



PATHWAYS4KIDS

Supporting Evidenced Based Practices

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**Nicklaus Children's
Health System**



Improving value for the care of mental health conditions in a pediatric emergency department.



Background: Escalating prevalence of Mental Health Crisis

Objectives: Reduce Low value care on patients requiring admission to psychiatry

Methods: Implementation of a 100-day workout QI project which included development of a clinical pathway

Results

Discussion and future opportunities



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Background

- Prevalence of mental health among children has been increasing overtime.
- It is estimated that 11-20 % of children in USA suffer from a mental health disorder.
- Among children aged 3-17 years, anxiety problems affect 7.1%, behavioral or conduct problems affect 7.4%, and depression affects 3.2%.

1 in 5 children have a mental illness



References:

1- <https://publications.aap.org/pediatrics/article-lookup/doi/10.1542/peds.2025-073172>.

2- <https://pubmed.ncbi.nlm.nih.gov/30322701>.Journal of Pediatrics





Background

- Mental health crisis has led to increased visits to the emergency department.
- According to the National Hospital Ambulatory Medical Care Survey, mental health diagnoses accounted for 15.6% of emergency department visits by adolescents aged 12 to 17 years in 2019, almost double the percentage in 2011 (8.6%).
- There are as many as 7.5 million ED encounters for mental health–related concerns among children in the United States each year.
- Pediatric hospitalizations for mental health diagnoses also increased, rising by 25.8% between 2009 and 2019

References

1- Pediatric mental health hospitalizations at acute care hospitals in the US, 2009–2019. JAMA. 2023;329(12):1000–1011.

PubMed doi: 10.1001/jama.2023.1992

2-National trends in emergency department visits for suicide attempts and intentional self-harm. Am J Psychiatry.

2024;181(8):741–752. PubMed doi: 10.1176/appi.ajp.20230397





Medical Clearance

- Most children with acute mental health concerns do not have underlying medical etiologies that would warrant routine testing.
- The Pediatric Emergency Medicine Choosing Wisely campaign advises against universal routine testing in these patients.





An initiative of the ABIM Foundation

American Academy of Pediatrics –
Section on Emergency Medicine and the
Canadian Association of Emergency Physicians

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Five Things Physicians and Patients Should Question

1

Do not obtain radiographs in children with bronchiolitis, croup, asthma, or first-time wheezing.

Respiratory illnesses are among the most common reasons for pediatric emergency department (ED) visits, with wheezing being a frequently encountered clinical finding. For children presenting with first-time wheezing or with typical findings of asthma, bronchiolitis, or croup, radiographs rarely yield important positive findings and expose patients to radiation, increased cost of care, and prolonged ED length of stay. National and international guidelines emphasize the value of the history and physical examination in making an accurate diagnosis and excluding serious underlying pathology. Radiography performed in the absence of significant findings has been shown to be associated with overuse of antibiotics. Radiographs should not be routinely obtained in these situations unless findings such as significant hypoxia, focal abnormalities, prolonged course of illness, or severe distress are present. If wheezing is occurring without a clear atopic etiology or without upper respiratory tract infection symptoms (eg, rhinorrhea, nasal congestion, and/or fever), appropriate diagnostic imaging should be considered on a case-by-case basis.

2

Do not obtain screening laboratory tests in the medical clearance process of pediatric patients who require inpatient psychiatric admission unless clinically indicated.

The incidence of mental health problems in children has increased in the last two decades, with suicide surpassing homicide as the second leading cause of death in teenagers. Most children with acute mental health issues do not have underlying medical etiologies for these symptoms. A large body of evidence, in both adults and children, has shown that routine laboratory testing without clinical indication is unnecessary and adds to health care costs. Any diagnostic testing should be based on a thorough history and physical examination. Universal requirements for routine testing should be abandoned.





Choosing Wisely

What do the guidelines say?



Do not obtain screening laboratory tests in the medical clearance process of paediatric patients who require inpatient psychiatric admission unless clinically indicated

Routine screening laboratory tests



Not recommended

Undertake investigations based upon



History and Examination

Children with normal vital signs and examination



Do not undertake laboratory investigations





Choosing Wisely

When should we consider laboratory tests?

