# Choosing Wisely

## Tests & Treatments Providers & Patients Should Question

**Matt Pollard, M.D.**

**Intermountain Healthcare**

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# Healthcare Transformation

What needs to ***transform?***


*Fee for Service*

*Value-based*

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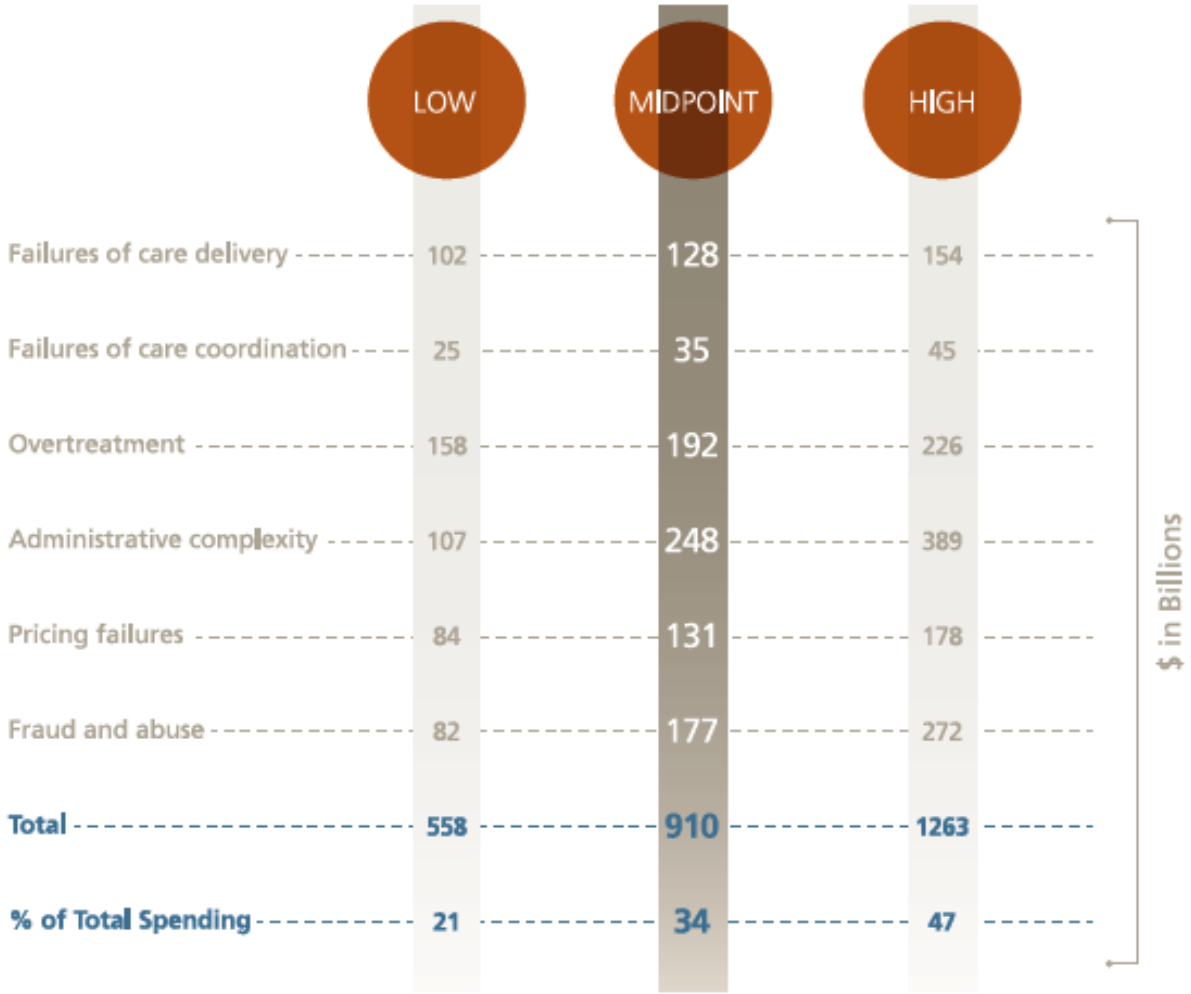
# Annual Cost to US Health Care System in 2011




JAMA. 2012;307(14):1513-1516. doi:10.1001/jama.2012.362

98,000 HIGH

EST. ANNUAL

Preventable

Deaths

IN THE U.S.

44,000 LOW

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Source: Institute of Medicine, To Err Is Human, Nov. 1999

radioviceonline.com

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# *Why physicians?*

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**Power of the PEN!**

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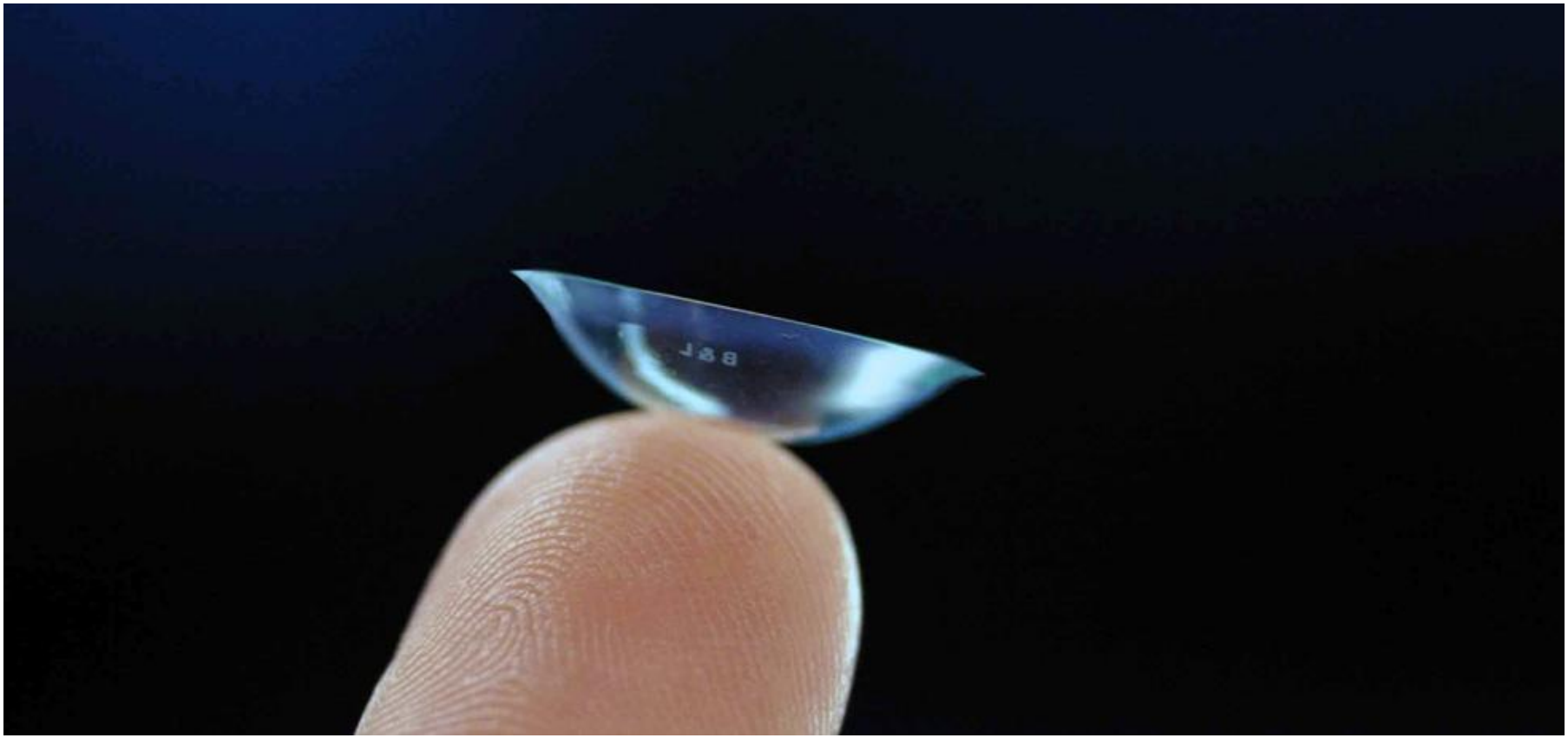

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# Controversy

What looks like

**resistance**

is often

**lack of clarity**.

- Chip & Dan Heath


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# Choosing Wisely

*Choosing Wisely*® aims to promote conversations between providers and patients by helping patients choose care that is:

- Supported by evidence
- Not duplicative of other tests or procedures already received
- Free from harm
- Truly necessary

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# American Academy of Family Physicians

1

## Don't do imaging for low back pain within the first six weeks, unless red flags are present.

Red flags include, but are not limited to, severe or progressive neurological deficits or when serious underlying conditions such as osteomyelitis are suspected. Imaging of the lower spine before six weeks does not improve outcomes, but does increase costs. Low back pain is the fifth most common reason for all physician visits.

