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Development and evaluation of a concise nurse-driven non-pharmacological delirium reduction workflow for hospitalized patients: An interrupted time series study

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Abstract

We created a concise nurse-driven delirium reduction workflow with the aim of reducing delirium rates and length of stay for hospitalized adults. Our nurse-driven workflow included five evidence-based daytime “sunrise” interventions (patient room lights on, blinds up, mobilization/out-of-bed, water within patient’s reach and patient awake) and five nighttime “turndown” interventions (patient room lights off, blinds down, television off, noise reduction and pre-set bedtime). Interventions were also chosen because fidelity could be quickly monitored twice daily without patient interruption from outside the room. To evaluate the workflow, we used an interrupted time series study design between 06/01/17 and 05/30/22 to determine if the workflow significantly reduced the unit’s delirium rate and average length of stay. Our workflow is feasible to implement and monitor and initially significantly reduced delirium rates but not length of stay. However,

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Presentations

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Supplementary materials

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the reduction in delirium rates were not sustained following the emergence of the COVID-19 pandemic.

Keywords

Delirium; Nurses; Intervention studies; Quality improvement; Hospitals

Introduction

Delirium is common in hospitalized adults.[1] Overall incidence can reach 50% in general acute non-intensive care unit (ICU) settings, and can be higher for older adults and patients with dementia.[1–5] As a syndrome, delirium is characterized by an acute change in cognition and level of consciousness, inattention, and has a fluctuating course.[1,6] Compared to patients who do not develop delirium, those with delirium experience more harmful events and negative outcomes including an increased risk of falling, cognitive and functional decline, mortality, as well as increased healthcare utilization and costs.[1,7–10] Multiple studies have also shown that patients with delirium have longer lengths of hospital stay.[11–13]

Delirium is preventable in 30–40% of cases and can be mitigated with the use of clinical protocols, practices and standardized procedures. [14,15] Nonpharmacologic interventions to prevent delirium can include: cognitive reorientation, sleep enhancement (i.e., nonpharmacologic sleep protocol and sleep hygiene), early mobility and/or physical rehabilitation, adaptations for visual and hearing impairment, nutrition and fluid repletion, pain management, appropriate medication usage, adequate oxygenation, and prevention of constipation.[14] Many of these interventions have been bundled together to form multicomponent non-pharmacologic interventions that have been shown in randomized controlled trials (RCTs) and meta-analyses to be an effective strategy to prevent and treat hospital-acquired delirium regardless of cause.[16–20]

However, given the resource and time intensive nature of these multiple interventions, implementation outside of the context of a clinical trial and in real-world clinical settings remains challenging.[21,22] One of the key barriers to implementation of delirium reduction interventions is the number of individual components that are part of these interventions.[23] The number of individual components can range between 1 and 18 with an average of 11 components reported.[18,23,24] As a result, fidelity, or adherence to these multicomponent interventions can vary across inpatient settings.[25,26] In fact, one of the most recognized delirium reduction interventions, the Hospital Elder Life Program (HELP), which has consistently been shown to reduce delirium incidence[26,27] has been compromised by real-world challenges with intervention HELP protocol fidelity.[21,28]

The routine assessment to the fidelity of multicomponent interventions brings challenges, primarily the burden of electronic health record (EHR) documentation of non-clinical items (i.e., room lights off) by clinical team members.[22,29,30] This is problematic because without an accurate ongoing measurement of fidelity it remains unclear whether the failures of interventions to significantly change delirium outcomes are because of poor implementation delivery or a poorly designed intervention. In fact, fidelity has been shown to be an

important and independent predictor of the effectiveness of a multicomponent delirium reduction interventions.[31] Therefore, it is imperative to identify delirium reduction strategies that are feasible to deliver, where fidelity is easy to monitor without additional EHR documentation burden, in busy, real-world clinical settings.

The aims of our study are to 1) co-develop with nurses a concise delirium reduction workflow comprising of components that can be feasibly incorporated into nurses' and patient care assistants' care routines, and where fidelity to the workflow can be assessed without disturbing patients or adding to documentation burden and 2) evaluate the effectiveness of the workflow on delirium rates and lengths of stay. Our hypotheses are that nurses can feasibly incorporate the workflow into their daily care practices, fidelity to the intervention can be measured from outside the room without disturbing patients or adding to documentation burden, and that the workflow will result in a significant reduction in delirium rates and length of stay.

