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COMMUNICATION OF CRITICAL PATIENT DATA IN A RURAL PRIMARY CARE SETTING

By

Whitney Mick, BA, BSN, RN

A scholarly project

submitted in partial fulfillment

of the requirements for the degree of

Doctor of Nursing Practice in the Department of Health Sciences

Colorado Mesa University

Grand Junction, Colorado

Spring 2022

COMMUNICATION OF CRITICAL PATIENT DATA IN A
RURAL PRIMARY CARE SETTING

Whitney Mick, BA, BSN, RN

The final copy of this scholarly project has been examined by the signatories, and we find that both the content and the form meet acceptable presentation standards of scholarly work in the Department of Health Sciences. It has, therefore, been approved as meeting the requirements for the degree of Doctor of Nursing Practice.

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ABSTRACT

COMMUNICATION OF CRITICAL PATIENT DATA IN A RURAL PRIMARY CARE SETTING

Critical patient data are values that represent pathophysiological states at such variance from normal as to be life-threatening. A delay in reporting critical patient data can negatively impact patients, providers, and the health care system. The purpose of this project is to develop and implement a communication pathway for reporting critical patient data in a rural primary care setting. The university's Institutional Review Board (IRB) determined that this project is not research involving human subjects as defined by 45 CFR 46.102(e). The project facilitator conducted an integrated literature review to identify best practices related to the communication of critical patient data. Findings were organized by the social ecological level and used to develop a communication pathway for reporting critical patient data in a rural primary care setting. Stakeholders included staff working in a rural primary care clinic in southwest Colorado. Implementation activities were guided by Meleis's transition theory and included the development of an inventory tool to assess current clinic practices related to critical patient data reporting, modification of the inventory tool to accommodate the uniqueness of this clinic, and prioritization of action items for implementation. By the end of the ten-week project, a communication pathway for communicating critical patient data was developed and

partially implemented. Facilitators and inhibitors to implementation were noted. Recommendations for future projects are outlined and implications for nursing are discussed.

Keywords: critical patient data, communication, development, implement, reporting.

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CMU Federalwide Assurance Number: 00024298

TO: Whitney Mick

FROM: Dr. Cheryl K. Green CKG
Director of Sponsored Programs; Research Integrity Officer

SUBJECT: IRB Determination of Human Subject Research

DATE: March 4, 2021

STUDY: **Protocol 21-34: Reporting Critical Lab Values in a Rural Primary Care Setting: A Quality Improvement Project**

The Colorado Mesa University Institutional Review Board (IRB) also known as the Human Subjects Committee has reviewed your request for determination of human subject research and based on your answers, your project is deemed to not be research involving human subjects as defined by 45 CFR 46.102(e).

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IRB Number: **21-34**. This number is your protocol number and should be used on all correspondence with the IRB regarding this study.

Determination Date: March 4, 2021

If you have any questions, please feel free to contact me at irb@coloradomesa.edu.

Best wishes on your project.

This manuscript is dedicated to my family and Charlie.

I did all of this for us!

NURSE ON!

ACKNOWLEDGMENTS

I want to recognize the faculty in the Graduate Nursing Program, Dr. Kathleen Hall, Dr. K. Bridget Marshall, Dr. Stacie Schreiner, and Dr. Karen Urban, for their encouragement, support, and wisdom. I would like to thank Patrick Oglesby for his encouragement and comradery throughout this journey.

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COMMUNICATION OF CRITICAL PATIENT DATA IN A RURAL PRIMARY CARE SETTING

Clinicians rely on patient data during the clinical decision-making process. Delays in clinicians' receipt of patient data pose risks to patients and unfortunately, are not uncommon in busy primary care settings. Primary care settings may benefit from implementing strategies to improve the communication of patient data.

Background

Patient data are defined as individual patient information relevant to decisions about current or future health or illness (Segen's Medical Dictionary, 2011). Patient data include vital signs, laboratory tests, imaging, and diagnostic testing results. Critical patient data (CPD) are defined as values representing pathophysiological states at such variance with normal as life-threatening unless something is done promptly (Lundberg, 1972 as cited in Lundberg, 1990). Early recognition of CPD by health care providers is essential to quality care. The Joint Commission has prioritized safe and timely communication of CPD as a national patient safety goal (NPSG.02.03.01) (The Joint Commission: 2021 National Patient Safety Goals, 2021).

Delayed recognition of critical patient data (DRCPD) increases the possibility of negative consequences for patients, their providers, and the health system. See Table 1.1. Casalino et al. (2009) reported that DRCPD occurred once for every 14 tests ordered in the outpatient setting. DRCPD included imaging studies, laboratory results, anatomic pathology, microbiology results, and diagnostic procedures (Callen et al., 2011; Casalino et al., 2009; Wahls & Cram, 2007). Whals and Cram (2007) reported that DRCPD was associated with cancer, endocrine, and cardiac disorders (Figure 1.1). Strategies for prompt recognition of CPD are essential to quality care.

Table 1.1

Consequences of Delayed Recognition of Critical Patient Data

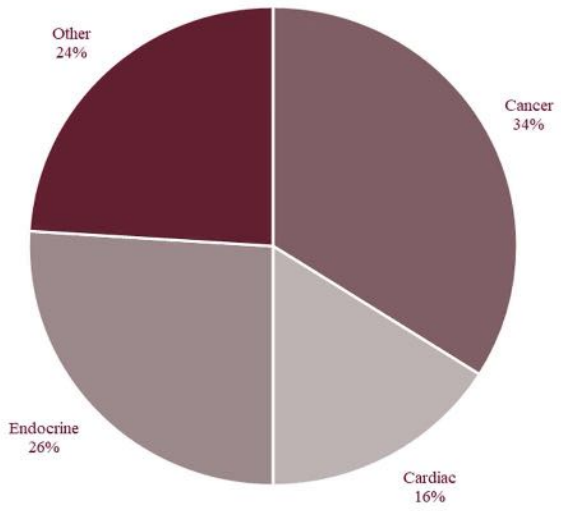
UOA	Consequences
Patients	Delay in the diagnosis of malignancy leading to metastasis (Callen et al., 2011).
	Sub/supra-therapeutic lab values & poorly titrated medications (Callen et al., 2011; Casalino et al., 2009; Rinke et al., 2018).
	Secondary infection r/t untreated/undiagnosed primary infection (Callen et al., 2015; Rinke et al., 2018).
	Increased hospital admissions r/t electrolyte, hematology, or drug levels managed in outpatient settings (Callen et al., 2011; Whals & Cram, 2007).
	More extended hospital stays & ADE r/t missed critical values (Callen et al., 2011).
Providers	Lack of clarity r/t where & to whom to report test results for patient follow-up (Callen et al., 2015; Sarkar et al., 2012).
	Lack of clarity r/t critical, unexpected, or significantly abnormal results (Montes et al., 2014; Sarkar et al., 2012).