2

## Don't routinely prescribe antibiotics for acute mild-to-moderate sinusitis unless symptoms last for seven or more days, or symptoms worsen after initial clinical improvement.

Symptoms must include discolored nasal secretions and facial or dental tenderness when touched. Most sinusitis in the ambulatory setting is due to a viral infection that will resolve on its own. Despite consistent recommendations to the contrary, antibiotics are prescribed in more than 80 percent of outpatient visits for acute sinusitis. Sinusitis accounts for 16 million office visits and $5.8 billion in annual health care costs.

3

## Don't use dual-energy x-ray absorptiometry (DEXA) screening for osteoporosis in women younger than 65 or men younger than 70 with no risk factors.

DEXA is not cost effective in younger, low-risk patients, but is cost effective in older patients.

4

## Don't order annual electrocardiograms (EKGs) or any other cardiac screening for low-risk patients without symptoms.

There is little evidence that detection of coronary artery stenosis in asymptomatic patients at low risk for coronary heart disease improves health outcomes. False-positive tests are likely to lead to harm through unnecessary invasive procedures, over-treatment and misdiagnosis. Potential harms of this routine annual screening exceed the potential benefit.

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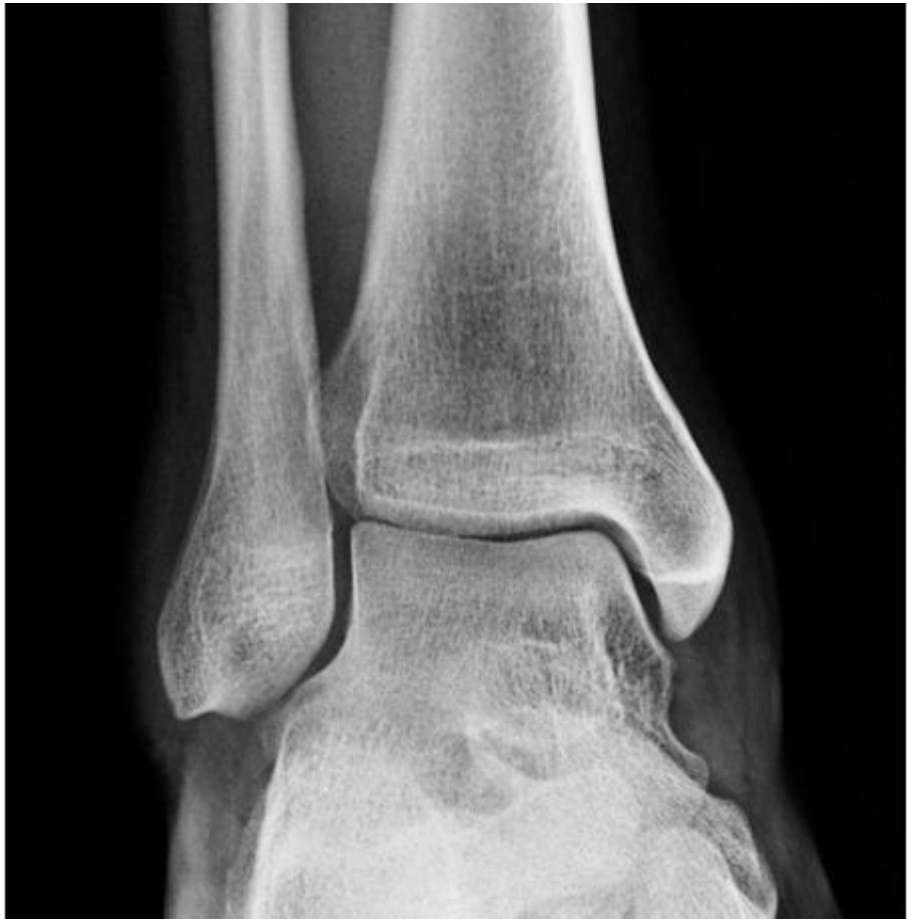

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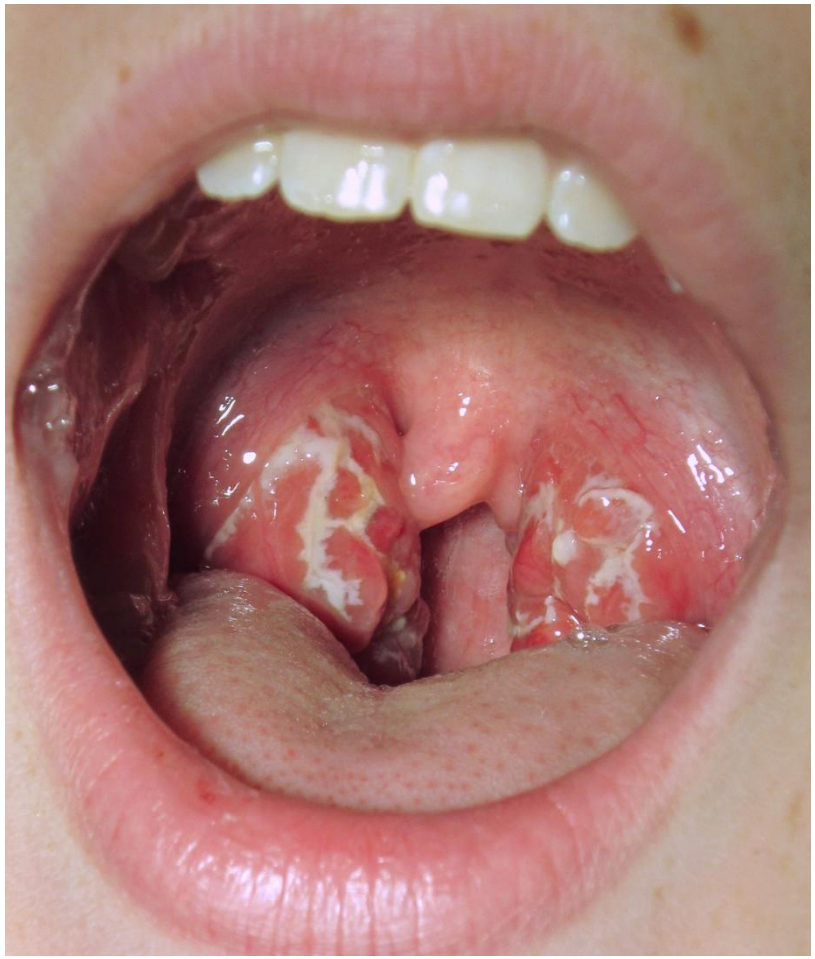