Materials and methods

Study design, setting and overview

We conducted a prospective interrupted time series (ITS) study at the University of California San Francisco (UCSF) Medical Center. Interrupted time series designed studies are an established, and valid, method for evaluating the effectiveness of unit level interventions that have been implemented at clearly defined time points. This study took place on a hybrid Acute Care for Elders (ACE) unit and general medicine unit. The UCSF ACE Unit comprises a rolling number of 8–22 beds on a 31-bed general medicine unit, and provides an evidence-based model of care designed to reduce incidence of functional and cognitive decline for hospitalized older adults (≥65 years old) through the provision of specialized interdisciplinary geriatrics care.[32] Non-ACE Unit patients (aged 18–64 years) are also admitted to the unit as general medicine patients according to bed control needs. Those patients aged ≤64 years receive usual general medicine care, and those age ≥65 years receive the ACE specialized interdisciplinary geriatrics care. The delirium prevention protocol was implemented for all (ACE and non-ACE) patients admitted to the unit, for two reasons: delirium prevention is important for all patients, and fidelity to interventions is likely more successful when done routinely for all patients on a shift.

The UCSF ACE unit was created in September of 2016. Our study timeline (see Fig. 1) consists of a 24-month pre-intervention period (01/06/2017 to 05/31/2019) of which the ACE unit activities were fully operational, a 10-month intervention period with the new nurse-driven delirium reduction workflow (06/01/2019 to 03/31/2020) and a 25-month post-intervention period (04/01/2020 to 05/31/2022). The post-intervention period also coincided with the emergence of the novel CoronaVirus Disease-2019 (COVID-19) pandemic. During the pre-intervention period, there were no specific delirium prevention interventions being used on the unit. The only general delirium reduction work focused on education for the unit nurses about delirium and daily delirium screening using a validated tool.[33] This was followed by the intervention period when the delirium reduction workflow was introduced, implemented and fidelty monitored. Following COVID-19s emergence and in

the post-intervention period, the delirium reduction workflow continued to be implemented and fidelty monitored.

This work was reviewed by the UCSF Institutional Review Board and categorized as quality improvement. We used the Standards for Quality Improvement Reporting Excellence (SQUIRE) as a guide to prepare this manuscript.[34]

Concise delirium reduction workflow development and description

The concise non-pharmacologic, nurse-driven, delirium reduction workflow was created by an interdisciplinary team of physicians, nurses, and quality improvement specialists in partnership with the nurses and nursing leaders on the unit. The project team reviewed existing evidence-based delirium prevention interventions described in systematic reviews and clinical excellence guidelines to identify potential components for inclusion in the workflow.[19,20,26] The study team then used the following criteria to reduce the number of possible components to be included in the workflow. Specifically, that components: 1) were part of an existing evidence-based delirium prevention intervention, 2) were feasible to incorporate into nurse's and patient care assistant's morning and evening patient-care routines, and 3) the assessment of fidelty to the intervention components was easy and quick to monitor without adding to EHR documentation burden (i.e., fidelity to intervention components could be observed/measured from outside the patient room and would not disturb the patients). The study team then met with unit nurses and nurse leaders during staff meetings to ascertain their final input on which components to include. This resulted in five morning and five nighttime components were selected to include in the workflow (see Fig. 2). The workflow branding of morning and evening interventions was changed to "sunrise" and "turndown" services respectively, therefore ensuring they were easily and collectively recognized by unit staff. Specific times were set during which intervention components were expected to be completed; 9–11am for sunrise services and 10–11pm for turndown services.

