

Supplemental Material

Table of Contents

Content	Page
Supplemental Table 1 Full Description of Deficits included in the Frailty Index	2
Supplemental Table 2 Frailty index by Age and Sex in 2017 Cohort	4
Supplemental Table 3. Hazard Ratios associated with age and sex by each Model and Cohort by Outcome	5
Supplemental Figure 1. Cohort Flow Diagram for 2017 cohort	6
Supplemental Figure 2. Locally estimated scatterplot smoothing (LOESS) curves of Frailty Index and Outcomes Identifies Three Frailty Index Categories	7
Supplemental Figure 3 Kaplan-Meier Curves in the 2017 Cohort	10
Supplemental Figure 4. Visualization of all 53 Deficits	12

Supplemental Table 1. Full Description of Deficits included in the Frailty Index

ICD-9	Code Definition
110-118	Mycoses
150-159	Malignant neoplasm of digestive organs and peritoneum
170-176	Malignant neoplasm of bone, connective tissue, skin, and breast
179-189	Malignant neoplasm of genitourinary organs
235-238	Neoplasms of uncertain behavior
240-246	Disorders of the thyroid gland
260-269	Nutritional deficiencies
290-294	Organic psychotic conditions
360-379	Disorders of the eye
389-389	Hearing loss
410-414	Ischemic heart disease
420-429	Other forms of heart disease
440-449	Diseases of arteries, arterioles, and capillaries
451-459	Diseases of veins and lymphatics, and other diseases of circulatory system
480-487	Pneumonia and influenza
490-496	COPD and allied conditions
590-599	Other diseases of urinary system
600-608	Diseases of male genital organs
690-698	Other inflammatory conditions of skin and subcutaneous tissue
700-709	Other diseases of skin and subcutaneous tissue
710-719, 725	Arthropathies, related disorders, and polymyalgia rheumatica
726-729	Other disorders of joints and soft tissue
797-799	Ill-defined and unknown causes of morbidity and mortality
805-809	Fracture of spine and trunk
820-829	Fracture of lower limb
870-879	Open wound of head neck and trunk
910-924	Superficial injury and contusion
958-959	Certain early complications of trauma
V01-V09	Persons with potential health hazards related to communicable diseases
V50-V59	Encounters for other specific health care
BETOS	
D1B	Hospital beds
D1C	Oxygen and supplies
D1D	Wheelchairs
I1A	Standard imaging - chest
I2A	Advanced imaging - cat: head
M2A	Hospital visit - initial
M2B	Hospital visit - subsequent
M3	Emergency room visit
M4A	Home visit

M4B	Nursing home visit
M5C	Specialist - ophthalmology
O1A	Ambulance
O1G	Influenza immunization
P5A	Ambulatory procedures - skin
P6A	Minor procedures - skin
T1C	Lab tests - urinalysis
T2A	Other tests - electrocardiograms
T2C	Other tests - EKG monitoring
Y1	Other - Medicare fee schedule
Y2	Other - non-Medicare fee schedule
Medical Evidence	
BMI<20 (low BMI)	This is not a code, so there is no additional definition.
Inability to Transfer	This is not a code, so there is no additional definition.
Needs assistance with daily activities	This is not a code, so there is no additional definition.

Supplemental Table 2 Frailty index by Age and Sex in 2017 Cohort

Age group (years)	Male		Female	
	Mean (SD)	N	Mean (SD)	N
65-69	0.24 (0.13)	3222	0.27 (0.12)	2473
70-74	0.26 (0.13)	3336	0.29 (0.12)	2381
75-79	0.29 (0.13)	2733	0.30 (0.12)	2003
80-84	0.30 (0.13)	1939	0.31 (0.12)	1386
85-90	0.32 (0.13)	1088	0.33 (0.12)	794

Supplemental Table 3. Hazard Ratios associated with Age and Sex by each Model and Cohort by Outcome