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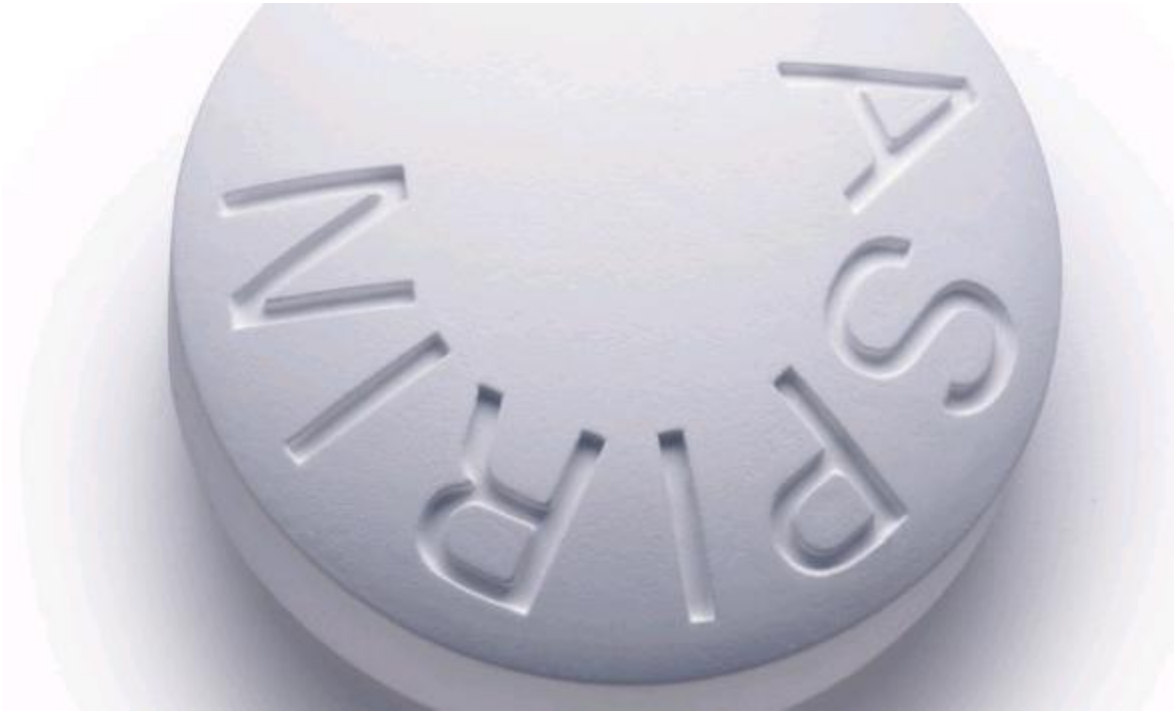


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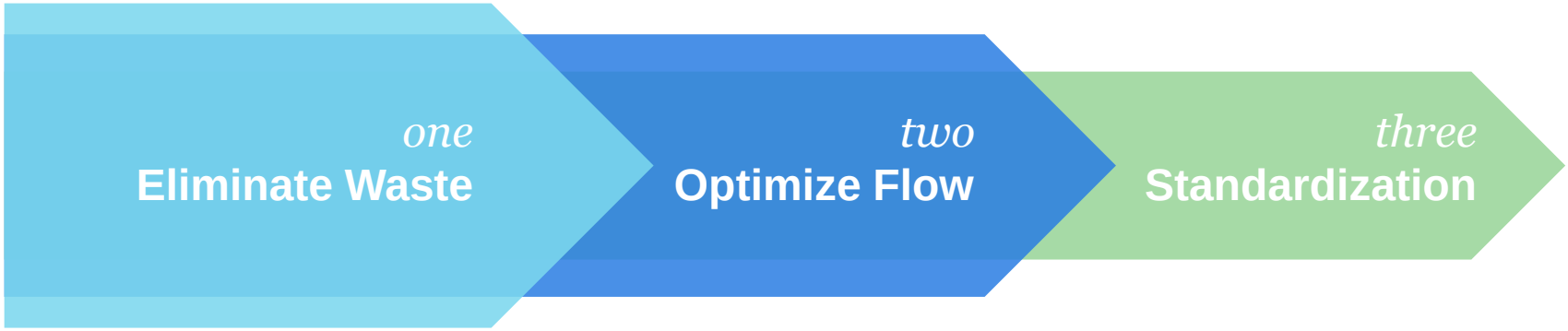
# **CONTINUOUS IMPROVEMENT** FOR PHYSICIANS

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# HOW DOES **CONTINUOUS IMPROVEMENT** APPLY TO PHYSICIANS?

*one*

**Eliminate Waste**

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# Stoplight Improvement | Intermountain Healthcare – Urban North Region

**Improvement:**

**Trigger:**

**Clinical Areas Involved:**

**Owner:**

**Version/Date:** **Date for Review:**

| *Stop! Consider changing from this . . .* | *Go! To this . . .* |
| --- | --- |
| | |

**Visual Cues**

Critical Steps | Safety | Timing | Tip

# Stoplight Improvement | Intermountain Healthcare – Urban North Region

**Improvement:** Cardiac biomarker testing

**Trigger:** Evaluation of any patient with chest pain or anginal equivalent

**Clinical Areas Involved:** ED, Medicine, Cardiology, ICU
**Owner:** Matt Pollard, MD; John Lund, MD
**Version/Date:** 1.0 | 10/2013 **Date for Review:** 10/2014

## *Stop! Consider changing from this . . .*

*"Cardiac markers are used in the diagnosis and risk stratification of patients with chest pain and suspected acute coronary syndrome (ACS). The cardiac troponins, in particular, have become the cardiac markers of choice for patients with ACS. Indeed, cardiac troponin is central to the definition of acute myocardial infarction (MI) in the consensus guidelines from the American College of Cardiology (ACC))."* *(Medscape)*

Because of their increased sensitivity and specificity compared with creatine kinase MB (CK-MB) and other markers, troponins are preferred for the diagnosis of myocardial infarction (MI).

It is difficult today to find any situation in which CK-MB adds anything other than cost to the clinical utility of troponin if that marker is used properly. This is becoming increasingly evident as these cardiac biomarkers have been studied and compared for more than a decade.


We recommend that clinicians no longer use CK and CK-MB when evaluating patients with suspected AMI or ACS.


*References:*

Eggers KM, Oldgren J, Nordenskjöld A, Lindahl B. Diagnostic value of serial measurement of cardiac markers in patients with chest pain: limited value of adding myoglobin to troponin I for exclusion of myocardial infarction. *Am Heart J*. Oct 2004;148(4):574-81.

Macrae AR, Kavsak PA, Lustig V, Bhargava R, Vandersluis R, Palomaki GE, et al. Assessing the requirement for the 6-hour interval between specimens in the American Heart Association Classification of Myocardial Infarction in Epidemiology and Clinical Research Studies. *Clin Chem*. May 2006;52(5):812-8.

Saenger AK, Jaffe AS. Requiem for a heavyweight: the demise of creatine kinase-MB. *Circulation*. Nov 18 2008;118(21):2200-6.

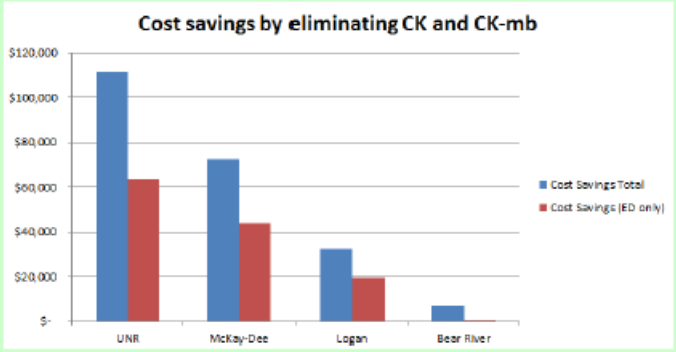

## *Go! To this . . .*

When evaluating patients with chest pain for AMI/ACS, remove CK, CK-MB and other cardiac biomarkers from your orders and use cardiac troponin as the sole biomarker in these patients.

