

CHAPTER 7

Nutritional Status on Dialysis

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Table 7.1.1: Distribution of serum albumin, HD patients, 2002-2011

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % patients <30g/L | % patients 30-<35g/L | % patients 35-<40g/L | % patients ≥40g/L |
|-------------|---------------------------|-------------|------------|---------------|-------------|-------------|-----------------------------|--------------------------------|--------------------------------|--------------------------|
| 2002 | 5568 | 39.2 | 5.6 | 39 | 36.5 | 42 | 3 | 12 | 42 | 43 |
| 2003 | 6524 | 39.9 | 5.4 | 40 | 37.3 | 42.5 | 3 | 9 | 35 | 52 |
| 2004 | 7581 | 39.9 | 5.3 | 40 | 37 | 42.8 | 3 | 10 | 34 | 53 |
| 2005 | 8706 | 40 | 5.2 | 40.3 | 37.5 | 42.8 | 3 | 9 | 33 | 56 |
| 2006 | 10928 | 39.8 | 5.4 | 40.3 | 37.3 | 42.8 | 3 | 10 | 33 | 54 |
| 2007 | 12315 | 39.7 | 5.3 | 40 | 37 | 42.5 | 3 | 10 | 35 | 52 |
| 2008 | 14548 | 39.4 | 5.1 | 40 | 37 | 42.3 | 3 | 10 | 36 | 50 |
| 2009 | 16940 | 39.4 | 5.1 | 40 | 37 | 42.3 | 3 | 11 | 35 | 51 |
| 2010 | 18757 | 38.9 | 4.9 | 39.3 | 36.3 | 41.8 | 4 | 13 | 40 | 44 |
| 2011 | 21793 | 38.7 | 4.9 | 39 | 36.3 | 41.5 | 4 | 13 | 41 | 43 |

Figure 7.1.1: Cumulative distribution of serum albumin, HD patients 2002-2011

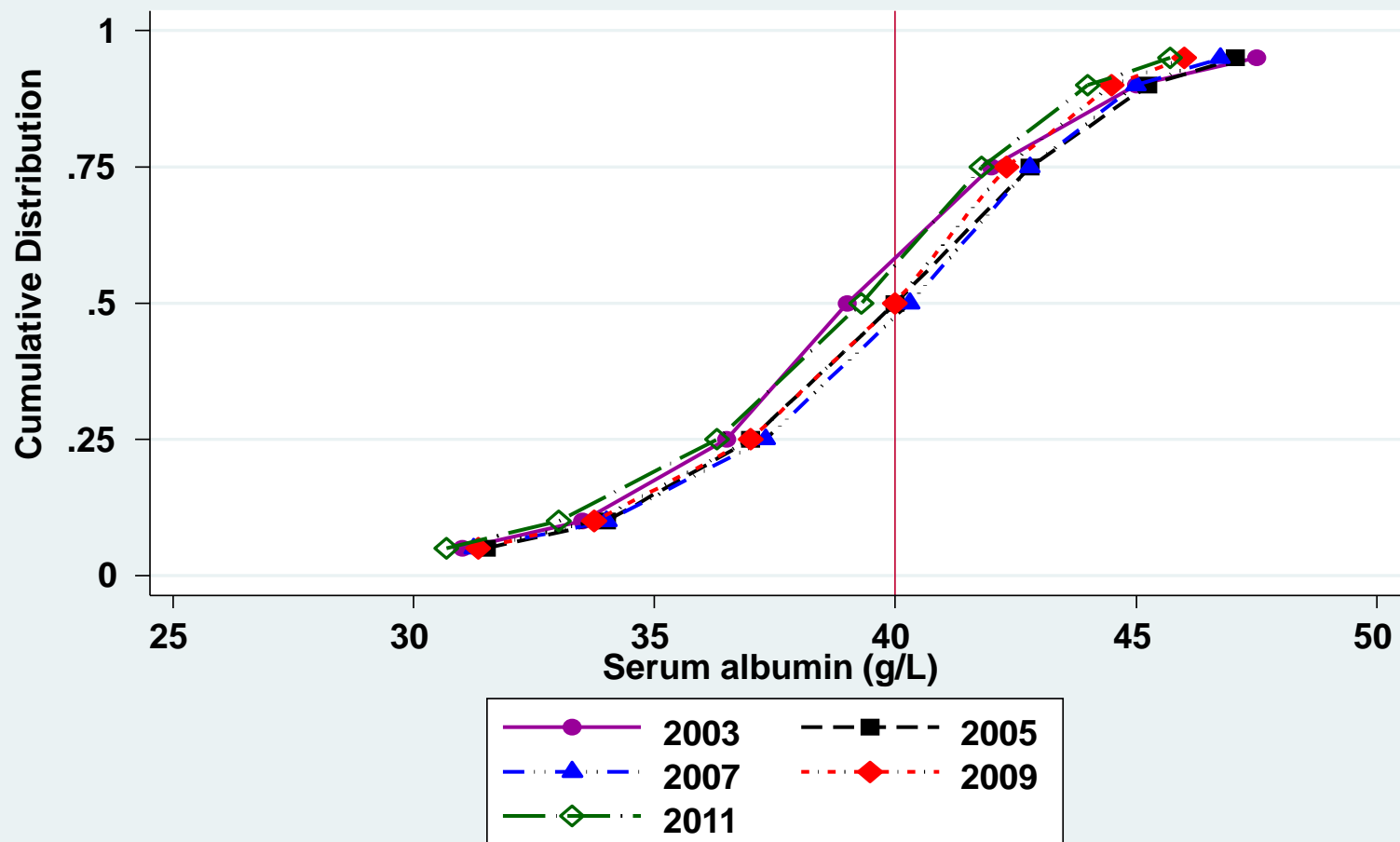


Table 7.1.2: Distribution of serum albumin, PD patients, 2002-2011

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % patients <30g/L | % patients 30-<35g/L | % patients 35-<40g/L | % patients ≥40g/L |
|-------------|---------------------------|-------------|------------|---------------|-------------|-------------|-----------------------------|--------------------------------|--------------------------------|--------------------------|
| 2002 | 862 | 33.9 | 5.9 | 34.3 | 30.8 | 37.5 | 21 | 35 | 33 | 12 |
| 2003 | 1180 | 33.3 | 5.8 | 33.8 | 29.7 | 37.3 | 26 | 33 | 30 | 11 |
| 2004 | 1284 | 33 | 6 | 33.8 | 29.5 | 37.3 | 27 | 32 | 30 | 11 |
| 2005 | 1346 | 33.2 | 6.4 | 33.3 | 29.5 | 37 | 27 | 33 | 30 | 10 |
| 2006 | 1498 | 33.5 | 6.1 | 33.8 | 30 | 37 | 25 | 33 | 30 | 12 |
| 2007 | 1753 | 33.6 | 6.2 | 34 | 30 | 37.8 | 25 | 31 | 30 | 14 |
| 2008 | 2021 | 33.1 | 6.4 | 33.3 | 29.3 | 37.3 | 28 | 32 | 27 | 13 |
| 2009 | 2138 | 32.7 | 6.4 | 33 | 29 | 36.8 | 30 | 34 | 25 | 11 |
| 2010 | 2305 | 32.1 | 6.2 | 32.3 | 28.5 | 36 | 33 | 35 | 24 | 8 |
| 2011 | 2523 | 31.9 | 6 | 32 | 28.3 | 36 | 35 | 34 | 23 | 8 |