Time to Death				
	Age (5 year increments)		Sex (female vs male)	
	2013	2017	2013	2017
	HR (95% CI)			
Model 1	1.22 (1.19, 1.25)	1.18 (1.14, 1.20)	0.85 (0.79, 0.90)	0.84 (0.78, 0.89)
Model 2	1.18 (1.15, 1.21)	1.14 (1.11, 1.17)	0.86 (0.81, 0.92)	0.85 (0.79, 0.91)
Model 3	1.16 (1.13, 1.19)	1.11 (1.09, 1.14)	0.80 (0.75, 0.85)	0.79 (0.74, 0.85)
Model 4	1.16 (1.13, 1.19)	1.12 (1.09, 1.15)	0.83 (0.77, 0.88)	0.82 (0.77, 0.88)
Time to First Hospitalization				
	Age (5 year increments)		Sex (female vs male)	
	2013	2017	2013	2017
Model 1	1.06 (1.04, 1.07)	1.05 (1.04, 1.07)	1.12 (1.08, 1.17)	1.14 (1.10, 1.19)
Model 2	1.03 (1.02, 1.05)	1.03 (1.01, 1.04)	1.13 (1.09, 1.17)	1.15 (1.11, 1.19)
Model 3	1.01 (1.00, 1.03)	1.01 (0.99, 1.02)	1.06 (1.02, 1.10)	1.09 (1.05, 1.13)
Model 4	1.01 (1.00, 1.03)	1.01 (0.99, 1.02)	1.08 (1.04, 1.12)	1.11 (1.07, 1.15)

