DETERMINING THE EFFECTIVENESS OF SYSTEM-BASED SOLUTIONS TO IMPROVE FRAGMENTED CARE FOR ONCOLOGY PATIENTS LIVING IN RURAL AND REMOTE REGIONS: AN INTEGRATIVE REVIEW

A Scholarly Project

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

By

Andrea Nicole Fulmer

Liberty University

Lynchburg, VA

September 23, 2020

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Scholarly Project Chair Approval:

Dr. Dorothy Murphy, DNP, FNP-BC, A.A.C.C. September 23, 2020

ABSTRACT

The purpose of this integrative review is to review, critique, and synthesize the current literature to determine the state of the science related to the established systems approach for improving healthcare management and care coordination of the oncology patient population in rural and remote regions. The oncology patient population with co-existing chronic disease living in rural and remote regions experience fragmented health care. New cancer diagnoses take precedence over other existing comorbidities and require focused and specialized care for lengthy periods of time. Research is significantly limited for the current state of science for the identified patient population living in rural areas, and there are substantial gaps in care coordination via established systems approaches.

Keywords: Oncology, fragmented care, chronic health conditions, rural, care coordination.

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Dedication

This body of work is dedicated to all the men and women living in rural or remote regions fighting cancer and other chronic health conditions. May you remain strong, informed, and never give up on healthcare options. Thank you for allowing my generation to break boundaries and find new ways to provide safe and quality care. You are a gift.

Acknowledgments

To the staff at Liberty University for guidance and for promoting a Christian Worldview to always serve as my compass. Thank you, Dr. Murphy, this integrative review journey was exceptional because of you. Thank you, Michelle Wyatt for serving as a role model, mentor, and always providing sound judgment when I needed it. To my husband, Kevin, thank you for your support and patience throughout the past three years. To Charlotte and Francis, thank you for giving me motivation and the reminder that life is precious and to live in the present. I love you. And thank you dear Lord for giving me strength and courage to move forward and making every moment eminently worthwhile.

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List of Abbreviations

Agency for Healthcare Research and Quality (AHRQ)

American Association of Colleges of Nursing (AACN)

Cumulative Index to Nursing & Allied Health Literature (CINAHL)

Doctor of Nursing Practice (DNP)

Institutional Review Board (IRB)

Levels of Evidence (LOE)

Liberty University (LU)

Medical Subject Headings (MeSH)

Oncology Nurse Navigator (ONN)

Primary Care Provider (PCP)

Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA)

World Health Organization (WHO)

SECTION ONE: FORMULATING THE REVIEW QUESTION

Introduction

Cancer is a complex and chronic disease that varies in treatment regimens dependent upon patient demographics, cancer type, and phase of cancer care trajectory. The complexity of oncology care, whether it is medical, radiation, or surgical oncology, is carefully managed by specialists, while comorbid conditions and adverse side effects secondary to oncology treatments often go unaddressed. Previous studies revealed increased care fragmentation when multiple providers were involved and were also compounded with comorbidities (Sondergaard, et al., 2013). Research on the continuum of cancer care has been mitigated through the use of a nurse navigator, but fragmented healthcare persists due to the complexity of multimodal cancer therapy (Gorin, et al., 2017). Other studies have identified that there is a lack of follow-up appointments after early detection screenings, which prevent transitioning from primary to specialty care (Weaver & Jacobson, 2018).

Geographically-challenged states and rural patients living in the most austere locations face additional complexity in the delivery of healthcare and are left vulnerable to worsening, fragmented health care. While research has investigated the fragmentation of oncology healthcare, there are limited studies on the fragmentation of oncology healthcare for patients living in rural and remote locations. Additional studies identified that rural surgical oncology patients are more likely to experience fragmented care due to seeking high volume surgeons with transitional care at multiple facilities (Hussain, et al., 2015). Therefore, the need for an integrative review is warranted to address the current state of evidence and highlight the gaps pertaining to the literature. The ability to guide future research to support optimal patient care coordination is imperative and at the forefront of today’s healthcare needs.

The need to eliminate fragmented health care in an already-complex healthcare system leaves endless opportunities to improve the quality of healthcare and care coordination, especially for oncology patients with co-existing chronic diseases living in rural and remote locations. According to the 2017 American Society of Clinical Oncology Practice Census Survey, currently 20% of Americans live in rural areas with 9% of oncology providers available in those rural or remote regions (Passwater & Itano, 2018). The Institute of Medicine (2020) forecasted that by 2030, the number of individuals 65 years or older will have doubled and an estimated 23 million new cancer cases will be diagnosed in that same year (National Cancer Institute [NCI], 2020). This is compounded by a prevalence range of multi-morbidities of 50-85% for that age group (World Health Organizations [WHO], 2020). A study conducted on stage III colon cancer patients revealed that an average of $28,737 was saved per patient who selected care at a facility providing both a surgical and medical oncologist compared to a patient receiving care at two different facilities (Hussain, et al., 2015). Whether coordinated or fragmented, every year the cost of cancer is rising with an estimated national expenditure in 2030 well over $150 billion (NCI, 2020).

The Institute of Medicine identified oncology care as a top priority for focusing on fragmented health care (Hussain, et al., 2015). The fragmentation of health care adds to the rising cost of oncology treatment, but it is imperative to ensure consistent, continuous, and comprehensive patient-centered health care to oncology patients who reside in rural and remote regions (Passwater & Itano, 2018). Research has determined that rurally-located cancer patients will not receive all care at the same location, which leads to vulnerability for fragmented care (Hussain, et al., 2015). Furthermore, rural hospitals continue to close based off non-Medicaid expansion states. Over the past decade, rural North Carolina had 89 hospitals close, forcing cancer patients to travel 2-4 hours for care (Piana, 2018). Fragmented healthcare leads to a lack of or delayed care, medication errors, polypharmacy, unmanaged health conditions, and unplanned hospitalizations that negatively impact quality of life (Hershey & Given, 2020). Recent studies have identified that the location of initial cancer treatment has an impact on preventing fragmented health care; however, while this is relevant for urban residents, it is not for rural and remote residents , who are challenged with multiple barriers for oncology care and simultaneous comprehensive care for coexisting chronic illnesses (Molina & Qadan, 2019). For review purposes, the definition of a rural region is one in which the patient must travel more than 60 minutes to a tertiary facility to receive care (Passwater & Ibano, 2018). The rural and remote regions will pertain to locations within the United States.

Defining Concepts and Variables

The conceptual definition of fragmented healthcare for the oncology patient population with co-existing chronic disease living in rural and remote regions is the lack of deliberate care coordination between one or more providers at two different locations. The operational definition for fragmented healthcare are gaps in communication, modes of communication, role of the primary care provider and oncology provider, delay in care, hospital readmissions, and poor quality of care.

Rationale for Conducting the Review

The oncology patient population with co-existing chronic disease living in rural and remote regions experiences fragmented health care (Weaver & Jacobsen, 2018). New cancer diagnoses take precedence over other existing comorbidities and require focused and specialized care for a varied period of time depending on the type of oncology treatment but can extend for months to years (Easly, et al., 2016). Oncologists continue to provide care, collaborating with other specialists, focusing on cancer-related conditions but this leaves little to no care coordination outside of oncological services to address other chronic health conditions (Easley, et al., 2016). Unfortunately, patient care is fragmented leaving comorbidities unaddressed or ignored and the delivery of poor care quality for those medical conditions outside of oncology treatment (Lee, et al., 2018). Depending on the type of cancer and co-existing chronic health conditions, patient healthcare needs rely on the location of clinical facilities and inter-professional collaboration (Easly, et al., 2016). Therefore, care coordination during active cancer treatment is a complex transition period for the patient, causing more confusion of what provider is responsible for different care, which has the potential to lead to medical errors, duplicated diagnostic testing, delay in care, and lost faith in the healthcare system (Sondergaard, et al., 2013). Multiple studies have suggested that fragmented healthcare exacerbates patient comorbidities, limits access to care, financially challenges the patient and healthcare system, and deteriorates patient outcomes.

Purpose and Review Questions

The purpose of this integrative review is to review, critique, and synthesize the current literature to determine the state of the science related to the established systems approach for improving healthcare management and care coordination of the oncology patient population in rural and remote regions. The Agency for Healthcare Research and Quality (AHRQ) acknowledges there are large variations in the delivery of healthcare across America with obstacles that have yet to be overcome (2018). This integrative review will focus on the following clinical question: For oncology patients with chronic health conditions living in rural and remote regions, is there an established systems approach for improving healthcare management and care coordination? The following supplemental questions will assist in guiding the review:

1) Are interdisciplinary healthcare teams coordinating care beyond the oncology center?
2) Where is healthcare being delivered in comparison to the patient's home of record?
3) How are care plans distributed and communicated throughout the cancer trajectory?
4) Is the patient's primary care provider a standalone provider or part of a large facility?

Essentials of Doctoral Education for Advanced Practice Nursing

Essential I

The purpose of the integrative review is to review, critique, and synthesize the current literature to determine the state of the science related to the established systems approach for improving healthcare management and care coordination of the oncology patient population in rural and remote regions, which aligns with the scientific underpinnings for practice founded in *Essential I.* According to Kirkevold (1997), scientific knowledge is the fundamental element to improving nursing care. Upon determining the state of the science, the state of "health care delivery phenomena," innovative strategies will assist in ameliorating fragmented health care for rural or remotely-located patients (American Association of Colleges of Nurses [AACN], 2006, p. 9).

Essential II

This review sought to determine the current state of the science in connection with the established systems to improve healthcare management and care coordination in geographical regions with limited or no healthcare access. *Essential II* focuses on the art and science of cultivating leadership to continuously improve the quality of healthcare, delivery models, and the promotion of patient safety (AACN, 2006). Whittemore and Knafl (2005) discussed the importance of diverse methodologies necessary to incorporate varying perspectives of the phenomenon of interest to make sustainable improvements or imperative changes at local agency or political levels. This review will address the gaps in communication to improve the quality of healthcare being delivered, a cost comparison of fragmented and coordinated care, and a vulnerable patient population living in geographically-challenged locations. Discussion of this review promotes awareness and encourages innovativeness for those nurse leaders who have the influence to make positive impacts on their organizational systems.

Essential III

The compilation of diverse research allows the “integration of knowledge” and the “application of knowledge” to identify the current practice causing fragmented healthcare while affording an opportunity for future research to discover resolutions for fragmented healthcare (AACN, 2006, p. 11). The Melnyk Levels of Evidence (Melnyk & Fineout-Overholt, 2015) (which critically appraises the current literature) was used throughout this integrative review in order to review, critique, and synthesize the literature on the care coordination, or lack thereof, for the identified patient population. In addition to identifying and analyzing the literature, any gaps in the current state of science will be addressed with proper dissemination of the comprehensive literature review, which supports *Essential III.*

Essential IV

An integrative review, differing from evidence-based practice, demonstrates the reviewer’s ability to navigate technology through the use of the databases, search engines, platforms, and search interface, finding relevant literature to appraise, review, critique, and synthesize. *Essential IV* focuses on proficiency and the ability to utilize information systems and technology to improve healthcare while transforming the delivery and quality to higher standards

(AACN, 2006). The fundamental of locating the most relevant articles out of hundreds and extracting critical information from each article to apply toward patient care or overall healthcare delivery systems, fulfills *Essential IV*. Whittemore and Knafl (2005) indicated the significance of accurately searching for articles to improve rigor and eliminate bias, which forces the reviewer to navigate different technological platforms and begin paving the way to healthcare transformation.

Essential V

This integrative review not only provides an update on the current state of science for the identified patient population of interest, but also serves as a steppingstone to guide future research and transform health care policy that often misrepresents rural and geographically-remote patients: "Integrative reviews have the potential to build nursing science, informing research, practice, and policy initiatives" (Whittemore & Knafl, 2005, p. 546). To drive transformation, this integrative review will be used as a vehicle to promote awareness on fragmented care and design, lead an improved healthcare delivery approach for rural and remotely-located patients, and educate policy makers at the highest level (AACN, 2006).

Essential VI

The Institute of Medicine (IOM) mandates "safe, timely, effective, efficient, equitable, and patient-centered care" and the achievement of this goal will be obtained through integrative reviews, such as this one, and the dissemination via leadership collaboration with other care professionals. (AANC, 2006, p. 14). This integrative review demonstrates the reviewer's ability to identify and analyze areas of concern and distribute the results throughout nursing publications for the broadest dissemination.

Essential VII

This integrative review addresses fragmented care for a vulnerable population of oncological aggregates in need of nursing advocacy for clinical prevention and overall health population. This review evaluates the healthcare delivery and strategies of those rural and remotely-located patients with an originating problem statement and supplemental questions (AACN, 2006). “To synthesize concepts of the psychosocial dimensions” associated with clinical prevention while determining the most applicable intervention for gaps in healthcare, this integrative review strategically searches for established systems approaches for oncology patients with chronic health conditions living in rural and remote regions (AANC, 2006, p. 16). The supplemental questions previously mentioned further direct the review, allowing the reviewer to have a specific focus (Whittemore & Knafl, 2005).

Essential VIII

In order to see healthcare delivery transform, this integrative review will further function as an educational tool for other professionals attempting to enhance the wellbeing of their patients. *Essential VIII* focuses on preparing the DNP graduate for areas of interest in specialties, cultivating one’s “refined assessment skills” and appropriately managing the multiple dimensions of healthcare (AACN, 2006, p. 16). This integrative review allows the reviewer to identify the strengths and weaknesses of this patient population through previously-established research or lack thereof, while simultaneously establishing a direct link between the “research and disciplinary development” (Kirkevold, 1997, p. 979).

Formulate Inclusion and Exclusion Criteria

The studies considered included adult patient populations with no restriction placed on the age range. This excluded hundreds of pediatric studies, revealing the low number of previous studies on the adult patient population, in general, who experienced fragmented health care. Areas of interest included oncology patients living with or surviving cancer in addition to having a chronic disease requiring healthcare outside of oncology-driven services. There were also no patient settings identified, which enabled inclusion of a few relevant studies that identified significant data necessary for review. Peer-reviewed, full-text articles published from 2010 to 2020 and written in the English language were of interest for this integrative review. Further details will be discussed in the method section in order to validate that the process was free of bias. Outcomes of interest were focused on interventions useful in improving individual coordinated healthcare needs, information needs, activities of daily living, and overall improvement of quality of life. Studies were inclusive to all adult oncology studies and studies in conjunction with patients' co-existing chronic conditions. Removing restrictions for cancer cases and comorbidities allowed for a broader range of studies to be reviewed. There were no interventions of interest. Additionally, there were no restrictions in place for study design in order to abide by the direction of Whittemore and Knafl's (2005) integrative methodology: "Integrative reviews are the broadest type of research review methods allowing for the simultaneous inclusion of experimental and non-experimental research in order to more fully understand a phenomenon of concern" (Whittemore & Knafl, 2005, p. 547). The location of studies was restricted to the United States.