Figure 7.1.2: Cumulative distribution of serum albumin, PD patients 2002-2011

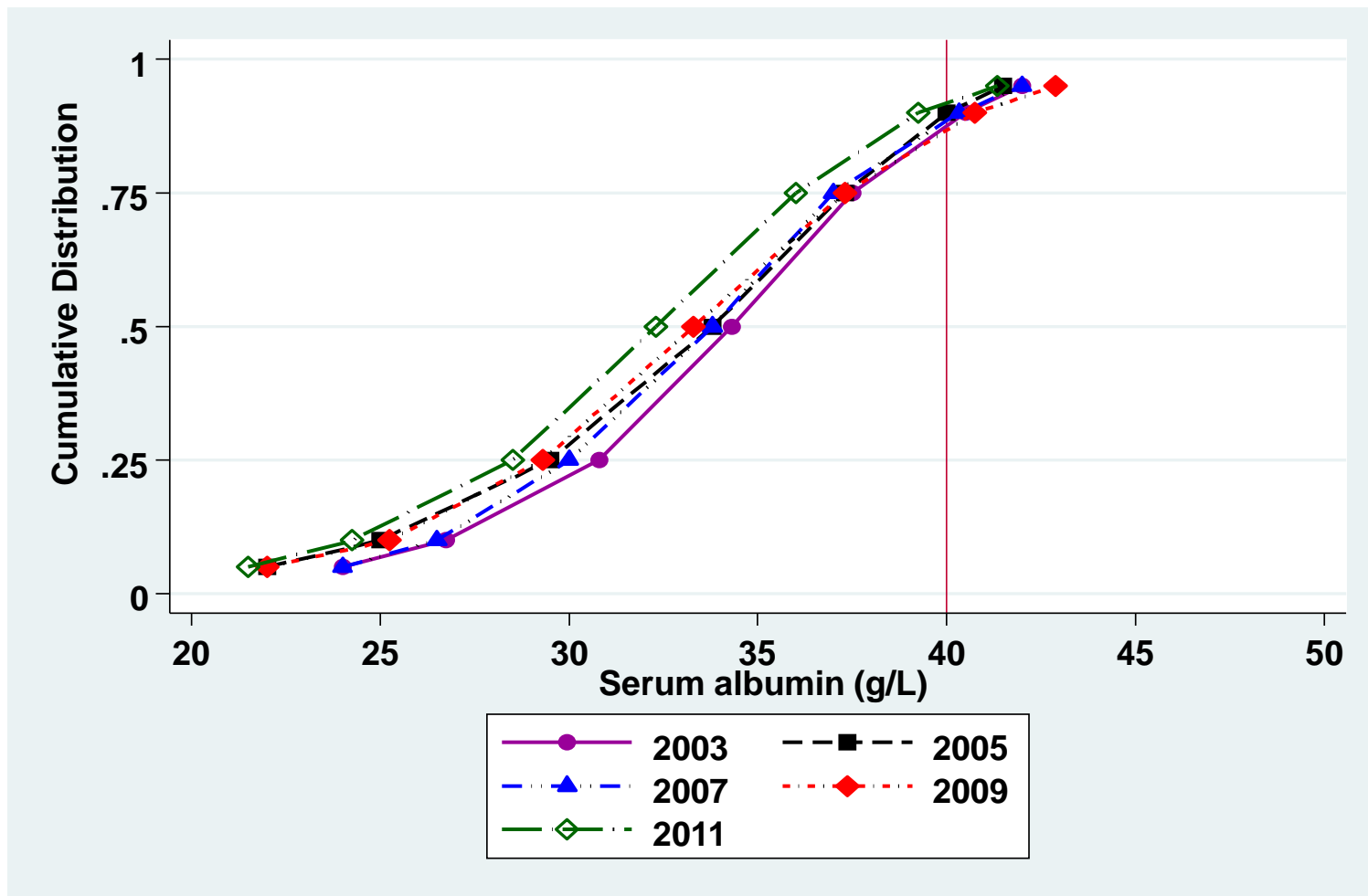


Table 7.1.3: Variation in proportion of patients with serum albumin $\geq 40\text{g/L}$ among HD centres 2002-2011

| Year | Number of centers | Min | 5th centile | LQ | Median | UQ | 95th centile | Max |
|-------------|--------------------------|------------|-------------------------------|-----------|---------------|-------------|--------------------------------|------------|
| 2002 | 143 | 0 | 10 | 25 | 43 | 62 | 85 | 100 |
| 2003 | 172 | 0 | 18 | 39 | 54 | 70 | 92 | 100 |
| 2004 | 203 | 4 | 12 | 36 | 58 | 73 | 87 | 100 |
| 2005 | 233 | 4 | 11 | 42 | 57 | 68 | 86 | 100 |
| 2006 | 278 | 0 | 11 | 37 | 54 | 71 | 87 | 96 |
| 2007 | 315 | 0 | 12 | 36 | 54 | 68 | 85 | 100 |
| 2008 | 364 | 0 | 7 | 35 | 50 | 66.5 | 83 | 100 |
| 2009 | 400 | 0 | 8 | 36 | 53 | 67 | 82.5 | 100 |
| 2010 | 440 | 0 | 6 | 25 | 44 | 60 | 80 | 96 |
| 2011 | 496 | 0 | 5 | 26 | 43 | 57 | 76 | 100 |

Figure 7.1.3: Variation in proportion of patients with serum albumin $\geq 40\text{g/L}$, HD centres 2011

