

APPENDIX C – Specifications of the National Voluntary Consensus Standards for Nursing-Sensitive Performance Measurement

Framework Category	Measure	Source of Measure	Numerator	Denominator	Exclusions
Patient-centered Outcome Measures	1. Failure to rescue (major surgical patients) <sup>1</sup>	US Department of Health and Human Services (DHHS) <sup>2</sup>	Inpatients whose discharge status is death	Major surgical discharges <sup>3</sup> with complications of care: sepsis (ICD-9-CM codes 038, 790.7), pneumonia (ICD-9-CM codes 507.0, 997.3, 514, 482, 485, 486), GI bleeding (ICD-9-CM codes 531.00-531.31, 531.9, 532.00-532.31, 532.9, 533.00-533.31, 533.9, 534.00-534.31, 534.9, 535.01, 535.4, 578.9, 530.82), shock/cardiac arrest (ICD-9-CM codes 427.5, 785.5, 785.50, 785.51, 785.59, 799.1, 93.93, 99.60, 99.63), DVT/PE (ICD-9-CM codes 451.81, 451.11, 451.19, 415.11, 415.1, 453.8)	Exclusions as noted for each complication of care: <ul style="list-style-type: none"> <li>• Sepsis excluding sepsis as a primary diagnosis, immunocompromised states, AIDS, LOS &gt; 3 days, infection related admission (DRG 20, 68-70, 79-81, 89-91, 126, 238, 242, 277-279, 320-322, 415, 416, 417, 423)</li> <li>• Pneumonia excluding any primary diagnosis of pneumonia (ICD-9-CM 480-487, 507.0, 514, 997.3), any secondary diagnosis of ICD-9-CM 480, 481, 483, 484, 487, MDC4 (respiratory system), AIDS, immunocompromised states</li> <li>• GI Bleeding excluding primary GI bleed as a primary diagnosis, MDC 6 (digestive tract), MDC 7 (hepatobiliary tract and pancreas), primary diagnosis of anemia due to blood loss (ICD-9-CM 280.0, 285.1), trauma, burn, alcoholism</li> <li>• shock/cardiac arrest excluding shock as primary diagnosis, MDC 4 (respiratory), MDC 5 (cardiac), hemorrhage or trauma as a primary diagnosis;</li> <li>• DVT/PE excluding DVT/PE as a primary diagnosis and pregnancy related PE (673.2X)</li> </ul>

<sup>1</sup> Patient level factors that contribute to the risk of acquiring particular in-hospital complications used in a logistic regression model to predict each patient’s probability. See Table 1. for the risk adjustment coefficients as provided by Needleman J et al.

<sup>2</sup> Needleman J, Buerhaus PI, Mattke S, Stewart M, Zelevinsky K. Nurse Staffing and Patient Outcomes in Hospitals. Final Report, US Department of Health and Human Services, Health Resources and Services Administration, February 28, 2001. Contract No. 230-99-0021.

<sup>3</sup> Risk pools were constructed based on the DRG codes found in Table 2.

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	2. Pressure ulcer prevalence	ANA/ CalNOC <sup>4</sup>	<p>Inpatients with National Pressure Ulcer Advisory Panel (NPUAP) – Stage II or greater hospital-acquired pressure ulcers<sup>5</sup></p> <p>Inpatients with NPUAP – Stage I-IV ulcers (AHCPR)</p>	<p>Inpatients in the prevalence study x 100<sup>6,7</sup></p> <p>NOTE: Quarterly reporting is recommended by measure developer</p>	<ul style="list-style-type: none"> <li>• Patients less than 16 years of age</li> <li>• Skin breakdown due to arterial occlusion, venous insufficiency, diabetes neuropathy, or incontinence dermatitis is not reported in the numerator</li> <li>• Pressure ulcers present on admission (community-acquired)::               <ul style="list-style-type: none"> <li>○ Pressure ulcers discovered/ documented on first day of hospitalization</li> <li>○ If the prevalence study is done on day 1 of patient's hospital stay and the patient's ulcer is already present</li> <li>○ If the prevalence study is done on day 2 of patient's hospital stay and the patient's Stage II+ ulcer is already present</li> </ul> </li> </ul>

<sup>4</sup> VANOD and MilNOD initiatives are also using this measure.

<sup>5</sup> NPUAP/AHCPR classification (any lesion caused by unrelieved pressure resulting in damage of underlying tissue); In *Pressure Ulcers in Adults: Prediction and Prevention*. Clinical Practice Guideline Number 3. AHCPR Pub. No. 92-0047: May 1992.

<sup>6</sup> Stratified by unit type: medical-surgical, critical care, step down (intermediate care units; specialized telemetry units; transitional care units, i.e., transition from critical care to acute med/surg),.