	Alert fatigue & failure to recognize critical values (Callen et al., 2015). Malpractice litigation, per-claim payment r/t permanent, severe morbidity accounted for 4.5% of paid claims (mean payout $808,591) (Saber Tehrani et al., 2013).
HCS	Malpractice outpatient diagnostic error litigation claims outnumber inpatient claims (68.8% versus 31.2%, $p<0.001$) (Saber Tehrani et al., 2013). Reduced hospital reimbursement for readmissions (with the same diagnosis) within 30-days of hospital discharge (CMS, 2021).

Note. UOA = unit of analysis; r/t = related to; ADE = adverse drug event; CMS = Centers for Medicare & Medicaid Services; HCS = health care system.

Figure 1.1

Distribution of Treatment Delays



Note. Distribution of treatment delays reported by providers related to missed test results. Adapted from "The Frequency of Missed Test Results and Associated Treatment Delays in a Highly Computerized Health System," by T. L. Wahls & P. M. Cram, 2007, http://www.biomedcentral.com/1471-2296/8/32

Gap in Practice

A Doctor of Nursing Practice (DNP) student partnered with a healthcare stakeholder to complete a needs assessment of a rural primary care clinic. This clinic was one of three clinics that the stakeholder oversaw. These clinics were part of a larger health care organization. The needs assessment indicated a problem with DRCPD, especially with laboratory tests, stemming from poorly defined communication processes in and among the electronic health record (EHR), primary care providers (PCPs), and clinical staff (Mick, 2021). The clinical environment was marked by high staff turnover, disparities between staffing needs and responsibilities, and corporate policies with remote management (Mick, 2021). See Appendix A for the abstract of the needs assessment.

Purpose & Strategic Planning

This scholarly project (SP) aimed to develop and implement a communication pathway for the reporting of CPD in a rural primary care setting. This SP served as one step in facilitating prompt recognition of CPD. Planned activities included an assessment of current relevant literature, the development of communication pathways, and the execution of an implementation plan. Cost considerations included staffing relative value units (RVUs), modifications in information technology (IT), and staff training. Buy-in from the stakeholder existed as an ongoing quality improvement (QI) project for improving patient outcomes and safety. Strategic planning was planned frequently throughout the SP. Table 1.2 defines SP terms.

Table 1.2

Definition of Terms

Term	Definition
Development	The act, process, or result of developing (Merriam-Webster, n.d.-a).
Communication pathway	An established connection between two endpoints, each on separate servers or zones. The connection may be configured with appropriate communication protocols (Glosbe, n.d).
Critical patient data	Values representing pathophysiological states at such variance with normal can be life-threatening unless something is done promptly (Lundberg, 1972 as cited in Lundberg, 1990).
Implement	Carry out, accomplish. To give practical effect to & ensure actual fulfillment by concrete measures (Merriam-Webster, n.d.-b).
Report	An official document giving information about a particular subject (Merriam-Webster, n.d.-c).

SECTION 2

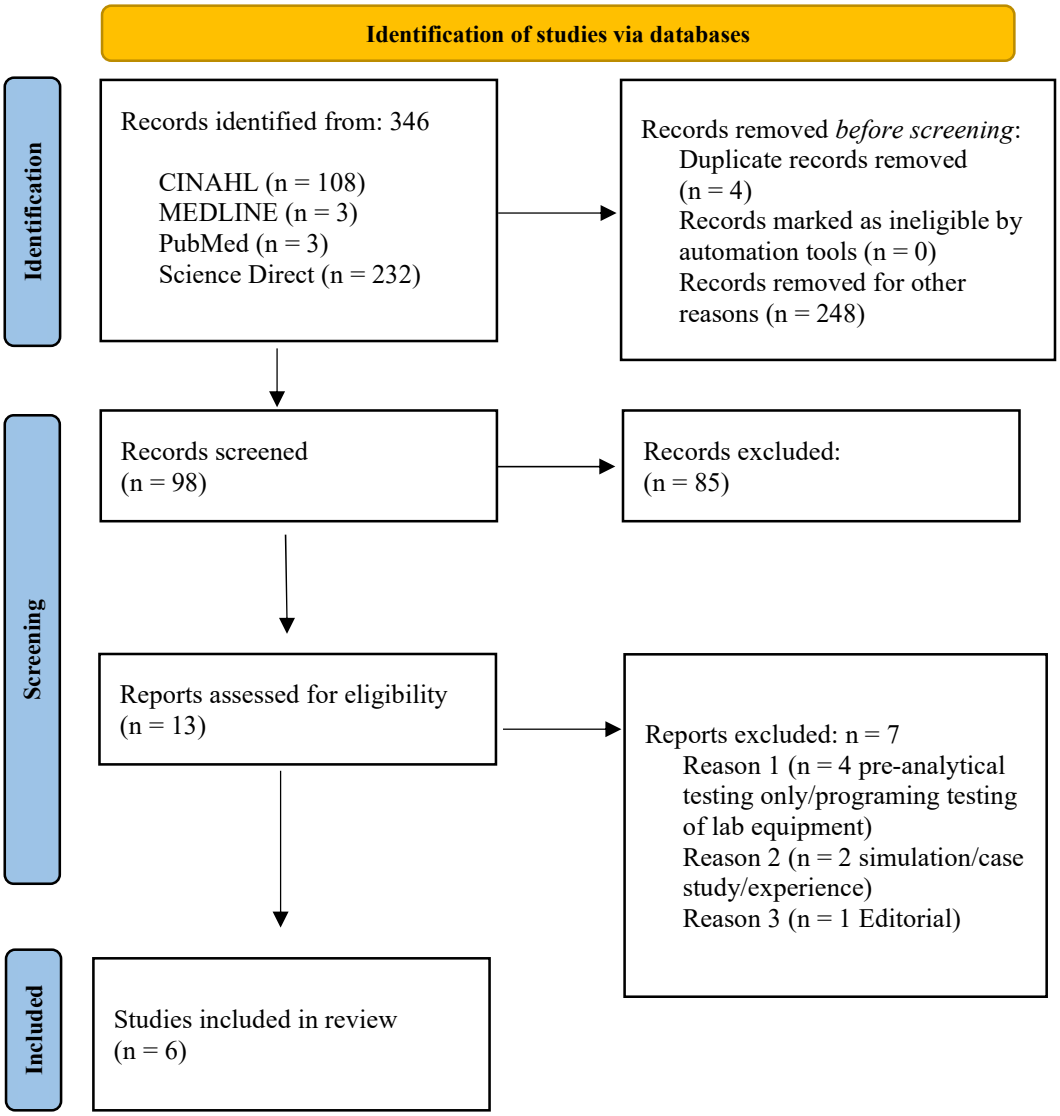
INTEGRATED LITERATURE REVIEW

An integrated literature review was completed using an adaptation of the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines to identify best practices related to the development and implementation of communication of CPD (see Figure 2.1). Databases used for article retrieval were the Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, and Science Direct. MeSH Search terms included: ("critical value" OR "critical patient data" OR "critical risk") AND communicat* AND report* AND ("primary care" OR "primary health care" OR "primary healthcare" OR "general practice" OR "gp").

