Checklists: Not Just for the Operating Room. Putting Clinical Practice Guidelines to Work

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I have no financial conflicts of interest related to this work.
Hypothesis: We can prevent complications, reduce medical errors and reduce surgical variation by utilizing evidence based clinical pathways, standardized ordersets, patient safety checklists, and attending accountability:

Is it feasible?
Can it be installed into the EMR?
Will it be used?
Does it work?
Can we overcome the barriers?
• An **Evidence Based Clinical Practice Guideline** is developed from a systematic, transparent, and non-biased examination of the highest quality evidence in the peer reviewed published literature.

• Using a rigorous and standardized methodology, and weighing the quality of the evidence, a set of practice recommendations are developed, as well as their “strength”.

• A CPG is a summary of our knowledge base for a particular disease, diagnosis or condition.

• A CPG answers: Does this intervention work?
The AAOS has been developing quality initiatives for more than two decades:

A major disappointment has been the failure of the orthopaedic community to incorporate evidence based guidelines into the fabric of clinical practice to improve the care of their patients.
• **Clinical Pathways** are designed to standardize care processes, reduce variability, and promote patient safety.

• They use the principles of “**process management**”, emphasizing teamwork, while detailing the various steps a patient undergoes during an episode of illness.

• They try to capture “**foreseeable events**” that occur along the pathway of care, and apply practices based on the best evidence for safety and effectiveness.

• **Metrics** are gathered simultaneously.
Why clinical pathways?

Clinical Practice Guidelines tell what **should** be done.

Clinical Pathways tell what is **actually** being done.
Project Scope

• Develop Clinical Pathways for the 2 most common orthopaedic diagnoses at SCH
• Base the Pathway on the AAOS Evidence Based Clinical Practice Guidelines
• Develop Ordersets to standardize work and reduce duplicate orders.
• Develop Patient Safety Checklists
• Incorporate the Checklists into our Clinical Information System (CIS)
• Require attending surgeon attestation.
The framework we used for developing clinical pathways:

Clinical Pathways Roadmap

1. Where is the patient going? *(Patient Flow)*
2. Add the directions. *(Order Sets)*
3. Add the traffic lights *(Safety Check Lists)*
4. Radar to monitor all activity *(Metrics)*
Pathway Development Roadmap

Step 1: Determine Patient Flow

- ED
- OR and PACU
- Floor
- Home
Pathway Development Roadmap

Step 2: Determine the Directions
Pathway Development Roadmap

**Step 3: Determine Safety Check Points**
Pathway Development Roadmap

Step 4: Put It Together
Pathway Development Roadmap
Step 5: Measure (air traffic control)
STEP 1: We developed patient flow diagrams for supracondylar fractures and femur diaphyseal fractures using the AAOS Evidence Based Clinical Practice Guidelines as a foundation.
STEP 2: Standardized Order Sets

• Avoid duplicate and contradictory orders.
• Keep it simple, focusing on “common” orders with option to add specifics orders as needed.
• Applicable to an array of orthopaedic diagnoses.
• Orders arranged in “how residents think” sequence.
**ORDER ACCORDING TO WHERE PATIENT IS GOING**

- Patient going from PACU to FLOOR—Group A and Group B
- Patient going DIRECTLY from ED to OR—Group A ONLY
- Patient going from ED to OR VIA FLOOR—Group A and Holding Orders from Group B
- Patient going from Clinic/ED to FLOOR for Assessment—Group A and Group B
- Patient being Discharged—Group C ONLY

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### **Group A: Diagnosis Ordersets**

- Ortho Fracture Orderset
- Ortho HemOnc. Tumor Orderset
- Ortho Infection Orderset
- Ortho Knee Procedure Orderset
- Ortho Non HemOnc Tumor Orderset
- Ortho Spine Orderset
- Ortho Other Diagnosis Orderset

### **Group B: Admit Ordersets—MUST ALWAYS be used with Group A**

- Ortho Holding Orders for OR Orderset
- Ortho Long Stay No Pain Service Admit Orderset
- Ortho Long Stay with Pain Service Admit Orderset
- Ortho Short Stay No Pain Service Admit Orderset
- Ortho Short Stay with Pain Service Admit Orderset

### **Group C: Discharge Ordersets**

- Ortho Supracondylar Fracture Discharge Orderset
- Ortho Femur Fracture Discharge Orderset
- Ortho Surgery Discharge Orderset
- Ortho Day Surgery Discharge Orderset
<table>
<thead>
<tr>
<th>Component</th>
<th>Orderset</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Order According to Where Patient is Going</strong></td>
<td></td>
</tr>
<tr>
<td>&gt; Patient going from PACU to FLOOR—Group A and Group B</td>
<td></td>
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| **Group A: Diagnosis Ordersets** |
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| Ortho Knee Procedure Orderset |
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| Ortho Supracondylar Fracture Discharge Orderset |
| Ortho Femur Fracture Discharge Orderset |
| Ortho Surgery Discharge Orderset |
| Ortho Day Surgery Discharge Orderset |
STEP 3. Safety/Process Check Lists

