THE IMPACT OF COMPUTERIZED CLINICAL DECISION SUPPORT ON DIAGNOSTIC ACCURACY IN NURSE PRACTITIONERS

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Learner Objectives:

1. Articulate the value proposition for computerized clinical decision support availability at the point care to influence healthcare outcomes.

2. Describe how using an evidence based practice improvement framework can promote successful integration of an innovation in a practice setting.

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PURPOSE OF THE QUALITY IMPROVEMENT PROJECT

Use an evidence based practice improvement framework to test the impact of a newly acquired electronic clinical decision support (CDS) system on diagnostic accuracy among a pilot group of nurse practitioners (NPs) in a home visiting medical practice

Use pilot results to inform the dissemination strategy for the CDS system across the entire practice
DEFINITION: CLINICAL DECISION SUPPORT

Clinical Decision Support is a system, application or process that helps professionals make clinical decisions to enhance patient care:

- Current clinical facts / research findings
- Clinical practice guidelines
- Medication management support
- Diagnostic reasoning support
- Foster evidence based practice
- Optimize cost effectiveness and reimbursement
- Enhance patient education and care management
- Assist in meeting regulatory requirements (coding)
- Improve overall safety of care
ADOPTION OF CDS SYSTEM

Involvement of end-users ensures proactive attention to potential barriers:

1. Clear goals and objectives for CDS system use:
   1. Awareness of rationale for implementation
   2. Clinician participation in selection and use case

2. Strong conceptual and tangible Leadership support
   1. Information technology support
   2. All expenses absorbed by the organization

3. Alignment with unique culture of the practice setting
   1. Device preferences
   2. Level of technologic savvy
DEFINITION: DIAGNOSTIC ACCURACY

The correctness of the medical diagnosis made by clinician as a result of a patient encounter

Clinicians synthesize information gained from interview and examination to discern a diagnosis

- Signs and symptoms
- Physical assessment findings
- Test results

All findings must be documented in the medical record to substantiate the diagnosis

Accurate diagnosis code selection is essential
DIAGNOSTIC ERROR

Sources of error in determining diagnosis

• Quality and quantity of information elicited from the patient due to insufficient probing

• Inadequate knowledge of best diagnostic tests and procedures as well as their interpretation

• Individual clinical acumen dependent on training, experience, attention, thoroughness, critical thinking skills

• Delay in learning about new evidence about current methods to ensure correct diagnosis
EVIDENCE IN SUPPORT OF CDS SYSTEM USE

• CDS use has the potential to produce improvement in outcomes; variability exists in the types of systems and methods of CDS implementation (Bryan & Boren, 2008)

• CDS has demonstrated a positive impact on clinician performance:
  • Medication prescription
  • Preventive care
  • Disease management
  • Diagnostic accuracy
  • The effects on patient outcomes remains understudied (Garg et al., 2005)

• Professional use of CDS systems is considered optional and relies on user discretion (Weber, 2008)
Setting:
Home visiting practice
Primarily NP providers
Autonomous role
Urban setting
Wireless tablet computers
Electronic medical record
No available CDS system

Participants:
Sample size = 7
Active caseload
Experience > 1 year
Voluntary participation
Activities on work time

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THE LOCAL PROBLEM

Clinician feedback regarding current CDS:

• Difficult to carry references in the field
• Infrequent access to collaborating physician
• Reliance on colleagues and manager for CDS

Informal chart review demonstrated:

• Variable levels of diagnostic expertise and incidences of diagnostic error
• Documentation in the medical record inconsistently substantiated the medical diagnosis
• Diagnosis codes lacked specificity and were not ordered by primary and secondary diagnoses
CLINICAL QUESTION

In a population of home visiting nurse practitioners, does the availability of a clinical decision support system at the point of care improve the incidence of correct clinical diagnosis substantiated by relevant clinical documentation?
Adapted from the PARIHS Framework (Kitson, Harvey & McCormack, 1998) And Evidence Based Practice Improvement Model (Levin, Keefer, Marren, Vetter, Lauder, & Sobolewski, 2010)
APPLICATION OF ENHANCED EBPI MODEL

