SUPPLEMENTARY TABLE 1 Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist^.

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON MANUSCRIPT SECTION
TITLE			
Title	1	Identify the report as a scoping review.	Title
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Abstract
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Introduction
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Aims
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	Not performed according to the nature of the scoping review
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Methods: Search strategy and inclusion/exclusion criteria Table 1
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Methods: Search strategy and inclusion/exclusion criteria
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Methods: Search strategy and inclusion/exclusion criteria Supplementary Table 2
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Methods: Search outcomes
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	Methods: Data extraction
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Methods: Data extraction

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON MANUSCRIPT SECTION
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	Not performed according to the nature of the scoping review
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Methods: Data synthesis
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Figure 1 Results
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Results Table 2
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not performed according to the nature of the scoping review
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Results Table 2 Supplementary Table 3
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Results Table 2 Supplementary Table 3
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Discussion
Limitations	20	Discuss the limitations of the scoping review process.	Limitation
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Conclusions
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	No funding to declare

Abbreviations: PRISMA-ScR, Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
^ Tricco et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Ann Intern Med. 2018;169(7):467-473.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (2015), Levac and colleagues (2010), and the Joanna Briggs Institute guidance (Peters et al., 2015; Peters et al., 2017) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

SUPPLEMENTARY TABLE 2 Electronic search strategy for at least one database.

CINAHL (performed on the 1st of January 2022, at 10.30)			
Search number	**Query**	**Filters**	**Results**
11	S9 AND S10	English, Up to 2022/1/1	**9**
10	S5 OR S6 OR S7 OR S8	English, Up to 2022/1/1	194,786
9	S1 OR S2 OR S3 OR S4	English, Up to 2022/1/1	1,621
8	TI video capture OR AB video capture	English, Up to 2022/1/1	238
7	TI video OR AB video	English, Up to 2022/1/1	38,831
6	TI elderly OR AB elderly	English, Up to 2022/1/1	99,628
5	TI inpatients OR AB inpatients	English, Up to 2022/1/1	59,044
4	TI biomechanics of falls OR AB biomechanics of falls	English, Up to 2022/1/1	25
3	TI dynamics of falls OR AB dynamics of falls	English, Up to 2022/1/1	341
2	TI mechanisms of falls OR AB mechanisms of falls	English, Up to 2022/1/1	911
1	TI accidental falls OR AB accidental falls	English, Up to 2022/1/1	375
PubMed (performed on the 1st of January 2022, at 10.46)			
Search number	**Query**	**Filters**	**Results**
11	((((accidental falls[Title/Abstract]) OR (mechanisms of falls[Title/Abstract])) OR (dynamics of falls[Title/Abstract])) OR (biomechanics of falls[Title/Abstract])) AND ((((inpatients[Title/Abstract]) OR (video[Title/Abstract])) OR (video capture[Title/Abstract])) OR (elderly[Title/Abstract]))	English, Up to 2022/1/1	**214**
10	(((inpatients[Title/Abstract]) OR (video[Title/Abstract])) OR (video capture[Title/Abstract])) OR (elderly[Title/Abstract])	English, Up to 2022/1/1	428,885
9	(((accidental falls[Title/Abstract]) OR (mechanisms of falls[Title/Abstract])) OR (dynamics of falls[Title/Abstract])) OR (biomechanics of falls[Title/Abstract])	English, Up to 2022/1/1	1485
8	video capture[Title/Abstract]	English, Up to 2022/1/1	285
7	video[Title/Abstract]	English, Up to 2022/1/1	110,020
6	elderly[Title/Abstract]	English, Up to 2022/1/1	275,438
5	inpatients[Title/Abstract]	English, Up to 2022/1/1	47,232
4	biomechanics of falls[Title/Abstract]	English, Up to 2022/1/1	4
3	dynamics of falls[Title/Abstract]	English, Up to 2022/1/1	8
2	mechanisms of falls[Title/Abstract]	English, Up to 2022/1/1	5
1	accidental falls[Title/Abstract]	English, Up to 2022/1/1	1468
Google Scholar (performed on the 1st of January 2022, at 11.08)			
Search number	**Query**	**Filters**	**Results**
1	("accidental falls" OR "mechanisms of falls" OR "dynamics of falls" OR "biomechanics of falls") AND (inpatients OR elderly OR video OR "video capture")	English, Up to 2022/1/1 All in title	**1720**

Abbreviations: CINAHL, Cumulative Index to Nursing and Allied Health Literature.

SUPPLEMENTARY TABLE 3 Specific measures extracted.

