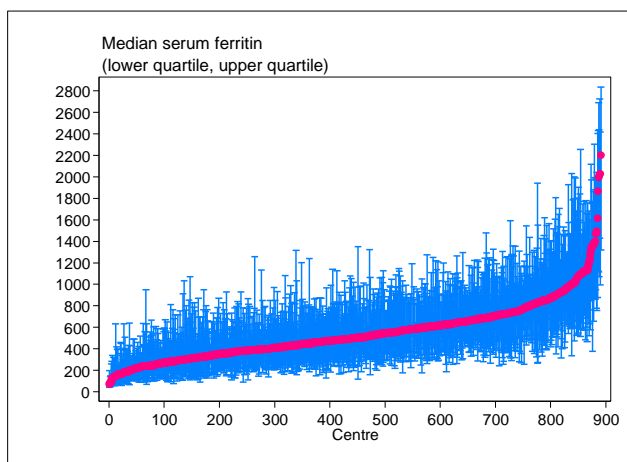


Figure 5.2.9(b): Variation in centres' proportion of patients on ESAs with serum ferritin 200-500ng/ml, HD centres 2023

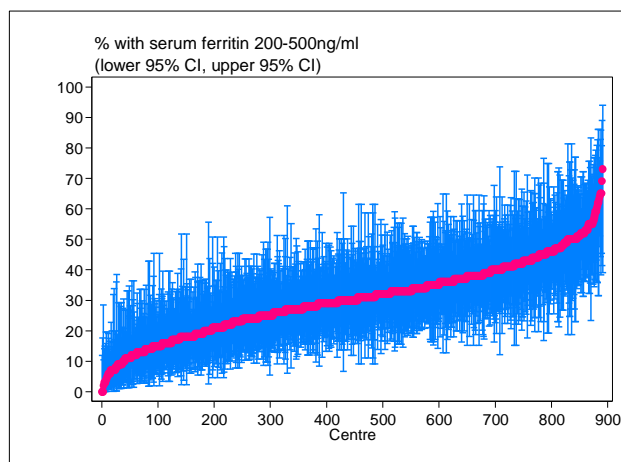


Table 5.2.9(b): Centres' proportion of patients on ESAs with serum ferritin 200-500ng/ml, HD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|----|--------|------|--------------------------|-----|
| 2023 | 891 | 0 | 11 | 22 | 30 | 38 | 51 | 73 |
| 2022 | 830 | 0 | 13 | 24 | 32 | 39 | 51 | 80 |
| 2021 | 788 | 0 | 12 | 23 | 30 | 38 | 51 | 79 |
| 2020 | 760 | 0 | 12 | 23 | 31 | 38.5 | 52 | 87 |
| 2019 | 728 | 0 | 11 | 22 | 30 | 38 | 50 | 69 |
| 2018 | 692 | 0 | 10 | 21 | 30 | 38 | 52 | 72 |
| 2017 | 672 | 0 | 10 | 21 | 30 | 37 | 49 | 68 |
| 2016 | 655 | 0 | 11 | 21 | 29 | 37 | 50 | 71 |
| 2015 | 619 | 3 | 12 | 22 | 30 | 39 | 50 | 69 |
| 2014 | 585 | 0 | 11 | 23 | 31 | 39 | 50 | 73 |

Table 5.2.9(c): Transferrin saturation among patients on ESAs, HD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|------|-------------------------|------|--------|------|--------------------------|------|
| 2023 | 889 | 17.6 | 22.7 | 26.4 | 29.3 | 32.2 | 37.6 | 64.7 |
| 2022 | 829 | 16.8 | 22.6 | 25.8 | 28.6 | 31.7 | 36.9 | 52.6 |
| 2021 | 787 | 17 | 22.2 | 25.7 | 28.2 | 30.8 | 36.4 | 51.7 |
| 2020 | 762 | 17.1 | 21.4 | 24.8 | 27.5 | 30.5 | 35.4 | 55.4 |
| 2019 | 730 | 16.6 | 21.4 | 24.9 | 27.6 | 30.7 | 35.9 | 46.4 |
| 2018 | 696 | 14.1 | 20.8 | 24.8 | 27.5 | 30.5 | 35 | 44.2 |
| 2017 | 677 | 16.9 | 21 | 25 | 27.6 | 30.6 | 35.3 | 51.1 |
| 2016 | 661 | 15.9 | 21.7 | 24.8 | 27.7 | 30.5 | 34.6 | 65.7 |
| 2015 | 621 | 13.9 | 21.1 | 25.1 | 27.8 | 30.8 | 34.9 | 61 |
| 2014 | 582 | 17.7 | 21.6 | 25.3 | 28.5 | 31.6 | 37.2 | 69.5 |

Figure 5.2.9(c): Variation in median transferrin saturation among patients on ESAs HD centres 2023