• Well established tools for improving process and performance.
• They are known to improve team communication and reduce errors.
• They include process steps where there may not be conclusive evidence.
• They allow for individual variability while at the same time promoting safe and sequential care for the patients.
Supracondylar Humerus Fracture Patient Safety Checklist Pre-Operative

This form to be completed before the patient leaves the ED

Radiographic evaluation includes AP/Lateral views?
- Yes
- No

Examination and documentation of vascular status to include wrist pulses and hand perfusion?
- Yes
- No

Examination and documentation of neurological status to include median nerve (including AIN), ulnar nerve, and radial nerve (including PIN)?
- Yes
- No

Displaced fracture needing surgery?
- Yes
- No

Immobilization of the fracture with elbow flexion not greater than 90 degrees?
- Yes
- No

Reason AP/Lateral views not included
Reason wrist pulses and hand perfusion not included in vascular status examination
Reason median nerve, ulnar nerve and radial nerve not included in neurological status examination
Reason surgery not needed
Reason fracture not immobilized

STOP HERE UNLESS YOU ARE THE ATTENDING

Attestation MUST Be Completed By Attending

I reviewed this patient safety checklist and agree with the information as documented
- Yes
- Yes, except for

Exception comments
Supracondylar Humerus Fracture Patient Safety Checklist Post-Operative

This form to be completed before the patient leaves the OR/PACU

Displaced fractures treated with closed reduction and percutaneous pin fixation using 2-3 lateral pins?
- Yes
- No

Reason fracture not treated with lateral pins

Residual malposition after attempted closed reduction treated with open reduction?
- Yes
- Unnecessary - not malpositioned

Reason fracture not immobilized

Reduction and pinning followed by immediate (intra-operative) reassessment and documentation of vascular status to include radial pulse, hand perfusion, and palpation of forearm compartments?
- Yes
- No

Reason intra-operative reassessment not completed

Immobilization of fracture with elbow flexion not greater than 90 degrees?
- Yes
- No

Reason fracture not immobilized

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I reviewed this patient safety checklist and agree with the information as documented
- Yes
- Yes, except for

Exception comments
Supracondylar Humerus Fracture Patient Safety Checklist Discharge

This form to be completed before the patient is discharged

Examination and documentation of post-operative neurological status to include median nerve (including AIN), ulnar nerve, and radial nerve (including PIN) completed prior to discharge?

☐ Yes  ☐ No

Reason exam and documentation not completed

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I reviewed this patient safety checklist and agree with the information as documented

☐ Yes  ☐ Yes, except for

Exception comments
**Femoral Shaft Fracture Patient Safety Checklist Pre-Operative**

Complete this form before the patient leaves the ED

Radiographic evaluation includes AP/Lateral views of the femur to include both the hip and knee?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

Reason AP/Lateral views not obtained

Assess femur for possible pathological fracture?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

Reason not assessed for pathological fracture

Assess for associated head injury?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

Reason not assessed for associated head injury

Assess for potential evidence of child abuse?  

Required for children 0 months to 36 months of age

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

Reason child not assessed for child abuse

Suspected Child Abuse/Neglect (SCAN) team contacted?  

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

Reason Suspected Child Abuse/Neglect team was not contacted

Infant less than 6 months of age?  

<table>
<thead>
<tr>
<th>Pelvic harness</th>
<th>Early spine cast</th>
<th>Other</th>
</tr>
</thead>
</table>

Document "Other" Details

**STOP HERE UNLESS YOU ARE THE ATTENDING**

Attestation MUST Be Completed By Attending
Femoral Shaft Fracture Patient Safety Checklist Post-Operative

Complete this form before the patient leaves the OR/PACU

Checklist
- Pavlik harness
- Early spica cast
- Other

Document *Other* Details

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- Yes
- Yes, except for

Exception comments
Femoral Shaft Fracture Patient Safety Checklist Post-Operative

Complete this form before the patient leaves the OR/PACU

Checklist
- Flexible Intramedullary Nail
- Rigid Intramedullary Nail: Use only trochanteric entry nailing. Do not use pyniformis or near pyiformis entry
- Sub muscular plate
- Other