The initial search produced 346 articles. Articles published in languages other than English, published prior to 2011, not peer-reviewed, and duplicate records were excluded. Ninety-eight articles' titles and abstracts were reviewed for inclusion and exclusion criteria (Table 2.1). After title and abstract review, 76 articles were excluded. Twenty-two articles were reviewed in full. Thirteen articles were reviewed in full text, with seven excluded for reasons listed in the flow diagram (Figure 2.1). A summary of the literature reviewed appears in Table 2.2.

Figure 2.1

Flow Diagram for Integrated Systematic Review



Note. The flow diagram is an adaptation from PRISMA DIAGRAM systematic integrated literature review from Page et al., 2021, http://www.prisma-statement.org/

Table 2.1

Article Inclusion & Exclusion Criteria

Inclusion	Exclusion
English language	Other languages than English
Publication date <10 years	Publication date prior to 2011
Peer-reviewed	Not peer-reviewed
Study location in an outpatient setting	Study location inpatient care setting only
Communication processes	Abstracts for conferences
Reporting processes	Bulletin report
	Editorial
	Laboratory process testing (instrumentation or validity of process for specimen)
	Research on research techniques (e.g., human testing processes)

Table 2.2

Articles Included in Review

Author(s) (date)	Purpose	Sample	LOE & Study Design	Interventions (Communication Process)	Findings	UOA & Implications (D/I)
Maillet et al., (2018)	Identify the main impacts of health IT on the primary laboratory testing in primary care.	N = 22 articles	Level V; Systematic review	TTP Process in 5 phases	Outlined TTP process: pre-pre-analytic (access to prior labs, practice guidelines), pre-analytic (appropriate tests), intra-analytic (trackable, +/- user-friendly IT systems), post-analytic (faster reporting, elimination of manual entry, satisfaction if not technical problems), post-post-analytic (faster report to provider but not always to patients). Facilitators: clinician documentation of CPD receipt/viewing, improved communication between patients, providers, & patient-centered care. Barriers: technical failure, user error, role ambiguity, unclear routing & responsibility.	Institutional: D, I Interpersonal: I Individual: I
Montes et al., (2014)	Reporting delivery methods of CPD & role of the person receiving CPD	N = 70 PCP offices	Level VI Single descriptive study	Communication delivery methods	Delivery of CPD: majority (77.1%) ≥ 1 method; majority (92%) telephone &/or fax; 31% EHR notification; 11.6% mobile app. Initial Receipt CPD: 42.9% multiple personnel; 40.0% secretary; 38.6% nurse; 51.4% physician; 27.2%; barriers: lack of SOP, inadequate	Structure: D, I Institutional: D, I Interpersonal: I

					training; facilitators: RBVR, clear SOP	
Piva et al., (2014)	Assess the effectiveness of automated CPD notification on CDM inpatient than outpatient processes.	117 tests	Level VI Descriptive study	HIS generated automated notification system	First group INRs: 100% CPD reported GP change or stop warfarin dose; 24% repeat INR to confirm CPD; 5% medical exam by consultant; 0% admitted for hospitalization Second group hyperkalemia: 65% K+ unexpected finding, treatment received within 4 hours; 45% admitted to hospital for intervention.	Structure: D, I Institutional: D, I
Reiner, (2013a)	Creation of standardized communication databases to record, track & analyze all CPD communication & supporting data creating accountability.	1 VA health care system	Level VII	Development of schema for CRC	CRC recommended data inclusive of classification, follow-up recommendations, anatomic location, finding/diagnosis, & degree of urgency; facilitator: reporting time component	Structure: D, I Institutional: D, I Interpersonal: I
Reiner, (2013b)	Provide a practical schema of communication of CPD.	1 VA health care system	Level VII	CRC Schema	Provided predictable & sequential steps for CRC process: identification & classification; creation of CRC instrument; transmission of CRC; receipt & acknowledgment of CRC; recipient feedback with an option for consultation; initiation of clinical intervention/follow-up actions; diagnostic confirmation; analysis of CPD in compliance with standards. Facilitators: standardized, predictable, & sequential CRC process, mandatory data fields, data to support research,	Structure: D, I Institutional: D, I Interpersonal: I

					education & training, decisional support, creation of clinical guidelines, quality assurance, individual & institutional performance assessment & clinical outcomes analysis. Classification: emergent, discrepant, unexpected, clinical request Urgency: hyper-acute (<1h), acute (<6hr), subacute (<24h), routine (<72h), & follow up	
Salinas et al., (2013)	Development, implementation & evaluation of a CRC concept in primary care.	4309 lab requests 10 PCPs	Level IV Prospective Analysis Study	Receipt & timely communication of CPD through LIS	Receipt of CPD changed patient care; PCP satisfaction (90%) valued CRC notification. Facilitators: institutionalized process regardless of provider interest. Barriers: failure to look at LIS, failure to respond to flagged values, missing results suggestive of disease.	Structure: D, I Institutional: D, I Interpersonal: I

*Note***.** LOE = level of evidence per *Evidence-Based Practice in Nursing & Healthcare: A guide to best practice* (Melnyk & Fineout-Overholt, 2019); UOA = unit of analysis; D = development; I = implement; CPD = critical patient data; CRC = critical reporting communication; EHR = electronic health record; GP = general practitioner; HIS = health information system; LIS = laboratory information system; PCP = primary care provider; CDM = clinical decision making; TTP = total testing process; SOP = standard operating procedure; RBVR = read back verify result.

Synthesis of Findings

Literature supported the importance of a communication process that was clearly defined, accountable, and timely (Maillet et al., 2018). Communication pathway development and implementation strategies were identified and organized using the social ecology model (Bronfenbrenner, 1974). While strategies existed at the structure, institutional, interpersonal, and individual levels, no evidence from the literature review reflected the community level of analysis.

Structure Level

Development and implementation strategies at the structure level were concerned with policy compliance (Montes et al., 2014; Piva et al., 2014). Reiner (2013a, 2013b) discussed the development of communication tools within the Veterans' Administration (VA) health system. Communication tools classified and defined the urgency of radiology results and tracked compliance with national (Clinical Laboratory Improvement Amendments [CLIA], American College of Radiology [ACR]) and institutional organizations (VA policies) (Montes et al., 2014; Piva et al., 2014).