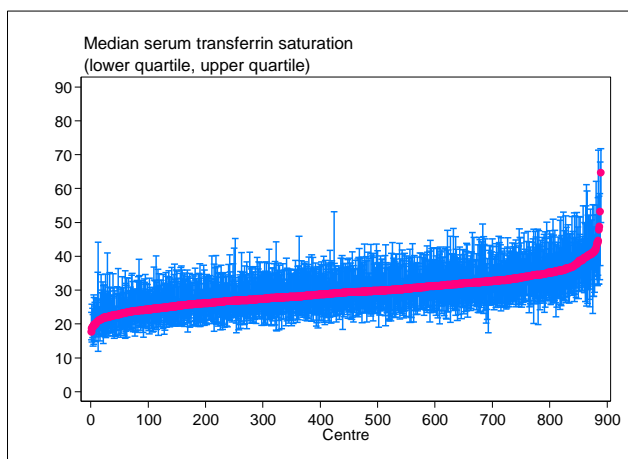


Figure 5.2.9(d): Variation in centres' proportion of patients on ESAs with transferrin saturation \geq 20%, HD centres 2023

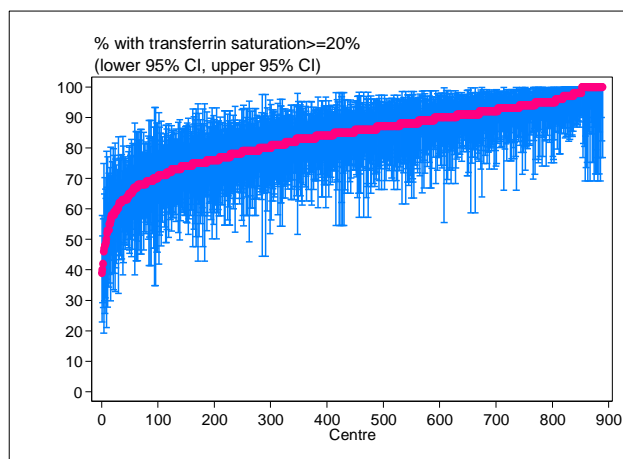


Table 5.2.9(d): Centres' proportion of patients on ESAs with transferrin saturation \geq 20%, HD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|----|--------|----|--------------------------|-----|
| 2023 | 889 | 39 | 63 | 77 | 85 | 91 | 98 | 100 |
| 2022 | 829 | 20 | 63 | 76 | 84 | 91 | 97 | 100 |
| 2021 | 787 | 23 | 61 | 74 | 83 | 90 | 96 | 100 |
| 2020 | 762 | 31 | 57 | 72 | 81 | 89 | 97 | 100 |
| 2019 | 730 | 21 | 58 | 72 | 81.5 | 89 | 97 | 100 |
| 2018 | 696 | 31 | 54 | 71 | 81 | 88 | 97 | 100 |
| 2017 | 677 | 26 | 56 | 72 | 81 | 89 | 97 | 100 |
| 2016 | 661 | 24 | 57 | 73 | 82 | 89 | 97 | 100 |
| 2015 | 621 | 26 | 55 | 73 | 83 | 90 | 98 | 100 |
| 2014 | 582 | 37 | 58 | 74 | 84 | 91 | 100 | 100 |

Table 5.2.10(a): Variation in serum ferritin among patients on ESAs, PD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-------|-------------------------|-------|--------|-------|--------------------------|--------|
| 2023 | 48 | 244.6 | 277.1 | 415 | 509.3 | 595.4 | 783.6 | 1122.9 |
| 2022 | 46 | 237.8 | 316.3 | 409.4 | 492.1 | 582.4 | 779.6 | 1053 |
| 2021 | 45 | 298.6 | 324.5 | 425.9 | 501.8 | 588.2 | 875.8 | 1060 |
| 2020 | 41 | 220.5 | 297.6 | 369.1 | 482.7 | 622.4 | 950.6 | 1207.6 |
| 2019 | 34 | 251.3 | 274.7 | 418.9 | 577.5 | 668.6 | 937.1 | 1159.1 |
| 2018 | 35 | 189.1 | 231.4 | 450.8 | 559.1 | 673.9 | 858.6 | 1185.1 |
| 2017 | 33 | 138.6 | 283.8 | 458.2 | 563.5 | 663.6 | 1015 | 1323.4 |
| 2016 | 34 | 34 | 239.5 | 488.6 | 563.6 | 652.7 | 1192.4 | 1262.7 |
| 2015 | 33 | 165.5 | 404.5 | 498.4 | 594 | 686.7 | 890.3 | 1008.4 |
| 2014 | 29 | 186.7 | 291 | 487.1 | 556 | 696.1 | 1216.4 | 1224.2 |

Figure 5.2.10(a): Variation in medium serum ferritin among patients on ESAs, PD centres 2023

