Diagnostic Errors - patient safety
Michael H. Kanter, MD-Kaiser Permanente SCAL region
Medical Director, Quality & Clinical Analysis
Diagnostic Errors-definition/measurement

- Missed opportunity which may or may not result in harm to the patient
- May occur without any visits or contact between the patient and physician
- Patients are an active participant in their care (especially ambulatory care) and can contribute to incorrect diagnosis.
- If a physician makes the correct diagnosis but fails to properly document it, is it an error?
- Large opportunity to mitigate harm from diagnostic errors after they occur without the need for measurement, reporting, or feedback
- In measuring diagnostic error, what is the best denominator?
- Does one stay content with just measure an error rate or is the duration of the error just as important?
Characteristics of Diagnostic Errors

**Structure**
- Some structural metrics
- Presence of EMR
- Patient portal or Open Notes

**Process**
- Few process metrics
- No bundles to measure
- No “time outs” to measure

**Outcomes**
- Hard to measure outcomes
- Outcomes may have long delays
Safety net (electronic clinical surveillance) Overview

A regional program that systematically identifies members who have inadvertent lapses in care using a small, centralized team with limited clinical scope capacity to intervene before harm reaches the patient, taking advantage of the long delays between diagnostic errors occurring and harm reaching the patient.

As well as several automated electronic tools, consistently used by accountable frontline staff, to track certain abnormal results for all members.
Areas of Primary Focus

2 Categories of Outpatient Safety Risk

- Diagnosis Detection and Follow Up
- Medication Safety
Current Portfolio

**DIAGNOSIS DETECTION / FOLLOW UP**
- PSA Electronic Safety Net
- +FIT Electronic Safety Net
- Abnormal Pap Electronic Safety Net
- Kidney Disease (Repeat Creatinine)
- Colon Cancer (Iron Deficiency Anemia + No colonoscopy)
- Colon Cancer (Rectal Bleeding + No colonoscopy)
- Abdominal Aortic Aneurysm Tracking
- Post Splenectomy Immunizations
- Positive Chlamydia Follow up
- Hepatitis C (+Antibody + No confirmatory test )
- Newborn Hearing Screening
- Lung Nodules

**MEDICATION SAFETY (diagnostic error)**
- Annual Lab Monitoring: Digoxin (K+ and SCr)
- Annual Lab Monitoring: Anti-Convulsants (drug levels)
- Annual Lab Monitoring: ACEs/ARBs (Lytes and SCr)
- Annual Lab Monitoring: Diuretics (K+ and SCr)
- Amiodarone (Preventive monitoring plan)
- APAP Overuse
- Diuretic Medication Induced Hyponatremia
- Medication Induced Hyperkalemia
- NSAIDs in CKD 4-5, Dialysis, Kidney Transplant
Important cultural issues for diagnostic errors

- Blame free culture-
  - Feedback to physicians needs to be such that the physician will stay engaged with closing the loop on the diagnostic error (inform the patient and do appropriate follow up care).

- Diagnostic error continues until the correct diagnosis is made

- Encourage reporting errors and near misses by rapidly building new safety nets based on these reports

- Transparency is required
  - Initial launch of new program may identify larger prevalence of cases of errors even if the annual incidence is not so great.
Criteria for evaluating new electronic clinical surveillance programs

SPEED OF DEPLOYMENT OF PROGRAM—Most important to create the correct culture.

CLINICAL IMPACT—Will it improve patient safety or quality? If yes,
- How many people will be affected?
- What is the severity of the potential safety gap?

IDENTIFICATION—Is the potential safety gap readily identifiable using existing electronic health data? That is:
- Is the information required discretely coded?
- If the information required is not discretely coded, is it noted consistently in a way that makes natural language processing a reasonable option?
- If the potential safety problem is not readily identifiable, is it important enough that revisions to existing documentation should be considered?
Criteria for evaluating new electronic clinical surveillance programs (continued)

FOLLOW-UP—How many patients might be identified & what follow-up would be necessary?

– If the Safety Net is likely to identify a large number of patients, the importance of automated systems becomes more important
– If the number of patients identified is smaller, it may be feasible to have central review
– In considering the capacity for follow-up, existing care processes and resources to resolve safety issues in a timely fashion are considered

OTHER OPERATIONAL CONSIDERATIONS

– Is anyone already working on addressing this safety issue?
– Does the issue fall solely within one group's domain?
Process for developing and launching new electronic clinical surveillance programs through the Kaiser Permanente Southern California Outpatient Safety Net Program.

