APPENDIX A. SEARCH STRATEGIES

PATIENT SITTERS
SEARCH METHODOLOGY

DATABASE SEARCHED & TIME PERIOD COVERED:
Web of Science – From inception to 11/29/2018

LANGUAGE:
English

SEARCH STRATEGY:
"FORWARD SEARCHES" ON THE FOLLOWING ARTICLES:

Boswell, D. J., J. Ramsey, M. A. Smith and B. Wagers. (2001) "The cost-effectiveness of a patient-sitter program in an acute care hospital: a test of the impact of sitters on the incidence of falls and patient satisfaction." Qual Manag Health Care **10**(1): 10-6.

Carr, F. M. "The role of sitters in delirium: an update." (2013) Can Geriatr J **16**(1): 22-36.

Chu S. Special observations in the care of psychiatric inpatients: A review of the literature and developments in practice. (2016) ARC Journal of Psychiatry. 1(1):21-31.

Cox, A., M. Hayter and J. Ruane. "Alternative approaches to 'enhanced observations' in acute inpatient mental health care: a review of the literature." (2010) J Psychiatr Ment Health Nurs **17**(2): 162-71.

Feil M, Wallace S. The use of patient sitters to reduce falls: Best practices. (2014) Pennsylvania Patient
Safety Advisory. 11(1):8-14.

Lang, C. E. "Do sitters prevent falls? A review of the literature." (2014) J Gerontol Nurs **40**(5): 24-33; quiz 34-5.

Manna, M. "Effectiveness of formal observation in inpatient psychiatry in preventing adverse outcomes: the state of the science." (2010) J Psychiatr Ment Health Nurs **17**(3): 268-73.

Muralidharan, S. and M. Fenton. "Containment strategies for people with serious mental illness." (2006) Cochrane Database Syst Rev(3): Cd002084.

Salamon, L. and M. Lennon. "Decreasing companion usage without negatively affecting patient outcomes: a performance improvement project." (2003) Medsurg Nurs **12**(4): 230-6; quiz 237.

Xu, C., T. X. Audrey, S. L. Shi, Y. W. Shanel, J. M. Tan, K. Premarani, R. Parasuram and S. V. Kumar. "Effectiveness of interventions for the assessment and prevention of falls in adult psychiatric patients: A systematic review." (2012) JBI Libr Syst Rev **10**(9): 513-573.

DATABASE SEARCHED & TIME PERIOD COVERED:
PubMed – From inception to 12/18/2018

LANGUAGE:
English

SEARCH STRATEGY:
sitter*[tiab] OR sitter*[ot] OR patient-sitter* OR "enhanced observation" OR "formal observation" OR "continuous observation" OR "constant observation" OR "special observation" OR one-to-one observation* OR "close observation" OR patient observ* OR "patient safety assistant" OR "patient safety assistants" OR patient attendant* OR liaison nurse* OR ((virtual observ* OR video observ* OR video monitor* OR remote observ*) AND (patient OR patients)) OR "patient companion" OR "patient companions"
AND
safety management[mh] OR safety[mh] OR patient safety[mh] OR patient satisfaction[mh] OR accidental falls[mh] OR risk management[mh] OR suicide,attempted[mh] OR mental disorders[mh] OR crisis intervention[mh] OR self-injurious behavior[mh] OR violence[mh] OR nursing care[mh] OR wandering behavior[mh] OR accident prevention[mh] OR safe[tiab] OR safe[ot] OR safety[tiab] OR safety[ot] OR fall[tiab] OR fall[ot] OR falls[tiab] OR falls[ot] OR falling[tiab] OR falling[ot] OR wander*[tiab] OR wander[ot] OR suicid*[tiab] OR suicid*[ot] OR accident*[tiab] OR accident*[ot] OR self-harm*[tiab] OR self-harm*[ot] OR self harm*[tiab] OR self harm*[ot]
AND
cost-benefit analysis OR cost OR costs OR costly OR cost effective OR finance OR financial OR expense* OR expensive OR economic OR expenditure* OR effective OR effectiveness OR ineffective OR inefficient OR benefit* OR burden* OR intrusive OR deleterious OR reduction OR reduce OR reducing

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DATABASE SEARCHED & TIME PERIOD COVERED:
CINAHL – From inception to 11/30/2018

LANGUAGE:
English

SEARCH STRATEGY #1:
TI (sitter* OR patient-sitter* OR "enhanced observation" OR "formal observation" OR "continuous observation" OR "constant observation" OR "special observation" OR "one-to-one observation" OR "close observation" OR "patient safety assistant" OR "patient safety assistants" OR "patient attendant" OR "patient attendants") OR AB (sitter* OR patient-sitter* OR "enhanced observation" OR "formal observation" OR "continuous observation" OR "constant observation" OR "special observation" OR "one-to-one observation" OR "close observation" OR "patient safety assistant" OR "patient safety assistants" OR "patient attendant" OR "patient attendants") OR TI ((virtual OR video OR remote*) AND (observ* OR monitor*) AND (patient OR patients)) OR AB ((virtual OR video OR remote*) AND (observ* OR monitor*) AND (patient OR patients))

AND
MH "Injuries, Self-Inflicted/PC" OR "accident prevention" OR MH "Accidents" OR MH "Suicide, Attempted" OR MH "Behavioral Symptoms" OR MH "Suicidal Ideation" OR MH "Accidental Falls" OR MH "Patient Safety+"

NOT
cardio OR heart OR defibrill* OR cardiac OR diabetes OR fibrill*

SEARCH STRATEGY #2:
TI (sitter* OR patient-sitter* OR "enhanced observation" OR "formal observation" OR "continuous observation" OR "constant observation" OR "special observation" OR "one-to-one observation" OR "close observation") OR TI ("patient safety assistant" OR "patient safety assistants" OR "patient attendant" OR "patient attendants") OR TI ((virtual OR video OR remote*) AND (observ* OR monitor*) AND (patient OR patients))
NOT
cardio OR heart OR defibrill* OR cardiac OR diabetes OR fibrill*
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DATABASE SEARCHED & TIME PERIOD COVERED:
Cochrane Database of Systematic Reviews and Cochrane Trials – 1/1/1970 to 12/4/2018

LANGUAGE:
English

SEARCH STRATEGY:
sitter* OR patient-sitter* OR "enhanced observation" OR "formal observation" OR "continuous observation" OR "constant observation" OR "special observation" OR "one-to-one observation" OR "close observation"):ti,ab,kw (Word variations have been searched

OR
[("patient safety assistant" OR "patient safety assistants" OR (patient attendant" OR "patient attendants") OR (virtual OR video OR remote*) AND (observ* OR monitor*) AND (patient OR patients)):ti,ab,kw(Word variations have been searched)
AND
MeSH descriptor: [Patient Safety] explode all trees OR MeSH Descriptor: [Patient Harm] explode all trees OR MeSH descriptor: [Safety Management] explode all trees OR MeSH descriptor: [Accident Prevention] explode all trees OR MeSH descriptor: [Accidental Falls] explode all trees OR MeSH descriptor: [Accidents] this term only OR MeSH descriptor: [Suicidal Ideation] explode all trees OR MeSH descriptor: [Suicide, Attempted] explode all trees OR MeSH descriptor: [Suicide] this term only OR MeSH descriptor: [Self-Injurious Behavior] explode all trees]

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DATABASE SEARCHED & TIME PERIOD COVERED:
PsycINFO – 1/1/1970 to 12/4/2018

LANGUAGE:

English

SEARCH STRATEGY:

TI (sitter* OR patient-sitter* OR "enhanced observation" OR "formal observation" OR "continuous observation" OR "constant observation" OR "special observation" OR "one-to-one observation" OR "close observation") OR AB (sitter* OR patient-sitter* OR "enhanced observation" OR "formal observation" OR "continuous observation" OR "constant observation" OR "special observation" OR "one-to-one observation" OR "close observation") OR TI "patient safety assistant" OR "patient safety assistants" OR "patient attendant" OR "patient attendants") OR AB ("patient safety assistant" OR "patient safety assistants" OR "patient attendant" OR "patient attendants")
OR
[TI ((virtual OR video OR remote*) AND (observ* OR monitor*) AND (patient OR patients)) OR SU ((virtual OR video OR remote*) AND (observ* OR monitor*) AND (patient OR patients)) OR AB ((virtual OR video OR remote*) AND (observ* OR monitor*) AND (patient OR patients)))
AND
DE "Patient Safety" OR DE "Falls" OR DE "Accident Prevention" OR DE "Self-Injurious Behavior" OR DE "Self-Destructive Behavior" OR DE "Head Banging" OR DE "Self-Inflicted Wounds" OR DE "Self-Mutilation" OR DE "Attempted Suicide"]

