How to Utilize Program Evaluation Models to Evaluate the Effectiveness of Sepsis Quality Improvement Initiatives Including Clinical Decision Support Tools

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Session Objectives

1. By the end of the presentation, the participant will be able to understand program evaluation models and their application with quality improvement

2. By the end of the presentation, the participant will be able to identify quality improvement through program evaluation

3. By the end of this presentation, the participant will be able to utilize program evaluation to measure the effectiveness of quality improvement initiatives

ONC Clinical Quality & Safety

Provide Care and EHR Documentation

- Every patient encounter is the source of data that will be used in a variety of ways designed to improve clinical quality and safety
- HIT provides tools to manage patient data and improve outcomes

Measure Results

- Measurement is essential to optimizing health care
- Provides insight into
  - Provider performance
  - Areas for improvement
- Integral to value-based payment programs,
- Payers increasingly using to **reward providers for the quality and results of the care** they deliver to patients.

Clinical Decision Supports

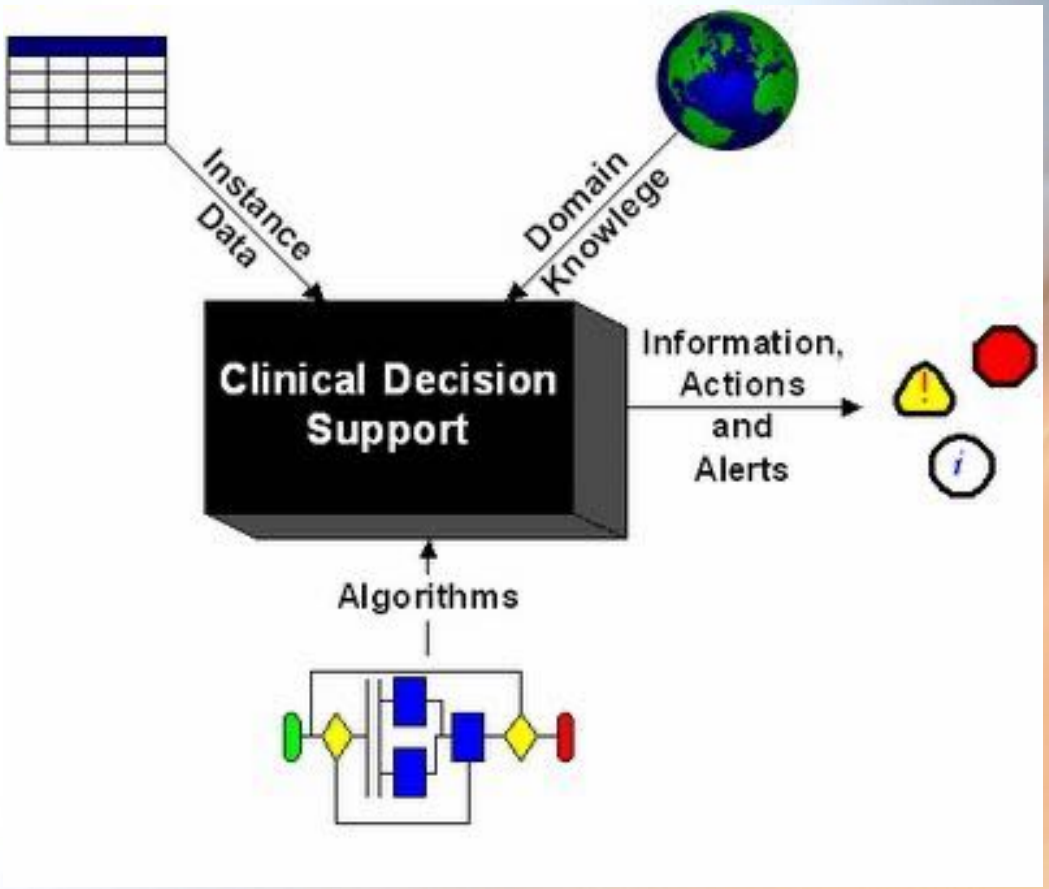
- Clinical decision support (CDS) provides clinicians, staff, patients or other individuals with:
- **knowledge** and **person-specific information**, **intelligently filtered or presented** at **appropriate times,** to *enhance health and healthcare*.