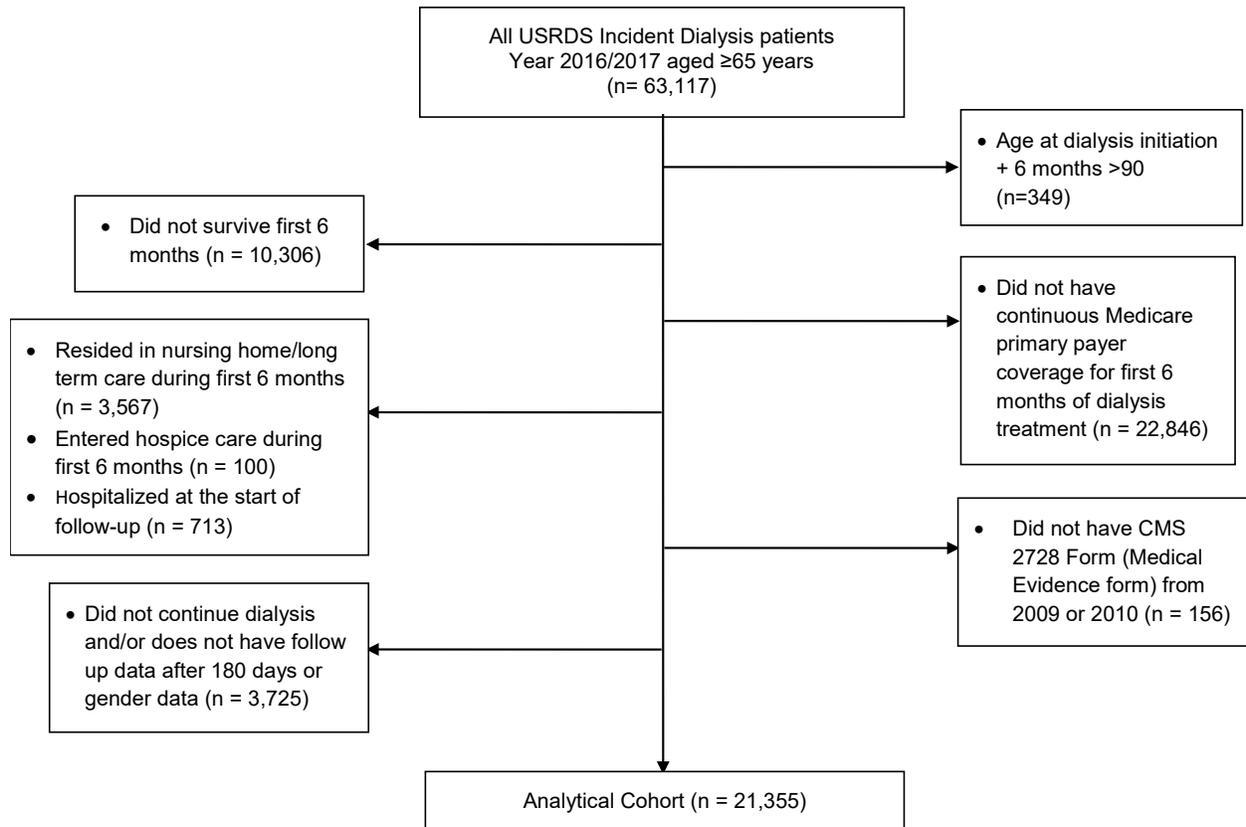
Model 1 – age and sex only

Model 2 – age, sex, and comorbidity index

Model 3 – age, sex, and frailty index

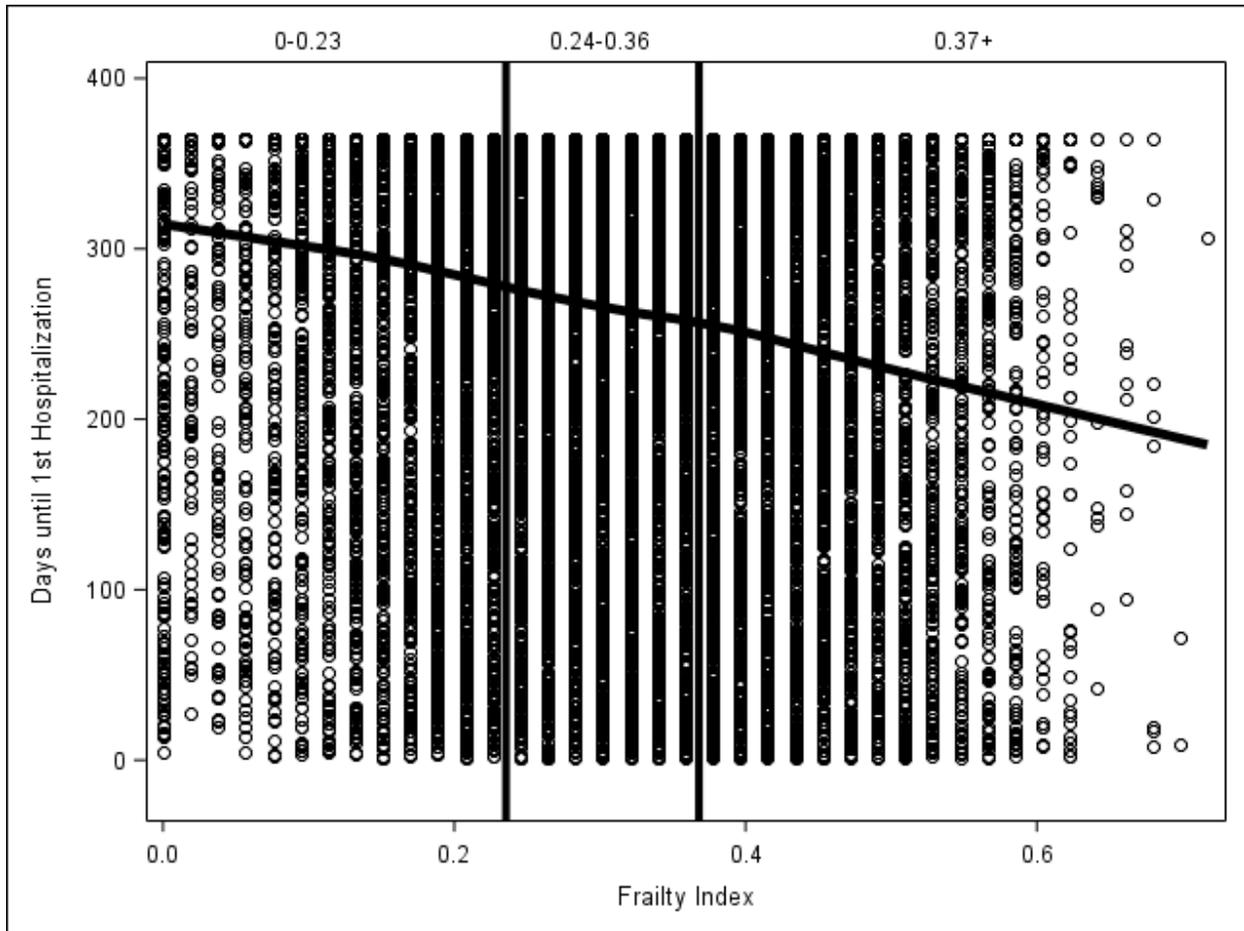
Model 4 – age, sex, comorbidity index, and frailty index

