

AN ABSTRACT OF THE THESIS OF

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Title: Care Team Burnout: Predictors and Potential Intervention

Abstract approved: _____

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Burnout is a state of physical or emotional exhaustion and disconnectedness induced by continuous stress that affects various aspects of an individual's life. Physicians experience burnout at a higher rate than other professions due to the highly stressful nature of their work. Consequently, physicians are at a higher risk of suicide than dentists, lawyers, farmers, educators, and police officers. However, current research on reducing physician and care team burnout focuses on the symptoms rather than systematic and organizational root causes. The objective of this thesis is to investigate root causes of physician and care team burnout, through an exploratory literature and data analysis.

The investigation set out by first identifying burnout trends in the literature, considered

predictors, and suggested interventions. Workload and satisfaction are two of many identified predictors. However, little is known about the effects of burnout on turnover rates. An examination of proposed interventions revealed cognitive-restructuring and behavioral-activation techniques are most effective in reducing burnout when implemented through culture-driven strategies. However, culture-driven intervention strategies are rare. The Conceptual Change Model is an identified culture-driven intervention strategy that focuses on behavior change. The model aims at transforming employees' behaviors from a reactive approach to one that promotes proactive engagement in the workplace as it has proven to be successful in implementing effective change. The literature calls for an understanding of the relationship between behaviors in healthcare and burnout.

A survey is used to explore the relationship between the identified potential predictors (turnover and learning behaviors) and burnout in organizations located in the United States, United Kingdom, France, Kuwait, United Arab Emirates, Bahrain, Indonesia, and Australia. This research used Mazur, McCrery, and Chen's (2012) framework of behavior in healthcare to classify participant's behaviors. The Maslach Burnout Inventory was used to measure burnout. The survey also measured turnover rate and its impact.

Survey findings indicate that care team members who exhibit a reflective approach towards obstacles in the workplace report lower rates of burnout. Additionally, physician turnover rates may have an influence on care team burnout. With higher turnover, the higher the burnout reported. Further research is needed to validate the findings observed in this study.

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Care Team Burnout: Predictors and Potential Intervention

by
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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

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TABLE OF CONTENTS

	<u>Page</u>
1 INTRODUCTION.....	1
1.1 Motivation.....	1
1.2 Research Objectives.....	2
1.3 Research Context.....	4
1.4 Research Methodology.....	5
1.5 Key Findings and Construct.....	7
1.6 Research Delimitations.....	8
1.7 Thesis Organization.....	9
2 LITERATURE REVIEW.....	10
2.1 State of the Art Matrix.....	10
2.2 Physician Burnout.....	14
2.2.1 Physician Suicide.....	14
2.2.2 Physician Satisfaction Trends.....	15
2.3 Care Team Burnout.....	16
2.4 Burnout Measurement.....	18
2.4.1 Maslach Burnout Inventory.....	18
2.4.2 Other Inventories.....	19
2.5 Burnout Predictors.....	19
2.5.1 Work-Life Balance.....	20
2.5.2 Career Development.....	21
2.5.3 Electronic Records and Burnout.....	22
2.5.4 Geographic Factors.....	24
2.6 Burnout Interventions.....	27
2.6.1 Why Interventions Fail.....	27

TABLE OF CONTENTS (continued)

	<u>Page</u>
2.6.2 “Best” Interventions.....	29
2.6.2.1 Workflow Intervention Techniques	29
2.6.2.2 Cognitive Behavioral Techniques.....	30
2.7 Understanding Behavior in Healthcare.....	30
2.8 Conceptual Change Model	31
2.8.1 Overview.....	31
2.8.2 Description.....	34
2.8.3 How it fits	35
2.9 Gaps in The Literature	36
3 METHODOLOGY	37
3.1 <i>Measurement Goal</i>	39
3.2 <i>Survey Design</i>	39
3.3 <i>Survey Population</i>	42
3.4 <i>Survey Distribution</i>	43
3.5 <i>Survey Response Analysis</i>	43
3.6 <i>Reliability</i>	45
3.6.1 Bias	46
3.6.2 Representativeness.....	46
4 RESULTS AND ANALYSIS	48
4.1 <i>Response Summary</i>	48
4.2 <i>Participation Information</i>	49
4.2.1 Overview.....	49
4.2.2 International Survey: Excluding US Responses	51
4.2.3 US Responses	52
4.3 <i>Learning Behaviors and Burnout</i>	54

TABLE OF CONTENTS (continued)

	<u>Page</u>
4.3.1 International Survey.....	55
4.3.2 US Survey.....	58
4.3.3 Combined Response Analysis.....	60
4.4 <i>Turnover Rate and Burnout</i>	62
4.4.1 International Survey.....	63
4.4.2 US Survey.....	66
4.4.3 Combined Survey.....	70
4.5 <i>Validity and Reliability</i>	73
4.5.1 International Survey.....	73
4.5.2 US Survey.....	74
4.5.3 Combined Survey.....	74
4.6 <i>Result Summary</i>	75
5 CONCLUSION AND FUTURE WORK.....	78
5.1 <i>Summary</i>	78
5.2 <i>Conclusions</i>	79
5.3 <i>Future Research Opportunities</i>	81
5.4 <i>Weakness and Improvement</i>	82
6 BIBLIOGRAPHY.....	83
7 APPENDICES.....	94
<i>Appendix A: MBI Questions by Syndrome</i>	95
<i>Appendix B: Learning Behaviors Questions by Behaviors</i>	96
<i>Appendix C: Survey Questions (Complete)</i>	97
<i>Appendix D: Consent Page</i>	106
<i>Appendix E: IRB Documents</i>	107

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Reviewed burnout publications by year (n=124).....	12
2. Topic areas identified from the literature (n=124).....	13
3. Articles that reported emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA) results.	14
4. Regions of the United States.....	25
5. Conceptual Change Model, source: Mirdad, Hille, & Melamad (2015)	33
6. Logic model of this research.....	38
7. A question obtained from the 22-MBI medical personnel questionnaire	40
8. Learning behaviors as defined by the Conceptual Change Model (adapted from Mazur, McCreery, & Chen, 2012).....	41
9. Physician turnover rate survey question	42
10. Survey response distribution per country	49
11. Participants' positions (n= 63).....	50
12. Participants' response to years worked at current organization (n=63)	51
13. International participants' positions (n= 40).....	51
14. Number of years' participants worked at their organization (n=40).....	52
15. Positions of US survey participants (n=23)	53
16. Number of years worked at organization from US responses (n=23)	54
17. Participants' responses of burnout and learning behaviors (n=40)	57
18. Participants' responses of burnout and learning behaviors (n=23)	60
19. Participants' responses of burnout and learning behaviors (n=63)	62
20. Participants' responses of burnout and reported physician turnover estimates (n=40).....	64
21. Participants' responses of burnout and impact of reported physician turnover estimates (n=40)	66

LIST OF FIGURES (continued)

<u>Figure</u>	<u>Page</u>
22. Participants' responses of burnout and impact of reported physician turnover estimates (n=22).....	68
23. Participants' responses of burnout and impact of reported physician turnover estimates (n=23).....	70
24. Participants' responses of burnout and impact of reported care team turnover estimates (n=63).....	73

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1. Definition of terms used in this research	3
2. Research questions, objectives, and measurement method.	6
3. 2016 region data estimates obtained from the United States Bureau of Labor Statistics data	26
4. The number of questions from the MBI pertaining to each syndrome	40
5. Summary of relationship between learning behaviors and burnout syndromes for international data excluding US (n=40).....	55
6. Summary of relationship between learning behavior scores and burnout syndromes for international data excluding US (n=40).....	57
7. Summary of relationship between learning behaviors and burnout syndromes for US survey data (n=23).....	58
8. Summary of relationship between learning behavior scores and burnout syndromes for US survey data (n=23)	59
9. Summary of relationship between learning behaviors and burnout syndromes for survey data (n=63).....	61
10. Summary of relationship between learning behavior scores and burnout syndromes for survey data (n=63)	61
11. Summary of relationship between turnover rates and burnout syndromes for international data (n=40).....	64
12. Summary of relationship between impact of turnover rates and burnout syndromes for international data (n=40).....	65
13. Summary of relationship between turnover rates and burnout syndromes for US data (n=22)	67
14. Summary of relationship between impact of turnover rates and burnout syndromes for US data (n=22).....	69
15. Summary of relationship between turnover rates and burnout syndromes for survey data (n=62).....	71
16. Summary of relationship between impact of turnover rates and burnout syndromes for survey data (n=63).....	72

LIST OF TABLES (continued)

<u>Table</u>	<u>Page</u>
17. Summary for Cronbach's alpha values obtained from international survey data	74
18. Summary for Cronbach's alpha values obtained from US survey data	74
19. Summary for Cronbach's alpha values obtained in this research data.....	75
20. Learning behaviors and burnout syndromes result summary	76
21. Turnover rate and burnout syndrome result summary	77
22. Fulfillment of gaps in the literature	81

1 INTRODUCTION

1.1 Motivation

The United States spent over \$3.3 trillion dollars on healthcare in 2016. This was a 4.3% increase from 2015, but there was no significant associated increase in care quality (Centers for Medicare & Medicaid Services, 2016). The literature suggests that medical errors impose costs up to \$17.1 billion US dollars (Van Den Bos, et al. 2011) and that burnout is partly responsible for medical errors (Kang, Lihm, & Kong, 2013; Shanafelt et al., 2010; Hayashino, Utsugi-Ozaki, Feldman, & Fukuhara, 2012). This is problematic because medical errors are the 3rd leading cause of death in the United States (Makary & Daniel, 2016).

Burnout is a physical and emotional condition induced by continuous stress, which affects an individual's quality of life and work performance (Akin, 2012). It is defined as a syndrome characterized by emotional exhaustion, depersonalization, and low sense of accomplishment (Maslach & Jackson, 1981). Individuals who experience burnout tend to have symptoms including fatigue, anxiety, and depression (Maslach & Jackson, 1981).

The Triple Aim (3A) is a widespread concept in healthcare used to measure improvements in patient health outcomes, improvement in patient experience, and reduction in the per capita cost of care (Berwick & Whittington, 2008). It is argued that providing adequate patient care requires “care for providers” (Bodenheimer & Sinsky, 2014). In a survey of 508 healthcare employees, Bodenheimer and Sinsky (2014) report that 60% of the care team experience burnout. The literature also suggests that the focus on 3A increases care team dissatisfaction (McHugh, Kutney-Lee, Cimiotti, & Sloane, 2011), and burnout, which affects both quality and cost of care (Bodenheimer & Sinsky, 2014). The literature proposes a transition from 3A to the Quadruple

Aim (4A) (Sikka, Morath, & Leape, 2015). The 4A contains an employee experience aim (Bodenheimer & Sinsky, 2014).