<sup>7</sup> Stratified by hospital size: under 100, 100-199, 200-299, 300-399, 400-499, 500 or more

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	3. Pneumonia (hospital-acquired) prevalence <sup>1,2</sup>	DHHS	Inpatients whose discharge diagnoses is aspiration pneumonia (ICD-9-CM code 507.0), post-operative pneumonia (ICD-9-CM code 997.3), hypostatic pneumonia (ICD-9-CM code 514), bacterial pneumonia (ICD-9-CM code 482), bronchopneumonia (ICD-9-CM code 485), unspecified pneumonia (ICD-9-CM code 486)	Medical and major surgical discharges <sup>3</sup>	<ul style="list-style-type: none"> <li>• Any primary diagnosis of pneumonia (ICD-9-CM code 480-487, 507.0, 514, 997.3)</li> <li>• Any secondary diagnosis of ICD-9-CM code 480, 481, 483, 484, 487</li> <li>• MDC 4 (respiratory system)</li> <li>• AIDS</li> <li>• Immunocompromised states</li> </ul>
	4. Falls prevalence <sup>8</sup>	ANA/ CalNOC <sup>4</sup>	Total falls <sup>9</sup>  Total falls with injuries  Falls are defined as “patients who experience an unplanned descent to the floor”	Inpatient days x 1,000 <sup>6,7</sup> .  NOTE: Quarterly reporting is recommended by measure developer	<ul style="list-style-type: none"> <li>• Patients less than 16 years of age</li> </ul>

<sup>8</sup> NQF-endorsed Hospital Care Performance Measure

<sup>9</sup> Falls are defined as patients who experience an unplanned descent to the floor

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	5. Restraint prevalence	CalNOC <sup>4</sup>	Inpatients that have restraint on the day of the prevalence study	Inpatients in the prevalence study <sup>6,7,10</sup>	<ul style="list-style-type: none"> <li>• Patients less than 16 years of age</li> </ul>
	6. Urinary tract infection (UTI) prevalence <sup>1,2</sup>	DHHS	Inpatients whose discharge diagnosis is UTI: unspecified (ICD-9-CM code 599.0), related to urinary catheter (ICD-9-CM code 996.64)	Medical and major surgical discharges <sup>3</sup>	<ul style="list-style-type: none"> <li>• UTI as primary diagnosis:</li> <li>• Sepsis as primary diagnosis</li> <li>• MDC 11 (kidney and urinary tract)</li> <li>• MDC 12 (male reproductive system)</li> <li>• MDC 13 (female reproductive system)</li> <li>• MDC 14 (pregnancy related)</li> <li>• MDC 15 (newborns)</li> <li>• pregnancy-related UTI (ICD-9-CM code 646.6X)</li> <li>• abortion-related UTI (ICD-9-CM code 639.8)</li> </ul>

<sup>10</sup> Any manual method of physical or mechanical device, material, or equipment attached or adjacent to the patient’s body that he or she cannot easily remove that restricts freedom of movement or normal access to one’s body. Side rails are defined as restraints based on facility policy.

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	7. Urinary catheter-associated UTI for intensive care unit (ICU) patients <sup>4</sup>	Centers for Disease Control and Prevention (CDC)	Number of indwelling urinary catheter-associated UTIs (defined by CDC case definitions of symptomatic UTI or asymptomatic bacteriuria, excludes other infections of the urinary tract <sup>11,12</sup> ) times 1,000	Number of central line-days for ICU patients Reported by type of ICU (coronary, cardiothoracic, medical, medical-surgical (major teaching and all others), neurosurgical, pediatric, surgical, trauma, burn, and respiratory)	<ul style="list-style-type: none"> <li>• None</li> </ul>

<sup>11</sup> Definitions for infections are given in: Garner JS, et al. CDC Definitions for Noscomial Infections. In: Olmsted, RN, ed. *APIC Infection Control and Applied Epidemiology: Principles and Practice*. St. Louis: Mosby, 1996: pp. A1-A20. Available at [www.apic.org/pdf/cdcdefs.pdf](http://www.apic.org/pdf/cdcdefs.pdf).

<sup>12</sup> Personal communication, Linda McKibbin, MD, MPH, Medical Officer, CDC/NCID, Division of Healthcare Quality Promotion/Prevention and Evaluation Branch, October 21, 2002.

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	8. Central line catheter-associated blood stream infection rate for ICU and high-risk nursery (HRN) patients <sup>4</sup>	CDC	Number of central line-associated blood stream infections (laboratory-confirmed bloodstream infection or clinical sepsis) times 1,000 <sup>9</sup>	<p>Number of central line-days for ICU patients Reported by type of ICU (coronary, cardiothoracic, medical, medical-surgical (major teaching and all others), neurosurgical, pediatric, surgical, trauma, burn, and respiratory)</p> <p>Number of central-line days for HRN patients Reported for HRNs by birth weight category (<math>\leq 1,000</math>, 1,001-1,500, 1,501-2,500, and <math>&gt;2,500</math>g)</p>	<ul style="list-style-type: none"> <li>• None</li> </ul>
	9. Ventilator-associated pneumonia for ICU and HRN patients <sup>4</sup>	CDC	Number of ventilator-associated pneumonias times 1,000 <sup>9</sup>	<p>Number of ventilator-days for ICU patients Reported by type of ICU (coronary, cardiothoracic, medical, medical-surgical (major teaching and all others), neurosurgical, pediatric, surgical, trauma, burn, and respiratory)</p> <p>Number of ventilator days for HRN patients Reported for HRNs by birth weight category (<math>\leq 1,000</math>, 1,001-1,500, 1,501-2,500, and <math>&gt;2,500</math>g)</p>	<ul style="list-style-type: none"> <li>• None</li> </ul>