Nurse training and education

All nurses and patient care assistants on the unit participated in a mandatory one-hour standardized training held in April 2019. Given the unit is a hybrid ACE unit and general medicine unit, all staff on the unit were expected to care for either type of patient in each shift. The training, led by a Geriatrics-trained Clinical Nurse Specialist included strategies for preventing delirium and for caring for patients with delirium as well as the specifics of the new sunrise/turndown workflow. To optimize use of, and fidelity to, the delirium reduction workflow, we used existing care delivery structures (i.e., daily nursing shift huddles, rounds, staff meetings) to emphasize the importance of elements in the workflow and ran a unit education campaign during which the project team attended unit staff meetings to champion the project. Nurses were primarily responsible for the implementation of the workflow across all patients on the unit, but patient care assistants (PCAs) were also asked to assist as needed. Both disciplines were educated that all patients (ACE and non-ACE patients) likely benefit from the delirium-reduction workflow and that that it should be applied to every patient they cared for during their shift.

Enhancing fidelity to the intervention

To maximize fidelity to the workflow, we used elements of the NIH Behavior Change Consortiums Best Practice for Enhancing Behavior Change guidelines.[35] For example, during the design of the intervention we ensured that workflow components were congruent with evidence-based practices and could be delivered to all patients regardless of their reason for hospital admission. We ensured all nurses received standardized training and education prior to the workflow launch, and that data regarding fidelity was regularly fed back to nurses to prevent "drift" in their ability to delivery workflow components.

Data collection: Audit and feedback of workflow fidelity

To evaluate the workflow process, we measured fidelity with individual intervention components across the entire unit during audits completed during twice-daily nursing leader rounds. Direct observation methods were chosen as they are considered more valid at assessing fidelty.[36] Instructions for nurse leaders completing audits were to start at one end of unit, stand in the doorway, observe if each component was completed ("Yes" or "No") at that moment and then move to the next patient room (see Appendix A). No patient interaction or assessment was required, and no patient identifiers were captured. Sunrise audits were required to be completed between 11am and noon and turndown audits between 11pm and midnight. The fidelty audit was timed and took around 53 seconds per patient to complete. Fidelty data were captured and managed using the REDCap (Research Electronic Data Capture)[37] application hosted at UCSF. Weekly data from RedCap was then summarized and visualized using Tableau (a visual analytics software) with fidelty graphs pushed to the nurses and patient care assistants monthly via email, huddle reports, and staff meetings. This, along with weekly staff huddle announcements, was used as a reinforcing mechanism to drive fidelity with intervention components.

Data collection: Outcome measures

We collected outcomes data for each month for delirium-days (i.e., delirium rate) and average length of stay for all unit patients with and without delirium because reducing delirium rates and length of stay was a health system priority. We did not collect data on the cause of delirium (i.e., infection) as evidence–based multicomponent delirium reduction bundles have been shown to decrease delirium rates when studied for all causes. For this study, we defined a patient with delirium as those with a Nursing Delirium-Screening Scale (Nu-DESC)[33] score of two or greater. The Nursing Delirium-Screening Scale (Nu-DESC) is designed for nurses, who rate the severity of five delirium characteristics from 0 (not present) to 2 (severe) based on their observations of the patient's behavior over the course of their shift.[38] The Nu-DESC screen has been validated at UCSF and found to have a specificity of 98% and a sensitivity of 42%.[38] We used the Nu-DESC score as a proxy for delirium diagnosis in this study due to the impracticability of confirming each delirium case using the gold-standard Confusion Assessment Method (CAM) tool in a real-world implementation quality improvement project.[39] Delirium rates were then determined by counting all days in which a patient had a positive Nu-DESC screening. Length of stay was defined as the number of days a patient was hospitalized. Patients' sociodemographic and clinical data were also obtained (age, gender, race, ethnicity, insurance type, language, and

diagnostic related group). All study data was obtained from the UCSF Electronic Health Record (EHR).