Supplemental Figure 1. Cohort Flow Diagram for 2017 cohort

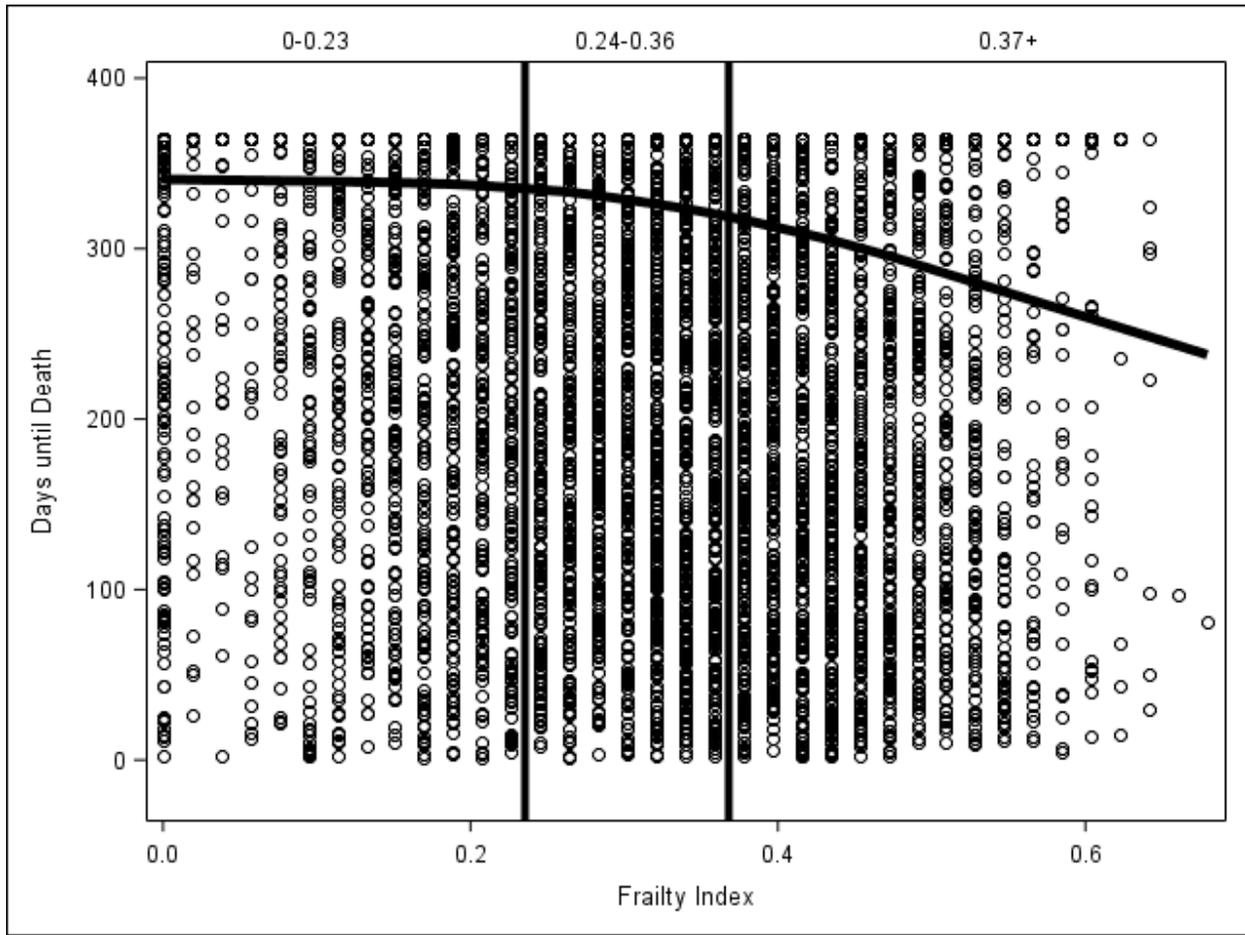


Supplemental Figure 2. Locally estimated scatterplot smoothing (LOESS) curves of Frailty