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Nurse-centered Intervention Measures	10. Smoking cessation counseling (AMI, HF, pneumonia) <sup>4</sup>	Joint Commission on Accreditation of Healthcare Organizations (JCAHO) (ORYX) and Centers for Medicare and Medicaid Services (CMS)-Quality Improvement Organizations (QIO)	Inpatients who receive smoking cessation advice or counseling given during hospitalization	<p>AMI inpatients (principle diagnosis ICD-9-CM code of 410.01, 410.11, 410.21, 410.31, 410.41, 410.51, 410.61, 410.71, 410.81, 410.91) with a history of smoking cigarettes anytime during the year prior to hospital arrival</p> <p>HF inpatients (principal diagnosis ICD-9-CM code of 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, 404.93, 428.0, 428.1, 428.20, 428.21, 428.23, 428.30, 428.31, 428.32, 428.33, 428.40, 428.41, 428.42, 428.43, 428.9) with a history of smoking cigarettes anytime during the year prior to hospital arrival</p> <p>Pneumonia inpatients (principal diagnosis ICD-9-CM code of 480.0-483.8, 485-486, or 487.0; or a principal diagnosis code of sepsis (038.xx) or 518.81<sup>13</sup> (respiratory failure), and a secondary diagnosis code of pneumonia) with a history of smoking cigarettes anytime during the year prior to hospital arrival</p>	<ul style="list-style-type: none"> <li>• &lt; 18 years of age</li> <li>• Transferred to another acute care hospital</li> <li>• Expired</li> <li>• Left against medical advice</li> <li>• Discharged to hospice</li> </ul> <ul style="list-style-type: none"> <li>• &lt; 18 years of age</li> <li>• Transferred to another acute care hospital</li> <li>• Expired</li> <li>• Left against medical advice</li> <li>• Discharged to hospice</li> </ul> <ul style="list-style-type: none"> <li>• &lt; 18 years of age</li> <li>• Transferred to another acute care hospital</li> <li>• Expired</li> <li>• Left against medical advice</li> <li>• Discharged to hospice</li> <li>• No working diagnosis of pneumonia on admission</li> <li>• Receiving comfort measures only</li> </ul>

<sup>13</sup> Principal diagnosis code 518.84 (acute & chronic respiratory failure) can be added to 518.81.

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System-centered Measures	11. Skill mix (RN and RN contract)	ANA/ CalNOC <sup>4</sup>	RN nursing care hours  RN contracted hours	Total number of productive hours worked by nursing staff with direct patient care responsibilities (RN, LVN/LPN, aides and other direct care providers) <sup>6,7</sup>	<ul style="list-style-type: none"> <li>• None</li> </ul>

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	12. Nursing care hours per patient day (RN, LPN, aide)	ANA/ CalNOC <sup>4</sup>	<p>Number of productive hours worked by RNs with direct patient care responsibilities</p> <p>Number of productive hours worked by RNs with direct patient care responsibilities, who are contract staff</p> <p>Number of productive hours worked by nursing staff with direct patient care responsibilities (RN, LVN/LPN, aides and other direct care providers)</p> <p>Number of productive hours worked by nursing staff with direct patient care responsibilities, who are contract staff (RN, LVN/LPN, aides and other direct care providers)</p>	Inpatient days x 1,000 <sup>6,7</sup>	<ul style="list-style-type: none"> <li>• None</li> </ul>

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	13. Practice Environment Scale—Nursing Work Index (composite and five subscales)	Literature <sup>14,15,16</sup>	Composite score = mean of all subscales <sup>17</sup>  Subscales = mean of all items comprising each subscale <sup>15</sup> : <ul style="list-style-type: none"> <li>• Nurse participation in hospital affairs</li> <li>• Nursing foundations for quality of care</li> <li>• Nurse manager ability, leadership, and support of nurses</li> <li>• Staffing and resource adequacy</li> <li>• Collegial nurse-physician relations</li> </ul>	Staff RNs  NOTE: Random sample with a minimum response of 15-25 completed surveys (all items completed) is recommended to retain instrument validity	<ul style="list-style-type: none"> <li>• None</li> </ul>

<sup>14</sup> Kramer M, Hafner LP. Shared values: impact on staff nurse job satisfaction and perceived productivity. *Nursing Research*. 1989;38:172-177.

<sup>15</sup> Aiken LH, Patrician P. Measuring organizational traits of hospitals: the revised nursing work index. *Nursing Research*. 2000;49:146-153.

<sup>16</sup> Lake ET. Development of the practice environment scale of the Nursing Work Index. *Res Nurs Health*. 2002;25:176-188.

<sup>17</sup> See Table 3 for the fully instrument..





Table 1: Failure to Rescue (risk adjustment)