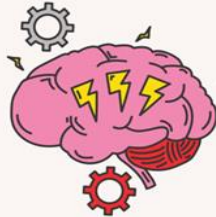


Do not obtain screening laboratory tests in the medical clearance process of paediatric patients who require inpatient psychiatric admission unless clinically indicated

Presumed medical cause of symptoms suspected

Unrelated medical complaint

Severe traumatic injury from self-harm (e.g., laceration, hanging)



Potentially toxic ingestion

Evaluation of sexual abuse



Monitoring of intoxication with alcohol or illicit substances





Variations in Medical Clearance Testing for Mental Health Emergency Department Visits

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BACKGROUND AND OBJECTIVES: There are recommendations against routine medical clearance testing for children evaluated in the emergency department (ED) for mental health concerns. Our objective was to determine variation, factors, and costs associated with medical clearance testing during ED encounters for mental health concerns.

METHODS: We conducted a cross-sectional study of ED encounters among children aged 5 to 18 years who presented to 35 US children's hospitals for mental health concerns (2016–2023). We determined the prevalence of medical clearance testing defined as any electrocardiogram, complete blood count, serum chemistry, urine or serum drug screening, urine pregnancy, urinalysis, COVID-19, or thyroid function testing. We used generalized estimating equations to identify patient and hospital factors associated with medical clearance testing. Costs for medical clearance evaluation were estimated from billed charges.

RESULTS: Among 604 869 ED encounters, 56.9% had at least 1 medical clearance test conducted. Medical clearance testing varied substantially by hospital (range: 33.5% to 85.3% of ED encounters). Compared with encounters resulting in ED discharge, admission to a psychiatric unit at the same facility (aOR, 30.73; 95% CI, 21.73–43.47) and transfer to a psychiatric facility (aOR, 5.64; 95% CI, 4.01–7.92) were associated with greater odds of medical clearance testing. Medical clearance testing cost a total of \$25 187 999 per year across the included hospitals.

CONCLUSIONS: More than half of ED encounters for children with mental health concerns involved medical clearance testing and such practices varied across hospitals. Medical clearance testing in ED encounters for mental health-related concerns resulted in substantial and potentially unnecessary costs.

