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PROCESS IMPROVEMENT TO REDUCE THE INCIDENCE OF DELIRIUM IN AN OVERFLOW UNIT

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N670 Final Evidence-Based Improvement Project

Process improvement to reduce the incidence of delirium in an inpatient overflow unit

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August 01, 2024

Process improvement to reduce the incidence of delirium in an inpatient overflow unit**Abstract**

Problem: This quality improvement project aims to reduce the incidence of hospital-acquired delirium in an overflow unit, which serves a diverse patient population from medical-surgical and telemetry microsystems. The unit averages 96 delirium episodes annually, costing approximately \$3,456,000. The goal is to reduce delirium incidence by 25%, decreasing monthly cases from 8 to 6 by October 31, 2024, and annual cases to 72 by April 2026.

Context: Delirium is a prevalent and severe neuropsychiatric syndrome that significantly affects older hospitalized patients, characterized by acute disturbances in attention, awareness, and cognition.

Interventions: The project introduced a bundle of four interventions over four months to prevent delirium in overflow units: staff education using the Confusion Assessment Method (CAM) tool; environmental modifications, such as placing clocks on bedside tables; patient engagement strategies, including increased daytime mobilization; proactive monitoring protocols, with monthly audits to assess delirium incidence.

Measures: Outcome measures included the incidence of delirium. Process measures included pre- and post-intervention staff surveys to assess baseline and comparative knowledge (n=30).

Weekly delirium audits were conducted and analyzed over four months.

Results: Interim results indicate increased staff knowledge in identifying and preventing delirium (n=30), with a reduction in the incidence of delirium in 2 patients, resulting in savings of \$72,000. RN surveys (n=117) post-implementation indicated 100% satisfaction.

Conclusions: The project demonstrated the necessity of nursing assessment and delirium prevention interventions. Clinical Nurse Leaders (CNLs) need to continuously advocate for

evidence-based projects to prevent delirium and its high costs, particularly in heterogeneous units like overflow units.

Keywords: overflow unit, delirium, prevention, clinical nurse leader, length of stay, confusion assessment method

Personal Leadership Statement

As a Clinical Nurse Leader (CNL), my leadership journey is anchored in a foundation of strengths, values, and a defined vision for advancing nursing practice and patient outcomes. Central to my approach is a steadfast commitment to patient-centered care, where empathy, integrity, and innovation serve as cornerstones. These principles resonate deeply with the mission of Kaiser Permanente- this integrated healthcare organization, which steadfastly aims to deliver exceptional, compassionate healthcare to every individual under its care.

In navigating my leadership path, I draw inspiration from the Balance Theory of Wisdom, which advocates for integrating empathy and compassion with a broader perspective and foresight (Baltes & Smith, 2008). While I have successfully embedded empathy and compassion into my leadership style, I recognize the imperative of expanding my scope to encompass strategic foresight and visionary leadership. This evolution is crucial in effectively guiding healthcare teams and navigating the complexities of a dynamic healthcare environment.

Mentorship is pivotal in my leadership development, providing invaluable guidance, perspective, and insights from seasoned leaders' experiences. By engaging in a mentorship framework, I continually refine my leadership capabilities, enhancing my ability to foster innovation, collaboration, and resilience within my team.

Strategically, I am drawn to visionary leadership practices that include scenario planning, cultivating a culture of innovation, and promoting interdisciplinary collaboration (Wei & Horton-Deutsch, 2022). These strategies not only empower nursing teams to adapt to changing healthcare landscapes but also encourage proactive problem-solving and continuous improvement in patient care delivery.

My journey as a CNL is characterized by a commitment to excellence, guided by empathy, integrity, and a proactive embrace of innovation. Through mentorship and strategic leadership approaches, I aim to continually elevate nursing practice, enhance patient outcomes, and contribute meaningfully to this organization's mission of providing compassionate, high-quality healthcare.

Problem Description

Healthcare aims to promote and maintain the health of individuals, prevent and treat illnesses, injuries, and diseases, and provide support and care for those with chronic or terminal conditions. This includes not only physical health but also mental, emotional, and social well-being. Healthcare providers work to improve the quality of life for their patients, alleviate their suffering, and help them achieve their full potential. Delirium is a common and severe medical condition that affects a significant proportion of older hospitalized patients. Delirium is an acute neuropsychiatric syndrome characterized by a disturbance in attention, awareness, and cognition that develops over a short period which stands as a critical concern within healthcare systems (Grover & Avasthi, 2018). Notably, the impact of this syndrome extends beyond individual patient experiences, prompting national attention from esteemed payers like the Center for Medicare & Medicaid Services (CMS) and integrated healthcare systems such as Kaiser Permanente. This widespread recognition underscores delirium's status as a top priority in both care delivery and policy-making circles, driving efforts to understand, prevent, and manage this complex condition.

Setting

This facility is a 352-bed capacity, community-based hospital that receives referrals from other Kaiser Permanente sites in Northern California. This quality improvement project is being

conducted in a medical-surgical and telemetry microsystem. The selected unit is unique because a variety of patients are admitted there and the unit shares adjacent space with other microsystems including mother-baby, pediatric, observation, and post-anesthesia care units; therefore, these units are considered “overflow units”. Based on this heterogeneous patient population (medical-surgical/ telemetry), this Clinical Nurse Leader (CNL) student has observed over the past three years a subpopulation of admitted patients who may arrive with signs and symptoms of delirium and/or risk factors for delirium.