Author(s) Year	Specific measures
Choi et al. [17] 2015	48% of falls (n=12; 4 FW and 8 BW) with head impact. 84% of falls (n=21; 4 FW, and 17 BW) with hand impact. 76% of falls (n=16) involving hand impact before the pelvis or head impact. The knee impacted before the pelvis on all 4 FW falls. The stepping was used in 64% of falls to gain balance. The most imbalance causes, respectively, incorrect weight shifting (n=12), hit (n=7). Trips, collapses, and loss-of-support each accounted for 2 falls. The most common activity at the time of falling, respectively, standing (n=14), followed by walking (n=8), and transferring from standing to sitting (n=3). 2 falls occurred while using a walker. The mean vertical velocity for pelvis 2.14 (±0.63) m/s, for the head 2.91 (±0.86) m/s, and for hand 2.87 (±1.60) m/s. When the hand(s) impacted before the pelvis, the vertical velocity was 2.19 (±0.61) m/s instead of 2.41 (±0.85) m/s (9% lower). When steps occurred, the vertical velocity was 2.19 (±0.59) m/s instead of 2.31 (±0.81) m/s (5% lower). Mean descent duration was 593 (±255) ms for pelvis, 757 (±217) ms for head, 479 (±230) ms for hand. Vertical impact velocity of the head was associated with fall height (p=0.036), hand and pelvis results were not statistically significant (p=0.19, 0.41).
Komisar et al. [44] 2021	The held weight-bearing objects were chairs/wheelchairs (255 falls; 23.1%), walkers/rollators (239 falls; 21.6%), tables/counters (109 falls; 9.9%), and handrails (36 falls; 3.3%). The held non-weight-bearing objects were pillows, clothing, purses, and linens (75 falls; 6.8%); dishes, utensils, and food (45 falls; 4.1%); reading material (14 falls; 1.3%); and tissues, paper, and napkins (14 falls; 1.3%).
Kuo et al. [34] 2020	A high muscle activation in the neck observed to avoid impact to the head during falls. In falls without head impact, residents appear to flex their hips and necks and had substantial muscle activation during the fall. A simultaneous flexion of the neck and pelvis observed to lift the head off the ground and to reduce the impact velocity.
O' Connor et al. [33] 2017	Initial fall directions: 34 SW (53%), 24 BW (38%), 5 FW (8%). Stepping in 28 falls (44%) and reached to grasp an object in 34 falls (54%) used to gain the balance. Final landing configuration; 31 BW (48%), 29 SW (45%) and mostly on back or pelvis. The most effected sites were pelvis (n=63, 98%), torso (n=61, 95%), elbow/forearm (n=52, 81%) and shoulder (n=47, 73%). 43 (67%) falls involved hand/wrist impact, 42 (66%) falls involved head impact, and 18 (28%) falls involved knee impact. In 52 (81%) falls, the perceived site of greatest energy absorption was the pelvis, torso or buttocks. In 46 (72%) falls, the site of greatest injury risk was the pelvis/torso/buttocks.
Robinovitch et al. [37] 2013	The cause of falling was incorrect weight shifting (93, 41%), followed by trip or stumble (48, 21%), hit or bump (25, 11%), loss of support (25, 11%), collapse (24, 11%) and slipping (6, 3%). The three activities associated with the highest proportion of falls were forward walking (54, 24%), standing quietly (29, 13%), and sitting down (28, 12%).
Schonnop et al. [42] 2013	Initial fall directions: 30 FW (39%), 26 BW (34%), 18 SW (23%), 3 ST (4%). Landing configurations: 32 BW (42%), 29 SW (38%), 16 FW (21%). The head impact was in 85 falls (37%); 54 to the ground, 11 to a wall, and 14 to the furniture. The greatest head impact for initial FW falls, and smallest for BW landing configuration. 74% of all falls involved hand(s) impact; 56% BW, 84% SW, 64% ST, and 97% FW. A mismatch was determined between initial and final configuration in the 70 falls (30%). 36% from SW to BW, 8% from SW to FW (reduced odds for head impact), 33% FW to SW (no association with head impact probability).