Statistical analysis

Complete case analysis was conducted on all eligible (ACE and non-ACE) patient encounters on the unit during the study time period. We categorized patients according to study period and calculated frequencies and percentages for dichotomous variables, means for continuous and medians interval scale variables. To assess differences between patients in each time period we used chi-square and Fisher's exact tests for categorical variables and one-way ANOVAs for continuous variables. We conducted interrupted time series analysis[40] to determine if the delirium reduction workflow produced a significant change in the trends of delirium rates and length of stay and to determine if the emergence of COVID-19 impacted the trends of these same outcomes. We utilized the "itsa" command in STATA which relies on ordinary least squares (OLS) rather than regression methods based on autoregressive integrated moving models.[41] We also used the "post trend" command to estimate the post-intervention trends separately after the pre-intervention and intervention periods. To check for the presence of autocorrelation of the error terms in the regression, we calculated the Cumby-Huizinga statistic.[42] When this was significant and autocorrelation existed, we specified the "lag" option of the "itsa" command with a maximum lag of 6, using Newey-West standard errors for model coefficients. To calculate fidelty rates, we divided the number of audits completed by eligible patient days. All analyses were conducted in Stata 16.0 (College Station, TX).

Results

Data from 10,636 adult patients were part of this study, including 4,925 in the pre-intervention period, 1,640 in the intervention period and 4,071 in the post-intervention period. Sociodemographic and clinical characteristics of patients in each period are shown in Table 1. Following the emergence of COVID-19, the characteristics of patients admitted to the unit changed significantly during the post-intervention period compared to the other periods. Specifically, patients in the post-intervention period were less likely to be White, to speak English and more likely to be Hispanic or Latino.

Delirium reduction workflow fidelity

There were 7,466 workflow fidelity audits (4,069 sunrise and 3,397 turndown) completed during the intervention period and 14,235 workflow audits (6,630 sunrise and 7,605 turndown) during the post-intervention period. Overall audit fidelity was 54% (7466 audits/13934 patient days) in the intervention period and 36% (14235 audits/39584 patient days) in the post-intervention period. Fidelity with individual components of the delirium reduction workflow is shown in Table 2. During the intervention period, individual component fidelity was high with the sunrise components (except for mobilization) ranging between 80% and 99% and turndown components ranging between 50% and 100%. However, during the post-intervention period, the lower bounds of fidelity for sunrise components (except for water in reach) decreased to 44–78% and for turn-down components (except for patient area quiet) decreased to between 33 and 61%.

Delirium reduction workflow and patient outcomes

Results of interrupted time series analyses are shown in Figs. 3 and 4 and Table 3. During the intervention period delirium rates decreased at a rate of 12.2 days per month (95% CI = −11.4 to −0.44) and this trend was significantly different compared to the pre-intervention trend for delirium rates ($p>0.01$). However, following the emergence of COVID-19 in the post-intervention period, the significant reduction in delirium rates compared to intervention rates was not sustained and rates increased. The delirium reduction workflow in the setting of the emergence of COVID-19 did not significantly change trends in length of stay for patients with or without delirium (see Table 3 and Fig. 4).

Discussion

A concise nurse-driven, non-pharmacologic delirium reduction workflow, where fidelity can be easily monitored, is feasible to implement and positively impacts delirium rates but not length of stay. However, the positive effects of this workflow on delirium rates were not sustained following the emergence of COVID-19.

The key to the initial success of the workflow on delirium rates was likely due to the fact our intervention was co-developed in partnership with nursing leaders and unit nurses, and comprised of evidence-based components that were feasible to implement and monitor. The process of engaging nurses during workflow development, implementation, and evaluation, ensured nursing buy-in remained high and created a nursing culture that supported the intervention. Engaging nurses as stakeholders and partners is shown to achieve excellence in clinical care for a range of quality improvement initiatives including reducing medical errors, increasing staff communication, implementing other evidence-based practices, and upgrading discharge planning.[43,44]

The five sunrise and five turn-down evidence-based components were chosen in recognition of bedside nurse care practices and the demands on time during busy clinical shifts as well unit leadership time and resource challenges needed to monitor the fidelity of the workflow. Our results suggest that by reducing the number of workflow components, nurses (with assistance from patient care assistants) were able to feasibly implement and monitor the entire workflow during their daytime and nighttime shifts. We were encouraged that fidelity audits of the workflow took less than one minute to complete per patient. Even though the overall audit fidelity rate during the intervention period was 54%, when audits were completed, individual component fidelity remained consistently higher during the intervention period compared to the post-intervention period suggesting the changes in delirium rates outcomes was likely impacted by our workflow. However, the overall fidelty rate in the intervention period suggests that even a simplified workflow and auditing process still presents implementation challenges in real world clinical settings. Understanding optimal implementation strategies of multicomponent interventions, including the determination of minimum number of elements and the ability to monitor fidelity, is a priority to advance delirium prevention research.[45] This study adds to this understanding and is an important finding. Future efforts should determine how to increase fidelty with workflow components and monitoring. This may include embedding this

workflow to the electronic health record so that nurses can complete the workflow while completing other routine tasks.