Gap Analysis

Currently, the overflow unit lacks a systematic and proactive approach to prevent hospital-acquired delirium. Staff understanding and training in delirium prevention varies, leading to inconsistencies in care quality. The absence of defined processes for identifying at-risk patients and implementing preventive interventions contributes to the high prevalence of delirium in the unit. Internal data reveal a high incidence of hospital-acquired delirium in this overflow unit, resulting in prolonged hospital stays and increased healthcare costs. Performance targets include reducing delirium incidence by 25% from 1 month of baseline data in 2024, and long-term within six months through the implementation of evidence-based interventions. Every year, the unit sees an average of 96 episodes of delirium. The annual cost of hospital-acquired delirium is roughly \$3,456,000 (Kaiser Permanente, n.d.-e, "Price Transparency in Northern California"). Without proactive measures and improvements, the likelihood of reducing delirium cases by 25% would be minimal. Over time, this inaction may increase healthcare costs, lead to longer hospital stays, and burden patients and healthcare providers. Additionally, the quality of patient care may be compromised, and the overflow unit may continue to face challenges in managing delirium effectively.

Reducing hospital-acquired delirium aligns with the organization's priorities of providing high-quality, patient-centered care and optimizing healthcare resource utilization. By focusing on the overflow unit, this project addresses a critical need within the organization and enhances care delivery in a resource-constrained environment. Implementing delirium prevention strategies is expected to improve patient outcomes by reducing the incidence of delirium and its associated complications (Grover & Avasthi, 2018). This will lead to shorter hospital stays, lower healthcare costs, and enhanced overall patient well-being, the project promotes a proactive approach to patient safety and supports the organization's goal of delivering efficient and effective healthcare services.

In conclusion, addressing the problem of hospital-acquired delirium in an overflow unit through evidence-informed quality improvement initiatives is essential for improving patient outcomes and optimizing healthcare resource utilization. By implementing targeted interventions and aligning with organizational priorities, the project aims to reduce the incidence of delirium and enhance overall care quality in the healthcare setting.

Project Aims

Global Aim

The global aim of this project is to reduce the incidence of hospital-acquired delirium by 25% from 96 cases to 72 within two years by April 2026.

Specific Aim

By October 31st, the specific aim is to reduce the incidence of hospital-acquired delirium by 25 % from baseline. Currently, in April of 2024, there were 8 cases per month; therefore, the goal is to identify no more than 6 cases per month.

Available Knowledge

PICOT questions guide literature searches in scholarly writing. For this quality improvement project, the following PICOT question was used: In an inpatient overflow unit (**P**), does the implementation of process improvement measures (**I**), compared to standard procedures (**C**), reduce the incidence of delirium among patients to 25% (**O**) within six months? (**T**). A summary of the evidence is appraised in Appendix C.

The search strategy for the articles involved an electronic search of databases such as PubMed, CINAHL, Cochrane Library, Google Scholar, and ScienceDirect. Keywords related to the PICOT question, such as: "older hospitalized patients with delirium," "cognitive stimulation," and "environmental modifications," were used. I also used the Boolean operators "AND" and "OR" to combine the keywords to narrow the search results. Finally, I filtered the results by publication date to only include articles from the last six years. The five articles were then screened and analyzed for credibility using the CRAAP criteria that examined the currency, relevance, authority, accuracy, and purpose to determine their applicability to my project.

The article by Deeken et al. (2022) presents the outcomes of a delirium prevention program implemented in a cohort of older persons after elective surgery. The program was designed to reduce the incidence of delirium and its associated complications during hospitalization. The study involved 1,739 patients aged 60 or older undergoing elective surgery at two hospitals in Germany. The intervention consisted of a cognitive stimulation program, consisting of cognitive training, physical activity, and psychosocial stimulation. The study results showed that the intervention was successful in decreasing the incidence of postoperative delirium by almost a third (31.7%) compared to the control group. The intervention was also associated with a significant decrease in the length of hospital stay and improved quality of life. The authors

also reported that the intervention was associated with improved cognitive functioning, as measured by executive function tests, and a reduction in the risk of falls. The findings of this study suggest that cognitive stimulation may be associated with improvements in cognitive functioning and quality of life, which could be beneficial in the management of delirium. I rated this evidence as level I using the JHNEBP scale as it provides a randomized control trial. However, the study was limited to a single research site, and the results may not be generalized to other hospital settings or populations. The low sample size also limited the power of the statistical analyses.

A research article by Evensen et al. (2018) examined the relationship between environmental factors and the risk of delirium in geriatric patients. The authors conducted an observational study of patients aged 70 and over admitted to a geriatric ward at a Norwegian hospital between 2008 and 2014. The authors identified different environmental factors associated with delirium, such as noise levels, temperature, humidity, and light levels, through medical records. They found that more patients developed delirium when exposed to higher noise levels, higher temperatures, and lower humidity levels. The authors noted that environmental modification strategies to reduce noise, enhance adequate and tolerable temperature levels, and light and humidity adjustments could significantly reduce delirium development. This article is relevant to my project as it provides evidence that environmental factors can increase the risk of delirium in geriatric patients. The findings of this study suggest that environmental modification strategies may be effective in reducing the risk of delirium in the elderly and can be used as part of an effective management plan. This is a level II study according to the Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) rating, as it is an observational study that examined the relationship between environmental factors and delirium

incidences among older adults. However, the study is limited by its observational design, which does not allow for a causal relationship.

The articles reviewed provide valuable insights into two key themes that can guide the "Process improvement to reduce the incidence of delirium in an inpatient overflow unit" project. Deeken et al. (2022) highlight the effectiveness of cognitive stimulation programs in reducing delirium incidence among older patients undergoing elective surgery. Their study suggests that interventions focusing on cognitive training, physical activity, and psychosocial stimulation can significantly decrease delirium rates, improve cognitive functioning, and enhance quality of life. Evensen et al. (2018) shed light on the impact of environmental factors on delirium risk, particularly in geriatric patients. Their findings emphasize the importance of addressing noise levels, temperature, humidity, and light levels in hospital environments to mitigate delirium development. These themes will guide the project by informing the implementation of targeted process improvements. Strategies such as incorporating cognitive stimulation programs and environmental modifications, based on the evidence from these studies, will be key components of the project's approach to reducing delirium incidence in the overflow unit.