Institutional Level

Development strategies included IT modifications to enhance documentation and communication processes (Maillet et al., 2018; Montes et al., 2014; Reiner 2013a, 2013b; Salinas et al., 2013). Institutional facilitators included having automated IT systems, allowing more organized and readily available results (Maillet et al., 2018). Strategies that received higher provider satisfaction were systems that automatically classified and sent an email notification of the CPD directly to the provider (Maillet et al., 2018).

Delivery methods of CPD at the institutional level varied (fax, email, phone call, mobile app, or mixed [both telephone call and fax]) (Maillet et al., 2018; Montes et al., 2014). Physicians supported developing and implementing CPD criteria and transparent policies, which increased adherence to clinical guidelines (Salinas et al., 2013; Reiner, 2013a, 2013b). A clear institutional standard operating procedure (SOP) aided in navigating the procedural system for communication (Montes et al., 2014; Reiner, 2013a). A lack of a SOP and an inadequate amount of training increased institutional obstacles (Montes et al., 2014). Workflow communication processes described in the literature are described in Table 2.3.

Table 2.3

Workflow Communication Processes

Reference	Description of Impact	Processes
Maillet et al., (2018)	The entire testing process was clearly defined, with critical steps for each phase.	Phases & critical steps
Reiner, (2013a, 2013b)	Critical result communication was predictable & sequential in steps throughout the reporting process.	Sequence of communication
Salinas et al., (2013)	Critical results were agreed upon & providers were alerted when present.	Automatic alerts
Reiner (2013b)	Levels of urgency were differentiated & used to establish provider notification turnaround times.	Communication turnaround time

Health IT systems that had direct synchronization with the EHR had better communication rates, higher rates of acknowledgment from the providers, and a timelier turnaround time between notification and intervention or diagnosis (Maillet et al., 2018;

Montes et al., 2014). Systems requiring a separate login or downloading and uploading information had longer times for interpretation and intervention with higher risks for communication breakdown (Salinas et al., 2013). Health IT systems had a better implementation of communication pathways when a SOP and training were made available (Maillet et al., 2018; Montes et al., 2014).

Interpersonal Level

Implementation of the CPD communication pathways was related to the timeliness of reporting, the methods of result delivery, and the role identification of the person receiving the result (Maillet et al., 2018; Reiner, 2013a, 2013b; Salinas et al., 2013). Identifying results' urgencies and implementing turnaround times increased clinical response (Reiner, 2013b). Implementing role responsibilities provided clarity of roles and standard operating processes with reduced role ambiguity (Maillet et al., 2018; Reiner, 2013a, 2013b; Salians et al., 2013). Non-clinical personnel receiving or retrieving critical results did not always understand the critical nature of the result (Salinas et al., 2013). Communicating CPD in more than one format (e.g., telephone and fax communication) improved integration into electronic systems and allowed documentation related to results, increasing accountability (Montes et al., 2014).

Individual Level

Implementation strategies at the individual level were related to documenting and viewing results. Having a defined process increased accountability (Maillet et al., 2018; Reiner et al., 2013b). Outlining specific steps throughout the testing process improved documentation and communication between clinicians (Maillet et al., 2018). Role ambiguity and unclear responsibilities increased the risk that CPD might be overlooked

by clinicians (Maillet et al., 2018; Salinas et al., 2013). Workload volume contributed to unacknowledged CPD (Salinas et al., 2013). A summary of best practice recommendations is presented in table 2.4.

Table 2.4

Summary of Best Practices for Communication of CPD

Best Practices for CPD
1. Classify the urgency of CPD & reporting timeframes (Montes et al., 2014; Piva et al., 2014)
2. Communicate via 2+ methods (Maillet et al., 2018)
3. Include an automated system (Maillet et al., 2018; Montes et al., 2014)
4. Establish clear policies & procedures with sufficient training of staff at all levels (Montes et al., 2014; Salinas et al., 2013; Reiner 2013a, 2013b)
5. Clarify the roles of who can report/receive CPD (Maillet et al., 2018; Reiner, 2013a, 2013b; Salians et al., 2013)
6. Require documentation for both receipt/viewing of CPD (Maillet et al., 2018)

Note. CPD = critical patient data.

SECTION THREE

THEORETICAL FRAMEWORK

Theories lend meaning, explain, impose order, and logically organize the phenomena of interest (Butts & Rich, 2018). Transition theory guided this SP, as it studies human experiences and responses to transitions or change (Meleis et al., 2000; Meleis, 2010). Transitions theory describes four transitions that often co-exist: developmental, situational, health-illness, and organizational transitions (Meleis, 2010). Organizational transitions were the focus of this project, knowing that the other transitions might have also existed. Organizational transitions were related to changes in leadership, new policy implementation, and changes in communities (Meleis, 2010).