Despite the initial reduction in delirium rates with implementation of our workflow, this reduction was not sustained following the emergence of COVID-19. This is not surprising given the COVID-19 pandemic profoundly impacted hospital quality improvement initiatives worldwide due to the need to divert effort and attention to COVID-19 management.[46] We hypothesize that COVID-19 negatively impacted the workflow, making it more difficult for nurses to deliver the sunrise and turn-down interventions, as shown by the overall reduction in fidelty with some workflow components (e.g., blinds up, blinds down, television off and patient awake during the daytime). Additionally, gains in delirium reduction may have been mitigated by the now-known high rates of COVID-19 associated delirium.[47] It is also possible that a change in patient characteristics during the post-intervention period may have impacted delirium rates. Following COVID-19, patients admitted to the unit were significantly less likely to be White, speak English and more likely to be Hispanic or Latino. These changes highlight yet again how the COVID-19 pandemic disproportionality impacted communities of color[48] but also adds to the evidence that racial and ethnic minoritized populations experience more cumulative disease burden, and delirium may be one of those cumulative factors.[49]

Our study has some limitations. The first is how the study's primary outcome, delirium-days is defined and measured. The Nu-DESC screening tool has been implemented at all UCSF hospitals due to the feasibility and rapidity of administration. It was important for bedside nurses to implement a tool that was quick to complete (i.e., 1–2 minutes) but provides adequate information on whether their patient is having acute cognitive changes.[50] The Nu-DESC does not diagnose delirium, but rather provides important screening information that allows the provision of better delirium care. We used the Nu-DESC score as a proxy for delirium diagnosis in this study due to the feasibility of real-life implementation and an inability to validate a diagnosis of delirium in every patient in our large sample. However, the expectation changes in the Nu-DESC positivity rate pre- and post-intervention, as well as during the COVID pandemic, suggests that it is a good proxy. Secondly, a RCT would have been more rigorous study design, but we opted to choose an interrupted time series design as this was the most appropriate given that we wanted to evaluate the implementation of the workflow in a real-world clinical setting. Finally, our is study conducted within one hybrid ACE and general medical unit at one academic medical center meaning results may not be generalizable to other settings. However, given the success of these study results demonstrating a reduction in delirium rates, as well as a different pilot-study completed on UCSF's neurological sciences unit,[51] the delirium reduction workflow has now been implemented across all units at UCSF. In combination, these limitations reflect challenges with implementation of delirium-reduction strategies outside the context of clinical trials but emphasize the need for these types of studies. Continued implementation research is needed so that rigorous evidence-based delirium reduction interventions can be embedded in real-world settings.

Conclusion

We developed and implemented a concise nurse-driven non-pharmacologic delirium reduction workflow that positively impacts delirium rates but not length of stay. However, the reduction of delirium rates was not sustained following the emergence of COVID-19. Partnering with nurses to develop a delirium reduction workflow and easy monitoring system facilitated integration of this delirium reduction strategy. Now that COVID-19 is endemic and care for patients with COVID-19 is part of every unit's daily nursing care, future efforts should re-focus on the feasible implementation and measurement of fidelity of delirium reduction strategies.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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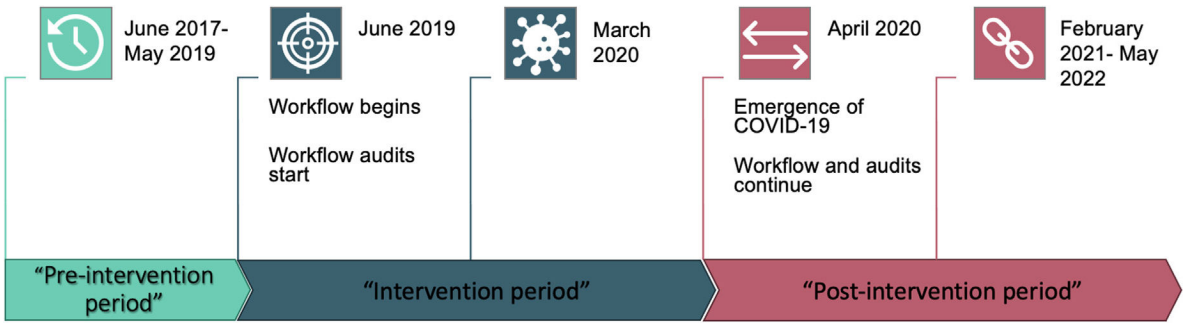