Rationale

The conceptual framework or theory used to guide the project can greatly influence its design, implementation, and evaluation. In the context of reducing the incidence of delirium in an inpatient overflow unit, a relevant theory to consider is the Model for Improvement (MFI) from the Institute of Healthcare Improvement (IHI) including "PDSA Cycles" (Plan-Do-Study-Act) (Institute of Healthcare Improvement, n.d.). This theory is often utilized in quality improvement initiatives within healthcare settings. The PDSA Cycle is a systematic framework

for testing and implementing changes to improve processes or outcomes. It consists of four key stages:

Plan: Identifying the problem and planning potential solutions.

Do: Implementing the planned change on a small scale.

Study: Evaluating the results of the change to determine its effectiveness.

Act: If the change was successful, implement it on a larger scale; if not, adjust the plan and try again.

The IHI MFI including PDSA Cycles will serve as a guiding framework for Process improvement to reduce the incidence of delirium in an inpatient overflow unit. For this project, these descriptions of the PDSA cycles are relevant:

Plan: The project team will identify the specific factors contributing to the incidence of delirium in the overflow unit. This could include factors like medication schedules, environmental stimuli, patient engagement activities, and staff training.

Do: Based on the identified factors, the team will implement targeted process improvements.

For example, this might involve adjusting medication schedules to reduce sedatives that contribute to delirium, creating a more calming environment, implementing regular delirium screening protocols, and providing staff training on delirium prevention and management.

Study: After the changes are implemented on a small scale (e.g., in one section of the unit), the team will study the results. This could involve tracking the incidence of delirium among patients in the test area compared to the rest of the unit.

Act: If the process improvements lead to a reduction in delirium incidence, the project team will scale up these changes to the entire unit. If the changes do not have the desired effect, the team will analyze the results, make adjustments to the plan, and repeat the PDSA cycle until the desired reduction goal of 25% is achieved.

By using the PDSA Cycles, the project team can systematically test and implement changes, ensuring that interventions are evidence-based, tailored to the specific needs of the unit, and continually refined based on ongoing evaluation. This framework promotes several PDSA cycles for continuous improvement (See Appendix A). Through the iterative application of these PDSA cycles, the process improvement will be continuously honed to optimize its efficacy in mitigating delirium incidence and ameliorating patient and staff outcomes with the overflow unit.

Context

The overflow unit currently needs a systematic and proactive strategy for delirium prevention, focusing on reactive treatments that may need to address the fundamental reasons adequately. Staff understanding and training in delirium prevention are varied, resulting in differences in the quality of treatment provided. Furthermore, the lack of defined processes for identifying at-risk patients and conducting preventive interventions contributes to the unit's hospital-acquired delirium prevalence. A comprehensive and streamlined strategy that proactively identifies at-risk patients and conducts evidence-based interventions to reduce hospital-acquired delirium by 25% is envisioned as the future state. This entails redesigning the present process, focusing on early diagnosis, staff education, and the adoption of the best delirium prevention techniques. Action steps are critical for closing the gap between the current and future stages. To guarantee that healthcare professionals in the overflow unit are well-versed

in delirium risk factors, symptoms, and prevention strategies, a comprehensive staff training program should be undertaken. Standardized screening measures should be used to identify at-risk patients and allow for timely interventions. To establish a cohesive approach to delirium prevention, collaborative efforts with interdisciplinary teams, including nursing, physicians, and allied health workers, should be encouraged. A robust electronic health record system can enable real-time patient monitoring, allowing for early diagnosis of delirium symptoms and timely care. Regular audits and quality improvement activities should be implemented to evaluate the efficacy of the new process and make any adjustments. To summarize, closing the gap between current and future states necessitates a multidimensional approach that includes staff education, protocol standardization, interdisciplinary collaboration, and technological integration. The overflow unit can considerably reduce the incidence of hospital-acquired delirium by executing these action measures, improving patient outcomes, and optimizing healthcare resource consumption.

The potential for considerable improvements in patient outcomes is one of the primary benefits of establishing an enhanced strategy to prevent delirium in an overflow unit. The goal of reducing hospital-acquired delirium by 25% reflects a commitment to improving care quality. Furthermore, an effective delirium prevention program can contribute to greater patient satisfaction, positively improving the healthcare facility's overall reputation. If the process improvements are cost-effective, they can enhance the hospital's financial performance by reducing the burden of treating delirium-related problems. The implementation of a new process may be resistant from the perspective of healthcare staff, particularly if it disrupts established routines or requires additional training. Furthermore, there may be challenges in securing sufficient resources, both in terms of personnel and budget, to support the delirium prevention