In an effort to improve care team wellbeing, the literature recommends interventions to alleviate burnout, including changes to electronic records (Linzer et al., 2015), training initiatives (Babbott et al., 2014), and scheduling modifications (Linzer et al., 2016). However, research shows that 80% of the proposed interventions fail within six months to a year of implementation (Awa, Plaumann, & Walter, 2010).

There is a need to explore the underlying reason(s) for failed burnout interventions'. Through investigating the underlying factors that drive burnout, and examining existing interventions, this research can pursue factors that most likely influence the effectiveness of burnout interventions. The identification of such factors will help develop tools that permanently alleviate burnout to promote care team wellbeing.

1.2 Research Objectives

This exploratory study is focused on identifying factors that affect care team burnout and factors that drive and sustain improvements. Factors considered include turnover rate, care team distribution, and individual mindsets. The insight of this study will help improve our understanding of burnout in healthcare.

Given the cultural and behavioral aspect of burnout research and workplace management, Mirdad, Hille, and Melamed's (2015) Conceptual Change Model will be used to assess continuous improvement mindsets. The model consists of "single-" and "double-loop" actors. Single-loop actors are individuals who engage in reactive and workaround behavior (Hille,

2016). Double-loop actors are individuals who engage in a proactive, reflective behavior (Hille, 2016). Mazur, McCreery, and Chen (2012) suggest organizations function better when employees are double-loop actors. This thesis research uses the single- vs double-loop behavior to investigate burnout levels. Table 1 provides definitions of the terminology used in this research.

Table 1: Definition of terms used in this research

Term	Definition
Burnout	A condition defined as a syndrome of three experiences: <ul style="list-style-type: none"> • emotional fatigue (emotional exhaustion), • disengagement or detachment (depersonalization), • and lack of sense of professional pride or high rates of inefficacy (personal accomplishment) (Maslach, Schaufeli, & Leiter, 2001).
Turnover rate	the rate at which employees leave the organization
Learning behaviors	behaviors exhibited by organization actors characterised as single-loop and double-loop learning
Single-loop learning behaviors	the ability “detect and correct defects, without addressing underlying values that drive action and govern behavior”. Single-loop learning includes 3 behaviors: quick fixing, conforming, and expediting (Mazur, McCreery, & Chen, 2012)
Double-loop learning behaviors	a reflective approach to defects in which organization actors not only address the problem at hand but develop ways to prevent it from reoccurring. Double-loop learning behaviors include: initiating and enhancing (Mazur, McCreery, & Chen, 2012).
Disruptive events	any unexpected event that interferes with everyday workflow excluding emergencies such as fires and earthquakes.
Individual-driven strategies	interventions that promote teaching techniques to help the care team cope with a particular workplace stressor (Maslach, Schaufeli, & Leiter, 2001).
Culture-driven strategies	interventions that promote educating care team members to engage with their work environment through the combination of structural and managerial interventions and individual-driven strategies (Maslach, Schaufeli, & Leiter, 2001).

1.3 Research Context

Burnout is a widespread concern in healthcare. However, little is known beyond anecdotal evidence of root cause (Drummond, 2015). The literature examines burnout predictors including work-life balance (Shanafelt, et al., 2015), career development (Linzer et al., 2013), electronic records (Babbott et al., 2014), and workflow (Linzer et al., 2015). These studies identified burnout mitigation strategies focused on improving workflow (e.g. task offloading or working to the top of license), and work-life balance (e.g. simplified electronic records to reduce after-hours electronic records usage) (Linzer et al., 2015; Sinsky, 2017).

Interventions can further be classified as one of four techniques like workflow intervention techniques, mediation techniques, interpersonal-skill enhancement, and cognitive-behavioral techniques (CBT) (Richardson & Rothstein, 2008). Cognitive-behavioral techniques are defined as interventions that focus on cognitive restructuring and behavioral activation. Such interventions introduced in literature include therapy, training, and counselling (Awa, Plaumann, & Walter, 2010). Richardson and Rothstein (2008) investigated the effects of CBT in sustaining burnout reduction by observing 36 interventions and found that the relationship between CBT and sustaining improvement is “very high”. Additionally, these techniques can either be implemented as individual-driven or culture-driven strategies (Kahill, 1998).

Individual-driven strategies provide coping techniques for the care team regarding a particular stressor (Maslach, Schaufeli, & Leiter, 2001). Meanwhile, culture-driven strategies aim at changing the organization while utilizing individual-driven coping techniques alongside structural changes (Maslach, Schaufeli, & Leiter, 2001).

An examination by Awa and colleagues (2010) showed that 80% of the organizations studied relied on individual physicians to make burnout reducing changes. The research also noted that CBT interventions fail at sustaining improvements when CBT is implemented through individual-driven strategies (Awa, Plaumann, & Walter, 2010). Though proven to have long lasting effect, culture-driven intervention strategies in healthcare are rare compared to individual-driven intervention strategies (Panagioti et al., 2017).

The literature identified the Conceptual Change Model as a tool to implement culture-driven cognitive-behavioral techniques. The Conceptual Change Model provides the ability to transform individuals from single-loop (reactive) to double-loop (proactive) actors (Mirdad, Hille, & Meleamad, 2015). For example, double-loop learning behaviors train individuals to approach day-to-day obstacles by not just momentarily altering behavior but also their assumptions so that future encounters do not impose unnecessary stress (Carthey, de Leval, & Reason, 2001). However, little is known about the relationship between care team behaviors and burnout. An investigation is needed to examine if proactive behaviors that aim at reducing stress can in turn reduce emotional exhaustion and depersonalization, and improve the care team's sense of personal accomplishment. Further discussion on interventions explored in the literature can be found in Chapter 2.

1.4 Research Methodology

This section provides an overview of the methodology used in this research. A detailed methodology can be found in Chapter 3. Table 2 contains the research objectives, research questions, and measurement methods used in this research. The thesis is based on the result of one internet survey. The threefold focus of the survey was to measure care team burnout, assess

respondent's learning behavior on the conceptual change (single vs double-loop) spectrum, and measure turnover rate estimates and their impact.

Table 2: Research questions, objectives, and measurement method.

Question	Objective	Measurement method
What factors drive physician burnout?	Investigating potential root cause of physician and care burnout	Historic data analysis, survey
How do individual mindsets affect burnout?	Potential for developing effective burnout solution	Survey

The survey used the Maslach Burnout Inventory (MBI) to measure burnout. The instrument uses a 7-point Likert scale to measure burnout frequency and intensity. Burnout scale included Never = 0, A few times a year or less = 1, Once a month or less = 2, A few times a month = 3, Once a week = 4, A few times a week = 5, Every day = 6.

Learning behavior questions were developed using Mazur, McCrery, and Chen's (2012) categories of behavior. The questions were constructed to mimic the structure of the MBI questions for consistency. Learning behaviors 7-point Likert scale included Never = 0, Rarely = 1, Occasionally = 2, Sometimes = 3, Frequently = 4, Usually = 5, Always = 6. Further discussion of survey questions is found in Section 3.3.

Target participants include physicians, nurses, and other care team personnel. Participants were contacted online and were provided one of two survey links. One survey link was intended to document responses within the US, and the other for international respondents. The survey was open to participants irrespective of location because of the early phase of this exploratory research. Care team members agreed to participate in the study voluntarily. The responses provided are anonymous.

A non-parametric approach was used to analyze the research data obtained from this survey. Spearman's correlation coefficient is used to measure significance of the relationship between learning behaviors and burnout, and turnover rate and burnout. The reliability of the survey was measured using Cronbach's alpha.

This thesis research considered additional factors that have potential effect on burnout. Publically available data from the Bureau of Labor Statistics was used to explore the relationship between care team turnover rate and factors such as population density with respect to care team employment per region in the United States. Findings from this exploration are discussed in Section 2.5.4.

1.5 Key Findings and Construct

A 95% confidence interval was used for the analysis in this thesis. The results from the conducted survey indicate the relationship between learning behaviors and burnout is significant. Care team members who engage in proactive behavior in the workplace reported lower rates of disengagement, and sense of professional inefficacy. Consequently, care team members who engage in reactive behavior in the workplace reported higher rates of disengagement, and sense of professional inefficacy. However, further investigation is needed to explore the relationship between experienced emotional fatigue and learning behaviors. This finding also suggests that the Conceptual Change Model will have an effect on reducing burnout.

However, the relationship between single- and double- loop behaviors differed when the data is analyzed for US responses and international responses (excluding US) separately. The US data indicate that participants engaging in proactive behavior report lower rates of emotional fatigue and higher rates of personal accomplishment. The international responses indicate that

individuals who engage in proactive behavior report experiencing higher rates of personal accomplishment only. The result from the analysis is discussed in Section 4.3.

The relationship between the impact of survey reported physician turnover rates and emotional exhaustion, depersonalization, and personal accomplishment were shown to be significant.

Additionally, a relationship was observed between the impact of survey reported care team turnover rates and personal accomplishment. The analysis did not find statistical significance between impact of care team turnover rates and emotional exhaustion and depersonalization.

This suggests *that turnover rates* can be strong indicators of the experienced care team burnout at both the organization and the region. Further research is needed to validate the observations obtained from the analysis performed in this thesis research.

Additionally, data obtained from the Bureau of Labor Statistics indicated that care team distribution relate to turnover rates. However, an extensive study is needed to determine the significance and effect of this relationship.

1.6 Research Delimitations

Data accessibility is the main limitation of this research. The survey produced and used in this research was administrated on voluntary basis, which may have influenced sample size. The analysis only included the responses of individuals who chose to express their opinion. Voluntary sampling of data introduces biases that can be avoided by choosing an alternative sampling method. A non-voluntary random sampling approach would increase the sample size and improve validity of the results observed. However, this approach was infeasible at this exploratory stage of the research.

1.7 Thesis Organization

Chapter 1 is an outline of this thesis, including the justification of the thesis research, discussion of the research approach, statement of study limitations and summary of key conclusions.

Chapter 2 is a review of care team burnout literature, measurement tools, predictors, intervention methods, and the Conceptual Change Model. Chapter 3 contains the methodology used for the survey, including the questions developed, validity and reliability of the survey, the population, distribution, and survey response analysis. Chapter 4 is an analysis of the results produced by the thesis research. Chapter 5 is the conclusion, which contains research findings, implications, and future work.

2 LITERATURE REVIEW

This chapter provides a detailed review of previous research findings from the past 37 years on care team burnout. The focus areas in this thesis research are selected based on this review. Section 2.1 discusses the approach utilized for this review and a summary of topic findings. Section 2.2 is focused on physician burnout and Section 2.3 on care team burnout. Section 2.4 provides an overview of the burnout measurement tools used in the literature. Section 2.5 is focused on burnout predictors present in the literature. Section 2.6 discusses interventions techniques illustrated in the review. Section 2.7 is focused on behaviors in healthcare. Section 2.8 discusses the Conceptual Change Model as it fits to this thesis research. Finally, Section 2.9 summarizes the gaps in the literature.