Source: (Osheroff, et al., 2007)

At the Appropriate Time

- At the point of decision making
- When new data arrives
- To stop dangerous decisions
- When clinician requests it
- Appropriate frequency

Clinical Decision Support Model



Boone, 2008
Image courtesy of Keith Boone

CDS Improves Quality

- Improve adherence to guidelines
  - Avoid inappropriate procedures
- Avoid diagnostic/therapy errors
  - Drug Interactions
  - Delay in diagnosis

CDS Improves Quality

- Minimize problem severity/complications
  - Early alerts to abnormal lab values
  - Alerts to adverse drug events
  - Diagnostic screening reminders
  - Immunization reminders

Examples of CDS Interventions by Target Area of Care

Target area of care	Example
Preventive care	Immunization, screening, disease management guidelines for secondary prevention
Diagnosis	Suggestions for possible diagnoses that match a patient's signs and symptoms
Planning or implementing treatment	Treatment guidelines for specific diagnoses, drug dosage recommendations, alerts for drug-drug interactions
Follow-up management	Orders or reminders for drug adverse event monitoring
Hospital, provider efficiency	Care plans to minimize length of stay, order sets
Cost reductions and improved patient convenience	Duplicate testing alerts, drug formulary guidelines

Table 5.1 Target Area of Care (Berner, 2009)

CDS Intervention Types/Examples

Intervention Types	Examples
Documentation forms/templates	Patient history, visit note
Relevant data presentation	Flowsheets, surveillance
Order/prescription creation facilitators	Order sentences, sets
Protocol/pathway support	New admission protocol
Reference information and guidance	Infobuttons, Web
Alerts and reminders	Proactive warnings

Table 5.2 Intervention Types (Osheroff, 2009)

Protocol/Pathway Support Intervention Subtypes

Subtypes	Example
Stepwise processing of multi-step protocol or guideline	Tools for monitoring and supporting inpatient clinical pathways (for example, for pneumonia admissions) and multiday/multi-cycle chemotherapy protocols in the inpatient or outpatient setting
Support for managing clinical problems over long periods and many encounters	Computer-assisted management algorithm for treating hyperlipidemia over many outpatient visits