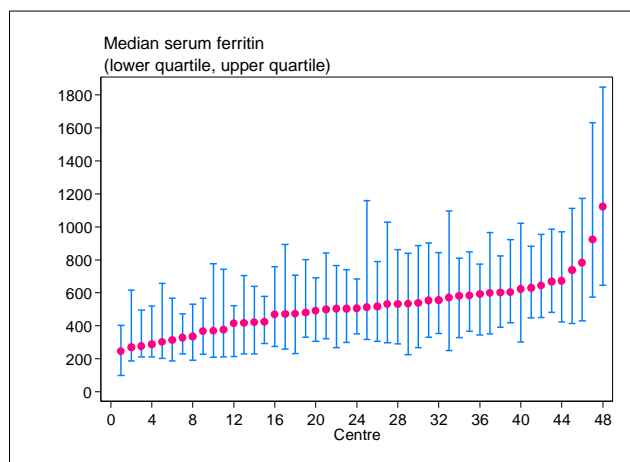


Figure 5.2.10(b): Variation in centres' proportion of patients on ESAs with serum ferritin 200-500ng/ml, PD centres 2023

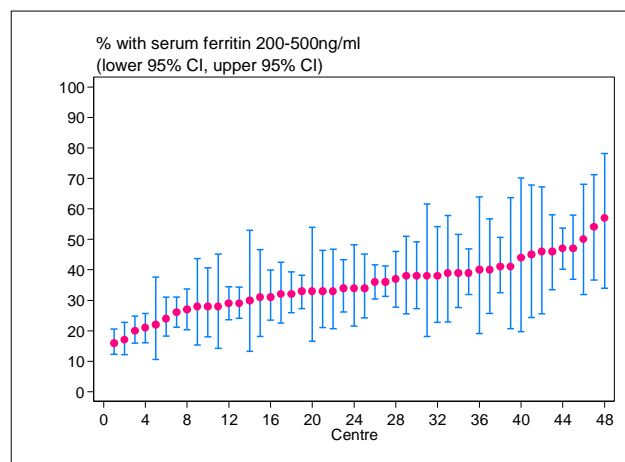


Table 5.2.10(b): Centres' proportion of patients on ESAs with serum ferritin 200-500ng /ml, PD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|----|--------|----|--------------------------|-----|
| 2023 | 48 | 16 | 20 | 29 | 34 | 40 | 50 | 57 |
| 2022 | 46 | 12 | 16 | 27 | 33 | 40 | 49 | 52 |
| 2021 | 45 | 11 | 20 | 27 | 33 | 41 | 49 | 57 |
| 2020 | 41 | 11 | 14 | 26 | 31 | 39 | 48 | 53 |
| 2019 | 34 | 5 | 13 | 26 | 32.5 | 38 | 51 | 52 |
| 2018 | 35 | 15 | 17 | 23 | 29 | 36 | 43 | 50 |
| 2017 | 33 | 8 | 9 | 25 | 29 | 36 | 46 | 57 |
| 2016 | 34 | 0 | 11 | 24 | 28.5 | 34 | 43 | 46 |
| 2015 | 33 | 9 | 13 | 23 | 28 | 35 | 50 | 53 |
| 2014 | 29 | 10 | 11 | 22 | 28 | 34 | 45 | 45 |

Table 5.2.10(c): Median transferrin saturation among patients on ESAs, PD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|------|-------------------------|------|--------|------|--------------------------|------|
| 2023 | 49 | 24.3 | 26.9 | 29.2 | 31.5 | 34.5 | 38.5 | 46.6 |
| 2022 | 47 | 25 | 26 | 28.4 | 31.1 | 32.7 | 37.3 | 49.5 |
| 2021 | 43 | 25.3 | 26.9 | 28.7 | 31.3 | 33.6 | 37.7 | 48.4 |
| 2020 | 39 | 22.5 | 25.1 | 28.9 | 30.4 | 33.2 | 40.2 | 47.6 |
| 2019 | 32 | 24.7 | 26.7 | 28.4 | 29.7 | 33.5 | 39.9 | 45.2 |
| 2018 | 32 | 24.2 | 25.2 | 27.8 | 31.1 | 34.6 | 38.5 | 40.7 |
| 2017 | 31 | 23.6 | 24.3 | 29.5 | 30.8 | 34.4 | 40.6 | 41.6 |
| 2016 | 32 | 23.7 | 23.8 | 30.4 | 32 | 35.8 | 43.7 | 47.8 |
| 2015 | 31 | 25.5 | 27.9 | 29.8 | 34.5 | 36.5 | 38.1 | 43.6 |
| 2014 | 26 | 26.3 | 26.8 | 29.6 | 32 | 36.7 | 41.1 | 49.7 |

Figure 5.2.10(c): Variation in median transferrin saturation among patients on ESAs, PD centres 2023