APPENDIX B. RISK OF BIAS IN NON-RANDOMISED STUDIES – OF INTERVENTIONS (ROBINS-I) TOOL

Bias Domains Included in ROBINS-I[12]

Pre-intervention	Risk of bias assessment is mainly distinct from assessments of randomised trials
Bias due to confounding	Baseline confounding occurs when one or more prognostic variables (factors that predict the outcome of interest) also predicts the intervention received at baseline ROBINS-I can also address time-varying confounding, which occurs when individuals switch between the interventions being compared and when post-baseline prognostic factors affect the intervention received after baseline
Bias in selection of participants into the study	When exclusion of some eligible participants, or the initial follow-up time of some participants, or some outcome events is related to both intervention and outcome, there will be an association between interventions and outcome even if the effects of the interventions are identical This form of selection bias is distinct from confounding—A specific example is bias due to the inclusion of prevalent users, rather than new users, of an intervention
At intervention	Risk of bias assessment is mainly distinct from assessments of randomised trials
Bias in classification of interventions	Bias introduced by either differential or non-differential misclassification of intervention status Non-differential misclassification is unrelated to the outcome and will usually bias the estimated effect of intervention towards the null Differential misclassification occurs when misclassification of intervention status is related to the outcome or the risk of the outcome, and is likely to lead to bias
Post-intervention	Risk of bias assessment has substantial overlap with assessments of randomised trials
Bias due to deviations from intended interventions	Bias that arises when there are systematic differences between experimental intervention and comparator groups in the care provided, which represent a deviation from the intended intervention(s) Assessment of bias in this domain will depend on the type of effect of interest (either the effect of assignment to intervention or the effect of starting and adhering to intervention).
Bias due to missing data	Bias that arises when later follow-up is missing for individuals initially included and followed (such as differential loss to follow-up that is affected by prognostic factors); bias due to exclusion of individuals with missing information about intervention status or other variables such as confounders
Bias in measurement of outcomes	Bias introduced by either differential or non-differential errors in measurement of outcome data. Such bias can arise when outcome assessors are aware of intervention status, if different methods are used to assess outcomes in different intervention groups, or if measurement errors are related to intervention status or effects
Bias in selection of the reported result	Selective reporting of results in a way that depends on the findings and prevents the estimate from being included in a meta-analysis (or other synthesis)

APPENDIX C. PEER REVIEW COMMENTS/AUTHOR RESPONSES

Question	Reviewer comment	Authors' response
Are there any published or unpublished studies that we may have overlooked?	Yes - Unclear. Authors did not search SCOPUS, EMBASE, or search for gray literature.	See below for a detailed discussion of our search strategy.
	Yes - I realize this one may have come out after you did your search. Sand-Jecklin Et. al. Video Monitoring for Fall Prevention and Patient Safety 2018 J Nurs Care Qual Vol 34 No. 2 pp145-150 Would like to understand why excluded for background, thank you. Quigley et. al. Outcomes of Patient-Engaged Video Surveillance on Falls and Other Adverse Events. Clin Geriatr Med 35 (2019) 253-263	The paper by Sand-Jecklin (2018) was about outcomes rather than falls, and hence we could not include it. We did include as evidence the earlier paper by Sand-Jecklin (2016). The paper by Quigley and colleagues could not be included as evidence as it did not report any pre-intervention data points; it was thus excluded.
Additional suggestions or comments can be provided below. If applicable, please indicate the page and line numbers from the draft report.	Excellent report addressing the request	Thank you for your comment.
	I have added comments in the manuscript using the notes.	Thank you for your comments. We have read the attached document and incorporated the comments in this table.
	Great job!!! No comments except would like to edit my info listed under Technical Expert Panel to read: Tatjana Bulat, MD,CMD Director, VISN 8 Patient Safety Center of Inquiry Associate Chief of Staff for Geriatrics and Extended Care, James A. Haley VA Hospital and Clinics, Tampa, FL Associate Professor of Medicine, Morsani College of Medicine	Thank you for your comments. We have now made these changes to the text.
	General comments: this report serves a very useful purpose in synthesizing the evidence to date on safety attendants and related interventions for the prevention of falls. The report was well-written.	Thank you for your comment.
	The interventions focused on video monitoring seem relevant to the VA, but the business case does not seem fully established by the publications reviewed, in part because the cost of acquiring the video technology was not always factored into the cost calculations, if I understood correctly. Did any of the articles comment on sustainability of the video interventions? It would seem likely that if there was a true business case for the video intervention (i.e., if it truly paid for itself) and stakeholders perceived clinical value, then the intervention would be likely to be sustained.	This is a great question. A few of the video monitoring studies noted things like ROI or reported that the hospital administration had scaled up the intervention, which implies that leadership judged the costs to be worth the benefit. We added text to those studies.

	Page 1, line 12 -- delete "can" from "help can prevent"	We re-phrased this to “staff…at hand can help prevent a fall”
	Page 6, lines 43-44 -- It is noted that "US acute care hospitals can spend more than $1 million annually on sitters" -- is this the cost per hospital (more plausible) or the cost across all US acute care hospitals combined?	It is the cost-per-hospital. We rephrased this to make it clearer.
	Page 9, line 30 -- It's written that "...the data presented here are all from observational studies." This confused me when I first read it, because when I hear the term "observational study," it makes me think that no intervention was conducted, i.e., a cohort study where the people with sitters and without sitters were followed to observe their fall rates. Consider defining the term "observational studies" or using an alternative like "non-randomized intervention studies" or "quasi-experimental studies."	We changed this to “observational studies, primarily time series analyses of the effect of an intervention.”
	Page 9, line 52-53 -- another potential issue related to bias in outcome ascertainment is that the individuals collecting the data on falls may or may not have been blinded to the interventions that were ongoing.	We have added this to the list of issues.
	Table 2 (intervention components) -- found this table to be a useful compilation of the interventions that have been tried in the literature to date.	Thank you for your comment.
	Page 14, line 56 -- p values is reported as "p<0.000" -- is this a typo or is it how the study reported it? P value must be a positive number.	That is how it is reported in the original article. We presume that what the authors mean is that it is a positive number, but even smaller than 0.000 (for example, 0.0001).
	Page 14, line 58 -- should be "percent of patients" rather than "number of patients"	Thank you for your comments. We have now made these changes to the text.
	Page 18, line 11 -- what does "an indicated cost savings" mean? Did they give a number or just qualitatively report that there was cost savings?	We took out the “indicated”, so it is just “a cost savings was reported”.
	Page 19, line 35 -- is "Donoghue and Giles" referring to a single study by those two authors or to two separate studies, one by Donoghue and one by Giles?	These are two different studies; we have re-phrased to make that clear.
	Thank you for the opportunity to review this report. This is an important issue, but unfortunately the authors have displayed that the currently available literature does not provide adequate guidance to improve decision making. I reviewed this report with the attached PRISMA checklist. There appear to be a couple of issues that could be clarified/improved in items 11-15 and 17. Please see attached comments.	Thank you for your comment. See responses to individual comments, below.

