Importance

Inpatient falls are among the most common incidents reported in hospitals and can increase length of stay and patient costs. Due to the potential for serious harm associated with patient falls, "patient death or serious injury associated with a fall while being cared for in a health care setting" is considered a Serious Reportable Event by the National Quality Forum (NQF, 2019).

Certain protocols and prevention measures to reduce patient falls with injury include using fall risk assessment tools to gauge individual patient risk, implementing fall prevention protocols directed at individual patient risk factors, and implementing environmental rounds to assess and correct environmental fall hazards. Recommended clinical guidelines and practices to reduce falls and injuries from falls in hospitals support many prevention activities including implementing multifactorial interventions (see Tables 11-27 in the clinical practice guidelines section of this document) and tailoring interventions to individual patient's conditions and needs (WFG, 2022, RNAO, 2017; ACS NSQIP/AGS, 2016; NICE, 2013). The scientific evidence and effectiveness on how certain falls prevention protocols impact falls with injury outcomes, however, is limited (Dykes et al., 2010; Gu et al., 2016). The intent and desired outcome for this eCQM is to work with existing falls prevention processes to track falls and aim to reduce rates of inpatient falls resulting in major and moderate injuries.

This eCQM logic model is adopted from The World Falls Guidelines (WFG) Task Force, World guidelines for falls prevention and management for older adults: a global initiative. Age and Ageing, 51(9), 1–36. https://doi.org/10.1093/ageing/afac205

Exhibit 1: Falls Logic Model

References:

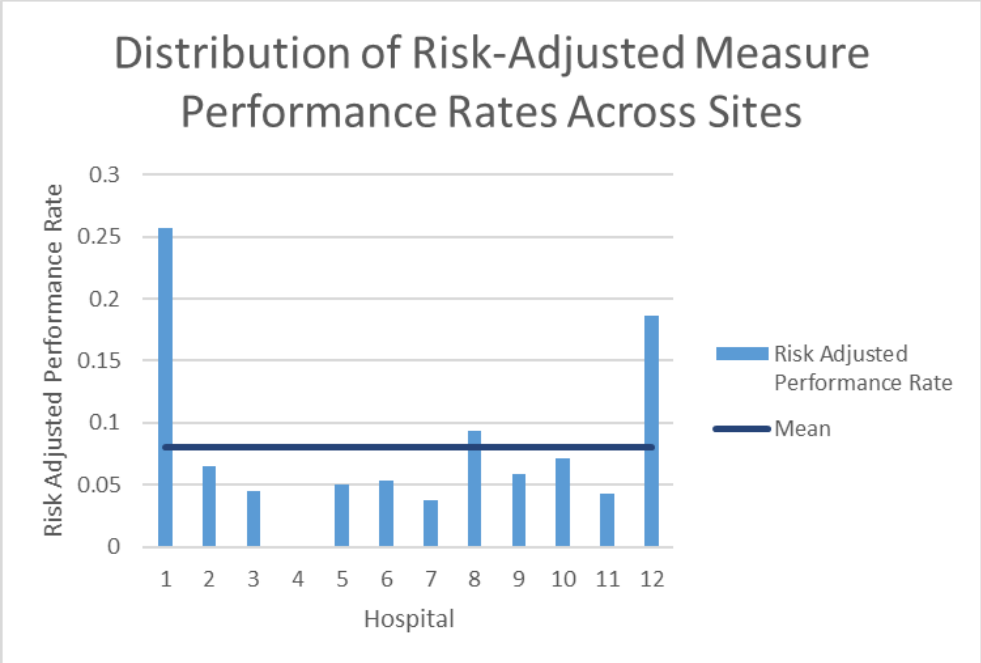
1. ACS National Surgical Quality Improvement Program (NSQIP)/American Geriatrics Society (AGS). Optimal Perioperative Management of the Geriatric Patient: Best Practices Guideline from ACS NSQIP/AGS.; 2016. https://www.facs.org/-/media/files/quality-programs/geriatric/acs-nsqip-geriatric-2016-guidelines.ashx?la=en. Accessed July 9, 2019.
2. Dykes PC, Diane Carroll DnsL, Ann Hurley B, et al. Fall Prevention in Acute Care Hospitals A Randomized Trial. Vol 304.; 2010. https://jamanetwork.com/.

3. Gu Y-Y, Balcaen K, Ni Y, Ampe J, Goffin J. Review on prevention of falls in hospital settings. Chinese Nurs Res. 2016;3:7-10. doi:10.1016/j.cnre.2015.11.002
4. Montero-Odasso, M., van der Velde, N., Martin, F. C., Petrovic, M., Tan, M. P., Ryg, J., Aguilar-Navarro, S., Alexander, N. B., Becker, C., Blain, H., Bourke, R., Cameron, I. D., Camicioli, R., Clemson, L., Close, J., Delbaere, K., Duan, L., Duque, G., Dyer, S. M., Rixt Zijlstra, G. A. (2022). World guidelines for falls prevention and management for older adults: a global initiative. Age and Ageing, 51(9), 1–36
5. National Quality Forum. Serious Reportable Events. http://www.qualityforum.org/topics/sres/serious_reportable_events.aspx. Accessed July 24, 2019.
6. NICE. *Falls in Older People: Assessing Risk and Prevention*. London, UK; 2013
7. RNAO. *Preventing Falls and Reducing Injury from Falls*. 4th edition. Toronto, ON; 2017

Table 1: Performance Results, By Site (Observed, Predicted, and Risk Adjusted Rates)

Hospital	Observed Rate (per 1000 encounter days)	Predicted Rate (per 1000 encounter days)	Risk Adjusted (performance) rate	RA rate lower 95% CI	RA rate Upper 95% CI	
1	0.2174	0.0626	0.2575	0.1313	0.3837	MAXIMUM
2	0.0578	0.0660	0.0650	0.0168	0.1131	
3	0.0361	0.0593	0.0451	0.0000	0.1076	
4	0.0000	0.0296	0.0000	0.0000	0.0000	MINIMUM
5	0.0478	0.0714	0.0497	0.0203	0.0791	
6	0.0590	0.0826	0.0530	0.0011	0.1049	MEDIAN
7	0.0461	0.0912	0.0375	0.0000	0.0894	
8	0.1012	0.0803	0.0935	0.0382	0.1487	
9	0.0630	0.0800	0.0585	0.0307	0.0862	
10	0.0790	0.0828	0.0708	0.0000	0.2097	
11	0.0388	0.0673	0.0428	0.0053	0.0803	
12	0.2286	0.0911	0.1861	0.0708	0.3015	

Exhibit 2: Distribution of Risk-Adjusted Performance Rates Across Sites



Feasibility

Table 2. Feasibility Scores (All Sites)

Data Element	Data Availability	Data Accuracy	Data Standards	Workflow
Patient encounter (Emergency Department, Observation Services, Inpatient)	100%	100%	100%	100%
Demographic Data (Birthdate, Race, Ethnicity, Payer, Sex)	100%	100%	100%	100%
Clinical Documentation that a fall occurred during hospitalization	100%	100%	100%	92%
ICD-10-CM Diagnosis (Major or Moderate Injury)	100%	100%	100%	100%
ICD-10-CM Diagnosis (Falls)	100%	100%	100%	92%
Present on Admission Indicator (related to Falls and Injury Documentation)	100%	100%	100%	100%
ICD-10-CM Diagnosis (risk variables)	100%	100%	100%	100%
Medication Active (risk variables)	100%	100%	100%	100%

Scientific Acceptability

Table 3. Hospital Test Site Characteristics

Health System	Hospital Test Site	EHR System	Region	Bed Size	Teaching Status^	Urban/Rural
A	1	Epic	Southeast	200-499	Community Teaching	Urban
B	2	Epic	West	200-499	Major Teaching	Urban
B	3	Epic	West	100-199	Community Teaching	Urban
C	4	Allscripts	Northeast	100-199	Community Teaching	Urban
C	5	Allscripts	Northeast	>499	Major Teaching	Urban
C	6	Allscripts	Northeast	200-499	Community Teaching	Urban
C	7	Allscripts	Northeast	200-499	Community Teaching	Urban
C	8	Allscripts	Northeast	200-499	Community Teaching	Urban
C	9	Allscripts	Northeast	>499	Major Teaching	Urban
C	10	Allscripts	Northeast	100-199	Community Teaching	Urban
C	11	Allscripts	Northeast	200-499	Community Teaching	Urban
C	12	Allscripts	Northeast	200-499	Community Teaching	Urban
D*	13	Epic	Northeast	200-499	Community Teaching	Urban

Note: *System D (site 13) participated in alpha testing (feasibility) only.
Note: ^ Teaching intensity is often measured by the ratio of interns and residents to beds. In this report, major teaching hospitals are those with an intern- and resident-to-bed ratio (IRB) of 0.25 (one resident for every four beds) or above and at least 50 beds, while community teaching hospitals include hospitals with an IRB of less than 0.25 or teaching hospitals with fewer than 50 beds.