age5_17	-.3412416	.5277429	-0.65	0.518	-1.375599	.6931156
age45_64	.5242741	.2045233	2.56	0.010	.1234157	.9251325
age65_74	.5207053	.2413296	2.16	0.031	.047708	.9937027
age75_84	.8686256	.2451043	3.54	0.000	.38823	1.349021
agegt85	1.126256	.2599512	4.33	0.000	.6167612	1.635751
female	-.0140685	.0864482	-0.16	0.871	-.1835039	.1553669
mcare	.1727217	.15174	1.14	0.255	-.1246832	.4701267
mcaid	.1798518	.1858234	0.97	0.333	-.1843554	.5440591
selfpay	.2365317	.3022537	0.78	0.434	-.3558747	.8289381
othpay	-.5810461	.3357356	-1.73	0.084	-1.239076	.0769836
unkpay	-.3730547	.2054073	-1.82	0.069	-.7756457	.0295362
govpay	.1550515	.8069318	0.19	0.848	-1.426506	1.736609
cancer_p	.7013328	.4139954	1.69	0.090	-.1100833	1.512749
m_cancer	.4258919	.2273916	1.87	0.061	-.0197875	.8715713
cad	-.3683642	.3577694	-1.03	0.303	-1.069579	.332851
chf	.7660714	.1898078	4.04	0.000	.3940549	1.138088
vascular	.1257182	.4182595	0.30	0.764	-.6940553	.9454916
liver	1.37157	.3999519	3.43	0.001	.5876791	2.155462
renal	.9859003	.282138	3.49	0.000	.4329201	1.538881
dementia	-2.636146	1.139208	-2.31	0.021	-4.868952	-.403339
function	.5866873	.3117184	1.88	0.060	-.0242695	1.197644
diabetes	-.0892849	.3816809	-0.23	0.815	-.8373657	.6587959
pulmon	-.0568577	.2043143	-0.28	0.781	-.4573062	.3435909
nutritio	.0695748	.2963035	0.23	0.814	-.5111694	.650319
emerg	.3588939	.1395081	2.57	0.010	.085463	.6323248
ny	.775021	.1274421	6.08	0.000	.5252391	1.024803
ra1844	1.625551	2.395472	0.68	0.497	-3.069489	6.32059
ra4564	2.2744	2.297342	0.99	0.322	-2.228308	6.777108
ra6574	1.63555	2.375002	0.69	0.491	-3.019368	6.290468
ra7584	1.951858	2.411339	0.81	0.418	-2.77428	6.677995
ragt85	2.069761	2.54113	0.81	0.415	-2.910762	7.050285
rsmal	-.680412	.6806679	-1.00	0.317	-2.014497	.6536727
rpmcare	-1.217198	1.359183	-0.90	0.371	-3.881149	1.446752
rpmcaid	-.2372839	1.487382	-0.16	0.873	-3.152499	2.677932
rpprivp	-.6812012	1.364535	-0.50	0.618	-3.355641	1.993239
rpselfp	.7423648	2.184124	0.34	0.734	-3.538439	5.023169
rgovpay	-.2457098	7.213942	-0.03	0.973	-14.38478	13.89336
rccanp	2.269562	2.836435	0.80	0.424	-3.289749	7.828872
rccanm	.3854396	1.479925	0.26	0.795	-2.51516	3.286039
rccad	1.015059	1.631568	0.62	0.534	-2.182756	4.212874
rcchf	-1.469334	.7948429	-1.85	0.065	-3.027198	.088529
rcvasc	2.368887	1.866019	1.27	0.204	-1.288443	6.026217
rcliver	-.9400092	3.213343	-0.29	0.770	-7.238045	5.358027
rcrenal	1.692382	1.644389	1.03	0.303	-1.530561	4.915324
rcdeme	5.257012	2.493407	2.11	0.035	.3700248	10.144
rcfunc	-2.5315	1.127014	-2.25	0.025	-4.740406	-.3225939
rcdiab	.6328954	2.609358	0.24	0.808	-4.481353	5.747143
rcpulm	-.0077628	.8950757	-0.01	0.993	-1.762079	1.746553
rcnutri	-3.404533	1.240129	-2.75	0.006	-5.835141	-.9739249
remerg	-.9884126	.7303708	-1.35	0.176	-2.419913	.4430879
ccanp65	-.1976347	.4334684	-0.46	0.648	-1.047217	.6519477
ccanm65	.0065438	.2385081	0.03	0.978	-.4609235	.4740112



Table 1: Failure to Rescue (risk adjustment)

emerg		.5888212	.0979842	6.01	0.000	.3967757	.7808666
nv		-.1654503	.0842016	-1.96	0.049	-.3304824	-.0004182
az		-.1424548	.067363	-2.11	0.034	-.2744838	-.0104258
ra1844		-.5626443	1.976153	-0.28	0.776	-4.435833	3.310544
ra4564		.9714942	1.958791	0.50	0.620	-2.867666	4.810654
ra6574		1.554641	2.089376	0.74	0.457	-2.54046	5.649742
ra7584		.7147486	2.09915	0.34	0.733	-3.39951	4.829007
ragt85		4.938536	2.425669	2.04	0.042	.1843124	9.692759
rsfem		1.410577	.6464898	2.18	0.029	.1434805	2.677674
rpmcare		2.048773	4.212651	0.49	0.627	-6.207871	10.30542
rpmcaid		.6708424	4.247343	0.16	0.875	-7.653796	8.995481
rpprivp		.3533527	4.193201	0.08	0.933	-7.865169	8.571875
rpselfp		.8764345	4.442729	0.20	0.844	-7.831155	9.584024
rgovpay		1.521155	4.562344	0.33	0.739	-7.420874	10.46318
rccanp		-7.268976	2.521313	-2.88	0.004	-12.21066	-2.327292
rccanm		-.5713954	1.714222	-0.33	0.739	-3.931208	2.788417
rccad		-.7577314	1.484615	-0.51	0.610	-3.667523	2.15206
rcchf		-4.157619	.8406797	-4.95	0.000	-5.805321	-2.509917
rcvasc		-1.219719	1.637641	-0.74	0.456	-4.429436	1.989999
rcliver		-1.794866	2.241764	-0.80	0.423	-6.188642	2.598911
rcrenal		2.647041	1.658154	1.60	0.110	-.6028803	5.896963
rcdeme		-3.131036	2.024562	-1.55	0.122	-7.099104	.8370321
rcfunc		-2.472459	1.561157	-1.58	0.113	-5.532269	.5873522
rcdiab		.5042041	2.010371	0.25	0.802	-3.436051	4.44446
rcpulm		-.6880402	.7876462	-0.87	0.382	-2.231798	.8557181
rcnutri		-2.564538	1.10449	-2.32	0.020	-4.729298	-.3997779
remerg		-1.311626	.7391401	-1.77	0.076	-2.760314	.1370619
ccanp65		.0708786	.3442961	0.21	0.837	-.6039293	.7456866
ccanm65		-.1639307	.1833735	-0.89	0.371	-.523336	.1954747
ccad65		-.1492113	.2202692	-0.68	0.498	-.5809311	.2825084
cchf65		-.2633795	.1301252	-2.02	0.043	-.5184202	-.0083388
cvasc65		.3418326	.2693307	1.27	0.204	-.1860459	.8697111
cliv65		.0056079	.2433056	0.02	0.982	-.4712623	.4824782
cren65		.1685926	.2048967	0.82	0.411	-.2329976	.5701828
cdem65		.0953041	.3791931	0.25	0.802	-.6479006	.8385089
cfunc65		-.2716323	.2336044	-1.16	0.245	-.7294885	.1862238
cdiab65		.1274753	.2390174	0.53	0.594	-.3409903	.5959408
cpulm65		-.0092073	.1288086	-0.07	0.943	-.2616676	.2432529
cnutr65		.6583508	.1899768	3.47	0.001	.2860031	1.030699
emerg65		-.2341855	.1024308	-2.29	0.022	-.4349462	-.0334247
_cons		-2.880359	.1407151	-20.47	0.000	-3.156155	-2.604562