Fig. 1.
Specific time periods of the study timeline

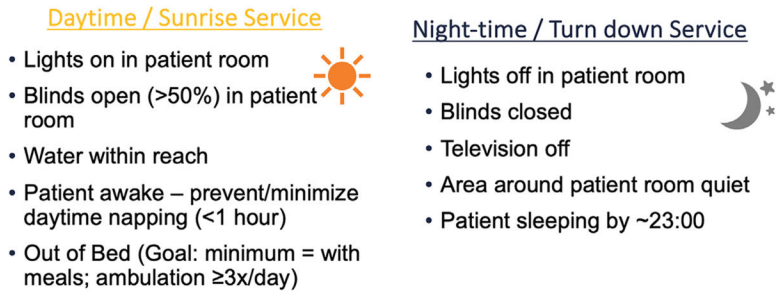


Fig. 2.

Sunrise and Turndown components in the nurse-driven non-pharmacological delirium reduction workflow

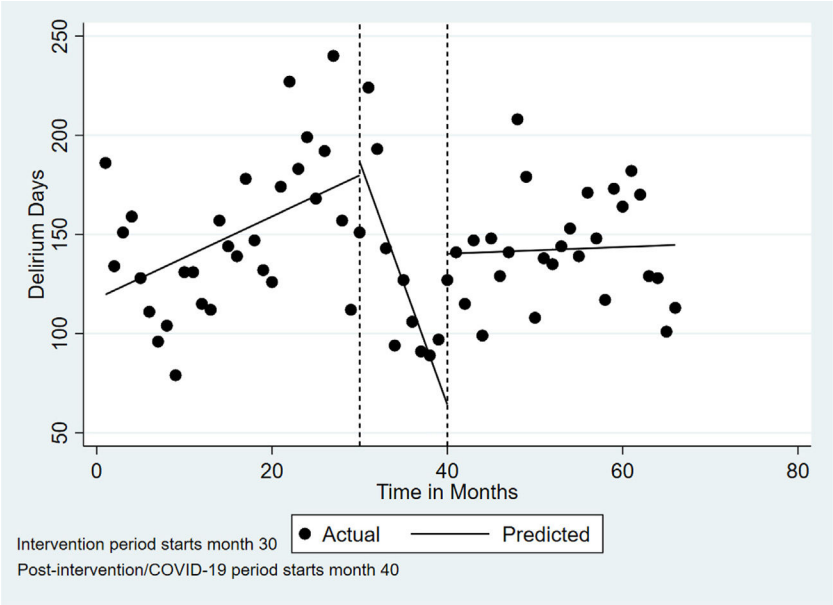
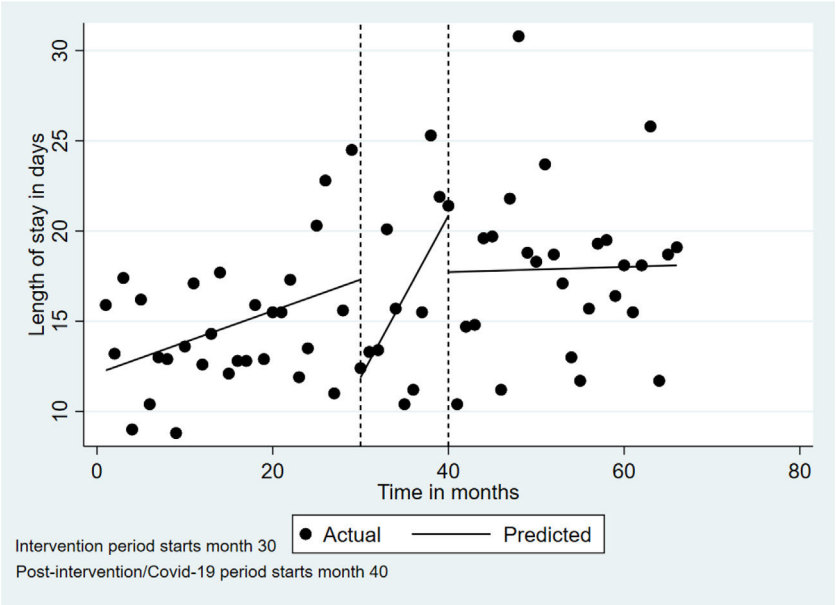