	Cleaning up these issues may help others avoid the compulsion to spend their time repeating this work. Thanks again for your contribution.	
	Thank you so much for doing this important review. This issue is critically important since falls can cause loss of function and loss of life. Sitters use many resources and we are not even sure they help. This could also be helpful for families who may wonder why their loved one didn't get one to one observation.	Thank you for your comment.
	This is my error for not noticing sooner: KQ1: ideally this would address the effectiveness of reducing falls and fall-related injuries. I see that when possible you mentioned outcomes that measured falls with injury. I think it would be worth it to state this in KQ1 and whenever possible state the impact on fall-related injuries. I realize there is probably not much more on this but just to close the loop on this would be valuable.	We specifically looked for and abstracted when it was present the outcome of fall was with injury. Unfortunately, this was not common, as most articles reported only falls.
	Study selection: My error for not noticing sooner but the papers were pulled from acute care only. So much of VA falls are in CLC- could you also look at papers from long term care? I realize there may not be more literature addressing long term care settings for falls but also important to let readers know you looked for this.	The limitation of the eligible settings to acute care only was made very early in this process, and we can't go back and easily retrieve the long-term care articles, as they would have been rejected and included in the 1,700+ rejects. If evidence on sitters and alternatives to sitters is desired, we suggest nominating it to the ESP as a new topic.
	Excellent introduction, well referenced and covered important points about falls.	Thank you for your comment.
	Pg 4, Lines 29-30: poor grammar here, don't end the sentence with "at"....	Thank you for your comment. We have now made this change to the text.
	Pg 6, Line 44: Is that the total cost for the US for one year or in one hospital for one year? It seems very low if it is the US.	This is the cost-per-hospital. Re-phrased to make this clear.
	Pg 8, Line 28: Do you have a reference for this?	This information was given to us via email directly from Jo McKenzie, who said it was a pre-print of Chapter 25 in the 2019 edition of the Cochrane Handbook. Not sure if it is publicly available yet, but we are sure it is the latest advice.
	Pg 17, Lines 55-59: This is confusing, I thought there WAS a significant difference from pre to post intervention??	It was confusing as written. The statistically significant difference was between the pre-intervention period and the post-intervention period for patients in the brain injury unit. The nonsignificant difference was within the brain injury unit post-intervention, comparing patients who were

		placed in the video monitored rooms as compared to other patients. Changes made to the text to clarify.
	Pg 18, Lines 19-21: Is this decrease for the video group vs. the non-video group for all groups over time?	Yes, that is correct—it is 9 months of pre-intervention data across all 3 units compared with 9 months of post-intervention data. Text added to clarify this.
	Pg 19, Line 37: I'm not sure where these other studies are discussed - you mean you have already discussed them or they will be discussed below?	They were presented earlier in the "Adding Sitters to Prevent Falls" section. Text added to guide readers to this.
	Pg 27, Line 48-49: We can only speculate as to the applicability of these finding to VA populations.	Thank you for your comment. We have now made this change to the text.
	Appendix E: Evidence Table - this table is very hard to read, can you present the data in another way e.g. as a bulleted paragraph with sub-headings?	It's a challenge, for sure. We tried some other formats, none of which seemed ideal, and this format is what we thought was the best balance between detail and presentation.
	Data items: A full description of measures seems limited/lacking—what is the "outcome" they are looking to see change/improve?	We're not sure what part of text this is referring to. Almost all the studies were seeking to decrease the number of hours sitters were ordered to prevent falls, so the outcomes were sitter use, measured in hours or money, and falls, either falls in general or falls with injury.
	Risk of bias in individual studies: Additional use of GRADE seems fine, though a bit confusing because all they had was a narrative synthesis. Could the authors be more clear about what they mean about effect estimate when they didn't do a meta-analysis? Need to be clear on how they were collating the data so the reviewer understands how they were comparing studies across one another to determine "improvement" "worsening" or "no change"	The only GRADE criteria that is different across the interventions and outcomes assessed is that video monitoring reduced sitter use while not adversely influencing falls, which was judged as having consistent evidence, because all studies reported these outcomes, whether statistically tested or not.

	The search for articles (if the authors are attempting to comment as strongly as they are on publication bias) is insufficient. There appears to be handwaving when referring to publication bias as the authors do not provide quantitative evidence. They do not mention reviewing the references of included studies or searching a formal trial registry such as clinicaltrials.gov or looking at conference abstracts. They also did not search a more comprehensive database such as EMBASE or SCOPUS. There is no mention on involving a reference librarian. It is unclear whether they limited to English only studies. That being said, their searches were reasonable but given that they only found 16 references. To be thorough suggests the authors should consider searching SCOPUS or EMBASE and make some attempt to find grey literature.	We understand the reviewer's desire for more or different databases to be searched, but this type of critique can be applied to every review of every topic – there are far more databases that can be searched than there is time and money to search them. Choices have to be made. We made our choices based on the input of our reference librarian, Roberta Shanman, MLS, who is listed in the acknowledgement (but we will now include this information in the Methods, too, since it may be overlooked in the acknowledgments). We did not search SCOPUS because it is our experience that SCOPUS has content similar to Web of Science, which we did search. We did not search EMBASE because this is not the type of intervention for which EMBASE has a known added benefit to searching PubMed (for example, EMBASE lists RCTs of drug interventions that are not found in PubMed). Instead, given this intervention, we searched CINAHL, with its focus on nurses and other health professionals. We did search the references of included studies (see next comment). We did not search clinicaltrials.gov, as we did not find a single included study that reported it to have been prospectively registered, indicating to us that studies of these interventions are not viewed by their investigators as something needing or requiring prospective registration. The gray literature search suggestion is a good one, and for this revision we did a gray literature search. We found 3 additional studies, which are now included – but the addition of these studies does not change any conclusion. We disagree with our presentation of the possibility of publication bias as handwaving. Firstly, we are not able to do statistical testing for unexplained heterogeneity, due to the nature of the data. Secondly, we are describing the real world of quality improvement initiatives, in that most – both successful and unsuccessful – almost certainly never get written up for publication. Virtually every

		US hospital is engaged each year in 1 or more QI initiatives, and there are nowhere near that number of QI publications from US hospitals each year.
	Please explain “Ref mine:10.” Is this a review of reference lists?	Ref mine is a review of reference lists.
	It might be better to have Table 1 present study characteristics for which data were extracted (e.g., study size, PICOS, follow-up period)/provide the citations and make the Robins table a later table.	The evidence table with the PICOS, study design, sample size, etc., is by ESP format something that is placed in the Appendix, so we did not move it into the body of the report (it is 40+ pages long).

APPENDIX D. CITATIONS FOR EXCLUDED STUDIES

Background, n=15

1. Patient sitters' disturbing, firsthand encounters. Hospital Employee Health. 2016;35(4):41-41.

2. Report: Train sitters upon hire, and annually. Hospital Employee Health. 2016;35(4):42.

3. Bailey M, Amato S, Mouhlas C. A creative alternative for providing constant observation on an acute-brain-injury unit. Rehabilitation nursing : the official journal of the Association of Rehabilitation Nurses. 2009;34(1):11-16, 23.

4. Boswell DJ, Ramsey J, Smith MA, Wagers B. The cost-effectiveness of a patient-sitter program in an acute care hospital: a test of the impact of sitters on the incidence of falls and patient satisfaction. Quality management in health care. 2001;10(1):10-16.

5. Feil M, Wallace SC. The Use of Patient Sitters to Reduce Falls: Best Practices. Pennsylvania Patient Safety Advisory. 2014;11(1):8-14.

6. Green JS, Grindel CG. Supervision of suicidal patients in adult inpatient psychiatric units in general hospitals. Psychiatric services (Washington, DC). 1996;47(1075-2730 (Print)):859-863.

7. Laws D, Crawford CL. Alternative strategies to constant patient observation and sitters: a proactive approach. The Journal of nursing administration. 2013;43(1539-0721 (Electronic)):497-501.

8. Lee EA, Gibbs NE, Fahey L, Whiffen TL. Making hospitals safer for older adults: updating quality metrics by understanding hospital-acquired delirium and its link to falls. The Permanente journal. 2013;17(1552-5775 (Electronic)):32-36.

9. Manna M. Effectiveness of formal observation in inpatient psychiatry in preventing adverse outcomes: the state of the science. Journal of psychiatric and mental health nursing. 2010;17(3):268-273.

10. McCurley, J. and J. Pittman (2014). "A new approach to fall prevention in inpatient care implementing remote audio visual monitoring of at risk patients." Patient Saf Qual Health Care 11(6): 50-53.

11. Pinkhasov A, Singh D, Chavali S, Legrand L, Calixte R. A Proactive Behavioral Health Service Model to Address Use of Constant Observation in a General Hospital. Psychiatric Services. 2018;69(3):251-253.

12. Quigley PA, Votruba L, Kaminski J. Outcomes of Patient-Engaged Video Surveillance on Falls and Other Adverse Events. Clin Geriatr Med. 2019;35(2):253-263.

13. Ray R, Perkins E, Roberts P, Fuller L. The Impact of Nursing Protocols on Continuous Special Observation. Journal of the American Psychiatric Nurses Association. 2017;23(1):19-27.

14. Schoenfisch AL, Pompeii LA, Lipscomb HJ, Smith CD, Upadhyaya M, Dement JM. An Urgent Need to Understand and Address the Safety and Well-Being of Hospital "Sitters". American journal of industrial medicine. 2015;58(12):1278-1287.

15. Torkelson DJ, Dobal MT. Constant observation in medical-surgical settings: a multihospital study. Nursing economic$. 1999;17(0746-1739 (Print)):149-155.