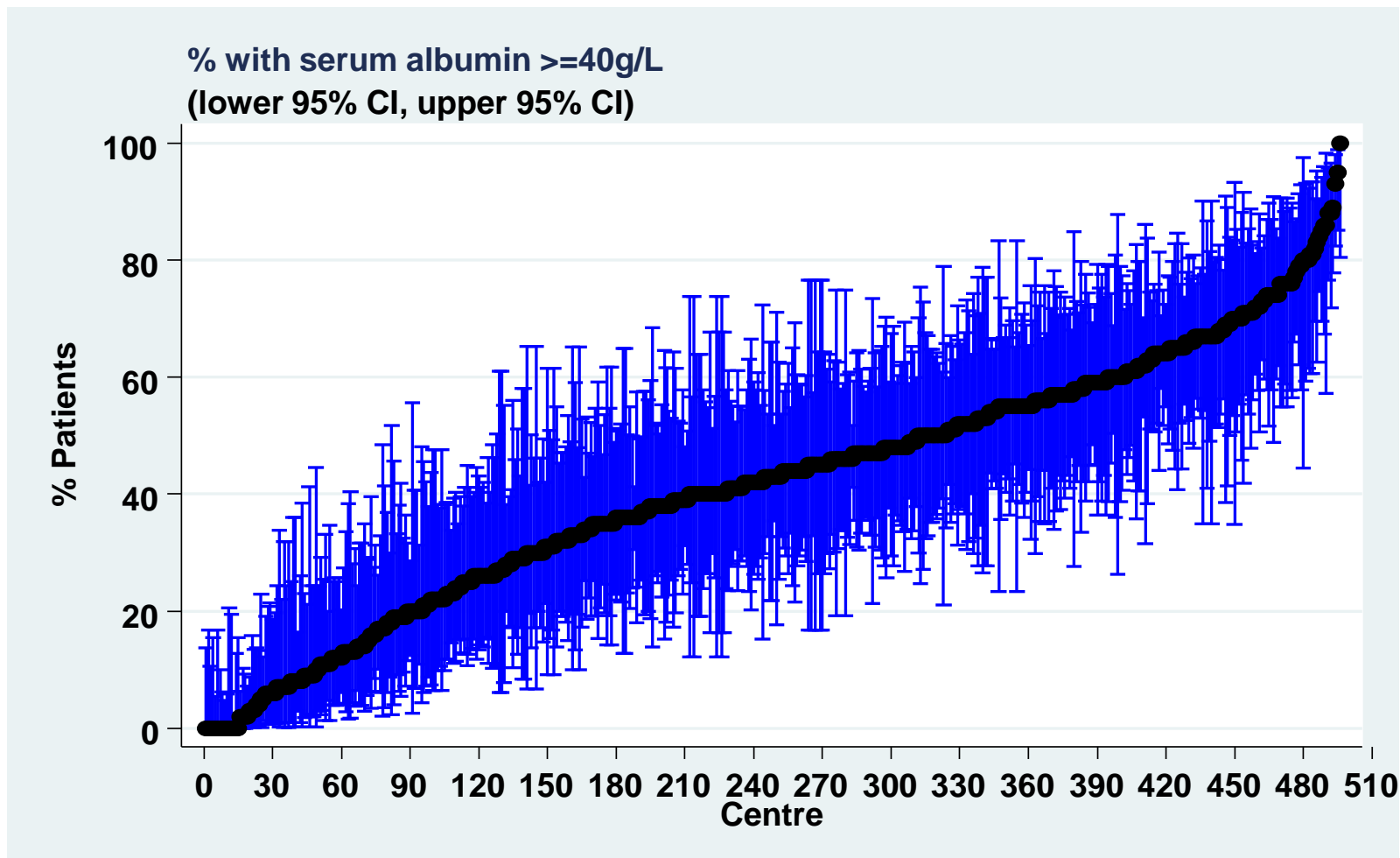


Table 7.1.4: Variation in proportion of patients with serum albumin $\geq 40\text{g/L}$ among PD centres 2002-2011

| Year | Number of centers | Min | 5th centile | LQ | Median | UQ | 95th centile | Max |
|-------------|--------------------------|------------|-------------------------------|-----------|---------------|-----------|--------------------------------|------------|
| 2002 | 15 | 5 | 5 | 6 | 10 | 24 | 36 | 36 |
| 2003 | 18 | 1 | 1 | 8 | 14 | 19 | 58 | 58 |
| 2004 | 18 | 2 | 2 | 8 | 14 | 21 | 35 | 35 |
| 2005 | 19 | 1 | 1 | 7 | 14 | 23 | 29 | 29 |
| 2006 | 22 | 1 | 1 | 6 | 12.5 | 22 | 42 | 72 |
| 2007 | 22 | 0 | 1 | 11 | 14 | 21 | 36 | 62 |
| 2008 | 23 | 0 | 1 | 4 | 15 | 25 | 41 | 53 |
| 2009 | 24 | 0 | 0 | 6 | 14 | 21 | 35 | 37 |
| 2010 | 25 | 0 | 0 | 2 | 9 | 14 | 30 | 31 |
| 2011 | 27 | 0 | 0 | 1 | 5 | 21 | 29 | 38 |

Figure 7.1.4: Variation in proportion of patients with serum albumin $\geq 40\text{g/L}$, PD centres 2011