Conceptual Framework

The effort to increase rigor, improve accuracy, and remain free of bias, the search strategy will be through the methodology established by Whittemore and Knafl (2005). This thorough but modified framework will guide the development of this integrative review to comprehensively review, critique, and synthesize the current literature to determine the state of the science related to the established systems approach for improving healthcare management and care coordination of the oncology patient population in rural and remote regions. Following the outlined problem identification stage, literature search, data analysis, and data evaluation, a comprehensive and unbiased review of research can successfully extract the current findings and direct future research for resolving fragmented care and health disparities for those patients living in rural or remote areas.

Problem Identification

After multiple revisions, a clearly-stated problem was identified followed by the purpose of the review. Well-defined concepts and variables were outlined, to include both conceptual and operational definitions, in order to be transparent and explicit for the influence they have on retrieving literature (Toronto & Remington, 2020). Whittemore and Knafl (2005) stressed the importance of developing a well-defined purpose with clearly-identified variables to facilitate the remainder of the review, with significance in “differentiating between pertinent and extraneous information in the data extraction stage” (p. 548).

Literature Search

The preliminary literature search was completed after several attempts with the assistance of a librarian. The first database used was CINAHL with an extensive exploratory combination of keywords which pulled from the problem statement and supplemental questions. Limiters and restrictions were set in order to define the strategy well, to enhance the rigor, remain free from bias, and ensure accurate results to extract data (Whittemore & Knafl, 2005). A systematic research process is needed to build upon knowledge and prevent external entities from questioning or attacking the review (Kirkevold, 1997).

Data Evaluation

The evaluation of primary and secondary sources is complex and there is no gold standard, according to Whittemore and Knafl (2005). Therefore, the articles were first "graded" using the Melnyk Levels of Evidence, or hierarchy of evidence, based on their design, validity, and applicability to the identified problem statement (Melnyk & Fineout-Overholt, 2015). Using guidance from Whittemore and Knafl (2005), the articles were next evaluated based on a degree of authenticity, methodological quality, and informational value. The three above-mentioned criteria were scored based on quality of data using a two-point system for high or low ratings.

Data Analysis

The goal of the data analysis section is to reveal an unbiased, comprehensive interpretation of the data extracted and analyzed from the reviewed articles (Whittemore & Knafl, 2005). To be successful in achieving the goal, the data collected from primary sources was carefully ordered, appropriately coded, strategically categorized, and efficiently summarized into a well-organized and amalgamated conclusion pertaining to the identified problem statement (Whittemore & Knafl, 2005). Polit and Beck (2012) encouraged a system to accurately document key findings throughout the data extraction in support of data analysis. A consistent and ongoing comparison approach was utilized throughout the data analysis to capture relevant data from qualitative designs, which will be further extracted into systematic and coded categories (Whittemore & Knafl, 2005). Further sections of data analysis is discussed in detail as the integrative review progresses, which includes data reduction, data display, data comparison, and conclusion drawing and verification.

SECTION TWO: COMPREHENSIVE AND SYSTEMATIC SEARCH

The search was initiated following Whittemore and Knafl’s (2005) problem identification stage to ensure focus remained on collecting relevant information using the purpose and supplemental questions to construct keywords and Boolean phrases. The primary nursing database used for the preliminary background search was Cumulative Index of Nursing and Allied Health Literature (CINAHL). A librarian was consulted to assist in building the initial article search, capture accurate documentation, and carefully organize results. The initial search referred to the original question of oncology patients with chronic health conditions living in rural and remote regions: “Is there an established systems approach for improving healthcare management and care coordination.” Concepts were pulled to facilitate the preliminary initial background search and will further expand future articles searches. The following supplemental questions were used to guide the literature search for background information and will guide future literature reviews:

1) Are interdisciplinary healthcare teams coordinating care beyond the oncology center?
2) Where is healthcare being delivered in comparison to the patient’s home of record?
3) How are care plans distributed and communicated throughout the cancer trajectory?
4) Is the patient’s primary care provider a standalone provider or part of a large facility?

Search Organization and Reporting Strategies

This integrative review was conducted using only nursing, allied health, and medical databases due to the nature of the topic. The most appropriate database for the initial search of articles was CINAHL, a comprehensive resource covering a wide range of healthcare from nursing to multiple allied health disciplines, to include consumer health. The following concepts, also known as the search terms, were used to produce results: cancer survivors, cost, care, fragmented care, care coordination, rural, cancer, remote, survivorship, fragmented healthcare, chronic health conditions, cancer healthcare, rural population, and rural patients. Four themes were used to organize the search process and develop Boolean phrases: the subject of oncology with fragmented care in rural or remote regions, the topic of care coordination for oncology patients, rural oncology patients with chronic health conditions, and systems design for oncology in rural or remote regions. An initial search using the terms with the inclusion criteria of full-text and peer-reviewed articles, a timeframe of 2010 to 2020, limited to the geographical region of the United States, and printed in the English language, yielded a total of 119 articles. The search effort using identifying concepts was executed by searching the major subject headings in each database with concepts, Boolean phrases, and the simple keywords of the natural language or layman’s terminology, such as cancer instead of oncology, which produced 26 duplicated articles. Removal of those duplications left 93 for review but of those, only 8 supported the intent of the background information.

A second extensive preliminary search for background information was conducted using CINAHL again with focus on the use of Boolean logic and operators to expand results. For example, in an attempt to provide an adequate cost comparison between fragmented and coordinated care, the Boolean phrase “*cost benefit analysis*” AND *coordinated Care* OR *fragmented care* yielded 874 articles. Four limiting factors, full text, articles published within the last 10 years, all adult population, and the geographical location of the United States, were applied to narrow the articles to 15 for background information. After completing the initial background CINAHL database search, the keywords, *survivorship* and *survivors,* were removed due to yielded literature identifying post-cancer treatment care plans and end-of-life quality of care, which was not the purpose of the integrative review. Both *survivorship* and *survivor* keywords triggered search details pertaining to palliative care, hospice care, end-of-life care, clinical trials, cancer screenings, and advance care planning. These topics were not completely eliminated by direct removal of the two terms, but based on the implementation of smart text searches and natural vocabulary subjects, they reappeared in the search results. For example, the CINAHL database search incorporated smart text searches based on keywords and informed the researcher that, “Your initial search did not yield any results. However, using SmartText Searching, results were found based on your keywords.”

Progressing through the search in CINAHL, the first Boolean phrase entered in the subject line was *fragmented care AND cancer AND rural regions* to include any of the keywords within the phrase, which resulted with an initial 2,056 articles. After using an advanced search technique with limiters, only 21 were available for screening. In order to compare the use of keywords, natural language versus controlled language, the word *cancer* was replaced with *oncology*. Therefore, the Boolean phrase *fragmented care AND oncology AND rural regions* were entered yielding 1,976 articles based off SmartText Searches and 22 articles were eligible for review after advanced technique limiters were implemented. Of those 22 articles, only two were relevant based off screening titles, but after further review of inclusion and exclusion criteria, neither one met the inclusion criteria. Another common term used in relation to cancer and oncology is the keyword *neoplasm* which was incorporated into the Boolean phrase *fragmented care AND neoplasm AND rural regions.* A total of 1,997 articles were populated with 20 articles, yielding the same non-relevant articles found in the two prior searches with *cancer* and *oncology.*

Based off that comparison and the guidance from Remington and Toronto (2020), indicating that controlled vocabulary yields fewer articles but higher relevance, synonymous search terms were removed. In further support to make the decision to use the term *oncology* instead of *cancer* or *neoplasm* in the searches, it is known that the National Library of Medicine developed Medical Subject Headings (MeSH) to assign vocabulary terms for thesaurus use to articles in nursing, medicine, and allied health databases such as CINAHL (National Library of Medicine [NLM], 2020). It is evident that terms such as *cancer, oncology,* and *neoplasm* yield the same articles when searched within the context of the same Boolean phrase. Quotations were also incorporated on the first Boolean phrase “fragmented care” AND “oncology” AND rural regions, which revealed the same statement of “no results,” but through the use of SmartText, a total of 1,682 articles were yielded. After the application of the advanced search with previously-identified limiters, only 50 were available for review. Upon reviewing the titles, none of the articles were relevant to the search topic. For example, a majority of the articles discussed electrocardiography and fragmented QRS complexes. Therefore, quotations were not implemented nor the use of the truncation symbol, parentheses, the wildcard symbol, or proximity searches.

Six more Boolean phrases were entered in CINAHL to exhaust the database based off the identified concepts and themes. *Rural oncology patients AND Fragmented Care* yielded 2,464 articles, and after advanced search limiters, 55 articles were left for screening by title with two being relevant for further screening but were duplicates upon review. *Care coordination AND oncology AND patients* yielded 242 initial articles with 19 remaining after filters and only nine titles relevant for further abstract screening and selection. After abstract review, only two articles were appropriate for the integrative review, and two articles were identified for supplemental support in the topic of fragmented care. *Oncology patients AND chronic health conditions AND rural* also yielded 31,912 initial articles with 486 remaining after filters and 16 articles relevant for further review. Seven duplicates were removed, and after abstract screening, there were four meeting the inclusion criteria and one duplicate removed, leaving three articles for the integrative review. *Oncology AND care plans AND rural healthcare* subject search yielded one article with zero articles after filters. *Systems design for remote healthcare AND oncology* populated 5,153 articles before filters were applied, and 52 articles remained with none of the articles' titles relevant for further abstract screening. The final Boolean phrase for CINAHL was *Oncology AND interdisciplinary care coordination AND rural* and produced 13,486 articles based off SmartText Searches; 110 articles were filtered through advanced search techniques. Of those 110, there were no article titles relevant for additional screening. Therefore, a CINAHL search produced a total of 56,916 articles before the advanced search, and 794 article titles were screened after use of advanced searching. Thirty-one articles were relevant based on titles alone with ten duplicates removed. Of those 21 articles, only nine met the inclusion criteria for the Melnyk Level of Evidence review.

Ongoing collaboration with the librarian supported further extensive searches and explored the following databases: Health Source: Nursing/Academic Edition, Nursing & Allied Health (ProQuest), MEDLINE with full text (EBSCO), and gray literature in order to complete a more comprehensive and rigorous article review. Health Source: Nursing/Academic Edition varied from the CINAHL search in regards to filter applications. The following limiters were easily set and mirrored the CINAHL search: full-text, peer-reviewed, and publication dates 2010-2020. However, the ability to set patient population and isolate the United States was more difficult. Due to the inability to isolate geographical location of the United States, and all adult patient population, the publication section was expanded and the following were selected: *Clinical Journal of Oncology Nursing, Journal of Interprofessional Care, Oncology Nursing*

Forum, Oncology Connect, ONS Voice, and *Sarcoma*. This eliminated pediatric articles, other specialties such as cardiology, and isolated pharmaceutical and genetic studies. In an effort to conduct another comprehensive and robust article search, the same Boolean phrases were used. In the same systematic fashion, the Boolean phrases were used to yield the following number of articles: *Fragmented healthcare AND oncology patients AND rural* produced 776 articles before the application of limiters and 75 articles after with none of the articles with titles relevant to the review topic. *Fragmented healthcare AND oncology patients AND rural OR remote regions* did not populate any articles with or without the application of limiters. *Fragmented care AND oncology AND rural regions* yielded 774 before filters and 75 articles after limiters were applied, which is identical to the first Boolean phrase results. *Rural oncology patients AND fragmented care* produced 1,034 articles before use of the advanced search and 93 articles after limiters. After screening article titles, zero articles were relevant to the topic of interest. *Care coordination AND oncology AND patients* yielded 181 articles before and 84 articles after limiters with 16 articles relevant through screening titles. The abstract review identified six duplicate articles and three relevant articles meeting the inclusion criteria. The *Oncology patients AND chronic health conditions AND rural* yielded 29,240 articles before limiters were applied and 691 after the advanced search was applied. Of those 691, 12 titles were relevant for further abstract screening with six duplicates and four not meeting the inclusion criteria. Therefore, only two article abstracts were left for further Melnyk Level of Evidence review. *Oncology AND care plans AND rural healthcare* only produced five before limiters and two afterwards with no relevant titles for further review. *System design for remote AND oncology* populated 5,467 before and 353 articles after limiters were applied with one article of relevance by title identification, but it was a duplicate of an article in a previous search that did not meet the inclusion criteria. The final Boolean phrase for Health Source: Nursing/Academic Edition database was *Oncology AND interdisciplinary care coordination AND rural*, which yielded 11,579 articles before limiters and 2,401 afterwards. Six titles were relevant for abstract screening, but all six were duplicates from previous searches. After searching Health Source: Nursing/Academic Edition, a total of 48,282 articles were yielded before limiters and 3,796 article titles were screened for relevancy with only 34 articles relevant for further abstract screening. There were 18 duplicates removed, and after the remaining 16 were screened, only three articles remained for the further full-text review.

Next, Nursing & Allied Health Database was searched using the same Boolean phrases but with varying filters. The search was sorted by relevance, full text, peer reviewed, publication date of 2010 to 2020, English language, geographically limited to the United States, all adult population, and publication titles were specified with the following selections: *Lancet Oncology, Oncology Nursing Forum, Supportive Care in Cancer, Clinical Journal of Oncology Nursing, and Cancer Epidemiology*. The Nursing & Allied Health Database does not allow for distinct limiters for population age or geographical region; therefore, the above-mentioned journals were selected to capture the intended inclusion criteria while eliminating pediatric, foreign, and other non-cancer related publications. The one exception to the publications is Lancet Oncology, which was included even though it covers international cancer topics. The goal was to capture anything within the United States; therefore, it was included, and all non-U.S. studies were screened by title and abstract. The same Boolean phrases were used for searching the database. *Fragmented care AND oncology AND rural regions* produced 560 articles before and 40 after application of filters. Upon title review, none of the articles were relevant for further review. *Rural oncology patients AND fragmented care* resulted in 874 initial articles and 60 after use of filters with one article relevant for abstract review. *Care coordination AND oncology AND patients* populated 8,710 articles and after implementation of filters, 743 articles were available with seven articles relevant by title. After abstract screening, all seven of those articles were duplicates from previous searches. *Oncology patients AND chronic health conditions AND rural* produced 5,045 articles before and 294 articles after filters were applied. Two articles were identified as relevant but upon further review, were duplicates from a previous search. *Oncology AND care plans AND rural healthcare* populated 4,610 articles before and 184 after applying filters, with only four titles warranting further review for relevancy and all four were duplicates. *Systems design for remote healthcare AND oncology* produced 1,985 articles before and 52 after the application of filters, with only two with titles relevant for further review. And finally, *Oncology AND interdisciplinary care coordination AND rural* resulted in 904 articles before implementing filters and after only 36 available for review. Of those 36, two articles were relevant by title and ended up being duplicates. The overall search for Nursing & Allied Health Database produced a total of 22,688 articles, but after use of filters for inclusion criteria, 1,409 articles were left for screening with only 18 relevant by title, with 17 being duplicates, leaving one article, but it did not meet the inclusion criteria.

