

5.4.6. Interpretation of Risk/Case-mix Factor Findings

CBE ID 5598, Standardized Modality Switch Ratio for Incident Dialysis Patients (SMoSR)

The final model includes the following risk factors:

- Age groups: 18 – <=25; >25 - <=35; >35 - <=45; >45 - <=55; >65 - <=75; >75 - <=85; >85
- BMI categories: underweight (0 < bmi < 18.5); overweight (25 <= bmi < 30); obese (bmi >= 30)
- Primary cause of ESRD: Diabetes
- Primary cause of ESRD: Missing
- Incident year: 2021
- Incident year: 2022
- Incident comorbidities: Atherosclerotic heart disease; Other cardiac disease; Congestive heart failure, Inability to ambulate; Chronic obstructive pulmonary disease; Inability to transfer; Malignant neoplasm/cancer; Diabetes (all types including cause of ESRD); Peripheral vascular disease; Cerebrovascular disease/CVA/TIA; Tobacco use (current smoker); Alcohol dependence; Drug dependence; At least one of the incident comorbidities listed

These patient level covariates were included in the model based on strength of association with the dependent variable suggesting strong predictors of modality switches. In addition, the variable definitions are objectively defined using data from national data sets managed by federal agencies and contributed to by all U.S. dialysis facilities and organizations (e.g. EQRS).

Several sociodemographic and socioeconomic risk variables were considered for inclusion in the model during original measure development but were ultimately not included in the final model. These variables are sex, race, ethnicity, dual-eligible status, area-level SES deprivation, and employment status 6 months prior to ESRD.

Table 1: Comparing hazard ratios between sensitivity models with and without SDS/SES adjustors, 2021-2023: SMoSR Model Coefficients

Covariates	Baseline SMoSR Hazard Ratio	Baseline SMoSR p-value	SDS/SES- adjusted SMoSR Hazard Ratio	SDS/SES- adjusted SMoSR p-value
Sex	*	*	*	*
Male	NA	NA	Reference	*
Female	NA	NA	1.04	0.0014
Race	*	*	*	*
White	NA	NA	Reference	*
Black	NA	NA	0.63	<0.0001
Asian / Pacific Islander	NA	NA	0.87	<0.0001
Native American / Alaskan Native	NA	NA	0.65	<0.0001
Other Race	NA	NA	0.76	<0.0001
Ethnicity	*	*	*	*

Covariates	Baseline SMoSR Hazard Ratio	Baseline SMoSR p-value	SDS/SES- adjusted SMoSR Hazard Ratio	SDS/SES- adjusted SMoSR p-value
Non-Hispanic	NA	NA	Reference	*
Hispanic	NA	NA	0.65	<0.0001
Unknown	NA	NA	0.000006	0.9429
Dual Eligible Status	*	*	*	*
Non-Dual Eligible	NA	NA	Reference	*
Dual Eligible	NA	NA	0.58	<0.0001
Area Level SES Deprivation	*	*	*	*
ADI	NA	NA	0.78	<0.0001
Employment Status 6 Months Prior to ESRD	*	*	*	*
Employed	NA	NA	1.85	<0.0001
Retired/Other/Unknown	NA	NA	1.17	<0.0001
Unemployed	NA	NA	Reference	*
Age	*	*	*	*
18 < Age <= 25	2.00	<0.0001	1.99	<0.0001
25 < Age <= 35	1.81	<0.0001	1.85	<0.0001
35 < Age <= 45	1.67	<0.0001	1.69	<0.0001
45 < Age <= 55	1.32	<0.0001	1.32	<0.0001
55 < Age <= 65	Reference	*	Reference	*
65 < Age <= 75	0.86	<0.0001	0.87	<0.0001
75 < Age <= 85	0.66	<0.0001	0.64	<0.0001
Age > 85	0.51	<0.0001	0.49	<0.0001
BMI	*	*	*	*
BMI < 18.5	0.87	<0.0001	0.88	0.0008
18.5 <= BMI < 25	Reference	*	Reference	*
25 <= BMI < 30	1.11	<0.0001	1.09	<0.0001
BMI >= 30	1.08	<0.0001	1.05	0.0021
Cause of ESRD	*	*	*	*
Diabetes	0.99	0.5790	1.00	0.9174
Missing	0.29	0.0063	0.33	0.0158
Incident Comorbidities	*	*	*	*
Atherosclerotic Heart Disease	1.08	0.0002	1.04	0.0442
Other Heart Disease	1.08	<0.0001	1.06	0.0002
Congestive Heart Failure	0.89	<0.0001	0.91	<0.0001
Inability to Ambulate	0.59	<0.0001	0.63	<0.0001
Chronic Obstructive Pulmonary Disease	0.89	<0.0001	0.91	<0.0001
Inability to Transfer	0.68	<0.0001	0.71	<0.0001

Covariates	Baseline SMoSR Hazard Ratio	Baseline SMoSR p-value	SDS/SES- adjusted SMoSR Hazard Ratio	SDS/SES- adjusted SMoSR p-value
Malignant neoplasm, cancer	1.05	0.0462	0.98	0.4939
Diabetes (all types, including cause of ESRD)	0.89	<0.0001	0.93	0.0002
Peripheral Vascular Disease	0.94	0.0126	0.96	0.0619
Cerebrovascular Disease, CVA, TIA	0.81	<0.0001	0.86	<0.0001
Tobacco Use (current smoker)	0.87	<0.0001	0.89	<0.0001
Alcohol Dependence	0.67	<0.0001	0.66	<0.0001
Drug Dependence	0.49	<0.0001	0.56	<0.0001
At Least One of the Incident Comorbidities Listed	0.90	<0.0001	0.92	<0.0001
Year	*	*	*	*
2021	1.00	0.9328	1.00	0.7408
2022	1.00	0.8507	1.00	0.9498
2023	Reference	*	Reference	*