2.1 State of the Art Matrix

The literature was compiled using the State of the Art Matrix approach, in which matrices are formed to organize the literature with the objective of drawing meaningful information (Beruvides & Omachonu, 2001). This approach was used to guide the literature review of burnout in healthcare. The State of the Art Matrix provided insight relating to trends of burnout in healthcare literature, focus areas, and prevalent gaps in current research. The identification of trends and focus areas in the literature help understand the problem to be addressed. The gap in the literature provides an understanding of what areas of research are incomplete so this thesis research can address and provide new knowledge to the field.

The literature was collected from databases, including: 1Search, Web of Science, Google Scholar, and Springer Link. Search terms included physician burnout, care team burnout, physician burnout suicide, healthcare burnout, burnout, work-life balance and burnout, physician

burnout interventions, healthcare workflow, workflow and burnout in healthcare, Electronic Health Records (EHR), EHR and burnout, Electronic Medical Records (EMR), EMR and burnout. Key terms were used in combination to yield different search results. The search results ranged from 400-20000 articles that relate to the searched key terms.

Articles were selected in this review based on their relevance to topic or searched key terms, and number of times they were cited. Articles were also selected based on citations within a reviewed article. If an article is cited in more than one reviewed article, it was obtained and reviewed. Author based searches were conducted to investigate if the author produced other similar or highly relevant papers.

A total of 124 articles were reviewed from 1981-2017. Figure 1 illustrates a chronological distribution of the articles reviewed. Only five papers were produced, and found relevant to this research, prior to 1994. There was an upward trend of published literature following 1994. The literature continues to increase at a rate of 40% per time bracket. A 68% jump in publication occurs following 2009. Seventy-two percent of the reviewed articles are published after 2009. There is no steady rate of increase of publications at this point in time as the field continues to grow.

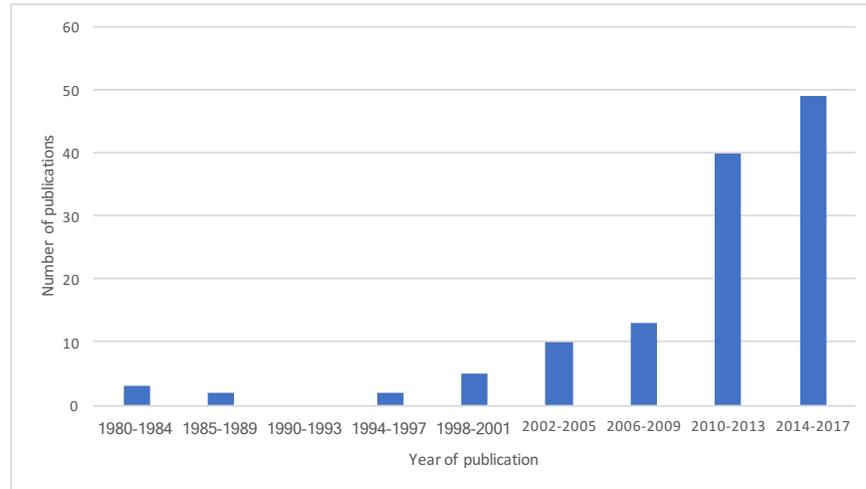


Figure 1: Reviewed burnout publications by year (n=124)

Articles reviewed were classified by categories related to article type, data-collection type, and content. Article type included *primary* theory articles in which a new theory is introduced, *secondary* theory articles in which a theory is introduced that is supportive of another existing theory in literature, *model* articles produce frameworks and may include measurements, *measurement* articles measure data and produce a conclusion based on the data, *review* articles that include compiled conclusions obtained from the literature to produce a new one, and others. Data-collection type category indicates whether articles used quantitative or qualitative approaches. Content categories were based on focus areas in the literature.

Out of the 124 articles, 70 were measurement-based research articles where data is measured and a conclusion about the topic, burnout, is made based on the data. Both quantitative and qualitative type measurement articles were reviewed. Figure 2 provides a summary of the topics covered in this review.

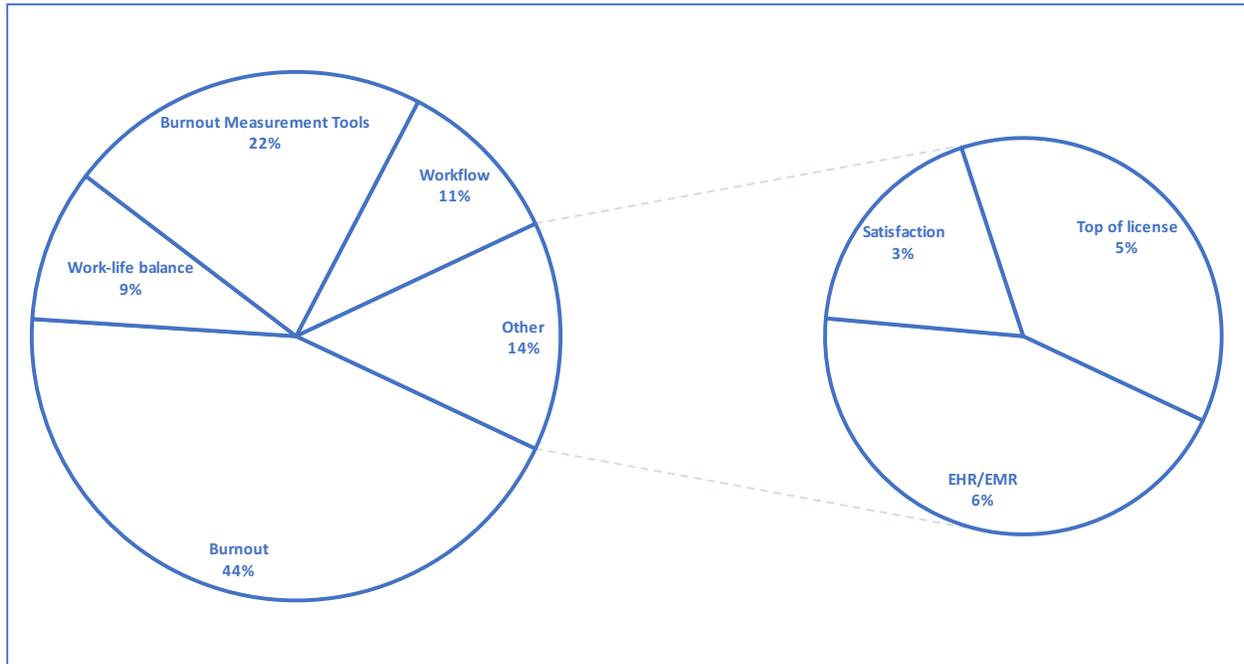


Figure 2: Topic areas identified from the literature (n=124)

Sixty-eight percent of the burnout-related articles focused on physician burnout, twenty-two percent were focused on care team burnout, and ten percent were focused on others such as residents and social workers. Articles were further categorized by burnout syndromes, shown in Figure 3. However only 51% of the burnout articles reported burnout results in terms of emotional exhaustion, depersonalization, and/or personal accomplishment. The rest of the burnout-related articles reported a single value to quantify experienced burnout (i.e. not in terms of its syndromes). The following sections of this thesis chapter discusses the observations attained from this literature review.

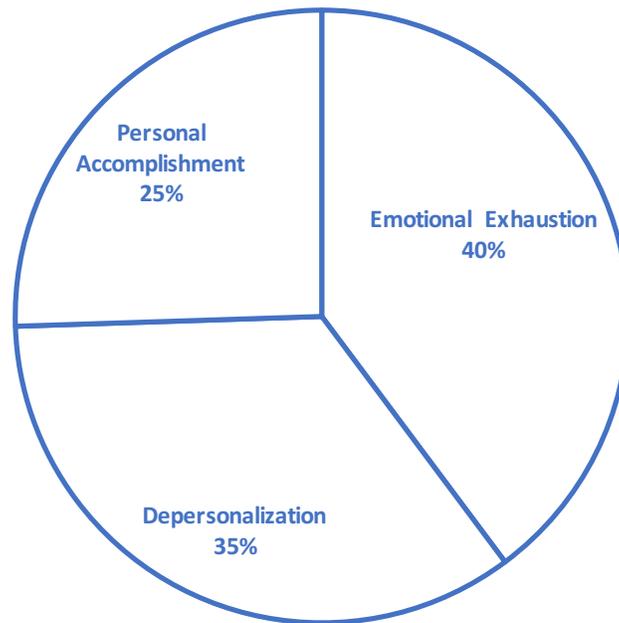


Figure 3: Articles that reported emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA) results.

2.2 Physician Burnout

The literature reports that at least 50% of physicians experience high rates of emotional exhaustion, 35% report high rates of depersonalization, and 17% report low sense of accomplishment (Shanafelt, 2015). The consequences of which not only affects physician wellbeing, but also the quality of provided care (Salyer, 2016). The impact of burnout syndromes on physicians is discussed in this section.

2.2.1 Physician Suicide

In a 2013 study of 31,616 suicide victims, Gold found job related stress was highly correlated with occupation. The study indicates that if a victim has experienced job related stress that contributed to the fatal decision, it can be predicted with high confidence that the victim was a

physician (Gold, Sen, & Schwenk, 2013). This link between job stress induced suicide and occupation was made, in part, because of the extent to which physicians derive their identity from their work. Consequently, deteriorating work conditions are significant threats to physicians' self-identity. Stress imposed by the workplace puts a strain on care team self-identity leading to higher rates of detachment. That is, detachment or depersonalization in physicians can be fatal (Gold, Sen, & Schwenk, 2013).

A similar study showed that physicians in the United States rate highest for suicide and self-harm. Schernhammer and Colditz (2004) conducted a quantitative and gender meta-analysis of physician suicide. The analysis included data from 25 studies published after 1960, in which age and gender information was provided (Schernhammer, & Colditz, 2004). The dataset was compared to the suicide rates of the general population (Schernhammer, & Colditz, 2004). This study showed that depersonalization has higher probability on imposing fatal threats on physicians than its effects on the general population. Specifically, the study concluded that male physician suicide rate ratio was 1.4 compared to general population (Schernhammer, & Colditz, 2004). Female physician suicide rates were 3 times higher than the general population (Schernhammer, & Colditz, 2004).

2.2.2 Physician Satisfaction Trends

Burnout stems from simple experiences of dissatisfaction (Maslach & Jackson, 1981). Appealing to what physicians identify as contributors to satisfaction can aid in developing effective burnout intervention. Increasing satisfaction in physicians can decrease experiences of emotional fatigue, disengagement, and increase sense of accomplishment (Maslach & Jackson 1981).