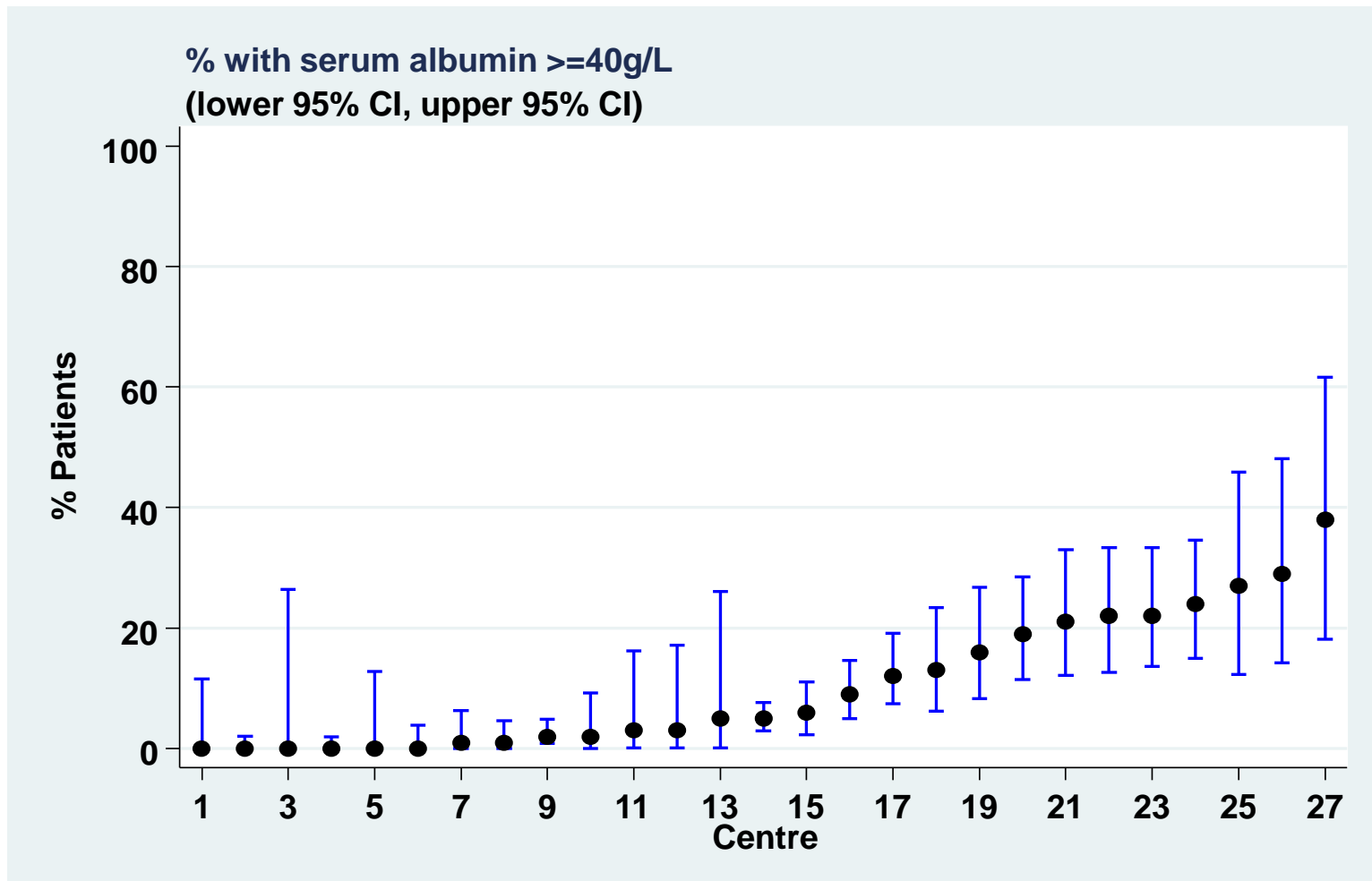


Table 7.2.1: Distribution of BMI, HD patients, 2002-2011

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % patients <18.5 | % patients 18.5-25 | % patients \geq25 |
|-------------|---------------------------|-------------|-----------|---------------|-----------|-----------|----------------------------|---------------------------|---------------------------------------|
| 2002 | 5104 | 23.2 | 10.6 | 22 | 19.5 | 24.9 | 16 | 59 | 24 |
| 2003 | 5990 | 23.1 | 9.7 | 22.1 | 19.5 | 25.1 | 16 | 58 | 26 |
| 2004 | 6776 | 23.3 | 9 | 22.4 | 19.8 | 25.4 | 14 | 58 | 28 |
| 2005 | 7837 | 23.4 | 9 | 22.5 | 19.8 | 25.6 | 14 | 57 | 29 |
| 2006 | 9793 | 23.3 | 7.9 | 22.6 | 19.9 | 25.7 | 14 | 56 | 29 |
| 2007 | 10514 | 23.4 | 7.9 | 22.7 | 19.9 | 25.8 | 14 | 56 | 30 |
| 2008 | 12222 | 23.5 | 7.5 | 22.8 | 20.1 | 26 | 13 | 55 | 31 |
| 2009 | 13721 | 23.8 | 8.2 | 23 | 20.1 | 26.2 | 13 | 54 | 33 |
| 2010 | 14694 | 24 | 7.8 | 23.2 | 20.3 | 26.5 | 12 | 53 | 35 |
| 2011 | 16496 | 24.1 | 8.7 | 23.3 | 20.4 | 26.5 | 12 | 53 | 35 |

Figure 7.2.1: Cumulative distribution of BMI, HD patients 2002-2011

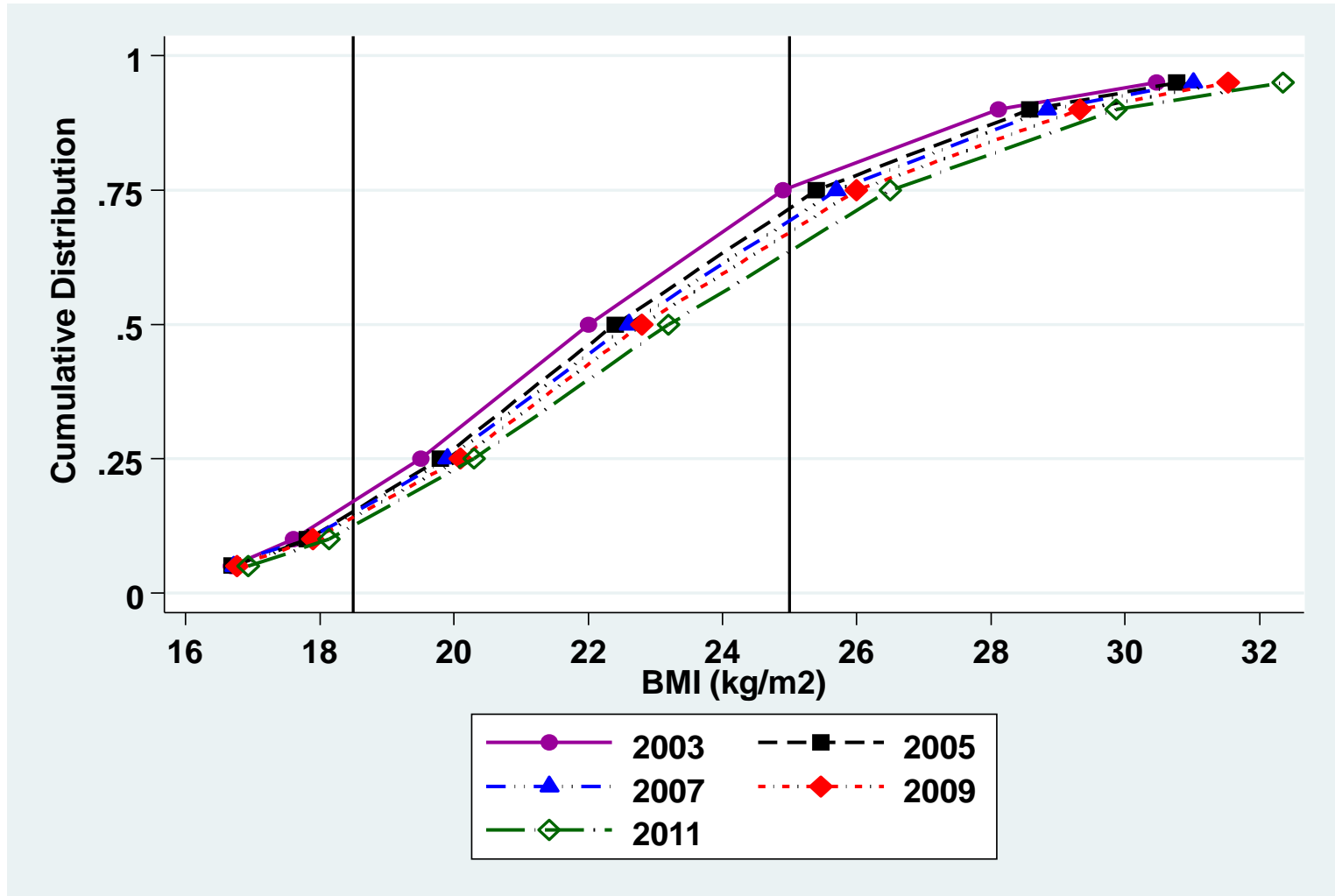


Table 7.2.2: Distribution of BMI, PD patients 2002-2011

| Year | Number of patients | Mean | SD | Median | LQ | UQ | % patients <18.5 | % patients 18.5-25 | % patients ≥25 |
|-------------|---------------------------|-------------|-----------|---------------|-----------|-----------|----------------------------|---------------------------|-----------------------|
| 2002 | 751 | 22.2 | 5.1 | 22.1 | 18.7 | 25.5 | 24 | 47 | 30 |
| 2003 | 1071 | 22.8 | 6.9 | 22.5 | 19.2 | 25.8 | 20 | 50 | 30 |
| 2004 | 1175 | 23.1 | 7.3 | 22.6 | 19.4 | 26 | 19 | 50 | 31 |
| 2005 | 1223 | 23 | 7.2 | 22.5 | 19.3 | 25.8 | 20 | 50 | 30 |
| 2006 | 1420 | 23.3 | 8.3 | 22.6 | 19.6 | 26.1 | 16 | 50 | 33 |
| 2007 | 1616 | 23.4 | 5.9 | 22.9 | 19.9 | 26.3 | 15 | 51 | 34 |
| 2008 | 1872 | 23.8 | 7.7 | 23.2 | 20.2 | 26.6 | 14 | 50 | 36 |
| 2009 | 1944 | 24.1 | 8.5 | 23.4 | 20.4 | 26.8 | 13 | 50 | 38 |
| 2010 | 2050 | 24.5 | 10.2 | 23.5 | 20.5 | 27.1 | 13 | 49 | 39 |
| 2011 | 2223 | 24.2 | 8.8 | 23.5 | 20.3 | 27 | 13 | 49 | 38 |