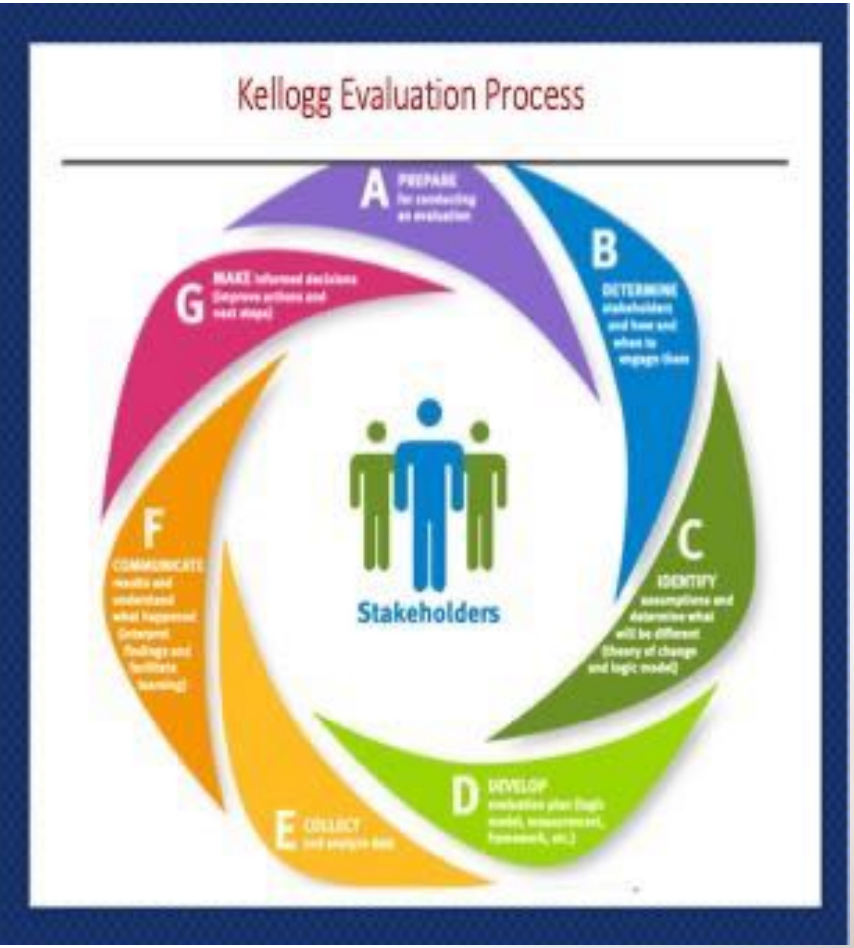
Table 5.6 Protocol/Pathway Support Intervention Subtypes (Osheroff et al., 2005)

Alerts and Reminders Intervention Subtypes

Subtypes	Example
Alerts to prevent potential omission/commission errors or hazards	Drug interaction alert, for example, with drugs, pregnancy, laboratory, food
Alerts to foster best care	Disease management, for example, alert for needed therapeutic intervention based on guidelines/evidence and patient-specific factors

Table 5.8 Alerts and Reminders Intervention Subtypes (Osheroff et al., 2005)

W.F. Kellogg Program Evaluation



- Prepare
- Determine stakeholders
- Identify assumptions – develop logic model
- Develop evaluation plan
- Collect & analyze data
- Communicate & interpret results
- Make informed decisions

- Note: Visual depiction from W.K. Kellogg Foundation, 2017. *The Step-by-Step Guide to Evaluation: How to Become Savvy Evaluation Consumers.* https://www.wkkf.org/resosurce-directory#10=10&p=19

Kellogg Program Evaluation

- Evaluation is a process of "collecting and summarizing evidence that leads to conclusions about the value, merit, significance, or quality of an effort." (Kellogg, 2017)
- Evaluative thinking is the focus of the process, which involves 'dialogue, reflection, learning, and improving (Kellogg, 2017)
- Several guiding principles – one is that evaluation planning should begin when new strategies, initiatives, and programs are conceptualized (Kellogg, 2017)
- This principle often not followed in the healthcare setting
- Focus often on implementation – evaluation outcomes lost in process

Observations of QI Process in DNP Project Organization

- Clinical problem identified
- Usually, minimal literature search unless DNP involved
- Committee formed with identified interdisciplinary members
- Brainstorming – consensus on top 1-2 solutions
- Solution teams formed – implement
- Staff re-education is often a main strategy
- Wait for results of usually one outcome measure