South-Eastern region (Maryland, Virginia, West Virginia and South Carolina ):

Logit estimates

Number of obs = 6544

LR chi2(68) = 570.90

Prob > chi2 = 0.0000

Log likelihood = -3061.5955

Pseudo R2 = 0.0853

nfailmaj	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
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Table 1: Failure to Rescue (risk adjustment)

deaddrg		12.27573	4.372822	2.81	0.005	3.705155	20.8463
agelt1		.5939335	.4884623	1.22	0.224	-.363435	1.551302
age1_4		.3134513	.5397998	0.58	0.561	-.7445369	1.371439
age5_17		-.0672141	.439453	-0.15	0.878	-.9285261	.7940979
age45_64		.3207648	.1888037	1.70	0.089	-.0492836	.6908133
age65_74		.7134402	.2263348	3.15	0.002	.2698321	1.157048
age75_84		1.050219	.2308023	4.55	0.000	.5978549	1.502583
agegt85		1.264341	.253624	4.99	0.000	.7672468	1.761435
female		-.1139447	.0933508	-1.22	0.222	-.2969089	.0690195
mcare		.2409263	.1573017	1.53	0.126	-.0673793	.549232
mcaid		.1491392	.2168775	0.69	0.492	-.2759329	.5742113
selfpay		.2759632	.2946401	0.94	0.349	-.3015208	.8534472
othpay		-.6845967	.5238111	-1.31	0.191	-1.711248	.3420542
unkpay		-.085194	.2698014	-0.32	0.752	-.613995	.443607
govpay		.6681023	.4809372	1.39	0.165	-.2745173	1.610722
cancer_p		1.135064	.4414926	2.57	0.010	.2697543	2.000373
m_cancer		.3370649	.2781572	1.21	0.226	-.2081133	.882243
cad		-.1639441	.3539668	-0.46	0.643	-.8577063	.5298181
chf		.404985	.2164074	1.87	0.061	-.0191656	.8291357
vascular		-.0405782	.4217141	-0.10	0.923	-.8671226	.7859662
liver		1.504723	.4202836	3.58	0.000	.680982	2.328463
renal		1.038641	.2705369	3.84	0.000	.5083986	1.568884
dementia		-1.197377	1.047973	-1.14	0.253	-3.251366	.856612
function		-.1973536	.4681265	-0.42	0.673	-1.114865	.7201576
diabetes		.1537326	.3496779	0.44	0.660	-.5316235	.8390887
pulmon		-.1030663	.2088886	-0.49	0.622	-.5124805	.3063478
nutritio		.5135741	.2841712	1.81	0.071	-.0433912	1.070539
emerg		.3241251	.157166	2.06	0.039	.0160854	.6321648
wv		-.0814047	.125377	-0.65	0.516	-.3271391	.1643297
va		-.0224501	.0915028	-0.25	0.806	-.2017924	.1568921
sc		-.0266507	.1031646	-0.26	0.796	-.2288495	.1755481
ra1844		1.645078	2.407791	0.68	0.494	-3.074106	6.364261
ra4564		2.062052	2.317715	0.89	0.374	-2.480586	6.60469
ra6574		1.914358	2.438315	0.79	0.432	-2.86465	6.693367
ra7584		1.525149	2.488423	0.61	0.540	-3.35207	6.402367
ragt85		.2279492	2.84228	0.08	0.936	-5.342817	5.798715
rsfem		.8242686	.9619546	0.86	0.392	-1.061128	2.709665
rpmcare		-7.352637	4.024915	-1.83	0.068	-15.24132	.5360519
rpmcaid		-7.205862	4.165384	-1.73	0.084	-15.36987	.9581408
rpprivp		-6.580357	3.875781	-1.70	0.090	-14.17675	1.016034
rpselfp		-5.756945	4.431939	-1.30	0.194	-14.44339	2.929497
rgovpay		-14.27492	6.551409	-2.18	0.029	-27.11544	-1.434391
rccanp		-.7575503	3.628269	-0.21	0.835	-7.868827	6.353727
rccanm		-.1839209	2.580281	-0.07	0.943	-5.24118	4.873338
rccad		2.160822	2.248141	0.96	0.336	-2.245453	6.567097
rcchf		-.9100538	1.254009	-0.73	0.468	-3.367867	1.547759
rcvasc		-2.259938	2.342218	-0.96	0.335	-6.8506	2.330725
rcliver		.296561	3.958038	0.07	0.940	-7.461051	8.054173
rcrenal		-2.109648	2.180749	-0.97	0.333	-6.383838	2.164542
rcdeme		-1.107861	3.218523	-0.34	0.731	-7.416051	5.200329
rcfunc		-.8945558	2.352832	-0.38	0.704	-5.506021	3.71691
rcdiab		3.579787	2.980797	1.20	0.230	-2.262467	9.422041