Figure 7.2.2: Cumulative distribution of BMI, PD patients 2002-2011

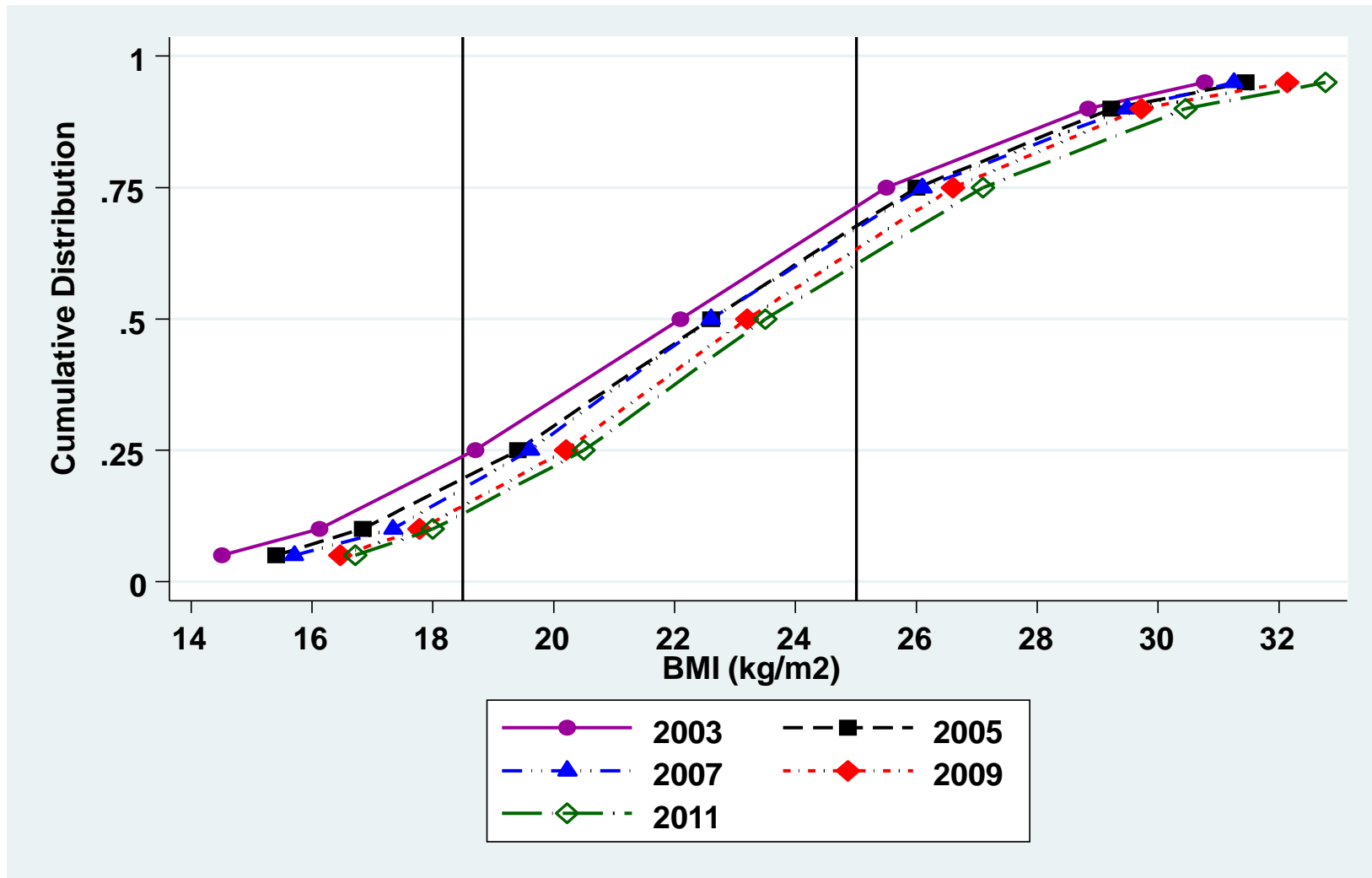


Table 7.2.3: Variation in proportion of patients with BMI \geq 18.5 among HD centres 2002-2011

| Year | Number of centers | Min | 5th centile | LQ | Median | UQ | 95th centile | Max |
|-------------|--------------------------|------------|-------------------------------|-----------|---------------|-------------|--------------------------------|------------|
| 2002 | 133 | 55 | 67 | 79 | 85 | 89 | 100 | 100 |
| 2003 | 159 | 62 | 70 | 79 | 84 | 91 | 100 | 100 |
| 2004 | 189 | 60 | 70 | 82 | 87 | 92 | 100 | 100 |
| 2005 | 208 | 60 | 70 | 80 | 88 | 93 | 100 | 100 |
| 2006 | 259 | 53 | 70 | 80 | 86 | 92 | 100 | 100 |
| 2007 | 279 | 62 | 70 | 81 | 87 | 92 | 100 | 100 |
| 2008 | 328 | 59 | 71 | 82 | 88 | 93 | 100 | 100 |
| 2009 | 359 | 63 | 74 | 82 | 88 | 93 | 100 | 100 |
| 2010 | 388 | 31 | 74 | 84 | 89 | 93.5 | 100 | 100 |
| 2011 | 429 | 57 | 75 | 84 | 89 | 94 | 100 | 100 |

Figure 7.2.3: Variation in proportion of patients with BMI ≥ 18.5 among HD centres 2011