After extensive collaboration with clinicians, several other institutions, including Mayo Clinic, have taken similar actions without any discernible negative effects on clinical care.

In fact, removing CK-MB from the cardiac biomarker panel will not only reduce cost but may also reduce confusion when evaluating these patients.

A very conservative estimate of the annual cost savings per facility are as follows:




*It is recommended that the use of CK be eliminated in those cases only where AMI/ACS are being considered. It remains a useful test when evaluating other clinical conditions such as rhabdomyolysis.*

*Examples of when CK, CK-MB might be helpful:*

- *When evaluating patients where there is a concern for re-infarction since the troponin clearance is longer than that of CK-MB.*
- *Patients who have a marginal troponin that might be explained by a clinical condition other than AMI (PE, myositis, renal failure, etc.).*

**Visual Cues**

Critical Steps | Safety | Timing | Tip

# Stoplight Improvement | Intermountain Healthcare – Urban North Region

**Improvement:** Blood Count Ordering

**Trigger:** Any time a blood count is ordered

**Clinical Areas Involved:** All inpatient/outpatient areas

**Owner:** RJ Bunnell, MD – Lead Hospitalist; Barb Kerwin, MD – ICU Medical Director; Matt Pollard, MD – Continuous Improvement

**Version/Date:** 1.0 5/2014 **Date for Review:** 05/2014

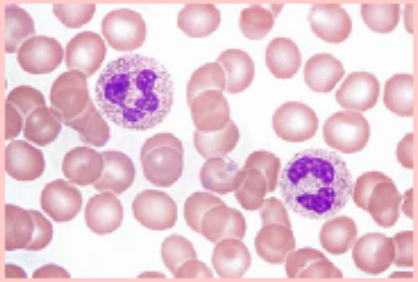
## *Stop! Consider changing from this . . .*

Before ordering a blood count, consider what elements of the panel you really need and if there might be a more cost-conscious test that would give you the same information.


Clinicians might not be aware that other options exist.

Here are a few examples pertaining to the ***blood count***:

- Do you need a WBC differential in all patients?
- When monitoring a patient for blood loss, is the entire CBC needed?
- Is it more cost effective to order a CBC vs. Hgb/Hct vs. Hgb if you really only need to know the patient's hemoglobin level?



## *Go! To this . . .*

Sensible selection of those tests that are most appropriate for our patients is consistent Intermountain Healthcare's vision for *Operational Effectiveness*, *Clinical Excellence* and *Physician Engagement* as well as our values of *Accountability* and *Excellence*. It is also a way that we can contribute to an overall cost savings to the entire healthcare system.

The following table shows the relative unit cost for different cell counts and is provided with the hope that having this knowledge will enable providers to select tests that are both cost-efficient and appropriate for their patients.

| Test | Relative Unit Cost |
|---|---|
| CBC w/ manual diff | 4.2 |
| CBC w/ auto diff | 2.7 |
| CBC without diff | 2.4 |
| Hgb/Hct | 2.1 |
| Hgb | 1.1 |
| Hct | 1.0 |

**Observations and Caveats:**

- Cost savings is not the only consideration when ordering lab tests and should not discourage ordering whatever test is felt appropriate for the individual patient clinical scenario.
- If the results of ordering a test are not going to change your management, consider *not* ordering a test at all.

**Ideas for Future Improvements:**

Provide cost data to providers for multiple lab panels, radiology studies, etc.

**Visual Cues**

Critical Steps | Safety | Timing | Tip

# Stoplight Improvement | Intermountain Healthcare – Urban North Region

**Improvement:** Side effect monitoring of antipsychotic drugs

**Trigger:** Any admission to BHU; routine outpatient monitoring

**Clinical Areas Involved:** Psychiatry, Primary Care
**Owner:** Ben Holt, MD
**Version/Date:** 1.0 | 9/2014 **Date for Review:** 9/2015

## *Stop! Consider changing from this . . .*

Patients taking antipsychotic drugs need scheduled monitoring for side effects of these medications. In particular, the *fasting lipid and fasting blood glucose (FBG) levels* must be watched closely but currently might not be done at regular or recommended intervals.

Furthermore, when patients get admitted to psychiatry, screening laboratories are routinely obtained both for medical clearance and/or ongoing treatment. Most of the time, these labs are medically necessary to provide the best care to the patient. However, there are times when these tests are obtained more out of habit or reflexively and might not be necessary.

Fasting lipid and glucose levels are often obtained on many patients admitted to the psychiatric unit as a routine order, whether or not they are necessary in the ongoing treatment of the patient.


Sensible selection of those tests that are most appropriate for our patients is consistent Intermountain Healthcare's vision for *Operational Effectiveness, Clinical Excellence* and *Physician Engagement* as well as our values of *Accountability* and *Excellence*. It is also a way that we can contribute to an overall cost savings to the entire healthcare system.

In the near future, further recommendations regarding other screening laboratories for patients admitted to psychiatry will be released.

## *Go! To this . . .*

Instead of routinely ordering fasting lipids and FBG when admitting a patient to psychiatry or when following a patient on an outpatient basis, pause to consider whether they are needed. A quick review of the chart and the patient's history will help guide the decision.

**Recommendations:**

- Any patient taking an antipsychotic (at any dose) should have appropriate metabolic screening. Fasting lipid panel and FBG should be obtained when an antipsychotic is initiated and again at 12 weeks into treatment.
- After initial screening, FBG is monitored annually and fasting lipid panel is monitored at least every 5 years or sooner if clinically indicated.
- *There is no need to check these levels when admitting a patient to psychiatry* if the patient is not taking an antipsychotic or they do not have another condition requiring such monitoring.
- More frequent monitoring may be needed for patients who exhibit significant weight gain while taking any antipsychotic.
- Olanzapine, quetiapine, and clozapine all have an elevated risk of insulin resistance. Patients on these medications should have more frequent assessment of fasting lipids and FBG than is typically recommended for other antipsychotics.

The following table from *UpToDate* summarizes the recommended monitoring schedule for patients taking first and second-generation antipsychotics:

| | Baseline | 4 Weeks | 8 Weeks | 12 Weeks | Quarterly | Annually | At least every 5 years |
|---|---|---|---|---|---|---|---|
| Personal or family history | X | | | | | X | |
| Weight (BMI) | X | X | X | X | X | | |
| Waist circumference | X | | | X | | X | |
| Blood Pressure | X | | | X | | X | |
| Fasting plasma glucose | X | | | X | | X | |
| Fasting lipid profile | X | * | | X | | | X |

* For patients taking olanzapine, quetiapine, clozapine.

**Visual Cues**

Critical Steps | Safety | Timing | Tip

# Stoplight Improvement | Intermountain Healthcare – Urban North Region

**Improvement: URI Viral Panel Testing**

**Trigger**: Adult and pediatric patients with symptoms c/w viral respiratory infection

**Clinical Areas Involved**: Any practice environment where viral panel testing is considered (ED, clinics, hospitals, InstaCare, etc.)

**Owner: Matt Pollard, MD – Continuous Improvement**

**Version/Date**: 2 | Oct 2014 **Date for Review**: Oct 2015

## *Stop! Consider changing from this . . .*

Viral upper respiratory infections are among the most common diagnoses during the late fall, winter and early spring months. Many times when evaluating these patients in the outpatient setting the question arises whether or not these patients should have viral panel testing performed. In fact, in many instances, viral panels might routinely be performed whether the results of the testing will have an impact on the treatment plan or not.

Recognizing that there are instances when viral panel testing is appropriate, this *Stoplight Improvement* has the aim of helping the clinician consider when testing might not be needed.

Before testing these patients without further consideration -


## *Go! To this . . .*

As a general rule, <u>if the results of a test are not going to change management, that test might not be needed</u>. In the case of viral panel testing there are instances where the results might not change management but *where testing is recommended* (inpatients, epidemiological purposes, etc.). However, the majority of patients likely do not need testing.