Table 4. Measure Denominator Population Characteristics (Sites 1-6)

Measure Denominator Population Characteristics	Site 1	Site 1	Site 2	Site 2	Site 3	Site 3	Site 4	Site 4	Site 5	Site 5	Site 6	Site 6
*	n	%	n	%	n	%	n	%	n	%	n	%
Number of encounters	13,319	6.9	16,772	8.7	10,390	5.4	451	0.2	36,996	19.1	12,393	6.4
Hospital stay days (Mean/Std Dev)	5.5	6.5	7.2	8.2	5.3	5.3	8.0	12.5	6.2	7.7	5.5	5.9
Age (Mean)	52.7	21.2	56.7	18.2	59.2	20.0	20.1	3.0	55.3	20.7	58.4	21.2
Sex	*	*	*	*	*	*	*	*	*	*	*	*
Male	3,960	29.7	8,991	53.6	4,509	43.4	226	50.1	13,701	37.0	4,743	38.3
Race	*	*	*	*	*	*	*	*	*	*	*	*
White	7,739	58.1	9,372	55.9	7,297	70.2	161	35.7	11,999	32.4	3,872	31.2
Black or African American	4,571	34.3	1,951	11.6	871	8.4	116	25.7	10,572	28.6	1,795	14.5
Other	919	6.9	5,327	31.8	2,171	20.9	169	37.5	13,479	36.4	6,259	50.5
Unknown	90	0.7	122	0.7	51	0.5	5	1.1	946	2.6	467	3.8
Ethnicity	*	*	*	*	*	*	*	*	*	*	*	*
Hispanic or Latino	403	3.0	7,059	42.1	3,045	29.3	94	70.3	4,346	11.8	3,852	31.1
Non-Hispanic	12,789	96.0	9,591	57.2	7,288	70.1	317	20.8	31,683	85.6	8,122	65.5
Missing	127	1.0	122	0.7	57	0.6	40	8.9	967	2.6	419	3.4
(Primary) Payer	*	*	*	*	*	*	*	*	*	*	*	*
Medicaid	1,388	10.4	8,819	52.6	3,898	37.5	247	54.8	13,511	36.5	5,965	48.1
Non-Medicaid	11,868	89.1	7,939	47.3	6,485	62.4	204	45.2	23,485	63.5	6,426	51.9
Missing	63	0.5	14	0.1	7	0.1	0	0.0	0	0.0	2	0.0
Comorbidity: Obesity	5,469	51.1	3,640	21.7	1,302	12.5	22	4.9	3,894	10.5	1,306	10.5
Comorbidity: Weight loss or malnutrition	892	6.7	2,155	12.9	393	3.8	51	11.3	3,132	8.5	1,439	11.6
Comorbidity: Coagulation disorder	1,027	7.7	3,051	18.2	621	6.0	59	13.1	2,175	5.9	714	5.8
Comorbidity: Delirium	297	2.2	449	2.7	98	0.9	6	1.3	627	1.7	227	1.8
Comorbidity: Dementia	760	5.7	596	3.6	398	3.8	0	0.0	2,004	5.4	1,271	10.3
Comorbidity: Depression	1,854	13.9	1,852	11.0	779	7.5	61	13.5	2,453	6.6	738	6.0
Comorbidity: Seizures and epilepsy	370	2.8	918	5.5	241	2.3	59	13.1	1,212	3.3	476	3.8
Comorbidity: Leukemia or lymphoma	223	1.7	477	2.8	167	1.6	71	15.7	702	1.9	142	1.2
Comorbidity: Liver disease	138	1.0	792	4.7	149	1.4	4	0.9	328	0.9	122	1.0
Comorbidity: Malignant bone disease	228	1.7	258	1.5	63	0.6	7	1.6	657	1.8	97	0.8
Comorbidity: Neurological movement disorders	134	1.0	165	1.0	109	1.1	3	0.7	424	1.2	214	1.7
Comorbidity: Other neurological disorders	886	6.7	2,333	13.9	703	6.8	32	7.1	2,604	7.0	979	7.9
Comorbidity: Osteoporosis	486	3.7	362	2.2	113	1.1	0	0.0	486	1.3	185	1.5
Comorbidity: Neuropathy	925	6.9	1,261	7.5	570	5.5	25	5.5	1,581	4.3	522	4.2
Comorbidity: Psychosis	176	1.3	366	2.2	87	0.8	0	0.0	877	2.4	213	1.7
Stroke (POA)	431	3.2	1,237	7.4	354	3.4	13	2.9	1,280	3.5	439	3.5
Surgical procedure	5,070	38.1	5,853	34.9	2,920	28.1	35	7.8	3,319	9.0	947	7.6
Medication: Anticoagulant	7,676	57.6	11,164	66.6	4,810	46.3	55	12.2	4,401	11.9	1,509	12.2
Home medication: Antidepressant	2,140	16.1	33	0.2	22	0.2	83	18.4	3,100	8.4	1,110	9.0

Measure Denominator Population Characteristics	Site 1	Site 1	Site 2	Site 2	Site 3	Site 3	Site 4	Site 4	Site 5	Site 5	Site 6	Site 6
*	n	%	n	%	n	%	n	%	n	%	n	%
Home medication: Antihypertensive	4,571	33.9	70	0.4	41	0.4	77	17.1	15,560	42.1	5,331	43.0
Home medication: CNS depressant	2,706	20.3	1,173	7.0	476	4.6	174	38.6	7,198	19.5	2,547	20.6
Home medication: Diuretic	1,935	14.5	168	1.00	146	1.4	21	4.7	3,995	10.8	1,360	11.0
Home medication: Opioids	1,811	13.6	688	4.1	172	1.7	117	25.9	4,245	11.5	1,175	9.5

Note: * Cells intentionally left blank.

Table 5. Measure Denominator Population Characteristics (Sites 8-12)