Document *Other* Details

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- Yes
- Yes, except for

Exception comments
Femoral Shaft Fracture Patient Safety Checklist Discharge

Complete this form before the patient is discharged

Obtain Hematocrit on post-operative day 2 of hospitalized patients?
- [ ] Yes
- [ ] No
- [ ] Not applicable

Assessment of Spica cast or brace fit. Skin care and cast/brace care instructions provided?
- [ ] Yes
- [ ] No
- [ ] Not applicable

Reason Hematocrit was not obtained

Reason assessment not completed

Durable Medical Equipment Assessment performed?
- [ ] Yes
- [ ] No
- [ ] Not applicable

Reason Durable Medical Assessment was not performed

Parent education provided?
- [ ] Yes
- [ ] No

Reason parent education was not provided

Safe transport home arranged?
- [ ] Yes
- [ ] No

Reason transport home was not arranged

Patient met discharge criteria?
- [ ] Yes
- [ ] No

Reason discharge criteria was not met

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I reviewed this patient safety checklist and agree with the information as documented
- [ ] Yes
- [ ] Yes, except for

Exception comments
STEP 4: Combining checklists, order sets and patient flow

• Formal (airplane) checklists are not easily adapted to medicine.

• Thus to start, we proposed a YES-NO option with a NO check requiring a text box.

• The check list itself, and triggers for resident and attending are embedded in CIS order sets.

• Check list must be completed by resident for patient to be handed off from one locale to another.

• Physician attestation is required.
Attending Attestation

• Attending responsibility is to insure safe, high quality performance by the resident.
• Attending is accountable for quality and safety.
• Check list attestation is one way to these goals.
• The system however, must be simple, easy, and not “slow the flow”.

Key Information

- Measured Wt: 20kg
- Code Status: Full Support
- CASPER: None
- Isolation: None
- Critical Precautions: None
- Other Precautions: None
- Diet: NPO
- Medical Service & Team: General Medicine/Med team 2
- Contact Provider: Not Assigned
- Assigned RN: Not Assigned
- Consults: None
- Clinical Pathways: Asthma, Pyloric Stenosis, Supracondylar Humerus Fracture
- Discharge Criteria: Last update: 07/18/2012 17:02
### CSW Pathway Summary Tool

**(-) Asthma**  
**Current Phase:** Inpt (1 of 1)  
**Progress:** Phase 1c  
**Resp Score:** 3  
- Inpt: ordered 07/18/12

**(-) Pyloric Stenosis**  
**Current Phase:** ED (1 of 4)  
- ED: ordered 07/18/12
- Pre Op: not ordered
- Op Ready: not ordered
- Post Op: not ordered

**(-) Supracondylar Humerus Fracture**  
**Current Phase:** Pre Op (1 of 3)  
- Pre Op: ordered 07/18/12
- Post Op: not ordered
- Discharge: not ordered

- Humerus Fx Pt Safety Check Pre-Op Form
- Humerus Fx Pt Safety Check Post-Op Form
- Humerus Fx Pt Safety Check Disch Form

- Attending Attestation Complete
Supracondylar Humerus Fracture Patient Safety Checklist Pre-Operative

This form to be completed before the patient leaves the ED

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I reviewed this patient safety checklist and agree with the information as documented

☑ Yes ☐ Yes, except for

Exception comments
STEP 5: Add metrics to monitor pathway performance

1. Standard Hospital metrics
2. Specific orthopaedic pathway metrics.
3. Calculate specific performance measures for both residents and attending surgeons.
4. Continuous monitoring and reporting.
5. In-depth analysis of all variations in the patient safety checklists. ("no" responses)
Hypothesis: We can prevent complications, reduce medical errors and reduce surgical variation by utilizing evidence based clinical pathways, standardized ordersets, patient safety checklists, and attending accountability:

Is it feasible? yes
Can it be installed into the EMR? yes
Will it be used?
Does it work?
Can we overcome the barriers?
Supracondylar Humerus Fracture Clinical Pathway

Supracondylar humerus fractures is the most common orthopaedic diagnosis for admission and surgery.