Here are some specific examples and other considerations:

- RSV testing is rarely necessary or helpful in making the diagnosis of bronchiolitis and is no longer a criterion for evaluation and treatment in the Bronchiolitis Clinics at Intermountain.
- **Influenza Considerations**:
  - Testing is not needed for all patients with signs and symptoms of influenza to make antiviral treatment decisions. Once influenza activity has been documented in the community or geographic area, a clinical diagnosis of influenza can be made for outpatients with signs and symptoms consistent with suspected influenza, especially during periods of peak influenza activity in the community. (credit: CDC.gov)
  - If the patient has had symptoms for more than 3 days, any prescribed antiviral will have minimal (if any) effect and testing might not be indicated.
  - False negative rapid flu results are common (false negatives are *not* common with PCR testing). If you are going to treat the patient regardless of the result perhaps you should reconsider.
  - <u>*Caveat*</u>: Testing in the right circumstances can be important (institutions, schools, outbreaks, etc.).
- RFAPCR testing is very expensive and should likely be reserved for select cases and inpatients (<u>it *is* recommended for many inpatients</u>).
- **In the febrile infant < 3 months old viral panel testing SHOULD be done.**

The Laboratory Services Test Ordering Quick Guide for Respiratory Infectious Diseases is available and provides other useful information – including approximate costs per test – approximate turn-around times, etc.

**Visual Cues**: Critical Steps | Safety | Timing | Tip

## Stoplight Improvement | Intermountain Healthcare – Urban North Region

**Improvement**: Blood Count Ordering

**Trigger**: Any time a blood count is ordered

**Idea**: Todd Miller, MD – Bear River

**Clinical Areas Involved**: All inpatient/outpatient areas

**Owner**: RJ Bunnell, MD – Lead Hospitalist; Barb Kerwin, MD – ICU Medical Director; Matt Pollard, MD – Continuous Improvement

**Version/Date**: 1.0 5/2014 **Date for Review**:

*Stop! Consider changing from this . . .*

*Go! To this . . .*

Visual Cues: Critical Steps | Safety | Timing | Tip

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## Stoplight Improvement | Intermountain Healthcare – Urban North Region

**Improvement**: Side effect monitoring of antipsych

**Trigger**: Primary Care

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## Stoplight Improvement | Inte

**Improvement**: URI Viral Panel Testing

**Trigger**: Adult and pediatric patients with symptoms c/w viral respiratory infection

*Stop! Consider changing from this . . .*

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## Stoplight Improvement | Inte

**Improvement**: Prealbumin & CRP Ordering

**Trigger**: Any time nutritional status being co

*Stop! Consider changing from this . . .*

**Prealbumin and CRP** levels are used commonly to evaluate a patien nutritional status. Through an analysis of ordering patterns through Intermountain, it was discovered that McKay-Dee hospital had the frequency of these tests requested and the majority of these were the ICU. In an effort to try and understand this data, it was revealed was an established set of standing orders in the ICU calling for thes ordered twice-weekly – regardless of the patient's length-of-stay, status or other condition.


Visual Cues: Critical Steps | Safety | Timing | Tip

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## Stoplight Improvement | Intermountain Healthcare – Urban North Region

**Improvement**: Trauma I CBC Ordering

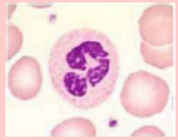
**Trigger**: Any Level I Trauma

**Clinical Areas Involved**: Trauma Service, ED

**Owner/Idea**: Lovenia Stam, NP

**Version/Date**: 1.0 8/2014 **Date for Review**: 8/2015

*Stop! Consider changing from this . . .*



Routine ordering of a white blood cell count differential adds little value to a trauma victim's initial evaluation due to WBC demargination and an anticipated transient increase in the overall white blood cell count.


*Go! To this . . .*

Much like the removal of amylase from the Level I Trauma lab panel, the WBC count differential is now removed from the trauma panel.

If a patient's clinical condition changes or warrants further evaluation, a differential will be obtained later in the patient's care.

It is anticipated that this change will make a marginal difference with regards to cost savings but still represents our commitment to Operational Effectiveness and Continuous Improvement.


Visual Cues: ★ Critical Steps | ✚ Safety | ⧗ Timing | ➤ Tip

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# HOW DOES **CONTINUOUS IMPROVEMENT** APPLY TO PHYSICIANS?

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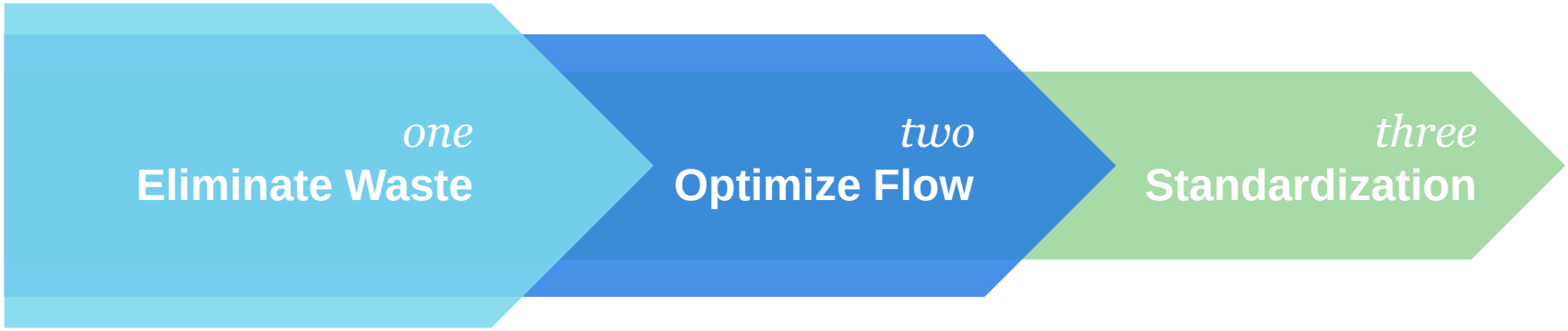


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WHERE THERE IS

**NO [STANDARD],**

THERE CAN BE

**NO IMPROVEMENT**

- Taichi Ohno -

*"It is more important that you do it the same than that you do it "right."*

*- Dr. Brent James*

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# STANDARDIZATION


| Doctors | | Approach | | Problems |
|---|---|---|---|---|
| **10** | **→** | **10** | **=** | **10** |
| **10** | **→** | **1** | **=** | **1** |

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think

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ASSESSMENT AND MANAGEMENT OF

# Pediatric Community-Acquired Pneumonia (CAP)

*patients age 3 months and older without bronchiolitis*

This care process model (CPM) is produced by Intermountain Healthcare's Pediatric Infectious Disease Team, a subgroup of the Pediatric Speciality Clinical Program. The CPM summarizes evaluation and treatment recommendations for **community-acquired pneumonia (CAP) in previously healthy children without chronic health conditions age 3 months and older.** Recommendations are based on recent studies in peer-reviewed medical literature, local susceptibility data and practice patterns, and recent consensus guidelines from the Infectious Disease Society of America (IDSA) and the British Thoracic Society Standards of Care Committee (BTS).[1,2]

Note that this model **does not provide guidance for treating children with bronchiolitis;** refer instead to Intermountain protocols available on the Bronchiolitis clinical topic page. Also note that this model **does not apply to healthcare-associated pneumonia (HCAP) or to complicated pneumonia** requiring care in the ICU or interventions for effusion.