Leadership Steering Committee:

1. Engaged leaders and key stakeholders
2. Increased awareness of internal and external evidence
3. Emphasized the team effort needed for success
4. Highlighted potential organizational barriers
5. Communicated the need for initial and ongoing support
6. Identified facilitation strategies for long term adoption
7. Articulated the return on investment for quality and costs
SELECTION OF A CDS SYSTEM

Process informed by the evidence:

1. End-users participated in demonstration by 3 vendors
2. Each criterion received weighted score:
   1. Adequate support of differential diagnosis
   2. Diagnosis and procedure coding support
   3. Drug prescribing guide
   4. Patient education materials
   5. Language translation
   6. Continuing education
   7. Intuitive use
   8. System accessibility
   9. Affordability
EBPI PROJECT OVERVIEW – 3 MONTHS

PDSA 1

Inter-rater agreement on chart audit tool

PDSA 2

Baseline audit of 2 randomly selected charts per NP

PDSA 3

CDS training and evaluation

Chart audit after 1 week and 2 weeks later

PDSA 4

Unplanned coding workshop followed by chart audit

Focus Group

Recorded and analyzed for theme
RESULTS

• **PDSA 1**
  - Inter-rater agreement of 100% reached after 3 reviews
  - Fourth review achieved 100% indicating sustainability of the measurement process

• **PDSA 2,3,4**
  - Total of 39 charts audited
    - One chart missed at baseline due to NP transfer
    - Two charts not audited as NP did not attend coding workshop
  - Charts judged as fair quality in need of remediation according to policy = 3
  - No charts were judged to be of poor quality
CDS TRAINING & EVALUATION

• All participants attended the training
• Additional time (30 minutes) was required
• No technologic issues related to the mixed method educational strategy
• One recommendation: More time to practice in CDS
• All participants strongly agreed that the content was orderly, informative, used appropriate teaching methods and stimulated interest in using CDS system.
• Ratings on a scale of 0-10
  • 10 rating by 4 participants
  • 9 rating by 3 participants
CHART AUDIT POST CDS TRAINING

• Compared to pre-training baseline there was **no difference** in aggregate scores

• Individual variability in audit results related to:
  • Time in the NP role
  • Experience in primary care
  • Previous exposure to a CDS system

**Action Items:**

• Inadequate knowledge of ICD-9 coding principles
• **CONDUCT A CODING WORKSHOP**
QUALITY ISSUES

• Key quality findings of serial chart audits
  • Primary diagnoses did not reflect the current, most significant reason for the encounter
  • ICD-9 coding lacked specificity
  • Substantiating documentation had variable depth
  • High level of reliance on structured content in the EMR not reflective of the individual clinical presentation

Action Item: Reconfiguration of structured data in EMR
  • Refer to Quality and Professional Advisory Committee
  • Reach out to CDS vendor to suggest system enhancements
CHART AUDIT POST CODING WORKSHOP

• All participants agreed that the workshop content should be included in the initial CDS training in the future
• Chart audit results significantly improved in the audit done within 1 week
• The chart audit done 2 weeks later did not demonstrate sustained improvement

Action Items:

• Chart auditing must continue to promote CDS adoption
• Pair novice NPs with a mentor
• Mimic the audit process as a self-check
• Pilot NPs will function as CHAMPIONS of the CDS system in the dissemination of the system across the practice
FOCUS GROUP FINDINGS

Liked Most
- Intuitive ease of use
- Better than using text references
- Valuable features: medication support; pill identification, patient education, history and exam, disease surveillance

Liked Least
- Requirement to be connected to internet
- Inability to look up ICD-9 in CDS system

Overall satisfaction
- Ratings of 10 (3); 9 (2); 7 (2)
- Met needs for multidimensional knowledge support
RECOMMENDATIONS

• Continue to use Enhanced EBPI framework for quality improvement in the practice

• Advocate for organizational attention to hardware issues impacting connectivity in the field

• Utilize CDS system as a foundation for disease specific quality improvement efforts

• Raise awareness of the needs of specialty providers of primary care in the home in relation to technology
Thank You!