Index and Outcomes Identifies Three Frailty Index Categories

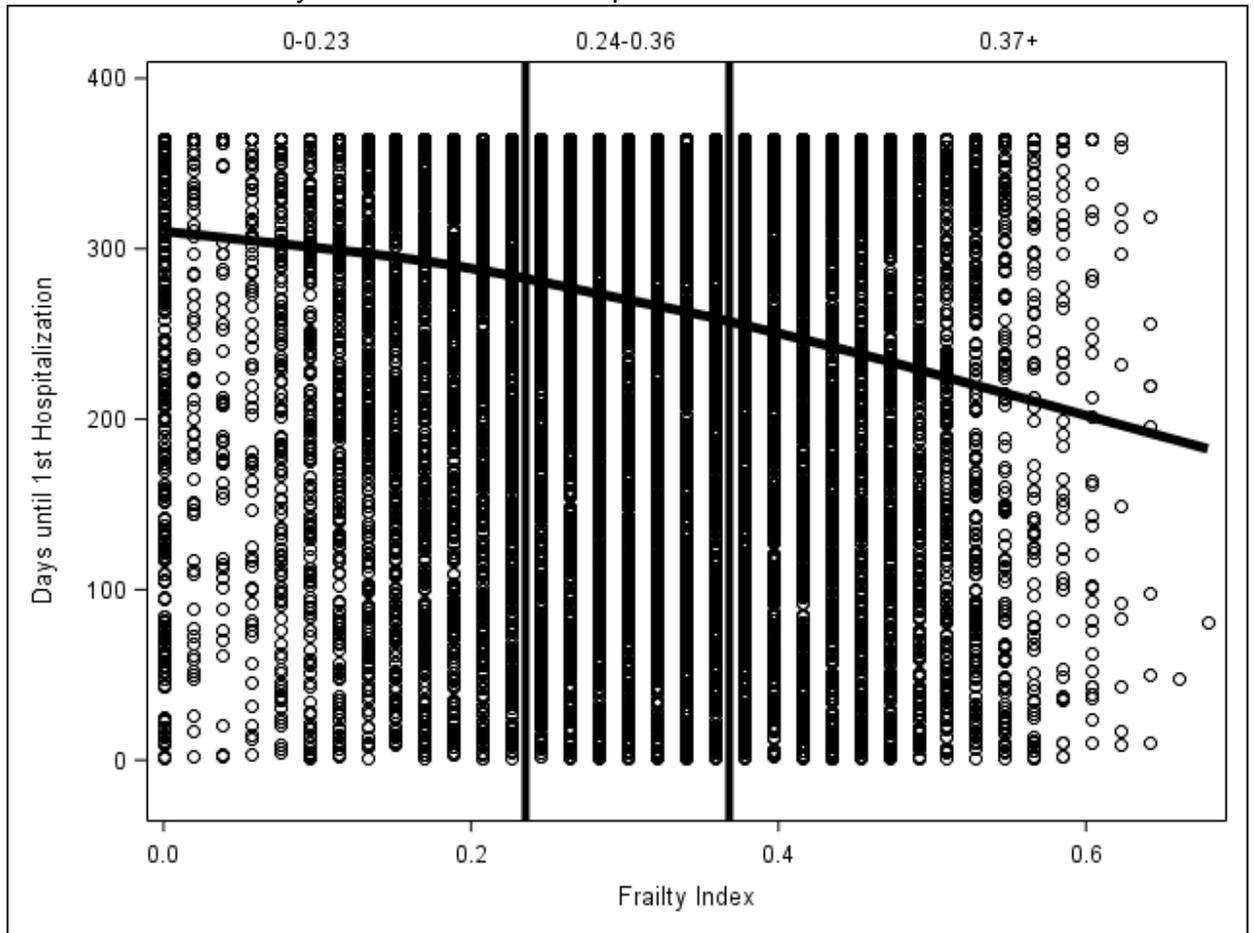
A) LOESS Curve of Frailty Index and Time to Hospitalization in the 2013 Cohort



