CHART AUDITS
PROS AND CONS AS A RESEARCH/QI & DATA COLLECTION METHODOLOGY

DR. JANICE BISSONNETTE RN-EC, MScN, PHD
APN RENAL TRANSPLANT PROGRAM,
CLINICIAN INVESTIGATOR
DEPARTMENT OF EPIDEMIOLOGY/KIDNEY RESEARCH CENTRE/OHRI

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OBJECTIVES

To describe, present and open for discussion:

- Definition
- Chart audit purpose
- Planning a Chart Audit
- Chart audit advantages/disadvantages
- Ethical considerations
- Using results for quality improvement
- Q & A
WHAT IS A CHART AUDIT?

Chart audits, AKA…clinical record review, retrospective data analysis, clinical chart review: ‘An examination of medical records, electronic &/or hard copy to measure some component of performance, to determine what has been done, and see if can be done better.’

Example
One day a provider in the Sleepytown Community Health Center sees several patients complaining of prolonged cough. Three of them have had Tuberculin skin tests placed in the past few months, but there’s no record in the charts of readings for these tests. How could he or she figure out if this was just an unusually bad day, or if there’s a systematic problem in the office?
WHAT IS A CHART AUDIT?

- Most commonly used data collection method for assessment of the quality of medical/health care, first described in 1928.
- Considered only viable option for most quality of care studies.
- Widely used as a data collection method for studies examining incidence, prevalence, clinical course, prognosis of specific conditions (clinical epidemiology), and studies examining determinants/outcomes of health service use (health care epidemiology), retrospective data to answer clinical queries, adherence to guidelines or standards of practice.

* Wu & Ashton (1997).
CHART AUDIT PURPOSE

- Required measurements, Administrative requirements, Research, Quality Improvement.

- Useful method when data has been recorded in case notes or a structured database, & need an analysis of the data elements.

- Steps include – studying the data – summarizing the data – statistical analysis of the data – drawing inferences/conclusions from the data.

- Data sources – pros and cons to each source.

- Ultimate goal is quality improvement.
Going back to our example of the Sleepytown Community Health Center:

Suppose the chart audit reveals documented readings for only 45% of the Tuberculin skin test placed. Where could you look to figure out what’s going wrong?
DATA SOURCES FOR CLINICAL RECORD REVIEW

- Pharmacy records/attendance registers
- Adverse events monitoring
- Stored data from clinical trials/cohorts studies
- Inpatient case files
- National demographic databases

Sarkar & Seshadri (2014).
PLANNING A CHART AUDIT

1. Formulating the clinical question – “Which medication regimen is associated with better adherence to treatment and follow-up among patients post kidney transplantation?” - typically a descriptive question ‘what is going on here’? - incidence/prevalence. Too narrow or broad? High frequency/high risk/area of interest to the practice.

2. Identify the appropriate data source/measure that can answer the clinical question.
   • Assess the data source in terms of accuracy and completion. Yes criteria met/No not met.
   • Is there a measure for the topic/focus? Is the measure available in the medical record?

3. Develop an instrument to extract the data from the data source/health record.
   • Decide upon which variables would be coded/how to enter.
   • Prepare a manual defining the various terminologies/variables being extracted.
PLANNING A CHART AUDIT

4. Extraction of the data – in keeping with the instrument developed and definitions agreed upon prior. If two or more raters code the data, then inter-rater reliability can be evaluated.
   • A small subsample (approximately 10 percent of the total/eligible charts) can be reassessed to check agreement with the previously coded data, to detect inaccuracies if any. Informal minimum is usually 10 to 20 records.

5. Data analysis using appropriate statistical method based on question.
   • Analysis can range in complexity from semi-quantitative measures for qualitative data, to hierarchical multivariate quantitative analysis.
   • Descriptive analysis typically reported as proportions, percentages, frequencies, measures of central tendency (mean/median/mode), measures of variability (standard deviation, range).

6. Dissemination of results to expand scientific evidence base/knowledge translation.
6. Dissemination of results to expand scientific evidence base/knowledge translation.