initiative. The potential for unforeseen complications or unintended consequences must also be considered, as well as the risk of not achieving the targeted reduction in hospital-acquired delirium, leading to potential disappointment among stakeholders. The emphasis on delirium prevention allows the hospital to differentiate itself in the market by prioritizing patient safety and quality of care. Reducing hospital-acquired delirium can improve patient outcomes, potentially attracting additional patients and referrals. There may also be chances to partner with research institutions or healthcare organizations, boosting the hospital's reputation as a patient-care leader and improving delirium prevention measures. External variables can bring risks and problems to the project. Changes in healthcare rules and reimbursement practices may impact the initiative's financial viability. Other institutions may apply similar delirium prevention measures, posing issues within the healthcare industry. Furthermore, unanticipated external events, such as public health crises, may draw attention and resources away from the initiative. It will be vital for successful implementation to maintain adaptation and resilience in the face of these problems. Competition in the healthcare industry can be both motivating and challenging. On the plus side, the project has the potential to distinguish the hospital from competitors by displaying a dedication to creative and effective patient care. On the negative side, identical tactics may be adopted by other institutions, lowering the differentiating feature. Regulatory changes, particularly those affecting quality indicators and patient outcomes, may impact the project's performance. Reimbursement policies may also impact the initiative's financial viability, needing careful alignment with shifting healthcare policy. Internally, the dedication to quality improvement serves as a motivator. The project aligns with the hospital's aim of providing high-quality care, which could lead to increased patient satisfaction and retention. However, the cost of implementing the new method may burden the hospital's budget, necessitating a delicate

balance between financial concerns and the desire to improve patient care. The hospital's healthcare personnel's engagement and support are crucial internal aspects influencing the project's success. Ongoing training and communication will be required to overcome any resistance to change.

Implementing an improved strategy to prevent delirium in the overflow unit is not only feasible but also necessary for enhancing patient outcomes. Evidence-based processes, staff education, and proactive monitoring systems reveal a viable approach. Adequate resources, including persons and technology, are available to ensure a smooth deployment (Deeken et al., 2022). The potential benefits, such as a 25% reduction in hospital-acquired delirium, outweigh the related expenses. The healthcare team's dedication to prioritizing patient well-being and the good influence on overall hospital efficiency supports this practicality. The proposed delirium prevention strategy in the overflow unit is realistic and promising. The implementation is positioned to reduce hospital-acquired delirium by leveraging existing resources and establishing a culture of continuous improvement. This proactive strategy not only corresponds with best practices in patient care but also emphasizes the organization's dedication to providing high-quality healthcare services. Because of the anticipated positive effects, this effort is positioned as a beneficial investment in patient safety and overall healthcare excellence.

Interventions

Description of Intervention:

This study proposed implementing an enhanced protocol to mitigate delirium occurrences within overflow units. Delirium, a pervasive challenge in such environments due to heightened fast-phased throughput, sharing space with other microsystems, and increased patient acuity, presents substantial threats to patient safety and care quality. These interventions utilized a

multifaceted approach amalgamating four components: 1. Staff education: 2. Environmental adjustments; 3. Patient engagement strategies; and 4. Proactive monitoring protocols.

Four components of the Intervention:

1. Staff Education and Training:

Comprehensive educational sessions were conducted for all healthcare personnel stationed within the overflow unit. These sessions concentrated on early delirium detection, understanding contributing factors, and implementing efficacious prevention and management strategies. Emphasis was placed on fostering communication techniques adept at de-escalating agitated patients and fostering a tranquil and supportive milieu.

2. Environmental Modifications:

Tactical alterations to the physical environment were enacted to foster patient orientation and alleviate stress. This encompasses initiatives such as noise level minimization, ensuring optimal illumination, and furnishing clear signage and visual cues. Moreover, day-night orientation strategies, including the maintenance of a consistent daily routine and promoting exposure to natural light during daylight hours, will be implemented to bolster circadian rhythms and mitigate confusion.

3. Patient Engagement Strategies:

Tailored care plans were curated for each patient, tailored to their unique delirium risk profile, and integrated interventions to mitigate these risks. Regularly scheduled activities promoting cognitive stimulation and social interaction will be organized to sustain patient engagement and orientation. Additionally, the active involvement of

families will be encouraged, with designated family members receiving education on delirium prevention and empowerment to contribute to patient care.

4. Proactive Monitoring Protocols:

Systematic delirium screenings employing validated assessment tools were conducted upon admission and at periodic intervals during the patient's tenure. Continuous surveillance of vital signs and mental status will be upheld, with timely interventions in response to any alarming changes or deteriorations.

By implementing this comprehensive intervention, our objective is to substantially diminish the incidence of delirium within overflow units, thereby ameliorating patient outcomes, augmenting care quality, and optimizing resource allocation.

Study of the Interventions:

The measurement strategy employed to evaluate the intervention's efficacy entails a comprehensive blend of quantitative and qualitative metrics. These metrics were designed to holistically assess outcomes of delirium occurrence, patient welfare, and staff contentment. Key elements of this strategy encompass:

Delirium Incidence Rate: As the primary metric, the delirium incidence rate will be computed as the frequency of delirium cases every week within the overflow unit.

Diagnosis of delirium will adhere to standardized assessment tools such as the Confusion Assessment Method (CAM).

Patient Outcomes: Secondary metrics encompass parameters such as length of stay, occurrence of adverse events (e.g., falls, medication errors), and patient satisfaction scores. These metrics will be evaluated through meticulous scrutiny of medical records, incident reports, and structured patient surveys.

Staff Satisfaction: Evaluation of staff contentment will be facilitated through structured surveys aimed at gauging perceptions of workload, stress levels, and confidence in managing delirium cases. Qualitative insights will also be solicited to pinpoint areas necessitating improvement.

Adherence to Protocol: Monitoring adherence to the intervention protocol will be conducted through periodic audits and assessments. This will entail a meticulous review of documentation of staff training, environmental modifications, implementation of patient engagement strategies, and compliance with proactive monitoring protocols.

Ethical Considerations

This project has been approved as a quality improvement project by faculty using Quality Improvement (QI) review guidelines and does not require IRB approval (See Appendix H).