## WHY FOCUS ON PEDIATRIC PNEUMONIA?

- **Pneumonia remains common, serious, and costly.** Pneumonia is the leading cause of death in children worldwide. Each year, more than 2 million children younger than 5 years die from pneumonia, representing approximately 20% of all deaths in children within this age group.[1] Within Intermountain Healthcare, pneumonia is the fourth most common reason for a pediatric admission and is the pediatric condition with the fourth highest cost.[3]
- **Well designed and implemented guidelines have decreased morbidity and mortality for adults with CAP.**[1] For the management of pediatric CAP, retrospective studies support the safety and efficacy of the recommendations in the IDSA and BTS guidelines; adapting these to our Intermountain system local practice can guide outpatient and inpatient care and drive better outcomes.[4]
- **We have an opportunity to improve care and reduce variability in several areas of practice.** Analysis of Intermountain practice patterns reveals several areas where we can standardize care around evidence-based guidelines:
  - Use of pulse oximetry to support diagnosis and guide site-of-care decisions
  - Use of immunization screening and viral testing to guide treatment decisions
  - Appropriate use of chest x-rays for diagnosis and follow-up
  - Blood culture testing at admission and prior to antibiotic therapy
  - Selection and administration of anti-infective agents used in outpatient and inpatient care
  - Discharge criteria for inpatients

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*The inside pages of this tool provide an algorithm and can be folded open and posted in your office or clinic. The back page provides a discussion of recommendations and information about resources and references.*

## KEY RECOMMENDATIONS IN THIS CPM

- Use **pulse oximetry** and clinical assessments of respiratory distress to make site-of-care determinations
- Assess **immunization status** of all patients
- For outpatients, **do not** routinely order chest x-rays; **do not** automatically prescribe anti-infective therapy
- Perform **viral testing** — always for inpatients, as needed for outpatients
- Obtain **blood cultures** on all admitted patients before starting anti-infective therapy; do not routinely perform cultures in fully immunized children well enough for outpatient care
- When antibiotic therapy is indicated, begin with **amoxicillin or ampicillin** (and when IV ampicillin is used, convert early to oral medication)
- Provide **influenza antiviral therapy** for all children hospitalized with flu

## GOAL

To support our overall goal of improving clinical outcomes and appropriate use of resources, in 2013 we will begin measuring in select Intermountain facilities the percentage of **children admitted to the hospital** with uncomplicated CAP and given antibiotics **who receive amoxicillin** or **ampicillin**. **Our goal: 55% or better.**

# Management of Asthma

## 2012 Update

This care process model (CPM) was created by the Intermountain Healthcare's **Primary Care** and **Pediatric Specialty Clinical Programs.** It summarizes clinical literature and provides expert advice regarding the diagnosis and management of asthma in pediatric and adult patients. This update builds on previous versions of Intermountain's CPM as well as on the *Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma* (EPR-3), a 2007 publication of the National Heart, Lung, and Blood Institute (NHLBI).[1]

## What's new IN THIS UPDATE?

Intermountain's model remains closely aligned with the 2007 EPR-3 guidelines. This 2012 update includes **updated information on testing** (exhaled nitric oxide and pulmonary function testing) **and medication** (formulations, dosages, prices) and highlights **patient and provider tools** recently developed at Intermountain to support this standard of care.

## What's happening AT INTERMOUNTAIN?

Recent observations, results, and initiatives include the following:

- **Continued evidence for and focus on the use of daily controller medication.** Over the past two years, outcomes for asthma patients served by Intermountain continue to show a tight correlation between improved controller use and decrease in emergency room utilization.
- **Measuring our management — and our patients' outcomes.** We currently track controller use, beta-agonist use, inpatient admissions and emergency room visits for asthma, and education and discharge processes following pediatric inpatient admissions. Results of note are:
  - **Controller use:** We track the number of patients who filled controller prescriptions (without looking at how often they refilled their prescriptions). Using this approach, we are about 75% nationally on controller use. However, if we look at the number of patients who fill controllers consistently, we see much room for improvement. To address this, we plan a new measure (see next section of this discussion, below).

## WHAT'S INSIDE



## GOALS

This CPM is part of a comprehensive care management system for asthma; its overall goal is to help providers deliver the best clinical care in a consistent and integrated

# clinical standard work pathway

# CSW Pathway: Skin & Soft Tissue Infections v.1.0

## ALGORITHM: SSTI




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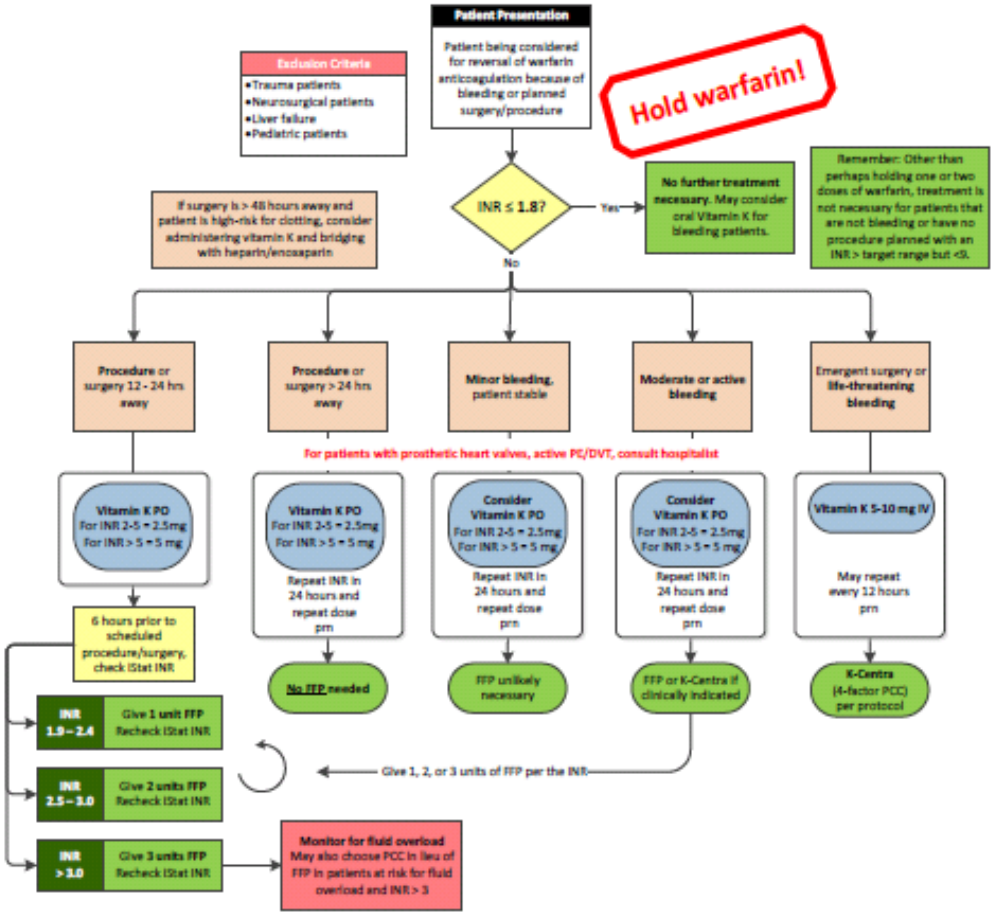
# UNR Clinical Standard Work Pathway: Adult Diabetic Ketoacidosis(DKA) and Hyperosmolar Hyperglycemic State (HHS), V. 1.0