Condition, n= 1

1. Esserman L. Recommend Watchful Waiting with Close Observation. In. Vol 374. Waltham, Massachusetts: New England Journal of Medicine; 2016:390-391.

Duplicate, n=1

1. Burtson PL, Vento L. Sitter Reduction Through Mobile Video Monitoring. Journal of Nursing Administration. 2015;45(7/8):363-369.

Intervention, n=4

1. Chan DK, Sherrington C, Naganathan V, et al. Key issues to consider and innovative ideas on fall prevention in the geriatric department of a teaching hospital. Australasian journal on ageing. 2018;37(2):140-143.

2. Schoenfisch A, Pompeii L, Lipscomb H, Dement J. Violence perpetrated by hospital patients and visitors (type II) against 'sitters'. Occupational & Environmental Medicine. 2014;71:A53-A53.

3. Shever LL, Titler MG, Mackin ML, Kueny A. Fall prevention practices in adult medical-surgical nursing units described by nurse managers. Western journal of nursing research. 2011;33(3):385-397.

4. Zubkoff L, Neily J, Quigley P, et al. Virtual Breakthrough Series, Part 2: Improving Fall Prevention Practices in the Veterans Health Administration. Joint Commission journal on quality and patient safety. 2016;42(1553-7250 (Print)):497-ap412.

Letter, n=2

1. Melear B. Support for sitter alternatives...'A S.A.F.E. alternative to sitters', Nurs Manage, 2009 August issue. Nursing management. 2009;40(12):8-8.

2. Routh A, Sustaita L, Pamperin R, Holguin M. Cost containment detrimentally affects patient care... 'Constant observation: implications for nursing practice'. Journal of Psychosocial Nursing & Mental Health Services. 1995;33(8):3-3.

Outcome, n=12

1. Carr FM. The role of sitters in delirium: an update. Canadian geriatrics journal : CGJ. 2013;16(1):22-36.

2. DeSousa, T. L. (2011). Evaluation of the Patient Sitter Assessment Tool. Nursing, Rhode Island College. Master of Science in Nursing (MSN).

3. McNicoll L, Baumhover L, Gifford D, Inouye S. Impact Of 'Sitter' Reduction Policies On Restraint Use; The Effect Of A Targeted Multicomponent Intervention In. Providence, Rhode Island: Rhode Island Hospital; 2018.

4. Moghabghab R. Constant Observation for Older Adults in Acute Care: A Mixed Methods Study. Constant Observation for Older Adults in Acute Care: Mixed Methods Study. 2017:1-1.

5. Moore V, Allen L, Nash MG, Buck J, Chipps E. Exploring Nurses' Perception of Dynamic Patient Events. The Journal of nursing administration. 2016;46(2):57-60.

6. Moyle W, Borbasi S, Wallis M, Olorenshaw R, Gracia N. Acute care management of older people with dementia: a qualitative perspective. Journal of clinical nursing. 2011;20(3-4):420-428.

7. Nadler-Moodie M, Burnell L, Fries J, Agan DL. A S.A.F.E. alternative to sitters...Specialized Adult-Focused Environment. Nursing management. 2009;40(8):43-50.

8. Richman C, Sarnese P. Patient Sitter Use Within Hospitals: A Cross-Sectional Study. International Healthcare Security and Safety Foundation;2014.

9. Riddell K. A comparative study of the constant observation model of care, Master of Nursing thesis: School of Nursing and Midwifery, Deakin University; 2012.

10. Siddharthan K, Nelson A, Tiesman H, Chen FF. Advances in Patient Safety Cost-effectiveness of a Multifaceted Program for Safe Patient Handling. In: Henriksen K, Battles JB, Marks ES, Lewin DI, eds. Advances in Patient Safety: From Research to Implementation (Volume 3: Implementation Issues). Rockville (MD): Agency for Healthcare Research and Quality (US); 2005.

11. Tzeng H, Yin C. International perspectives. Using family visitors, sitters, or volunteers to prevent inpatient falls. Journal of Nursing Administration. 2007;37(7/8):329-334.

12. Wilkes L, Jackson D, Mohan S, Wallis M. Close observation by 'specials' to promote the safety of the older person with behavioural disturbances in the acute care setting. Contemporary nurse. 2010;36(1037-6178 (Print)):131-142.

Systematic Review, n=4

1. Lang CE. Do sitters prevent falls? A review of the literature. Journal of gerontological nursing. 2014;40(5):24-33; quiz 34-25.

2. Nienaber A, Schulz M, Hemkendreis B, Lohr M. Special Observation in Inpatient Treatment of People with Mental Illness A Systematic Review of the Literature. Psychiatr Prax. 2013;40(1):14-20.

3. Wood VJ, Vindrola-Padros C, Swart N, et al. One to one specialling and sitters in acute care hospitals: A scoping review. International journal of nursing studies. 2018;84:61-77.

4. Xu C, Audrey TX, Shi SL, et al. Effectiveness of interventions for the assessment and prevention of falls in adult psychiatric patients: A systematic review. JBI library of systematic reviews. 2012;10(9):513-573.

Unavailable, n=13

1. Patient sitters found effective in reducing falls. Healthcare Risk Management. 2014;36(6):54-55.

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APPENDIX E. EVIDENCE TABLE

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
Adams, 2013[17] USA	**Study Setting:** • Med-Surg • ICU **Setting Details:** • 4 hospitals - 2 urban tertiary teaching hospitals - Geriatric center - Orthopedic and spine hospital **Baseline Fall Rate:** 4.5 falls/1000 pt days (derived from Fig. 3 image; raw numbers not provided)	Time Series	Yes **-- to reduce sitter usage** without negatively impacting select quality indicators: falls, restraints, and pressures ulcers	1:1 sitters	• Formal criteria for sitters • Equipment like low beds • Education • Chair alarms • Increased rounding • Activity aprons • No skid socks • Color-coded blankets & chart stickers (identifying tools)	• Benchmarking • Falls Champions on each unit • Daily huddles identify patients at increased risk of falls • More frequent rounding on pts designated as high risk for falls • Monthly feedback • Staff education on indication for sitter alternative equipment and how to obtain them • Letters sent to staff, physicians, patients and families regarding changes to sitter policy • Changing sitter request form from paper to electronic	**Falls:** Falls/1,000 patient days: no change (Figure 3) **Falls with injury:** Not reported. "Severity of injury rate from a fall decreased" (anecdotal comment in the text. No supporting data provided) **Change in Sitter Use:** **"**Over a 6-month period, sitter use dropped appreciably (see Figure 1). This reduction has been maintained to date" **Costs:** $1.2 million annual savings	**FALLS:** Pre-intervention Data for fall rates: 7 quarters (Nov 2007-May 2009) 1st Intervention: June 2009 Final Intervention: Sept 2010 Most recent Data reported July 2011 **COSTS:** Baseline Pre-intervention Data for costs: Fiscal Year 2009 (Sept 2009-Aug 2010)

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
							$400,000 sitter agency savings ($477, 561.86 FY09 à 491,991.27 FY10) **Other Outcomes:** Restraint use decreased from 12% à 3%	**Post-Intervention** Fiscal Year 2010 (Sept 2010 – Aug 2011
Bock, 2016[18]USA	**Study Setting:** · 48-bed adult medical specialties unit · 53-bed adult telemetry unit **Setting Details:** · 2 hospitals affiliated with a 7- hospital health system **Baseline fall data:** Unit 1: 3.14 falls/1000 pt days	Pre-post	No	1:1 Sitter	• Fall reduction best practices • New vendor equipment	• Gap analysis via a collaborative work group that reviewed current evidence and system policies to identify most effective practices. • Best practices disseminated and targeted to the two intervention units. • Active fall safety huddle at the beginning of each shift to identify all high-risk patients	**Falls:** Both units reported a small and statistically insignificant increase in fall rate Unit 1: 3.14 à 3.35 falls/1000 pt days (p=0.41) Unit 2: 3.48 à 3.80 falls/100o pt days (p=0.45) Combined performance:	**Pre-intervention** 12 months (FY 2016) **Post-intervention** 60 days (annualized)

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
	Unit 2: 3.48 falls/1000 pt days					• Scripted safety education discussion with patients during bedside shift report • Staff education via staff meetings, Fall Risk Committee education, vendor best practices, handouts and emails • New product vendor with new equipment: • Cordless chair and mobility alarms • Non-restraint roll belts • Improved patient mobility support equipment	3.30 à 3.57 (p=0.42) **Falls with injury:** Not analyzed for statistical significance due to the extreme infrequency of such events **Change in Sitter Use:** Unit 1 reduced sitter use by 32.8% (p=0.83) 1.90 FTE à 1.28 FTE Unit 2 reduced sitter use by 57.9% (p=0.93) 2.12 FTE à 0.89 FTE Combined performance reduced sitter use by 46% (p=0.96) 4.02 FTE à 2.17 FTE **Costs:**	