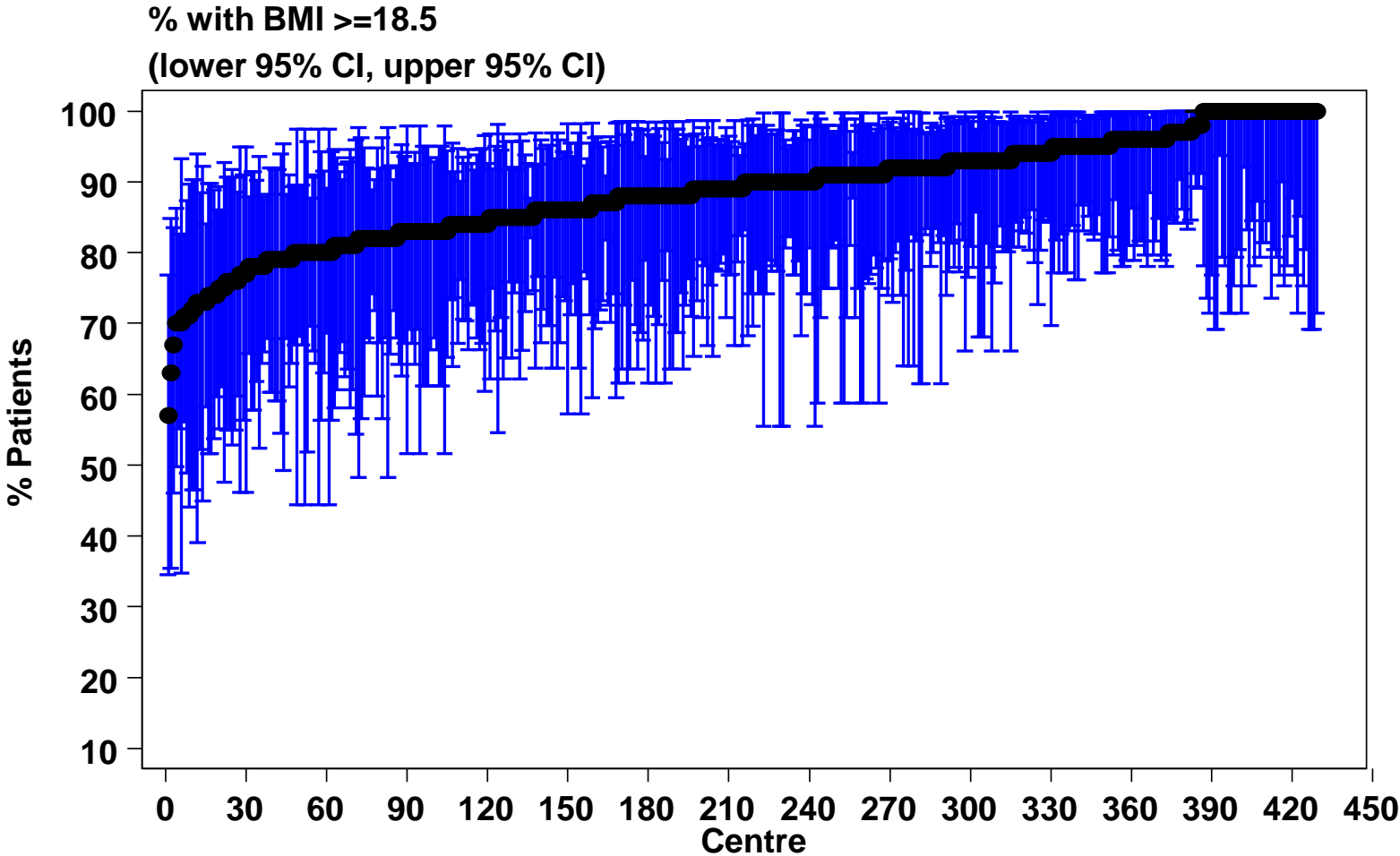


Table 7.2.4: Variation in proportion of patients with BMI \geq 18.5 among PD centres 2002-2011

| Year | Number of centers | Min | 5th centile | LQ | Median | UQ | 95th centile | Max |
|-------------|--------------------------|------------|-------------------------------|-----------|---------------|-----------|--------------------------------|------------|
| 2002 | 14 | 20 | 20 | 73 | 81.5 | 85 | 87 | 87 |
| 2003 | 18 | 18 | 18 | 74 | 80.5 | 88 | 96 | 96 |
| 2004 | 18 | 28 | 28 | 73 | 81.5 | 89 | 94 | 94 |
| 2005 | 18 | 17 | 17 | 70 | 83.5 | 87 | 91 | 91 |
| 2006 | 22 | 13 | 20 | 78 | 84 | 91 | 92 | 92 |
| 2007 | 22 | 15 | 18 | 76 | 87 | 91 | 97 | 100 |
| 2008 | 22 | 17 | 27 | 78 | 87.5 | 91 | 96 | 100 |
| 2009 | 22 | 35 | 38 | 80 | 90.5 | 93 | 95 | 97 |
| 2010 | 23 | 40 | 42 | 77 | 89 | 93 | 98 | 98 |
| 2011 | 26 | 31 | 33 | 80 | 88 | 93 | 96 | 98 |

Figure 7.2.4: Variation in proportion of patients with BMI ≥ 18.5 among PD centres 2011

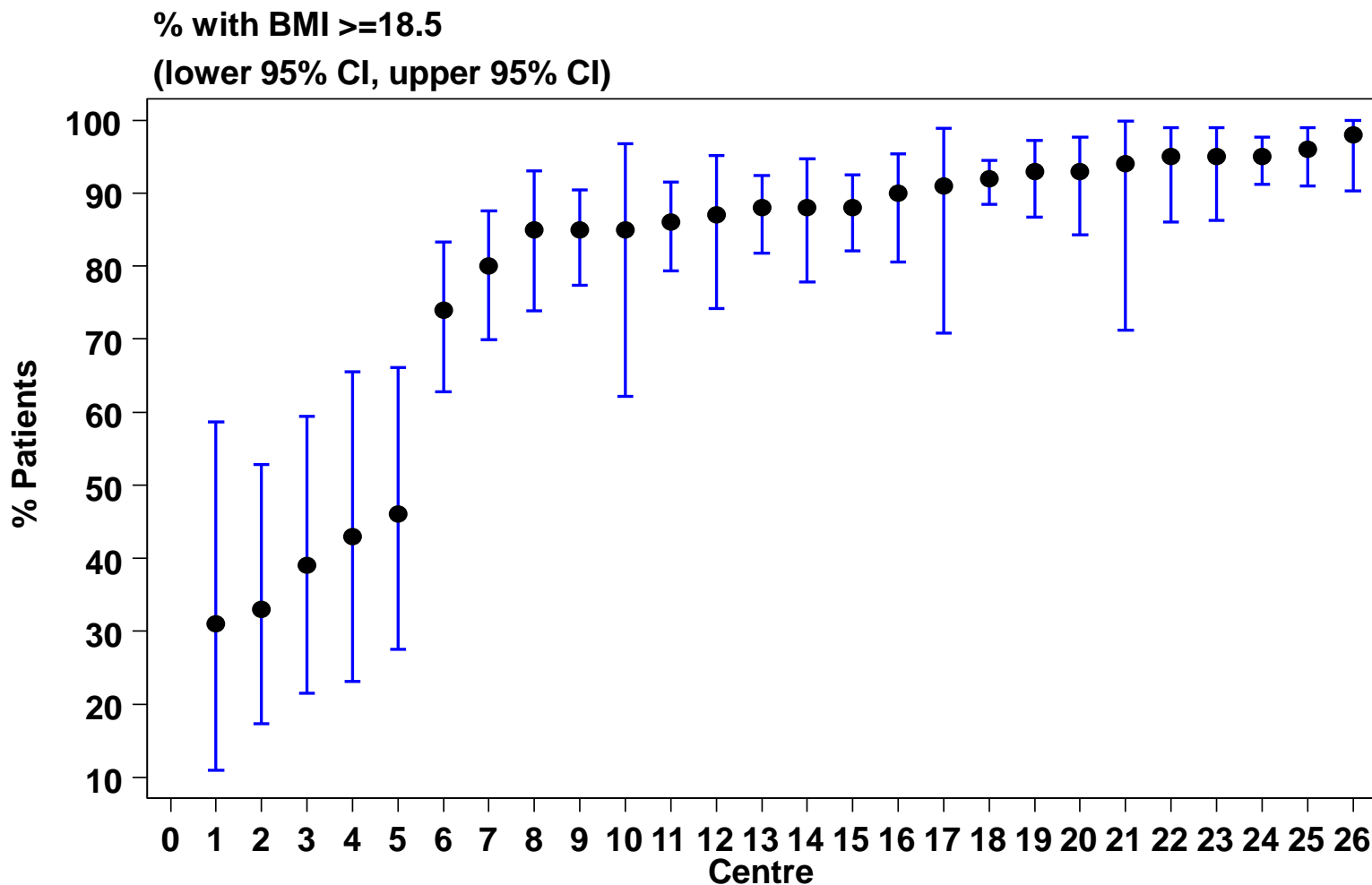


Table 7.2.5: Variation in proportion of patients with BMI \geq 18.5 and serum albumin \geq 40 g/dL among HD centres 2002-2011