van Schooten et al. [35] 2018	*Initiation phase:* intrinsic cause 56.8%, stand-sit transfer 17.5%, sit-stand transfer 10.7%, sitting 14.2%, standing 24.0%, walking 33.6%, initially forward 19.3%, initially backward 32.2%, initially sideward 29.1%, initially straight down 19.3%. *Descent phase:* stepping 48.9%, grasping 24.2%, turning during descent 36.7%, attempted upper limb arrest 88.0%. *Impact phase:* head impact 33.6%, hip impact 40.8%, sustained injury 23.2%. The causes of imbalance preceding a fall were incorrect weight transfer accounting for 49.5% of falls; loss of support from an external object (22.0%); trip or stumble (12.5%); hit or bump (8.8%); collapse (6.7%); and slip (0.5%). 33.8% BW falls, 28.8% SW falls, 19.2% ST falls. 23.2% of falls caused an injury: lacerations or abrasions (50.7%), swelling or hematomas (29.4%), superficial signs (14.0%), bone fracture (2.9%) and joint sprain or dislocation (2.9%). Impact: 50.4% head, 13.6% elbow, 8.8% knee/shin, 8.0% hand/wrists, 7.2% shoulder/arm, 5.6% spine/back, 4.8% hip/thigh, 0.8% pelvis/tailbone.
van Schooten et al. [38] 2019	Cause of imbalance as incorrect weight transfer (49.5% of falls), loss of support with an external object (22.0%), trip or stumble (12.5%), hit or bump (8.8%), collapse (6.7%), or slip (0.5%). We classified the activity at the time of the fall as walking (32.9%), standing (23.7%), stand-to-sit transferring (18.4%), sitting (13.8%), or sit-to-stand transferring (11.2%).
Vlaeyen et al. [23] 2013	*Prefall phase* The activities before the fall, respectively, transitioning on/off bed, sofa or wheelchair (n=9; 35%), walking (n=7; 27%), bending down (n=5; 19%), dressing (n=4; 15%) and bathing (n=1; 4%). In 14 (54%) falls were involved a rollator (n=11) or a wheel chair (n=3). *Critical phase* 14 (54%) initial BW falls, 6 (23%) SW falls, 4 (15%) FW falls, 2 (8%) ST. The perceived site of greatest energy absorption was the pelvis, torso or buttocks in 21 (81%) falls. The most frequently impact side, respectively, pelvis (89%), torso (81%), head (62%) and elbow or forearm (62%). The mean of duration of falls 1946 (±639) ms in 21 falls. In 18 (69%) falls attempted to gain balance by stepping, eight (31%) cases reached to grasp an object, six falls (23%) rolled to change fall configuration. *Postfall phase* 17 (65%) falls in the living area, four (15%) in the sleeping area, three (12%) in the hall and two (8%) in the bathroom. A call alarm used in 14 falls (54%). A significant difference found between the mean time on the ground and using call alarm ($p<0.05$). The mean time on the ground was 11 minutes (SD=9.2; range 3–38) in case a call alarm, 28 minutes (SD=25.4; range 2–59) in case no call alarm. The mean time of lying on the ground was 14 minutes. *Recovery phase* None were able to get up unaided. The number of drugs and the drugs rated as high-risk for falls (e.g. psychotropics, antidepressants, diuretics) were collected.
Weaver et al. [36] 2016	The stepping was in 450 falls (47.1%). There was no difference between the two groups (Parkinson's disease and not Parkinson's disease) to gain balance by stepping. To attempt to grasp an object was in 234 falls (24.5%). Parkinson's disease residents were 1.6 times more likely to initiate reaching responses, but probability of fixing (but releasing) the object was 5.0 times greater than second group. No differences observed for initial and landing configuration (sideways falls occurred most frequently). No differences in the occurrence of head, hip or hand(s) impact, 42% of falls involved hip impact, 33% involved head, and 67% at least one hand/forearm. Impact: 206 of with hip impact and 335 of with hand impact. 160 (73%) of hip impact cases wore hip protectors.
Yang et al. [16]	*Descent stage* The most selected fall directions; BW (42%) and SW (31%).