B) LOESS Curve of Frailty Index and Time to Death in the 2017 Cohort



C) LOESS Curve of Frailty Index and Time to Hospitalization in the 2017 Cohort

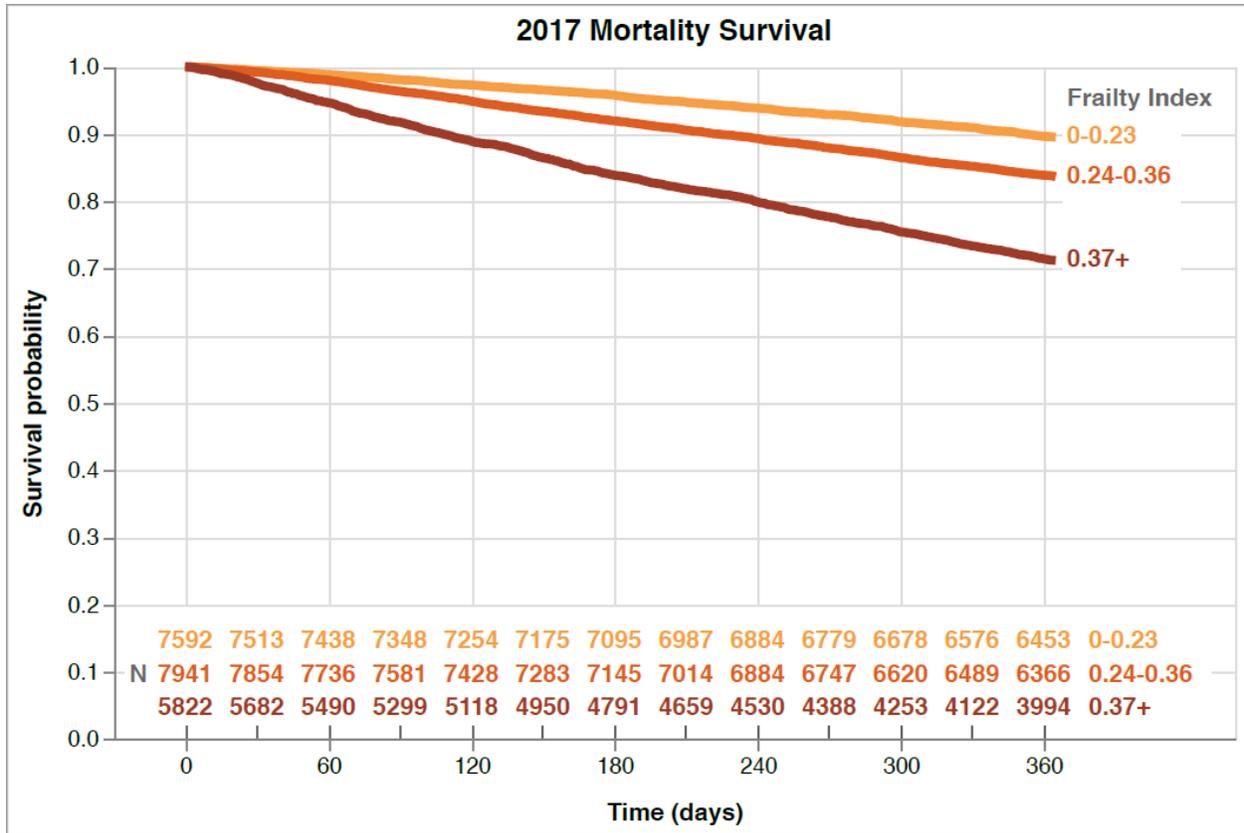


Three frailty index categories identified by visual inspection: 0-0.23, 0.24-0.36, and 0.37 or higher.