Table 1: Failure to Rescue (risk adjustment)

rcpulm		-.8998367	1.231991	-0.73	0.465	-3.314495	1.514822
rcnutri		-1.564262	2.009016	-0.78	0.436	-5.501861	2.373338
remerg		-1.920655	1.093686	-1.76	0.079	-4.064241	.2229301
ccanp65		-.4782059	.4148036	-1.15	0.249	-1.291206	.3347942
ccanm65		-.1854858	.2890896	-0.64	0.521	-.7520911	.3811195
ccad65		-.2860806	.3653974	-0.78	0.434	-1.002246	.4300852
cchf65		-.0362276	.2066302	-0.18	0.861	-.4412154	.3687602
cvasc65		.4429129	.4142057	1.07	0.285	-.3689153	1.254741
cliv65		-.1999506	.4432473	-0.45	0.652	-1.068699	.6687982
cren65		-.0319692	.2841051	-0.11	0.910	-.5888049	.5248665
cdem65		.2809836	1.060265	0.27	0.791	-1.797098	2.359066
cfunc65		-.189119	.444816	-0.43	0.671	-1.060942	.6827044
cdiab65		-.8235154	.3831957	-2.15	0.032	-1.574565	-.0724656
cpulm65		.2096419	.2048049	1.02	0.306	-.1917683	.6110521
cnutr65		-.2579309	.275149	-0.94	0.349	-.797213	.2813511
emerg65		.1422053	.1497276	0.95	0.342	-.1512554	.4356661
_cons		-2.798581	.1898639	-14.74	0.000	-3.170708	-2.426455

**Definitions of the patient level variables for the risk adjustment regression:**

deaddrg -- the average probability of the person dying in the patient's DRG.

agelt1 -- age less than one

age1\_4 -- age from 1 to 4

age5\_17 -- age from 5 to 17

age45\_64 -- age from 45 to 64

age65\_74 -- age from 65 to 74

age75\_84 -- age from 75 to 84

agegt85 -- age greater than 85

female -- female? (1 for yes, 0 for no)

mcare -- medicare? (1 for yes, 0 for no)

mcaid -- medicid? (1 for yes, 0 for no)

selfpay -- self-paying? (1 for yes, 0 for no)

othpay -- paid for by someone else? (1 for yes, 0 for no)

govpay -- paid for by the government? (1 for yes, 0 for no)

Chronic diseases (Diagnosis codes in a separate file):

cancer\_p -- cancer with poor prognosis? (1 for yes, 0 for no)

## Table 1: Failure to Rescue (risk adjustment)

m\_cancer -- metastatic cancer? (1 for yes, 0 for no)  
cad -- coronary artery disease? (1 for yes, 0 for no)  
chf -- congestive heart failure? (1 for yes, 0 for no)  
vascular -- peripheral vascular disease? (1 for yes, 0 for no)  
liver -- severe chronic liver disease? (1 for yes, 0 for no)  
renal -- chronic renal failure? (1 for yes, 0 for no)  
dementia -- dementia? (1 for yes, 0 for no)  
function -- functional impairment? (1 for yes, 0 for no)  
diabetes -- diabetes with end organ damage? (1 for yes, 0 for no)  
pulmon -- chronic pulmonary disease? (1 for yes, 0 for no)  
nutritio -- nutritional deficiencies? (1 for yes, 0 for no)  
emerg -- emergency admission? (1 for yes, 0 for no)  
mo/ma/ny/ca/etc. -- state of residence (1 for yes, 0 for no)

### Interactions:

Interaction between the average probability of the event happening in the DRG (deaddrg) and the age variables:

ra1844 -- age 18-44  
ra4564 -- age 45-64  
ra6574 -- age 65-74  
ra7584 -- age 75-84  
ragt85 -- age greater than 85

Interactions between the deaddrg variable and the gender variables:

rsmal -- the male dummy variable

Interactions between the deaddrg variable and the payer variables:

rpmcare -- mcare  
rpmcaid -- mcaid  
rpprivp -- private pay  
rpselfp -- self pay  
rgovpay -- government pay

**Table 1: Failure to Rescue (risk adjustment)**

Interactions between the deaddrg variable and the payer variables:

- rccanp -- cancer with poor diagnosis
- rccanm -- metastatic cancer
- rccad -- coronary artery disease
- rcchf -- congestive heart failure
- rcvasc -- peripheral vascular disease
- rcliver -- severe chronic liver failure
- rcrenal -- chronic renal failure
- rcdeme -- dementia
- rcfunc -- functional impairment
- rcdiab -- diabetes with end organ damage
- rcpulm -- chronic pulmonary disease
- rcnutri -- nutritional deficiencies

Interactions between the deaddrg variable and the emergency admission dummy variable:

remerg

Interactions between the chronic disease variables and the dummy variable for age greater than 65:

- ccanp65 -- cancer with poor diagnosis
- ccanm65 -- metastatic cancer
- ccad65 -- coronary artery disease
- cchf65 -- congestive heart failure
- cvasc65 -- peripheral vascular disease
- cliv65 -- severe chronic liver failure
- cren65 -- chronic renal failure
- cdem65 -- dementia
- cfunc65 -- functional impairment
- cdiab65 -- diabetes with end organ damage
- cpulm65 -- chronic pulmonary disease
- cnutr65 -- nutritional deficiencies

emerg65 -- emergency admission

**Diagnosis codes for chronic diseases (The chronic Disease dummy variables are set to one if a patient in our data has a secondary diagnosis in the list below.)**

```
*****.
* FORMATS FOR ASSIGNMENT OF CHRONIC DISEASE CONDITION INDICATORS *;
* Assigns the following indicators:
*   Cancer with poor prognosis
*   Metastatic Cancer
*   AIDS
*   Chronic Pulmonary Disease
*   Coronary Artery Disease
*   Congestive Heart Failure
```

Table 1: Failure to Rescue (risk adjustment)

- \* Peripheral Vascular Disease
  - \* Severe Chronic Liver Disease
  - \* Diabetes with end organ damage
  - \* Chronic Renal Failure
  - \* Nutritional Deficiencies
  - \* Dementia
  - \* Functional Impairment
- \*\*\*\*\*

VALUE \$CHRDIS

/\* SECONDARY DIAGNOSES INDICATING PRESENCE OF A CHRONIC \*/  
 /\* DISEASE CONDITION. \*/

- '1500 '
- '1501 '
- '1502 '
- '1503 '
- '1504 '
- '1505 '
- '1508 '
- '1509 '
- '1510 '
- '1511 '
- '1512 '
- '1513 '
- '1514 '
- '1515 '
- '1516 '
- '1518 '
- '1519 '
- '1550 '
- '1551 '
- '1552 '
- '1570 '
- '1571 '
- '1572 '
- '1573 '
- '1574 '
- '1578 '
- '1579 '
- '1580 '
- '1588 '
- '1589 '
- '1620 '
- '1622 '
- '1623 '
- '1624 '
- '1625 '
- '1628 '
- '1629 '
- '1630 '
- '1631 '
- '1638 '

Table 1: Failure to Rescue (risk adjustment)

'1639 ',  
'1830 ',  
'1832 ',  
'1833 ',  
'1834 ',  
'1835 ',  
'1838 ',  
'1839 ',  
'1910 ',  
'1911 ',  
'1912 ',  
'1913 ',  
'1914 ',  
'1915 ',  
'1916 ',  
'1917 ',  
'1918 ',  
'1919 ',  
'20400',  
'20410',  
'20420',  
'20480',  
'20490',  
'20500',  
'20510',  
'20520',  
'20530',  
'20580',  
'20590',  
'20600',  
'20610',  
'20620',  
'20680',  
'20690',  
'20700',  
'20710',  
'20720',  
'20780',  
'20800',  
'20810',  
'20820',  
'20880',  
'20890' = 'CANCER\_P' /\* CANCER WITH A POOR PROGNOSIS \*/  
  
'1960 ',  
'1961 ',  
'1962 ',  
'1963 ',  
'1965 ',  
'1966 ',  
'1968 ',  
'1969 ',

Table 1: Failure to Rescue (risk adjustment)

'1970 ',  
'1971 ',  
'1972 ',  
'1973 ',  
'1974 ',  
'1975 ',  
'1976 ',  
'1977 ',  
'1978 ',  
'1980 ',  
'1981 ',  
'1982 ',  
'1983 ',  
'1984 ',  
'1985 ',  
'1986 ',  
'1987 ',  
'19881',  
'19882',  
'19889',  
'1990 ',  
'1991 ' = 'M\_CANCER' /\* METASTATIC CANCER \*/

'0420 ',  
'0421 ',  
'0422 ',  
'0429 ',  
'0430 ',  
'0431 ',  
'0432 ',  
'0433 ',  
'0440 ',  
'1363 ',  
'1760 ',  
'1761 ',  
'1762 ',  
'1763 ',  
'1764 ',  
'1765 ',  
'1768 ',  
'1769 ' = 'AIDS' /\* ACQUIRED IMMUNODEFICIENCY SYNDROME \*/

'4911 ',  
'49120',  
'49121',  
'4918 ',  
'4919 ',  
'4920 ',  
'4928 ',  
'49310',  
'49311',  
'49390',

Table 1: Failure to Rescue (risk adjustment)

'49391',  
'494 ',  
'496 ',  
'501 ',  
'5064 ',  
'515 ' = 'PULMON' /\* CHRONIC PULMONARY DISEASE \*/

'4111 ',  
'4118 ',  
'41181',  
'41189',  
'412 ',  
'4130 ',  
'4139 ',  
'4140 ',  
'4148 ',  
'4149 ' = 'CAD' /\* CORONARY ARTERY DISEASE \*/

'4280 ',  
'4281 ',  
'4289 ',  
'40201',  
'40211',  
'40291',  
'39891',  
'40401',  
'40411',  
'40413',  
'40491',  
'40493' = 'CHF' /\* CONGESTIVE HEART FAILURE \*/

'4400 ',  
'4401 ',  
'44020'-'44024',  
'4408 ',  
'4409 ',  
'4410 ',  
'4411 ',  
'4412 ',  
'4413 ',  
'4414 ',  
'4415 ',  
'4419 ',  
'4439 ' = 'VASCULAR' /\* PERIPHERAL VASCULAR DISEASE \*/

'5712 ',  
'5715 ',  
'5716 ',  
'5723 ' = 'LIVER' /\* SEVERE CHRONIC LIVER DISEASE \*/

'25040'-'25043',  
'25050'-'25053',

Table 1: Failure to Rescue (risk adjustment)