The next database searched was *MEDLINE* (ProQuest) using the same Boolean phrases for consistent and systematic searching. *Fragmented care AND oncology AND rural regions* prompted the statement, “Your search for *Fragmented care AND oncology AND rural regions* found 0 results.” Therefore, to explore the original concept in the problem statement, *oncology fragmented care* was entered to determine if the topic would generate any results. Seventy-nine articles were produced based off that simple phrase, and after the application of peer-review, publication date 2010-2020, and the specification for English language only, seven articles remained. After screening the titles, none of the articles were relevant for the integrative review. Regardless of the minimal results, the rest of the Boolean phrases were searched to ensure a rigorous review. *Rural oncology patients AND fragmented care* produced three articles before and after the application of the limiters with none of the article titles meeting screening criteria. *Care coordination AND oncology AND patients* populated 666 articles before limiters were applied and 49 remained with only one having a relevant title for further review. After abstract review, the article did not meet the inclusion criteria. Next, *oncology patients AND chronic health conditions AND rural* was entered in the search with only eight articles produced before limiters and one remaining for further review, but the article did not meet the geographical inclusion criteria. The Boolean Phrase *Oncology AND care plans AND rural healthcare* produced eight articles before application of limiters and one afterwards. After reviewing the title of the remaining article, it did not have any relevance toward the topic of the integrative review. *Systems design for remote* healthcare *AND oncology* only had three articles before and zero after limiters. And finally, the Boolean Phrase *oncology AND interdisciplinary care coordination AND rural* produced only two articles before limiters and zero afterwards. Overall, the MEDLINE search only produced 690 articles and 769 articles with the standalone phrase *oncology fragmented care.* After the application of limiters, 54 articles were left for title screening with two articles warranting abstract screening but not meeting inclusion criteria.

The gray literature search included Google Scholar and Google based off guidance from Toronto and Remington (2020) identifying Google as more inclusive and producing more useful results with the application of limiters. To test the boundaries of yielded results, the phrase *oncology patients and fragmented care* was entered in the google search bar. The initial result was the following statement: Your search - oncology patients and (fragmented care or coordinated care) and (file .pdf or file .org) and ... - did not match any documents. However, closely affiliated topics based off relevancy were populated for review. A total of 2,960,000 results populated. Therefore, following the guidance of Toronto and Remington (2020), the initial search of oncology patients and (fragmented care or coordinated care) and (file .pdf or file .org) and site: .edu or site: .org or site: .gov) yielded 14,700 results. There were 34 pages to review with the first several pages of results yielded books found in the National Center for Biotechnology Information (NCBI) with the U.S. National Library of Medicine (NLM). Topics of discussion were workforce strategies for care communication, patient-centered communication, reducing fragmented care through patient-centered medical homes, toolkits and implementation guides for care coordination and communication, and patient navigation systems. Advancing through the internet pages populated by the Google search, more specific information was displayed, such as cyberknife radiation therapy specific treatment, care redesign innovative goals, palliative care across the cancer trajectory, safety net medical home initiatives, healthcare reform, and focused care on cancer alone. The titles were scanned and only opened if the title identified oncology or cancer, date range was within 2010-2020, and the link reflected article, such as “...journals.plos.org › plosone › article › journal.pone.015...”. After searching through the first four pages of 40 hyperlinks, the search presented the following statement, “In order to show you the most relevant results, we have omitted some entries very similar to the 40 already displayed. If you like, you can repeat the search with the omitted results included,” which presented with a hyperlink to continue the search process. Upon further searching, the options repeated were hyperlinks, books, websites, articles that were not relevant by title and out of the specified date range.

Overall, the search through gray literature produced specific oncology interventions, higher initiatives for healthcare reform, Medicare and Medicaid reimbursements, The Affordable Care Act, and foreign publications that all align with the exclusion criteria. The phrase *with chronic health conditions* was added to the Google search, which yielded 11,000 results. This search had more relevance with the integrative review; however, they were not within the United States, an inclusion criteria. After scrolling through pages of results, the previous data search results were evident as highlighted by darkened hyperlinks, identifying previous selections in the prior search. In attempt to exhaust the literature search, an ancestry search (more commonly known as footnote chasing) was used. Toronto and Remington (2020) refer to the ancestry search as citation related article searching. To maintain a simple process, the original 11 reviewed articles' references were screened by title, abstract, and then full-text, the same process outlined above. Of the 11 articles, there was a combined total of 466 references with only 11 relevant by title. One article was a duplicate, while only two met the inclusion criteria based on abstract screening. The narratively outlined database searches were followed by three other layman users and they were successful in capturing the same results, within ± five to ten articles, which is the intent discussed by Whittemore and Knafl (2005) to clearly document and replicate, if attempted.

Terminology

The following database terminology are defined for clarification in order to facilitate understanding of the comprehensive article search throughout the integrative review: platform, database, search interface, and search engine. The *platform* references the software used by each database and may be different than the actual name of the database (Toronto & Remington, 2020). A *platform* is often interchangeable with the term *search engine.* This integrative review used and will use the following platforms: EBSCOhost, PubMed, ProQuest, Web of Science, Ovid, and National Center for Biotechnology Information. The term *database* refers to the published material that one is able to search for, such as journal articles, reports, and other written material. The *databases* that were used are CINAHL, Health Source: Nursing/Academic Edition, Nursing & Allied Health, and MEDLINE. According to Toronto and Remington (2020), not all *databases* will have the same name as the corresponding *platform.* A *search interface* is a feature allowing an individual to search the desired database, using limiting factors to define the search, and it allows one to save the search history for support of the integrative review. *Search interface* options include but are not restricted to article mode or limiters that incorporate full text, abstract available, references available, and publication dates timeframes. Once limiters are established, further options within the *search interface* are available, such as source types, publications, publishers, language, gender, age, and geography. These identifiers allow search refinement to discover gray literature, "capture as much literature pertaining to the topic as possible," and document for replication of the integrative review, if needed (Toronto & Remington, 2020, p. 989). It is now apparent why the databases produced a total of 44 duplicates out of the 84 article abstracts screened with the similar *platforms* supporting the *database* searches.

SECTION THREE: MANAGING THE COLLECTED DATA

The collected data was managed in accordance with the guidance from Toronto and Remington (2020) focusing on screening for relevancy through corresponding eligibility criteria, selecting by full text, and sorting the article data into studies. The PRISMA flowchart was also utilized to capture the flow of the data (Toronto & Remington, 2020). The previous section detailed the yielded results from the comprehensive database searches including CINAHL, Health Source: Nursing/Academic Edition, Nursing & Allied Health, MEDLINE, and Google

Scholar. The screening process involved reviewing the titles of 5,932 articles for relevancy, focusing on oncology patients, including both hematology and oncology disorders, and disregarding any titles with *cancer survivorship* and *cancer survivors.* During this screening process, not only were titles identifying patient population, but the titles were also screened for foreign locations.

After a thorough title screening process, 84 articles were left for further abstract screening. At this time, all data was collected in an excel format to identify the author, title, and inclusion and exclusion criteria for review. Toronto and Remington (2020) recommended a step-by-step process of screening by title, removal of duplicates, and eliminating any irrelevant titles. Article abstracts were reviewed for all relevant and suspected relevant titles that were questionable. The supporting citations were captured in Excel format to align with either the inclusion or exclusion criteria to further demonstrate relevancy or irrelevancy. Therefore, of the 96 relevant articles or candidates, as Toronto and Remington (2020) refer to them, there were 57 articles meeting the inclusion criteria for full-text screening with 44 of those being duplicates. Toronto and Remington (2020) clearly stated that the database search process can be identified as complete once new searches are no longer yielding new and relevant results. The duplicates were an indicator of database search completion as well as the fact that modified search strategies implemented different keywords relevant to the topic but produced the same articles. This was previously discussed based off the initial use of natural language keywords followed by identification of the controlled language systems relevant to those familiar natural language vocabulary keywords (Toronto & Remington, 2020).

After elimination of the duplicates, a thorough full-text screening was conducted. This included reading through 13 articles to ensure all inclusion criteria were met while further reviewing for bias, internal validity, appraisal, analysis and synthesis (discussed in the next two sections). The process of selection was executed using the Integrative Review Abstract Screening Tool (Table 1), outlined the narrative inclusion and exclusion criteria met, while the PRISMA Flow Chart (Figure 1) displayed the comprehensive search process. Next, sorting was implemented to determine if the article contained one or more studies to support the integrative review. There was only one article (Thomson & Henry, 2012) that presented three individual case studies; therefore, those case studies were handled separately.

SECTION FOUR: QUALITY APPRAISAL

Due to the low number of articles for the integrative review, all articles were considered, including inferior studies, for analysis and appraisal while remaining cognizant of high risks for bias that could potentially skew the results (Toronto & Remington, 2020). Upon applying the inclusion criteria, the original review question served to keep the analysis and appraisal on track: For oncology patients with chronic health conditions living in rural and remote regions, is there an established systems approach for improving healthcare management and care coordination? Every article was reviewed with the two factors influencing the decision to include the article in the integrative review: 1) inclusion criteria and 2) the relevancy to the above mentioned review question.

Sources of Bias

The presence of bias was carefully evaluated along with identification of the methodological rigor. The four potential sources of bias for the quantitative studies were selection of participants, measurement of variables or outcomes, attrition rate, and performance participants or groups in the study (Toronto & Remington, 2020). For qualitative studies, the four dimensions evaluated were transferability, credibility, dependability, and confirmability

(Toronto & Remington, 2020). It was recommended to consider the strength and weaknesses of chosen studies prior to determining inferences regarding the situation of interest. The Melnyk Level of Evidence (see Appendix 1) addresses the presence of bias in the strength and limitations with focus on the design, selection of subjects, measurement of study outcomes, attrition, and performance of different study groups, if applicable (Toronto & Remington, 2020). Beginning with Passwater and Itano (2018), a literature review of 27 articles was completed to identify the complex health care needs of cancer patients in rural settings and find strategies to improve care coordination. There were no strengths or limitations noted within the study, but there was a high risk for bias due to the low number of articles and minimal case studies found in the literature review. The study highlighted one case study out of all articles reviewed; therefore, no efforts were made to minimize bias selection. It was not included in the integrative review but supported information background by addressing the various barriers rural cancer patients experience and identified areas for nursing implication along with further opportunities in research. Goebel, Valinski, and Hershey (2016) identified issues with diabetes management in patients with cancer by examining perspectives of oncology providers, nurses, and patients. This article was included in the integrative review even though there was high risk for bias. The authors identified the limitations of the small sample size within the two focus groups that placed the study at a higher risk for bias. This study was relevant to the integrative review clinical question by addressing diabetes and cancer, which are “two of the most common chronic conditions diagnosed in the United States” (Goebel, Valinski, & Hershey, 2016, p. 648).

Gorin, Haggstrom, Han, Fairfield, Krebs, and Clauser (2017) conducted a systematic review and meta-analysis of 52 and 11 articles, respectively. The aim of the study was to evaluate care coordination across multiple care settings of the care continuum and was at low risk for bias due to strong selection of articles based of inclusion and exclusion criteria. While the article did not address a chronic health condition, it provided a wealth of knowledge on care coordination and established systems approaches that informs the background content. Hershey and Given (2020) was an expert opinion article that did not meet the inclusion criteria due to lacking peer review. It had high risk for bias based off the lack of measurement and participants, but it served as supplemental information due to the validity of the content it discussed and identification of the collaborative care coordination between the oncologist and PCP in an attempt to manage comorbidities throughout cancer treatment. This article is the expert opinion of what this integrative review is trying to determine with the current state of science and as Hershey and Given (2020) state, “to improve the care coordination between primary care and oncology providers. Only then can we have patient-centered cancer care” (p. 86).

Hussain, Chang, Veenstra, and Pollack (2015) explored how frequently stage III colon cancer patients received care outside of one hospital and the association to mortality and costs. There was moderate risk for bias due to the fact that a limited number of patients within the cohorts were not assigned to a specific medical oncologist, potentially skewing the results (Hussain, Chang, Veenstra, & Pollack, 2015). This article was not included in the integrative review after full-text review identifying the oncology patients missing a chronic health condition, which is part of the inclusion criteria. The article remained critical to supporting the background information given the fact that patients may need various types of cancer care: medical, radiation, and surgical. This aspect of care coordination is underdeveloped and heightens awareness for “collaboration between cancer specialists” (Hussain, et al., 2015, p. 388). Irwin, Henderson, Knight, and Pirl (2014) reviewed the care coordination for cancer patients with schizophrenia and how these patients are more vulnerable and have a higher mortality rate. The bias was low based on the on the selection of participants being randomized, but the attrition rate was moderately higher due to the complexity of patients living with schizophrenia (Irwin, Henderson, Knight, & Pirl, 2014). This article was included in the integrative review.

Jackson (2018) explored transitional care using a case study of a 68 year-old-female with comorbidities and newly diagnosed with gallbladder cancer. The strengths and bias were not addressed in the article; however, there was high risk for bias based on the singular case study. The study was included in the integrative review with credibility and transferability based on the integration of a literature review and embedded citations supporting the descriptive case study (Toronto & Remington, 2020). Molina and Qadan (2019) focused on one type of patient with hepatocellular carcinoma with no definitive patient population and high bias risk due to isolated viewpoints of two authors: “Findings demonstrated that non-fragmented care and care at high-volume hospitals both were associated with improved overall survival among patients with hepatocellular carcinoma” (Molina & Qadan, 2019, p. 3296). This article was questionable in the confirmability related to the data discussed. Statistical data was obsolete and strategies to triangulate the data or transfer the data were difficult to conceptualize. After reviewing the citations within the article, it was difficult to follow without further detailed discussion in the body of the article. One of the authors disclosed a conflict of interest as being a paid partner in a referenced entity, it was determined that this article would not be part of the integrative review but used as supplemental information.

Muñoz, Farshidpour, Chaudhary, and Fathi (2018) conducted a study on the role of a gastroenterologist oncology nurse navigator coordinating care for complex oncology patients experiencing care needs for comorbidities. The potential bias was based on the fact that the study focused on the whole multidisciplinary cancer care model and not specifically on the individual with varying and unique circumstances. It was a low risk due to the patient selection being high with 413 retrospective subjects and consistent measurements of initial diagnosis date to treatment date(s). Therefore, this article was included in the integrative review. Continuing to capture the multidisciplinary systems based approach, Page, Lederman, Kelly, Barry, and James (2020) focused their study on the shared mental model of teamwork in the approach to care coordinating for oncology patients and comorbidities. The study was at a high risk for bias due to use of one case study patient. The content of the article was relevant to the original clinical question and addressed the topic of care coordination from an inpatient setting to an often poorly-planned discharge to the outpatient setting, causing fragmentation of care and hospital readmissions (Page, Lederman, Kelly, Barry, & James, 2020). This article was included in the integrative review.