   • Quality assessment of record reviews is another important research consideration. Presently there are no uniform guidelines for reporting of chart reviews as compared to the ones developed for reporting meta-analysis (PRISMA) and randomized controlled trials (CONSORT).

   • Methods suggested for the assessment of quality of record reviews include checklists to assess the various methodological aspects of record reviews, which contain elements like representativeness of the sample, tackling inconsistent data, avoiding misclassification bias, & declaration of conflict of interest of the authors.
Summarizing the data is a little more complex than just counting up all the data sheets.

The trickiest part is often determining the proper denominator to use for percentages. Inconsistencies here can lead to confusing or uninterpretable data.

For example, an audit was done to measure compliance with the guideline that all asthmatics stage 2 or higher should be on anti-inflammatory medication.

Of the 50 records reviewed,

- 40% of the patients were stage 2 or higher.
- 40% were on anti-inflammatory medication. How do you interpret that result?
In the following audit results, what is the appropriate denominator if you want to know the percentage of patients appropriately prescribed antibiotics for community-acquired pneumonia?

<table>
<thead>
<tr>
<th>Total Charts in audit</th>
<th>128</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases with pneumonia</td>
<td>75</td>
</tr>
<tr>
<td>Hospital-acquired</td>
<td>30</td>
</tr>
<tr>
<td>Community-acquired</td>
<td>45</td>
</tr>
<tr>
<td>Appropriate antibiotic</td>
<td>40</td>
</tr>
</tbody>
</table>
CHART AUDIT ADVANTAGES*

- Less effort and time as compared to prospective study.
- Assessment of large sample at limited cost.
- Minimizes recall bias for an event in the past.
- Easy collection of information routinely recorded.
- Reduces intrusion into patients time.
- Depending on research question – may be most feasible type of study
  - knowing prescription trends of a particular medication, pressure ulcer prevalence, falls risk.

*Sarkar & Seshadri (2014).*
CHART AUDIT APPLICATIONS*

Widespread application across clinical settings & include:

1. **Knowing the clinical characteristics of diseases** – Record reviews and clinical chart reviews have been utilized to know the characteristics associated with a disease or a health condition.

2. **Studying the course and outcome of diseases over a follow up period** – Information about the course of the disease can be obtained from the follow up and progress notes of the patient over a period of time.

3. **Attributes of patient population using a service** - Record reviews can also analyse the characteristics of subjects attending a particular treatment service; both inpatient, as well as outpatient.

4. **Adverse events monitoring** – Surveillance about health conditions and medication side effects.

5. **Surveillance on health issues and indicators** – Hospital and other records can serve as markers of trends in various disorders.

6. **Medical errors** – Medical records can also be utilized to investigate medical errors to allow for subsequent corrective action.

CHART AUDIT DISADVANTAGES*

- More difficult than appears
- Project specific – failure to create well defined, clearly articulated research question- typically descriptive in nature.
- Barriers include: imprecisely worded research questions, vague definition of variables, poorly designed chart abstract tools, inappropriate interpretation by abstractors, poor or missing recording of data in the chart…all may compromise data quality
- Retrospective versus Prospective- dependent on information already available in the form of records & reliably recorded/documenteded.
- Retrospective review more helpful in finding associations versus causal relationships with prospective studies.
- Poor methodological standards- failure to consider sampling issues prior to study- sample size calculations – power analysis to determine number of charts needed for a particular study.

ETHICAL CONSIDERATIONS

▶ Informed consent and patient confidentiality are the important ethical issues relating to record reviews.

▶ Usually when data is collected and stored in medical records, it is not done so with the explicit intention of further use in research in most situations.