The Physician Foundation conducts a biennial survey to monitor physician burnout and

satisfaction trends. Data from 2008-2016 provide insight about physician satisfaction in the workplace. Data from 2010 is not publically available. The surveys reviewed included an average response of 15,703 per surveyed year in the United States. The survey provided consistent results with respect to what physicians listed as a contributor to satisfaction in the workplace. Seventy-three percent of physicians ranked “relationship with the patient” as the factor that contributed most to their satisfaction. Intellectual stimulation ranked second at 58%, and professional and collegial relationship ranked third at 19%. Ranking remained consistent in 2008, 2012, and 2014 with small variations to the allocated percentage (The Physician Foundation, 2008; The Physician Foundation, 2012; The Physician Foundation, 2014; The Physician Foundation, 2016).

Physicians listed morale, non-clinical paperwork, and lack of autonomy as contributors to their dissatisfaction at the workplace. The same contributors were selected from year to year but the ranking varied from one year to the next (The Physician Foundation, 2016).

The literature suggests a decline in satisfaction in the workplace. A study conducted by the Mayo Clinic showed that there exists a 9% decline in physician satisfaction from the year 2011 to 2014. The survey included 6880 participants, and incorporated the Maslach Burnout Inventory to assess burnout. The survey was distributed in 2011, and again in 2014. The data from both years were compared (Shanafelt et al., 2016).

2.3 Care Team Burnout

Burnout in healthcare research has been primarily focused on physician burnout. Only a few studies have reported values to quantify care team burnout. Helfrich (2014) reported that around 39% of healthcare employees experience burnout, based on survey data distributed in 2012. The

survey included 4538 healthcare employees. However, the survey did not use the MBI to measure burnout. Instead, Helfrich measured care team burnout using 5-point questionnaire obtained from the Physician Worklife Study (PWS). The burnout measured value reported by Helfrich did not provide information regarding care team experienced rate of emotional exhaustion, depersonalization, and personal accomplishment.

Bodenheimer and Sinsky (2014) reported that 60% of care team employees experience burnout. However, no information was provided regarding care team experienced burnout syndromes as the study did not use the MBI.

In 2016, Linzer reported that 56% of healthcare employees experience burnout. The study included 579 respondents. The survey, also, did not use MBI to measure burnout. Linzer, measured burnout using a Mini-Z survey (Linzer et al, 2016). In 2017, Helfrich re-conducted his study based on survey distributed in 2014. He reported that 41% of care team employees experience burnout (Helfrich, 2017).

There is no publically available data that evaluates care team burnout in terms of emotional exhaustion, depersonalization, and personal accomplishment in the United States. However, Glasberg, Eriksson, and Norberg (2007) conducted a study in Sweden that utilized the Maslach Burnout Inventory to quantify burnout in both physicians and nurses. The study reported that 25% experienced high emotional exhaustion, 7% experienced high level of depersonalization, and 19% reported low levels of personal accomplishment (Glasberg, Eriksson, & Norberg, 2007).

Glasberg, Eriksson, and Norberg's study included 423 care team members. The study aimed to investigate the relationship between burnout syndromes and levels of "stress conscious". A Stress

of Conscious Questionnaire (SCQ) was used to measure this variable. The study found that individuals experiencing high rates of emotional exhaustion and depersonalization also reported high rates of “stress of conscious”. The study defines stress of conscious as “a product of the frequency of the stressful situation and of the perceived degree of troubled conscience”. Participants who experience stress of conscious report feeling they “deadened” their own conscious, or feeling like they are not living to other’s expectations (Glasberg, Eriksson, & Norberg, 2007).

2.4 Burnout Measurement

Forty percent of the articles reviewed utilized a measurement instrument to quantify burnout. The tools identified in the literature are discussed in this section.

2.4.1 Maslach Burnout Inventory

Psychologists developed a tool to measure burnout from theories that view burnout as a reaction to a stimulus in the workplace (Maslach & Jackson, 1981). The Maslach Burnout Inventory (MBI) is a popular tool used to measure burnout in human services occupations, healthcare employees, educators, students, and many others. The MBI provides a measurement of burnout as an assessment of the individual’s experience of the three burnout syndromes: emotional exhaustion, depersonalization, and personal accomplishment. The tool treats burnout as a continuous variable that ranges in frequency and intensity.

Numerous studies, outside of healthcare, have used the MBI to measure burnout. The internal reliability of the MBI is reported to produce on average a Cronbach's coefficient alpha of 0.90 for emotional exhaustion, 0.79 for depersonalization, and 0.71 for personal accomplishment (Maslach, Jackson, & Leiter, 2016).

Fifty-seven percent of the burnout measurement-based literature reviewed in this thesis used the MBI. Other literature either used their own developed assessment of burnout, Copenhagen Burnout Inventory, or Oldenburg Burnout Inventory. The other used tools are discussed in the following section.

2.4.2 Other Inventories

Three percent of the reviewed literature used the Copenhagen Burnout Inventory (CBI). The CBI is a burnout measurement tool that provides an estimate of burnout based on an evaluation of a single burnout syndrome (Lee, Medford, & Halim, 2015). The CBI measures the extent of an individual's experienced emotional exhaustion with respect to the workplace, personal life, and patient related exhaustion (Kristensen et al. 2015). The CBI does not evaluate burnout in terms of depersonalization or personal accomplishment (Lee, Medford, & Halim, 2015).

An alternative tool to measure burnout is the Oldenburg Burnout Inventory (OLBI). The OLBI measures burnout in terms of emotional exhaustion and depersonalization (Subburaj, & Vijayadurai, 2016). However, the OLBI fails to consider personal accomplishment (Lee, Medford, & Halim, 2015). The OLBI was used in three percent of the articles reviewed (Thanacoody, Newman, & Fuchs, 2013).

Other reviewed articles measure burnout using surveys that utilize questions developed specifically for their study. The burnout measurement questions used in these studies were either constructed in their entirety, or similar questions to existing burnout inventories were adapted. The literature alternates between measurement tools depending on the need of the study.

2.5 Burnout Predictors

The literature identifies factors that have an impact on experienced care team burnout. Among

these factors are achieving work-life balance, satisfaction, career development, and electronic record. This section discusses in detail the predictor identified by the review.

2.5.1 Work-Life Balance

Many would argue that achieving a work-life balance has positive impact on a person's well-being. However, Keeton, Fenner, Johnson, and Hayward (2007) appear to contradict the connection between work-life balance and burnout. This cross-sectional study used survey responses from 935 physicians to investigate the relationship between burnout, work-life balance, and satisfaction. The Maslach Burnout Inventory was modified and used to measure burnout. A 100-point scale was used to assess satisfaction and work life balance (see Keeton, Fenner, Johnson, & Hayward, 2007). A multivariable analysis was used to investigate the relationship between the relationship hypothesized. The study produced a standardized β of 0.05 between work-life balance and career satisfaction while personal accomplishment and emotional exhaustion produced standardized β of 0.60. The results indicate that care team work-life can be unbalanced and yet experience high job satisfaction if emotional exhaustion is low and personal accomplishment is high. Keeton also suggests satisfaction is more appropriate burnout predictor than achieving a work-life balance (Keeton, Fenner, Johnson, & Hayward, 2007).

However, other articles in the literature promote the idea of achieving a work-life balance to reduce burnout. Shanafelt (2012) conducted a survey based on the Maslach Burnout Inventory to measure physician burnout and work-life balance. The study was repeated by Shanafelt (2015) in 2014. The findings suggest that achieving work-life balance contributes to burnout reduction (Shanafelt et al., 2012; Shanafelt et al., 2015). However, the study did not analyze the relationship between the syndromes of burnout and work-life balance.

Starmer (2016) confirms this relationship in a similar study, the results of which suggest that dissatisfaction with work-life balance is a burnout predictor. The study showed that dissatisfaction with the workplace made participants 5 times more likely to experience burnout. The burnout measurement was not obtained using the MBI. The study also showed that participants' experiencing work-life conflicts are more likely to experience burnout (Starmer, 2016).

Further investigation of quality improvement projects, Linzer considered the effect of work environment, such as autonomy, space, time and other conditions, on the quality of provided care (Linzer, 2016). The study found that achieving a work-life balance through intervention improved physicians' satisfaction (Linzer, 2016). However, the study also found that the work-life balance interventions did little to improve quality of care as it is more resistant to change (Linzer, 2016).

2.5.2 Career Development

Physicians identity is highly tied to their career (Gold, Sen, & Schwenk, 2013). High personal accomplishment is achieved as they progress in their career. Linzer (2013) describes a relationship between career development and burnout prevention. In this discussion, Linzer promotes the idea of "career fit" in which he argues that work-life balance achieves lower burnout rates because physicians are contributing to work about which they are passionate about (Linzer et al., 2013).

Rates of experienced personal accomplishment is associated with career progress and the *type* of work performed. The literature surveys show that physicians spend a large portion of their time doing tasks that could be done by those with less training (Bodenheimer, & Smith, 2013). A

study by Richard Baron (2010) realized that physicians responded to laboratory results an average of 43.2 times per day, and refilled prescriptions 12.1 times per day. Additionally, the 2016 Physician Foundation survey found that 21% of a physician's work day is spent on non-clinical paperwork that could be completed by other care team members (the Physician Foundation, 2016).

Sinsky et al. (2016) also investigated work conditions through a time and motion study set to examine how physicians spend their work day. The investigation found, through observation, that work-life imbalance exists in ambulatory care. The findings suggest that physicians spend 2 hours of their personal time outside of work to complete work related tasks including filling in patients' electronic records (Sinsky et al., 2016). Care team members doing work they felt was *valuable* to patient-care and the development of their career have higher sense of professional efficacy (Linzer et al., 2016)

2.5.3 Electronic Records and Burnout

Electronic Medical Records (EMR) is a tool used within a practice for day-to-day record keeping (Garrett, 2011). It is used as an alternative to the paper record keeping route and is the information recorded is not intended to be shared outside the practice. Electronic Health Records (EHR) is a tool used to share documented information between practices and providers. EHR, also, gives patients the option to access their records (Garrett, 2011).

According to the 2014 Physician Foundation survey, EMR improves quality of care by 32%, efficiency by 24% and patient interaction by 4% but not physician satisfaction (the Physician Foundation, 2014). The literature suggests that there exists a relationship between electronic record keeping and care team burnout and satisfaction. Babbott et al. (2014) conducted a

Minimizing Error, Maximizing Outcome (MEMO) study on 379 physicians from 92 practices to investigate the relationship between EMR functions and work conditions such as burnout, satisfaction, and stress. The study showed a negative association between the number of EMR functions the physician was required to complete and the physician's satisfaction level (Babbott et al., 2014). The second point the study makes is that the number of functions required of physicians to operate during a patient-physician encounter induces an added state of stress in which the physician believes that s/he does not have enough time to complete the required task and provide quality care (Babbott et al., 2014).

Contradictory to the 2014 survey, the 2016 Physician Foundation survey revealed that EHR has a negative impact on factors such as efficiency, quality of care, and patient interaction. In this survey, physicians also expressed dissatisfaction with the user interface design (the Physician Foundation, 2016). Sinsky et al. (2016) investigated how physicians utilize their time by making observations in 16 practices and included a total of 57 participants. The results of the study indicate that physicians spend nearly half of their time on EHR. Of this time spent on EHR, 6% is spent on reviewing test results, 2% on requesting medical orders, and another 2% on other order. That is, half of the physicians' day is spent on EHR and 40% of this time is spent solely on documentation (Sinsky et al., 2016).