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
							46 % sitter reductions produced an annualized savings of $72, 324 **Other Outcomes:** None	
Burtson, 2015[19] USA	**Study Setting:** • Med-Surg **Setting Details:** • 595 bed Magnet academic health system • 2 university-affiliated hospitals **Baseline Fall Rate:** (quarterly range) 2.16-3.41 falls/1000 pt days over 4 years **Baseline Fall with Injury Rate:** (quarterly range) 0.54-0.87 falls	Time Series	Yes – for reduction in sitter use, preventing falls, preventing elopements	1:1 sitters	• Video monitoring Guidelines	• Mobile video monitoring carts • Standardized workflows • Video monitoring technician training with competency testing • Project champions educate clinicians • Re-evaluation after 6 months with devised criteria • Elimination of sitter from physician order sets • Daily manager reviews • Elimination of high fall risk from	**Falls:** Falls per 1000 patient days: no change (Figure 3) **Falls with injury:** Decreased (per Figure 4; data not reported) **Change in Sitter Use:** Decrease in sitter and VMT staffing by 23.9% year 1, 53.6% year 2	**Pre-Intervention** 1.5 years (= 6 quarters) **Post-Intervention Data** 2 years (= 8 quarters)

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
	with injuries/1000 pt days					nursing protocol for sitters • Sitters requested outside of protocol were authorized by a unit manager after specific alternatives were tried and failed to meet the safety need.	**Costs:** Estimated savings $772,000 year 1, $1,720,000 year 2 **Other Outcomes:** Not reported	
Cournan, 2018[20] USA	**Study Setting:** • Rehab Unit *(authors describe unique rehab unit, more similar to inpatient hospital setting in terms of patient acuity and facility resources. Have included in this study to be comparable to Med-Surg)* **Setting Details:**	Pre/Post	No	1:1 and close observation	• Video monitoring • bed • alarms • chair alarms • low beds • fall mats • sitters	• Video Monitor Tech monitors up to 15 patients at one time • Mobile units had speakers. All units able to zoom and move 360 degrees • Video Monitoring exclusion criteria: patients pulling at tubes/devices, restlessness and agitation requiring undivided attention and suicidal patients • Established escalating protocol if the	**Falls:** Fall rate on Brain Injury Unit per 1,000 patient-days: 10.26 prevideo à 6.87 postvideo significant, t(18) = 2.647, p=.016 Hospital-wide fall rate per 1,000 patient-days: 6.34 falls per month (SD = 1.75) for the 21 months prevideo à 5.09 falls per month (SD	**Pre-Intervention** 21 months **Post-Intervention** 12 months

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
	• 115-bed freestanding inpatient rehabilitation facility (with focus on 31-bed brain injury unit within facility) **Sample Size:** • 15 beds monitored of total 115 beds in facility ➔ 8 mounted in brain injury unit ➔ 2 mounted in other units ➔ 5 mobile units **Baseline Fall Rate:** 6.34 falls/1000 pt days					patient does not respond to monitor technician remote • Nurse manager reviews VMT log • Patients removed from monitoring program if shows a steady decrease in need for VMT interventions • Video monitor room was separate from the nurses' station to minimize distractions • Manufacturer provided training on how to use the video system • VMTs trained to look for behaviors that might lead to unsafe action • Physician order and patient/family consent not required	= 1.52) for the 12 months postvideo significant, t (31) = 2.043, p=.0496 Brain injury Unit video vs non-video fall rate per 1000 patient-days: no difference Proportion of in-room falls increased (72.4% pre à 77% post) Number of hallway falls decreased (20 pre à 3 post) **Falls with Injury:** Not reported **Change in Sitter Use:** Not reported **Costs:**	

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
							Net $40,000 savings in 21-month period for Falls and fall-related injuries. $186,120 saved on one-to-one sitters in 12 months **Other Outcomes:** Not reported	
Davis, 2017[21] USA	**Study Setting:** · Cardiology unit · Neuroscience unit **Setting Details:** · Large, not for-profit teaching facility **Baseline Fall Rates:** Unit 1: 4.25 falls/1000 pt days Unit 2: 6.50 falls/1000 pt days	Time series	No	Constant observation (1-2 pts/sitter)	• Video monitoring	• Ceiling-mounted cameras installed at the foot of selected beds • Camera was wired to a central console at the nurses station located in close proximity to the designated patient rooms • Console observed continuously by trained, unlicensed staff member for 4 hours at a time • Staff member monitoring the console would immediately go to the room if concerning	**Falls:** No statistically significant change in falls/1000 pt days Unit 1: 4.25 (baseline) à 6.25 (Year 2) à 1.25 (Year 4) Unit 2: 6.50 (baseline) à 8.25 (Year 2) à 6.00 (Year 4) **Falls with injury:**	**Pre-intervention** Baseline time interval not defined **Post-intervention** 4 years

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
						behavior was noted. Another staff member would monitor the console until the responder returned.	Not reported **Change in Sitter Use:** Unit 1: Statistically significant decrease of in-room sitter days Year 2: 61.86 à 7.875 (p<0.05) Year 4: 61.86 à 1.13 (p<0.001) Unit 2: Statistically significant decrease of in-room sitter days Year 2: 45 à 1 (p<0.001) Year 4: 45 à 0.29 (p<0.001)	

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
							Costs: Unit 1: statistically significant decrease in monthly expense for sitter at Year 4 Year 2: $17,255.70 à $10,632.30 (not statistically significant) Year 4: $17,255.70 à $8,749.86 (p<0.05) Unit 2: statistically significant decrease in monthly expense for sitter at Years 2 and 4 Year 2: $12,549.60 à $8,715.00 (p<0.05) Year 4: $12,549.60 à $5716.99 (p<0.05)	

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
							Other Outcomes: Self-harm events were measured; however, due to the rareness of these events inferential statistics could not be performed	
Donoghue 2005,[16] Australia	**Study Setting:** • Med-Surg **Setting Details:** • Acute aged care unit with hospital in Sydney, Australia **Baseline Fall Rate:** 16.4 falls/1000 occupied bed days	Time series	Yes Falls	Nursing risk assessment Moving pts closer to nurses' station Medication review and adjustment Guidelines for physical restraints Magnetic falls risk symbols applied to beds	• Volunteers as "companion observers"	• Revised risk criteria and clinical judgement used by nursing staff to identify patients at high fall risk. • High-risk patients placed in 4 bed room near the nurses' station • CO volunteers were assigned 2-hour shifts weekdays from 08:00-20:00 • Escalating protocol of: - gentle reassurance of the patient - alerting nursing staff if unsuccessful • Other CO activities: - Conversation - playing cards	**Falls:** During 6-month pilot: 51% reduction in rate of falls (16.4 falls/1000 OBD à 8.4 falls/1000 OBD) 18 month post-pilot data: Decreased in fall rate (15.6/1000 OBD à 8.8/1000 OBD)=44% reduction in risk (p<0.000; OR 0.56, 95% CI 0.45-0.68) Average monthly reduction of 6.8 falls/1000 bed days	**Pre-Intervention** 6 month **Post-Intervention** 18 month post-pilot data collected

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
						- reading out loud - playing appropriate music - providing practical assistance with finding belonging - meal set-up • Volunteer coordinator in daily contact with nursing unit manager to identify any issues	Decrease in repeated falls during CO intervention (32% à 15.5%; p<0.01; OR 0.39; 95% CI 0.20-0.77) 5 months with no repeat fallers **Falls with Injury:** Not reported **Change in Sitter Use:** Not reported **Costs:** Not reported **Other Outcomes:** Communication between nurses and volunteers was sometimes problematic (anecdotal)	