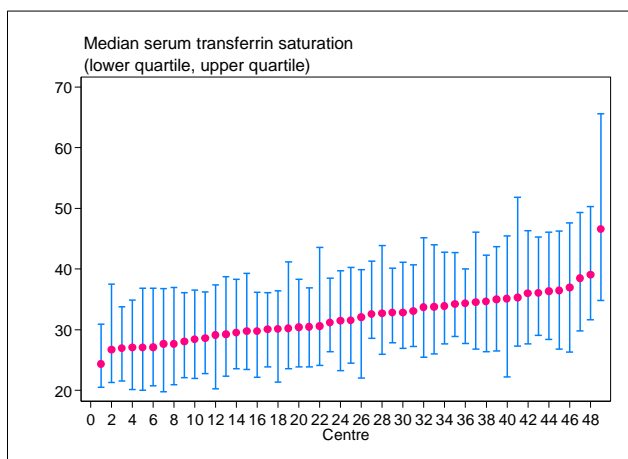


Figure 5.2.10(d): Variation in centres' proportion of patients on ESAs with transferrin saturation $\geq 20\%$, PD centres 2023

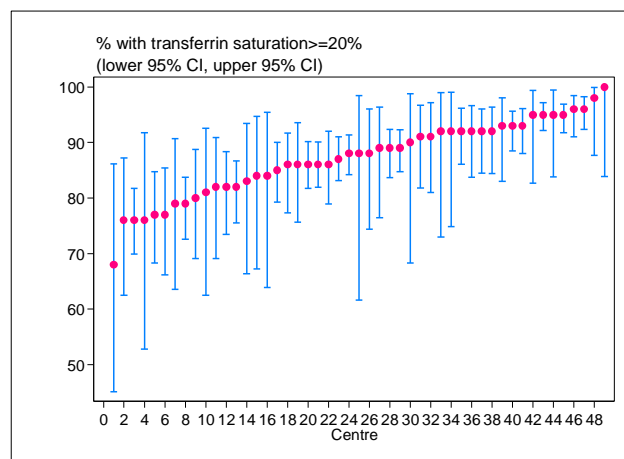


Table 5.2.10(d): Centres' proportion of patients on ESAs with transferrin saturation $\geq 20\%$, PD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|------|--------|----|--------------------------|-----|
| 2023 | 49 | 68 | 76 | 82 | 88 | 92 | 96 | 100 |
| 2022 | 47 | 71 | 72 | 81 | 87 | 91 | 99 | 100 |
| 2021 | 43 | 73 | 77 | 84 | 88 | 93 | 98 | 98 |
| 2020 | 39 | 63 | 64 | 77 | 85 | 91 | 97 | 97 |
| 2019 | 32 | 74 | 75 | 80.5 | 84.5 | 90 | 98 | 100 |
| 2018 | 32 | 70 | 71 | 81.5 | 87.5 | 91 | 97 | 97 |
| 2017 | 31 | 65 | 69 | 82 | 88 | 92 | 97 | 98 |
| 2016 | 32 | 59 | 67 | 83.5 | 90 | 94 | 97 | 100 |
| 2015 | 31 | 81 | 82 | 87 | 92 | 96 | 100 | 100 |
| 2014 | 26 | 75 | 84 | 87 | 94 | 95 | 100 | 100 |

SECTION 5.3: HAEMOGLOBIN OUTCOMES ON DIALYSIS

The median haemoglobin for patients without ESA in HD and PD patients is 12.0 g/dl and 11.5 g/dl respectively (Table 5.3.1 and 5.3.3). 17% and 13% of HD and PD patients not on ESA have haemoglobin <10 g/dl. Percentage of patients with haemoglobin <10g/dl without ESA has reduced over the years.

The median haemoglobin for patients with ESA in HD and PD patients is 10.3 g/dl and 10.1 g/dl respectively. 42% and 47% of HD and PD patients on ESA have haemoglobin <10 g/dl. This trend has remained the same for the past 10 years. Interesting to note that 22% and 19% of HD and PD patients respectively, on ESA have haemoglobin more than 11.5 g/dl.

Table 5.3.1: Distribution of haemoglobin concentration without ESAs, HD patients 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients <10g/dL | % Patients 10-<11.5g/dL | % Patients ≥11.5g/dL |
|------|--------------------|------|-----|--------|------|------|--------------------|-------------------------|----------------------|
| 2023 | 3535 | 11.8 | 2 | 12 | 10.8 | 13.2 | 17 | 21 | 62 |
| 2022 | 3515 | 11.7 | 2 | 11.9 | 10.5 | 13 | 19 | 23 | 58 |
| 2021 | 3860 | 11.7 | 2.1 | 12 | 10.6 | 13.1 | 18 | 22 | 60 |
| 2020 | 3549 | 11.8 | 2.1 | 12.1 | 10.7 | 13.3 | 18 | 20 | 63 |
| 2019 | 3880 | 10.7 | 2.2 | 10.8 | 9.2 | 12.2 | 36 | 27 | 37 |
| 2018 | 6496 | 10.4 | 2.1 | 10.5 | 8.9 | 11.9 | 42 | 26 | 32 |
| 2017 | 4937 | 10.6 | 2.2 | 10.6 | 8.9 | 12.2 | 40 | 24 | 36 |
| 2016 | 2928 | 11.6 | 2.2 | 11.9 | 10.1 | 13.1 | 24 | 20 | 56 |
| 2015 | 2484 | 11.6 | 2.1 | 11.9 | 10.3 | 13.1 | 22 | 19 | 59 |
| 2014 | 2429 | 11.6 | 2.2 | 11.9 | 10.2 | 13.2 | 23 | 21 | 56 |