Additionally, physicians employ workarounds when using EHR to document. These workarounds include late data entry, entry of data in the incorrect EHR slot, and the most serious offense of all: using the system without making sure their own account is logged-on and the previous user's logged-off (Ser, Richardson, & Sheikh, 2014). A further investigation that included 6375 physicians illustrated that there exists a relationship between EHR dissatisfaction

and burnout. The study concluded that 44% of respondents are dissatisfied with EHR, 63% of respondents indicated that EHR use negatively impacts their efficiency, and 58% of respondents showed at least one symptom of burnout (Shanafelt et al., 2016).

2.5.4 Geographic Factors

The turnover rate of 2016 in the United States is 18.10%; the highest of the past 3 years (CompData, 2016). According to the US Bureau of Labor Statistics, an estimate of 552,000 healthcare employees left their organization in 2016. The Bureau of Labor Statistics calculates separation as the total number of individuals who either quit, were laid-off, retired, and any other form of action that required the individual to separate from their current workplace. The 2016 data showed that the care team contributed to ten percent of total separations that occurred in 2016.

In an effort to understand care team turnover, population estimates and healthcare employment estimates were obtained from the Bureau of Labor Statistics. The data from 2016 was used to calculate the ratio between the population of individuals residing within a region and the number of care team members employed in the region. The United States was divided into four regions, as illustrated in Figure 4.

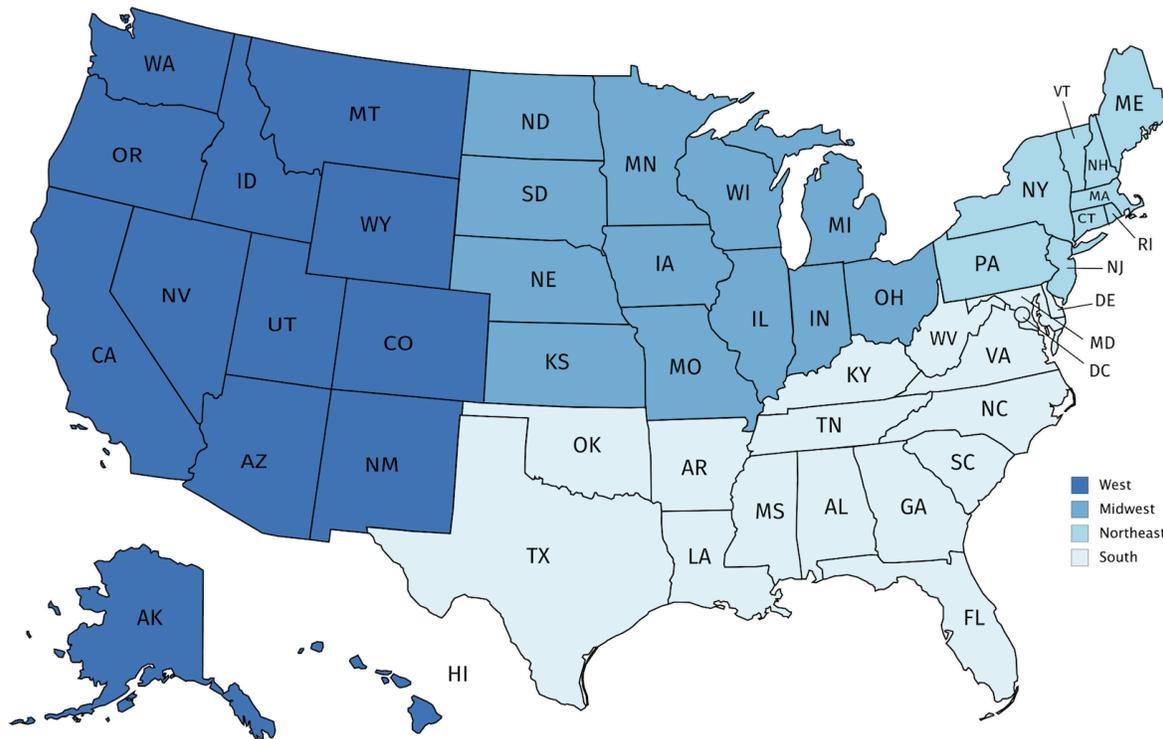


Figure 4: Regions of the United States

The ratios suggest that for every care team member employed in a region, an estimate of 13-20 individuals reside in the same region. That is, for every care team employee in a region, there are at least 13 individuals that require some form of care. However, this is an overestimate as not all individuals residing in a region seek care.

The ratios obtained per region were used in comparison to healthcare separation estimates obtained from the 2016 Bureau of Labor Statistics data. The regions were ranked according to their separation estimates. The comparison indicates that population to care team ratios and separation estimates relate. Lower population-care team ratios in a region produced lower separation estimates. Consequently, regions with high population-care team ratios produced higher separation estimates. As illustrated in Table 4, the two highest population-care team ratios

corresponded to the two highest separation estimates. However, their rank with respect to separation and ratio differ. The south region of the United States includes 17:1 population to care team ratio and reports the highest care team separation estimates. The west region of the United States indicates a 20:1, the highest population to care team ratio, but corresponds to the second highest separation estimate. This observation indicates that there may be other variables that contribute to the care team decision to leave their organizations.

Table 4: 2016 region data estimates obtained from the United States Bureau of Labor Statistics data

Region	Population estimate	Healthcare employment	Population-careteam ratio	Healthcare separation estimate	Separation rank
Northeast	55,318,350	4,217,480	13:1	83,372	4
Midwest	66,929,794	4,520,770	15:1	115,817	3
South	114,563,024	6,616,420	17:1	201,859	1
West	71,946,937	3,686,670	20:1	120,951	2

Additionally, the literature suggests that care team turnover is related to burnout. Thanacoody, Newman, and Fuchs (2013) conducted a study that included 302 care team members such as physicians, registered nurses, and other care team workers in an Australian organization. The study illustrated a relationship between turnover intentions and emotional exhaustion. However, this study did not examine how turnover rates impact emotional exhaustion or other burnout syndromes. The literature reviewed provides no observation on the interaction of turnover rates and experienced burnout.

2.6 Burnout Interventions

Existing research proposes several interventions to reduce burnout and improve physician well-being, including: *reducing physician workload* through advanced planning (Sinsky et al., 2013), *alteration to the process of using electronic health records* (Babbott et al., 2014), *hiring scribes* (Sinsky et al., 2013), *counseling* (Awa, Plaumann, & Walter, 2010), *and training* (Shanafelt et al., 2012). Some claim that appealing to physician work-life balance, in ways such as part time hire or shared practice, improves burnout rate (Linzer et al., 2013).

Similar intervention methods have been proposed for other occupations such as skill training in nurses (Boumans & Landeweerd, 1996), care givers (Pålsson, R Hallberg, Norberg, & Björvell, 1996), and fire department workers (Halbesleben, Osburn, & Mumford, 2006). Other interventions include scheduling changes to staff working with patients who are cognitively impaired to improve care and alleviate stress in caregiver because these patients demand more effort (Innstrand, Espnes, & Mykletun, 2004), and behavioral and cognitive training in several occupations (Awa, Plaumann, & Walter, 2010).

2.6.1 Why Interventions Fail

Burnout interventions are successful in reducing burnout in healthcare. However, burnout returns to pre-intervention rates nearly a year after implementation (Awa, Plaumann, & Walter, 2010).

The implemented interventions act as coping mechanisms that only temporarily reduce burnout. Additionally, 80% of the interventions are implemented through individual-driven strategies (Awa, Plaumann, & Walter, 2010).

Interventions can be implemented under one of two strategies: individual-driven strategies and culture-driven strategies (Maslach, Schaufeli, & Leiter, 2001). Individual-driven strategies

assume that burnout is the result of the care team struggling to adapt to their environment (Kahill, 1988). Individual-driven intervention strategies promote teaching techniques to help individuals cope with a particular stressor in the workplace (West, Dyrbye, Erwin, & Shanafelt, 2016). Individual-driven strategies alleviate emotional exhaustion (Maslach, Schaufeli, & Leiter, 2001).

Culture-driven intervention strategies focus on reducing stressors imposed by the environment that may lead to care team burnout (Kahil, 1988). Culture-driven strategies involve the combination of structural, managerial, and individual-level changes within the system (Maslach, Schaufeli, & Leiter, 2001; Panagioti, 2017). Culture-driven intervention strategies promote educating individuals to engage with their work environment (Maslach, Schaufeli, & Leiter, 2001). This particular type of intervention strategy utilizes individuals to drive cultural change (Montgomery, 2013).

The literature suggests that individual-driven strategies are focused on training individuals to cope with their environment (Maslach, Schaufeli, & Leiter, 2001). The goal of culture driven strategies is to utilize individuals within the organization to drive organization-wide change (Panagioti et al., 2017). To do that, the literature states that these type of strategies include combining the individual-driven interventions with small structural changes to promote engagement in the workplace and reduce burnout (Maslach, Schaufeli, & Leiter, 2001; West, Dyrbye, Erwin, & Shanafelt, 2016). Cultural-driven intervention strategies are not completely distinct from individual-driven strategies. Culture-driven interventions strategies utilize individual-driven interventions as a tool towards effective change (Maslach, Schaufeli, & Leiter, 2001).

Culture-driven interventions strategies are significantly more effective in reducing burnout than implementations of individual-driven intervention strategies alone (Panagioti et al., 2017).

However, Culture-driven interventions are implemented less in healthcare in comparison to individual-driven strategies alone (Maricutoiu, Sava, & Butta, 2014). Culture-driven intervention strategies implementations are scarce. Only 3-5 interventions were found to be implemented in the literature (Maricutoiu, Sava, & Butta, 2014; Panagioti et al., 2017).

Interventions can be further classified as one of four techniques: workflow interventions, mediation (counselling and therapy), interpersonal-skill enhancement (training), and cognitive-behavioral techniques (CBT) (Richardson & Rothstein, 2008; Anderson, Levinson, Barker, & Kiewra, 1999; Brooks, 2010; Forsgarde, 2000; Davidson, 2007). The following section discusses the most effective burnout intervention techniques found in the reviewed literature.

2.6.2 “Best” Interventions

2.6.2.1 Workflow Intervention Techniques

Interventions have been proposed to improve work conditions in healthcare. These interventions range from patient flow improvement including layout changes, task off-loading which includes designating specific tasks to other individuals in the workplace, implementing a visual workspace, protocol changes to improve information flow (Linzer et al. 2015; Linzer et al. 2013). In a cluster randomization study conducted by Linzer et al. (2015) to address work conditions, the results showed that the intervention reduced burnout at an odds ratio of 5.9 (Linzer et al., 2015). That is, the probability of burnout reduction after appropriate and effective workflow interventions was 5.9 times larger than the probability that the workflow interventions had no impact on burnout.