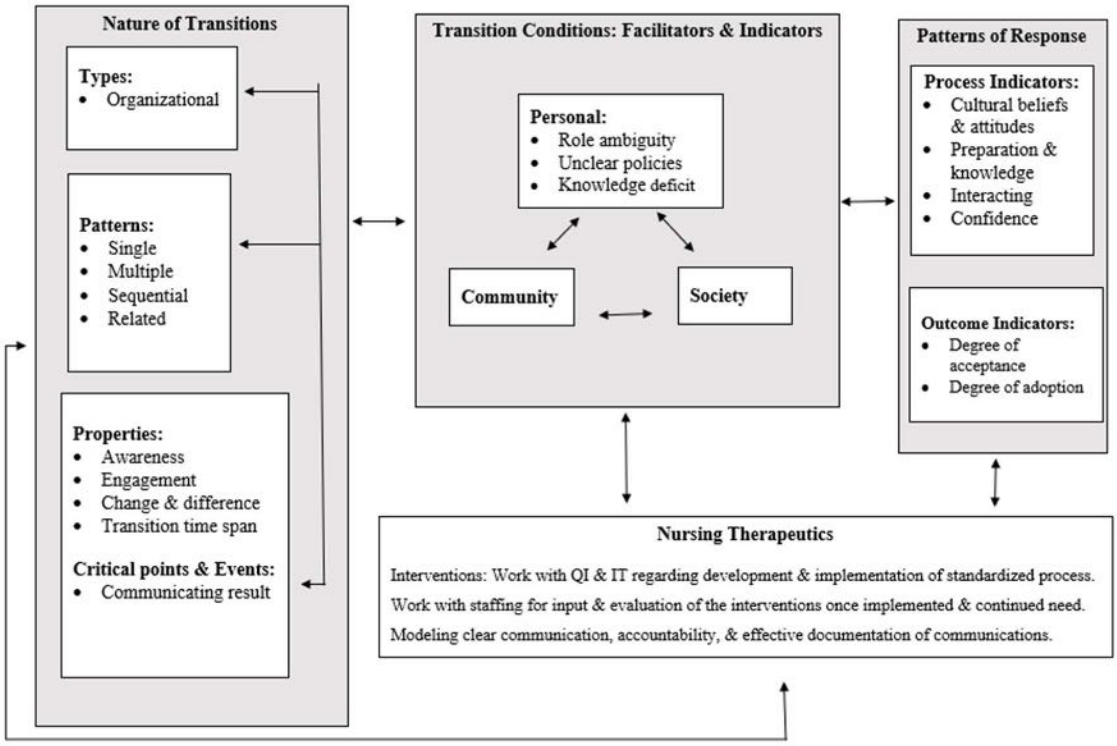
Transition Theory

Transitions theory consists of several core concepts: the nature of the transition, transition conditions (facilitators and inhibitors of transition), patterns of responses, and the impact of nursing therapeutics (Meleis, 2010). The *nature of transitions* is a complex and multidimensional process that refers to the transition process's type, pattern, and properties (Meleis, 2010). The *transition conditions* refer to the personal, community, and societal context in which the transition occurs (Meleis, 2010). The meanings, cultural beliefs, cultural attitudes, and socioeconomic status are inclusive of the personal background (Meleis, 2010). The *patterns of response* refer to the process and outcome indicators that the transition has transpired (Meleis, 2010). As discussed by Meleis et al.,

(2000), the determination of a completed transition must remain flexible and vary based on the nature, pattern, type of change, or event initiating the transition. Process indicators symbolize that the transition is on the course (e.g., successful coping, gaining confidence, or identification of a new role) (Meleis et al., 2000). This SP expanded the transitions framework's applicability to the communication transition process of reporting CPD in the primary care setting. Figure 3.1 outlines an adaptation of transitions theory to the SP.

Figure 3.1

Transitions Theory Framework Adapted for the SP



Note. The flow diagram was adapted from "Experiencing Transitions: An Emerging Middle-Range Theory" by Meleis, A. I., Sawyer, L., M., Im, E-O, Hilfinger Messias, D. K., & Schumacher, K., 2000, *Advances in Nursing Science, 23*(1). https://www.doi.10.1097/00012272-200009000-00006

The transition theory's starting point has been defined as a *triggering event* (Meleis, 2010). The triggering event for this SP was identified as the DRCPD that occurred in the PCP office (Mick, 2021). The SP was to develop and implement an organizational transition change to the process and documentation of communication of CPD. The transitions theory's concepts aligned to this SP are described in Table 3.1.

Table 3.1

Transitions Theory Concepts Adapted to Support Scholarly Project

TT Concept	Adaptation for SP
Conditions that trigger transition	Needs assessment findings: • A concern of overlooked CPD (e.g., lab values, diagnostic results, or vital signs) • No established standardized operational procedure
Nature of transition	Develop & implement a communication pathway for CPD
Transition conditions	The environment in transition with contributing factors: remote management, staff turnover, unclear policies, & role ambiguity Consideration for additional personal, community & societal barriers & facilitators as they are identified
Patterns of response	Process Indicators measured at critical points of time for: cultural beliefs & attitudes, preparation & knowledge, interacting, confidence Outcome Indicators are measured by evaluation of how the planned processes align with actual processes • Degree of acceptance • Degree of adoption

Note. TT = transition theory; SP = scholarly project; CPD = critical patient data.

Doctor of Nursing Practice Essentials

This SP demonstrated advanced education to advance and improve clinical nursing practice. The DNP essentials outline skills to integrate nursing science with organization, biophysical, and analytical sciences (AACN, 2006). Table 3.2 outlines how the SP achieved the domains essential to advanced practice nursing at the doctoral level.

Table 3.2

Doctor of Nursing Practice Essentials 2006

DNP Essential	Evidence of DNP Essential
I: Scientific underpinnings for practice	Organization & synthesis of empirical, theoretical, & praxis knowledge to identify the state of the science for communicating CPD.
II: Organizational & systems leadership for quality improvement & systems thinking	Use of multi-level models (social ecology, transitions theory) to develop & implement CPD communication pathways. Leadership through the development of SP & defense of all activities included in SP.
III: Clinical scholarship & analytical methods for EBP	Submission of abstract of integrated literature review on best practices for development & implementation of CPD communication pathways.
IV: Information systems/technology & patient care technology for the improvement & transformation of health care	Collaboration with information technologist to evaluate & monitor the development & implementation of CPD communication pathways.

V: Health care policy for advocacy in health care	Completion of the CITI Program training & IRB approval as QI. Development & implementation of policy or procedures for health care change.
VI: Interprofessional collaboration for improving patient & population health outcomes	Collaboration with interprofessional stakeholders across a multidisciplinary spectrum for health care delivery.
VII: Clinical prevention & population health for improving the nation's health	Healthcare delivery continuum for recognition of CPD in the primary care setting. Investigating population statistics for consequences of DRCPD.
VIII: Advanced nursing practice	Use of the transition theory centering around the implementation of change. Assumption of accountability for all SP activities.

Note. Adapted from *the essentials of doctoral education for advanced nursing practice,* from American Association of Colleges of Nursing (AACN) essentials to nursing practice (AACN, 2006). DNP = Doctor of Nursing Practice; SP = scholarly project; PF = project facilitator; CITI = Collaborative Institutional Training Initiative; IRB = Institutional Review Board; EBP = evidence-based practice; CPD = critical patient data; QI = quality improvement; DRCPD = delayed recognition of critical patient data.

SECTION FOUR

METHODOLOGY

The purpose of this SP was to develop and implement a communication pathway for the reporting of CPD in a rural primary care setting. The project was completed in one of three primary healthcare settings affiliated with a larger health care system. The social ecology model (Bronfenbrenner,1974) was used to organize the findings from the literature. These findings served as the basis for the creation of a QI checklist for communicating CPD. Transitions theory (Meleis, 2010) and the model for improvement (MI) (Langley et al., 2009) were used to guide project implementation and evaluation.

Ethical Considerations

Ethical considerations included training through the Collaborative Institutional Training Initiative (CITI) and applying to the university's Institutional Review Board (IRB). The IRB determined this project to be QI (IRB #21-34) (see Appendix B). The IRB determined that the project was not research involving human subjects as defined by 45 CFR 46.102(e).

