# Supplementary Appendix

The authors have included this appendix to give readers additional information about the work.

Supplement to: FA, JP, JB, JH & ZQ. Association between freestanding dialysis facility size and Medicare Quality Incentive Program performance scores: An analysis of Medicare Dialysis Facility Data and United States Renal Data System

Table S1: Bivariate using total number of stations as continuous, squared and squared + cubic terms to predict QIP scores

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Estimate  | SE | t test | P-value |
| Total stations  | -0.019 | 0.022 | -0.87 | 0.3857 |
|   |  |  |  |  |
| Total stations | 0.087 | 0.068 | 1.28 | 0.2007 |
| Total stations \*total stations  | -0.002 | 0.001 | -1.65 | 0.098 |
|   |  |  |  |  |
| Total stations | 0.001 | 0.037 | 0.03 | 0.9732 |
| Total stations \*total stations \*total stations | -0.000 | 0.000 | -0.69 | 0.4878 |
|   |  |  |  |  |
| Total stations | 0.618 | 0.154 | 4.02 | <.0001 |
| Total stations \*total stations  | -0.023 | 0.006 | -4.14 | <.0001 |
| Total station\*total stations \*total stations  | 0.000 | 0.000 | 3.85 | 0.0001 |

Table S2: Adjusted analysis for association between facility size and performance scores, payment year, 2015 (n=5193)