2.6.2.2 Cognitive Behavioral Techniques

Cognitive-restructuring and Behavioral-activation Techniques (CBT) are best in sustaining burnout reduction. Richardson and Rothstein (2008) investigated this phenomenon by observing 36 CBT interventions. The study concluded that CBT interventions produce a Cohens coefficient of 1.2. Cohens d provides information regarding the effect size between two means. The value obtained from this study is considered “very large” which implies that CBT interventions have a large impact on reducing burnout (Richardson & Rothstein, 2008).

Awa, Plaumann, and Walter’s (2010) research revealed that CBTs were employed in some of the studies investigated as individual-driven strategies. The implementation strategy chosen for CBT in existing research influences the effectiveness of burnout interventions. Even though CBT is the most effective technique in reducing burnout, the interventions fail to sustain burnout improvements, and a return to pre-intervention levels occur after a six to twelve months’ period when implemented solely as individual-driven strategies. This thesis research concludes culture-driven cognitive-behavioral based interventions techniques to be most effective in reducing burnout.

2.7 Understanding Behavior in Healthcare

Argyris (1976) explains that individuals’ decision making ability is linked to the learning that occurs during the investigation of a decision. In this learning theory, organizations that allow individuals to question and make modifications to the fundamentals of the organization are ones that encourage double-loop learning. Organizations that prevent individuals from questioning the fundamentals of the organization are ones that encourage single-loop learning. Consequently, individuals engaging in single-loop learning tend to engage in little self-reflection and often act

based on limited information available to them. Individuals engaging in double-loop learning tend to act after thoughtful reflection (Argyris, 1976).

Mazur, McCrery and Chen (2012) use single- and double-loop learning theory, established by Argyris (1978), to describe behaviors in healthcare. Mazur and colleagues argue that learning must occur to implement effective change, in which success is measured by the ability to change care team behavior (Mazur, McCrery, & Chen, 2012).

Single-loop learning behavior is defined as the “detection and correction of [defects], but without addressing the underlying values that drive action and govern behavior” (Mazur, McCrery, & Chen, 2012). On the other hand, double-loop learning behavior is a reflective approach in which defects are corrected and the underlying root-cause is also addressed through communication and problem solving. Double-loop learning behavior facilitates long-term intervention success as it promotes continuous improvement in healthcare organizations (Mazur, McCrery, & Chen, 2012).

However, no study has examined the relationship between single- and double-loop behaviors and burnout. The aim of this thesis research is to explore the potential relationship between the learning behaviors and burnout in order to implement an intervention that utilizes behavioral change.

2.8 Conceptual Change Model

2.8.1 Overview

Mirdad et al. (2015) developed a model based on Argyris' (1976) single- to double-loop learning model. The Mirdad et al. model, shown in Figure 5, represents the steps it takes to transition the individual, and ultimately the organization, towards double-loop learning behaviors. In this model, single-loop learners are individuals that address issues they encounter without addressing

the root cause of why the problem came about (Mirdad, Hille, & Melamed, 2015). Double-loop learners, on the other hand are individuals that not only address the issue encountered but also act to prevent the issue from reoccurring through a thoughtful analysis of the root cause (Mirdad, Hille, & Melamed, 2015). The Conceptual Change Model as a culture-driven cognitive-behavioral intervention technique acts as a foundation for this research. The results of this thesis research will determine if it is applicable as a potential intervention for future work.

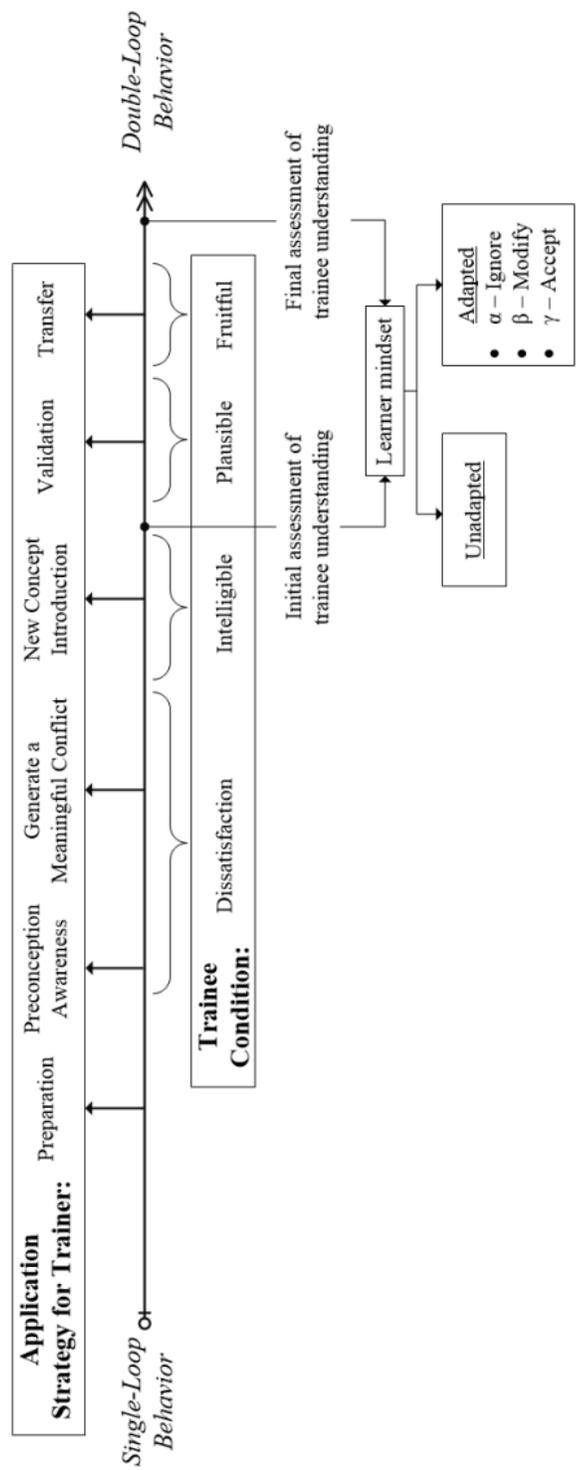


Figure 5: Conceptual Change Model, source: Mirdad, Hille, & Melamad (2015)

2.8.2 Description

The Conceptual Change Model consists of six stages: preparation, preconception awareness, generate a meaningful conflict, new concept introduction, validation, and transfer. The first stage, *preparation*, consists of identifying and understanding key variables that contribute to the change set out in place. This stage is completed before implementing physical changes to the workplace. The main goal of this stage is to get individuals to start thinking about factors that contribute to the change in order to better understand the factors influence on the change desired (Hille, 2016).

The second stage, *preconception awareness*, concentrates on helping individuals realize where they conceptually stand in the current model through discussion. The third step, *generate a meaning conflict*, focuses on leading individuals to realize that their current conceptual model does not entirely solve a particular conflict. This is not stated but the participants are anticipated to come to realize the weaknesses of the current model through the discussion (Mirdad, Hille & Melamed, 2015; Hille, 2016).

The fourth stage, *new concept introduction*, is when the new concept is introduced to participants. The fifth stage, *validation*, is to ensure that participants realize how the new concept fulfills the need to solve the problem as well as fill in the weaknesses imposed by the previous concept. The sixth stage, *transfer*, purpose is to aid participants to use this new way of thinking towards other problems in the workplace (Mirdad, Hille & Melamed, 2015).

The new Conceptual Change Model requires two assessments once stages 4 and 6 are completed. The purpose of the assessment is to characterize the degree of change towards the new concept model (Hille, 2016).

2.8.3 How it fits

The purpose of the Conceptual Change Model is to move away from single-loop learning behaviors, ones that are concerned with solving a problem for the sake of getting the job done, towards double-loop learning behaviors, ones that are concerned with getting the job done as well as innovatively exploring a way to prevent problems from reoccurring in the future (Mazur, McCreery, & Chen, 2012; Mirdad, Hille, & Meleamad, 2015)

Literature interventions have been focused on helping the care team cope with certain problems such as obstacles, workflow issues, or work conditions. The Conceptual Change Model does not focus on a specific problem to reduce burnout but provides a new way of thinking where individuals within the system are able to solve any given obstacle that present itself in the workplace. It aids individuals within the organization to address root cause of a problem imposed by the environment. It is a culture-driven approach that utilizes the individuals within the system to drive improvement through educating individuals, altering their behavior, and promoting their engagement with the workplace. The Conceptual Change Model is therefore a potential tool to reduce burnout because it is designed to facilitate culture change (culture-driven) through individual interventions that strive for continuous improvement.

However, before it can be utilized as a culture-driven cognitive-behavioral technique, the relationship between learning behaviors and burnout must first be investigated. This thesis research is focused on exploring this relationship. The goal is to provide sufficient evidence that there exists a relationship between proactive behavior and burnout so that the Conceptual Change Model can be utilized as an intervention tool for future research.

2.9 Gaps in The Literature

The literature fails to provide consistent measurement of care team burnout. The Maslach Burnout Inventory is not used to measure care team burnout in the United States. The literature does not investigate the relationships between burnout and care team distribution, turnover rate, and other geographic factors.

There is also a need for a culture-driven cognitive-behavioral technique. The Conceptual Change Model has potential in being used as a culture-driven cognitive-behavioral intervention.

However, there is no evidence that suggests it would have any effect on reducing burnout. This thesis research was set to provide such evidence to encourage the Conceptual Change Model application in healthcare as a burnout intervention.

3 METHODOLOGY

The methodology of this thesis research was developed using a logic model. The logic model in Figure 6 presents a high-level overview of this thesis research. The logic model contains the research questions, theoretical constructs, research methods, expected outcomes, and expected significance of the research. The objective of developing a logic model in this research was to identify theoretical constructs and research methods that would aid in answering this research's questions. The questions for this research included: (1) what drives care team burnout, and (2) how do individual mindsets (learning behaviors) influence burnout?

This chapter includes a description of the research design, survey distribution, and the methodology used to analyze results. Section 3.1 contains the goal and overview of the chosen method. Section 3.2 provides a description of the survey population. Survey questions are outlined in Section 3.3. The validity and reliability of the survey is discussed in Section 3.4. A discussion of the survey distribution is presented in Section 3.5. The analysis of the results is covered in Section 3.6.