Measure Denominator Population Characteristics	Site 7	Site 7	Site 8	Site 8	Site 9	Site 9	Site 10	Site 10	Site 11	Site 11	Site 12	Site 12
*	n	%	n	%	n	%	n	%	n	%	n	%
Number of encounters	7,006	3.6	20,022	10.4	40,286	20.8	3,217	1.7	27,789	14.4	4,757	2.5
Hospital Stay Days (Mean/Std Dev)	6.2	6.2	5.4	6.4	6.7	8.6	3.9	3.5	4.6	5.8	9.2	9.3
Age (Mean/Std.Dev)	69.3	18.2	59.3	19.5	59.6	20.2	67.2	17.5	57.4	19.7	67.6	17.1
Sex												
Male	3,394	48.4	8,847	44.2	16,766	41.6	1,352	42.0	11,691	42.1	2,368	49.8
Race												
White	5,489	78.4	11,995	59.9	21,655	53.8	2,343	72.8	13,298	47.9	3,221	67.7
Black or African American	369	5.3	2,363	11.8	6,107	15.2	282	8.8	5,064	18.2	511	10.7
Other	1,011	14.4	5,048	25.2	11,293	28.0	508	15.8	8,541	30.7	910	19.1
Unknown	137	1.9	616	3.1	1,231	3.0	84	2.6	886	3.2	115	2.5
Ethnicity												
Hispanic or Latino	477	6.8	4,506	22.5	4,328	86.3	209	6.5	4,251	15.3	560	11.8
Non-Hispanic	6,361	90.8	14,404	71.9	34,749	10.7	2,906	90.3	22,321	80.3	4,075	85.7
Unknown	168	2.4	1,112	5.6	1,209	3.0	102	3.2	1,217	4.4	122	2.5
(Primary) Payer												
Medicaid	1,227	17.5	6,596	32.9	9,130	22.7	497	15.5	7,182	25.8	1,106	23.3
Non-Medicaid	5,778	82.4	13,425	67.0	31,061	77.1	2,708	84.2	20,601	74.1	3,642	76.6
Unknown	1	0.0	1	0.0	95	0.2	12	0.3	6	0.0	9	0.1
Comorbidity: Obesity	931	13.3	3,146	15.7	4,387	10.9	769	23.9	4,125	14.8	662	13.9
Comorbidity: Weight loss or malnutrition	919	13.1	2,674	13.4	4,542	11.3	223	6.9	2,472	8.9	1,306	27.5
Comorbidity: Coagulation disorder	637	9.1	1,269	6.3	3,932	9.8	137	4.3	1,700	6.1	498	10.5
Comorbidity: Delirium	204	2.9	483	2.4	1,086	2.7	52	1.6	400	1.4	192	4.0
Comorbidity: Dementia	875	12.5	998	5.0	2,293	5.7	371	11.5	1,043	3.8	434	9.1
Comorbidity: Depression	948	13.5	1,800	9.0	2,938	7.3	395	12.3	2,371	8.5	706	14.8
Comorbidity: Seizures and epilepsy	308	4.4	960	4.8	1,697	4.2	79	2.5	1,058	3.8	280	5.9
Comorbidity: Leukemia or lymphoma	148	2.1	286	1.4	1,638	4.1	32	1.0	445	1.6	86	1.8
Comorbidity: Liver disease	111	1.6	258	1.3	662	1.6	22	0.7	179	0.6	48	1.0
Comorbidity: Malignant bone disease	77	1.1	146	0.7	520	1.3	21	0.7	249	0.9	74	1.6

Measure Denominator Population Characteristics	Site 7	Site 7	Site 8	Site 8	Site 9	Site 9	Site 10	Site 10	Site 11	Site 11	Site 12	Site 12
*	n	%	n	%	n	%	n	%	n	%	n	%
Comorbidity: Neurological movement disorders	172	2.5	201	1.0	643	1.6	52	1.6	273	1.0	168	3.5
Comorbidity: Other neurological disorders	898	12.8	1,655	8.3	3,458	8.6	197	6.1	1,575	5.7	446	9.4
Comorbidity: Osteoporosis	270	3.9	263	1.3	696	1.7	128	4.0	435	1.6	140	2.9
Comorbidity: Neuropathy	563	8.0	1,004	5.0	2,108	5.2	178	5.5	1,071	3.9	335	7.0
Comorbidity: Psychosis	84	1.2	393	2.0	464	1.2	40	1.2	521	1.9	77	1.6
Stroke (POA)	294	4.2	957	4.8	2,072	5.1	63	2.0	863	3.1	638	13.4
Surgical procedure	584	8.3	2,023	10.1	2,979	7.4	798	24.8	4,035	14.5	188	4.0
Medication: Anticoagulant	1,435	20.5	3,296	16.5	6,469	16.1	455	14.1	3,533	12.7	1,527	32.1
Home medication: Antidepressant	1,381	19.7	2,784	13.9	4,419	11.0	549	17.1	2,703	9.7	811	17.1
Home medication: Antihypertensive	4,177	59.6	9,497	47.4	18,673	46.4	1,651	51.3	11,598	41.7	2,573	54.1
Home medication: CNS depressant	2,150	30.7	4,841	24.2	8,689	21.6	784	24.4	5,259	18.9	1,605	33.7
Home medication: Diuretic	1,438	20.5	2,960	14.8	5,792	14.4	358	11.1	2,856	10.3	668	14.0
Home medication: Opioids	977	14.0	2,885	14.4	4,985	12.4	493	15.3	2,885	10.4	968	20.4

Note: * Cells intentionally left blank. Site 13 only participated in alpha testing (not beta) and therefore is not included in the table above.

Reliability

For each level of reliability testing conducted, describe the method of reliability testing and what it tests.

For hospital h in subsample t where each hospital subsample is based on summarizing performance across a varying number of denominator-eligible patient-days (n_{ht}), we assumed that the smoothed and risk-adjusted performance measure for hospital h and subsample t (Y_{ht}) follows a simple two-level model: $Y_{ht} = \mu + \alpha_h + \varepsilon_{ht}$ where the hospital effects (α_h) are sampled from a normal distribution with mean 0 and variance of hospital effects (σ_b^2) and the residual errors (ε_{ht}) are independently sampled from a normal distribution with mean 0 and variance: σ_e^2/n_{ht}^6

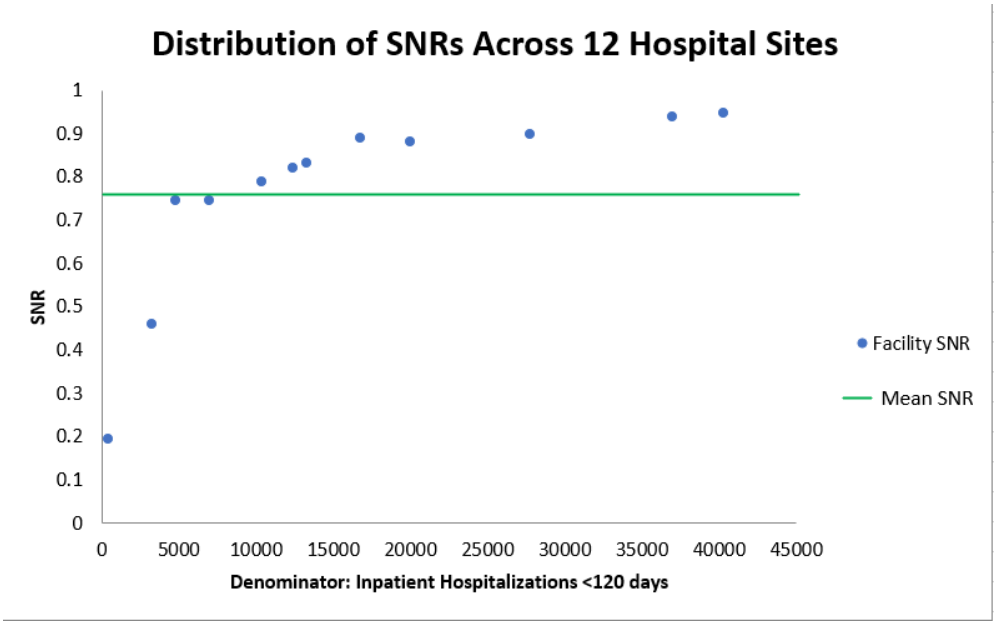
The subsamples here could come from different calendar periods or from randomly generated subsamples (e.g., split-halves) of patients, stratified by hospital. In the split-half approach, we set T=2 without replacement, resulting in two records per hospital based on all-inclusive and mutually exclusive subsamples. Note that the specification of the residual error variance assumes that, conditional on hospital random effects, the variance is inversely proportional to the sample size used to form the hospital-subsample estimate.

We used SAS PROC NLMIXED to analyze the dataset where the units of analysis are hospital subsample estimates. This allowed us to specify a two-level random effects model (hospital subsamples nested within hospital) to properly account for the between-observation variation in denominator sizes, so that we could obtain maximum likelihood estimates of the variance components, including the between hospital variance component (σ_b^2) and the error variance component (σ_e^2). These estimates were then used in a "plug-in" estimator of the classical intracluster correlation coefficient (ICC): $ICC(n) = \sigma_b^2/[(\sigma_b^2 + (\sigma_e^2/n)] = nR/(nR+1)$ where $R = \sigma_b^2/\sigma_e^2$, which is the ratio of the between-hospital variance

component (σ_b^2) over the error variance component (σ_e^2), and n is a hospital's denominator-eligible sample size.