Fig. 3.
Impact of workflow during intervention and post-intervention on delirium days



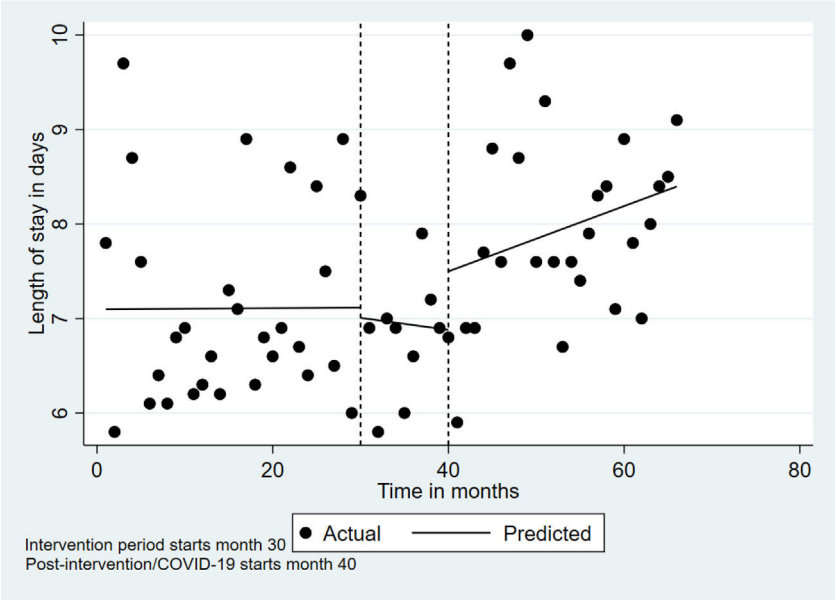


Fig. 4.

Impact of intervention and COVID on average length of stay for patients with (top) and without (bottom) delirium.

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Table 1

Baseline characteristics of patients in the three time periods: pre-intervention, intervention, and post-intervention

Variable	Pre-intervention	Intervention	Post-intervention	p-value
	01/06/2017 to 05/31/2019 n= 4925	06/01/2019 to 03/31/2020 n=1640	04/01/2020 to 05/31/2022 n=4071	
		N (%)		
Gender				0.473
Female	2524(51.25)	816(49.76)	2074(50.95)	
Male	2401(48.75)	824(50.24)	1994(48.98)	
Age at admission, median (IQR)	66(51,80)	67(53, 80)	66(48, 77)	0.165
Primary Race				<.0001
American Indian or Alaska Native	45(0.91)	13(0.79)	44(1.08)	
Asian	1009(20.49)	398(24.28)	959(23.56)	
Black or AA	712(14.46)	212(12.93)	555(13.63)	
Native Hawaiian or Other Pacific Islander	53(1.08)	21(1.28)	66(1.62)	
White or Caucasian	2417(49.08)	798(48.69)	1759(43.21)	
Other	640(12.99)	180(10.98)	643(15.79)	
Unknown/Declined	49(0.99)	17(1.04)	45(1.11)	
Ethnicity				<.0001
Hispanic or Latino	547(11.11)	159(9.70)	623(15.3)	
Coverage Type				0.076
Medicare	2837(57.60)	987(60.18)	2338(57.43)	
Medical	1124(22.82)	33(20.12)	887(21.79)	
Private Coverage	910(18.48)	312(19.02)	817(20.07)	
Self-Pay	29(0.59)	6(0.37)	13(0.32)	
Other	25(0.51)	5(0.30)	16(0.39)	
Language				<.0001
English	3950(80.20)	1285(78.35)	3106(76.30)	
Chinese	470(9.54)	184(11.22)	408(10.02)	
Russian	138(2.80)	39(2.38)	124(3.05)	
Spanish	194(3.94)	58(3.54)	236(5.80)	
Other	173(3.51)	74(4.51)	197(4.84)	