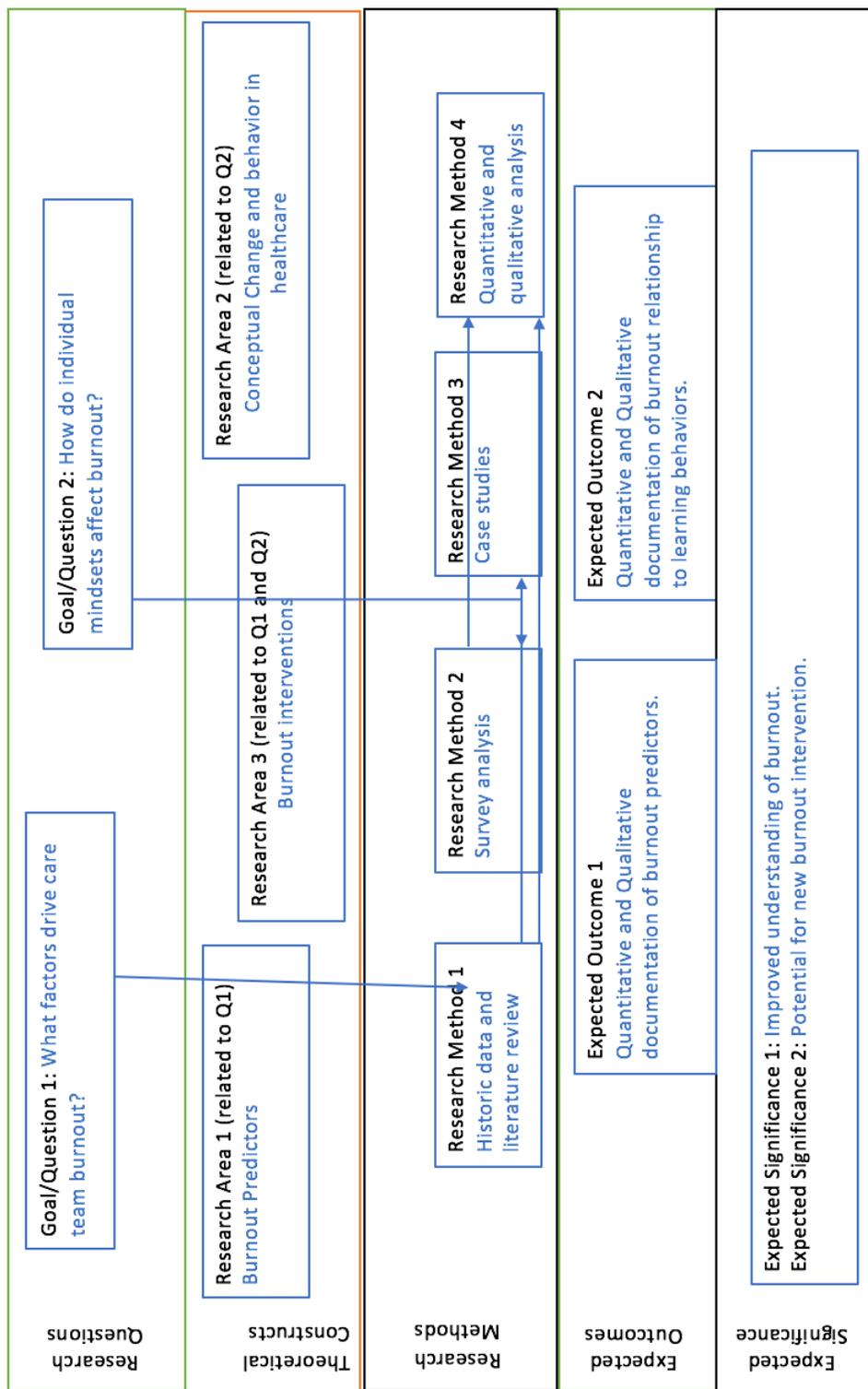


Figure 6: Logic model of this research

3.1 *Measurement Goal*

The goal of this study was to explore the relationship between burnout and learning behaviors, and between burnout and turnover rate. In order to investigate this relationship, burnout needed to be measured, as well as learning behaviors, and turnover rate. The best method to measure burnout was to utilize the Maslach Burnout Inventory. The MBI is widely used in the literature to measure burnout in terms of the three syndromes: emotional exhaustion, depersonalization, and personal accomplishment. The MBI requires the questions to be distributed to participants in survey form. The learning behaviors and turnover rate questions were also added onto the survey to create one coherent survey. Learning behaviors questions were created in statement form, in the same manner as the MBI. That is, statements were used to measure learning behaviors where participants provided their engagement in the behavior according to a 7-point Likert scale. This is to ensure consistency in the survey. The following section discusses in detail the questions contained within the survey.

3.2 *Survey Design*

The MBI medical personnel questionnaire provided 22 questions in statement form. The medical personnel questionnaire has been altered by Maslach to adapt to healthcare setting. The questionnaire measured frequency and intensity of burnout using a 7-point Likert scale (Maslach & Jackson, 1981). Figure 7 provides an example of an MBI question used in the survey.

On a scale from 0-6, how often are the following statements true?

	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day
I feel emotionally drained from my work.	●	●	●	●	●	●	●

Figure 7: A question obtained from the 22-MBI medical personnel questionnaire (Copyright ©1981, 2016 by Christina Maslach & Susan E. Jackson. All rights reserved in all media. Published by Mind Garden, Inc., www.mindgarden.com)

The MBI burnout questionnaire measured burnout in terms of emotional exhaustion, depersonalization, and personal accomplishment as opposed to providing a single burnout measure. This provided additional information about care team experiences. Table 5 provides a summary of the number of questions that measure each of the syndrome. The complete list of burnout questions as they appeared in the survey, and the syndromes each question intended to measure can be found in Appendix A.

Table 5: The number of questions from the MBI pertaining to each syndrome

Syndrome	Number of questions
Emotional Exhaustion	9
Depersonalization	5
Personal Accomplishment	8

The learning behavior questions were created in the same statement form as the MBI. The positive statements were created to measure all instances of single- and double-loop learning.

The questions were created based on the behaviors defined in Figure 8. At least two questions were created for each behavior category. The survey includes nine single-loop related question and six double-loop related question. The complete list of questions as they relate to each of the behavior is provided in Appendix B.

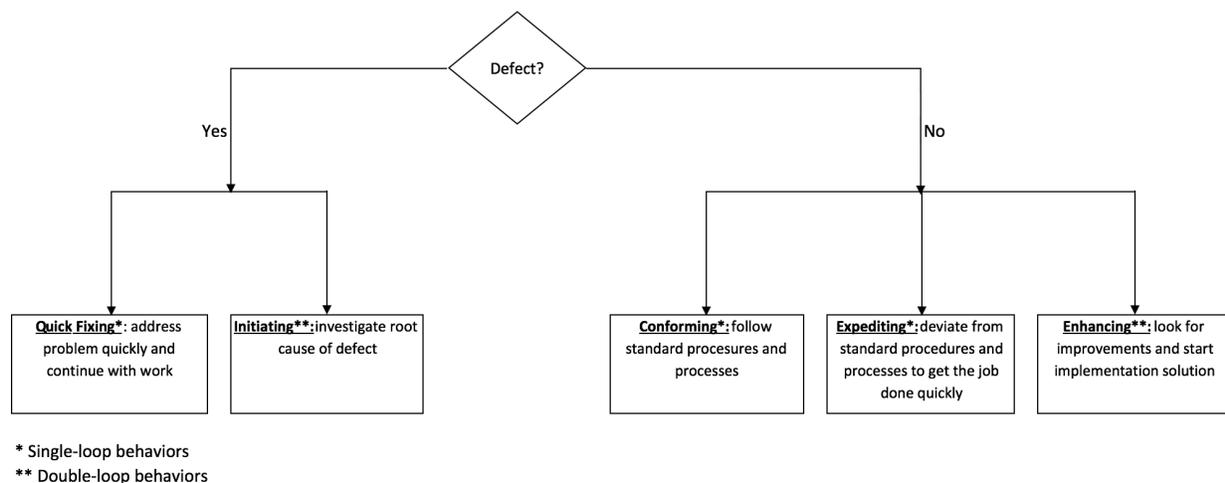


Figure 8: learning behaviors as defined by the Conceptual Change Model (adapted from Mazur, McCreery, & Chen, 2012)

Turnover rate questions were measured in two forms (1) the percentage of turnover rate at the organization and region as observed by the participant, and (2) the impact of turnover rate at the organization and region as observed by the participant. This was to shed light on how the care team experiences the effects of turnover rate. Figure 9 provides an example of turnover question used in the survey. The complete survey questions can be found in Appendix C.

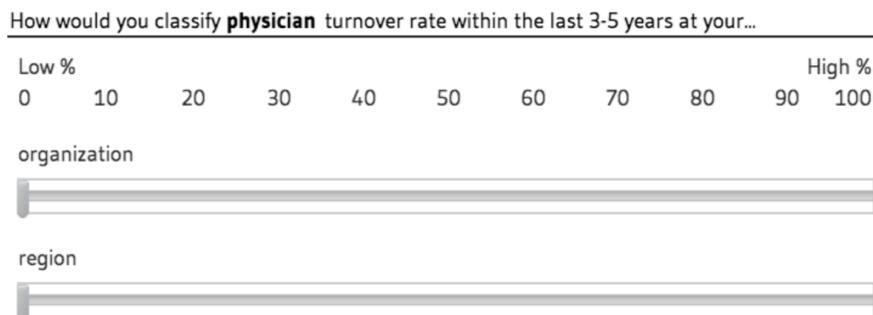


Figure 9: Physician turnover rate survey question

The survey was self-administered. Thus, the first page of the survey was dedicated to introducing the research purpose and context, found in Appendix D. The participants established consent by reading the introduction page and choosing to move forward with the survey by clicking the “next” arrow. Participants were allowed to take the survey once this was done. To ensure completion of responses, the survey did not allow for the participant to move to the next page before all questions within a page were answered. The survey included 17 questions, most of which included sub-questions. In total, participants were presented with 37 statement type questions using a 7-point Likert scale, 6 questions relating to their positions, and 4 turnover rate related questions.

3.3 *Survey Population*

The target population for this research were care team employees in healthcare. This includes physicians, physician assistants, nurse practitioners, registered nurses, medical assistants, and all employees directly involved with patient care. The study tried to deliver the survey to care team employees of various specialties. However, the survey was voluntary which may have an effect on the sample size obtained. The survey developed is an online survey. This distribution method

restricts the ability for the research to be conducted in a random manner which in turn restricts the data analysis.

3.4 *Survey Distribution*

A detailed protocol that included the consent form, recruitment form, and a draft of the survey were submitted to Oregon State University's Institutional Review Board (IRB). The application, IRB code 8258, was submitted on September 20, 2017 and approved on September 29, 2017. Several iterations to the survey were performed after the approval was obtained. All modifications were permitted by the protocol and included layout changes, question reduction and expansion, and clarification of statements. The final survey version was produced on November 16, 2017. The complete forms can be found in Appendix E.

The survey was distributed electronically with a link to the Qualtrics Survey Software. The software allowed participants to access the survey online and through their mobile device. Two survey links were developed. One to collect responses internationally and the other within the US. The links were provided to care team member in direct contact with the researcher.