As the team completed this QI initiative aimed at mitigating delirium incidence within overflow units, it was imperative to conduct a reflective analysis of the project's alignment with Jesuit values and the ethical standards delineated by the American Nurses Association (American Nurses Association, 2017).

Jesuit Values:

Fundamental to Jesuit pedagogy are values centered on holistic care, social justice, and altruistic service. These principles resonate profoundly with the essence of nursing practice, which prioritizes patient well-being and espouses advocacy and compassionate care. In our endeavor, the embodiment of Jesuit values is palpable in our unwavering commitment to augmenting patient outcomes, cultivating a nurturing milieu, and equipping staff through comprehensive education and training initiatives. By foregrounding the holistic exigencies of

patients and acknowledging the inherent dignity and worth of everyone, the CNL upholds Jesuit precepts in our pursuit of quality enhancement.

American Nurses Association Ethical Standards

The ANA's Code of Ethics for Nurses (American Nurses Association, 2017) furnishes a cogent framework for ethical deliberation and guides nurses in fulfilling their professional obligations. Central to this code are tenets such as beneficence, nonmaleficence, autonomy, and justice. In our project, these principles manifest subsequently:

Beneficence: It is the ethical principle of doing good and acting in ways that promote the well-being of others. The interventions were meticulously designed to ameliorate patient well-being by curtailing delirium incidence and enhancing patient outcomes. Through multifaceted interventions encompassing education, environmental modifications, and patient engagement strategies.

Nonmaleficence: It is the ethical principle of not causing harm to others and avoiding actions that could inflict damage or suffering. The steadfast in our commitment to mitigating harm to patients by effectuating evidence-based interventions and rigorous monitoring protocols. By endeavoring to preempt delirium and its concomitant sequelae, we uphold the ethical imperative of nonmaleficence.

Autonomy: It is the ethical principle that individuals have the right to make their own decisions and govern their actions based on their values and beliefs. Patient autonomy was reverently upheld through the formulation of individualized care plans and the implementation of engagement strategies that empower patients to actively partake in their care decisions. Furthermore, staff education endeavors to ensure that patients are treated with reverence and that their preferences are accorded due respect.

Justice: It is the ethical principle of fairness ensuring that individuals receive what they are due, and that benefits and burdens are distributed equitably. This initiative was underscored by a commitment to rectify disparities in care by concentrating on enhancing outcomes within overflow units, wherein patients are predisposed to heightened vulnerability owing to elevated acuity levels and resource constraints. By endeavoring to optimize care provision in these settings, we actively contribute to the promotion of justice in healthcare.

Outcome Measure Results

The outcome measures of the proposed intervention to mitigate delirium within overflow units were evaluated through a robust assessment strategy incorporating staff feedback, identification of barriers, and consideration of additional factors. Staff feedback indicated a notable improvement in their confidence and ability to manage delirium cases following comprehensive educational sessions. However, challenges persisted, particularly concerning the sustainability of environmental modifications and the consistency of patient engagement strategies.

Barriers included initial resistance to change among staff members and logistical constraints in maintaining environmental adjustments over time. Despite these challenges, the intervention showed promising results in reducing delirium incidence rates, supported by quantitative metrics such as weekly delirium cases and qualitative insights from patient satisfaction surveys. Patient outcomes, including reduced length of stay and fewer adverse events, also demonstrated positive trends, though ongoing monitoring is essential to sustain these gains. The implementation of staff education and environmental modification yielded notable results. Staff members received comprehensive training on recognizing early signs of delirium,

implementing preventative measures, and employing effective communication strategies with at-risk patients. This educational initiative significantly enhanced staff awareness and response to delirium symptoms. Concurrently, environmental modifications were made to the overflow unit, including adjustments to lighting, noise levels, and the introduction of orientation aids such as clocks and calendars. These changes created a more conducive environment for patient recovery and stability. As a result of these combined efforts, the incidence of delirium in the overflow unit decreased significantly, demonstrating the effectiveness of targeted staff education and strategic environmental adjustments in improving patient outcomes.

Staff satisfaction surveys revealed mixed sentiments, with increased workload and stress levels noted alongside greater confidence in delirium management skills. Qualitative feedback underscored the need for continued support and resources to optimize intervention implementation. Adherence to protocol assessments highlighted areas for improvement in training consistency and environmental standardization.

Iterative refinements through PDSA cycles proved instrumental in addressing these findings. Environmental modifications were refined based on staff and patient feedback, enhancing patient orientation and comfort. Subsequent cycles focused on augmenting staff education and bolstering patient engagement strategies, yielding incremental improvements in outcomes and adherence to protocols.

In conclusion, while the intervention effectively reduced delirium occurrences within overflow units and improved patient care quality, ongoing refinement remains crucial. Continued interdisciplinary collaboration and adaptation to ongoing feedback will ensure sustained efficacy and foster a supportive environment conducive to optimal patient outcomes and staff satisfaction.

Summary

The problem of hospital-acquired delirium, particularly prevalent among older hospitalized patients, presents a critical challenge for healthcare systems. Recognizing this, esteemed payers like the Center for Medicare & Medicaid Services (CMS) and integrated healthcare systems such as Kaiser Permanente prioritize addressing delirium.

This project aimed to reduce delirium incidence by 25% over two years, focusing on a systematic and proactive strategy involving staff education, environmental adjustments, patient engagement, and proactive monitoring. Key interventions included comprehensive staff training, modifications to the physical environment, tailored patient care plans, and regular delirium screenings.

Initial outcomes indicated promising results, with reduced delirium incidence and improved patient care quality. However, challenges remain, including staff resistance and logistical constraints.