|  |  Model A Facility Characteristics only |  Model BFacility & Community |  Model CFacility, Community & Patient |
| --- | --- | --- | --- |
|   | Estimate | 95% CI | Estimate | 95% CI | Estimate | 95% CI |
| Parameter |  | Lower | Upper |  | Lower | Upper |  | Lower | Upper |
| *Facility factors*  |   |   |   |   |   |   |   |   |   |
| Dialysis facility size *(≤ 10 stations)* |   |   |   |   |   |   |   |   |   |
| >10- ≤ 15  | 0.70 | -0.61 | 2.02 | 1.23 | -0.09 | 2.54 | **3.01** | **0.82** | **5.21** |
| >15- ≤ 20  | 0.64 | -0.69 | 1.98 | **1.49** | **0.12** | **2.87** | **4.21** | **2.03** | **6.40** |
| >20- ≤ 33 | -0.12 | -1.56 | 1.31 | 1.03 | -0.45 | 2.52 | **4.08** | **1.81** | **6.35** |
| ≥ 33  | -1.94 | -4.29 | 0.40 | -0.41 | -2.81 | 1.99 | **3.20** | **0.24** | **6.16** |
| Chain Type *(No chain affiliation)* |   |   |   |   |   |   |  |  |  |
| Chain 1: Large for-profit chain† | **10.00** | **8.82** | **11.18** | **10.38** | **9.21** | **11.56** | **10.33** | **8.89** | **11.77** |
| Chain 2: Large non-profit chain  | **5.83** | **3.54** | **8.12** | **5.78** | **3.50** | **8.06** | **3.83** | **0.95** | **6.72** |
| Chain 3: Large for-profit chain† | **-1.38** | **-2.61** | **-0.15** | -1.10 | -2.33 | 0.13 | -1.47 | -2.96 | 0.02 |
| Chain 4: Other Chains | **3.73** | **2.48** | **4.99** | **3.90** | **2.64** | **5.17** | **2.82** | **1.31** | **4.32** |
| Home Hemodialysis *(Yes)* |  |  |  |  |  |  |  |  |  |
|  No | **0.91** | **0.06** | **1.76** | 0.86 | 0.00 | 1.71 | 0.57 | -0.40 | 1.55 |
| Peritoneal Dialysis (*Yes)* |  |  |  |  |  |  |  |  |  |
|  No  | **0.91** | **0.15** | **1.66** | **1.02** | **0.26** | **1.78** | **2.10** | **1.20** | **3.00** |
| Shift *(Yes)* |  |  |  |  |  |  |  |  |  |
|  No | -0.76 | -1.62 | 0.09 | **-0.94** | **-1.81** | **-0.06** | -0.79 | -1.72 | 0.14 |
| Own type *(Profit)*  |  |  |  |  |  |  |  |  |  |
|  Non-Profit | **-1.90** | **-3.46** | **-0.34** | **-1.81** | **-3.38** | **-0.24** | -1.51 | -3.39 | 0.38 |
| Low volume facilities *(Yes)* |  |  |  |  |  |  |  |  |  |
|  Yes | **2.02** | **0.48** | **3.56** | 1.52 | -0.03 | 3.06 | 2.83 | -0.12 | 5.78 |
| Patients per station *(>5.4/stations)* |  |  |  |  |  |  |  |  |  |
|  ≤ 5.4/station | 0.58 | -0.21 | 1.37 | 0.29 | -0.51 | 1.09 | -0.68 | -1.67 | 0.30 |
| Dialysis treatments/facility | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total staff per 100 patients  | **-0.05** | **-0.08** | **-0.02** | **-0.05** | **-0.08** | **-0.02** | 0.05 | -0.02 | 0.12 |
| Dialysis hours per session  | **1.55** | **0.31** | **2.80** | **1.83** | **0.54** | **3.13** | **1.95** | **0.38** | **3.53** |
| Dialysis treatments session | 1.36 | -0.74 | 3.50 | **2.28** | **0.19** | **4.37** | 1.68 | -1.98 |  5.34 |
| Transplant rate  | **0.35** | **0.15** | **0.54** | **0.38** |  **0.18** | **0.57** | 0.13 | -0.08 | 0.34 |
| *Ecological factors* |  |  |  |  |  |  |  |  |  |
| Rural (*Urban)* |  |  |  |  |  |  |  |  |  |
| Small adjacent /remote rural  |  |  |  | **1.65** | **0.05** | **3.25** | 1.99 | -0.55 | 4.53 |
| Micropolitan  |  |  |  | 1.21 | -0.02 | 2.44 | 1.67 | -0.02 | 3.31 |
| Region *(West)* |  |  |  |  |  |  |  |  |  |
|  Midwest |  |  |  | -1.00 | -2.15 | 0.15 | 0.67 |  -0.73 |  2.08 |
|  Northeast |  |  |  | 1.02 | -0.23 | 2.26 | **1.61** |  **0.08** |  **3.14** |
|  South |  |  |  | -0.04 | -1.20 | 1.12 | **1.68** |  **0.23** |  **3.13** |
| Hispanics population in county  |  |  |  | 0.02 | -0.01 | 0.06 | **0.09** | **0.04** | **0.13** |
| Black population in county |  |  |  | -0.03 | -0.06 | 0.01 | **-0.05** | **-0.08** | **-0.02** |
| Unemployment Rate, 16+ |  |  |  | -0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Median Household Income  |   |   |   | **-0.16** | **-0.29** | **-0.03** | -0.16 | -0.32 | 0.00 |
| Persons in Poverty (percent) |   |   |   | -0.17 | -0.37 | 0.03 | -0.07 | -0.31 | 0.17 |
| Persons with ≥ high school (percent) |  |  |  | **-0.13** | **-0.24** | **-0.02** | -0.11 | -0.24 | 0.03 |
| Competition index |   |   |   | **1.81** | **0.37** | **3.25** | 1.73 | -0.10 | 3.56 |
| *Patient factors averaged at facility level*   |
| Distance (*<5.4 miles)* |   |   |   |   |   |   |   |   |   |
| 5.4- < 8.5 |   |   |   |   |   |   |  **1.18** |  **-0.21** | **2.56** |
| 8.5- < 13.9 miles |   |   |   |   |   |   | **-0.29** | **-1.55** | **-0.94** |
| >=13.9 miles |   |   |   |   |   |   | **-1.54** | **-2.05** | **-0.40** |
| Age of patients  |   |   |   |   |   |   | -0.03 | -0.15 | 0.21 |
| Male (percent) |   |   |   |   |   |   | 0.04 | -0.03 | 0.11 |
| Black patients (percent) |   |   |   |   |   |   | **-0.05** | **-0.08** | **-0.02** |
| Hispanic patients (percent) |   |   |   |   |   |   | **0.09** | **0.04** | **0.13** |
| With ≥ 2 comorbidities (percent) |   |   |   |   |   |   | -0.03 | -0.11 | 0.05 |
| Catheter at treatment initiation (percent) |   |   |   |   |   |   | **-0.10** | **-0.14** | **-0.07** |
| Obese (percent) |   |   |   |   |   |   | 0.01 | -0.07 | 0.08 |
| Medicaid insured (percent) |   |   |   |   |   |   | 0.04 | -0.02 | 0.10 |
| Uninsured (percent) |   |   |   |   |   |   | 0.03 | -0.04 | 0.10 |
| Pre-ESRD Nephrology care(percent) |   |   |   |   |   |   | **0.08** | **0.05** | **0.10** |
| Tobacco users (percent) |   |   |   |   |   |   | 0.00 | -0.10 | 0.11 |
| Glomerular Filtration Rate/ facility |   |   |   |   |   |   | -0.63 | -0.96 | 0.29 |
| Hemoglobin/ facility |   |   |   |   |   |   | 0.09 | -0.07 | 0.25 |
| Comorbidities |  |  |  |  |  |  |  |  |  |
|  Diabetes (percent) |  |  |  |  |  |  | 0.03 | -0.04 | 0.10 |
|  Hypertension (percent) |  |  |  |  |  |  | 0.10 | -0.04 | 0.17 |
|  CHF(percent) |  |  |  |  |  |  | -0.02 | -0.08 | 0.03 |
|  Glomerulonephritis(percent) |  |  |  |  |  |  | 0.00 | -0.08 | 0.08 |
| Notes: \*Proc GLM at α= 0.05† refers two distinct large for-profit chains

|  |
| --- |
| Model A: adjusted for facility factors including chain type, home hemodialysis, peritoneal dialysis, for-profit status, shift, low volume, regional networks, patients per station, staff per 100 patients, dialysis treatment per facility, hemodialysis session per week per patients, hours per session, transplant rate (Model R-square = 16.1%) |
| Model B: adjusted additionally for ecological factors including median household income, unemployment rate among 16+, proportion of person in poverty/county, proportion of black patients per county, proportion of Hispanic patients per county, rurality, region, competition index, educated ≥ high school (Model R-square = 17%) |
| Model C: adjusted additionally for patients factor including per facility average distance from facility, average age of patients, proportion of male patients, proportion of black patients, proportion of Hispanic patients, proportion of ≥ 2 comorbidities, proportion of obese, proportion of Medicaid insured, proportion of uninsured, proportion with catheter at the time of treatment initiation, proportion of pre-ESRD nephrologist care, proportion of smokers, average hemoglobin level, average glomerular filtration rate, proportion of patients with diabetes, hypertension, congestive heart failure and glomerulonephritis (Model R-square = 26.4%) |

 |
|  |