▶ Hence, there is no a-priori informed consent for the use of data in a subsequent record review study.
**ETHICAL CONSIDERATIONS**

- Certain principles can help in ethical conduct of the study.
- Firstly, only that much information should be extracted and coded as is required for answering the research question.
- Secondly, any identifying information from the data set should be removed by data controllers before further usage and analysis, use of coding keys.
- Thirdly, safeguards must be in place for appropriate and ethical use of the data, confidentiality clauses for those doing data extraction.
- Fourthly, due consideration should be given towards seeking ethical clearance from an Institutional Review Board (IRB) before starting data collection, especially while dealing with sensitive information. Many IRBs have policies of exempting certain types of record reviews, but this should be clarified prior to conduct of the study.
USING RESULTS FOR QUALITY IMPROVEMENT

- Compare your findings with standards/benchmarks
- Initial measure or baseline
- Root cause analysis
- Develop intervention
- Execute and evaluate
CLINICAL EXAMPLES AT TOH

LISA FREEMAN, RN, MScN
CORPORATE COORDINATOR,
NURSING BEST PRACTICES
**Clinical Events**

Date of Event: 22/03/2015 (dd/mm/yyyy)

Hospitalization

Was the patient hospitalized: ☐ Yes ☐ No
If yes, indicate the number of days: 3

Complications (check all that apply)

- Return to Operating Room
- Cardiac arrest
- Myocardial infarction
- Acute coronary syndrome
- Arrhythmia
- Stroke
- Acute limb ischemia
- Pulmonary embolism
- Other cardiac event (specify):
- Sepsis
- Pneumonia
- Wound infection
- Urinary tract infection
- Gastro intestinal bleed
- Bowel perforation
- Bowel obstruction
- New onset diabetes
- Other, specify: partial toe amputation
EXAMPLE: BI-ANNUAL NURSING PREVALENCE SURVEY

PURPOSE

• One-day (8 hour) bi-annual prevalence survey to measure incidence/prevalence of pressure ulcers, in-hospital patient falls, use of restraints, delirium, catheter-associated urinary tract infections, satisfaction with nursing care and adherence to clinical tactics.

• Survey includes a chart audit and a physical/environmental assessment focusing on patient outcomes as well as adherence to programs/policies.

• Results shared corporately and are incorporated into annual performance reviews for nursing leaders and are a focus for targeted quality improvement work.

• Survey includes all inpatients at Civic and General Campuses as of midnight on the day of the survey.
BI-ANNUAL NURSING PREVALENCE SURVEY: PROCESS

- Minimum of 2 clinical staff members from each inpatient unit participate as surveyors to collect data for all patients identified for their assigned unit.

- Each surveyor must attend a 4-hour face-to-face education session prior to prevalence survey.

- A team leader is assigned on prevalence day to a group of units to answer surveyor questions and ensure data is collected in a timely way.

- Eligible patients are approached by a surveyor who explains the survey and proceeds with data collection.
BI-ANNUAL NURSING PREVALENCE SURVEY: TOOL

- Information is collected with iPADs utilizing the Patient Safety Learning System (PSLS) platform.
- At midnight of the day of the prevalence survey, an electronic trigger creates a case report form based on the daily hospital inpatient census.
- The form includes prepopulated patient demographics such as patient name, medical record number, age, gender, campus, unit, room number as well as the chart review and patient assessment questions.
- Data is stored in a central, secure repository.
### PREVALENCE SURVEY – HOME SCREEN

**Chart Review**

**Patient Assessment**
If patient is a fall risk, then Fall Risk Profile MUST be completed to have individualized interventions selected.
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there any documentation that the patient had a fall in hospital?</td>
<td>Yes, No</td>
</tr>
<tr>
<td>Did the patient sustain a physical injury as a result of the fall?</td>
<td>Yes - Major, Yes - Minor not requiring any interventions, No, Not Available</td>
</tr>
<tr>
<td>If a major injury, what type of injury was sustained?</td>
<td>Dislocation, Fracture, Intracerebral injury, Laceration requiring sutures, Skin tear/avulsion or significant bruising, Other</td>
</tr>
<tr>
<td>Is there evidence of new individualized interventions implemented?</td>
<td>Yes, No</td>
</tr>
</tbody>
</table>
## CHART REVIEW

**Restraints**

### Restraint Assessment:
Reis can only order approved physical & environmental restraints. Orders must be re-written every 24 hours. A new record is initiated daily ADM VIII 540).