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
							CO volunteers asked to perform tasks outside of their limits (*ie*, walk or feed patients)	
Giles 2006,[15] Australia	**Study Setting:** • Med-Surg **Setting Details:** • 2 Hospitals in Australia with 370 beds total • 2 four bed "safety bays" - 1 general medical unit - 1 dementia & behavioral unit **Baseline Fall Rate:** 14.5/1000 OBD (occupied bed days)	Time series	Yes Falls	No sitter	• Volunteer companion program • Four-bed "safety bay"	• Creation of a 4-bed "safety bay" on each unit • Patients at high risk for falls identified with the STRATIFY risk screening tool at 1 hospital and "clinical judgement" at the second hospital • Patients observed by volunteers 9am-5pm M-F and 4hr morning shift on Saturday • 4-hour volunteer shifts • General medicine safety bay had 1 volunteer per shift • Dementia/ behavioral safety bay had 2 volunteers/shift • Volunteer training program included falls prevention • Falls recorded in the hospital's monitoring system	**Falls:** Falls increased from 14.5 falls/1000 OBD à 15.5 falls/1000 OBD) IRR=1.07 (95% CI 0.77-1.49; p=0.346) 24 % of the falls in the implementation wards occurred in the safety bays when the volunteers were not present **Falls with Injury:** Not reported **Change in Sitter Use:** Not reported. **Costs:**	**Pre-Intervention** 2/2002-5/2002 (4 months) **Implementation period (no data)** July 2002-Jan 2003 **Post-Intervention** 2/2003-5/2003 (4 months)

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
						• Volunteers kept journals to document their experience • Satisfaction surveys given to volunteers, staff, patients, patients' families	2,345 donated volunteer hours=$56,866 value ($AU24.25/hr) **Other Outcomes:** Companions acted as pt advocates, provided companionship and enhanced the delivery of care	
Jeffers, 2013[22] USA	**Study Setting:** • Med-Surg • Psych Ward **Setting Details:** • 525-bed acute care facility • 8-18 patients daily from 7 acute care units, with an average daily program census of 12 patients **Baseline Fall Rate:** 4.70-4.96 falls/1000 pt days	Time series	Yes-- Fall reduction	1:1	• Video monitoring	• Collaboration of nursing administration, acute care nursing management and staff, nursing support services, biomedical services, information technology, legal, regulatory, quality, patient safety and vendor partners • Project manager assigned to coordinate and streamline implementation steps • IT selected video technology for continuous	**Falls:** The first 3 months of VMT interventions contributed to the prevention of 57 falls 75% of nursing units met or exceeded National Database of Nursing Quality Indicators (NDNQI) benchmark fall rates **Falls with Injury:** Not reported **Change in Sitter Use:**	**Pre-Intervention** 3 Quarters **Post-Intervention** 1.5 years (6 quarters)

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
						monitoring without recording and patient visualization in both high- and low-light settings • Construction of a centralized monitoring room with expansion of the nurse call system to allow immediate audio contact with nursing staff and patients • Creation of flow sheets for documentation, admit and discharge logs and resource manuals • Staff education and hands on training • Competency evaluation tools • Consent for video monitoring was part of the general consent form and did not require a separate consent • 2 CNAs staff the CVM room 24/7 with 12-hr shifts	Not reported **Costs:** $2.02 million in deferred cost savings in 1.5 years (Figure 5) $24,225 in first 3 months from 57 prevented falls First quarter deferred staff savings of $392,000 exceeded original technology investment of $305,000 **Other Outcomes:** Patient elopements: video not adequate tool for assessment of this measure The first 3 months of VMT interventions contributed to the	

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
						• Patients could refuse video monitoring, and opt for 1:1 CNA sitters • Documentation occurs in real-time on a video monitoring technician work log à transferred to EMR q2h. • VMT's shift begins with a formal hand-off of information from previous shift. VMT rounds on each nursing unit to collect patient census reports and communicate w/staff. Each shift, unit charge nurse report to the VMTs to confirm correct patients are on camera.	prevention of 7 oxygen therapy disruptions and 10 IV catheter pulls. Facilitated faster transfer to SNF for 2 patients. 1 case prevented sitter risk/harm. Identified patients requiring assistance with meals or replacement of oxygen cannula	
McNicoll, 2013[23] USA	**Study Setting:** • Med-Surg **Setting Details:** • 24 bed total Med-surg unit • 8 bed area of med surg unit	Time series	No	? constant observation	• Acute Care for the Elderly (ACE) Unit/ close observation unit	• Education of nurses and nurses' aides on geriatric friendly care • ABCD Algorithm for admission criteria: -Age >70	**Falls:** Fall rates unchanged **Falls with injury**: decreased by 12%	**Pre-Intervention** data collected for 2011 (1 year)

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
	allowing close observation from a central area **Baseline Fall Rate:** Data not reported. Refer to "Any Falls" figure in text **Baseline Fall with Injuries Rate:** Data not reported. Refer to "Falls with Injuries" figure in text					-Brittle bones and risk of falls and fracture -Coagulopathy and risk of bleeding -Delirium and dementia • Environmental modifications: -Low beds -Floor mats -Bed/chair alarms -Raised toilet seats -Gait belts -Walking aids -Walking paths -Hearing amplifiers -Communal area for dining and activities -Large TV and DVD for evening entertainment • Scheduled activities for increased interaction • 2 nurses' aides and 1 nurse on the unit at all	**Change in sitter use:** Monthly constant observation hours decreased by 23% (830 à 641) **Costs:** Not reported **Other outcomes:** Pressure ulcer rates decreased by 23% Press Ganey results: -Patient satisfaction improved 1.3 points (82.3 à 83.6) Communication with RN improved 3.8 points (70.5 à 74.3) -Pain satisfaction improved 2.7 points (58.6 à 61.3)	**Post-Intervention** data collected for 2012 (1 year)

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
						times with one aide providing safety monitoring • Geriatric NP rounding twice weekly to provide support • Monthly multi-disciplinary team meetings (geriatric psychiatrist, geriatrician, management and quality nursing)		
Rausch, 2010[24] USA	**Study Setting:** • Medical-surgical units (50%) • ICU (30%) • rehabilitation (18%) • women care/ obstetrics units (2%) **Setting Details:** • 800-bed hospital • Urban tertiary Magnet designated hospital **Sample Size:**	Time Series	No	1:1 constant observation ordered by MD (RN often decides to discontinue)	• Physical restraints • Pharmaco-logic restraints (*ie*, haldol) • Intentional rounding	• Psychiatric liaison nurse (PLN) to support nursing staff on all wards to provide education and support, and closely collaborate with the nursing staff (with input from attending physician and social work) on alternatives to 1:1 Constant observation • By making rounds in person or telephoning to speak with the charge nurse, the	**Falls:** Hospital-wide falls declined by 25%. NO increase of falls **Falls with injury:** Not reported **Change in Sitter Use:**	**Pre-Intervention** 4 months **early PLN implementation** = May-August 2008 (4 months) **late PLN implementation** (when PLN role well-

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
	175 patients, age 15-94 yo Delirium and confusion precipitated most CO consults (62%), followed by suicidal ideation or precautions (17%) and elopement risk (10%) **Baseline Fall Rate:** 69 falls/month (no data to calculate/1000 pt days)					PLN contacted 15 patient-care areas of the hospital each day to determine which areas were using CO and which patients had unmet psychiatric needs. • PLN tracked Constant Observation (CO) consults during regular business hours M-F • For each CO consult the PLN completed a "Daily Attendant Report" with patient demographics, reason for CO and alternative interventions/plan. • Reports sent daily to hospital directors, patient care managers and assistant patient care managers • "Open pager" policy for nursing staff to contact	Number of constant observation shifts decreased by 42%, or 400 CO shifts **Costs:** 1:1 constant observation cost savings of $97,056 over a 4-month period, a 53% reduction in CO costs (table 2) **Other Outcomes:** No increase of restraint prevalence Psychiatric consultation-liaison nurse (PCLN) psychiatric assessment recommended by PLN one-fourth of the time	established in all hospital units) = September-December 2008 (4 months) **Post-Intervention** 8 months

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
						the PLN as often as needed		
Sand-Jecklin, 2016[25] USA	**Study Setting:** • Med-surg (Mixed neuroscience, medical and med-surg units) **Setting Details:** • Large academic medical center **Sample Size:** 1508 cases **Baseline Fall Rate:** 3.9 falls/1000 pt days	Pre/Post	Yes Patient falls	1:1 sitter/constant observation sitter	• Video monitoring • Wristbands etc. • Environmental Interventions • Increased rounding • Low beds • Bed alarms	• Installation of fixed video cameras (without ability to record) in 14 private rooms on each unit • Centralized monitoring room • Video Monitor Technicians (VMT) hiring and training • Algorithm used to determine high fall risk patients appropriate for video monitoring with associated education of staff on use • CVM intervention did not require a physician order • Patient and family education, however no consent for monitoring required • Signage regarding the use of CVM placed inside and outside the room	**Falls:** 28% reduction in falls from 3.9 falls/1000 pt days to 2.8 falls/1000 patient days (Z=1.85, P=.032) Majority of falls post-implementation were not video monitored **Falls with injury** in post-implementation period: monitored (0/15) v unmonitored (6/34) **Change in Sitter Use:** 23.2% reduction in sitter shifts (56.9 shifts/1000pt days --> 43.7 shifts/1000pt days; Z 5.84, p<.001)	**Pre-Intervention** 6 months **Post-Intervention** 6 months