abstract





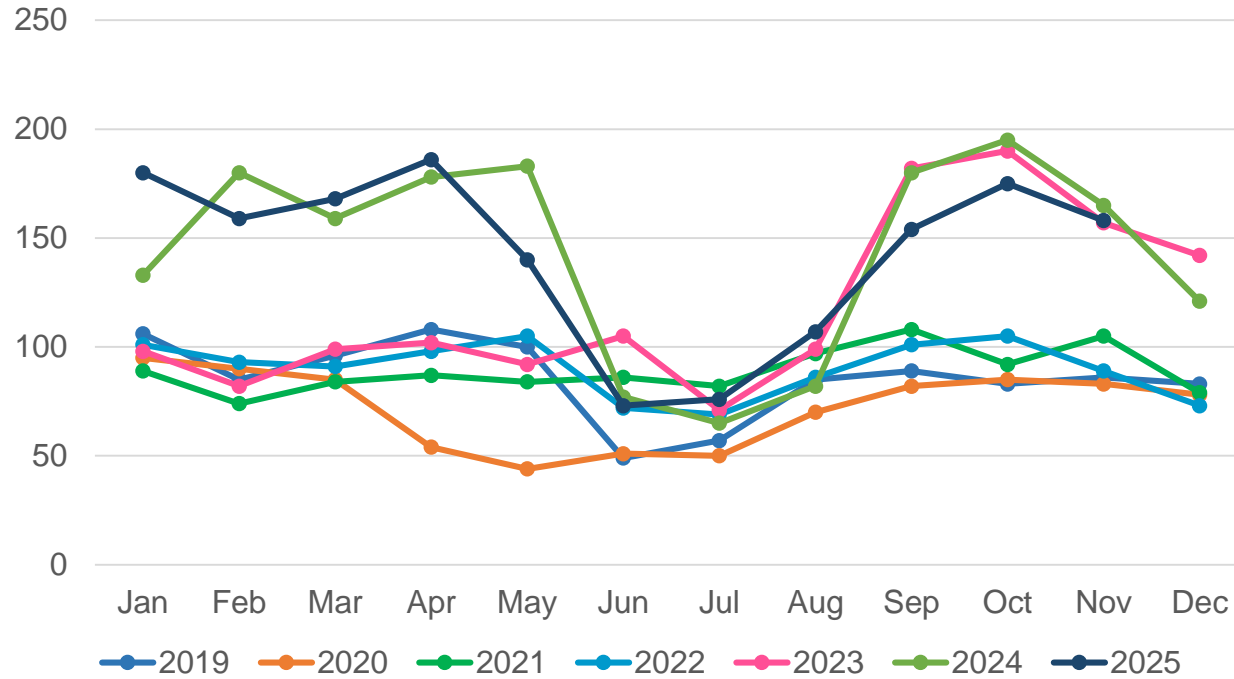
Setting

- Nicklaus Children's Hospital is a large freestanding children's hospital with a dedicated 40-bed inpatient psychiatric unit.
- The ED sees approximately 100,000 patients annually.
- In 2023, a total of 1,419 patients presenting with mental health concerns required admission, which increased in 2024 to 1,718





Inpatient Psychiatry Admissions by Month 2019-2025





100-Day Workout

- In 2022, our health system, looking to address budgetary challenges, partnered with an external consultant, Caldwell Butler. This firm has developed a powerful tool , the “100-Day Workout” that integrates Lean Six Sigma methodology to achieve rapid gains in hospital performance. The workout established a structure based on five characteristics:

Focus: identification and prioritization of process to improve

Speed: in use of data for goal setting and to create department-level action plans

Inter-departmental collaboration: work between departments in the care continuum

Accountability: identify specific leader responsible for actions

Return of investment: bottom line results tracking





Improving value for the care of mental health conditions in a pediatric emergency department.



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- During one of the workouts, a multidisciplinary team including clinician and nursing leaders identified gaps and opportunities to reduce cost and improve care of patients presenting to the emergency department with mental health concerns.
- The team named the workout “Game Changer”



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- Aim: to reduce low value care on patients presenting to the ED requiring admission to the psychiatry unit.
- Primary goal: to decrease the use of routine laboratory tests by 25% within 100 days of implementing a new evidence-based clinical pathway.
- Secondary goal: to quantify the associated financial impact, comparing baseline utilization and costs to post-intervention metrics.
- We used Lean Six Sigma methodology and implemented a new evidence-based pathway and order set.



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Define

- Before our pathway was introduced, 96% of the patients who presented with a mental health chief complaint had routine laboratory tests obtained regardless of their history or physical exam findings to be medically cleared for admission to inpatient psychiatry
- Routine medical clearance testing included CBC, basic metabolic panel, TSH, CPK, EKG, u/a, urine drug screen, and UPT (if indicated)
- Patients who transferred to a psychiatric facility outside of our institution were excluded from this study, as other institutions in the region still require routine laboratory testing for medical clearance.



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100-Day Workout- 5-Why Analyze

5-Why Analysis						
Problem: Children who are healthy and require admission to psychiatry are spending time in the emergency room waiting for unnecessary laboratory screening EKG						
Why 1	Why 2	Why 3	Why 4	Root Cause	Recurrence Prevention	
Because medical clearance laboratories have always been done for these patients	→ Because there is no standard work in place for children who require admission to psychiatry	→ Because there is no established criteria at NCH for inpatient psychiatry admissions	→ Because a group of subject matter experts has not met to discuss which patients require laboratory workup prior to admission to inpatient psychiatry	Lack of standardization	Develop a guideline	
Lack of knowledge of what psychiatry unit needs to admit patient	→ Because each provider may order different tests	→ Because there is a perception that every admission needs laboratory or EKG performed	→ Because there is no standard work in place	Lack of standardization	Develop a guideline	
Because patient may require transfer to another institution	→ Because there is no established order set for patients who require transfer	→ Because each accepting facility has different requirements	→ Because there is no standard work in place	Lack of standardization	Develop a guideline	





Improve

- Under the guidance of the hospital's Clinical Effectiveness Program, a multidisciplinary team developed a standardized medical screening pathway and order set.
- Subject matter experts from psychiatry, hospital medicine, and emergency medicine created a clinical pathway, which was implemented in November 2023.
- The clinical pathway was uploaded to the hospital's intranet for easy access.