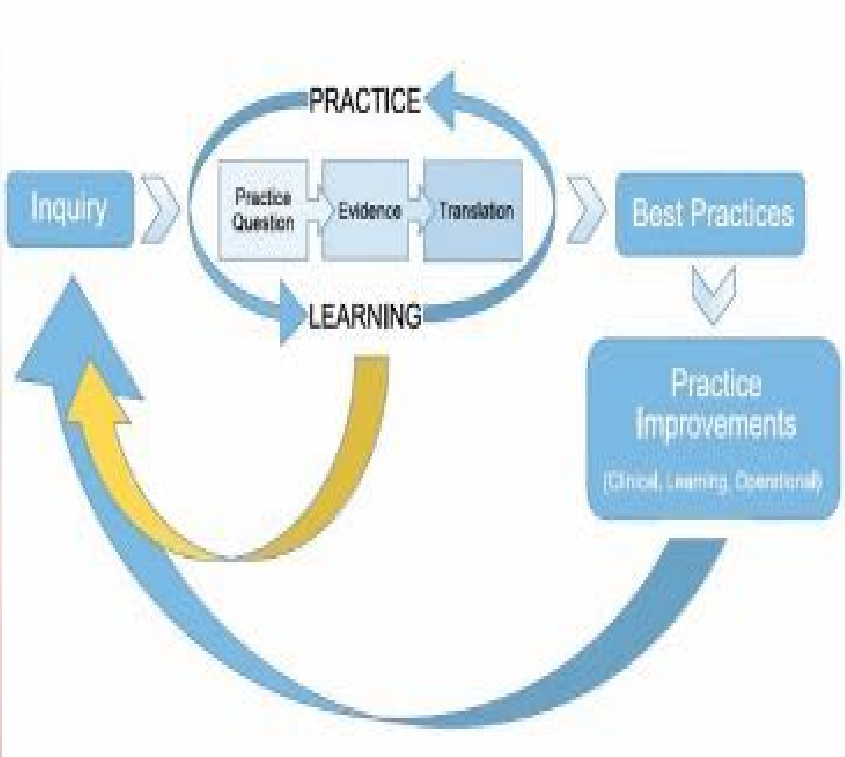
New Approaches to QI

- Models and frameworks provide additional insight
- Make us look at problems through a different lens
- As nurse leaders, we must foster new approaches to quality improvement
- Maximize the benefits of the EHR by learning how to use the massive data in the EHR
- Evidence-based research provides such an approach

Literature Review - Framework

John Hopkins Nursing Evidence-Based Practice Model

- Provides an approach to clinical decision problem-solving
- Practical tools
- Considers external & internal factors that affect clinical problem
- This DNP project is heavily influenced by internal & external factors, lending itself to this model.



Sittig & Singh Socio-Technological Model

Program Evaluation Project

- Sepsis most expensive clinical condition to treat in hospital, high mortality rate
- Goal of sepsis treatment – early recognition based on established criteria
- Clinical Decision Support (CDS)- tools
- Electronic sepsis alerts – monitor patient changes indicative of sepsis. Alerts providers to expedite early intervention
- Despite all these improvement initiatives – sepsis rates continue to rise.
- Millions of dollars spent on EHR, including sepsis alerts.
- Opportunity to improve their use- missed due to lack of evaluation of its effectiveness

Program Evaluation Project

- These session describes completion of a program evaluation on a hospital system's sepsis CDS and other improvement initiatives.
- The W.K. Kellogg Step-by-Step Guide to Evaluation used to determine effectiveness of initiatives
- Implemented electronic sepsis order sets, sepsis, education, overhead code S process, SIRS alert, Severe sepsis alert
- Medicare quality sepsis scores – large percentage of patients not receiving best practice sepsis bundle care.
- Use of systematic program evaluation methods – strategy to identify areas for quality improvement and their effectiveness

Impact of Sittig –Singh Eight Dimensions on Sepsis Alerts

Dimension	Project Impact	Dimension	Project Impact
Hardware & software	Is there a delay in receiving timely alert	*Workflow & communication*	Does staff understand workflow of process
Clinical content	Vital signs not entered timely or complete	*Internal policy, procedure, culture*	Review existing vital sign policy & procedure
Human/ Computer interface	Lack of understanding between VS & alert	*External rules, regulations, pressures*	Publicly reported quality scores
People	Staff finds design of alert not effective, alert fatigue	*System measusrement & monitoring*	Has this alert process ever been monitored

Evaluation Questions to be Answered

- Did the organization's initiatives reduce the frequency, severity, and mortality of sepsis cases?
- What are the perceived organizational barriers to sepsis improvement?
- What improvements can be made to the VS workflow process on medical/surgical units to improve completeness and timeliness of electronic entry?