Data pulled from Orthopedic Department Trauma Database
How well are we doing? Depends on what you want to count
(August 2011-February 2012) N = 56

Pathway Compliance

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Patients on pathway</th>
<th>Checklists activated</th>
<th>Checklist attestation</th>
<th>Patients w/ all 3 checklists</th>
<th>Patients with 3 checklists and 3 attestations</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>89</td>
<td>81</td>
<td>71</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>
How are we doing? 9 months of data
August 2011- May 2012  N = 84

- Patients on pathway: 100%
- Checklist activated: 92.8%
- Checklist attestation: 85.8%
- Patients with all 3 checklists: 81.0%
- Patients with 3 checklists and 3 attestations: 62%
Checklists Activated by Residents

- August 2011 - February 2012: 88.0%
- Mar-12: 100.0%
- Apr-12: 100.0%
- May-12: 100.0%

Checklist activation compliance rate
Attending attestation compliance rate

August 2011-February 2012: 78.8%
March 2012 (Mar-12): 91.3%
April 2012 (Apr-12): 92.9%
May 2012 (May-12): 100.0%
Patients with all 3 checklists activated

August 2011 - February 2012

Mar-12: 100.0%
Apr-12: 100.0%
May-12: 100.0%

June 2012: 68.0%

Patients with all checklists activated (rate)
Patients with 3 Checklists Activated and 3 checklists attested

Perfect Compliance Rate
Patients with Femur Fractures: August 2011-May 2012

- Femur fx's detected: 51
- Isolated Femur fx: 35
- Femur fx plus...: 16
How well are we doing? Depends on what you want to count. N=35
Hypothesis: We can prevent complications, reduce medical errors and reduce surgical variation by utilizing evidence based clinical pathways, standardized ordersets, patient safety checklists, and attending accountability:

Is it feasible? yes
Can it be installed into the EMR? yes
Will it be used? A guarded yes.
Does it work?
Can we overcome the barriers?
Analysis of the Checklist Responses

• The checklists have a YES – NO response.
• The NO response requires the completion of a text box.
• We reviewed all the NO boxes to determine:
  Was there clinically important practice variation?
  Were there potential safety missteps?
Supracondylar Fx: Analysis of the “NO” responses

33 patients with activated checklists had 46 “No” responses noted by the residents and/or attendings.

11 of the 46 “No” responses were significant provider practice variances that have the potential to impact patient safety.
Significant “No” responses from the Supracondylar Fracture Checklists:

Process Missteps:
   In ED: splints not taken down to confirm pulse.
   In OR: Failure to confirm radial pulse after reduction and pinning (x2)

Resident Attending Differences:
   Failure to detect neurologic deficits (x3)
   Failure to detect thready radial pulse (near miss)
   Indication for surgery

Surgeon Variation:
   Pin placement
   Open reduction rather than closed
Femur Fracture: Analysis of the “NO” responses

0 of the 53 “No” responses indicated significant provider practice variances
Hypothesis: We can prevent complications, reduce medical errors and reduce surgical variation by utilizing clinical pathways, standardized ordersets, patient safety checklists, and attending accountability:

Is it feasible? Yes
Can it be installed into the EMR? Yes
Will it be used? A guarded yes
Does it work? Yes
Can we overcome the barriers?
We encountered a number of barriers doing this work. The most difficult to overcome was?

A. Lack of hospital financial support
B. Hospital culture
C. Physician culture
D. Resident culture
E. Information EMR Computer Issues
Major barriers to successful implementation

Hospital culture:

• Throughput versus do no harm
Major barriers to successful implementation

**Physician culture:**

- Resistance to change
- Resistance to being measured
- My patients are different
- What’s in it for me? Academic recognition. MOC
Major barriers to successful implementation

Resident culture:

• Residents focus is on throughput
• Residents do not read CIS: Pattern recognition
• Residents do what is important to their attending
Major barriers to successful implementation

Information (EMR) System Issues

• CIS systems developed for billing not safety
• Systems do not talk with each other
• Lack of modern notification tools (Apps)
• Attendings uncomfortable with EMRs
Major barriers to successful implementation

Hospital culture:
• Throughput versus do no harm

Physician culture:
• Resistance to change
• Resistance to being measured
• My patients are different
• What’s in it for me?

Resident culture:
• Residents focus is on throughput
• Residents do not read CIS: Pattern recognition

***Information (EMR) System Issues***
• CIS Systems developed for billing not safety
• Do not talk with each other
• Lack of modern notification tools (Apps)

There was no lack of Hospital financial support
Hypothesis: We can prevent complications, reduce medical errors and reduce surgical variation by utilizing evidence based clinical pathways, standardized ordersets, patient safety checklists, and attending accountability:

Is it feasible? yes
Can it be installed into the EMR?  yes
Will it be used? A guarded yes
Does it work? Yes
Can we overcome the barriers? Hopefully
Our recommendation is to build Evidence Based Clinical Pathways:

To Include:
- Standardized ordersets
- Patient safety checklists at the points of patient hand-off.
- Attending attestation
- Incorporated into CIS
- Easy to monitor metrics

With the goal of:
- Promoting patient safety
- Reducing complications
- Reducing practice variation
- Discovering actionable items for process improvement
- Developing research questions.
- Education