'25060'-'25063',  
'25070'-'25073',  
'25090'-'25093',  
'3572 ',  
'36641',  
'36201',  
'36202' = 'DIABETES' /\* DIABETES WITH END ORGAN DAMAGE \*/

'40301',  
'40311',  
'40391',  
'585 ',  
'V451 ',  
'V560 ',  
'V568 ' = 'RENAL' /\* CHRONIC RENAL FAILURE \*/

'260 ',  
'261 ',  
'262 ',  
'2630 ',  
'2638 ',  
'2639 ',  
'7830 ',  
'7834 ',  
'7994 ' = 'NUTRITIO' /\* NUTRITIONAL DEFICIENCIES \*/

'2900 ',  
'29010',  
'29011',  
'29012',  
'29013',  
'29020',  
'29021',  
'2903 ',  
'29040',  
'29041',  
'29042',  
'29043',  
'2808 ',  
'2809 ',  
'2940 ',  
'2941 ',  
'2948 ',  
'2949 ',  
'3310 ',  
'3312 ',  
'797 ' = 'DEMENTIA'

'7993 ',  
'438 ',  
'3420 ',  
'3421 ',

Table 1: Failure to Rescue (risk adjustment)

'3429 ',  
'3440 ',  
'3441 ',  
'3442 ',  
'3443 ',  
'3444 ',  
'3445 ',  
/\* '34481', deleted 11/26/95 \*/  
'34489',  
'3449 ',  
'34460',  
'34461',  
'V440 ',  
'V441 ',  
'V460 ',  
'V461 ',  
'V468 ',  
'V469 ',  
'V538 ' = 'FUNCTION' /\* FUNCTIONAL IMPAIRMENT \*/  
OTHER = 'NOTHING '  
;

**Table 2: Medical and Major Surgical Risk Pools for DHHS Measures (DRGs)**

**Medical Risk Pool**

009 – 035, 043 – 048, 064 – 074, 078 – 102, 121 – 145, 172 – 184, 185 – 187, 188 – 190, 202 – 208, 235 – 256, 271 – 284, 294 – 301, 316 – 333, 346 – 352, 366 – 369, 372 – 373, 376, 378 – 380, 382 – 384, 395 – 399, 403 – 404, 409 – 414, 416 – 423, 425 – 432, 444 – 455, 457, 460, 462 – 467, 475, 487, 489 – 490, 492, 505, 508, 509, 510, 511

**Major Surgical Risk Pool**

001-002, 004-005, 049, 075, 103-108, 110-111, 113-114, 146-151, 154-155, 156, 159-160, 164-167, 191-200, 209-211, 212, 213-215, 218-219, 220, 221-222, 226-227, 230-231, 257-261, 263-266, 285-290, 302-307, 310-311, 334-337, 353-359, 392, 393, 400-402, 406-407, 415, 439-440, 458-459, 468, 471-472, 476, 480-486, 488, 491, 493-504, 506-507

APPENDIX C – Specifications of the National Voluntary Consensus Standards for Nursing-Sensitive Performance Measurement

**Table 3: The Practice Environment Scale of the Nursing Work Index**

For each item, please indicate the extent to which you agree that the item is PRESENT IN YOUR CURRENT JOB. Indicate your degree of agreement by circling the appropriate number.

	Strongly Agree	Agree	Disagree	Strongly Disagree
1 Adequate support services allow me to spend time with my patients.	1	2	3	4
2 Physicians and nurses have good working relationships				
3 A supervisory staff that is supportive of the nurses.				
4 Active staff development or continuing education programs for nurses.				
5 Career development/clinical ladder opportunity.				
6 Opportunity for staff nurses to participate in policy decisions.				
7 Supervisors use mistakes as learning opportunities, not criticism.				
8 Enough time and opportunity to discuss patient care problems with other nurses				
9 Enough registered nurses to provide quality patient care.				
10 A nurse manager who is a good manager and leader.				
11 A chief nursing officer who is highly visible and accessible to staff				
12 Enough staff to get the work done				
13 Praise and recognition for a job well done.				
14 High standards of nursing care are expected by the administration				
15 A chief nurse officer equal in power and authority to other top-level hospital executives				
16 A lot of team work between nurses and physicians.				
17 Opportunities for advancement.				
18 A clear philosophy of nursing that pervades the patient care environment.				
19 Working with nurses who are clinically competent.				
20 A nurse manager who backs up the nursing staff in decision making, even if the conflict is with a physician.				
21 Administration that listens and responds to employee concerns.				

## APPENDIX C – Specifications of the National Voluntary Consensus Standards for Nursing-Sensitive Performance Measurement

- 22 An active quality assurance program.
- 23 Staff nurses are involved in the internal governance of the hospital (e.g., practice and policy committees).
- 24 Collaboration (joint practice) between nurses and physicians.
- 25 A preceptor program for newly hired RNs
- 26 Nursing care is based on a nursing, rather than a medical, model.
- 27 Staff nurses have the opportunity to serve on hospital and nursing committees.
- 28 Nursing administrators consult with staff on daily problems and procedures
- 29 Written, up-to-date nursing care plans for all patients.
- 30 Patient care assignments that foster continuity of care, i.e., the same nurse cares for the patient from one day to the next.
- 31 Use of nursing diagnoses.

Source: Eileen T. Lake. "Development of the Practice Environment Scale of the Nursing Work Index." *Research in Nursing & Health*, May/June 2002; 25(3): 176-188.