Procedures

The MI was used to guide the project procedures. Components of MI included three fundamental questions and plan-do-study-act (PDSA) cycles. The three fundamental questions related to the SP are outlined in Table 4.1. The PF planned to meet

weekly with the stakeholder throughout all PDSA cycles. Planned procedures were outlined and dependent on stakeholders' prioritization of action items and needs. Table 4.2 outlines the first planned PDSA cycle. Sample PDSA cycles were drafted based on the best practices for communication of CPD. The stakeholder determined subsequent PDSA cycles based on specific needs for the clinic. See Table 4.3.

Table 4.1

MI Fundamental Questions Related to SP

MI Question	SP Component
What is trying to be accomplished?	Development & implementation of a communication pathway for reporting critical patient data.
How will it be determined that the change is an improvement?	1. Percentage of providers that accept or reject proposed change/transitions. 2. Ongoing measurement of data from each cycle after implementation of new change/transitions. 3. Summarization of facilitators & inhibitors related to transition conditions.
What changes can be made that will result in improvement?	Intake of the current practice compared to best practice collected through inventory. Discrepancies were identified & action items were prioritized by stakeholder need(s).

Note. Model for improvement fundamental questions adapted to the scholarly project (Langley et al., 2009). MI = model for improvement; SP = scholarly project.

Table 4.2

Plan-Do-Study-Act Cycle 1

	PDSA Cycle 1
Plan	Review the findings from the literature review with stakeholders; this included best practices identified in the literature for the reporting of CPD.
Do	Construct a fact sheet & inventory tool based on best practices provided by current literature. Present inventory tool to stakeholders.
Study	Compare current practice to best practice to identify discrepancies.
Act	Stakeholders prioritize the inventory based on their specific needs.

Note. CPD = critical patient data.

Table 4.3

Planned PDSA Cycles

Action Items	PDSA	Measures
Classify urgency of CPD	P: Draft best practice urgency classification of CPD D: Present to PCP S: Modify draft r/t feedback; identify facilitators & inhibitors A: Revise or agree & implement	1. Percentage of PCP that agree with drafted proposal (adoption: rejection) 2. % reported using urgency classification of CPD/wk.: %CPD/wk. 3. Facilitators & inhibitors
Define reporting timeframes	P: Draft timetable for best practice for reporting CPD to PCP D: Present to PCP & clinical staff S: Modify draft r/t feedback; identify facilitators & inhibitors A: Revise or agree & implement	1. Percentage of PCP that agree with drafted proposal (adoption: rejection) 2. % reported CPD using timeframes classification of CPD/wk.: %CPD/wk. 3. Facilitators & inhibitors
Communicate via 2+ methods	P: Draft best practice for delivery of CPD D: Present to PCP & staff S: Modify draft r/t feedback; identify facilitators & inhibitors A: Revise or agree & implement	1. Percentage of PCP that agree with drafted proposal (adoption: rejection) 2. % reported using preferred delivery of CPD/wk.: % CPD/wk 3. Facilitators & inhibitors

Included in an automated system	P: Draft best practice delivery of CPD with automated EHR D: Present to PCP & IT S: Modify draft r/t feedback; identify facilitators & inhibitors A: Revise or agree & implement	1. Percentage of PCP & IT that agree with the drafted proposal (adoption: rejection) 2. % reported using automated EMR system for CPD/wk.: % CPD/wk. 3. Facilitators & inhibitors
Establish clear policies & procedures with sufficient training for staff at all levels	P: Draft sequential steps for access & training for current P&P in place D: Present to stakeholders & PCP S: Modify draft r/t feedback; identify facilitators & inhibitors A: Revise or agree & implement	1. Percentage of PCP that agree with drafted proposal (adoption: rejection) 2. % reported using P&P for CPD/wk.: % CPD/wk. 3. Facilitators & inhibitors
Clarification of who can report/receive CPD	P: Draft roles & duties that are identified with each role D: Present to stakeholders & staff S: Modify draft r/t feedback; identify facilitators & inhibitors A: Revise or agree & implement	1. Percentage of stakeholders & staff that agree with the drafted proposal (adoption: rejection) 2. % reported using a new role identification for communicating CPD/wk.: % CPD/wk. 3. Facilitators & inhibitors

Require documentation for both receipt/viewing of CPD	P: Draft documentation sequence D: Present to stakeholders & PCP S: Modify draft r/t feedback; identify facilitators & inhibitors. A: Revise or agree & implement	1. Percentage of PCP that agree with drafted proposal (adoption: rejection) 2. % reported using required documentation for CPD/wk.: % CPD/wk. 3. Facilitators & inhibitors

Note. The stakeholder determined plan-do-study-act cycles depending on the discrepancies of current practice & prioritized on an as needed basis. CPD = critical patient data; EMR = electronic medical record; PCP = primary care provider; P&P = policies & procedures; r/t = related to; wk.= week.

Instrumentation

An information sheet based on best practices found in the literature was created by the PF for the purpose of this project. This information was organized into an inventory sheet to document current practices and identify discrepancies. The inventory tool was reviewed with the stakeholder and approved for use before implementation (see Appendix C).

Data Collection & Measures

Data were collected on baseline practices using the inventory tool and prioritized by the stakeholder. PDSA cycles were prioritized from the stakeholder's highest need to the lowest. Data from each PDSA cycle were collected in three categories: provider acceptance/rejection of proposed best practice intervention, the ratio of CPD best practice opportunities to actual uses per week, and facilitators/inhibitors related to transition conditions. Once implemented, the data collected in each category were stored using a password-secured computer and Excel spreadsheet that remained at the facility. A field journal was maintained for ongoing documentation of additional recommendations and changes as they occurred during the SP.

The Statistical Program for Social Sciences (SPSS, IBM SPSS Statistics 27) analyzed quantitative data. The planned analysis included synthesizing provider acceptance/rejection of each best practice and adoption or rejection of best practices per week. Data entry was recorded using Excel to minimize errors using the double-entry technique. A summary of transition conditions, facilitators and inhibitors was compiled according to themes. Levels of planned data analysis are described in Table 4.4.

Table 4.4

Levels of Planned Analysis

Datum	Level
The ratio of accepting: reject drafted proposal	• Quantitative PDSA cycle, when proposed
The ratio of opportunities: used best practice	• Quantitative PDSA cycle when implemented (initial) & subsequent PDSA cycles (ongoing)
Facilitators & Inhibitors	• Qualitative Summary of themes

SECTION FIVE

RESULTS

The purpose of this SP was to develop and implement a communication pathway for the reporting of CPD in a rural primary care setting. The project was completed over a ten-week period in one of three primary health care settings affiliated with a larger health care system. The stakeholder requested that international normalized ratio (INR) laboratory values be initially prioritized for this project. Thus, PDSA cycles specifically addressed communication pathways for INRs.