Figure 5.3.1: Cumulative distribution of haemoglobin concentration without ESAs, HD patients 2014-2023

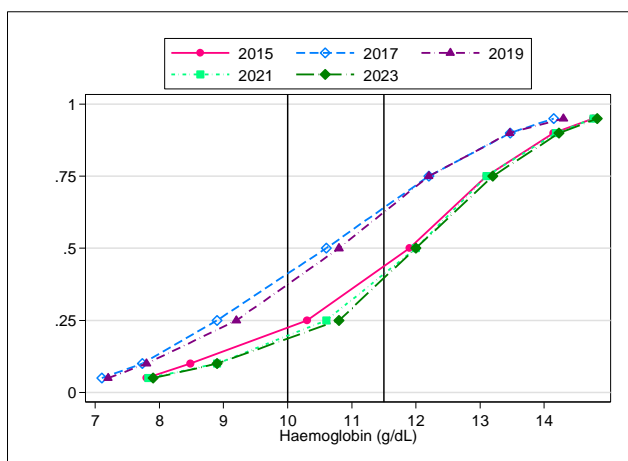


Figure 5.3.2: Cumulative distribution of haemoglobin concentration with ESAs, HD patients 2014-2023

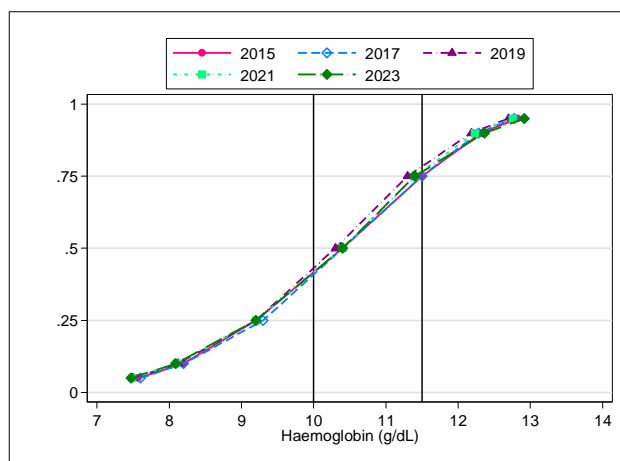


Table 5.3.2: Distribution of haemoglobin concentration with ESAs, HD patients 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients <10g/dL | % Patients 10-<11.5g/dL | % Patients ≥11.5g/dL |
|------|--------------------|------|-----|--------|-----|------|--------------------|-------------------------|----------------------|
| 2023 | 49125 | 10.2 | 1.6 | 10.3 | 9.1 | 11.4 | 42 | 36 | 22 |
| 2022 | 46782 | 10.2 | 1.6 | 10.2 | 9.1 | 11.3 | 44 | 36 | 20 |
| 2021 | 45844 | 10.3 | 1.6 | 10.4 | 9.2 | 11.4 | 40 | 36 | 24 |
| 2020 | 44180 | 10.3 | 1.7 | 10.5 | 9.2 | 11.5 | 40 | 35 | 25 |
| 2019 | 40607 | 10.3 | 1.7 | 10.4 | 9.2 | 11.4 | 41 | 35 | 24 |
| 2018 | 35058 | 10.3 | 1.6 | 10.4 | 9.2 | 11.4 | 41 | 36 | 23 |
| 2017 | 35101 | 10.3 | 1.6 | 10.4 | 9.2 | 11.4 | 41 | 36 | 23 |
| 2016 | 33264 | 10.3 | 1.6 | 10.4 | 9.2 | 11.4 | 41 | 37 | 23 |
| 2015 | 31118 | 10.2 | 1.6 | 10.3 | 9.2 | 11.3 | 42 | 37 | 22 |
| 2014 | 28574 | 10.3 | 1.6 | 10.4 | 9.2 | 11.4 | 41 | 37 | 22 |

Table 5.3.3: Distribution of haemoglobin concentration without ESAs, PD patients 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients <10g/dL | % Patients 10-<11.5g/dL | % Patients ≥11.5g/dL |
|------|--------------------|------|-----|--------|------|------|--------------------|-------------------------|----------------------|
| 2023 | 1083 | 11.6 | 1.7 | 11.5 | 10.6 | 12.7 | 13 | 36 | 51 |
| 2022 | 1127 | 11.5 | 1.7 | 11.5 | 10.5 | 12.5 | 14 | 36 | 50 |
| 2021 | 1138 | 11.5 | 1.7 | 11.5 | 10.6 | 12.6 | 15 | 35 | 50 |
| 2020 | 1003 | 11.6 | 1.7 | 11.6 | 10.6 | 12.6 | 14 | 33 | 53 |
| 2019 | 862 | 11.2 | 1.8 | 11.2 | 10.2 | 12.3 | 21 | 37 | 42 |
| 2018 | 1054 | 11.1 | 1.8 | 11 | 10 | 12.2 | 25 | 35 | 39 |
| 2017 | 933 | 11.2 | 1.8 | 11.2 | 10.1 | 12.3 | 23 | 34 | 43 |
| 2016 | 745 | 11.5 | 1.7 | 11.4 | 10.5 | 12.6 | 16 | 35 | 48 |
| 2015 | 754 | 11.3 | 1.7 | 11.3 | 10.3 | 12.4 | 18 | 38 | 44 |
| 2014 | 610 | 11.1 | 1.8 | 11.1 | 10 | 12.1 | 24 | 36 | 40 |