| | ED | IMC/ICU | Medicine/Transition to D/C |
|---|---|---|---|
| Assessment | Initial Laboratory Studies:<br>• BMP (or iStat-8), CBCA, UA (if appropriate).<br>• Consider ABG if bicarb < 15<br>• If WBC > 25,000 consider BCx x2, UCx<br>Consider UA for symptomatic patients or those with mental status changes. | Additional Studies:<br>• Serum ketones if urine ketones present and if needed<br>• Check fingerstick glucose hourly<br>• Serum osmolality if felt appropriate<br>• Consider magnesium and phosphate prn<br>Corrected Na = Measured Na + 0.016(glucose - 100) | Criteria for resolution of ketoacidosis include a blood glucose less than 200 mg/dl and two of the following:<br>• Serum bicarbonate ≥ 15 mEq/l<br>• Venous pH > 7.3<br>• Calculated AGAP ≤ 12 mEq/l |
| IV Fluid | Place 2 IVs<br>NS one liter bolus<br>For severe hypovolemia may repeat bolus and reevaluate. | **If initial pH is < 6.9:**<br>• Start sterile water with 100 mEq $NaHCO_3$ and KCL 20 mEq at 250 cc/hr<br>• Recheck ABG in 2 hrs and continue IV bicarb until pH > 6.9<br>! If not severely acidotic or hypovolemic<br>**Base Maintenance IV fluid (if not severely acidotic/ hypovolemic:**<br>• If *corrected* $Na^+$ < 137 then 0.9% saline @ 250 cc/hr<br>• If *corrected* $Na^+$ > 137 then 0.45% saline @ 250 cc/hr<br>If glucose < 200 mg/dL for DKA or < 300 for HHS, change the base IV fluid to D5 0.45 NS at 250 cc/hr *regardless of serum sodium*. | |
| Insulin | **Initial IV Bolus**: 0.1 units/kg<br>**Infusion**: 0.1 units/kg/hr<br>Hold all insulin if K < 3.3 mEq/L<br>Supplemental bolus: If serum glucose does not decrease by 10% in 1st hour, give additional 0.1 units/kg bolus and continue drip. | Transition to "computerized" IV insulin protocol:<br>• DKA: Once glucose < 200 mg/dL<br>• HHS: Once glucose < 300 mg/dL, decrease insulin gtt to 0.02 to 0.05 units/kg to maintain glucose between 200 to 300 until patient is mentally alert. Once alert, start "computerized" protocol. | To transfer from IV to SC insulin:<br>• Initiate SC multi-dose insulin regimen<br>• Continue IV insulin regimen for 1-2 hours after SC insulin begun to ensure adequate plasma insulin levels<br>For insulin naive patients, start SC insulin at 0.5 U/kg - 0.8 U/kg per body weight per day and ajdust prn. |
| Potassium Repletion | **If initial serum potassium < 3.3 mEq/L:**<br>• Hold IV insulin<br>• Give KCl 20 mEq over 1 hr (centrally) or 2 hours (peripherally).<br>• Recheck $K^+$ when repletion complete.<br>• Continue until serum $K^+$ > 3.3<br>! Remember to start insulin after K > 3.3 | Check serum potassium every 2 to 4 hours<br>For $K^+$ 3.3 to 5.2 mEq/L: add 20 mEq KCl to every 1L base IVF<br>If serum $K^+$ > 5.2 mEq/L, give base IVF alone | |

# CSWP: Adult Inpatient Warfarin Reversal v.1.0

## Algorithm for Inpatient Reversal of Warfarin Anticoagulation



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## CSWP: Adult Sepsis v.1.0

### INTRODUCTION:

Sepsis is a serious med
response to bloodstrea
leading cause of morta
evidence-based treatn
bundle are critical to b
successfully implemen
Medicine Clinical Progr
***from 4.4% to 77% and***
***2010.***

With the re-emphasis
2014 and the need for
introduced as a propos
at each of the hospital
Intermountain Healthc

### INCLUSION CRITERI

- Any *adult* pa
admitted to

### EXCLUSION CRITER

- Patients ent
to predefine

### KEY POINTS:

- Documents
Bundle Chec
patients alre
- Success in th
- The intent o

### REFERENCES:

Data and references fc

## CSW Pathway: Low Back Pain v. 1.1

### INTRODUCTION:

Low back pain (LBP) is a
75% of adults at some p
that is responsible for sig
expenditures within the

Two Care Process Model
Restoration/Chronic Pair
Healthcare's Pain Manag
and emergency departm
**framework by which the**
**of providers, clinics and**
**area**.

Rapid referrals to our ph
most cases) will enable e
patients and appropriate

### INCLUSION CRITERIA:

- Adult patients w
- Patient is not un
clinic or with an

### EXCLUSION CRITERIA:

- Pediatric patient
apply)
- Patients currentl

### KEY POINTS: (including so

- In most cases, im
interventions. W
- For most LBP, co
- A nonsurgical spe
- Careful attention

### REFERENCES:

Intermountain CPM's: Prim

(both available on inter

Keele University: STarT Back

## CSW Pathway: Adult First Seizure Evaluation

### INTRODUCTION:

This pathway addresses th
the acute care setting with
there has been some varia
generalized convulsions.

Various clinical conditions
Examples of this include ri
or concussion, and others.
categorization of an event

The purpose of this docum
patients in whom the likeli
focus on those patients wh

For clarification, a *provoke*
of a neurologic insult and i
hyponatremia, toxic ingest
(the focus of this documer
precipitating factor but mi
seizures (those occurring >
traumatic brain injury.

### INCLUSION CRITERIA:

- Adult patients aged 1
to an acute setting w
generalized convulsiv

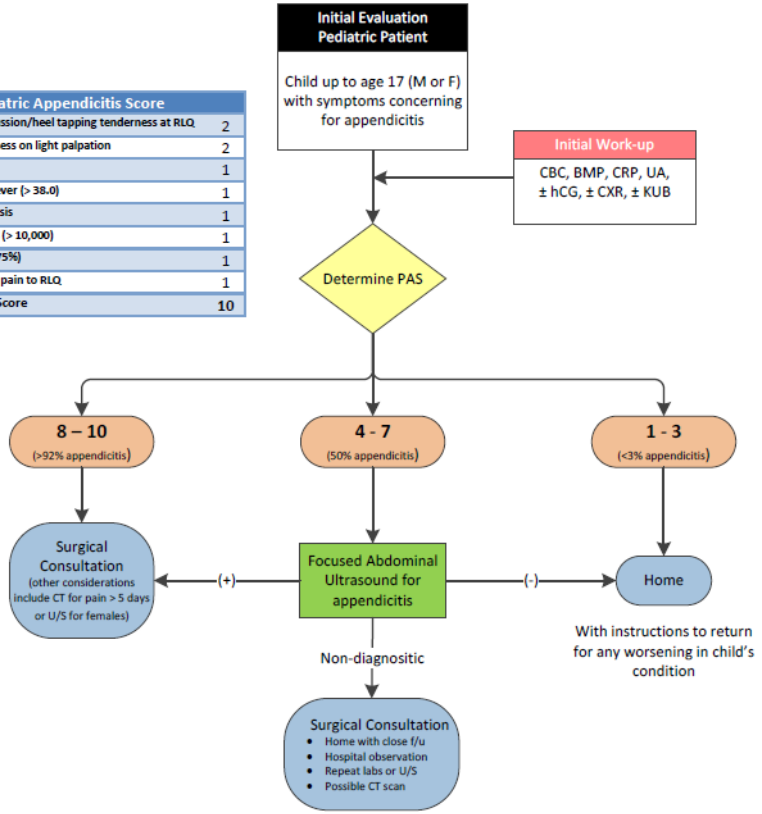
### EXCLUSION CRITERIA:

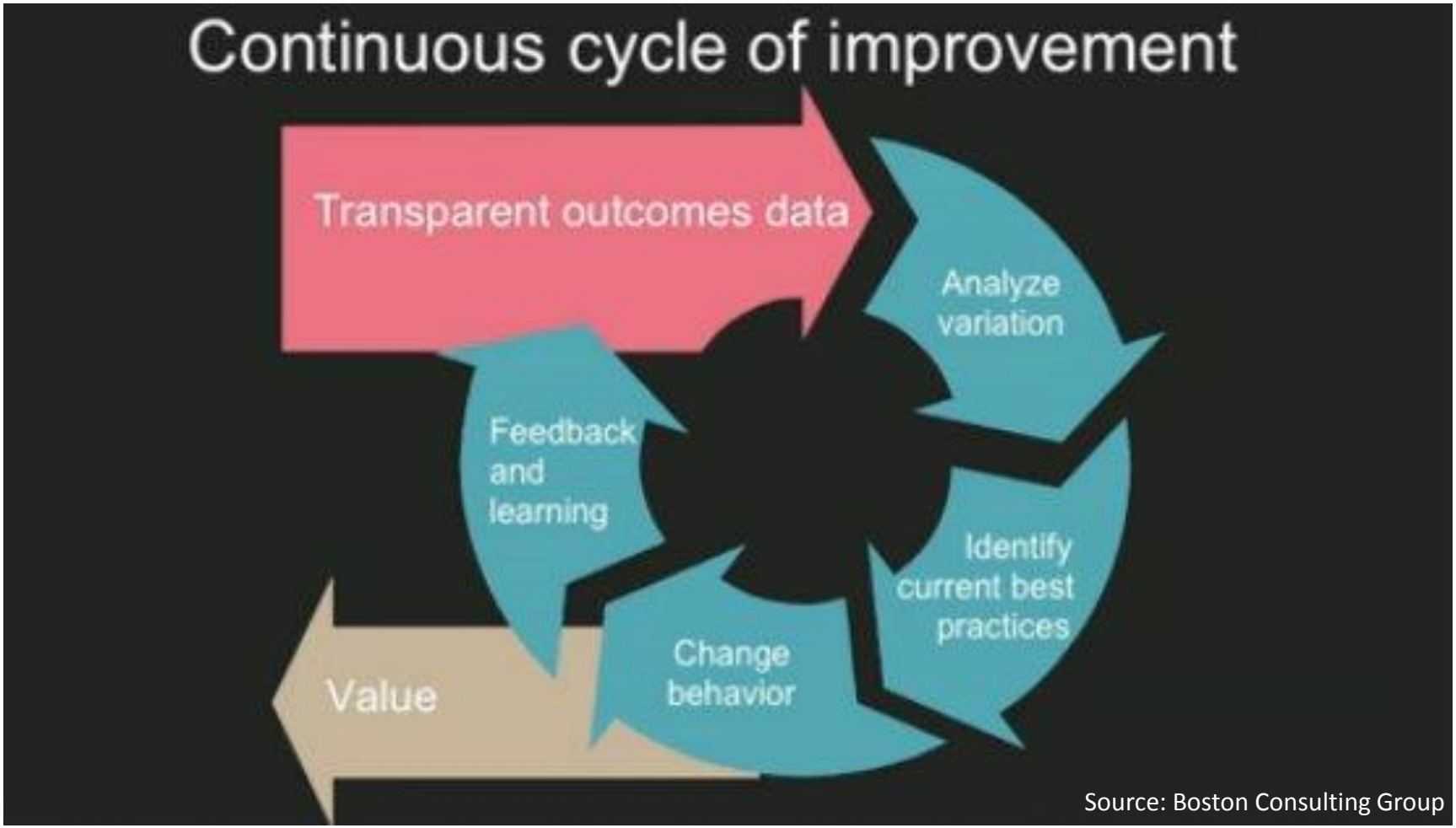
- Pediatric patients
- Patients with comple
- Patients with acute h
- Patients who have a
immunocompromise
eclampsia, or other p
- Status epilepticus or
- Patients with previou

## Clinical Standard Work Pathway: Appendicitis Evaluation v.1.0

### ALGORITHM: Pediatric patients up to age 17

| Pediatric Appendicitis Score | |
|---|---|
| Cough/percussion/heel tapping tenderness at RLQ | 2 |
| RLQ Tenderness on light palpation | 2 |
| Anorexia | 1 |
| Low-grade fever (> 38.0) | 1 |
| Nausea/emesis | 1 |
| Leukocytosis (> 10,000) | 1 |
| Left Shift (> 75%) | 1 |
| Migration of pain to RLQ | 1 |
| Maximum Score | 10 |



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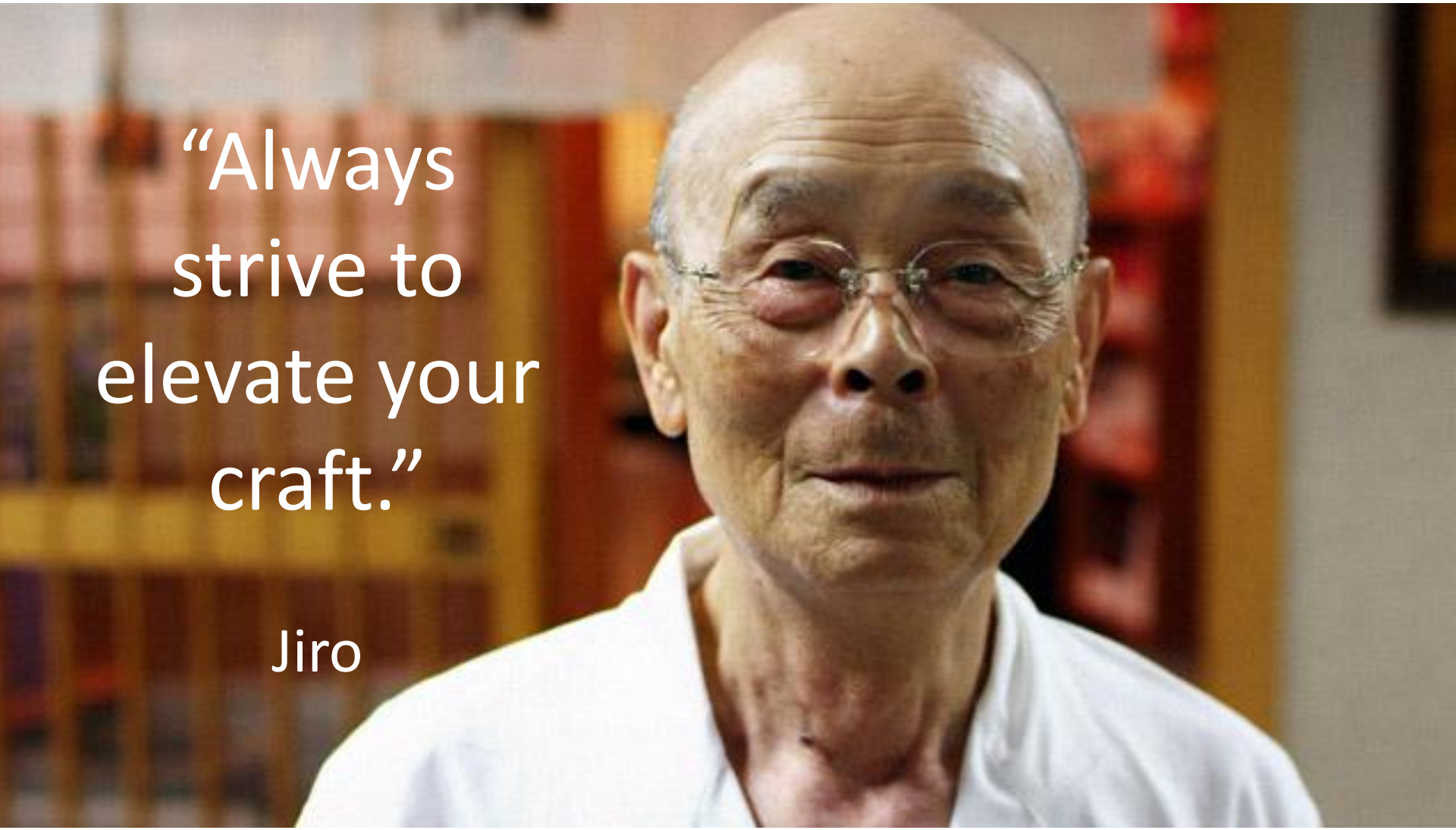


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