Process Evaluation

A comparison of planned and actual procedures is outlined in Table 5.1. Modifications were made due to transition conditions and condition factors. According to Meleis (2010), transition conditions affect the transition process by facilitating or inhibiting a change in process or behavior. Condition factors may be personal, community, societal, or global. The first PDSA cycle was planned to last one to two weeks but lasted six weeks due to the transition conditions shown in Table 5.1. The fact sheet (Appendix C) and inventory tool (Appendix D) were developed and approved by the stakeholder. A comparison between actual and best practices did occur and discrepancies were noted. Post-implementation, a modification was made to the inventory tool to accommodate an option for “other identified needs” (Appendix E).

Table 5.1

Process Evaluation & Process Indicators

PDSA Cycle (Week)	Planned Procedures	Actual Procedures	Impact (if any) on Process
1	Translation of Evidence into Clinical Instruments		
(Week 1-6)	P: Review with stakeholders findings from literature review for reporting CPD	P: Review with stakeholders findings from the literature for the reporting of CPD	No changes made to P, D, S Timeframe for A was increased
	D: PF constructed a fact sheet & inventory tool based on best practices Present inventory tool to stakeholders	D: PF constructed a fact sheet & inventory tool based on best practices Present inventory tool to nursing staff & stakeholders	Outcome: 100% (N=9) adopted
	S: Compare current practice to best practice to identify discrepancies	S: Compare current practice to best practices to identify discrepancies	
	A: Stakeholders prioritize the inventory based on their specific needs	A: Stakeholders prioritize the inventory based on their specific needs	
2	Clear Procedures for INR Reporting		
(Week 7-10)	P: Draft sequential steps for access & training for current P&P in place	P: Drafted steps for procedures in INR procedural guide based on established policies	P was modified to specifically address INRs per established policies
	D: Present to stakeholders & PCP	D: Presented to stakeholders & PCP	D was completed
	S: Modify draft r/t feedback; identify facilitators & inhibitors	S: Not completed	S & A were not completed, due to competing commitments for stakeholders
	A: Revise or agree & implement	A: Not completed.	Outcome: N/A

3	Clear Roles & Responsibilities for INR Receipt & Reporting		
(Week 7-10)	P: Draft roles & duties that are identified with each role D: Present to stakeholders & staff S: Modify draft r/t feedback; identify facilitators & inhibitors A: Revise or agree & implement	P: Drafted roles & duties for inclusion in INR procedural guide for staff D: Presented to stakeholders & PCPs S: Not completed A: Not completed	P & D were completed & modified to specifically address INRs S & A were not completed, due to competing commitments for stakeholders Outcome: N/A
4	Documentation of INR Receiving & Reporting		
(Week 7-10)	P: Draft documentation sequence D: Present to stakeholders & PCP S: Modify draft r/t feedback; identify facilitators & inhibitors A: Revise or agree & implement	P: Drafted sequential steps for documentation & coding as a component for inclusion in INR procedural guide D: Presented to stakeholders & PCPs S: Not completed A: Not completed	P & D were completed & modified to specifically address INRs S & A were not completed, due to competing commitments for stakeholders Outcome: N/A

Note. Comparison of planned PDSA cycle to completed PDSA cycles. P=plan; D=do; S=study; A=act; CPD = critical patient data; INR = international normalized ratio; PCP = primary care provider; P&P = policy & procedure; RN = registered nurse; r/t= related to.

Subsequent PDSA cycles (PDSA 2-4) were planned sequentially but were run simultaneously. The PF developed a procedural guide for INR communication, including defined roles and responsibilities for INR receipt and reporting, and clarification of documentation. However, the stakeholder had competing commitments and other clinic responsibilities took priority over approval of the drafted procedural guide. Transition conditions that impacted PDSA cycles two through four included staff turnover, management turnover, and a global pandemic. Staff turnover, in particular, resulted in less investment among the new staff members in the project. Facilitating conditioning, defined by Meleis et al. (2010) as factors that aid the transition, were present. Facilitating conditions included a newly hired and motivated clinical nurse manager and receptive nursing staff.

The outcome for PDSA cycle one was 100% (N=9) adoption by the stakeholders. Outcomes for PDSA cycles two through four could not be determined because the PDSA cycles were developed but were not completed. However, the stakeholder is expected to complete the PDSA cycles and can measure the outcomes of each upon completion. According to Meleis et al. (2000), nursing therapeutics affects the outcomes of transitions. Even at the organizational level, nursing therapeutics improved the outcomes of the transition process. For example, the PF created the inventory tool based on findings in the literature on best practices for reporting of CPD. However, based on the stakeholder's request to prioritize INR reporting, the inventory tool was modified to account for the unique request of this clinic.

Project Evaluation

The purpose of this project was to develop and implement a communication pathway for reporting of CPD in a rural primary care clinic. The project outcomes indicate that the project partially met this purpose. The development of a communication pathway for reporting CPD in rural primary care setting was completed. However, the implementation of the communication pathway was only partially completed. The best practices fact sheet, inventory tool, and the modified inventory tool were implemented. However, the INR procedural guide, including staff roles and responsibilities, and documentation procedures, was pending approval for implementation by the end of the project period.

Sustainability Plan

The SP has been returned to the stakeholder for their continuation. The clinical nurse manager and nursing staff plan to continue to work with the medical providers on the communication process for INRs within the clinic. A project champion was identified within the clinic that can aid in further project implementation. Transferability was reviewed with the stakeholder, as this process can be continued with additional CPD, including imaging results and diagnostic testing (Maillet et al., 2018, Montes et al., 2014, Piva et al., 2014, Reiner 2013a, 2013b; Salinas et al., 2013). The stakeholder was equipped with measuring outcomes within their current EHR system. The PF extended an offer to consult, if needed, to aid in sustainability. Cost considerations for sustainability include ongoing staff and provider education and EHR upgrades, if needed. However, the potential for improved patient care and reduced hospitalizations would likely offset these costs.

SECTION SIX

DISCUSSION

The identified clinical gap in practice was a delay in reporting of CPD in the primary care setting. The purpose of this project was to develop and implement a communication pathway for CPD. Evidence supports interventions to improve the communication process at multiple levels within a health care system (Maillet et al., 2018; Reiner, 2013b). Developing and implementing a communication pathway that is clearly defined, accountable, and timely has the potential to improve patient, provider, and health system outcomes (Maillet et al., 2018).