| Year | Number of centers | Min | 5th centile | LQ | Median | UQ | 95th centile | Max |
|-------------|--------------------------|------------|-------------------------------|-----------|---------------|-------------|--------------------------------|------------|
| 2002 | 125 | 0 | 7 | 26 | 36 | 54 | 73 | 100 |
| 2003 | 149 | 0 | 18 | 35 | 48 | 61 | 77 | 100 |
| 2004 | 182 | 0 | 11 | 35 | 52 | 64 | 80 | 100 |
| 2005 | 196 | 3 | 13 | 38 | 51 | 62 | 80 | 90 |
| 2006 | 244 | 0 | 11 | 33 | 47 | 62.5 | 80 | 92 |
| 2007 | 271 | 0 | 9 | 33 | 48 | 61 | 74 | 92 |
| 2008 | 311 | 0 | 8 | 31 | 47 | 60 | 76 | 92 |
| 2009 | 351 | 0 | 7 | 32 | 47 | 62 | 76 | 92 |
| 2010 | 380 | 0 | 1.5 | 23 | 41 | 57 | 72 | 91 |
| 2011 | 417 | 0 | 2 | 26 | 40 | 54 | 72 | 100 |

Figure 7.2.5: Variation in proportion of patients with BMI ≥ 18.5 and serum albumin ≥ 40 g/dL among HD centres 2011

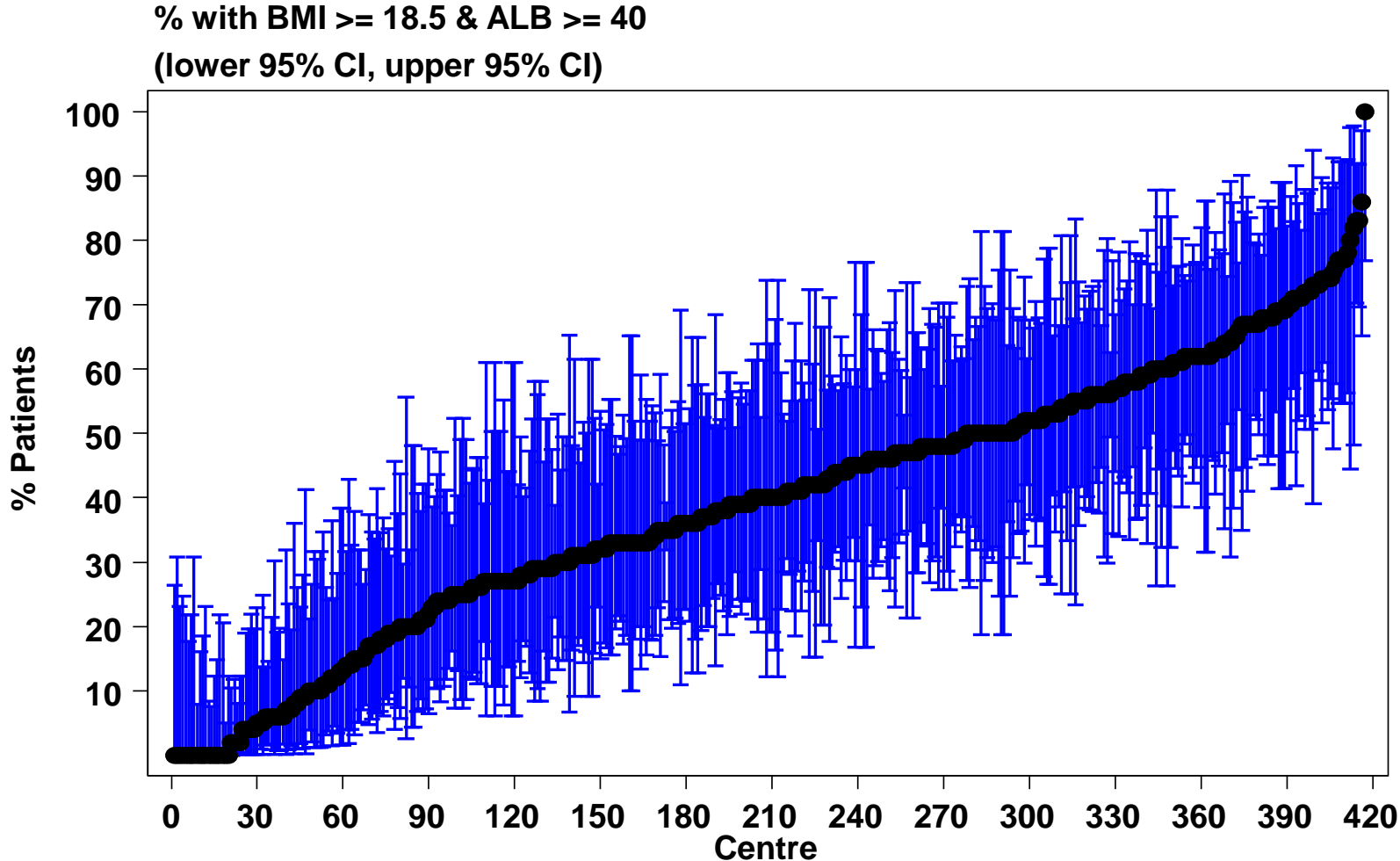


Table 7.2.6: Variation in proportion of patients with BMI \geq 18.5 and serum albumin \geq 40 g/dL among PD centres 2002-2011

| Year | Number of centers | Min | 5th centile | LQ | Median | UQ | 95th centile | Max |
|-------------|--------------------------|------------|-------------------------------|-----------|---------------|-----------|--------------------------------|------------|
| 2002 | 14 | 0 | 0 | 4 | 10.5 | 18 | 36 | 36 |
| 2003 | 18 | 0 | 0 | 4 | 10 | 16 | 46 | 46 |
| 2004 | 18 | 1 | 1 | 5 | 10.5 | 16 | 36 | 36 |
| 2005 | 18 | 0 | 0 | 4 | 8.5 | 17 | 26 | 26 |
| 2006 | 22 | 0 | 0 | 4 | 9.5 | 15 | 20 | 57 |
| 2007 | 22 | 0 | 1 | 5 | 11.5 | 19 | 37 | 57 |
| 2008 | 22 | 0 | 1 | 4 | 10 | 19 | 26 | 45 |
| 2009 | 22 | 0 | 0 | 5 | 11 | 20 | 29 | 34 |
| 2010 | 23 | 0 | 0 | 2 | 8 | 13 | 23 | 24 |
| 2011 | 26 | 0 | 0 | 0 | 5.5 | 17 | 26 | 35 |

Figure 7.2.6: Variation in proportion of patients with BMI ≥ 18.5 and serum albumin ≥ 40 g/dL among PD centres 2011