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Where Your Child Matters Most

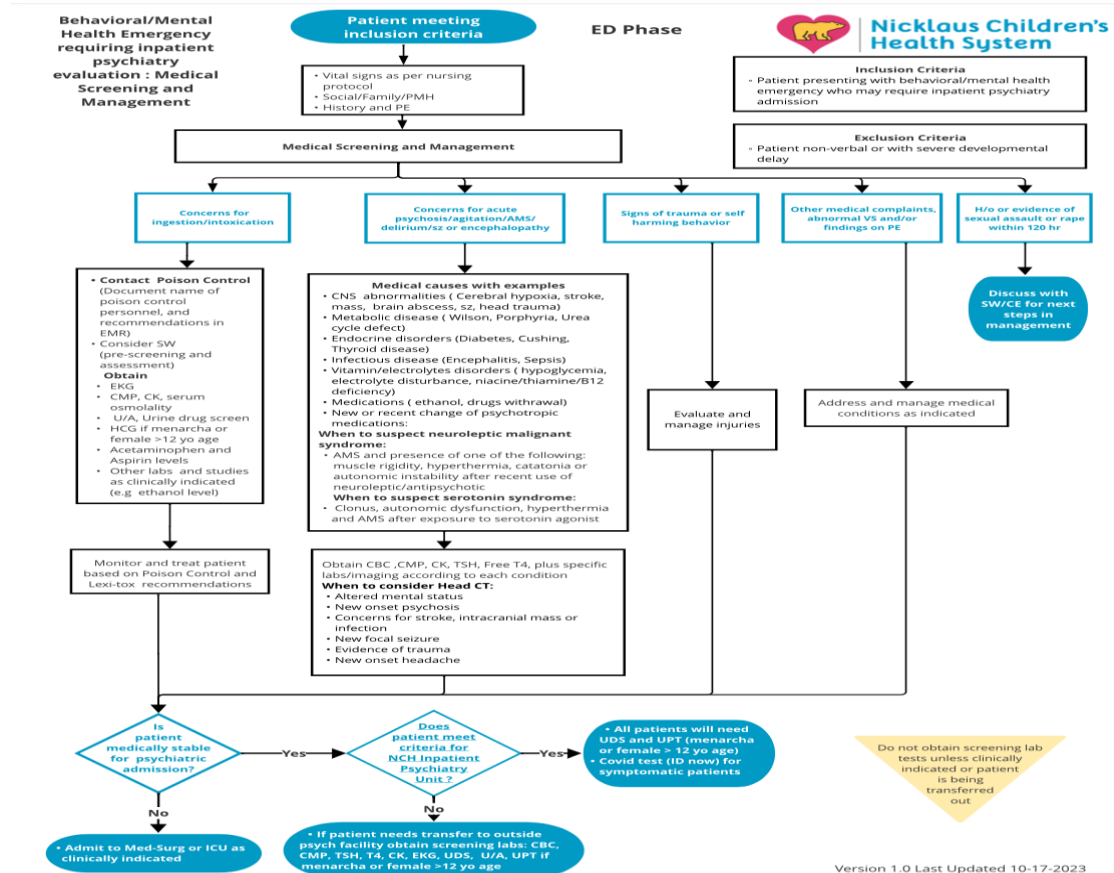
Clinical Effectiveness Program & Clinical Pathways