2013	To gain the balance the most common (42%) observable response was stepping. *Impact stage* The most selected landing configuration was BW (71%). The impact of the falls was to head (42%), hand(s) (71%), and pelvis (100%) and multiple body sites.
Yang et al. [20] 2015	The 40% falls (n=206) involved the hip impact; 96% (n=198) to the ground, 1% (n=2) to the wall, and 2.4% (n=5) to the furniture. The 77 % falls (n=160) with hip impact wore hip protectors at time of fall. In total, eight hip fracture were observed and 4 of them with hip protector. In two of four falls the individual landed backward, the six remaining (two where hip protectors were worn and four where they were not worn) involved sideways landings and hip impact. Wearing the hip protectors decreased the percent reasons of cases of hip fracture (11% to 2%; p=0.03). Initial fall direction; 96 FW (18%), 148 SW (28%), 172 BW (33%) and 103 ST (20%). Landing configuration; 54 FW (10%), 175 SW (34%), 290 BW (56%). The hand impact was in 335 falls (64%). In the body rotation during the descent, in 35% of the initial directed SW rotated to land BW reduced the hip impact with a 10-fold and, in 10% of initially directed SW rotated to a FW landing configuration increased the hip impact. The stepping was in 43% falls. The dependent ADL performance was associated with increased odds of hip impact (OR 1.6, 1.0–2.4).
Yang et al. [40] 2016	520 falls: 33% (n = 172) BW, 28% (n = 148) SW, 20% (n = 103) ST, 18% (n=96) FW. The cause of imbalance, activity at time of fall, initial fall direction, hand impact, stepping response, and use of mobility aids were all significantly associated with risk for hip impact. The risk for hip impact was higher for falls due to slip and trip (RR = 1.7, 95% CI [1.0–2.9]) than other causes (RR = 1.9, 95% CI [1.3–2.7]), and greater for falls FW landing or SW landing (RR = 4.2, 95% CI [2.4–7.1]) than falls directed BW landing (RR = 7.9, 95% CI [4.1–15.6]). The existing of hand impact was associated with 5.6-fold (3.6–8.8) higher odds for hip impact (RR = 5.6, 95% CI [3.6–8.8]). Stepping responses were associated with higher odds for hip impact (RR = 2.0, 95% CI [1.4–3.3]). Use of mobility aids was associated with 30 % lower of hip impact (RR = 0.7, 95% CI [0.5–0.9]). Use of medication: antipsychotic (72, 45%), antianxiety (30, 18.8%), antidepressant (73, 45.6%), hypnotic (23, 14.4%), diuretic (36, 22.5%), analgesics (82, 51.2%).
Yang et al. [41] 2017	170 of 520 falls involved head impact: 75 (44.1%) to back of the head, 53 (31.2%) to side of the head, 36 (21.2%) to front and 6 (3.5%) to top of the head. Impact was seen by the ground in 109 falls (64%), to furniture in 41 falls (24%) and to wall in 12% of falls). 64% of falls (n=333) involved hand(s) impact. 54 falls involved final FW, 465 falls involved other landing configurations. The residents who are independent of ADL and who had mild CPS had higher risk the odds for head impact. The impact to the head was 2.17-fold higher on trips or slips, 2.60-fold higher for falls during walking than for other activities, 2.48-fold greater for falls initially directed FW than in other directions, and 3.50-fold greater for falls involving a FW (than other) landing configuration. The body rotation during descent to SW or BW reduced the head impact risk versus the forward. Use of medication: antipsychotics (72, 45%), antianxiety agents (30, 18.8%), antidepressants (73, 45.6%), hypnotics (23, 14.4%), diuretics (36, 22.5%), analgesics (82, 51.2%).
Yang et al. [43] 2018	Regardless of sex, individuals with independent ADL performance (compared with dependent ADL performance) were less likely to fall due to hit/bump or while walking or standing, but nearly 2 times more likely to fall because of loss of support or while seated, getting up, or sitting down. Participants with severe cognitive impairment were less likely than those with mild impairment to fall while walking (0.61; 0.37-0.99) but more likely to fall while getting up (2.80; 1.19-6.61). Use of medication: antipsychotic (104, 45.6%), antianxiety (47, 20.6%), antidepressant (111, 48.7%), hypnotic (47, 20.6%), diuretic (46, 20.2%), analgesics (116, 50.9%).
Yang et al. [39]	Initial fall direction, 532 SW; 337 FW; 594 BW or ST. Final direction, 554 final SW, and 906 FW or BW.

2020	The risk of hip fracture was higher in falls initially directed SW or FW than BW or straight down (RR 4.62; 1.65–12.95 for SW and RR 4.02; 1.22–13.26 for FW) and landing SW had higher risk of hip fracture than other landing directions (RR 5.50; 2.36–12.78). 666 falls with hip impact, 868 with hand impact, and 690 with knee impact. Stepping respond in 1056 falls, reaching respond in 213 falls. In falls that were initially directed BW, rotating to land SW (observed in 22% of cases) increased hip fracture risk (RR 10.31; 1.09–100.0). In falls that were initially directed SW, rotating to land BW (which occurred in 42% of cases) reduced fracture risk (RR 0.28; 0.08–0.96). Having an impact to the hip increased the risk of hip fracture (RR 3.38; 1.49–7.67). 30 hip fracture falls: 23 with posterolateral impact, four with lateral impact, two with anterolateral impact, one with posterior impact. 73% of falls without hip fracture and 57% with hip fracture wore hip protectors. No differences between fracture and non-fracture groups in use of the upper limbs to arrest the fall (RR 0.58; 0.25–1.36), reaching to grasp a nearby support (RR 1.74; 0.68–4.46), or attempts to recover balance by stepping (RR 1.87;0.72–4.65).

Abbreviations: ADL, Activities of Daily Living; IADL, Instrumental Activities of Daily Living; OR, Odd Ratio; RR, Relative Risk.
Legend of Fall Categories: Initial fall direction: forward (FW), sideways (SW), backward (BW), straight down (ST). Landing configuration: forward (FW), sideways (SW), backward (BW).