Sampayo and Tofthagen (2017) met all inclusion criteria with relevancy toward the clinical question. The study focused on an educational program and had a moderate risk for bias based on the fact that the study had a small number of selected participants and was in a specific setting, a larger urban cancer center. The study's intent targeted the setting for educational purposes toward better caring for the management of hyperglycemia in cancer patients (Sampayo & Tofthagen, 2017). The use of corticosteroids to manage chemotherapy side effects make glucose management difficult; therefore, the study provided a unique established systems approach in healthcare management. Sondergaard, Grone, Wulff, Larsen, and Sondergaard, (2013) conducted a cross-sectional study with a questionnaire of 131 participants yielding a 52% attrition rate. The qualitative study runs a higher risk for bias due to the non-randomized patient selection in the surgical outpatient setting, and the 48% attrition rate. The nurses conducting the study were not properly informed on how to administer the questionnaire and "some of the

Cronbach's αs were very high (α > 0.95) suggesting that there might be redundant items in these scales" (Sondergaard, Grone, Wulff, Larsen, & Sondergaard, 2013, p. 5). Therefore, all four of the potential sources of bias were in question for this study: selection, measurement, attrition, and performance (Toronto & Remington, 2020). The article was not included in the integrative review but supplemented background information addressing fragmented care.

Stevens, Dinkel and Catanzaro (2011) focused on the dual diagnosis of cancer and diabetes. The integrative review was qualitative with high bias related to the inability to replicate the review, even though peer-reviewed in support of dependability. This article was included in the integrative review. Thomson and Henry (2012) captured the difficulties of managing severe mental disorders and cancer with three separate case studies. The selection of participants was limited with a small sample size of three patients and limited types of mental health and oncology diagnoses. The ability to minimize the bias for patient selection is difficult when dealing with mental health disorders, but the bias remained low using the perspective that selection is at random with mental health issues. Considering the concept of trustworthiness, the credibility is high, as it is peer-reviewed. The article was utilized in the integrative review

Weaver and Jacobsen (2018) addressed the continuum of cancer care from screening to the survivorship care coordination. This article was not included in the integrative review for missing the chronic health condition of the cancer patient. Due to the clinical relevancy of the clinical question, it was referenced for informational value. It does run a high risk for bias due to the four sources of bias not being mitigated. However, the article parallels dozens of other articles that discuss the complexity of cancer diagnoses and comorbidities being associated with lower odds of comprehensive treatment, poor prognosis, multiple adverse outcomes, preventable hospitalizations, and higher costs for fragmented care (Weaver & Jacobsen, 2018). Woersching, Van Cleave, Haber, and Chyun (2019) conducted a systematic review of 22 articles focusing on care for mental health and substance abuse disorders in oncology patients. The majority of studies in their review were retrospective and were nonrandomized samples with a potential for bias. The method of measure, sample sizes, and "study settings contributed to inconsistent study findings" (Woersching, Van Cleave, Haber, & Chyun, 2019, p. 380). Overall, the risk for bias of all included articles was higher than wanted but not unexpected related to the level of evidence generally being four or greater. This article was included in the integrative review.

Internal Validity

After examining the sources of bias, the proximity of the results to the truth were inconclusive based on the high risk of bias and inconsistencies in the reported results. Only four of the 15 articles presented statistical results supporting high risk of bias and the need for future research. All other correlational studies and expert opinions offered different systems-based approaches for improving care coordination but distinctly identified the concern that different patient settings may yield different results. The concept of trustworthiness for those qualitative studies lacked transferability but supported credibility in use of verbatim quotes and substantial citations (Toronto & Remington, 2020). The clinical question, for oncology patients with chronic health conditions living in rural and remote regions, is there an established systems approach for improving healthcare management and care coordination, addressed rural and remotely living patients. All but one article focused on urban inpatient and outpatient clinical conditions. All articles mentioned complications by rural living but never fully addressed specific resolutions, which highlighted the need for addition research.

Appraisal Tools (Literature Matrix)

According to Whittemore and Knafl (2005) and confirmed with Toronto and Remington (2020), there is no existing gold standard for the evaluation and appraisal of the quality in a study. For this integrative review, the rapid critical appraisal checklist and further distinct information outlined by Melnyk's level of evidence established by Melnyk and Fineout-Overholt (2015) was used. All of the articles were carefully evaluated based on a degree of authenticity, methodological quality (data rigor), and informational value (data relevancy). The rapid critical appraisal checklist reviewed the credibility of study content and the applicability/generalizability of study guidelines. The credibility section encompassed the degree of authenticity and methodological quality while the applicability/generalizability encompassed informational value or data relevancy. Toronto and Remington (2020), recommended that data relevance should be considered in the ability to add to the clinical question. The three mentioned criteria were scored based on quality of data using a two-point system (high = 2 or low = 1) ratings. (See Appendix B for comprehensive table.)

Goebel, et al. (2016) conducted a multiple category focus group design identifying issues with diabetes management in cancer patients by exploring the perspectives of oncology providers, nurses, and patients. The authenticity was high based on the comprehensive approach toward tackling the two most common disease processes with high mortality and morbidity rates as single health conditions but when combined, are more detrimental if not managed well. The comprehensive approach was not isolated by providers but included nurses and patients to empower and create shared responsibility (Goebel, et al., 2016). The credibility was low based on lack of explicit recommendations from guidelines, limited connection to scientific evidence, and missing peer review and replication testing. The applicability was unknown due to relevancy toward the targeted patient population listed in the clinical question, oncology patients with chronic health conditions. Gorin, et al. (2017) aimed to synthesize the findings of studies addressing cancer care coordination through a systematic review and meta-analysis. The authenticity was low reflecting the level of evidence being one and addressing cancer care continuum from screening to survivorship care. Credibility was high with the ability to replicate the search in a systematic method, and the applicability or relevancy was low based on the various results and system approaches: technical, patient-centered, and system-centered: “The measures of cancer care coordination applied across the 52 studies vary considerably by validity and reliability, as do findings on their implementation in US clinical settings” (Gorin et al., 2017, p. 541).

Hussain, et al. (2015) conducted a retrospective cohort study on stage III colon cancer patients who receive care from more than one hospital. Note that this article was used for background cost analysis in relation to fragmented care and mortality rates. The authenticity was high due to the nature of the study. The credibility was low due to inconsistent variables in the results due to medical oncologists not being embedded in the hospital where surgical oncology was handled. Two of the four researchers were funded by other National Cancer Institute grants, and they were key stakeholders in the area of study. The relevancy or informational value was also low due to the distinct problem of not being able to replicate the complex cancer care continuum in an inpatient setting and the inconsistencies on demonstrating that integrated care delivery lowers costs, but it did not address the challenges (Hussain, et al., 2015).

Jackson (2018) reviewed a case study supported by a literature search on transitional care. The research and recommendations were high for authenticity based on the concern for examining the transitional care from acute hospital discharge to a skilled nursing facility. The research promoted a heightened sense of awareness for a vulnerable patient population and did not default to palliative and hospice care even though a majority of the research identified a lack of hospital discharge plans (Jackson, 2018). The design was a correlational study and was deemed low for credibility missing guidelines, detailed and valid development strategies, and lack of explicit recommendations. The applicability was high based on the general recommendations. The nursing implications were generalized focusing on communication and identifying a discussion of care, which would be spearheaded by the nurse (Jackson, 2018). For example, the author pointed out that primary care providers previously expressed frustrations with oncologists while trying to co-manage the same patients, but there were no specific resolutions identified.

Molina and Qadan (2019) was not included in the integrative review but was used as background information in correlating the cancer survival rate with fragmented care throughout the cancer trajectory. Muñoz, et al. (2018) conducted a retrospective study on care coordination on random gastro-intestinal patients experiencing comorbidities with and without the use of an oncology nurse navigator. The authenticity was high, while the credibility was also high, related to the scientific evidence linked to all supportive citations. The systems-based approach discussed the oncology nurse navigator embedded in the multidisciplinary care team with further concern for care coordination balancing the multiple subspecialties involved with cancer care (Muñoz, et al., 2018). The applicability was high due to clinical relevance, practical implementations, applicable care toward patients, and the ability to measure successful care coordination from time of diagnosis to initial cancer treatment (Muñoz, et al., 2018). The limitation of the study were the potential deficiencies of multiple patient issues that could have impacted the end results, such availability of resources for cancer treatment.

Page, et al. (2020) focused on the use of shared mental models to improve teamwork during hospital discharge planning and follow-up care. Authenticity was high because "shared mental models have been used to understand, explain, predict, and improve teamwork in a variety of disciplines" (Page, et al., 2020, p. 1055). The credibility was low based off only a few statements of the critical appraisal checklist being marked as "yes." There were no distinct guidelines outlined, a lack of explicit recommendations, and there was not a completed peer review or testing but only discussion about one case study. The applicability was low with the clinical recommendations not being outlined and only discussion of future implications of communication, interprofessional collaboration, limited variation from standard practice, and measured care based off the identified care plan (Page, et al., 2010). Sampayo and Tofthagen's (2017) study devised an education program to improve awareness and knowledge of the hyperglycemia effects in patients with cancer by creating an algorithm. The credibility was high based on the detailed citations linked to the facts, explicit recommendations generated by the algorithm, and the testing conducted on a pilot group. The applicability or relevancy was also high with the awareness placed on the potential side effects of nephrotoxic chemotherapy to a patient population already vulnerable to renal dysfunction, dehydration, and infections (Sampayo & Tofthagen, 2017). The limitations of the study were the limited location of an infusion center of a large cancer facility, which may impede results if it were replicated in various settings.

Stevens, Dinkel, and Catanzaro (2011) completed an integrative review to identify the interaction of care between cancer patients with diabetes. Bias was high based on the inability to replicate the integrative review due to a missing list of the articles and how the integrative review was conducted. The authenticity was low with both credibility and applicability also being low. The content was of high value; however, the content focused on curriculum for the school environment. The inability to replicate and follow the data search of the reported integrative review attributed to the low credibility. Thomson and Henry (2012) focused their case study on three different types of mental illnesses in cancer patients making for a high authentic case study. The credibility was low with limited evidence-based knowledge on the initial subject content and the three case studies. The majority of the supporting evidence heightened the awareness on medication management and collaboration with oncology services but did not offer substantial evidence-based recommendations, which supported a low rating for relevancy and applicability for a significant limitation.

Weaver and Jacobsen (2018) published a commentary or position paper about the need for cancer care coordination across the continuum of cancer care, which reflected high authenticity and credibility. The applicability is low based on stress with on more research indicated. The focus of healthcare delivery system research with emphasis on the complexity of care coordination and lack of appropriate interventions, promotes the opportunity to explore different care models in attempt to find the ideal well-coordinated approach: “Recent reviews of care coordination interventions point to limited conceptual and measurement coherence across the existing body of evidence” (Weaver & Jacobsen, 2018, p. 503). Woersching, et al. (2019) conducted a systematic review on the understudied phenomenon of patients with mental and substance use disorders developing cancer. The authenticity, credibility, and applicability were all high based on the following standards: a valid development strategy was outlined, descriptive medication compatibility, suicide risk assessments, using a family member to assist with assessments and medication reconciliation, and offering improvement toward caring for patients. Minimal limitations were noted with the studies in the review being retrospective and involving non-randomized samples with the potential for bias.

Reporting Guidelines

The decision to use the Melnyk Level of Evidence (LOE) instead of the PRISMA guidelines was made based on the guidance from Toronto and Remington (2020) which recommended use of the PRISMA guidelines for systematic reviews. Toronto and Remington (2020) encouraged quality reporting and transparency following a specific guideline and as more review guidelines are developed, there will be more appropriate guidelines for an integrative review. The Evidence Table reports only the articles included in this integrative review, excluding articles for supplemental information which did not meet the inclusion criteria. There were only 12 articles included in the integrative review. There were two systematic review articles (Level 1), which used filtered databases. Seven of the articles were correlational design/cohort studies (Level 4), found using unfiltered databases. There were three expert opinion articles (Level 7) that offered insight toward future research and areas for the phenomenon of interest.

SECTION FIVE: DATA ANALYSIS AND SYNTHESIS

Whittemore and Knafl (2005) have reported that the data analysis guidance for an integrative review is limited due to underdevelopment, which is further supported by Toronto and Remington (2020) who revealed that searching other IRs for direction is often non-beneficial due to reported shortened data analysis stages. This integrative review has carefully distributed the findings of the reviewed articles throughout the paper and will focus on generating an integrated data collection revealing the current state of science. The clinical question and supplemental questions guided a thematic analysis, while key data was extracted for accurate data reduction, publication of a descriptive report, and ultimately to display the current state of science.

Data Analysis Methods

The data analysis method was initiated using the guidance from Whittemore and Knafl (2005) to order, code, and categorize to then synthesize the evidence. A data matrix was created to align with the IR clinical and supplemental questions. A thematic analysis based off the original clinical and supplemental questions was followed. Based on qualitative studies, coding was removed from this section due to all the implications referencing the need for future research or use of an oncology nurse to facilitate care coordination. In order to maintain order and transparency, the Melnyk Level of Evidence Table was modified to include pertinent data while adding columns for abstracted data. (See Appendix B: Abstracted Data Matrix Table). Data was extracted as it pertained the following clinical and supplemental questions: For oncology patients with chronic health conditions living in rural and remote regions, is there an established systems approach for improving healthcare management and care coordination? Are interdisciplinary healthcare teams coordinating care beyond the oncology center? Where is healthcare being delivered in comparison to the patient's home of record? How are care plans distributed and communicated throughout the cancer trajectory? Is the patient's primary care provider a standalone provider or part of a large facility? This style was preferred, easier to order, code, and categorize, and recommended by Coughlin and Sethares (2017) who conducted a previous integrative review and was referenced in Toronto and Remington (2020).

Descriptive Results

Remington and Toronto (2020) identified no established guidelines for a descriptive results section in an IR; therefore, the results will follow the layout described above in the data analysis method. The thematic analysis looks for patterns and trends or follows established questions. As previously mentioned, the clinical and supplemental questions will be answered in this descriptive results section. Focusing on a thematic analysis, all articles were assessed for a systems-based approach and discussion of rural or remotely-located patients.

Systems-based Approach

Of the 11 articles reviewed for data analysis, only six articles specifically addressed systems-based approaches toward care coordination. The remaining articles all mentioned gaps in the literature, the need for further professional collaboration, and stressed the role of an oncology nurse. Gorin, et al. (2017) discussed the use of patient navigation systems, home telehealth, and a nurse case manager in overcoming the complex challenges of the multimodalities of cancer care coordination. Although patient navigation was most frequently found in the 52 studies, it did not disclose the specifics of enhanced care coordination such as interventions, processes, or structures (Gorin, et al., 2017). There was no discussion on geographical location of the patients. Jackson (2018) discussed the transitional care model using a case study revealing the under-served and under-researched patient population. The transitional care model was used to describe areas of improvement within the case study and how the patient could have benefited from an outlined process ensuring a plan was followed. The study did not address rural or remote living.