Meleis et al. (2000) stated that transitions result *in* change, and result *from* the change. Meleis et al. (2000) identified nursing therapeutics as the nurse's role in facilitating organizational transitions. Nursing therapeutics include the promotion and restoration of organizational health (Im, 2022; Meleis, 2010). Creating conditions conducive to a healthful transition can be done by considering a holistic experience of transition (Meleis, 2010). For the purpose of this project, assessments and interventions were considered at multiple levels, supporting the concept of holism. The PF used nursing therapeutics, specifically clear communication, role-modeling, and cultural competency, to facilitate transition. Clear communication was exemplified through the development of the INR procedural guide. Role-modeling was exemplified through assumption of responsibility of all project activities. Cultural competency was

exemplified through the modification of the inventory tool to include the unique needs of the clinic.

Dissemination

Dissemination is an integral part of promoting nursing as a discipline and science (AANC, 2006). The dissemination plan included presenting the needs assessment at the community-wide student showcase in the spring of 2021. The literature review and synthesis is be presented at the National Nurse Practitioner Symposium (NNPS) in July 2022. The completed project was distributed to the stakeholder in April 2022 and presented to the graduate nursing faculty. The PF will submit the project to the Doctoral Project Repository, designed to share ideas and work products with the scholarly and consumer communities (Doctors of Nursing Practice, 2022). The PF will submit the project's results as an abstract for presentation at the NNPS in 2023.

DNP Essentials & Nursing

The Doctor of Nurse Practice (DNP) essentials are defined by the American Association of Colleges of Nursing (AACN, 2006) and outline eight areas in which a DNP graduate should be able to influence. My role as PF, and utilizing the social ecological model, transitions theory, and the MI, assisted in meeting all eight essentials during this project, as outlined in Table 3.2. This SP was an opportunity to apply a systematic process to promote change in practice. Even in a turbulent system, I was able to discover new knowledge related to communicating CPD in primary care. As a DNP-prepared APRN in charge of patient care and health systems, I have the ability to improve care at the individual and aggregate levels.

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APPENDIX A

NEEDS ASSESSMMENT CONDUCTED SPRING SEMESTER 2021

ABSTRACT

Goal: Evaluating critical lab reporting in a rural primary care setting.

Background: A critical lab value represents a variance from the normal lab value. The risk of a life-threatening complication can occur if laboratory reporting is not prompt. The electronic medical record is designed to facilitate timely reporting of critical lab values to health care providers about patients. The lack of a standardized communication process for critical lab values between the lab, providers, and patients jeopardizes patient care.

Purpose: To identify gaps in the current communication process of critical lab values from the laboratory to the health care provider and the patient.

Methods: A needs assessment was conducted in the primary care clinic in a rural southwestern United States. The project facilitator, with the collaboration of the clinics' stakeholders, collected descriptive data to inventory the current communication process of critical lab values. The social ecology model (Bronfenbrenner, 1977) was used to organize data. Descriptive data analysis was conducted to identify gaps in the clinic's communication processes.

Implications: Identification of communication gaps between the lab, providers, and patients inform clinic system changes to improve patient quality of care.

APPENDIX B

INSTITUTIONAL REVIEW BOARD LETTER
OF DETERMINATION

Sponsored Programs
1100 North Avenue • Grand Junction, CO 81501-3122
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INSTITUTIONAL REVIEW BOARD (IRB)
CMU Federalwide Assurance Number: 00024298

TO: Whitney Mick

FROM: Dr. Cheryl K. Green CKG
Director of Sponsored Programs; Research Integrity Officer

SUBJECT: IRB Determination of Human Subject Research

DATE: March 4, 2021

STUDY: **Protocol 21-34: Reporting Critical Lab Values in a Rural Primary Care Setting: A Quality Improvement Project**

The Colorado Mesa University Institutional Review Board (IRB) also known as the Human Subjects Committee has reviewed your request for determination of human subject research and based on your answers, your project is deemed to not be research involving human subjects as defined by 45 CFR 46.102(e).

No further IRB review is necessary unless modifications to your project meets the definition of research involving human subjects as defined by federal regulations. Should you wish to conduct this type of research on this project in the future, then please submit an applicable IRB protocol application (i.e., Exempt, Expedited/Full) for IRB review and approval.

IRB Number: **21-34**. This number is your protocol number and should be used on all correspondence with the IRB regarding this study.

Determination Date: March 4, 2021

If you have any questions, please feel free to contact me at irb@coloradomesa.edu.

Best wishes on your project.

APPENDIX C

FACTS SHEET

Best Practice for Reporting of Critical Patient Data (CPD)

- ✓ Classify urgency of CPD & reporting timeframes.
- ✓ Communicate via 2+ methods (e.g., telephone, text, email, fax, face-to-face, electronic health record [EHR]).
- ✓ Include in the automated system (e.g., EHR).
- ✓ Establish clear policies & procedures with sufficient training of staff at all levels.
- ✓ Clarification of roles of who can report & receive CPD.
- ✓ Require documentation for both receipts of CPD & viewing of CPD.

APPENDIX D

DRAFTED INVENTORY SHEET

Best Practices Inventory for Reporting Critical Patient Data (CPD)

Action Items	Evident in Current Practice (Yes/No- Example)	Priority
Classification of urgency of CPD (Based on priority, emergent, discrepant, unexpected, clinician requested)		
Classification of urgency reporting timeframes (e.g., hyperacute <1hr; acute <6hrs; subacute <24hrs; routine <72)		
Communicate via 2+ methods (e.g., telephone, text, fax, face-to-face, EHR)		
CPD included/synchronized in EHR system		
Clear policies & procedures established		
Availability of training of staff (at all levels) for location/understanding of policies & procedures		
Clarification of roles of whom can report CPD		
Clarification of roles of whom can receive CPD		
Documentation for receipt of CPD		
Documentation for viewing of CPD		

Note. Priority to set by rating 1-10 scale (1 = highest priority - 10 = lowest priority)

Inventory Date: _____ Inventory completed by: _____

NOTES: _____

Reviewed by & priority set by: _____

APPENDIX E

MODIFIED INVENTORY TOOL

Best Practices Inventory for Reporting Critical Patient Data (CPD)

Action Items	Evident in Current Practice (Yes/No- Example)	Priority
Classification of urgency of CPD (Based on priority, emergent, discrepant, unexpected, clinician requested)		
Classification of urgency reporting timeframes (e.g., hyperacute <1hr; acute <6hrs; subacute <24hrs; routine <72)		
Communicate via 2+ methods (e.g., telephone, text, fax, face-to-face, EHR)		
CPD included/synchronized in EHR system		
Clear policies & procedures established		
Availability of training of staff (at all levels) for location/understanding of policies & procedures		
Clarification of roles of whom can report CPD		
Clarification of roles of whom can receive CPD		
Documentation for receipt of CPD		
Documentation for viewing of CPD		
Other identified needs		

Note. Priority to set by rating 1-10 scale (1 = highest priority - 10 = lowest priority)

Inventory Date: _____ Inventory completed by: _____

NOTES: _____

Reviewed by & priority set by: _____