Nurse-Driven Electronic Medical Record Based Concussion Screening Improves Identification and Intervention in Pediatric Traumatic Brain Injury - A Quality Improvement Initiative

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Purpose

✓ Build and implement a screening tool within the EMR that would improve capture of symptoms associated with mild TBI in children admitted to the hospital

✓ Improve access to cognitive evaluation and education
Background

• Diagnosis and symptoms of mild TBI
• Concussion symptoms without head injury diagnosis
• Short and long term effects
• Old tool
### The Tool

#### RCHLE Concussion Screen - Physical Symptoms Present
- Headache
- Nausea
- Vomiting
- Fatigue
- Sensitivity to light
- Sensitivity to noise
- Numbness or Tingling
- Not nursing or eating
- Enuresis without other cause
- Balance problems
- Dizziness
- Visual problems
- None

#### RCHLE Concussion Screen - Cognitive Symptoms Present
- Select Multiple Options: (F5)
  - Feeling mentally foggy
  - Feeling slowed down
  - Difficulty concentrating
  - Difficulty remembering or forgetful
  - Appears dazed or stunned
  - Is confused
  - Answers questions slowly
  - Repeats questions
  - None

#### RCHLE Concussion Screen - Emotional Symptoms Present
- Select Multiple Options: (F5)
  - Irritability
  - Sadness
  - More emotional
  - Nervousness
  - Change in behavior or personality
  - High pitched cry
  - None

#### RCHLE Concussion Screen - Sleep
- Select Multiple Options: (F5)
  - Inappropriate drowsiness
  - Sleeping more than usual
  - None

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### PEDIATRIC TBI CHECKLIST

<table>
<thead>
<tr>
<th>RCHLE Concussion Screen - Physical Symptoms Present</th>
<th></th>
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<tbody>
<tr>
<td>RCHLE Concussion Screen - Cognitive Symptoms Present</td>
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<tr>
<td>RCHLE Concussion Screen - Emotional Symptoms Present</td>
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</tr>
<tr>
<td>RCHLE Concussion Screen - Sleep Symptoms Present</td>
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</tbody>
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![Crying baby](image)
Methods

• Multidisciplinary approach
• Current guidelines
• All developmental levels
• Use the EMR
• Nursing
• Education rollout
• PDSA Cycles
Results

Early Protocol Period
Aug 2017-Aug 2018

275 Admitted
114 Screened 42%
25 Evals

Late Protocol Period
Aug 2018-Aug 2019

274 Admitted
248 Screened 91%
58 Evals

P<0.001
### Late protocol period breakdown

<table>
<thead>
<tr>
<th></th>
<th>Positive Screen prompting</th>
<th>Negative or Missing Screen, cognitive evaluation ordered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Injury</td>
<td>25</td>
<td>13</td>
</tr>
<tr>
<td>No Head Injury</td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>

58 Cognitive evaluations

- 39 (67%) Clinic Follow Up
- 19 (33%) No Follow Up

- 28 (72%) Symptoms Resolved
- 11 (28%) Symptoms Persisted
- 11 (100%) Additional Follow Up

Other Results
Limitations

• Tool validation
• Facility limitations
• Developmental considerations
• Handoffs and transfers of care
• Screen fatigue
Conclusions and Recommendations

• Simple protocol for universal screening
• Leverage the EMR
• Capture patients without known head injury
Future

• LOC indicator
• ED discharges
• After visit summary and clinic follow up