By design, hospital-level risk-adjusted outcome measures are centered around a global mean with an approximately normal distribution (allowing for the fact that the tails of the distribution may be augmented with hospitals that are true quality outliers). Because this ICC depends only on the ratio of between-hospital to within-hospital estimated variance components, and the relevant denominator for each hospital, we can estimate reliability as a function of the hospital's denominator size, using an application of the Spearman-Brown prophecy formula. We applied this methodology to hospital subsamples that were formed by randomly dividing the available year of patient data from each hospital into two, then executing the measure code separately on each split-half, to yield two estimates per hospital.

Exhibit 3: Distribution of SNRs Across Sites



Validity

For each level of testing conducted, describe the method of validity testing and what it tests. *

Expectedly, manual abstraction is labor intensive; therefore, reducing burden while maximizing test result validity (e.g., level of power and significance) is important. To that end, we calculated the minimum required sample size (MRSS) for the abstraction using PPV as the primary endpoint and approximated MRSS using the conventional one-sample proportion formula, while accounting for the intracluster correlation: $n = \frac{z_{\frac{\alpha}{2}}^2 \cdot p \cdot (1-p)}{moe^2} \times VIF$ where a denotes the type I error rate, moe denotes the margin of error, p is PPV, and VIF is the variance inflation factor that accounts for the intracluster correlation. We simulated a series of *moes*, target ps, and the 95% confidence intervals associated with each p for different MRSSs. Simulations indicated that with a target PPV of 0.90, a Type I error rate of 5% (i.e., a PPV bounded by 0.85 and 0.95), and a conventionally accepted VIF, we determined that the MRSS per system in the range of 100 to 200 records would yield a *moe* of approximately 2.5%. Assuming 150 as a

plausible mid-point, we randomly sampled 155 cases (50 denominators, 50 numerators, and 55 denominator exclusions) per hospital system.

Table 6: Exclusion Testing (All Sites)

*	Den Count (N)	Den Change (%)	Num Count (N)	Num Change (%)
Current specification	193,398	*	83	*
Relax: Inpatient hospitalizations where the patient has a fall diagnosis present on admission	202,371	+4.6%	86	+3.6%

Note: *Cells intentionally left blank.

Table 7: PPV, Sensitivity, NPV, and Specificity Values (All Sites)

Measure Population	Per EHR	Per the Abstraction	PPV	Sensitivity	NPV	Specificity
Initial population	521	519	99.47%	100.00%	100.00%	98.65%
Denominator exclusion	146	146	100.00%	100.00%	100.00%	100.00%
Denominator not in numerator	282	289	98.95%	96.93%	96.15%	98.68%
Numerator	94	87	98.77%	87.91%	97.50%	99.77%

Table 8: PPV, Sensitivity, NPV, and Specificity Values (Epic Site, System A, Hospital 1)

Measure Population	Per EHR	Per the Abstraction	PPV	Sensitivity	NPV	Specificity
Initial population	165	165	100%	100.0%	100%	100.0%
Denominator exclusion	30	30	100%	100%	100%	100%
Denominator not in numerator	117	120	100%	97.5%	94%	100%
Numerator	18	15	83.3%	100%	100%	98.0%

Table 9: PPV, Sensitivity, NPV, and Specificity Values (Epic Site, System B, Hospitals 2&3)

Measure Population	Per EHR	Per the Abstraction	PPV	Sensitivity	NPV	Specificity
Initial population	160	158	100%	98.0%	100%	96.7%
Denominator exclusion	58	58	100%	100%	100%	100%
Denominator not in numerator	92	90	98%	100%	100%	97%
Numerator	11	9	81.8%	100%	100%	98.7%

Table 10: PPV, Sensitivity, NPV, and Specificity Values (Allscripts Site, System C, Hospitals 4-12)

Measure Population	Per EHR	Per the Abstraction	PPV	Sensitivity	NPV	Specificity
Initial population	196	196	100%	100%	100%	100%
Denominator exclusion	58	58	100%	100%	100%	100%

Measure Population	Per EHR	Per the Abstraction	PPV	Sensitivity	NPV	Specificity
Denominator not in numerator	73	79	98.7%	92.8%	94.9%	99.1%
Numerator	65	63	90.2%	98.2%	99.3%	95.7%

Clinical Practice Guidelines

Schoberer, D., Breimaier, H. E., Zuschnegg, J., Findling, T., Schaffer, S., & Archan, T. (2022). Fall prevention in hospitals and nursing homes: Clinical practice guideline. Worldviews on Evidence-Based Nursing, Vol. 19. https://doi.org/10.1111/wvn.12571

Schoberer et al. provide guidance via clinical practice recommendations for fall prevention in hospitals and nursing homes. Schoberer et al. developed this guideline to identify risk factors for falls, reduce falls specifically, and avoid the possible consequences of falls. The target audience of this guideline is nurses who are actively caring for older adults in hospitals and long-term care (LTC) institutions. The guideline panel consisted of nursing scientists from a medical university and clinical practitioners from a university hospital. This guideline is based on a systematic review of the literature. In total, 19 systematic reviews of randomized controlled trials (which included a total of 65 unique randomized controlled trials), 15 current additional randomized controlled trials, 8 systematic reviews of observational studies, 4 current additional observational studies, 3 systematic reviews of diagnostic accuracy studies, and 2 additional diagnostic accuracy studies met the inclusion criteria for development of the guideline.

The methodology for determining strength of recommendations (Table 11) and strength of evidence (Tables 12 and 13) is presented below, followed by key guideline recommendation statements that inform the proposed measure (Table 14). The GRADE (Grading of Recommendations Assessment Development and Evaluation) method was used to grade the quality of evidence and the recommendations.

Within each recommendation, the strength of recommendation is indicated as strong recommendation, weak recommendation, no recommendation, or expert opinion.

Table 11: Schoberer et al.: Strength of Recommendation Criteria

Strength of Recommendation	Rationale
Strong Recommendation	The panel is highly confident of the balance between desirable and undesirable consequences.
Weak Recommendation	The panel is less confident of the balance between desirable and undesirable consequences
No Recommendation	No recommedation
Expert Opinion	No randomized controlled studies were available. These questions were discussed by members of two panels in two workshops. Consensus statements by these panels are labeled as expert opinions in the guideline.

Within each recommendation, the quality of the supporting evidence is shown as high, moderate, low, very low, or N/A.

Table 12: Schoberer et al.: Strength of Evidence Criteria

Strength of Evidence	Rationale
High	The quality of the body of evidence is rated as 4+ We are very confident that the true effect lies close to that of the estimate of the effect.
Moderate	The quality of the body of evidence is rated as 3+ We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low	The quality of the body of evidence is rated as 2+ Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect.
Very Low	The quality of the body of evidence is rated as 1+ We have very little confidence in the effect of the estimate: The true effect is likely to be substantially different from the estimate of the effect.
N/A	No randomized controlled studies were available. These questions were discussed by members of two panels in two workshops. Consensus statements by these panels were not given a grading for their strength of evidence.

Additionally, the level of evidence also indicates the quality of the body of evidence used to inform the recommendations.