Program Implementation			Intended Outcomes		
Inputs	Components/Activities	Outputs	Initial	Intermediate	Long-term
EMR **Mentor time** **Preceptor time** **Staff time- decision support, quality, IT staff, sepsis committee members** **DNP student time**	**Data** - Obtain data from pre & post initiatives: Overall sepsis LOS 2018-2020, LOS & mortality by ICD-10 sepsis code, Covid-19 patients coded with sepsis, sepsis order set usage, sepsis alert usage - Obtain latest hospital compare data for pre/post - Obtain data on VS completeness & timeliness of entry **Surveys** -Develop sepsis committee survey to determine success & barriers in sepsis initiatives **Workflow -VS** - Develop a process for onsite observations -Develop workflow diagrams. **Code Sepsis** - Obtain data on usage **Alert Action** - Develop a process for reviewing alert action documentation	Data obtained Sepsis committee surveys completed & data compiled VS audit completed Workflow diagram completed Alert action documentation categorized.	Increase in order set usage Increase response to e-sepsis alert Increase staff awareness around early recognition of sepsis patients Ongoing improvement in VS compliance	Staff suggestions to improve the VS process	Hospital compare data improved Cost savings for overall sepsis care Decrease in mortality of sepsis patients Decrease in frequency & severity of sepsis

Environmental context: Organization utilizes IHI quality improvement methods, committed to quality improvement, team environment

Literature Review

There were four main themes which emerged from the literature search on sepsis and automated sepsis detection.

- ***Design of EA***– structure and how it visually looks
- ***Content of EA–*** criteria used for alert to trigger
- ***Measured outcome of EA –*** outcomes that support the sensitivity & specificity of the alert
- ***New Approaches to early sepsis detection –*** machine learning, artificial intelligence