Figure 5.3.3: Cumulative distribution of haemoglobin concentration without ESAs, PD patients 2014-2023

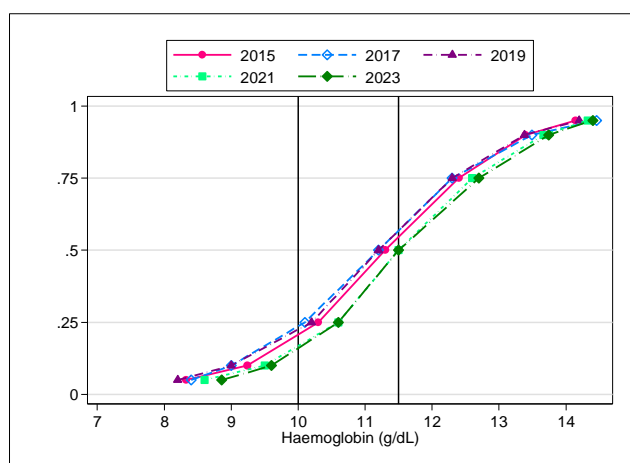


Figure 5.3.4: Cumulative distribution of haemoglobin concentration with ESAs, PD patients 2014-2023

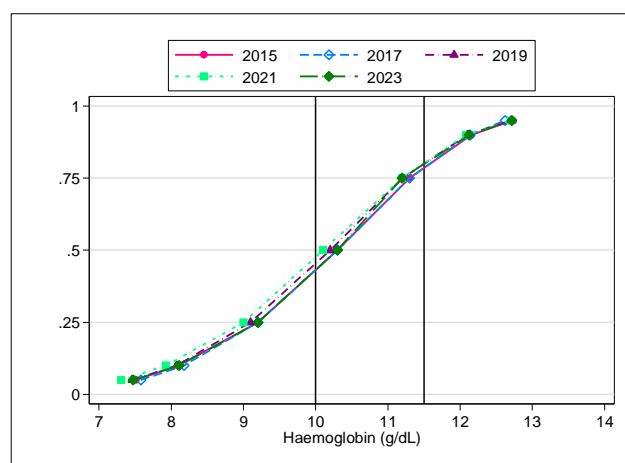


Table 5.3.4: Distribution of haemoglobin concentration with ESAs, PD patients 2014-2023

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % Patients <10g/dL | % Patients 10-<11.5g/dL | % Patients ≥11.5g/dL |
|------|--------------------|------|-----|--------|-----|------|--------------------|-------------------------|----------------------|
| 2023 | 6900 | 10.1 | 1.6 | 10.1 | 9 | 11.2 | 47 | 34 | 19 |
| 2022 | 6401 | 10.1 | 1.6 | 10.1 | 9 | 11.2 | 46 | 35 | 19 |
| 2021 | 6013 | 10.1 | 1.6 | 10.2 | 9.1 | 11.2 | 45 | 36 | 19 |
| 2020 | 5440 | 10.2 | 1.6 | 10.2 | 9.1 | 11.3 | 44 | 35 | 21 |
| 2019 | 4997 | 10.2 | 1.6 | 10.3 | 9.2 | 11.2 | 43 | 37 | 20 |
| 2018 | 4323 | 10.1 | 1.6 | 10.2 | 9.1 | 11.2 | 46 | 36 | 19 |
| 2017 | 4073 | 10.1 | 1.6 | 10.1 | 9 | 11.2 | 47 | 35 | 18 |
| 2016 | 3792 | 10.1 | 1.6 | 10.1 | 9.1 | 11.2 | 46 | 36 | 18 |
| 2015 | 3451 | 10.1 | 1.6 | 10.2 | 9.1 | 11.2 | 45 | 36 | 19 |
| 2014 | 3016 | 10.1 | 1.6 | 10.2 | 9.1 | 11.2 | 46 | 35 | 20 |

Median haemoglobin for patients on ESA among HD and PD centres was comparable at 10g/dl. (table 5.3.5(a) and 5.3.6(a)). The median proportion of patients with haemoglobin 10-11.5g/dl was 36% for HD centres and 30% for PD centres (table 5.3.5(b) and 5.3.6(b)).