Muñoz, et al. (2018) highlighted multidisciplinary cancer care models with the pivotal role of an ONN to care coordinate. The evolution of the ONN has grown to facilitate more than the patient-nurse relationship, but embraces patient advocacy on a higher level to include but not limited to: information exchange, increased access to care, assurance of timely treatment, a liaison for tumor board and patient, and collaboration for other healthcare specialties (Muñoz, et al., 2018). There was no mention of challenges for cancer patients living with chronic health conditions in rural or remote regions. Page, et al. (2020) explored the shared mental model while caring for oncology patients with chronic health conditions. The shared mental model focuses on teamwork while knowing every team members' role in patient care. A case study, of a newly diagnosed man with acute myeloid leukemia, was used to identify areas of improvement while capturing the need for continuity of care from inpatient to outpatient. A shared mental model enables teamwork by holding all stakeholders accountable and using collaborative tools to ensure teamwork is in place (Page, et al., 2020). There was no discussion on rural or remote living impacting care coordination.

Weaver and Jacobsen (2018) briefly discussed the chronic care model and cancer treatment models in concern for oncology patients with chronic health conditions identifying the lack of research and comprehensive teamwork. Regardless of these models, the concern for oncology patients and their comorbidities being underserved is alarming. Weaver and Jacobsen (2018) pointed out that oncologists may not feel prepared to treat those conditions beyond cancer, so referrals are placed to isolate treatment for those conditions. Whereas, the failure to collaborate induces fragmented care. The researchers did mention rural patients are at higher risk for not being cared for properly due to lack of access to care. All of the previous studies and other articles that did not identify a systems-based approach connect all care coordination to an oncology nurse. While nurses make up the largest healthcare workface (over 3 million) the general consensus from the articles is that the force multiplier is the nurse who interacts with all team members regarding care coordination (Page et al., 2020).

Interdisciplinary Care Coordination

The second theme or concept discussed interdisciplinary healthcare teams coordinating care beyond the oncology center with six of 11 studies mentioning it. Goebel, et al. (2016) discovered in their focus groups that oncologists often underestimated the care provided by the patient's primary care physician. Therefore, they would inherently take on the role of managing overall care, such as prescription medication and referrals. On the other hand, some oncologists isolated care to oncology and did not address other comorbidities. Gorin, et al. (2017) mentioned care coordination beyond the oncology setting but never specified details of care centers. Jackson (2018) addressed transition from an inpatient setting to both home and a skilled nursing facility for oncology rehabilitation with discussion of the multitude of other specialties involved. The articles heightened awareness on care fragmentation when a plan of care is not discussed with the patient and the gaining provider. Page, et al. (2020) captured the fragmented care amongst the inpatient setting, primary care physician, and ancillary services for follow up care. Thomson and Henry (2012) brought attention to mental health conditions with new cancer diagnoses and how the oncology team would defer all suspected behavioral health concerns to the psychiatrist. Woersching, et al. (2019) also addressed the complications of a cancer diagnosis with a patient living with mental health and/or substance abuse disorders. This article briefly described the inpatient, long-term care, and oncology and psychiatric outpatient settings.

Location of Care

The second supplemental question asked where healthcare was being delivered in comparison to the patient's home of record, which was not discussed in any of the reviewed articles. There were few mentions of increased concern for rural patients, but geographical distances for care or detailed logistical issues were not discussed.

Primary Care Services

The articles reviewed did not discuss the primary care provider, which may vary for each patient dependent upon residency. Therefore, it is not evident whether the patient's primary care provider is a standalone provider or part of a large facility.

Communication of Care Plans

The final theme involved care plans distribution and the communication throughout the cancer trajectory. Four of the reviewed articles mentioned cancer care continuum communication with the primary means of patient and nurse involvement. Jackson (2018) stressed the role of the oncology nurse bridging the gap for care coordination but throughout the article, there were no discrete interventions regarding the exchange of information except for the case study references with conversation between the patient and nurse. Page et al., (2020) further discussed the communication tools of huddles for verbal exchange of information and the white board for posting the situation, background, assessment, and recommendation (SBAR) update on patient care coordination. Both Thomson and Henry (2012) and Woersching et al. (2019) indicated that oncology nurses are the key players in communicating care plans with the multidisciplinary teams.

Synthesis

In order to maintain a systematic approach, a thematic synthesis will be discussed aligning with the purpose of the review and data analysis method. The decision to provide a synthesis within the identified themes used to analyze and critique data was determined to be one of the most common techniques to present existing results (Toronto & Remington, 2020). The purpose of the integrative review was to review, critique, and synthesize the current literature to determine the state of the science related to clinical question: For oncology patients with chronic health conditions living in rural and remote regions, is there an established systems approach for improving healthcare management and care coordination? The synthesis generated by the supplemental questions will be furthered discussed throughout this section. The clinical question attempted to identify established systems approaches for improving healthcare management and care coordination for oncology patients living with chronic health conditions. Focusing on established systems approaches, the evidence revealed fragmented care management (Goebel, et al., 2016), underdeveloped care coordination (Jackson, 2018), a need to strengthen and standardize management of care (Munoz, et al., 2018), improvement on interprofessional collaboration with clear communication (Thomson & Henry, 2012), and a means for knowing individual roles in care coordination (Page, et al., 2020).

There were several identified healthcare models currently in use with minimal data supporting the effectiveness of each one, while there was a significant absence in addressing rural patients. While the evidence led toward improving integrated healthcare systems, the oncology nurse navigator and nurse case managers were pivotal in providing care coordination through complex healthcare systems (Irwin, et al., 2014; Munoz, et al., 2018; Thomson & Henry, 2012; Woersching, et al., 2019). Care coordination was the goal of all mentioned models and systems approaches: cancer care models, chronic care models, transition care models, nurse case managers, home telehealth, and patient navigation. Care coordination is the deliberate organization of patient care between two or more individuals to ensure accurate and timely care (Gorin, et al., 2017). Furthermore, it is the series of events that occur between healthcare appointments (AHRQ, 2018). These series of events were not discussed in detail for future nursing implications, but the current state of science highlights the fundamental role of nurses who conduct assessments (Thomson & Henry, 2012) through frequent direct patient contact throughout the cancer care trajectory (Woersching, et al., 2019) while serving as an educator and lead communicator for staff (Goebel, et al., 2016; Stevens, et al., 2011). Muñoz, et al. (2018) identified shared responsibility by the patient navigator and attributed care coordination to a nurse case manager, but also highlighted that care coordination for health management continues to be a challenge. While evidence on established systems approaches for improving healthcare management and care coordination for oncology patients with chronic health conditions may be limited, the current evidence identifies the significance of the nurses' role.

The current state of science is significantly limited in research for the identified patient population living in rural areas while there are substantial gaps in care coordination via established systems approaches. None of the reviewed articles focused on rural patients. Therefore, there were no in-depth discussions of where healthcare is being delivered in comparison to the patient's home of record. The gaps in care coordination are further supported by the minimal research on the interdisciplinary healthcare teams coordinating care beyond the oncology center. The current state of science acknowledges the need for care coordination beyond the oncology realm but does not address the specifics of how it is accomplished (Weaver & Jacobsen, 2018). Published studies have proven limited outcomes for cancer care coordination and comorbidities (Gorin, et al., 2017). The alarming fact that patients allow cancer diagnoses to take precedence over other health conditions may have had or have an ongoing impact of the limited studies in cancer care coordination beyond the oncologist (Goebel, et al., 2016). Established guidelines should be developed to determine how treatment for comorbidities and cancer can occur while simultaneously allowing the oncologist, PCP, and other specialists to work together and pinpoint when "cancer treatment guidelines take precedence over other chronic illnesses and vice versa" (Hershey & Given, 2020, p. 86).

The interventions on how to effectively coordinate care for cancer patients with chronic health conditions were not abundant in this integrative review; there are a few mentioned categories of the distribution of care plans and how they are communicated throughout the cancer trajectory. Effective communication interventions are led by nurses and shared with the healthcare team, which with increased efforts can improve the future of care coordination (Goebel, et al., 2016). The current state of science reveals gaps in communication of care plans for oncology patients living with chronic health conditions. The fundamentals of the nursing school SBAR and huddles were mentioned (Page et al., 2020) but the lack of discussion of warm handoffs, sit-down face-to-face discussions with patients, and use of advanced electronic health records were missing in the data. The overarching theme of care plan distribution disregards the patient education and shared decision-making process when the standard practice is to ensure patient-centered care and the right to self-determination. Future nursing implications offered strategies to strengthen communication of care through the use of standardized, structured nursing huddles with the intent to share pertinent information (Jackson, 2018; Page, et al., 2020; Thomson & Henry, 2012; Woersching, et al., 2019). The current state of science for the phenomenon of interest is under-researched, allowing for future research opportunities to better serve a vulnerable oncology patient population with comorbidities living in rural and remote regions.

Ethical Considerations

An application was submitted to the Liberty University (LU) Institutional Review Board (IRB) for review and was found to be in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and not classified as human subjects research (See Appendix E). In addition to approval by LU IRB, training was completed through the Collaborative Institutional Training Initiative (CITI) on basic biosafety (See Appendix F).

SECTION SIX: DISCUSSION

The purpose of the integrative review is to review, critique, and synthesize the current literature to determine the state of the science related to established systems approach for improving healthcare management and care coordination of the oncology patient population in rural and remote regions. After review of the literature, it is known that oncology care often takes priority over other chronic health conditions, such as diabetes management (Goebel, et al., 2016). Research has also identified the lack of ownership when caring for a patient with cancer and other comorbidities, such as schizophrenia or bipolar disorder (Thomson & Henry, 2011). Care coordination was identified as an interaction of two or more individuals, to include the patient or caregiver, but more importantly addressed the significant benefits of identifying one designated person in coordination of care to ensure follow through of designed care plans (Jackson, 2018).

This integrative review contributes to the ongoing concern for care coordination and healthcare management of oncology patients with chronic health conditions identified by the WHO, AHRQ, and other nursing publications. While oncology care makes tremendous gains every day toward understanding genetic mutations and pharmaceutical interventions, the care continuum for the patient with co-existing chronic health conditions need attention. This study identifies that care coordination is fragmented and essentially non-existent for those patients living in rural or remote regions. While scientific advances progress, the fundamentals of nursing for true patient-centered care coordination are found wanting. Future research is needed to address the gaps in the current state of science. The future of care coordination for rural living oncology patients dealing with not only cancer treatment but other chronic health conditions was scarce upon the background search and remains underdeveloped at this time.

Implications for Practice

Focusing on the future in addressing care coordination through an established systems approach, further research must be completed identifying the success of telehealth in conjunction with oncology nursing navigators, and the availability of Fisher Housing for temporary relocation, if needed. While there are practices in place for case managers and nurse navigators, there should be a standardized protocol that guides the patient through the process and incorporates chronic health conditions specialty care providers. The enforcement of shared responsibility and understanding the patient's willingness to remain compliant in the designed care plan is missing. The inability to understand the patient's living dynamics limits identification of barriers and the lack of communication of information among multidisciplinary care teams is detrimental to any treatment plan (Passwater & Itano, 2018). Care coordination should be timely, safe, high quality, and meet the needs of the patient (Sondergaard, et al., 2013). The established systems approach is dependent upon nursing fundamentals and follow-through communication.

Dissemination

The phenomenon of interest will be disseminated through several journal publications to promote awareness for both providers and patients. As the future of medicine and nursing moves toward a technology-based era, it is imperative that the fundamentals of nursing and basic needs are assessed and met before attempting to achieve optimal patient outcomes.

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TABLES

Table 1

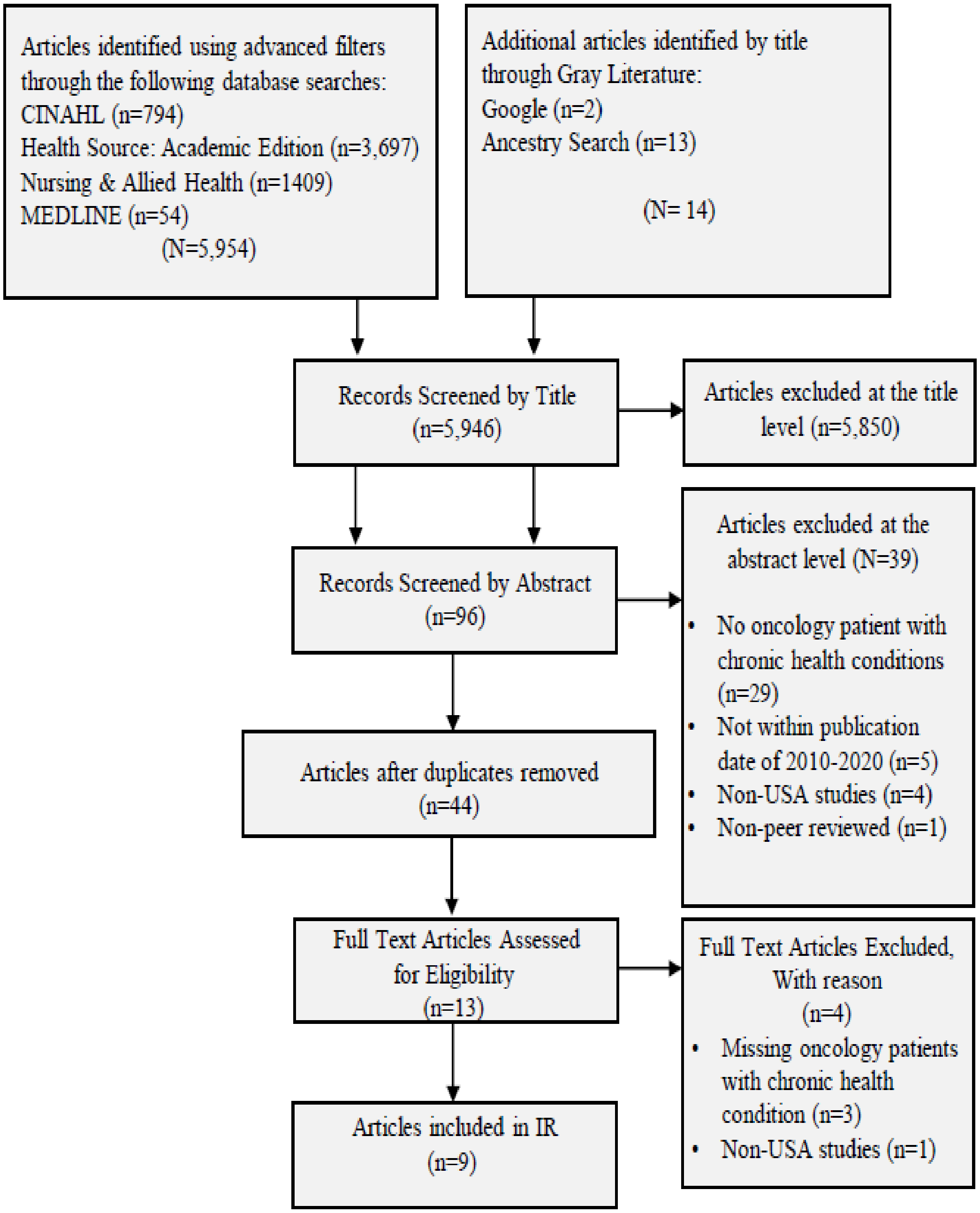
Inclusion and Exclusion Criteria

Inclusion	**Exclusion**
Adult patient population >18 years of age	Pediatrics or Adolescents
Oncology patients with chronic disease(s)	No patients identified as survivors, in remission, palliative, or hospice
Inpatient or outpatient settings, rehabilitation centers, skilled nursing facilities, home health	No hospice or palliative facilities
Peer-reviewed	Editorials or Commentaries
Full-text	Abstracts
English language	Foreign language publications
Publication timeline 2010-2020	Publications prior to 2010
Geographical location – United States	Research conducted outside of the U.S.