Table 13: Schoberer et al.: Level of Evidence Criteria

Study Design	Initial quality of a body of evidence	Lower if	Higher if
Randomized Trials	High	Risk of bias -1 serious -2 very serious Inconsistency -1 serious -2 very serious Indirectness -1 serious -2 very serious Imprecision -1 serious -2 very serious Publication bias -1 likely -2 very likely	Large effect +1 large +2 very large Dose response +1 Evidence of a gradient All plausible residual confounding +1 would reduce a demonstrated effect +1 would suggest a spurious effect if no effect was observed
Observational Studies	Low	Risk of bias -1 serious -2 very serious Inconsistency -1 serious -2 very serious Indirectness -1 serious -2 very serious Imprecision -1 serious -2 very serious	Large effect +1 large +2 very large Dose response +1 Evidence of a gradient All plausible residual confounding +1 would reduce a demonstrated effect +1 would suggest a spurious effect if no effect was observed

Study Design	Initial quality of a body of evidence	Lower if	Higher if
		Publication bias -1 likely -2 very likely	

Table 14: Schoberer et al. (2022): Additional Guidelines that Support the Measure

Verbatim Guideline	Strength of Evidence	Strength of Recommendation
Guidelines focused on Fall Risk Assessment	*	*
Every older patient should be systematically assessed for the risk of falls when admitted to hospital or nursing home.	N/A	Expert Opinion
The assessment should be based on observation and questioning for fall risk factors.	N/A	Expert Opinion
A detailed medical history can serve as a basis for determining risk factors, whereby patients with a positive fall history (at least one fall in the past six months) have a particularly high risk of falling.	N/A	Expert Opinion
The introduction and use of an assessment tool to assess the fall risk is not recommended.	Moderate	No Recommendation
Since causes of falls depend on internal factors of the patients/residents and external factors in the department, there are significant factors in each department that are frequently associated with falls. By collecting frequent causes of falls in your own department, specific risk factors for your setting can be identified.	N/A	Expert Opinion
Guidelines focused on Multifactorial Interventions	*	*
For residents at risk of falling, plan multifactorial interventions based on individual risk factors. These interventions should include the following components: •Body exercises •Review of medication •Adaptation of the environment •Patient education on fall risks and preventive measures	Low	Strong Recommendation
Guidelines focused on Patient/resident education and counselling interventions	*	*
Patients without cognitive impairments at risk of falling should be informed about fall risks and trained and advised on fall prevention measures. Ongoing training measures that use multimedia or written information in addition to verbal training and counselling have proven to be particularly effective.	High	Strong Recommendation
Patients with cognitive impairments at risk of falling can be informed about fall risks and trained and advised on fall prevention measures. The extent to which the measure is implemented must be assessed in each individual case.	Low	Moderate Recommendation
Make visitors and family members aware of an existing increased risk of falling and advise them to seek assistance if necessary (e.g., mobilization, transfer, walking).	N/A	Expert Opinion
Instruct patients/residents to consult the staff in case of dizziness, weakness, or nausea and to seek assistance in mobilization by the nursing staff in such a case.	N/A	Expert Opinion
Guidelines focused on Body exercise interventions	*	*

Patients at risk of falling, especially in departments with a focus on rehabilitation, should receive additional exercises training units by physiotherapy.	Low	Strong Recommendation
Guidelines focused on Interventions relating to external fall risks	*	*
Make sure that patients/residents wear their visual aids when leaving bed and that visual aids are always in a clean condition.	N/A	Expert Opinion
Help patients/residents at risk of falling to orient themselves by taking the time to show them the room, sanitary facilities and the entire department. Point out potential environmental risk of falls. Observe patients/resident risk of falling with regard to their orientation and offer support if necessary.	N/A	Expert Opinion
Arrange the institutional environment in such a way that the environmental risks of falls are minimized, e.g., set the bed height to the lowest level after care activities (when using low-floor beds, set a bed height appropriate to the situation), ensure that the floor is dry (watch out for spillage of washing water and spilled drinks), make sure that there are no objects lying around on the floor.	N/A	Expert Opinion
Make sure that patients wear well-fitting shoes that provide sufficient support, do not constrict their feet, enclose the heel and have a non-slip sole.	N/A	Expert Opinion
Guidelines focused on Medical devices for fall and injury prevention	*	*
Low-floor beds are not recommended for fall prevention in hospitals.	Very Low	No Recommendation
Alarm and sensor systems can be used for residents at risk of falling.	Very Low	Moderate Recommendation
Offer patients who get up frequently at night (e.g., to go to the toilet), and who have problems putting on shoes, socks with a non-slip sole or integrated nubs for the night.	N/A	Expert Opinion
Walking aids have to be kept in a functional condition (e.g., check the tyre pressure, the brakes) and have to be adapted to the respective person (e.g., height).	N/A	Expert Opinion
Employees and potential users of walking aides should be trained to use them correctly.	N/A	Expert Opinion
Guidelines focused on Medication review	*	*
A medication review can be arranged for patients at risk of falling.	Very Low	Moderate Recommendation
Guidelines focused on Measures restricting freedom	*	*
Restrictions on freedom to prevent falls should only be considered in individual cases when the hazard cannot be averted by other measures. The freedom-limiting measure should be ordered, documented and regularly evaluated in its appropriateness by a physician or a member of the health and nursing staff familiar with it. The decision should be discussed with relatives. Furthermore, only the least severe means of restriction of freedom may be used.	N/A	Expert Opinion
Guidelines focused on Increased observation	*	*
Increase the frequency of observations for patients/residents with frequent falls. If temporal fall patterns can be seen in patients with frequent falls, the increased observance should take place during these periods.	N/A	Expert Opinion

For patients who fall frequently, choose a room near the nurses' station to increase the practicability of the increased observance and to be able to provide prompt assistance in the event of a fall.	N/A	Expert Opinion
Guidelines focused on Staff education	*	*
Education interventions for nurses/nursing aids on fall prevention can be arranged. Strategies that can be used in training include handing out training materials, case discussions and an audit with feedback.	Very Low	Moderate Recommendation
Guidelines focused on Post fall analysis	*	*
If patients/residents fall frequently, arrange meetings in the multidisciplinary team to analyze the causes of the fall and plan or adapt fall prevention measures in a multidisciplinary manner.	N/A	Expert Opinion

Note: * Cells intentionally left blank.

National Institute for Health and Care Excellence (NICE) NICE. (2013). *Falls in older people: assessing risk and prevention*. London, UK.

The National Institute for Health and Care Excellence (NICE) society provide guidance via clinical practice recommendations for the prevention of falls in older persons. This is an extension to the remit of NICE clinical practice guideline 21 (published November 2004) to include assessing and preventing falls in older people during a hospital stay. The target audience is healthcare and other professionals and staff who care for older people who are at risk of falling. The target patient for this guideline is all older people; however, specific recommendations are targeted at older people who are admitted to hospital.

The NICE guidelines are not graded for strength of recommendation or evidence. Key guideline recommendation statements that inform the proposed measure are presented below (Table 15).

Table 15: NICE (2013): Additional Guidelines that Support the Measure

Verbatim Guideline	Strength of Evidence	Strength of Recommendation
Guidelines focused on Preventing Falls in Older People: Psychotropic Medications	*	*
1.1.7.1 Older people on psychotropic medications should have their medication reviewed, with specialist input if appropriate, and discontinued if possible to reduce their risk of falling.	N/A	N/A
Guidelines focused on Preventing Falls in Older People: Cardiac Pacing	*	*
1.1.8.1 Cardiac pacing should be considered for older people with cardioinhibitory carotid sinus hypersensitivity who have experienced unexplained falls.	N/A	N/A
Guidelines focused on Preventing Falls in Older People During a Hospital Stay: Predicting Patients' Risk of Falling in Hospital	*	*
1.2.1.1 Do not use fall risk prediction tools to predict inpatients' risk of falling in hospital.	N/A	N/A
1.2.1.2 Regard the following groups of inpatients as being at risk of falling in hospital and manage their care according to recommendations 1.2.2.1 to 1.2.3.2: •All patients aged 65 years or older •Patients aged 50 to 64 years who are judged by a clinician to be at higher risk of falling because of an underlying condition.	N/A	N/A