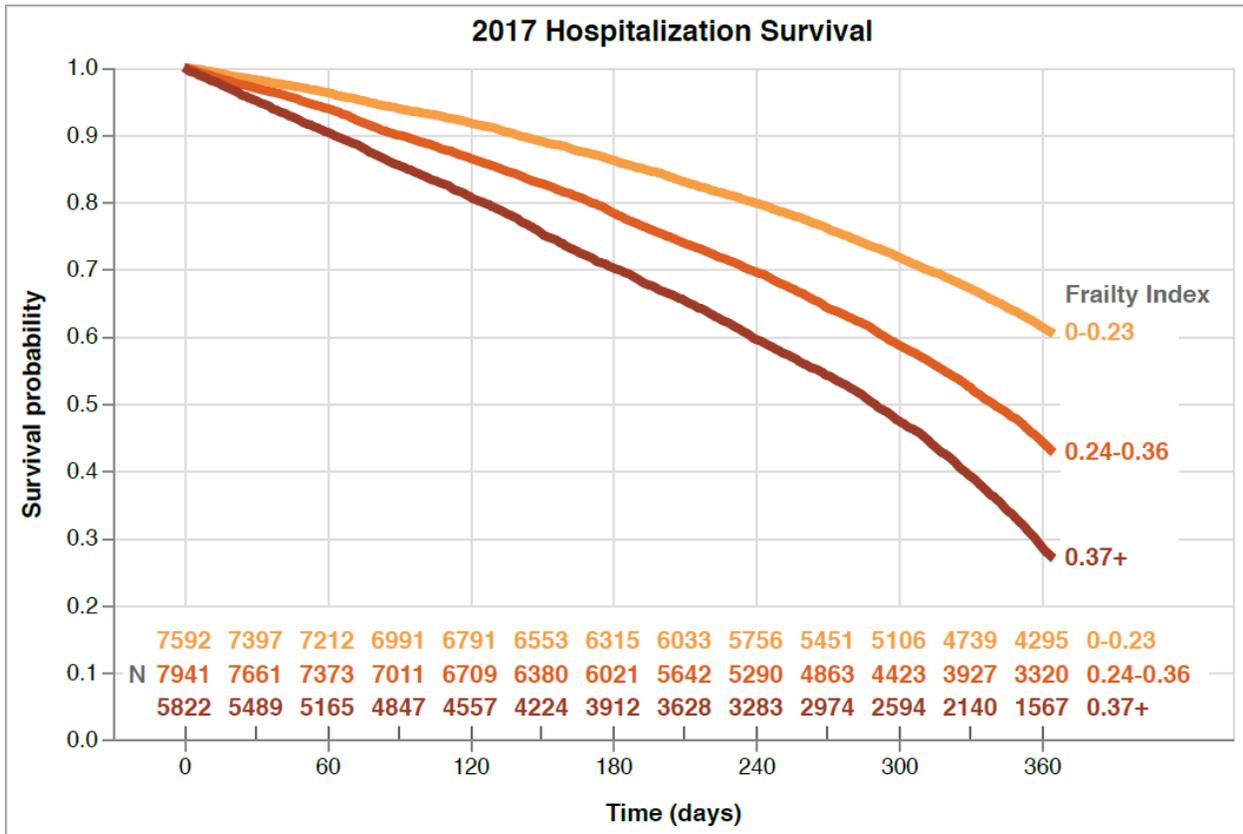
Supplemental Figure 3

Kaplan-Meier Curves in the 2017 Cohort

A) Kaplan-Meier Curve for Time to Death by Frailty Index Category



B) Kaplan-Meier Curve for Time to First Hospitalization by Frailty Index Category



For both plots, the lightest orange line is the 0-0.23 group, medium orange line is the 0.24-0.36 group, and darkest orange line is the 0.37+ group (those with the highest frailty index values).

Supplemental Figure 4. Visualization of all 53 Deficits