FIGURES

Figure 1

PRISMA Flow Diagram



Appendix A

Evidence Table

Name: Andrea N. Fulmer

Clinical Question: For oncology patients with chronic health conditions living in rural and remote regions, is there an established systems approach for improving healthcare management and care coordination?

Author (year)	**Study Purpose/ Objective(s)**	**Design, Sampling Method, & Subjects**	**Intervention & Outcomes**	**Results**	**LOE***	**Study Strengths & Limitations**
Goebel, J., Valinski, S., & Hershey, D. (2016).	The purpose is to identify the issues with diabetes management in patients with cancer by examining perspectives of oncology providers, nurses, and patients.	Method: Multiple category focus group design Subjects: 2 focus groups comprised of: 5 patients, 10 nurses and 10 Oncology doctors Setting: Two outpatient cancer clinics in Michigan	No intervention Additional research is needed to test interventions to improve care coordination and self-management. Nurses wanted patients to take ownership of their care, but patients were overwhelmed. Few oncologists felt it was not their problem	Results: Identified areas of interest: prioritization and responsibility, care coordination, and health/self-management. It highlighted areas for improvement of patients with preexisting diabetes being treated with chemotherapy.	Level 4 Cohort Group Design	Strengths: High authenticity based on relevancy to the clinical question by addressing diabetes and cancer, which are two common health conditions with high mortality rates. Limitations: High risk for bias due to a small sample size but allowed for 1:1 intimate sessions for the study. Low credibility related to subjective based data from focus groups of limited participants. No specific guidelines or

			and expected the PCP to manage DM. Oncologist providers felt it was not their responsibility for managing diabetes.			recommendations, which reflects a low informational value.
Irwin, K., Henderson, D., Knight, H., & Pirl, W. (2014).	This review summarizes data on overall and cancer-specific mortality for individuals with schizophrenia and reviews specific disparities across the cancer care continuum of screening, diagnosis, treatment, and end-of-life care.	Method: Case Study with literature review of 4 US retrospective case studies Subjects: 66yo female with paranoid schizophrenia diagnosed with a lung mass Setting: Multiple outpatient clinics, rehabilitation, and hospice	No intervention. Outcomes: Consulting psychiatry when a patient with schizophrenia is diagnosed with cancer may have the potential to improve cancer treatment.	Results: Psychiatrists can provide education about the patient’s cancer in a clear, individualized, and concrete manner before assessing the understanding of treatment and increase the patient’s capacity to consent to treatment.	Level 4: Case Study	Strengths: Study was high in authenticity and in applicability with clinical relevancy and measured outcomes through quality of life and treatment compliance. Limitations: Risk for high bias based on the lack of discussed strategy for collecting retrospective case studies. Case study is not standard due to various mental illnesses, cancer types, and treatment compliance. Low data rigor based on missing guidelines, and the inability to replicate the literature review based on missing data searches.

Jackson, M. (2018).	This article will examine the topic of older adults with cancer when transitioned to a skilled nursing setting and the challenges they may face along the care continuum.	Method: Case study supported by literature search on transitional care Subjects: 68-year-old female with comorbidities and new diagnosis of gallbladder cancer. Setting: Transitional care from inpatient, home setting, and skilled nursing facility	No intervention. Outcome: The study identified a need for more collaboration between all disciplines of the healthcare team. Eliminate the gaps in communication between various care settings to help ensure appropriate clinical care decisions are made for medically complex patients. Initiate and discussions about goals of care as they relate to each individual patient.	Results: Nurses advocate for effective and accurate exchange of information to help ensure the safety of patients and the medical treatment plans are in place as a patient transition between various healthcare settings. Nurses across a variety of disciplines, but particularly in the area of oncology, are in unique positions to encourage and initiate goals of care discussions as they relate to each individual patient.	Level 4: Case Study	Strengths: High authenticity and data relevancy related to guidelines outlined by clinical study for recommendations in clinical practice, feasibility, and the ability to measure outcomes. The case study highlights preventable situations that other oncology patients an potentially benefit from if guidelines are accepted. Limitations: Case study based on author's patient; therefore, high risk for bias. Low methodological rigor due to missing content of literature review used in support of the case study.
Muñoz, R., Farshidpour, L., Chaudhary, U., & Fathi, A. (2018).	This article aims to determine whether the inclusion of a gastrointestinal (GI) oncology nurse	Method: Retrospective Study Subjects: 413 patients referred to the ONN program	Intervention: The study measured time elapsed from the patient's	Results: Patients enrolled in ONN program as a part of the GI multidisciplinary	Level 3: Retrospective Comparative Design	Strengths: The study demonstrated high authenticity, data rigor, and data relevancy. Study outlined a

	navigator (ONN) on the multidisciplinary cancer care team is associated with improved quality of care for patients.	from January 2010 to August 2012 and evaluated multidisciplinary cancer care model established at the Community Medical Centers at two endpoints: (a) time of diagnosis to treatment and (b) the average number of missed appointments. Setting: Fresno County, California within Community Medical Centers Healthcare Network, which includes the Community Regional Medical Center and the Clovis Community Medical Center.	initial diagnosis to initiation of treatment as a measure of quality. Missed appointments were measured as an indicator of coordination effectiveness and treatment compliance. Results: Impact of the ONN had positive effects on the multi-disciplinary tumor board presentation and the time between diagnosis and treatment initiation, a weekly treatment planning conference and multidisciplinary clinic were arranged by the ONN.	cancer care model experienced a significantly shorter time lapse between the diagnosis and initial treatment ($p < 0.001$) than those patients who were not assigned ONN. Statistical analysis revealed no difference in missed appointment rates between the two groups ($p = 0.7$).		comparison analysis for the development strategy, was explicit in using evidence to support decisions, considered all options and outcomes in use of an ONN, and outlined specific guidelines. Limitations: This study is limited with the potential deficiencies of multiple patient issues or characteristics that could have independently impacted the final results, such availability of resources. A potential bias within this study could be that it was the multidisciplinary cancer care model as a whole and not an individual ONN. Low risk for bias with the patient selection being high with 413 retrospective subjects and reliable outcomes of the measurements of the initial diagnosis date to treatment date.

Page, J., Lederman, L., Kelly, J., Barry, M., & James, T. (2020).	This purpose of the article is to discuss the potential use for shared mental models to improve teamwork during hospital discharge planning and follow-up care for a cancer patient to understand care coordination with in- and outpatient cancer providers and primary care providers.	Method: Case Study Subjects: 58yo male with acute myeloid leukemia (AML) Setting: Inpatient setting, an academic medical center with discharge to home after 24 days of inpatient care. Readmitted 2 days later due to blood transfusion needed. (community setting)	No intervention. The study identified areas that could be improved for safer discharge. A shared mental model involves key providers, sharing of information, and patient input to ensure a successful discharge to include follow up care.	Results: Discharge from an inpatient to out-patient setting could apply a shared mental model that requires all team members involved in the patient's care to identify themselves as a member of the care team, to understand each other's roles, and to appreciate the implications of their own actions.	Level 4: Case Study (No control) Design	Strengths: High authenticity with use of an applicable case study and classic examples of fragmented care. Limitations: High risk for bias due to one case study reviewed. Low data rigor and date relevancy based on missing developmental strategies, strength of evidence in relation to the recommended guidelines. No discussion of important outcomes and unknown peer review.
Sampayo, V., & Tofthagen, C. (2017).	The purpose of this evidence-based project is to improve awareness and knowledge of the hyperglycemia effects in patients with cancer, increasing nurses' capability to effectively intervene. In addition, a clinical algorithm based on current evidence was developed.	Method: Educational program Subjects: 11 oncology nurses Setting: Infusion Center at University of Florida Cancer Center at Orlando Health.	Intervention: Educating nurses about the effects of hyperglycemia in patients with cancer empower them to educate and advocate, and promote patient self-care leading to improved outcomes.	Results: The findings of support the need for hyperglycemia education in patients with cancer. Pretest scores indicated that nurses did not know the implications of hyperglycemia in patients with cancer or which medications posed a greater risk for	Level 4: Correlational Design	Strengths: High authenticity with high methodological quality and data relevancy. The algorithm developmental strategy was a thorough narrative and displayed in an algorithm figure. Peer reviewed guidelines were supported with scientific evidence and applicable to clinical practice.

			Outcome: It promoted communication with the multi-disciplinary team and provide evidence-based recommendations to patients.	inducing hyperglycemia.		Limitations: Study was completed in the infusion center of a large cancer center. Results may differ if in various settings. Authors notes sample size was intentionally small, to improve management of hyperglycemia on a specific unit.
Stevens, C., Dinkel, S., & Catanzaro, J. (2011).	This integrative review of the literature will provide an overview of diabetes, cancer, and the complex interactions between the two	Methods: Integrative Review Subjects: None Settings: None	No intervention. Outcome: Identified more research for cancer care and diabetic co-management.	Results: Healthcare education curricula must include more information on the relationship between diabetes and cancer.	Level 1: Integrative Review Design	Strengths: Focused on the top two health conditions with high mortality rate and relevancy to the topic of interest. Limitations: High bias based on inability to replicate integrative review. Low authenticity, data rigor, and data relevancy. The content was of high value; however, the content focused on curriculum. Difficult to follow integrative review in relation to current state of science.
Thomson, K., & Henry, B. (2012).	This article examines problems that patients with Severe Mental Disorders (SMD) encounter with their	Methods: Case Study Subjects: 33-year-old female with breast cancer	No intervention. Outcome: An effective psychotropic medication	Results: Nurses must conduct suicide risk assessments in ambulatory settings and be	Level 4: Case Study Design	Strengths: High authenticity. Identified areas for future research for an underserved population. Low bias using the perspective

	cancer diagnosis and treatment.	and major depressive disorder 25-year-old female with breast cancer and schizophrenia, and 43-year-old male advanced pancreatic cancer and bipolar disorder Settings: Outpatient chemotherapy clinics	regimen should continue for at least six months to decrease risk of relapse. Collaboration with psychiatric prescribers is necessary for cancer patients with mental illnesses taking psychotropic medications.	prepared in outpatient cancer settings to intervene, if necessary. Open dialogue about the risk of suicide imperative and collaboration with the patient's psychiatrist is also necessary.		that selection is at random with mental health issues. Limitations: Low methodological quality and informational value. Content focused on pharmaceutical management and too many variables of psychiatric conditions and cancer type contributed toward specific guidelines or recommendations.
Woersching, J., Van Cleave, J., Haber, J., & Chyun, D. (2019).	The purpose of this literature review is to identify mental health disorders (MHDs) and substance use disorders (SUDs) on healthcare utilization (HCU) in patients with cancer is an understudied phenomenon.	Methods: Systematic Review Subject: Twenty-two articles meeting inclusion criteria of co-existing MHD and or SUD in a cancer patient Setting: Not applicable	No intervention. Outcomes: The clinical symptoms of mental health disorder (MHD) and substance use disorders (SUD) can influence healthcare utilization (HCU) in patients with cancer. Patients with MHDs and SUDs require additional mental health	Results: Oncology nurses are essential to addressing HCU in patients with MHDs and SUDs because of their direct patient care and interactions throughout the varying stages.	Level 1: Systematic Review	Strengths: High authenticity with study of an under-researched topic about patients with MHDs and SUDs and being one of the first integrative reviews on this topic. High credibility/data rigor and applicability/relevancy with a detailed literature search and consideration of varying outcomes. Limitations: Most studies in this review were retrospective, comprised of non-randomized samples with a potential for bias.

			and cancer screening to ensure they receive help navigating the complexities of cancer care.			Inconsistent findings related to the sample size.