Guidelines focused on Preventing Fall in Older People During a Hospital Stay: Assessment and Interventions	*	*
1.2.2.1 Ensure that aspects of the inpatient environment (including flooring, lighting, furniture and fittings such as hand holds) that could affect patients' risk of falling are systematically identified and addressed.	N/A	N/A
1.2.2.2 For patients at risk of falling in hospital (see recommendation 1.2.1.2), consider a multifactorial assessment and a multifactorial intervention.	N/A	N/A
1.2.2.3 Ensure that any multifactorial assessment identifies the patient's individual risk factors for falling in hospital that can be treated, improved or managed during their expected stay. These may include: •Cognitive impairment •Continence problems •Falls history, including causes and consequences (such as injury and fear of falling) •Footwear that is unsuitable or missing •Health problems that may increase their risk of falling •Medication •Postural instability, mobility problems and/or balance problems •Syncope syndrome •Visual impairment.	N/A	N/A
1.2.2.4 Ensure that any multifactorial intervention: •Promptly addresses that patient's identified individual risk factors for falling in hospital and •Takes into account whether the risk factors can be treated, improved or managed during the patient's expected stay.	N/A	N/A
1.2.2.5 Do not offer falls prevention interventions that are not tailored to address the patient's individual risk factors for falling.	N/A	N/A
Guidelines focused on Preventing Falls in Older People During a Hospital Stay: Information and Support	*	*
1.2.3.1 Provide relevant oral and written information and support for patients, and their family members and carers if the patient agrees. Take into account the patient's ability to understand and retain information. Information should include: •Explaining about the patient's individual risk factors for falling in hospital •Showing the patient how to use the nurse call system and encouraging them to use it when they need help •Informing family members and carers about when and how to raise and lower bed rails •Providing consistent messages about when a patient should ask for help before getting up or moving about •Helping the patient to engage in any multifactorial intervention aimed at addressing their individual risk factors.	N/A	N/A
1.2.3.2 Ensure that relevant information is shared across services. Apply the principles in the NICE guideline on Patient experience in adult NHS services in relation to continuity of care. [new 2013]	N/A	N/A

Note: * Cells intentionally left blank.

Registered Nurses' Association of Ontario (RNAO) **RNAO. (2017). *Preventing falls and reducing injury from falls (4th edition).* Toronto, ON.**

The Registered Nurses' Association of Ontario (RNAO) society provides guidance via clinical practice recommendations for preventing falls and reducing injury from falls. This guideline is an update to a previous edition of the guideline. The target audience for this nursing best practices guideline is nurses and other health-care providers working with adults. The target patient is adults who are at risk of falls and fall injuries. This guideline is based on a review of the literature and the purpose and scope of the Guideline, inclusion and exclusion criteria, and research questions for the systematic review was reviewed by an expert panel. The RNAO expert panel was interprofessional and included individuals with knowledge and experience in clinical practice, education, research, policy, and lived experience across a range of health-care organization, practice areas, and sectors.

The RNAO guidelines are graded for level of evidence and overall quality. The body of evidence used to inform the guidelines are additionally graded. The methodology for determining strength of evidence (Table 16) is presented below, followed by key guideline recommendation statements that inform the proposed measure (Table 19).

Within each recommendation, the quality of the supporting evidence is shown as Ia, Ib, IIa, IIb, III, IV, or V.

Table 16: RNAO: Level of Evidence Criteria

Strength of Evidence	Rationale
Ia	Evidence obtained from meta-analysis or systematic reviews of randomized controlled trials, and/or synthesis of multiple studies primarily of quantitative research.
Ib	Evidence obtained from at least one randomized controlled trial.
IIa	Evidence obtained from at least one well-designed controlled study without randomization.
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study, without randomization.
III	Synthesis of multiple studies primarily of qualitative research.
IV	Evidence obtained from well-designed non-experimental observational studies, such as analytical studies or descriptive studies, and/or qualitative studies.
V	Evidence obtained from expert opinion or committee reports, and/or clinical experiences of respected authorities.

In addition to the levels of evidence, the quality of each of the reviews cited in the discussion of evidence was appraised and categorized as strong, moderate, or low based on the AMSTAR instrument for reviews. The quality rating is calculated by converting the score on the AMSTAR tool into a percentage. When other guidelines informed the recommendation and discussion of evidence, the AGREE II instrument was used to determine the quality rating. Tables 17 and 18 highlight the quality scores required to achieve a strong, moderate, or low quality rating.

Within each recommendation, the quality rating for informing guidelines are graded as strong, moderate, or low according to the AGREE II tool.

Table 17: RNAO: Quality Rating for Guidelines using the AGREE II Tool

Quality Score on the AGREE II	Overall Quality Rating
A score of 6 or7 on the overall guideline quality	Strong
A score of 5 on the overall guideline quality	Moderate
A score of less than 4 on the overall guideline quality	Low (not used to support recommendations)

Within each recommendation, the quality rating for the reviews informing the guideline were additionally graded as strong, moderate, or low according to the AMSTAR tool.

Table 18: RNAO: Quality Rating for Reviews Using the AMSTAR Tool

Overall Quality Rating	Quality Score on the AMSTAR
Greater than, or equal to, a converted score of 82.4%	Strong
A converted score of 62.5 – 82.4%	Moderate
Less than, or equal to, a converted score of 62.4%	Low

Table 19: RNAO (2017): Additional Guidelines that Support the Measure

Verbatim Guideline	Level of Evidence	Guideline Quality	Quality of Evidence
Research Question #1: What are the most effective ways to identify adults at risk for falls or for injury due to falls?	*	*	*
1.1 Screen adults to identify those at risk for falls. Conduct screening as part of admission processes, after any significant change in health status, or at least annually. Ia Screening should include the following approaches: V •Identifying a history of previous falls •Identifying gait, balance, and/or mobility difficulties; and •Using clinical judgment. (All settings)	Ia & V	Strong & Expert Panel	Strong, Moderate, & Low
1.2a For adults at risk for falls, conduct a comprehensive assessment to identify factors contributing to risk and determine appropriate interventions. Use an approach and/or validated tool appropriate to the person and the health-care setting. (All settings)	III	Strong	Strong & Moderate
1.2b Refer adults with recurrent falls, multiple risk factors, or complex needs to the appropriate clinician(s) or to the interprofessional team for further assessment and to identify appropriate interventions. (All settings)	V	Expert Panel	Strong
Research Question #2: What interventions are effective in preventing falls and reducing the risk	*	*	*

Verbatim Guideline	Level of Evidence	Guideline Quality	Quality of Evidence
for falls or fall-related injury among at-risk adults?			
2.1 Engage adults at risk for falls and fall injuries using the following actions: •Explore their knowledge and perceptions of risk, and their level of motivation to address risk III •Communicate sensitivity about risk and use positive messaging III •Discuss options for interventions and support self-management Ia •Develop an individualized plan of care in collaboration with the person Ia •Engage family (as appropriate) and promote social support for interventions III •Evaluate the plan of care together with the person (and family) and revise as needed. V (All settings)	Ia, III, &V	Strong & Expert Panel	Strong, Moderate, & Low
2.2 Provide education to the person at risk for falls and fall injuries and their family (as appropriate) in conjunction with other falls prevention interventions. This includes providing information about falls risk, falls prevention, and interventions. Ia Ensure that the information is provided in a variety of formats and in the appropriate language. V (All settings)	Ia & V	Strong & Expert Panel	Strong, Moderate, & Low
2.3 Communicate the person's risk for falls and related plan of care/interventions to the next responsible health-care provider and/or the interprofessional team at all care transitions to ensure continuity of care and to prevent falls or fall injuries. (All settings)	V	No Evidence Found	Expert Panel
2.4 Implement a combination of interventions tailored to the person and the health-care setting to prevent falls or fall injuries.	Ia	Strong	Strong, Moderate, & Low
2.5 Recommend exercise interventions and physical training for adults at risk for falls to improve their strength and balance. Encourage an individualized, multicomponent program/activity that corresponds to the person's current abilities and functioning. (All settings)	Ia	Strong	Strong, Moderate, & Low
2.6 Collaborate with prescribers and the person at risk for falls to reduce, gradually withdraw, or discontinue medications that are associated with falling, when the person's health condition or change in status allows. Ia This includes the following actions: •Identify polypharmacy and medications that increase risk for falls; Ia •Conduct a medication review, or refer to appropriate health-care provider and/or the prescriber V; and •Monitor for side effects of medications known to contribute to risk for falls. Ia (All settings)	Ia & V	Strong	Strong, Moderate & Low