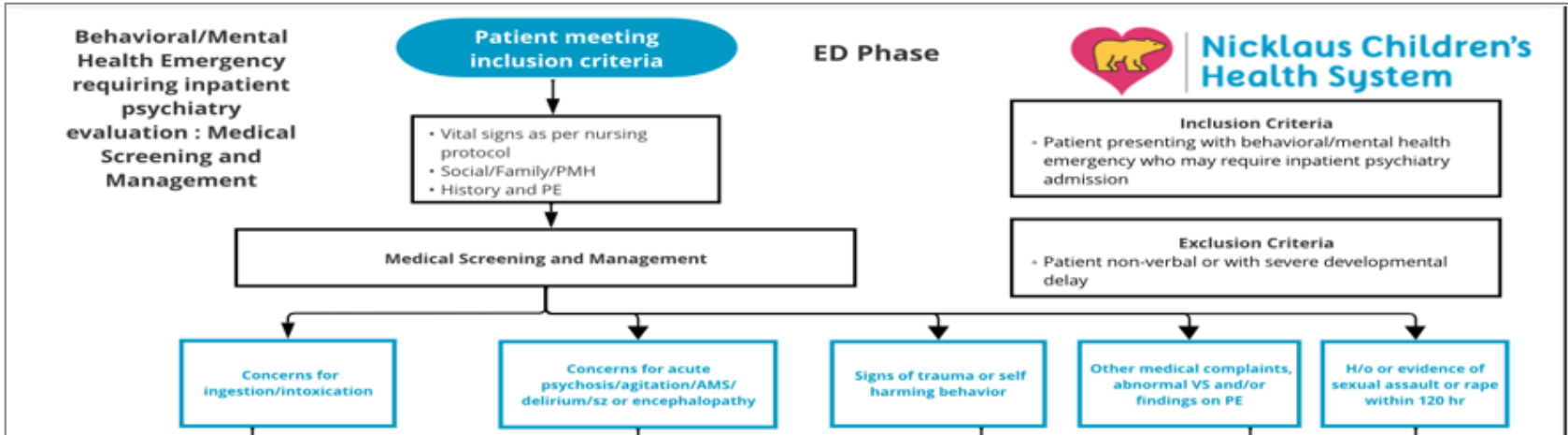


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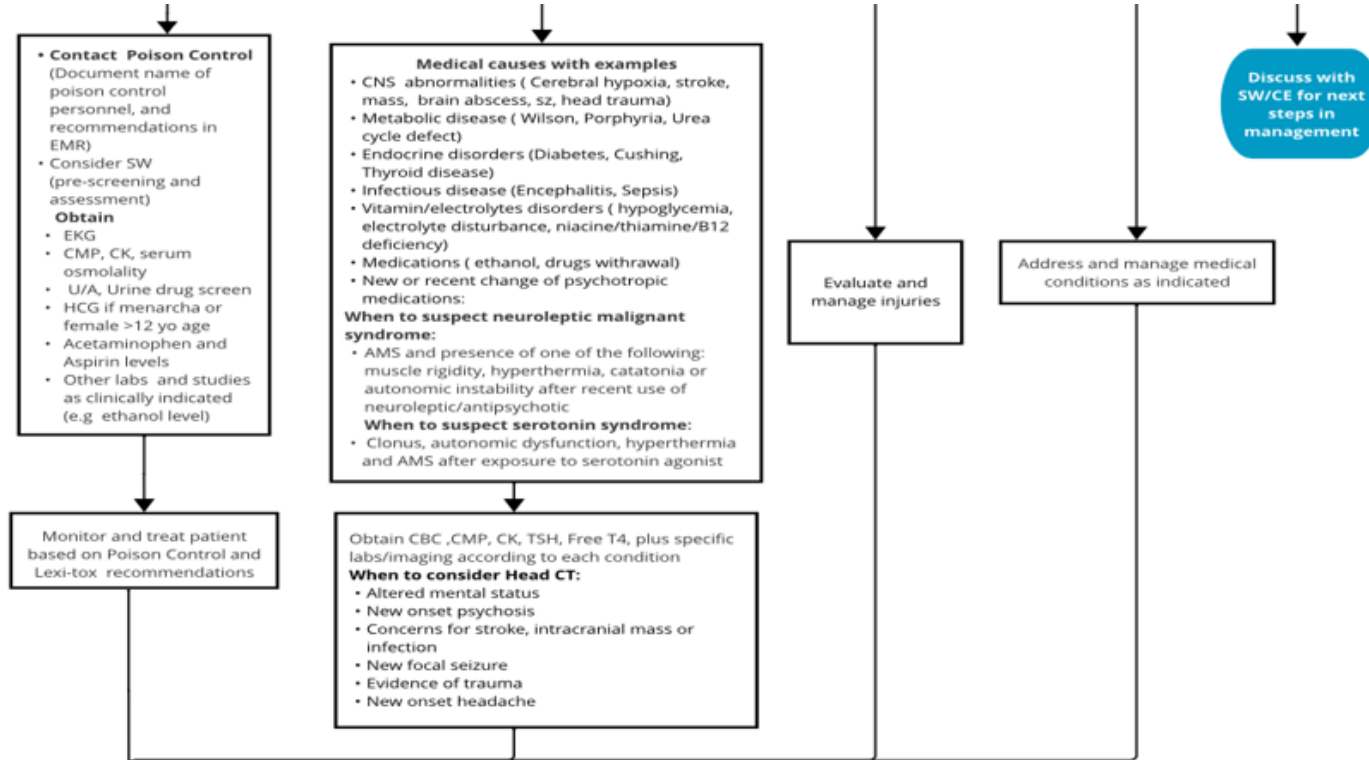
Clinical Pathway