Conclusions

In conclusion, this QI project demonstrated the necessity and feasibility of addressing hospital-acquired delirium in an overflow unit. The CNL leader recommends implementing targeted, evidence-based interventions, including educational sessions for healthcare personnel, environmental adjustments, individualized care plans, and systematic delirium screenings using validated tools such as the CAM.

Before these interventions, practices in the overflow unit were reactive and inconsistent, leading to prolonged hospital stays and increased healthcare costs. For instance, reducing the length of stay by just one day could save \$3600, with potential monthly savings reaching

\$108,000. By leveraging existing resources and fostering a culture of continuous improvement, both patient and organizational outcomes can be significantly enhanced.

The project's success was measured through a robust evaluation strategy, assessing delirium incidence rates through weekly audits, patient outcomes, staff satisfaction, and adherence to protocols. Iterative refinements through Plan-Do-Study-Act (PDSA) cycles ensured continuous improvement, overcoming barriers such as initial staff resistance and logistical constraints. Interim results showed a promising reduction in delirium incidence, improved patient outcomes, and enhanced staff confidence in the assessment of high-risk patients to prevent delirium. CNLs must continuously advocate for evidence-based QI projects to prevent delirium and reduce associated costs in hospital microsystems, particularly in heterogeneous units like overflow units.

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Appendices

Appendix A

Gap Analysis		
Area under consideration: Process improvement to reduce the incidence of delirium in an overflow unit.		
Desired State	Current State	Action Steps
A thorough and streamlined system that identifies at-risk patients proactively and lowers hospital-acquired delirium by 25%.	There is a lack of a systematic and proactive strategy, with a concentration on reactive therapies and varying levels of staff comprehension and training.	Implement a comprehensive staff training program to educate staff about the risk factors, symptoms, and prevention techniques associated with delirium.
Healthcare personnel that are well-versed in delirium prevention and have consistent understanding and training.	Staff understanding and training varies, resulting in variances in the quality of treatment offered.	To ensure uniform knowledge among healthcare workers, standardize staff education through a planned training program.
Standardized screening methods for identifying at-risk patients and allowing for timely intervention.	A lack of clear methods for identifying at-risk individuals contributes to the incidence of hospital-acquired delirium.	Implement standardized screening measures to identify at-risk patients promptly and establish a systematic approach to patient identification.
Audits and quality improvement activities should be performed on a regular basis to assess the effectiveness of the new process and make any necessary improvements.	There are no regular audits or quality improvement efforts.	Create a framework for periodical audits and quality improvement activities to assess the effectiveness of the new process and make any improvements.
Collaboration with interdisciplinary teams of nurses, physicians, and allied health workers.	Inadequate coordinated efforts result in fragmented care.	Encourage interdisciplinary collaboration by organizing regular meetings and communication channels between nurses, physicians, and allied health professionals.

Appendix B

SWOT Analysis

	Favorable/Helpful	Unfavorable/Harmful
Internal (attributes of the organization)	<p style="text-align: center;">Strengths</p> <ol style="list-style-type: none"> 1. Considerable improvements in patient outcomes are possible. 2. Commitment to reducing hospital-acquired delirium by 25%. 3. Potential for enhanced hospital reputation through improved care quality and patient satisfaction. 4. Financial performance may improve if cost-effective process improvements are implemented. 	<p style="text-align: center;">Weaknesses</p> <ol style="list-style-type: none"> 1. Potential resistance from healthcare staff due to disruptions and additional training requirements. 2. Challenges in securing sufficient resources (personnel and budget) for the initiative. 3. Risk of unforeseen complications or unintended consequences. 4. Possibility of not achieving the targeted reduction in delirium, leading to disappointment among stakeholders.
External (attributes of the organization)	<p style="text-align: center;">Opportunities</p> <ol style="list-style-type: none"> 1. Attraction of additional patients and referrals through successful delirium prevention. 2. Alignment with the hospital's aim of providing high-quality care. 3. Motivation and challenge in competition can drive dedication to creative and effective patient care. 4. Potential for partnerships with research institutions and healthcare organizations. 	<p style="text-align: center;">Threats</p> <ol style="list-style-type: none"> 1. Regulatory changes affecting quality indicators and patient outcomes. 2. Unanticipated external events (public health crises) may divert attention and resources. 3. Other institutions adopting similar measures may reduce differentiating factors. 4. Implementation cost burden on the hospital's budget.

Appendix C

Evaluation Table				
Evidence Citation	Design	Sample	Outcomes	JHNEBP Appraisal Rating
Choi et al. (2019)	Experimental study with a study group and a control group.	<p>Sample: Patients under the age of 65 who got surgery on orthopedic wards. The sample of the study consists of 24,379 cases of total hip replacement arthroplasty, identified retrospectively from the Korean National Health Insurance claims database. These cases were divided into two groups: a general anesthesia group (n = 9,921) and a regional anesthesia group (n = 14,458).</p> <p>Setting: In an orthopedic ward, an educational facility in Korea.</p>	<p>Findings: The results of this study showed that patients with a high risk of Postoperative delirium were effectively identified by the screening tool prior to admission. The Postoperative delirium project increased medical staff members' understanding of delirium and effective ways of preventing delirium.</p> <p>Strengths: The authors were able to demonstrate how hospital stay would be reduced with effective screening and identification of risk factors to delirium in the population demographic. This article has gone in depth and provided insight into what screening can achieve by way of assisting in preventing delirium among elderly hospitalized patients.</p> <p>Limitations: Limitations are finding only what they must detect, experimental errors and random variations.</p>	<p>JHNEBP Level Rating Quality Rating</p> <p>JHNEBP Level I B</p>