Verbatim Guideline	Level of Evidence	Guideline Quality	Quality of Evidence
2.9 Consider hip protectors as an intervention to reduce the risk of hip fracture among adults at risk for falls and hip fracture. Review the evidence, potential benefits, harms, and barriers to use with the person to support individualized decisions. (All settings)	Ia	Strong	Moderate & Low
Research Question #3: What interventions or processes should occur immediately following a fall?	*	*	*
3.1 After a person falls, provide the following interventions: •Conduct a physical examination to assess for injury and to determine the severity of any fall injuries; •Provide appropriate treatment and care; •Monitor for injuries that may not be immediately apparent; •Conduct a post-fall assessment to determine factors that contributed to the fall; •Collaborate with the person and the interprofessional team to conduct further assessments and determine appropriate interventions; •Refer the person to the appropriate health-care provider(s) for physical rehabilitation and/or to support psychological well-being (as needed). (All settings)	III & V	Strong & Expert Panel	Low
Research Question #4: What content and education strategies are necessary to effectively educate nurses and other health-care providers to prevent falls and injury from falls?	*	*	*
4.1 Educational institutions incorporate content on falls prevention and injury reduction into health-care education and training programs. (All settings)	V	Expert Panel	No Evidence Found
4.2 Health-care organizations provide ongoing organization-wide education to all staff in conjunction with other activities to help prevent falls and reduce injuries among persons in their care. (All settings)	Ia	Strong & Expert Panel	Moderate & Low
Research Question #5: What organizational policies and system-level supports are required to help prevent falls and injuries from falls among at-risk adults?	*	*	*
5.1 To ensure a safe environment: •Implement universal falls precautions, and •Identify and modify equipment and other factors in the physical/structural environment that contribute to risk for falls and fall injuries. (All settings)	Ia	Strong	Low
5.2 Organizational leaders, in collaboration with teams, apply implementation science strategies to enable successful implementation and sustainability of falls prevention/injury reduction initiatives. This includes identifying barriers and establishing	Ia	Strong	Moderate & Low

Verbatim Guideline	Level of Evidence	Guideline Quality	Quality of Evidence
formalized supports and structures within the organization. (All settings)			
5.3 Implement rounding as a strategy to proactively meet the person's needs and prevent falls. (Hospital and long-term care settings)	Ia	N/A	Low

Note: * Cells intentionally left blank.

American College of Surgeons National Surgical Quality Improvement Program / American Geriatrics Society (ACS NSQIP/AGS)

Mohanty, S., Rosenthal, R.A., Russell, M.M., Neuman, M.D., Ko, C.Y., & Esnaola, N.F. (2016). Optimal Perioperative Management of the Geriatric Patient: Best Practices Guideline from ACS NSQIP/AGS. *Journal of the American College of Surgeons 222*(5), 930-947. doi: 10.1016/j.jamcollsurg.2015.12.026

The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) and the American Geriatrics Society (AGS) provide guidance via clinical practice recommendations for preventing falls and reducing injury from falls. This guidance is provided within their practice guideline *Optimal Perioperative Management of the Geriatric Patient*. The target patient for this guideline is the older adult population undergoing surgical procedures. The purpose of this guideline was to review the literature, consolidate current guidelines, and provide a set of expert recommendations to help practicing surgeons, anesthesiologists, and allied health care professionals manage older adults during the perioperative period.

The ACS NSQIP/AGS guidelines are not graded for strength of evidence or strength of recommendations. Key guideline recommendation statements that inform the proposed measure are presented below (Tables 20-22).

Table 20: ACS NSQIP/AGS (2016): Additional Guidelines that Support the Measure

Verbatim Guideline	Strength of Evidence	Strength of Recommendation
Guidelines focused on Fall Risk Assessment and Prevention	*	*
All postoperative older adult patients should undergo an evaluation of their fall risk either through identification of risk factors (altered mental status, dehydration, frequent toileting, history of falls, impaired gait/mobility, medications, and visual impairment) or through the use of a risk scale.	N/A	N/A
Universal fall precautions (Table x are indicated in all older adult patients. Fall risk precautions should not interfere with early mobilization and ambulation in the postoperative setting.	N/A	N/A
Older adult patients with specific risk factors for falls in the postoperative period should receive targeted care planning for fall prevention.	N/A	N/A

Table 21: ACS NSQIP/AGS (2016): Universal Falls Precautions

Precaution
Familiarize patient with environment
Demonstrate call light use
Maintain call light within reach

Precaution
Keep personal possessions within reach
Sturdy handrails in bathrooms, room, and hallway
Hospital bed in low position when patient resting; raised to comfortable height when patient transferring
Hospital bed brakes locked
Wheelchair wheels locked when stationary
Nonslip, comfortable, well-fitting footwear
Night light or supplemental lighting use
Keep floor surfaces clean and dry; clean spills promptly
Keep patient care areas uncluttered
Follow safe patient handling practices

Table 22: ACS NSQIP/AGS (2016): Targeted Falls Prevention

Risk Factor	Assessment/Intervention
Altered mental status	Assess for delirium
Altered mental status	Frequent checks
Altered mental status	Review medications
Dehydration	Adequate hydration
Dehydration	Monitor for orthostatic hypotension
Frequent toileting	Scheduled toileting
History of falls	Assess injury risk (history of osteoporosis or low-trauma fractures)
History of falls	Identify patients on anticoagulant medications
History of falls	Review physical environment to reduce injury risk
History of falls	Assistive walking devices (e.g., walkers) at bedside if used as outpatient
Impaired gait or mobility	Participation in mobility program focused on positioning assistance and balance and gait training
Impaired gait or mobility	Early physical and/or occupational therapy
Medications	Daily medication review
Medications	Check for orthostatic hypotension
Visual impairment	Corrective lens within reach

World Falls Guidelines (WFG) Task Force

Montero-Odasso, M., van der Velde, N., Martin, F. C., Petrovic, M., Tan, M. P., Ryg, J., Aguilar-Navarro, S., Alexander, N. B., Becker, C., Blain, H., Bourke, R., Cameron, I. D., Camicioli, R., Clemson, L., Close, J., Delbaere, K., Duan, L., Duque, G., Dyer, S. M., … Rixt Zijlstra, G. A. (2022). World guidelines for falls prevention and management for older adults: a global initiative. *Age and Ageing*, *51*(9), 1–36. https://doi.org/10.1093/ageing/afac205

The World Falls Guidelines (WFG) Task Force provides guidance via clinical practice recommendations for preventing falls and reducing injury from falls. The target patient for this guideline is the older adult population in all settings. The purpose of this guideline was to create a set of evidence- and expert consensus-based falls and management recommendations applicable to older adults for use by healthcare and other professionals that consider: (i) a person-centered approach that includes the perspectives of older adults with lived experience, caregivers and other stakeholders; (ii) gaps in previous guidelines; (iii) recent developments in e-health and (iv) implementation across locations with limited access to resources such as low- and middle-income countries. The WFG Task Force assembled 96 experts from 39 countries that included representation from 36 scientific and academic societies.

The methodology for determining strength of recommendations (Table 23) and strength of evidence (Tables 24 and 25) is presented below, followed by key guideline recommendation statements that inform

the proposed measure (Table 27). The Task Force additionally provided a table explaining the interpretation and implications of each grade (Table 26). The GRADE (Grading of Recommendations Assessment Development and Evaluation) method was used to grade the quality of evidence and the recommendations.

Within each recommendation, the strength of recommendation is indicated as 1 (strong recommendation), 2 (weak recommendation), or E (expert opinion).