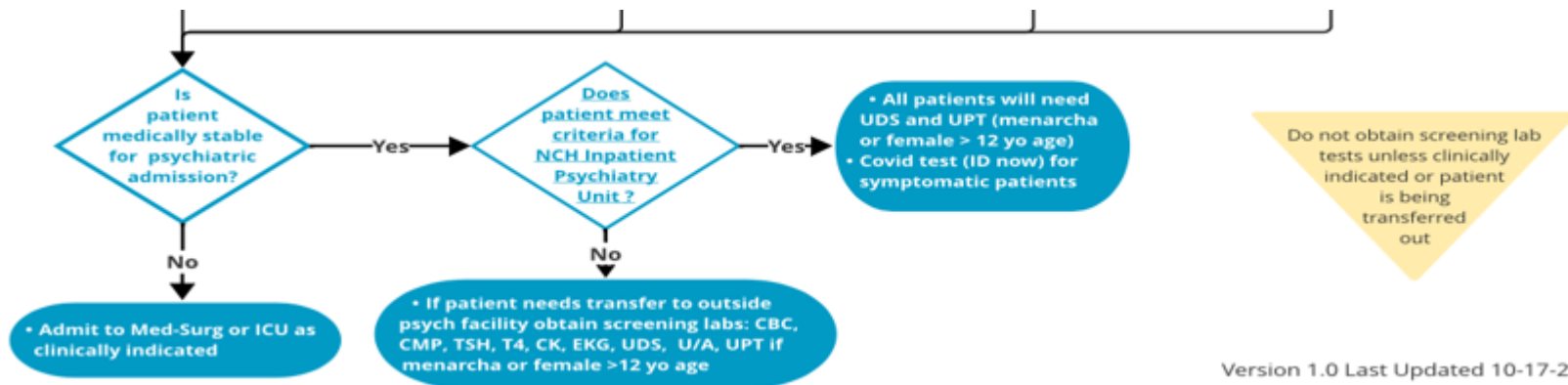




Clinical Pathway



Clinical Pathway



Psychiatry Unit Admission Criteria	
Inclusion	Exclusion
Ages 4-17 years old Suicidal with intent, active plan or recent suicide attempt Able to participate in individual or group therapy Psychiatrist on call contacted and agreed with admission Stable vital signs, afebrile Alert, awake oriented Able to tolerate diet No signs of intoxication No active seizures No respiratory distress Neurological exam at baseline Baseline EKG (if obtained)	18 years old and above Pregnancy Acute medical comorbidities Neurodevelopmental delay and unable to perform activities of daily living Law enforcement involvement Primary diagnosis of substance abuse





Medically Stable Criteria for Psychiatric Admission (all of the following):

- Vital signs stable, including afebrile
- Awake, Alert, Oriented and follows commands
- No signs of intoxication
- Able to eat and tolerate diet – No vomiting
- Neurological exam at baseline including ambulation
- No active seizures
- No respiratory distress
- Physical trauma and/or open wounds treated
- If EKG obtained: at baseline for patient (psychotropic medications may cause abnormalities)
- If LFT obtained : normal or trending down (if inpatient)
- If CK obtained and patient admitted to NCH: asymptomatic, no dehydration, tolerating oral intake, no history of recent (within 72hr) synthetic marijuana use. No evidence of AKI . If CK over 5000 U/L should be trending down before transfer.
- For intoxications/ingestions refer to Lexicomp and Poison Control recommendations