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
						• Observation and intervention log kept by the VMTs • VMT able to redirect the patient via communication into the room, telephone call to the nurse, activation of the patient call bell system or overhead paging of staff	Only 5% of the video monitored patients also required a sitter **Costs:** Initial data from CMV implementation indicate cost savings in terms of sitter hours, but the reduction in sitter shifts was not equal to the number of monitor technician shifts (282 sitter shifts vs 1092 VMT shifts) No further data provided to calculate **Other Outcomes:** Not reported	
Skowronsky, 2015[26] USA	**Study Setting:** • Med-Surg (Internal Medicine Units) **Sample Size:** • 1859 adult patients were admitted. Of patients, there	Time series (sitter use) Variant of Non-randomized interventio	No	1:1	• close observation (4:1) • use of volunteers to observe patients' behaviors • passive alarms • diversional • activities	• Created COU: 4-bed COU – 2 semi-private rooms with glass partition and 2 nursing work stations. Staffed with 1 RN and 1 unlicensed, noncertified clinical technician	**Falls:** No differences in patient falls between general IM unit (29/1878; 1.5%) and COU (3/145; 1.6%) (P=.476).	**Pre-Intervention** 61 days

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
	were 2023 admissions: 1878 admissions to the internal medicine unit. • 145 admissions to the Close Observation Unit (COU) • Some patients were admitted multiple times during study period. **Baseline Fall Rate:** Not reported	n Study (falls)			• placing patients in public areas such as the nurses' station for closer	• Staff nurses gave input on physical layout of unit and needed equipment • multidisciplinary team guided the unit's development, including psychiatrist, SW, case manager, and nurses. • staff attended an 8-hour course in avoiding physical confrontation.	On the basis of falls per 100 patient-days, fall rates were 31 of 8408 (0.369%) in the internal medicine unit and 4 of 700 (0.571%) i COU. **Falls with injury:** Not reported **Change in Sitter Use:** IM unit required 1112.75 hours of externally hired patient companion time (and 29,421 hours for all patient companion time) = more than 0.5 full-time equivalent in externally hired personnel and 14.0 full-time equivalents in all personnel. COU did not use any patient companions. Prior to COU opening, there were 480 shifts	**Post-Intervention** Data results reflect 61 days post-implementation. Text reports following for 1-year period.

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
							and 3840 hours used à post-COU, there were 115 shifts and 920 hours used(P< .001) (Fig 2) **Costs:** Not reported **Other Outcomes:** Patients treated in the COU were more likely to have a longer hospital length of stay, less likely to be discharged home, and more likely to have neurologic and psychiatric diagnoses.	
Spano-Szekely, 2018[27] USA	**Study Setting:** • Med-Surg **Setting Details:** 245 bed Magnet community hospital	Time Series	Yes Falls and falls with injuries	1:1 sitters Close observation	• Nurse assessment tool • Wristbands etc. • Bed/chair alarms • Increased rounding • Video monitoring	EBPI fall prevention program: • Nurse assessment tool • Injury risk assessment tool • Medication review • Mobility assessment • Standardized bed and chair alarm settings	**Falls:** 54 % reduction in falls: 2.51 falls/1000pt days à 1.15 falls/1000 pt days	**Pre-Intervention** Unclear monitoring period to determine baseline fall rate. Presumable 12 months/4

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
	Baseline Fall Rate: 3.21/1000 patient days (higher than the National Database of Nursing Quality Indicators' median of 2.91) **Baseline Fall with Injury Rate:** 0.77/1000 patient days					• Purposeful hourly rounding • Post-fall debriefing to identify causative factors • Identification arm bands • Door signage • Bed/chair alarms Video monitoring system with trained safety technicians (STs) • Verbally redirect patient • Notify care members to go in and help patient Other details • Education of all stakeholders • Staged implementation through "small tests of change" with review from subject matter experts every 2 weeks to evaluate implementation and process of each step	**Falls with injury:** Not reported **Change in Sitter Use:** 72% reduction in sitter usage reported. **Costs:** $84,000 annual savings reported **Other Outcomes:** Not reported	quarters as it is reported baseline fall rate "in 2013" **Implementation period** Varied for each stage of fall prevention program Implementation of fall prevention program Q1 2015 (data collected through Q2 2017) Video go-live April 2016 **Post video implementatio**

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
						• Evaluation of understanding and adherence to the program		**n data:** collected Q3 2016 à Q2 2017
Spiva, 2012[9] USA	**Study Setting:** • Med-Surg • ICU **Setting Details:** • 633-bed community acute care hospital - 5 critical care units (ICU) - 2 step-down units - 11 medical-surgical units **Baseline Fall Rate:** 2.45	Pre/Post	Yes – decrease fall rate	1:1	• moving patient closer to the nursing station • rotating staff to provide 1:1 • placing the patient with another sitter patient • medication review • nurse assessment tool	• sitter decision tree (includes medication review and requires alternative attempts to modify pt behavior • sitter justification and evaluation form (for nurse manager to review every 12 hours) • letters to nurses/MDs (explaining new program) • scripting for nursing staff, and a letter with a listing of private home care sitters • Educational training w/ follow-up educational fact sheet to staff • Sitter evaluation tool for each sitter to be evaluated at	**Falls:** No statistically significant difference in falls: • overall total falls 199 à 197(t = −0.050, P=.961) • overall fall rates 2.45 à 2.39 (t = −0.941, P=.360) fall rates in critical care (P=.20), step-down (P=.47), and medical-surgical (P=.81) units **Falls with Injury:** Not reported **Change in Sitter Use:** Overall: decreased from 47,218 to 17,208 hours. (t = 5.59, P=.001) • critical care (t = 3.76, P=.020)	**Pre-Intervention** June 2010 to December 2010 (7 months) **Implementation period** 5 months **Post-Intervention** June 2011 to December 2011 (7 months)

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						the end of the sitter's shift • All tools are stored on the hospital's intranet Web site for staff to access	• medical-surgical (t = 4.33, P=.001). **Costs:** Overall: decreased from $536,955 to $215,132, total cost savings of $321,822. (t = 4.76, P=.001). • critical care saved $74 675 (t = 3.58, P=.023) • medical-surgical $229 947 (t = 3.76, P=.004) • cost savings of $17 199 in the step-down unit. **Other Outcomes:** Not reported	
Tzeng, 2008[28] USA	**Study Setting:** • Med-Surg **Setting Details:** • 2 acute adult 32 bed medical units in Michigan, USA **Baseline Fall Rate:**	Pre/Post	Yes Falls and falls with injuries	1:1	Nurse Assessment tool, which includes: • requesting family help • pain management • verbal and visual (signs/labels) reorientation • Music • Back rubs	• Patient Attendant Assessment Tool (PAAT) was developed by an ad hoc committee as an initiative to improve quality and cost-efficiency • 2 acute adult medical units were provided with the PAAT, instructions for use of the tool	**Falls:** Unit 1: Increased rate of injuries from falls (Pre-PAAT mean=0.25, Post-PAAT mean=0.59, t=-2.79, P=0.01)	**Pre-Intervention** 8/2005-9/2006 (5 quarters) **Post-Intervention**

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	Reported in falls/1000 pt days: Unit 1: 4.75 Unit 2: 5.13 **Baseline Fall with Injuries Rate:** Reported in falls/1000 pt days: Unit 1: 0.25 Unit 2: 0.49				• Sleep protocol • Medication review • Lowering bed height	and a list of suggested alternatives to the use of sitters	Total falls/1000 patient days: Unit 1: Pre-PAAT mean=4.75, Post-PAAT mean=4.35 Unit 2: Pre-PAAT mean=5.13, Post-PAAT mean=4.15 **Falls with Injury:** Not reported **Change in Sitter Use:** Unit 1: Improved fill/request rate for sitters (Pre-PAAT mean=84.98%, Post-PAAT mean=93.84%, t=-2.19, P=0.04) Unit 2: Improved fill/request rate for sitters (Pre-PAAT mean=81.11%, Post-PAAT	10/2006-2/2007 (2 quarters)