Variable	Pre-intervention	Intervention	Post-intervention	p-value
Marital Status				0.0183
Married	1803(36.63)	619(37.77)	1605(39.43)	
Divorced/Separated	456(9.26)	159(9.70)	344(8.45)	
Registered domestic Partner/Significant Other	116(2.36)	38(2.32)	120(2.95)	
Single	1750(35.55)	573(34.96)	1427(35.05)	
Widowed	716(14.55)	229(13.97)	501(12.31)	
Unknown/Declined	81(1.65)	21(1.28)	74(1.82)	
Final Billing DRG Weight, median (IQR)	1.35(0.94,1.86)	1.35(0.95,1.87)	1.34(0.95,1.87)	0.9352
ICU Days, median (IQR)	0(0, 0)	0(0, 0)	0(0, 0)	0.704
LOS, median (IQR)	4.9(2.7, 9.2)	4.5(2.8, 8.0)	4.8(2.9, 8.8)	0.6984

Table 2

Weekly work flow fidelty during the intervention and post-intervention

	Intervention period	**Post-intervention period**
	(06/01/19 - 03/31/20)	**(04/01/20 - 05/31/22)**
	Weekly fidelty **(%) range**	
Daytime components		
Blinds up	80.8 – 99.5	66.7 – 100.0
Patient is out of bed	25.3 – 84.2	44.4 – 100.0
Lights on	86.5 – 99.5	76.7 – 100.0
Water in patient's reach	81.4 – 98.1	91.4 – 100.0
Patient is awake	94.1 – 99.2	77.8 – 100.0
Nighttime components		
Blinds down	50.4 – 89.0	36.2 – 90.0
Lights off	51.3 – 96.6	54.3 – 96.7
Television off	53.7 – 88.1	33.3 – 95.4
Patient is asleep	69.7 – 89.3	61.2 – 96.9
Patient area is quiet	68.5 – 100.0	95.3 – 100.00

Table 3

Interrupted time series results assessing impact of workflow on delirium rates and length of stay.

	Beta estimate (SE)	p-value
Delirium-Days (delirium rate)		
Intercept (baseline rate)	119.71(17.75)	<0.001
Pre-intervention period slope change	2.1(1.08)	0.06
At intervention launch rate	6.82(22.08)	0.76
Postintervention slope change	−14.31(2.89)	<0.001
Emergence of COVID rate	76.07(16.62)	<0.001
Postintervention slope change	12.41(2.65)	<0.001
Length of Stay for Delirium patients		
Intercept (baseline rate)	12.28(1.29)	<0.001
Pre-intervention period slope change	0.17(10)	0.08
At intervention launch rate	−5.43(2.21)	0.02
Postintervention slope change	0.72(0.36)	0.05
Emergence of COVID rate	−3.13(3.47)	0.37
Postintervention slope change	−0.88(0.37)	0.02
Length of Stay for Non-delirium patients		
Intercept (baseline rate)	7.10(0.48)	<0.001
Pre-intervention period slope change	0.0005(0.03)	0.99
At intervention launch rate	−0.11(0.71)	0.88
Postintervention slope change	−0.01(0.09)	0.89
Emergence of COVID rate	0.62(0.60)	0.30
Postintervention slope change	0.05(0.9)	0.61