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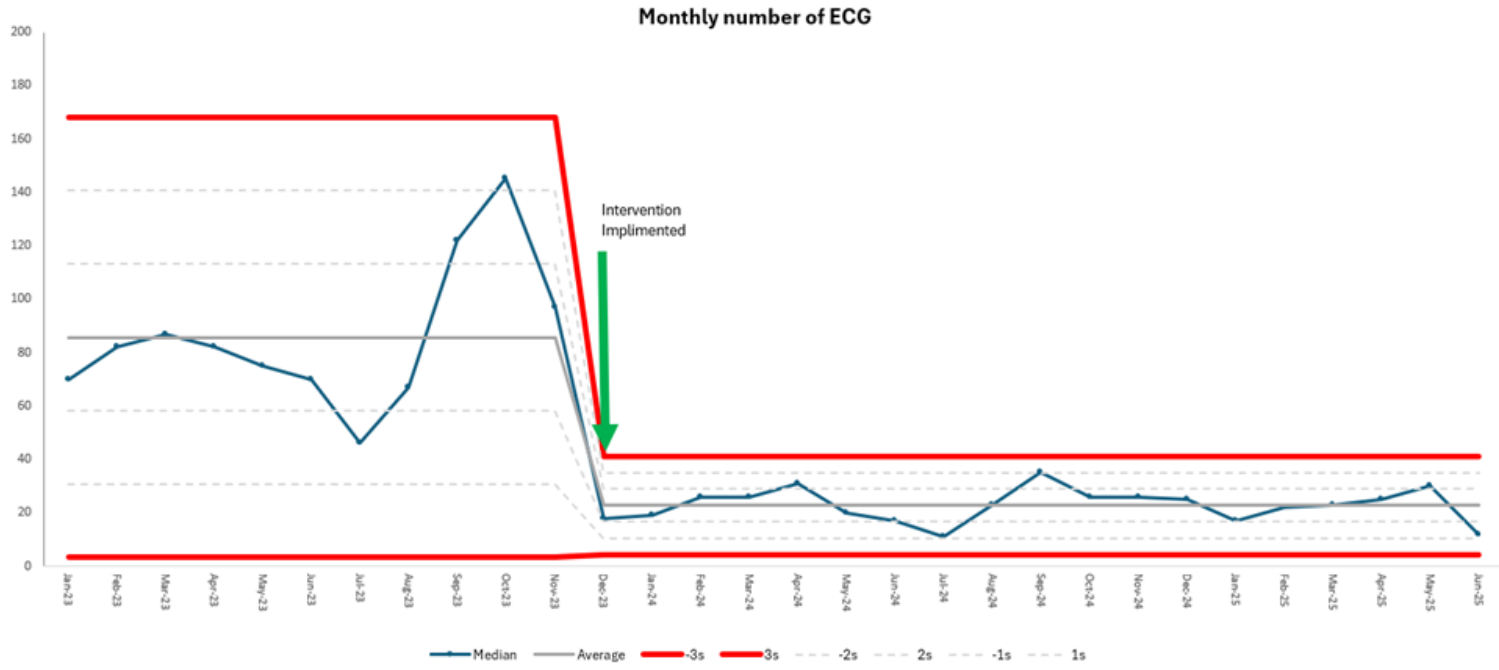
100 day-workout

- A total of 3171 patients met inclusion criteria.
- Pre-intervention period (Jan-Nov 2023): 942 psychiatric, with 96.4% undergoing routine CBC and 95.6% receiving EKG.
- During the post-implementation period (Dec 2023- June 2025), 2,229 patients were admitted to psychiatry.
- Of those patients, 22.9% (n=511) had routine CBC and 18.6% (n=416) had EKG.