Measuring Effectiveness

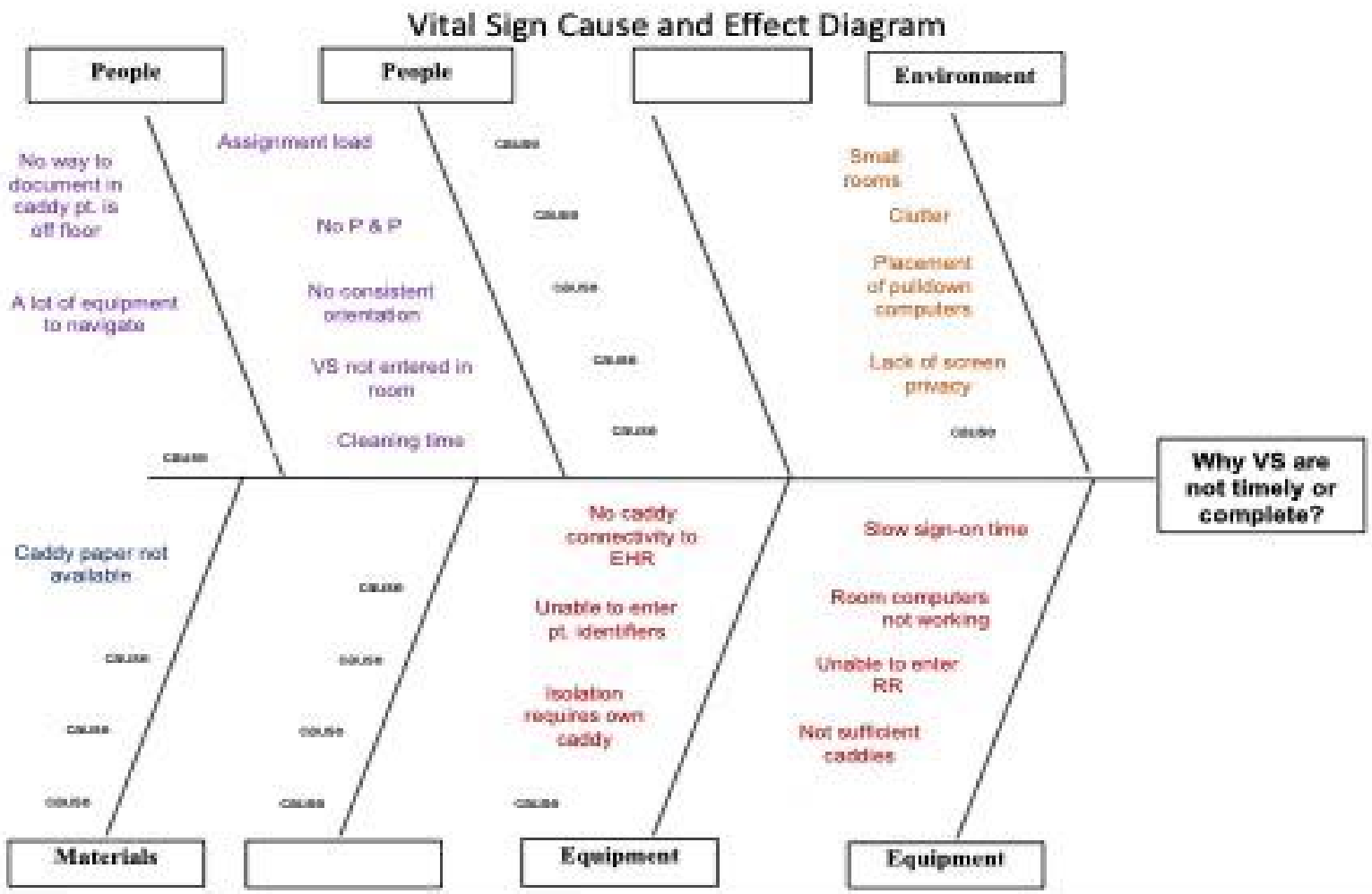
Did the organization's initiatives reduce the frequency, severity, and mortality of sepsis cases?

Fiscal Year	FY 18	FY 19	FY20	FY 21 YTD
Frequency	#1 803 #2 1108	#1 901 #2 1234	# 1 1138 #2 1430	# 1 740 #2 883
Severity - % Severe sepsis Septic shock	#1 22.5 #2 26.8	#1 29.6 #2 30.6	#1 32 #2 36.8	#1 67.5 #2 46
Mortality	#1 14.1 #2 13.3	#1 14.7 #2 11.75	#1 16 #2 20.3	#1 20.3 #2 18.8
Hospital-acquired mortality			#1 19 #2 23	#1 26.6 #2 25

Measuring Effectiveness

What are the perceived organizational barriers to sepsis improvement?

- Aging of the senior population
- Continued growth in the area
- Covid pandemic
- Manpower issues
- Physician buy-in
- Flawed vital sign process on med/surg units
- Numerous senior facilities – acute rehab, memory, assisted living, long-term care.
- Lack of big analytic data usage
- Lack of a more systematic approach to the issue



Reiner, R. (2021)

Measuring Effectiveness

What improvements can be made to the VS workflow process on medical/surgical units to improve completeness and timeliness of electronic entry?

- Develop policy and procedure for vital signs to address EHR entry timeliness and completeness. Address safety patient identification issues with VS caddy digital display
- Review placement of in-room computer for easier access for staff
- Evaluate sign-on time
- Explore software for automatic VS entry from caddy to EHR.

Summary

- Two experienced nurse administrators reflecting on their journey
- On the cusp of a big data breakthrough. Data mining will support the triple aim of improved patient experience, improved health of populations, reduce cost of care
- Program evaluation is a framework that can be used to evaluate & improve our QI initiatives
- Manpower issues still need to addressed
- DNP prepared CNOs are best equipped to lead the charge on evidence-based practice

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