Appendix B

Abstracted Data Matrix Table

For oncology patients with chronic health conditions living in rural and remote regions, is there an established systems approach for improving healthcare management and care coordination?					
Author (year) **LOE***	**Design** **Sampling Method** **Subjects**	**Results**		**Established Systems Approach**	**Consideration of Rural or Remote Region (Y/N)**
Goebel, J., Valinski, S., & Hershey, D. (2016). Level 4 Cohort Group Design	Method: Multiple category focus group design Subjects: 2 focus groups comprised of: 5 patients, 10 nurses and 10 Oncology doctors Setting: Two outpatient cancer clinics in Michigan	Results: Identified areas of interest: prioritization and responsibility, care coordination, and health/self-management. It highlighted areas for improvement of patients with preexisting diabetes being treated with chemotherapy.		None but identified "many gaps exist in the care management of patients with diabetes and cancer that may leave patients and providers uncertain as to what should be done and who is responsible for doing it" (Goebel, et al., 2016, p. 650).	No
Gorin, S.S., Haggstrom, D., Han, P.K., Fairfield, K.M., Krebs, P., & Clauser, S.B. (2017).	Method: Systematic Review and Meta-Analysis Subjects: A total of 52 articles met the inclusion criteria and 11	Results: Cancer care coordination approaches led to improvements in 81% of outcomes, including screening, measures of patient experience with		"**Patient navigation** (generally by a trained community member), **home telehealth** (with an automated message delivery by an interactive telehealth informatics infrastructure and a care coordinator), and **nurse case**	Yes (only 1 of 52 studies; no specifics regarding rural care coordination)

Level 1: Systematic Review and Meta-Analysis	articles for the meta-analysis. Setting: Multiple settings of the care continuum	care, and quality of end-of-life care. This review offers promising findings on the impact of cancer care coordination on increasing value & reducing healthcare costs in the USA.		**management**" (Gorin, et al., 2017, p. 536).	
Hussain, T., Chang, H., Veenstra, C., and Pollack, C. (2015). Level 4: Cohort Study	Method: Retrospective Cohort Study Subject: A total of 9,075 stage III colon cancer patients met the inclusion criteria Setting: Multiple settings including outpatient primary care, operating rooms, and inpatient	Results: Specialist collaboration is associated with lower mortality without increased cost among patients with stage III colon cancer. Facilitating formal and informal collaboration between specialists may be an important strategy for improving the care of patients with complex cancers.		Brief and general discussion of more positive outcomes for integrated delivery systems with the "current work suggests the potential that **integrated delivery systems** may have in reducing cancer costs while underscoring the challenges of doing so" (Hussain, et al., 2015, p. 3323).	Yes, mentions rural patients but does not address the concerns.
Irwin, K., Henderson, D., Knight, H., & Pirl, W. (2014). Level 4: Case Study	Method: Case Study with literature review of 4 US retrospective case studies Subjects: 66yo female with paranoid	Results: Psychiatrists can provide education about the patient's cancer in a clear, individualized, and concrete manner		"Models of care have used both **nurse care managers** and **peer recovery specialists** who partner with individuals with schizophrenia to help to negotiate a complex health system" (Irwin, et al., 2014, p. 332).	No

	schizophrenia diagnosed with a lung mass Setting: Multiple outpatient clinics, rehabilitation, and hospice	before assessing the understanding of treatment and increase the patient's capacity to consent to treatment.			
Jackson, M. (2018). Level 4: Case Study	Method: Case study supported by literature search on transitional care Subjects: 68-year-old female with comorbidities and new diagnosis of gallbladder cancer. Setting: Transitional care from inpatient, home setting, and skilled nursing facility	Results: Specialist collaboration is associated with lower mortality without increased cost among patients with stage III colon cancer. Facilitating formal and informal collaboration between specialists may be an important strategy for improving the care of patients with complex cancers.		"Although some **transitional care models** are promising, older adults with cancer in the setting of post-acute skilled nursing care is an under-researched model of transitional care" (Jackson, 2018, p. 38).	No
Molina, G., & Qadan, M. (2019). Level 7: Expert Opinion	Methods: Editorial or viewpoint Subjects: Hepatocellular carcinoma patient Setting: High-volume and low-volume hospitals	Results: Patients have a lower survival rate when receiving care at a low-volume hospital.		"The need to strengthen existing health care systems and to standardize how complex cancers with multidisciplinary expertise, such as hepatocellular carcinoma, should be managed across the United States. The focus should be on strengthening hospitals and	No

				health systems with deep ties to their communities” (Molina & Qadan, 2019, p. 3297).	
Muñoz, R., Farshidpour, L., Chaudhary, U., & Fathi, A. (2018). Level 3: Retrospective Comparative Design	Method: Retrospective Study Subjects: 413 patients referred to the ONN program from January 2010 to August 2012 and evaluated multidisciplinary cancer care model established at the Community Medical Centers at two endpoints: (a) time of diagnosis to treatment and (b) the average number of missed appointments. Setting: Fresno County, California within Community Medical Centers Healthcare Network, which includes the Community Regional Medical Center and the Clovis Community Medical Center.	Results: Patients enrolled in ONN program as a part of the GI multidisciplinary cancer care model experienced a significantly shorter time lapse between the diagnosis and initial treatment ($p < 0.001$) than those patients who were not assigned ONN. Statistical analysis revealed no difference in missed appointment rates between the two groups ($p = 0.7$).		“As a result of the challenges faced by patients after their initial diagnosis, many cancer care organizations have incorporated the role of the **oncology nurse navigator (ONN)** as a pivotal part of their **multidisciplinary cancer care models**” (Muñoz, et al., 2018, p. 141).	No
Page, J., Lederman, L., Kelly, J., Barry,	Method: Case Study	Results: Discharge from an inpatient to out-patient setting		“A **shared mental model** is one of three coordinating mechanisms that make teamwork possible.	No

M., & James, T. (2020). Level 4: Case Study (No control) Design	Subjects: 58yo male with acute myeloid leukemia (AML) Setting: Inpatient setting, an academic medical center with discharge to home after 24 days of inpatient care. Readmitted 2 days later due to blood transfusion needed. (community setting)	could apply a shared mental model that requires all team members involved in the patient's care to identify themselves as a member of the care team, to understand each other's roles, and to appreciate the implications of their own actions.		Under a shared mental model, all members of a team have an accurate, shared awareness and understanding of each other's tasks and responsibilities, allowing them to act appropriately and efficiently as a team" (Page, et al., 2020, p. 1005).	
Sampayo, V., & Tofthagen, C. (2017). Level 4: Correlational Design	Method: Educational program Subjects: 11 oncology nurses Setting: Infusion Center at University of Florida Cancer Center at Orlando Health.	Results: The findings of support the need for hyperglycemia education in patients with cancer. Pretest scores indicated that nurses did not know the implications of hyperglycemia in patients with cancer or which medications posed a greater risk for inducing hyperglycemia.		None discussed but the clinical algorithm enhanced awareness. "All members of the team must understand the consequences of hyperglycemia in patients with cancer so that effective management may take place. Additional work should aim to increase provider awareness of all implications of hyperglycemia in patients with cancer and recommend a baseline evaluation of risk and laboratory factors prior to cancer treatment planning" (Sampayo & Tofthagen, 2017, p. 351).	No

Stevens, C., Dinkel, S., & Catanzaro, J. (2011). Level 1: Integrative Review Design	This integrative review of the literature will provide an overview of diabetes, cancer, and the complex interactions between the two.	Results: Healthcare education curricula must include more information about the relationship between diabetes and cancer.		None mentioned.	No
Thomson, K., & Henry, B. (2012). Level 4: Case Study Design	Methods: Case Study Subjects: 33-year-old Female with breast cancer and major depressive disorder 25yo Female with breast cancer and schizophrenia, and 43yo Male advanced pancreatic cancer and bipolar disorder Settings: Outpatient chemotherapy clinics	Results: Nurses must conduct suicide risk assessments in ambulatory settings and be prepared in outpatient cancer settings to intervene, if necessary. Open dialogue about the risk of suicide imperative and collaboration with the patient’s psychiatrist is also necessary.		None mentioned but addressed the need for collaboration with other professionals. “Oncology nurses working with patients who have a SMD can facilitate a psychiatric consultation with professionals available within their facility and/or collaborate with the patient’s mental health provider(s) with the patient’s consent” (Thomson & Henry, 2012, p. 478).	No
Weaver, S., & Jacobsen, P. (2018). Level 7: Expert Opinion	Methods: Commentary; position paper Subjects: Cancer patients in general, no sample size. Setting: Multiple outpatient settings	Results: The article pointed out that fragmented care is problematic and is in need of a resolution.		“For example, **chronic care models** and related interventions in other domains, including geriatrics, renal, cardiovascular, and behavioral health, may provide a foundation for testing similar approaches in cancer. Efforts to integrate comprehensive geriatric assessments into the care of older	Yes, briefly mentions rural living concerns.

				cancer patients are one such example. The evidence to date suggests that implementing these assessments can inform treatment decision making and comorbidity management, which may help reduce treatment modifications and facilitate treatment completion. **Cancer treatment models** that integrate endocrinologists and diabetes educators directly into treatment planning and monitoring for cancer patients with diabetes and strategies designed to facilitate early integration of supportive care are other promising examples" (Weaver & Jacobsen, 2018, p. 505).	
Woersching, J., Van Cleave, J., Haber, J., & Chyun, D. (2019). Level 1: Systematic Review	Methods: Systematic Review Subject: Twenty-two articles meeting inclusion criteria of co-existing MHD and or SUD in a cancer patient Setting: Not applicable	Results: Oncology nurses are essential to addressing HCU in patients with MHDs and SUDs because of their direct patient care and interactions throughout the varying stages.		None mentioned but the key role of an "oncology nurses are essential to addressing HCU because of their direct patient contact throughout the multiple stages of care, including screening for postoperative complications and adverse drug reactions, patient and family education, discharge planning, and outpatient care transitions" (Woersching, et al., 2019, p. 380).	No
Are interdisciplinary healthcare teams coordinating care beyond the oncology center?					

Author (year) **LOE***	**Design** **Sampling Method** **Subjects**	**Results**			**Other Specialty Care Involved**
Goebel, J., Valinski, S., & Hershey, D. (2016). Level 4 Cohort Group Design	Method: Multiple category focus group design Subjects: 2 focus groups comprised of: 5 patients, 10 nurses and 10 Oncology doctors ** Patients were aged 21 years or older, had preexisting type 2 diabetes for at least six months prior to the start of chemotherapy for solid tumors or lymphoma, and were either receiving chemotherapy Setting: Two outpatient cancer clinics in Michigan	Results: Identified areas of interest: prioritization and responsibility, care coordination, and health/self-management. It highlighted areas for improvement of patients with preexisting diabetes being treated with chemotherapy.			“Oncologists felt that PCPs lacked adequate knowledge about cancer treatments, which often led them to transfer all care to oncologists. This was problematic as oncologists did not feel that their role was to manage noncancerous conditions or that they had the knowledge to do so. However, one nurse stated that problems occur when oncologists, being nice or doing a favor, will write for one of the patient’s other medications, such as the patient’s cardiac medication. Such acts can lead to patients skipping their next visit to their PCPs in the belief that their oncologists would manage all their care” (Goebel, et al., 2016, p. 647).
Gorin, S.S., Haggstrom, D., Han, P.K., Fairfield, K.M., Krebs, P., & Clauser, S.B. (2017).	Method: Systematic Review and Meta-Analysis Subjects: A total of 52 articles met the inclusion criteria and 11	Results: Cancer care coordination approaches led to improvements in 81% of outcomes, including screening, measures of patient			“Care coordination interventions increased appropriate health care utilization in primary, acute, and hospice care settings, the ED, and the ICU” (Gorin, et al., 2017, p. 541).

Level 1: Systematic Review and Meta-Analysis	articles for the meta-analysis. Setting: Multiple settings of the care continuum	experience with care, and quality of end-of-life care. This review offers promising findings on the impact of cancer care coordination on increasing value & reducing healthcare costs in the USA.			
Jackson, M. (2018). Level 4: Case Study	Method: Case study supported by literature search on transitional care Subjects: 68-year-old female with comorbidities and new diagnosis of gallbladder cancer. Setting: Transitional care from inpatient, home setting, and skilled nursing facility	Results: Specialist collaboration is associated with lower mortality without increased cost among patients with stage III colon cancer. Facilitating formal and informal collaboration between specialists may be an important strategy for improving the care of patients with complex cancers.			"The precise care needs at the time of discharge from acute hospital to SNF may not always be clear and are often uncertain, as in the case of J.S. Similar to the hospital structure, the SNF also has an interprofessional approach to the patient that involves the doctor or providers (e.g., nurse practitioners, physician assistants), RNs or licensed vocational nurses, case managers, social workers, rehabilitation therapists (e.g., physical, occupational, or speech therapists), dietitians, and pharmacists" (Jackson, 2018, p. 39).
Page, J., Lederman, L., Kelly, J., Barry, M., & James, T. (2020).	Method: Case Study Subjects: 58yo male with acute myeloid leukemia (AML)	Results: Discharge from an inpatient to out-patient setting could apply a shared mental model that requires			"Once the primary nurse was made aware of the discharge and need for follow-up tests, the patient was already home at a distance from the inpatient hospital" (Page, et al., 2020, p. 1056).

Level 4: Case Study (No control) Design	Setting: Inpatient setting, an academic medical center with discharge to home after 24 days of inpatient care. Readmitted 2 days later due to blood transfusion needed. (community setting)	all team members involved in the patient’s care to identify themselves as a member of the care team, to understand each other’s roles, and to appreciate the implications of their own actions.			
Thomson, K., & Henry, B. (2012). Level 4: Case Study Design	Methods: Case Study Subjects: 33yo Female with breast cancer and major depressive disorder 25yo Female with breast cancer and schizophrenia, and 43yo Male advanced pancreatic cancer and bipolar disorder Settings: Outpatient chemotherapy clinics	Results: Nurses must conduct suicide risk assessments in ambulatory settings and be prepared in outpatient cancer settings to intervene, if necessary. Open dialogue about the risk of suicide imperative and collaboration with the patient’s psychiatrist is also necessary.			“When the family member finally called the physician’s attention to the often-erratic behavior, B.H. was referred back to the family practice doctor who wanted to “do tests in hospital” or to a psychiatrist to “try some new medications.” No one in the oncology community sat down with B.H. to explain how important his bipolar medications were to his health or how it might have made a difference in the quality of his remaining life” (Thomson & Henry, 2012, p. 473-474).
Woersching, J., Van Cleave, J., Haber, J., & Chyun, D. (2019).	Methods: Systematic Review Subject: Twenty-two articles meeting	Results: Oncology nurses are essential to addressing HCU in patients with MHDs and SUDs			“Ten studies focused on hospital admissions. Six of those studies found that hospital admissions increased in patients with MHDs and SUDs. Seven studies examined emergency

Level 1: Systematic Review	inclusion criteria of co-existing MHD and or SUD in a cancer patient Setting: Not applicable	because of their direct patient care and interactions throughout the varying stages.			department visits. Five of those studies found that emergency department visits increased in patients with MHDs and SUDs. Of the four studies that focused on outpatient visits, two found increases in outpatient visits in patients with MHDs, SUDs, and prostate cancer. In two studies of long-term care, facility use decreased in patients with schizophrenia and dementia during treatment for lung cancer and in hospice care. In two studies, the number of surgeries or invasive procedures for head and neck, gastric, and colorectal cancer decreased in patients with schizophrenia found an increase in general practitioner consultations in patients with depression and colorectal cancer (Worsching, er al., 2019, p. 377-378).	
Where is healthcare being delivered in comparison to the patient’s home of record?						
				Home of Record	**Location of treatment**	
None of the studies disclosed this type of information.						
How are care plans distributed and communicated throughout the cancer trajectory?						
Author (year)	**Design** **Sampling Method**	**Results**	**Use of Care Manager or Oncology**	**Written (Faxed, Electronic**	**Verbal (Phone,**	**Patient Involvement**

LOE*	Subjects		Nurse Navigator	Health Record)	Nurse Huddles)	
Gorin, S.S., Haggstrom, D., Han, P.K., Fairfield, K.M., Krebs, P., & Clauser, S.B. (2017). Level 1: Systematic Review and Meta-Analysis	Method: Systematic Review and Meta-Analysis Subjects: A total of 52 articles met the inclusion criteria and 11 articles for the meta-analysis. Setting: Multiple settings of the care continuum	Results: Cancer care coordination approaches led to improvements in 81% of outcomes, including screening, measures of patient experience with care, and quality of end-of-life care. This review offers promising findings on the impact of cancer care coordination on increasing value & reducing healthcare costs in the USA.	None of the 52 studies revealed a specific mode of communication but stated that “increased communication across multidisciplinary teams could improve cancer care coordination. Effective interventions were generally led by nurses, navigators, or social workers” (Gorin, et al., 2017, p. 541).			
Jackson, M. (2018). Level 4: Cohort Study	Method: Case study supported by literature search on transitional care Subjects: 68-year-old female with comorbidities and new diagnosis of gallbladder cancer. Setting: Transitional care from inpatient,	Results: Specialist collaboration is associated with lower mortality without increased cost among patients with stage III colon cancer. Facilitating formal and informal collaboration between specialists may be an important strategy for improving the	“In the example of J.S., the SNF case manager arranged transportation for the follow-up appointment that J.S. was scheduled to have with her oncologist” (Jackson, 2018, p. 40).	None discussed	None discussed	“On her arrival, J.S. told the admission nurse that she had an upcoming chemotherapy appointment in four days, and the nurse replied, “I will let the doctor and the case manager know” (Jackson, 2018, p. 38).