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Table 2: Comparison of Facility Flagging between SMoSR Model with and without SDS/SES

*	*	SMoSR With SDS/SES			*
*	Facility Performance	Better than expected	As expected	Worse than expected	Total
SMoSR Without SDS/SES	Better than expected	462 (6.8%)	134 (2.0%)	0 (0%)	596 (8.7%)
	As expected	57 (0.8%)	5,652 (82.6%)	72 (1.1%)	5,781 (84.5%)
	Worse than expected	0 (0%)	121 (1.8%)	343 (5.0%)	464 (6.8%)
*	Total	519 (7.6%)	5,907 (86.3%)	415 (6.1%)	6,841 (100%)

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(Pearson's $r=0.965$)

Table 1 of this section reports results of the SMoSR model that includes adjustment for social risk factors of race, ethnicity, sex, dual eligible status, employment status, and area deprivation. Black patients, Asian/Pacific Islander, Native American/Alaskan Native patients had a 37%, 13%, and 35%, respectively,

lower hazard of switching from in-center dialysis to a home modality in their first year of dialysis (all $p < 0.0001$). Patients of Hispanic ethnicity also had a 35% lower hazard ($p < 0.0001$) of switching modality from in-center to home dialysis, and females had a 4% higher hazard ($p = 0.0014$) of switching modality than males. These findings are consistent with the published literature [1,2]. Among SES factors, employment status 6 months prior to incidence, dual eligible status, and area level SES deprivation (ADI) were associated with modality switch events. Employment status 6 months prior to incidence of ESRD was associated with 85% higher hazard ($p < 0.0001$) of switching from in-center to home dialysis treatment, while patients with Medicare dual eligible status or in areas with higher SES deprivation had lower hazard of modality switch (42%, 22%, respectively, both $p < 0.0001$). This is consistent with the literature [3,4] that suggest people with lower SES have lower uptake of a home dialysis modality. The lower uptake is potentially based on an assumption that patients with lower SES do not have the material and social resources needed to support dialysis at home. Similarly, facilities may generally not encourage home dialysis for patients that they feel may not be able to successfully do dialysis at home due to limited social and economic resources.

Table 2 of this section shows results that compare facility performance between the base model that does not adjust for social risk factors, to a model that includes adjustment for race, ethnicity, sex, dual eligible status, employment status 6 months prior to ESRD, and area deprivation. After adjustment for these social risk factors, 384 (5.6%) changed performance categories. 206 (3.0%) facilities moved to a lower performance category, and 178 (2.6%) moved to a higher performance category. SMOsR with and without adjustment for patient SDS/SES were highly correlated (Pearson's $r = 0.965$).

There are known disparities in uptake of home dialysis modality among people of Black race, Hispanic ethnicity, and lower socioeconomic status. This was further highlighted in a recent study examining the association of social risk factors and uptake of home dialysis [4]. Overall, the study reported that facilities with higher percentages of patients with social risk factors of race, ethnicity, or Medicaid coverage were less likely to offer peritoneal dialysis and had lower rates of initiation of home dialysis. These findings are generally consistent with other peer-reviewed literature that has reported lower uptake of home dialysis in these populations [1,2]. Thorsness et al suggested consideration of risk adjustment to assure a fair assessment of facilities with higher proportions of patients with social risk factors [4]. However, there was no examination whether the source of these differences was related to disparities in care and access to home modalities, in which case adjustment would not be appropriate.

Race, Hispanic ethnicity, female sex, and SES factors are not included in the final risk adjusted model for SMOsR. While these factors are associated with decreased uptake of home dialysis in patient-level analyses, the impact is largely attenuated at the facility-level analysis of flagging. That is, 94.4% of facilities performance category will not change with or without adjustment for these social risk factors. Furthermore, among the 5.6% of facilities whose performance category does change with SDS/SES adjustment, the 2.6% of facilities who move to a higher performance category are offset by the 3.0% of facilities that move to a lower performance category. Further work is needed to demonstrate that differences based on these factors are not related to facility processes of care and differences in the education provided to patients about home dialysis, in order to prevent disparities in care. While there is a push to include social risk factors as adjustments in performance measures, this has potential unintended consequences that may exacerbate disparities. In the absence of definitive evidence demonstrating risk adjustment for these social factors does not result in differential access to care, the most appropriate decision is not to risk adjust for these SDS/SES factors. The primary goal should be to

implement quality measures that result in the highest quality of patient care and equitable access for all patients to that care.

Finally, the 2021 Technical Expert Panel consensus was there are known disparities between social risk factors and uptake of home dialysis. TEP members expressed concern that adjusting for social risk factors of race, ethnicity, sex, and SES could potentially further disadvantage patients based on their race, ethnicity, or lack of SES-based resources [5]. During the TEP, CMS noted potential legal challenges with implementing race and ethnicity adjustment factors in Federal Payment programs.

References:

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