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							mean=94.58%, t=-3.12, P=0.01) **Costs:** Not reported **Other Outcomes:** Decrease in the frequency of soft limb restraints (Pre-PAAT mean=3.71, Post-PAAT mean=0.20, t=2.54, P=0.02)	
Votruba, 2016[29] USA	**Study Setting:** • Med-Surg • ICU **Setting Details:** • 350 bed urban, non-for profit, Magnet designated hospital	Pre/Post	Yes Falls and falls with injuries	1:1	• Video monitoring	• 92 non-recording ceiling cameras with infrared lighting and microphone/ speakers • Number of patients actively monitored limited to 12 • Three viewing screens split into 4 quadrants	**Falls:** 35% decrease in number of falls (85 à 53 p<0.0001, 95% CI) **Falls with Injury:**	**Pre-Intervention** 9 month **Post-Intervention**

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	- 1 critical care/ intermediate unit - 1 neuroscience unit - 1 senior adult unit **Sample Size:** 5,041 patient discharges (post-implementation data) **Baseline Fall Rate:** 1.7% Falls per patient discharge (= 85 falls/5,109 total patient discharges)					• Protocols created for telesitter to utilize • A second responder identified for telesitter to contact if primary nurse unavailable • Reason for monitoring/fall risks and communicated to telesitter at time of admission • 8 hour telesitter training	Authors estimate avoidance of 3-5 injurious falls annually (estimated with a falls with injury estimate of 9-15% per other studies and observed 35% fall decrease) **Change in Sitter Use:** Patient companion hours decreased 10% (1,930 hr/mo à 1,735 hr/mo) **Costs:** Projected fall cost avoidance of $52,000-$87,500/year (Using the CDC's (2013) estimate of $17,500 per fall, not internal data) Projected decrease in sitter cost of $25,200/year	9 month

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							(extrapolated from CDC data rather than internal institution costs) 24/7 telesitter cost ($120,000) almost completely offset by combined fall cost avoidance and sitter reduction savings ($77,200-$112,700) -- (unclear where this data is extrapolated from) **Other Outcomes:** Video monitors also used to prevent elopement, protect patients from interfering with their medical devices and to monitor seizure activity.	
Weeks, 2011[30] USA	**Study Setting:** • Med-Surg **Setting Details:**	Pre/Post	No	Constant observation	• "No sitter order" • Bed alarms • Fall precaution magnet and stickers • Slip resistant socks	• Physicians no longer allowed to write orders for sitters • Sitters provided only by policy (patients on involuntary commitment,	**Falls:** A decrease in falls (0.00543 falls/pt day à 0.00436 falls/pt day) OR 250 falls/46,004 patient days	**Pre-Intervention** 21 months

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	222 acute care bed not-for-profit hospital North Carolina, USA **Baseline Fall Rate:** 0.00543 falls/pt day **Baseline Fall-related Fracture Rate:** 0.0000652/pt day				• Encouraging family to stay with patient	suicide ideation/ attempt precautions or in behavioral restraints) or nursing assessment • Nursing annual competency testing on suicide precautions • Sitter education and suicide precaution exam	à 375 falls/86,003 patient days **Falls with Injury:** Fall-related fracture rates (0.0000652 fractures/pt day à 0.0000581 fractures/pt day) OR 3 fractures/46,004 patient days à 5 fractures/86,003 patient days OR 3 fractures/250 falls à 5 fractures/375 falls **Change in Sitter Use:** Fewer sitters used (no data reported) **Costs:** Not reported	**Post-Intervention** 42 months

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							Other Outcomes: Nurses reporting appreciation for not losing essential coworkers to a sitter assignment (anecdotal)	
Westle, 2019[31]USA	**Study Setting:** · Neuroscience (NS) · Med-surg · Cardiovascular **Setting Details:** · 815-bed hospital · 34-bed neuroscience unit · 32-bed med-surg unit · 32-bed cardiovascular unit	Time Series	No Falls Falls with injuries	1:1 Standard fall-prevention interventions: · Bed locked in low position · Bed rails up · Assistive devices, call lights and personal items within reach · Non-slip footwear	• Video monitoring with "virtual sitter" infrared camera (all pts received standard fall-prevention interventions)	• Infrared camera with depth sensors to visualize full-body 3-D movement • Open software program to define and draw virtual zones, tip wires and other trigger points • Two-way audio interface • "Virtual sitter" patient fall risk algorithm • Pts at risk for suicide/homicide, overdose or under legal restrictions excluded	**Falls:** Pilot: Neuroscience unit falls/1000 pt days: 4.77 pre "virtual sitter" à 3.45 post "virtual sitter" P<0.001 0 falls during the first three months of the pilot Post-scale falls/1000 pt days:	**Pre-intervention** 12 months for neuroscience and med-surg units 5 months for cardiovascular care unit **Post-intervention**

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
	Sample size: **Pilot:** 348 patient care days (98 pts monitored with "virtual sitter") **Baseline Fall Rate:** Neuroscience: 4.77 falls/1000 pt days 0.91 injuries/1000 pt days Med-surg: 4.30 falls/1000 pt days 0.76 injuries/1000 pt days Cardiovascular: 2.87 falls/1000 pt days 0.70 injuries/1000 pt days			· Clutter-free rooms · Dry floors and adequate lighting · Hourly clinical rounds · Patient and family education · Bed and chair alarms		• Creation of a central monitoring technician workstation for the pilot and subsequent off site central monitoring unit (CMU) • Training of monitor technicians with escalation pathway when a virtual sitter alert was generated	Neuroscience 4.77 à 3.90 Med-Surg 4.30 à 2.43 Cardiovascular 2.87 à 1.01 Aggregated data demonstrated 44% reduction in unassisted falls (p<0.001) **Falls with Injury:** Pilot: Neuroscience unit falls with injuries/1000 pt days: 0.91 pre "virtual sitter" à 0.74 post "virtual sitter" P<0.001 0 falls with injuries during the first 3 months of the pilot Post-scale falls with injuries/1000 pt days:	12 months pilot data 14 months post-scale data for all three units

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
							Neuroscience 0.91 à 0.74 Med-Surg 0.76 à 0.34 Cardiovascular 0.70 à 0.38 Aggregated data demonstrated 40% reduction in fall-related injuries (p=0.065) **Change in Sitter Use:** 145,000 hours of patient monitoring done by 8.4 FTE monitor technicians which would have required 60 FTEs for 1:1 sitters **Cost:** Cost avoidance of $196,000 for the 14 fewer injuries from falls	

Author Year Country	Setting Sample Size	Study Design	Use of Existing Theory/Logic Model	Control/Pre-Intervention Sitter Practice	Alternative(s) to Sitters	Implementation Details	Outcomes	Data Collection Intervals
							(average cost of $14,000/fall with injury) **Other Outcomes:** None	
Wray, 2014[32] USA	**Study Setting:** • Med-Surg **Setting Details:** 751 bed Magnet-designated academic medical center - USA **Baseline Fall Rate:** 3.2 falls/1000 pt days	Time series	Yes Falls	1:1 (Constant Observation – CO)	• Nurse assessment tool • Increased frequency of rounding • Intentional rounding	• Constant observation practice changed from a physician-driven to a nurse-driven intervention • Nurses were provided with a variety of tools to maintain the safety of confused patients • Framework for nurses to increase the level of observation and assessment - 15-30 minute rounding - 2:1 observation - 1:1 observation • Reporting of unit CO utilization data to increase accountability and transparency	**Falls:** 10.1% improvement in fall rates (3.2 falls/1000 patient days à 2.9 falls/1000 patient days) **Falls with Injury:** Not reported **Change in Sitter Use:** 42.6% decreased in total CO hours (75,328.7 à 43,253.7)	**Pre-Intervention** FY 2011 (7/2010-6/2011) **Post-Intervention** FY 2012 (7/2011-6/2012)

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						• Nurses discouraged to call physician for CO orders except in cases of suicidal patients • Engagement of family members to personally observe loved ones • Daily rounding with clinical nurse specialist to better manage confused patients	45.3% decrease in CO hours/100 patient days (115,769 à 163,622) **Costs:** 41.3% ($533,917) decrease in CO expenditures ($1,292,228—> $758,311) **Other Outcomes:** Elimination of 15.4 FTEs (36.2 à 20.8) 30.8% reduction in physical restraints (4.93% of patients in restraints à 3.41%)	