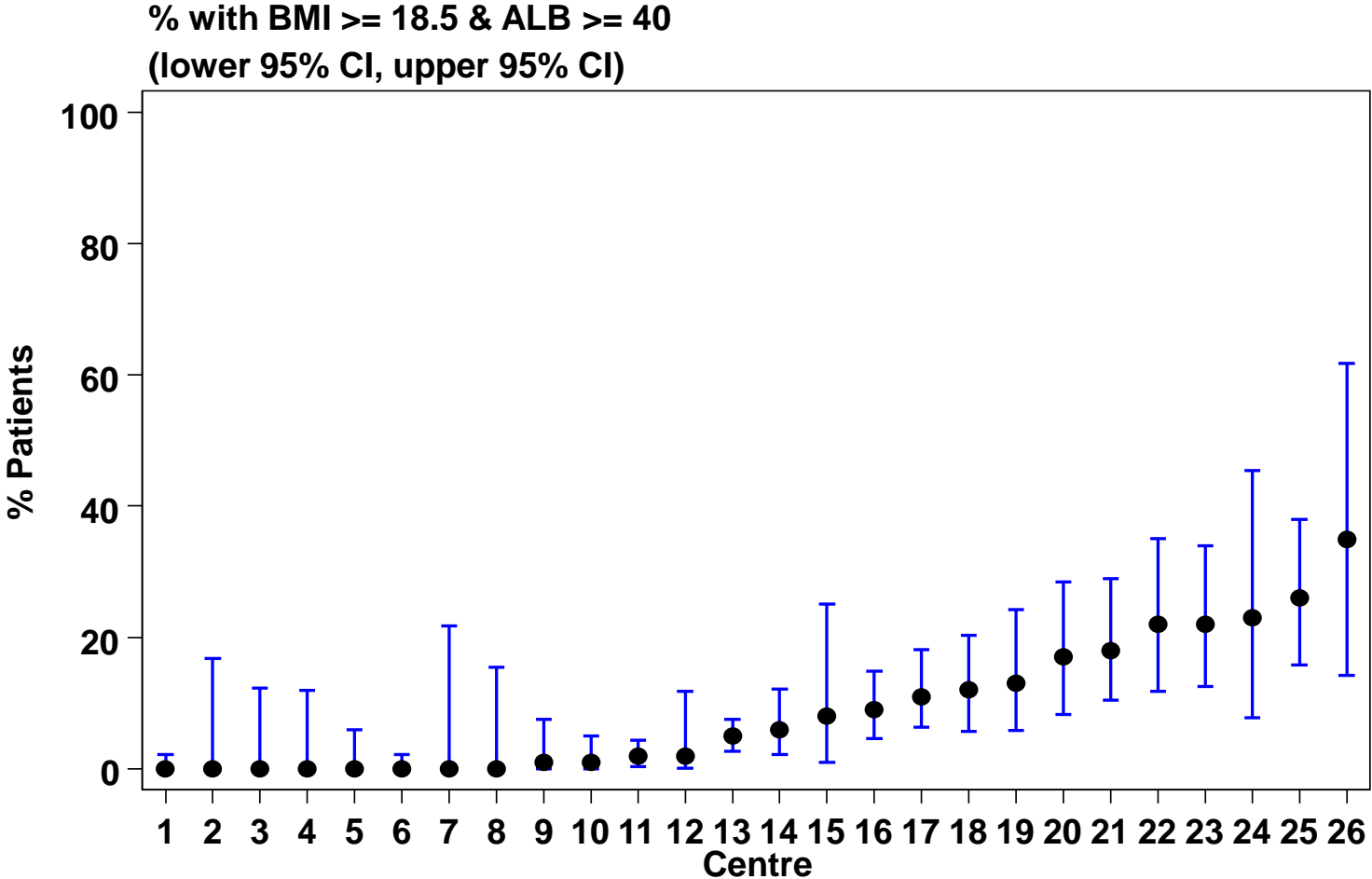


Table 7.3.1: Nutritional parameters between HD (n=22,740) and PD (n=2,612) patients, 2011

| | HD | | PD | |
|-----------------------------|--------------|--------------|--------------|--------------|
| | Mean | SD | Mean | SD |
| Age | 55.4 | 13.7 | 49.3 | 18.3 |
| Albumin (g/dL) | 38.7 | 4.9 | 31.9 | 6.0 |
| BMI | 24.1 | 8.7 | 24.2 | 8.8 |
| Cholesterol (mmol/L) | 4.5 | 1.1 | 5.1 | 1.3 |
| SrCreatinine (mg/dL) | 820.1 | 242.1 | 858.7 | 323.2 |
| Hemoglobin | 10.4 | 1.6 | 10.4 | 1.6 |

Table 7.3.2(a): Nutritional parameters between diabetic (n=10,523) and non-diabetic (n=11,773) HD patients, 2011

| | Diabetes | | Non-Diabetes | |
|-----------------------------|-----------------|--------------|---------------------|--------------|
| | Mean | SD | Mean | SD |
| Age | 51.6 | 15.0 | 59.7 | 10.6 |
| Albumin (g/dL) | 39.4 | 4.9 | 38.2 | 4.8 |
| BMI | 23.2 | 8.7 | 25.2 | 8.5 |
| Cholesterol (mmol/L) | 4.5 | 1.0 | 4.4 | 1.1 |
| SrCreatinine (mg/dL) | 878.0 | 245.9 | 750.6 | 216.9 |
| Hemoglobin | 10.5 | 1.6 | 10.3 | 1.6 |

Table 7.3.2(b): Nutritional parameters between diabetic (n=840) and non-diabetic (n=1,711) PD patients, 2011

| | Diabetes | | Non-Diabetes | |
|-----------------------------|-----------------|--------------|---------------------|--------------|
| | Mean | SD | Mean | SD |
| Age | 44.3 | 19.0 | 59.4 | 11.0 |
| Albumin (g/dL) | 32.6 | 5.9 | 30.5 | 6.0 |
| BMI | 23.4 | 7.8 | 26.0 | 10.5 |
| Cholesterol (mmol/L) | 5.2 | 1.3 | 5.0 | 1.3 |
| SrCreatinine (mg/dL) | 908.2 | 332.1 | 742.1 | 269.1 |
| Hemoglobin | 10.3 | 1.6 | 10.6 | 1.5 |

Table 7.3.3(a): Distribution of serum albumin and BMI by duration of dialysis among HD patients, 2002-2011

| Years | <1 | | 1 - <5 | | 5 - <10 | | ≥10 | |
|-----------------------|-------------|-------------|-------------|------------|-------------|------------|-------------|-------------|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Albumin (g/dL) | 36.3 | 5.6 | 39.1 | 4.0 | 40.3 | 3.3 | 40.5 | 3.0 |
| BMI | 24.3 | 10.5 | 24.5 | 8.1 | 23.8 | 6.9 | 22.6 | 10.6 |

Table 7.3.3(b): Distribution of serum albumin and BMI by duration of dialysis among PD patients, 2002-2011

| Years | <1 | | 1 - <5 | | 5 - <10 | | ≥10 | |
|-----------------------|--------------|------------|------------------|-------------|-------------------|------------|-------------|------------|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Albumin (g/dL) | 31.6 | 6.3 | 32.8 | 5.3 | 34.9 | 3.8 | 34.5 | 3.9 |
| BMI | 23.9 | 5.2 | 24.6 | 11.2 | 23.2 | 4.6 | 21.2 | 3.5 |