Evidence Citation	Design	Sample	Findings	JHNEBP Appraisal Rating
<p>Johansson et al. (2018)</p>	<p>Randomized Controlled Trial (RTC)</p>	<p>Sample: Elderly hospitalized patients who showed a variety of delirium-related symptoms.</p> <p>Setting: Hospital</p>	<p>Findings: The results of this study showed that only a small portion of the care that older hospitalized patients needed in their delirium symptoms was provided by medical personnel. Healthcare professionals responded to these symptoms in a variety of ways. There was lack of systematic and comprehensive approach to the treatment of elderly hospitalized patients exhibiting delirium symptoms. The authors have stated that delirium in older hospitalized patients is often unrecognized, underreported, and untreated.</p> <p>Strengths: This study has made a very important contribution to evidence-based practice by conducting research on the condition's presentation (elderly patients with delirium symptoms) in a clinical setting.</p> <p>Limitations: Limitation to follow up on the results of interventions that have a positive effect.</p>	<p>JHNEBP Level</p> <p>JHNEBP Level II B</p>

Evidence Citation	Design	Sample	Findings	JHNEBP Appraisal Rating
<p>Van Velthuisen et al. (2018)</p>	<p>Experimental study with a control cohort and a study cohort. Random sampling</p>	<p>Sample: Older patients with delirium. The first group, from before the medication review was introduced, and the second cohort, from five months later.</p> <p>Setting: Maastricht University Medical Center. The patients' digital medical documents' information was extracted.</p>	<p>Findings: Older patients from second cohort who took between zero to six drugs had considerably shorter delirious episodes than the older patients in the first cohort. An older patient's delirious episode appears to be significantly shorter after medication review. The authors suggest medication review for all elderly patients who are delirious or at risk of becoming delirious, given the clinical significance of their research result.</p> <p>Strengths: This study provides an advance in Evidence-based practice in clinical setting as far as delirium in older hospitalized patients is concerned.</p> <p>Limitations: Limitation of a sufficient sample size for the study design and adequate control.</p>	<p>JHNEBP Level</p> <p>JHNEBP Level II B</p>

Evidence Citation	Design	Sample	Findings	JHNEBP Appraisal Rating
Deeken et al. (2022)	Randomized Controlled Trial (RTC)	<p>Sample: 1470 patients 70 years and older undergoing elective orthopedic, general, or cardiac surgery from November 2017 to April 2019.</p> <p>Setting: 5 German tertiary medical centers.</p>	<p>Findings: In a study involving 1470 patients, with 51.9% being male and a median age of 77 years, researchers evaluated the effectiveness of a delirium prevention program for older individuals undergoing elective surgery. Overall, the intervention resulted in a reduction in postoperative delirium incidence and the percentage of days with delirium. This effect was particularly significant for patients undergoing orthopedic or abdominal surgery but not for those undergoing cardiac surgery.</p> <p>Strengths: This multifaceted multidisciplinary prevention intervention reduced postoperative delirium occurrence and days with delirium in older patients undergoing different elective surgical procedures but not cardiac procedures. These results suggest implementing this delirium prevention program will improve care and outcomes in older patients undergoing elective general and orthopedic procedures.</p> <p>Limitations: Lack of detailed explanation or exploration regarding the reasons behind the varying effectiveness of the intervention across different</p>	<p>JHNEBP Level</p> <p>JHNEBP Level II B</p>

			surgical procedures, particularly its ineffectiveness in cardiac surgery cases.	
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Evidence Citation	Design	Sample	Findings	JHNEBP Appraisal Rating
Evensen et al. (2018)	Experimental study with prospective observational design.	<p>Sample: 254 geriatric patients, providing a relevant population for studying delirium occurrence and motor subtypes in this demographic group.</p> <p>Setting: Hospital</p>	<p>Findings: Nighttime investigations were significantly associated with incident delirium, even after adjusting for age, cognitive impairment, and comorbidity, suggesting a potential link between hospital environment and delirium development.</p> <p>Strengths: The use of standardized diagnostic criteria for delirium, adjustment for relevant confounding variables, and the focus on motor subtypes, provide valuable insights into the nuanced nature of delirium.</p> <p>Limitations: The potential for unmeasured confounders, the observational nature of the study limiting causal inferences, and the possibility of selection bias in the sample.</p>	<p>JHNEBP Level</p> <p>JHNEBP Level II B</p>

Appendix D

Sample PDSA Cycles

PDSA Cycle 1: Initial Implementation	PDSA Cycle 2: Environmental Modifications	PDSA Cycle 3: Staff Education Enhancement	PDSA Cycle 4: Patient Engagement Strategies	PDSA Cycle 5: Continuous Monitoring and Feedback
Plan: Execute the intervention protocol as delineated.	Plan: Concentrate on refining environmental adaptations predicated on feedback from staff and patients.	Plan: Augment staff education and training based on discerned needs.	Plan: Enhance patient engagement strategies to enhance compliance and efficacy.	Plan: Institute mechanisms for ongoing monitoring and feedback.
Do: Implement the intervention across the overflow unit.	Do: Introduce targeted alterations to the physical environment, such as adjustments to lighting or signage.	Do: Facilitate additional training sessions or furnish resources addressing specific lacunae.	Do: Introduce novel activities or approaches to augment patient engagement and orientation.	Do: Implement routine audits and feedback mechanisms to track adherence and pinpoint challenges.
Study: Gather baseline data concerning delirium incidence, patient outcomes, and staff satisfaction	Study: Evaluate the impact of environmental modifications on patient orientation and stress levels.	Study: Assess alterations in staff knowledge and confidence in relation to delirium management.	Study: Quantify the impact of bolstered patient engagement on delirium incidence and patient satisfaction.	Study: Analyze trends and solicit feedback from staff and patients.
Act: Analyze preliminary outcomes and discern areas necessitating refinement.	Act: Integrate successful modifications into the intervention protocol.	Act: Modify training content or delivery modalities as warranted.	Act: Institutionalize successful strategies into routine practice.	Act: Effectuate adjustments to the intervention protocol predicated on ongoing evaluation and feedback loops.