Table 5.3.5(a): Variation in haemoglobin level among patients on ESAs, HD centres 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|-----|--------|------|--------------------------|------|
| 2023 | 911 | 7.9 | 9.1 | 9.9 | 10.3 | 10.7 | 11.2 | 11.9 |
| 2022 | 852 | 8 | 9.1 | 9.8 | 10.3 | 10.6 | 11.1 | 11.9 |
| 2021 | 812 | 8 | 9.2 | 10 | 10.4 | 10.8 | 11.2 | 11.9 |
| 2020 | 780 | 7.9 | 9.3 | 10 | 10.5 | 10.9 | 11.3 | 11.8 |
| 2019 | 752 | 7.9 | 9.1 | 9.9 | 10.4 | 10.8 | 11.3 | 12.1 |
| 2018 | 721 | 8 | 9.1 | 9.9 | 10.3 | 10.7 | 11.3 | 12.3 |
| 2017 | 709 | 7 | 9.2 | 9.9 | 10.3 | 10.7 | 11.2 | 12 |
| 2016 | 691 | 7.9 | 9.2 | 9.9 | 10.3 | 10.7 | 11.2 | 11.9 |
| 2015 | 665 | 8.3 | 9.3 | 9.9 | 10.3 | 10.7 | 11.2 | 12 |
| 2014 | 636 | 8.2 | 9.3 | 9.9 | 10.3 | 10.7 | 11.2 | 12 |

Figure 5.3.5(a): Variation in median haemoglobin level among patients on ESAs, HD centres 2023

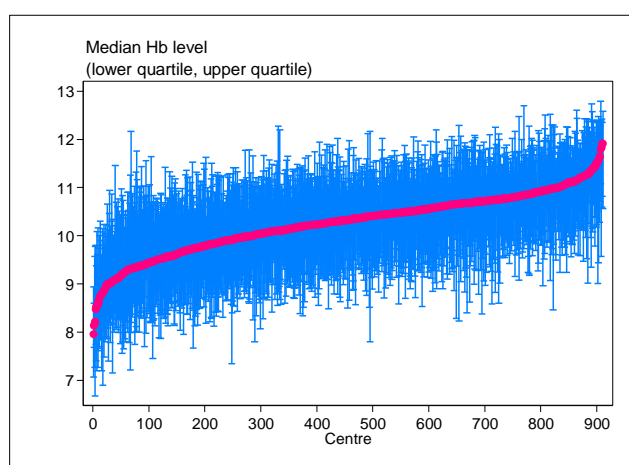
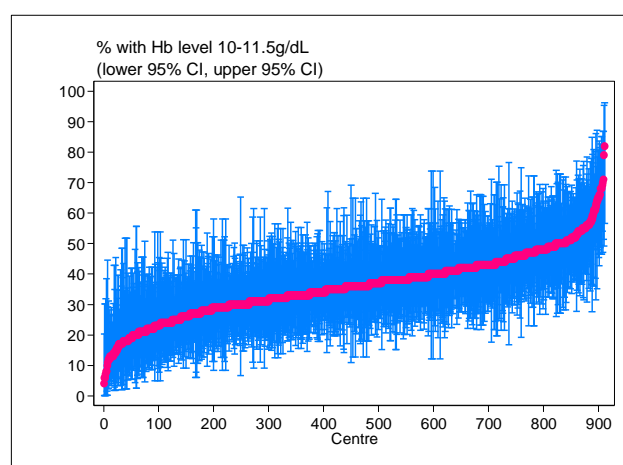


Figure 5.3.5(b): Variation in centres' proportion of patients on ESAs with haemoglobin level 10-11.5g/dL, HD centres 2023



At the median, only 36% and 32% of HD and PD centres respectively, achieved the target haemoglobin of 10 - 11.5 g/dl.

Table 5.3.5(b): Centres' proportion of patients on ESAs with haemoglobin level 10-11.5g/dL, HD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|------|--------|----|--------------------------|-----|
| 2023 | 911 | 4 | 19 | 30 | 36 | 43 | 54 | 82 |
| 2022 | 852 | 3 | 18 | 28 | 36 | 43 | 53 | 73 |
| 2021 | 812 | 0 | 20 | 28.5 | 35 | 42 | 53 | 73 |
| 2020 | 780 | 0 | 18 | 29 | 35 | 41 | 50 | 78 |
| 2019 | 752 | 0 | 17 | 29 | 34 | 41 | 52 | 81 |
| 2018 | 721 | 0 | 19 | 29 | 36 | 42 | 54 | 73 |
| 2017 | 709 | 0 | 18 | 29 | 36 | 43 | 53 | 76 |
| 2016 | 691 | 6 | 20 | 30 | 36 | 43 | 54 | 70 |
| 2015 | 665 | 0 | 20 | 29 | 36 | 43 | 54 | 79 |
| 2014 | 636 | 0 | 19 | 29.5 | 36 | 43 | 54 | 83 |