	home setting, and skilled nursing facility	care of patients with complex cancers.				
Page, J., Lederman, L., Kelly, J., Barry, M., & James, T. (2020). Level 4: Correlational Design	Method: Case Study Subjects: 58-year-old male with acute myeloid leukemia (AML) Setting: Inpatient setting, an academic medical center with discharge to home after 24 days of inpatient care. Readmitted 2 days later due to blood transfusion needed. (community setting)	Results: Discharge from an inpatient to out-patient setting could apply a shared mental model that requires all team members involved in the patient's care to identify themselves as a member of the care team, to understand each other's roles, and to appreciate the implications of their own actions.	None utilized	Discussed future implications "Communication with those team members not present at the huddle could be via **white board** on the unit or **electronically**, which requires buy-in from team members to access the information, as well as health information technology support" (Page, et al., 2020, p. 1056).	Discussed for future use: "Structured huddles, using the situation, background, assessment, and recommendation (SBAR) framework" (Page, et al., 2020, p. 1056).	The patient's primary nurse learned of his discharge when he called her that afternoon from home, saying his doctor told him to arrange for laboratory tests (Page, et al., 2020, p. 1054).
Thomson, K., & Henry, B. (2012). Level 4: Correlational Design	Methods: Case Study Subjects: 33yo Female with breast cancer and major depressive disorder 25yo Female with breast cancer and schizophrenia, and	Results: Nurses must conduct suicide risk assessments in ambulatory settings and be prepared in outpatient cancer settings to intervene, if necessary. Open	"Oncology nurses working with patients who have a SMD can facilitate a psychiatric consultation with professionals	None discussed.	None discussed.	"Her visit times were always scheduled as "extended," and great care was taken to lessen psychological discomfort. The oncology nurses knew that J.T. would call every Monday morning with at least

	43yo Male advanced pancreatic cancer and bipolar disorder Settings: Outpatient chemotherapy clinics	dialogue about the risk of suicide imperative and collaboration with the patient's psychiatrist is also necessary.	available within their facility or collaborate with the patient's mental health provider(s) with the patient's consent" (Page, et al., 2012, p. 478).			one or two questions for the triage nurse" (Thomson & Henry, 2012, p. 475).
Woersching, J., Van Cleave, J., Haber, J., & Chyun, D. (2019). Level 1: Systematic Review	Methods: Systematic Review Subject: Twenty-two articles meeting inclusion criteria of co-existing MHD and or SUD in a cancer patient Setting: Not applicable	Results: Oncology nurses are essential to addressing HCU in patients with MHDs and SUDs because of their direct patient care and interactions throughout the varying stages.	Discussed future concerns: "Oncology nurses are essential to addressing HCU because of their direct patient contact throughout the multiple stages of care, to include screening for postoperative complications and adverse drug reactions, patient and family education, discharge planning, and outpatient care	None discussed	None discussed	None discussed

			transitions” (Woersching, 2019, p. 380).			
Is the patient’s primary care provider a standalone provider or part of a large facility?						
Author (year) **LOE***	**Design** **Sampling Method** **Subjects**	**Results**		**Standalone** **(Yes/No)**	**Name of Larger Facility**	
None of the studies disclosed this type of information.						

Appendix C

Terminology

Geographically-challenged States – access to a majority of the region is reliant upon transportation beyond an automobile, such as planes, boats, and is dependent upon seasonal environmental factors affecting travel.

Remote Region – limited inhabitants, sparsely developed, and are difficult to access.

Rural – low population of no more than 50,000 inhabitants and commute to healthcare is 60 miles or more.

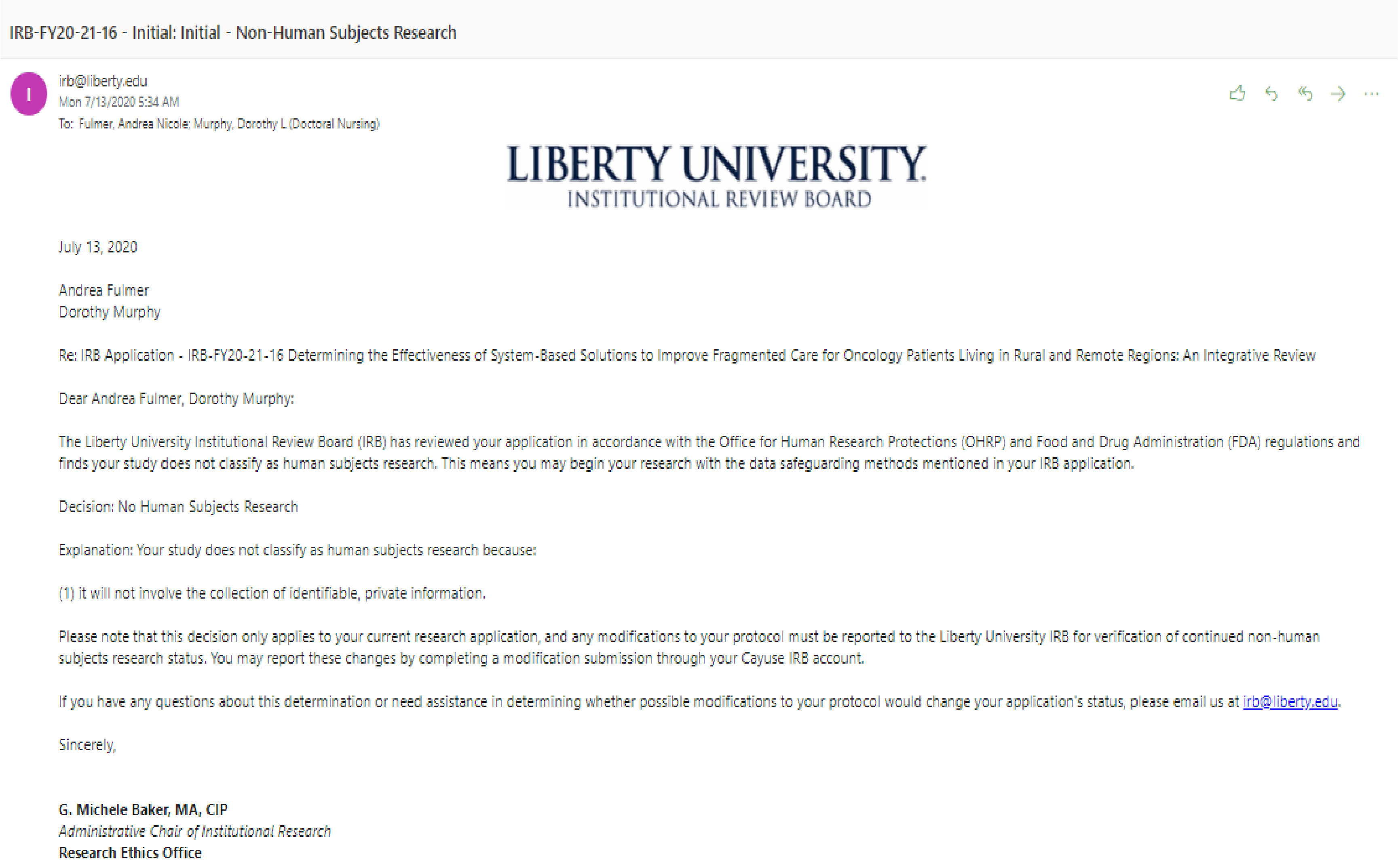
Appendix D

Timeline

April 29, 2020 – Integrative Review process initiated with consent granted by this author’s chair, Dr. Dorothy Murphy.
May 5, 2020 - Initial narrative for proposal was submitted.
May 7, 2020 – First revision submitted.
May 11, 2020 – Collaboration with LU librarian via email followed by frequent exchanges
May 14, 2020 – Second revision submitted.
May 21, 2020 – Third revision submitted.
May 29, 2020 – Video-teleconference with LU librarian via Microsoft Teams/Background clinical question approved.
June 12, 2020 – Fourth revision submitted.
June 19, 2020 – Ongoing discussion for proposal defense.
June 21, 2020 – Final proposal submission.
July 3, 2020 - Proposal defense completed.
July 10, 2020 - IRB approval application submitted.
July 13, 2020 - Research Ethics Office deemed the integrative review to not be classified as human subjects research.
July 14, 2020 – Exhausted CINAHL database.
July 21, 2020 – Exhausted Health Source: Nursing/Academic Edition
July 28, 2020 – Exhausted Nursing & Allied Health
August 3, 2020 – Exhausted MEDLINE.
August 11, 2020 – Gray literature search completed.
August 12, 2020 – Ongoing abstract data matrix and Melnyk LOE table updated.
August 18, 2020 – Section 5 and 6 of paper initiated and ongoing development.
September 9, 2020 – First draft of final IR submitted for review.

Appendix E

IRB Approval Documentation



IRB-FY20-21-16 - Initial: Initial - Non-Human Subjects Research

irb@liberty.edu
Mon 7/13/2020 5:34 AM
To: Fulmer, Andrea Nicole; Murphy, Dorothy L (Doctoral Nursing)

LIBERTY UNIVERSITY
INSTITUTIONAL REVIEW BOARD

July 13, 2020

Andrea Fulmer
Dorothy Murphy

Re: IRB Application - IRB-FY20-21-16 Determining the Effectiveness of System-Based Solutions to Improve Fragmented Care for Oncology Patients Living in Rural and Remote Regions: An Integrative Review

Dear Andrea Fulmer, Dorothy Murphy:

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your research with the data safeguarding methods mentioned in your IRB application.

Decision: No Human Subjects Research

Explanation: Your study does not classify as human subjects research because:

(1) it will not involve the collection of identifiable, private information.

Please note that this decision only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued non-human subjects research status. You may report these changes by completing a modification submission through your Cayuse IRB account.

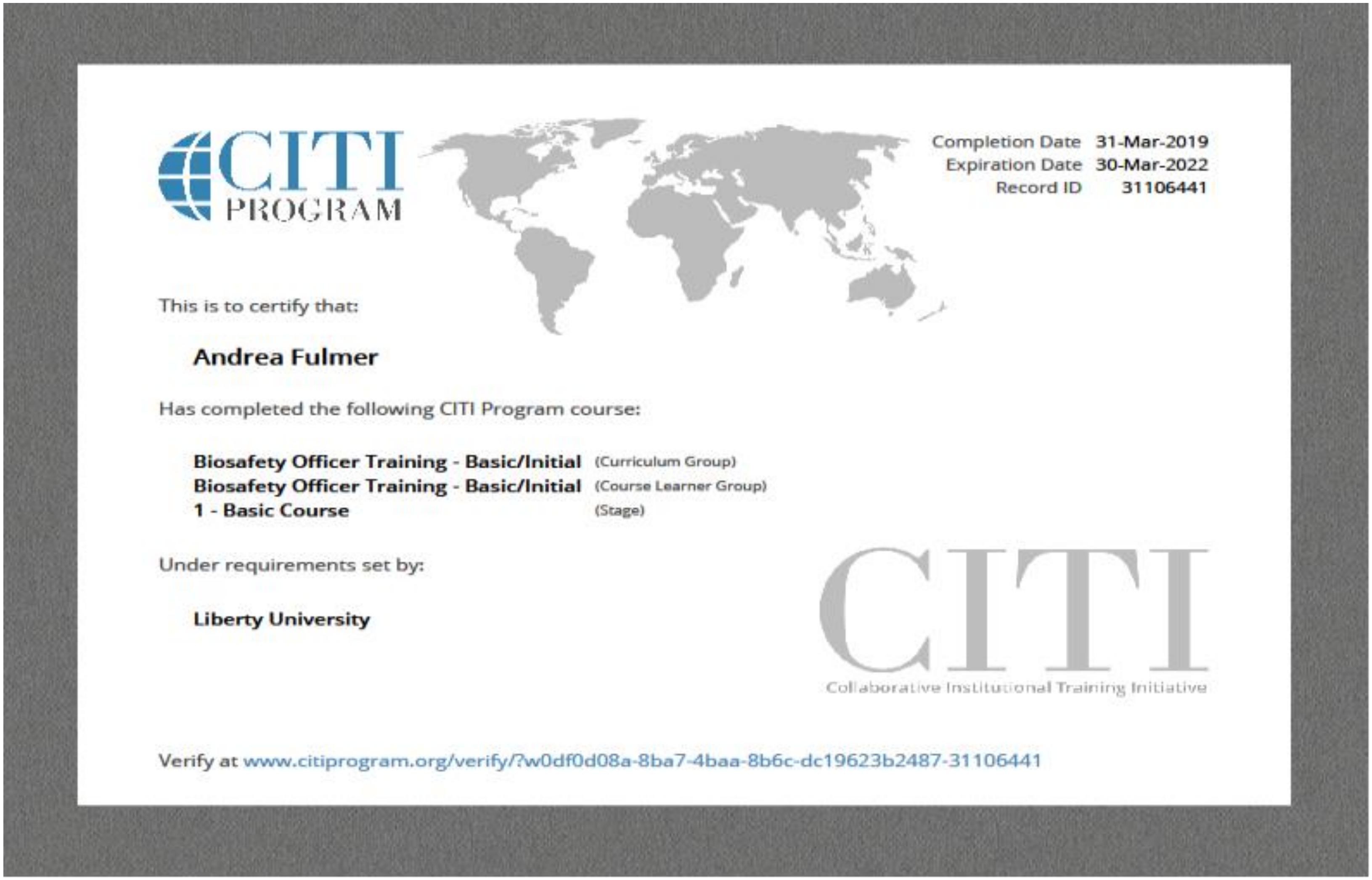
If you have any questions about this determination or need assistance in determining whether possible modifications to your protocol would change your application's status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

Appendix F

CITI Certificate



CITI PROGRAM

Completion Date 31-Mar-2019
Expiration Date 30-Mar-2022
Record ID 31106441

This is to certify that:

Andrea Fulmer

Has completed the following CITI Program course:

Biosafety Officer Training - Basic/Initial (Curriculum Group)
Biosafety Officer Training - Basic/Initial (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Liberty University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w0df0d08a-8ba7-4baa-8b6c-dc19623b2487-31106441