<table>
<thead>
<tr>
<th><strong>Is there documentation of restraint use within the past 48 hours?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>What type of restraint is in use?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical</td>
</tr>
<tr>
<td>Physical/Environmental</td>
</tr>
<tr>
<td>Both</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>If restraint use, is there a restraint order (MD and/or LRLR) within the past 48 hours?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>
Restraints

**CHART REVIEW**

Restraint Assessment: RNs can only order approved physical & environmental restraints. Orders must be re-written every 24 hours. A new record is initiated daily ADM VIII 540.

1. Are there any behaviors leading to restraint use documented in the past 48 hours (on the LRLR Daily Use of Record or integrated progress notes)?
   - Yes
   - No

2. If yes, what are the behaviors documented? (Select all that apply)
   - Agitation
   - Combative
   - Disorientation
   - Impaired Mobility
   - Memory deficit
   - Movement disorder
   - Pulling tubes
   - Unable to follow instructions
   - Other

3. Is there documentation of consent obtained from the patient or family within 12 hours of the initial physical or environmental restraint order?
   - Yes
   - No
   - Formed
### CHART REVIEW

#### Pressure Ulcers

**Pressure Ulcer Assessment: Acute Care:** All patients are assessed within 24 hrs of admission and 24 hrs using the Braden scale. Rehab & TCU: Patients are assessed on admission; reassessed on change of health status and/or as per unit protocol (NSG-3:B450).

- **Is a pressure ulcer documented on admission to the hospital?**
- **Is a pressure ulcer documented on transfer to your unit?**
- **Was the Braden Risk Scale completed within 24 hrs of admission to the unit?**

<table>
<thead>
<tr>
<th>Total Braden score (within 24 hrs of admission to the unit):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braden done and scored</td>
</tr>
<tr>
<td>Braden done but not scored</td>
</tr>
<tr>
<td>Braden not done</td>
</tr>
</tbody>
</table>

**Pressure Ulcer—Plie de pression**

<table>
<thead>
<tr>
<th>Location—Emplacement</th>
<th>Stage—Grade I</th>
<th>Stage—Grade II</th>
<th>Stage—Grade III</th>
<th>Stage—Grade IV</th>
<th>Stage—Grade X</th>
<th>Stage—Grade BD1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
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<tr>
<td>3.</td>
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</tbody>
</table>

**Braden scale—Echelle de Braden**

- **Sensory Perception:**
  - Perception sensorielle: 1 [Completely limited], 2 [Very limited], 3 [Slightly limited], 4 [No impairment], Non limited
- **Mobility:**
  - Mobilite: 1 [Completely immobile], 2 [Very limited], 3 [Slightly limited], 4 [No limitation], Avance atteinte
- **Moisture:**
  - Hydratation: 1 [Very dry], 2 [Slightly dry], 3 [Moderately dry], 4 [Regular]
- **Nutrition:**
  - Nutrition: 1 [Very poor], 2 [Probable inadequate], 3 [Adequate], 4 [Excellent]
- **Activity:**
  - Activite: 1 [Sedentary], 2 [Fairly sedentary], 3 [Frequent]
- **Friction/Shear:**
  - Friction: 1 [Frequent], 2 [Occasional], 3 [Rarely]

**TOTAL:**

- At risk—Faible risque (15-18)
- Moderate—Moderé (13-14)
- High—Élevé (10-12)
- Very high—Très élevé (9 or less—9 or moins)

If score 10 or lower, initiate Interprofessional Pressure Ulcer Prevention Care Plan NUR 217.

Si le total est 18 ou moins, mettre en oeuvre le plan de soins interprofessionnel des plaies de pression (NUR 217).
## Pressure Ulcers - Braden Scale

<table>
<thead>
<tr>
<th>Was the Braden Risk Scale completed within the last 48 hours or as per unit protocol?</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Braden done and scored</td>
</tr>
<tr>
<td>- Braden done but not scored</td>
</tr>
<tr>
<td>- Braden not done</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Braden score (within last 48 hours or as per unit protocol):</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
</tbody>
</table>