Table 5.3.6(a): Variation in median haemoglobin level among patients on ESAs, PD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|-----|--------|------|--------------------------|------|
| 2023 | 51 | 9 | 9.3 | 9.8 | 10.1 | 10.4 | 10.9 | 11.4 |
| 2022 | 48 | 8.5 | 9.1 | 9.7 | 10.1 | 10.3 | 11 | 11.2 |
| 2021 | 47 | 9.2 | 9.3 | 9.9 | 10.3 | 10.6 | 10.9 | 11.4 |
| 2020 | 43 | 8.8 | 9.2 | 9.6 | 10.1 | 10.5 | 10.9 | 11.6 |
| 2019 | 36 | 9 | 9.3 | 9.9 | 10.2 | 10.4 | 10.7 | 11.3 |
| 2018 | 36 | 8.7 | 8.8 | 9.7 | 9.9 | 10.4 | 10.6 | 10.7 |
| 2017 | 36 | 8.9 | 9.1 | 9.6 | 10.1 | 10.4 | 10.9 | 10.9 |
| 2016 | 37 | 8.9 | 9.2 | 9.7 | 10.2 | 10.4 | 10.7 | 11 |
| 2015 | 35 | 8.6 | 9.3 | 9.7 | 10.1 | 10.5 | 10.9 | 10.9 |
| 2014 | 31 | 8.6 | 8.9 | 9.8 | 10.2 | 10.5 | 10.8 | 11.1 |

Figure 5.3.6(a): Variation in median haemoglobin level among patients on ESAs, PD centres 2023

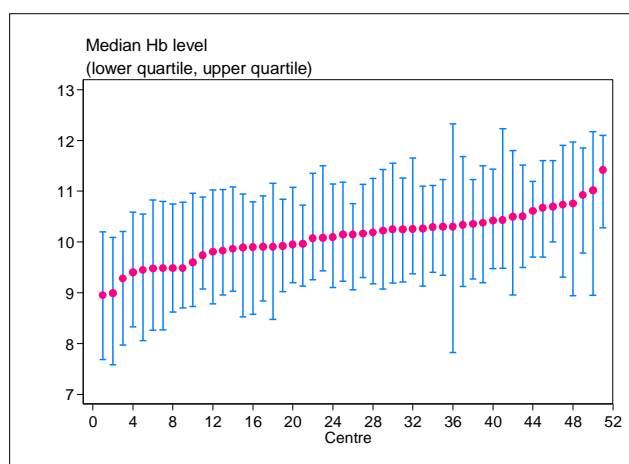


Figure 5.3.6(b): Variation in centres' proportion of patients on ESAs with haemoglobin level 10-11.5g/dL, PD centres, 2023

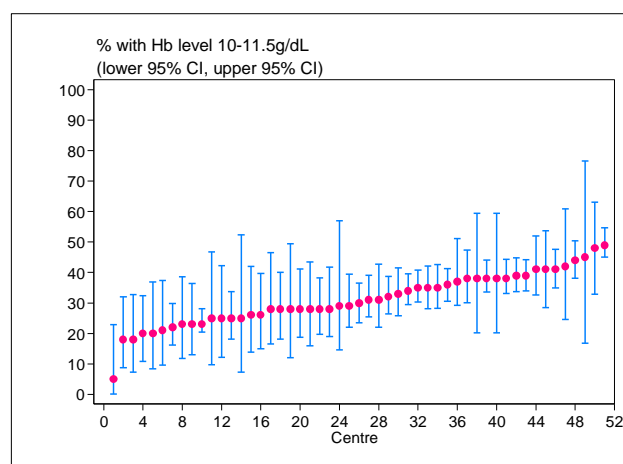


Table 5.3.6(b): Centres' proportion of patients on ESAs with haemoglobin level 10-11.5g/dL, PD centres, 2014-2023

| Year | Number of centres | Min | 5 th centile | LQ | Median | UQ | 95 th centile | Max |
|------|-------------------|-----|-------------------------|------|--------|----|--------------------------|-----|
| 2023 | 51 | 5 | 18 | 25 | 30 | 38 | 45 | 49 |
| 2022 | 48 | 13 | 18 | 25 | 34.5 | 39 | 45 | 53 |
| 2021 | 47 | 17 | 21 | 26 | 33 | 42 | 50 | 52 |
| 2020 | 43 | 9 | 14 | 25 | 33 | 36 | 43 | 48 |
| 2019 | 36 | 16 | 18 | 27 | 33.5 | 41 | 46 | 48 |
| 2018 | 36 | 16 | 18 | 25.5 | 31 | 40 | 45 | 49 |
| 2017 | 36 | 17 | 19 | 25.5 | 33 | 39 | 47 | 51 |
| 2016 | 37 | 17 | 20 | 27 | 33 | 39 | 50 | 58 |
| 2015 | 35 | 13 | 17 | 26 | 33 | 42 | 50 | 57 |
| 2014 | 31 | 4 | 13 | 23 | 34 | 40 | 45 | 46 |