SMEs panel always includes:
- Leadership
- Clinical guidelines
- Subject matter experts
Results For Three Year Period

8,076 patients for case management

3,833 patients received Urology appointments

2,204 patients underwent prostate biopsy

745 Prostate Cancers diagnosed

Zero claims related to missed abnormal PSAs
Unrepeated Creatinine

- 7,218 lab orders placed for patients with an abnormal creatinine not repeated after 90 days
- 3,465 total labs repeated within 90 days (48%)
- 1,768 abnormal results (51%)
- 1,624 New CKDs identified
Abdominal Aortic Aneurysm Tracking: A Three - Part Program

Part 1: Best Practice Advisory

**PREVENTION REMINDER:** Patient is a candidate for an Abdominal Aortic Aneurysm screening. A one-time AAA screening is recommended in men aged 65 through 75 yrs, (who have ever smoked).

**ACTION:** "Accept" to place imaging order for AAA screening.

(AAA SCREENING 65+ last satisfied: Not on file)
(No related orders found in patient record)

Part 2 – Follow Up According to Clinical Practice Guidelines

<table>
<thead>
<tr>
<th>Abdominal Aorta Diameter</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3 cm</td>
<td>normal, no further action needed</td>
</tr>
<tr>
<td>≥ 3.0 cm</td>
<td>code for condition, place on problem list, and treat with a statin</td>
</tr>
<tr>
<td>3.0 - 3.9 cm</td>
<td>annual ultrasound</td>
</tr>
<tr>
<td>4.0 to 5.9 cm</td>
<td>routine referral to vascular surgery</td>
</tr>
<tr>
<td>≥ 6.0 cm</td>
<td>urgent referral to vascular surgery</td>
</tr>
</tbody>
</table>

Part 3 - Tracking
Abdominal Aortic Aneurysm Tracking

Using the e-Autopsy process, a retrospective review of KPSC deaths caused by ruptured AAAs revealed that 25% were due to failure to follow up on patients already known to have AAAs.

6,275 patients in the Southern California region with an identified AAA

The AAA Tracking Safety Net has identified 1,581 patients overdue for follow up

25 patients were identified as needing surgical intervention
Post Splenectomy Immunizations

1,749 “asplenia” encounters on 966 unique patients identified by NLP

267 asplenic patients missing immunizations identified by NLP

696 asplenic patients missing immunizations identified by coding

963 immunization orders placed

292 asplenic patients have received appropriate vaccinations
Presumed Iron Deficiency Anemia w/o Colonoscopy

Chart review revealed delays in diagnosis of colorectal cancer due to lack of follow up on presumed IDA with endoscopy

- M/W 55-75 (not terminally ill)
- No colonoscopy in past 10 years
- GFR > 60
- Iron deficiency:
  - Men MCV < 80, HB < 14, RBC < 4.7M
  - Women MCV < 80, HB < 12, RBC < 4.2M
Presumed Iron Deficiency Anemia w/o Colonoscopy

- 206 patients with presumed IDA and no colonoscopy identified
- 128 referred for colonoscopy
- 26 polyps removed
- 18 hyperplastic and 8 tubular adenomas removed with polyps
- 29 other diagnoses (hemorrhoids, diverticular disease, etc)
Rectal Bleeding w/o Colonoscopy

Chart review revealed delays in diagnosis of colorectal cancer due to lack of follow up on patients with a history of rectal bleeding with endoscopy

- M/W 55-75 (not terminally ill)
- No colonoscopy in past 10 years
- GFR > 60
- History of rectal bleeding
  - Outpatient encounter with ICD9 diagnosis code of 569.3x or 455.xx
Rectal Bleeding w/o Colonoscopy

168 patients with a history of rectal bleeding and no colonoscopy identified

26 completed colonoscopy

6 had normal results

1 patient had an adenocarcinoma with spread to local lymph node, 1 had a carcinoid tumor

7 had one or more tublar adenomas, 11 had one or more hyperplastic polyps, hemorrhoids or colitis
Digoxin, ACE/ARB, Diuretics & Anti-convulsants

Digoxin, ACE/ARB, Diuretics, Anti-convulsants combined EOY 2012

114,328 lab orders placed for patients missing appropriate annual medication monitoring labs

92,606 letters mailed (81%)

75,010 labs completed (65%)

12,001 abnormal labs identified (16%)
57 year old male with history of Diabetes Mellitus, dyslipidemia and hypertension. Taking 12.5 mg hydrochlorothiazide (HCTZ) daily. Member presents to Primary Care Physician’s office with complaints of insomnia, headache and emotional stress.

- Completed Routine Labs (electrolytes) as a result of Batch Lab upload and outreach efforts.
- Electrolyte Results showed sodium of 119.
- Numerous attempts were made to advise patient to present to ER for evaluation of critical lab result.
- Ultimately admitted to hospital for observation with a sodium level of 117 revealed on repeat lab results.
- HCTZ discontinued.
- Discharged home in stable condition with a diagnosis of hyponatremia.
Acetaminophen (APAP) Overuse

Members identified as taking >4gm APAP daily based on Rx fill patterns

946 conversions recommended

736 referred to pain management clinic

210 patients converted to safer alternatives

22.2% reduction in potential harm
# Questions

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