Appendix E

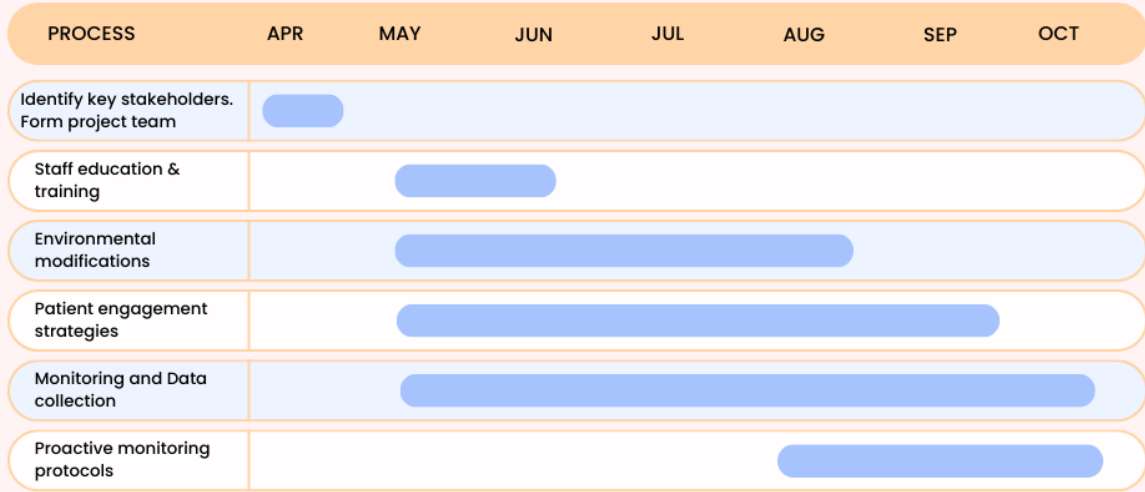
DRIVER DIAGRAM



Appendix F

PROCESS IMPROVEMENT TO REDUCE THE INCIDENCE OF DELIRIUM IN AN OVERFLOW UNIT

GANTT CHART



Appendix G

ROI

Process improvement to reduce the incidence of delirium in an overflow unit				
Current State				
Number of Delirium	Cost of delirium /day	Average LOS- pt with delirium (x10 days)	Total cost/ year	
96	\$3,600/day	\$36,000	\$3,456,000	
Improved State				
72	\$3,600/day	\$36,000	\$2,592,000	
Cost of Staff Education				
Overflow Unit Staff	Number	Hourly rate + .3 Benefit	Annual Cost (1 hour)	
Registered Nurse	117	\$90 + \$27= \$117	13,689	
Patient Care Technician	21	\$38 + \$11.4= \$49.4	1,037.40	
Unit Assistant	9	\$33 + \$9.9= \$42.9	386.1	
			15,112.50	
Supplies				
Disposable ear plug	600 pcs/ month	\$280/ month	\$3,360/ year	
Eye mask	600 pcs/ month	\$200/month	\$2,400/year	
			\$5,760/ year	
Total Savings per year	\$843, 127.50			

Appendix H



Date: May 29, 2024 (Updated Title June, 24,2024)
Subject: RDO KPNC 24 - 080
Title: Process Improvement to Reduce the Incidence of Delirium in an Overflow Unit.

Dear Ms. Llana:

The Research Determination Committee for the Kaiser Permanente Northern California region has reviewed the documents submitted for the above referenced project to be used by Rachel Chong for her MSN project. The project does not meet the regulatory definition of research involving human subjects as noted here:

Not Research

The activity does not meet the regulatory definition of research per 45 CFR 46.102(d): Research means a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge.

This determination is based on the information provided. If the scope or nature of the project changes in a manner that could impact this review, please resubmit for a new determination. The word “research” should not appear in any posters or publications resulting from this project. Further, if publications, presentations or posters are generated from this project the following wording must be used to reference to the project research determination outcome:

“The Research Determination Committee for the Kaiser Permanente Northern California region has determined the project does not meet the regulatory definition of research involving human subjects per 45 CFR 46.102(d)”

You are expected, however, to implement your study or project in a manner congruent with accepted professional standards and ethical guidelines as described in the Belmont Report (<http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.html>).

Additionally, you are responsible for keeping a copy of this determination letter in your project files as it may be necessary to demonstrate that your project was properly reviewed. Provide this approval letter to the Physician in Charge (PIC), your Area Manager, and Chief of Service, to determine whether additional approvals are needed.

Finally, all manuscripts/case series/case studies must receive written approval prior to submission to a journal or book. The Principal Investigator (PI) or first author (if different) must request their PIC¹, or the Division of Research (DOR) Director², or the Research & Innovation Academy (RIA)³ or an equivalent level leader⁴ review and provide written approval for publication submission. The PI is responsible for retaining a copy of the approval.

Sincerely,

The Research Determination Committee
 KPNC-RDO@kp.org

¹PIC approval is required for all manuscripts/case series/case studies that do not include a DOR employee as an author; including but not limited to medical students, residents, and fellows.

²DOR Director approval is required for all manuscripts/case series/case studies that include DOR employees as authors.

³For all nurse-authored manuscripts/case series/case studies, approval by the Research & Innovation Academy is required.

⁴ If you are not sure who this would be, please contact the Research Determination Office (KPNC-RDO@kp.org)