Table 23: WFG Task Force: Strength of Recommendation Criteria

Recommendation	Meaning	Rationale
1	Strong Recommendation	The benefits clearly outweigh undesirable effects
2	Weak or Conditional Recommendation	Either lower quality evidence or desirable and undesirable effects are more closely balanced
N/A	Expert Consensus	Expert consensus (when no evidence is available)

Within each recommendation, the quality of the supporting evidence is shown as A (high), B (intermediate), C (low), or E (experts).

Table 24: WFG Task Force: Strength of Evidence Criteria

Strength of Evidence	Meaning	Rationale
A	High	Further research is unlikely to change confidence in the estimate of effect
B	Intermediate	Further research is likely to have an important impact on the confidence in the estimate of effect and may change the estimate
C	Low	Further research is very likely to have an important impact on the confidence in the estimate of effect and is likely to change the estimate
E	Experts	When the review of the evidence failed to identify any quality studies meeting standards set or evidence was not available, recommendations were formulated expert consensus

Additionally, the level of evidence also indicates the quality of the body of evidence used to inform the recommendations. Certain study qualities may increase or decrease the rating.

Table 25: WFG Task Force (2022): Factors Impacting Study Quality

Rated Down	Rated Up
Risk of Bias	Large magnitude of effect
Imprecision	Dose-response gradient
Inconsistency	Confounding would reduce magnitude of effect
Indirectness	*
Publication bias	*

Note: * Cells intentionally left blank.

The WFG Task Force additionally provided a table explaining the full meaning and interpretation for each guideline grade.

Table 26: WFG Task Force (2022): Interpretation of Guideline Grades

Grade of Recommendation	Clarity of risk/benefit	Quality of supporting evidence *	Implications *
1A. Strong recommendation, high quality evidence	Benefits clearly outweigh risk and burdens, or vice versa.	Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.	Strong recommendations, can apply to most patients in most circumstances without reservation. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
1B. Strong recommendation, moderate quality evidence	Benefits clearly outweigh risk and burdens, or vice versa.	Evidence from randomized, controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate.	Strong recommendation and applies to most patients. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
1C. Strong recommendation, low quality evidence	Benefits appear to outweigh risk and burdens, or vice versa.	Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.	Strong recommendation, and applies to most patients. Some of the evidence base supporting the recommendation is, however, of low quality.
2A. Weak recommendation, high quality evidence	Benefits closely balanced with risks and burdens.	Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.	Weak recommendation, best action may differ depending on circumstances or patients or societal values.
2B. Weak recommendation, moderate quality evidence	Benefits closely balanced with risks and burdens, some uncertainly in the estimates of benefits, risks and burdens.	Evidence from randomized, controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate.	Weak recommendation, alternative approaches likely to be better for some patients under some circumstances.
2C. Weak recommendation, low quality evidence	Uncertainty in the estimates of benefits, risks, and burdens; benefits may be closely balanced with risks and burdens.	Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.	Very weak recommendation; other alternatives may be equally reasonable.

Note: * Cells intentionally left blank.

Table 27: WFG Task Force (2022): Additional Guidelines that Support the Measure

Verbatim Guideline	Strength of Evidence	Strength of Recommendation
Work Group (WG) 1: Gait and balance assessments tools to assess risk for falls	*	*
We recommend including Gait Speed (GS) for predicting falls risk.	A	1
As an alternative, the Timed Up and Go Test can be considered, although the evidence for fall prediction is less consistent.	B	1
We recommend that Gait and Balance should be assessed as part of the risk assessment of falls.	B	1
WG 2: Polypharmacy, Fall Risk Increasing Drugs, and Falls	*	*
We recommend assessing for fall history and the risk of falls before prescribing potential fall risk increasing drugs (FRIDs) to older adults.	B	1
We recommend the use of a validated, structured screening and assessment tool to identify FRIDs when performing a general medication review or medication review targeted to falls prevention.	C	1
We recommend that a medication review and appropriate deprescribing of fall-risk increasing drugs (FRIDs) should be part of multidomain falls prevention interventions.	B	1
WG 3: Cardiovascular Risk Factors for Falls	*	*
We recommend, as part of a multifactorial falls risk assessment, that a cardiovascular assessment that initially includes cardiac history, auscultation, lying and standing orthostatic blood pressure, and surface 12-lead electrocardiogram should be performed.	B	1
We recommend that the further cardiovascular assessment for unexplained falls should be the same as that for syncope, in addition to the multifactorial falls risk assessment.	A	1
We recommend that management of orthostatic hypotension should be included as a component of multidomain intervention in fallers.	A	1
We recommend that interventions for cardiovascular disorders identified during assessment for risk of falls should be the same as that for similar conditions when associated with syncope, in the addition to other interventions based on the multifactorial falls risk assessment.	B	1
WG 5: Falls in Hospitals and Care Homes	*	*
We conditionally recommend performing multifactorial falls risk assessment in all hospitalized older adults >65 years of age. We recommend against using scored falls risk screening tools in hospitals for multifactorial falls risk assessment in older adults.	B	2
We recommend conducting a post-fall assessment in hospitalized older adults following a fall in order to identify the mechanism of the fall, any resulting injuries, any precipitating factors (such as new intercurrent illness, complications or delirium), to reassess the individual's fall risk factors, and adjust the intervention strategy for the hospitalized older adults.	E	N/A
We recommend that tailored education on falls prevention should be delivered to all hospitalized older adults (≥65 years of age) and other high-risk groups (primary for MUC).	A	1
We recommend that personalized single or multidomain falls prevention strategies based on identified risk factors or behaviors (or situations) be implemented for all hospitalized older adults (≥65years of age), or younger individuals identified by the health professionals as at risk of falls.	C (Acute care) B (Sub-acute care)	1 1
We recommend against the use of physical restraints as a measure for falls prevention in care homes.	B	1
WG 6: Cognition and Falls	*	*

We recommend that routine assessment of cognition should be included as part of multifactorial falls risk assessment in older adults.	B	1
We recommend including both the older adult and caregiver's perspective, when creating the individual falls prevention care plans for adults with cognitive impairment since this strategy has shown better adherence to interventions and outcomes.	C	1
WG 7: Falls and Parkinson's disease and Related Disorders	*	*
We conditionally recommend a fall risk assessment for older adults with Parkinson's disease including a self-report-3-risk factor assessment tool, which includes a history of falls in the previous year, freezing of gait (FOG) in the past month, and slow gait speed.	B	2
We conditionally recommend that older adults with Parkinson's disease should be offered multidomain interventions, based on PD specific assessment and other identified falls risk factors.	B	2
WG 11: Older Adults' Perspectives on Falls	*	*
A care plan developed to prevent falls and related injuries should incorporate the values and preferences of the older adult.	B	1
WG 12: Concerns about Falling and Falls	*	*
We recommend using the FES-I or especially the Short FES-I for assessing concerns about falling in acute care hospitals or long-term care facilities.	B	1
Ad hoc Expert Group 1: Dizziness and Vestibular disorders and Falls	*	*
Routinely ask about dizziness symptoms, and undertake follow-up assessment as necessary to identify cardiovascular, neurological and/or vestibular causes.	E	N/A
Ad hoc Expert Group 2: Vision, Hearing and Falls		
Enquire about vision impairment as part of a multifactorial falls risk assessment, measure visual acuity and examine for other visual impairments such as hemianopia and neglect where appropriate.	E	N/A
Enquire about hearing impairment as part of a multifactorial falls risk assessment, measure and examine for hearing impairments and refer to a specialist where appropriate.	E	N/A
Ad hoc Expert Group 5: Depression and Falls		
Enquire about depressive symptoms as part of a multifactorial falls risk assessment, followed by further mental state assessment if necessary and referral to a specialist where appropriate.	E	N/A
Ad hoc Expert Group 9: Pain and Falls		
Enquire about pain as part of a multifactorial falls risk assessment, followed as indicated by a comprehensive pain assessment.	E	N/A
Adequate pain treatment should be considered as part of the multidomain approach.	E	N/A
Ad hoc Expert Group 10: Urinary symptoms and incontinence and Falls		
Enquire about urinary symptoms as part of a multifactorial falls risk assessment.	E	N/A

Note: * Cells intentionally left blank.