Improving value for the care of mental health conditions in a pediatric emergency department. ECG

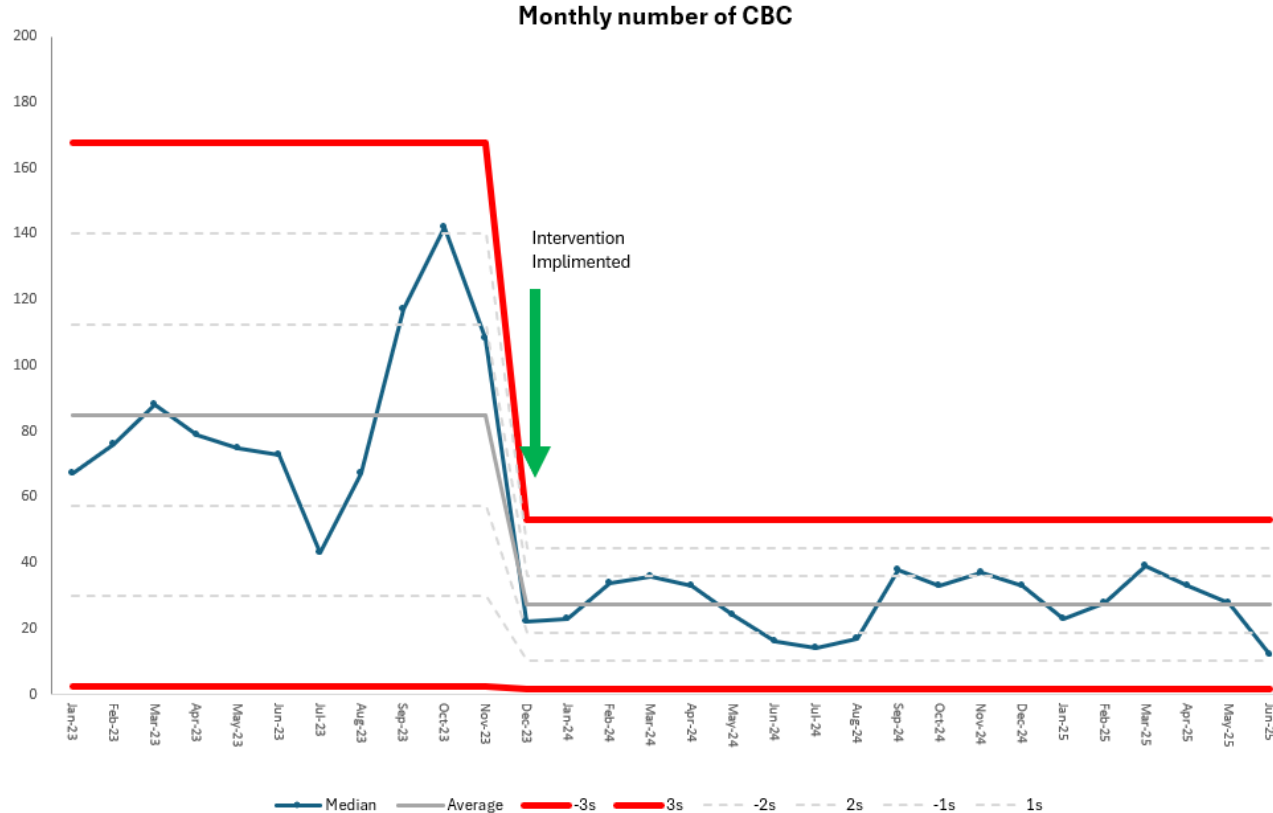




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Results

- Special cause variation (8 or more points below the centerline) was reached in both ECG and CBC charts, followed by a marked decrease in both tests after implementation of the clinical pathway.
- A new centerline was established for both CBC and EKG.
- Results were sustained after the intervention.
- All subsequent data points fall within the control limits and show no further patterns indicative of special cause variation, reflecting a stable and controlled process.





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Results

- The total cost per case associated with admission to psychiatry went down by 11% to \$10,874. Cost of hospitalization per case was \$4,001 in the pre-implementation period and \$3,550 in the post-implementation period.
- No patients were transferred from inpatient psychiatry to a medical-surgical unit in the pre- or post-implementation period.
- During this period, there was no difference in the number of transfers from psychiatry to the medical care units. This served as a balancing measure, suggesting that the intervention did not affect the rate of medical escalation.



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Discussion

- We conducted a quality improvement project “Game Changer”, which employed a novel combination of QI methodologies, highlighted by the design and implementation of a clinical pathway completed within 100 days.
- This initiative improved healthcare value for pediatric patients with mental health conditions admitted to the inpatient psychiatric unit.
- Other psychiatry facilities in the area still require “medical clearance labs”
- The approach could be replicated at other institutions in the region, and future studies may incorporate patient satisfaction.