### ICU Flowsheet

24 Hour Nursing Flowsheet

<table>
<thead>
<tr>
<th>Sensory perception:</th>
<th>Mobility:</th>
<th>Nutrition:</th>
<th>Activity:</th>
<th>Friction:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 1-completely limited;</td>
<td>- 1-completely immobile;</td>
<td>- 1-constant;</td>
<td>- 1-bedfast;</td>
<td>- 1-problem;</td>
</tr>
<tr>
<td>- 2-very limited;</td>
<td>- 2-very limited;</td>
<td>- 2-adequate;</td>
<td>- 2-chairst;</td>
<td>- 2-potential problem;</td>
</tr>
<tr>
<td>- 3-possibly inadequate;</td>
<td>- 3-possibly inadequate;</td>
<td>- 4-slightly limited;</td>
<td>- 4-chairst;</td>
<td>- 4-no apparent problem;</td>
</tr>
<tr>
<td>- 4-slightly limited;</td>
<td>- 4-slightly limited;</td>
<td>- 5-adequate;</td>
<td>- 5-walks occasionally;</td>
<td>- 5-often problem;</td>
</tr>
<tr>
<td>- 5-adequate;</td>
<td>- 5-adequate;</td>
<td>- 6-adequate;</td>
<td>- 6-walks frequently;</td>
<td>- 6-often problem;</td>
</tr>
<tr>
<td>- 6-adequate;</td>
<td>- 6-adequate;</td>
<td>- 7-adequate;</td>
<td>- 7-very high;</td>
<td>- 7-very high;</td>
</tr>
<tr>
<td>- 7-adequate;</td>
<td>- 7-adequate;</td>
<td>- 8-adequate;</td>
<td>- 8-very high;</td>
<td>- 8-very high;</td>
</tr>
<tr>
<td>- 8-adequate;</td>
<td>- 8-adequate;</td>
<td>- 9-adequate;</td>
<td>- 9-very high;</td>
<td>- 9-very high;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Friction/Shear</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
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<tr>
<td>2</td>
<td>2</td>
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<td>3</td>
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<td>4</td>
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</tbody>
</table>

**BRADEN SCALE**

**Score:** ___
Patient Admission History

**Pain Assessment**

- **Is there documentation that this patient had pain during the hospital stay?**
  - Yes
  - No

- **Is there documented evidence of ongoing reassessment within the past 24 hours on the daily flowsheet, a validated tool (BPI), integrated progress notes or interdisciplinary treatment plans?**
PRESENTING RESULTS:
PREVALENCE TRENDS
HOSPITAL ACQUIRED PRESSURE ULCERS
STAGE II AND GREATER (TARGET: 3.3%)
USE OF RESTRAINTS

Restraints Prevalence
2006-2016

Percent

Date

The Ottawa Hospital
L'Hôpital d'Ottawa

Affiliated with • Affilié à
DELIRIUM PREVALENCE

Delirium Prevalence
2006 - 2016

Percent

Date

The Ottawa Hospital
L'Hôpital d'Ottawa

Affiliated with • Affilié à uOttawa
FALLS PREVALENCE

Falls Prevalence 2010-2016

Date

Percent

The Ottawa Hospital
L’Hôpital d’Ottawa
### NURSING PREVALENCE SURVEY: CHART REVIEW

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enables large number of charts to be reviewed in one day</td>
<td>Resource intensive</td>
</tr>
<tr>
<td>Allows comparison between patient assessment and documentation</td>
<td>Subject to surveyor bias</td>
</tr>
<tr>
<td>Electronic tool reduces input error (i.e., predetermined drop down menu) and allows for easier centralization and access to data</td>
<td>Incomplete or missing documentation</td>
</tr>
<tr>
<td>Allows for trend analysis</td>
<td>Only completed twice/year</td>
</tr>
</tbody>
</table>
SUMMARY/KEY POINTS

- Chart audits can be useful tools in improvement and safety efforts.
- An essential step is to define precisely what you want to measure, and criteria by which you will do it.
- Sample sizes can be chosen informally, or determined in a statistically valid fashion.
- Summarize your data in a way that will be meaningful in addressing your chosen problem.
- Follow a step-wise process.
REFERENCES/RESOURCES