3.5 *Survey Response Analysis*

Parametric approaches cannot be used in this analysis as our distribution method was not random, sample size obtained was small, and no confident normality assumption can be made about the variables analyzed. A non-parametric approach was needed to obtain accurate inferences of the relationship between our examined variables. Relationship between variables in non-parametric approaches can be investigated through a correlation analysis.

The Spearman's rank-order correlation is a non-parametric statistical method used to analyze

relationship between two variables with a sample size greater than four (Corder, & Foreman, 2009). At least one variable must be ordinal and the variables must be monotonically related to use the Spearman's correlation (Corder, & Foreman, 2009). The burnout question and the learning behaviors questions are ordinal. This thesis research expects that the relationship between variables are monotonic. As participants exhibit higher double-loop behavior, we expect to see lower rates of burnout. The opposite is true for the expected relationship between turnover and burnout. The highest the reported turnover rates, the higher the expected burnout.

Equation 1 was used to obtain Spearman's correlation coefficient (Corder, & Foreman, 2009). The analysis was conducted using SPSS. This was done by performing the analysis on each of (1) emotional exhaustion and single-loop behavior, (2) emotional exhaustion and double-loop behavior, (3) depersonalization and single-loop behavior, (4) depersonalization and double-loop learning behaviors, (5) personal accomplishment and single-loop behavior, and (6) personal accomplishment and double-loop behavior. The relationship between burnout and turnover rate was conducted in the same manner.

$$r_s = 1 - \frac{6 \sum D_i^2}{n(n^2 - 1)}$$

n= number of elements

D_i = rank difference between paired elements Eq. (1)

SPSS reports the significance of the analyzed relationship using equation 2. A two-tailed test with a 95% confidence level was selected for this thesis research analysis. The correlation coefficient produced between variables with a significant relationship were analyzed for direction of relationship. A negative correlation means that the variables move in opposite directions. As one increases, the other decreases in value. A positive correlation on the other hand

means that the variables move in the same direction (Corder, & Foreman, 2009).

$$z = r[\sqrt{n - 1}]$$

Eq. (2)

Additionally, the Likert scale values were used to compute the extent of the burnout syndrome experienced by each participant. All MBI questions were used to evaluate care team experiences of burnout. After careful examination, only eight questions were included in the analysis of learning behavior. Each question was evaluated for evidence of single-loop and double-loop behavior. Care team members who scored a “3” or more on the Likert scale indicating that they engage “sometimes” in the behavior, were given a score of 1 for that particular behavior. For example, a care team member indicating that the “organization has procedure for considering employee suggestions, but [they] prefer keeping to [their self]” for some of the time were given a score of “1” for single-loop behavior and “0” for double-loop behavior for this particular question. This was done for all learning behavior questions included in the analysis.

The learning behavior scores for each participant were then summed to provide a single measurement of single-loop and double-loop behavior. The correlation analysis conducted in this research to explore the relationship between learning behavior and burnout used these scores.

3.6 Reliability

The reliability of the survey was established using Cronbach’s alpha. Cronbach’s alpha is a tool used to quantify reliability and internal consistency of an assessment (Pinto, Fagliatto, & Qannari, 2013). This was done using the equation provided below (Bland & Altman, 1997). The alpha value was used to assess reliability of burnout question, learning behaviors, and turnover

rate. Analysis resulting in a Cronbach's alpha value of 0.70 or higher were considered as reliable (Tavakol & Dennick, 2011).

$$\alpha = \frac{N*\bar{c}}{\bar{v}+(N-1)*\bar{c}}$$

N= number of elements

\bar{c} = average covariance of elements

\bar{v} = average variance of elements

Eq. (3)

Both learning behavior questions and turnover rate questions were developed for this research. The Cronbach's alpha measured for burnout questions in this survey were used to compare to the values reported in the literature. Reliability and validity of the MBI has been proven over 84 reviewed studies outside of healthcare. This analysis obtained a Cronbach's alpha estimates for emotional exhaustion 0.85-0.89, while estimates for depersonalization and personal accomplishment lie between 0.73-0.77 (Maslach, Jackson, & Leiter, 2016).

3.6.1 Bias

The distribution method utilized by this exploratory research study may affect the responses provided by participants. The online survey was made available to any care team member that was interested in taking the survey. The researcher reached out to healthcare members they were in direct contact with. This convenience sampling method is efficient for the purpose of exploration. However, future research will need to incorporate random sampling to obtain more representative results.

3.6.2 Representativeness

The significance from the response analysis was used to establish research validity for this

exploratory study. The analysis included observations from both the United States and other countries. Expanding the sample size would improve the validity of the results. Further research is needed to assess and improve on the representativeness of the observations obtained from this exploratory research. One main factor that will improve validity of the data is ensuring randomization with sampling.

4 RESULT AND ANALYSIS

This chapter provides a summary of the results and the statistical analysis of data collected from the survey. Section 4.1 provides a response summary. Participants information are discussed in Section 4.2. A summary of the statistical analysis between learning behaviors and burnout is provided in Section 4.3. A summary of the statistical analysis between turnover rates and burnout is presented in Section 4.4. Reliability and validity of the analysis are discussed in Section 4.5. Section 4.6 provides a summary of the results obtained for this research.

4.1 *Response Summary*

A total of 23 complete survey responses were used in the analysis of the US survey data. Out of the 23 “usable” US survey responses, one did not provide turnover rates. It did however provide values for the impact of the turnover rates. The response was included in this analysis. Four incomplete responses were disregarded from the US data survey analysis.

A total of 40 responses were used in the analysis of the international survey data that excludes responses from the US. Sixteen incomplete responses were disregarded from the analysis.

Analysis was conducted on the US survey data alone, the international survey data, and the two combined (63 responses). Figure 10 demonstrates the response distribution and sample size per country.

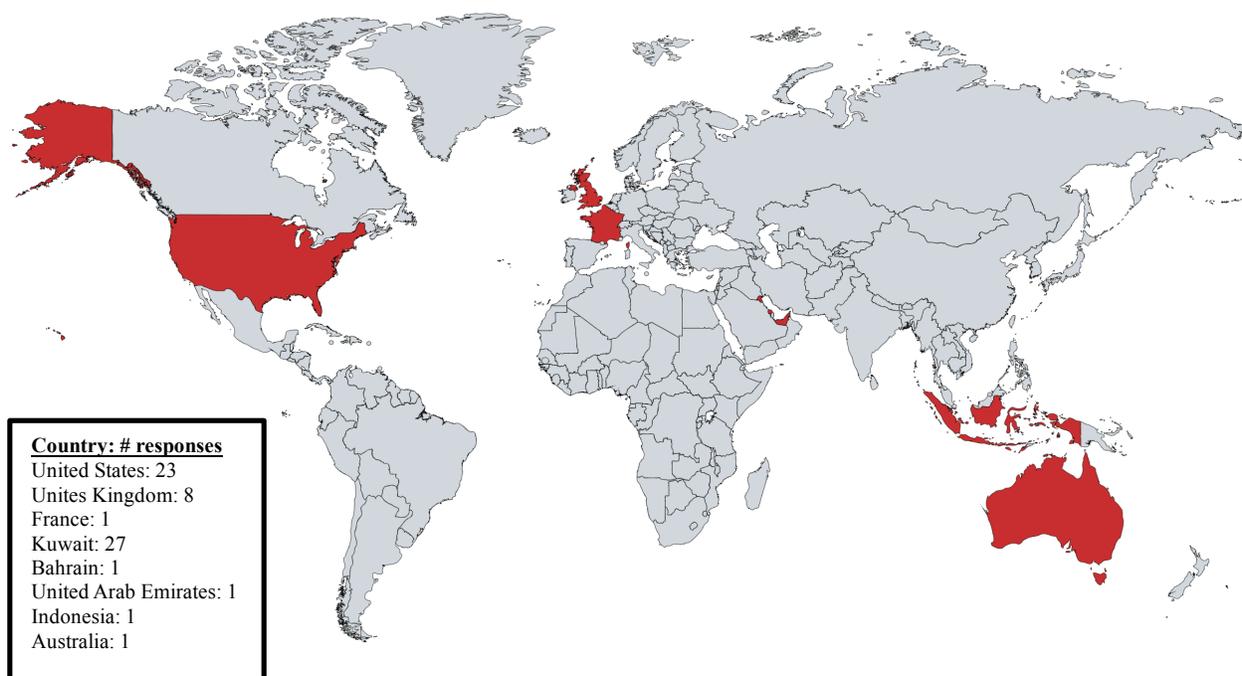


Figure 10: Survey response distribution per country

4.2 Participation Information

The survey asked participants to provide information regarding the number of years they have worked at their organization, the type of organization, and their positions. This section provides the observations made from these questions.

4.2.1 Overview

Participants were asked to identify their position at the organization. Figure 11 summarizes the participants' job positions from the combined survey results. Twenty-seven percent of the participants were licensed nurses, registered nurses, medical assistants, and others. An increase in sample size with the aim of ensuring all care team members are equally represented by the

responses (i.e. equal number of registered nurses and medical assistants) would improve the representativeness of the results for future research.

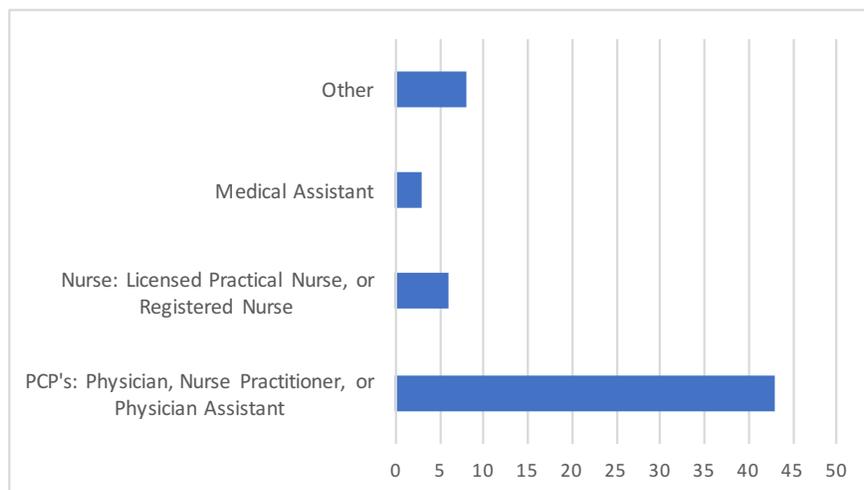


Figure 11: Participants' positions (n= 63)

Additionally, thirty-nine participants provide outpatient care, thirteen provide inpatient care, two work in emergency care, and six in specialty clinics. Future research should warrant that responses are representative of different type of care settings by ensuring that the sample includes an equal number of participants from each care setting.

As illustrated in Figure 12, 86% of participants have worked for at least 1-5 years at their organization. This indicates that more than half of the participants have engaged with their work environment for a sufficient time, and have longer exposure to stressors at their organization.

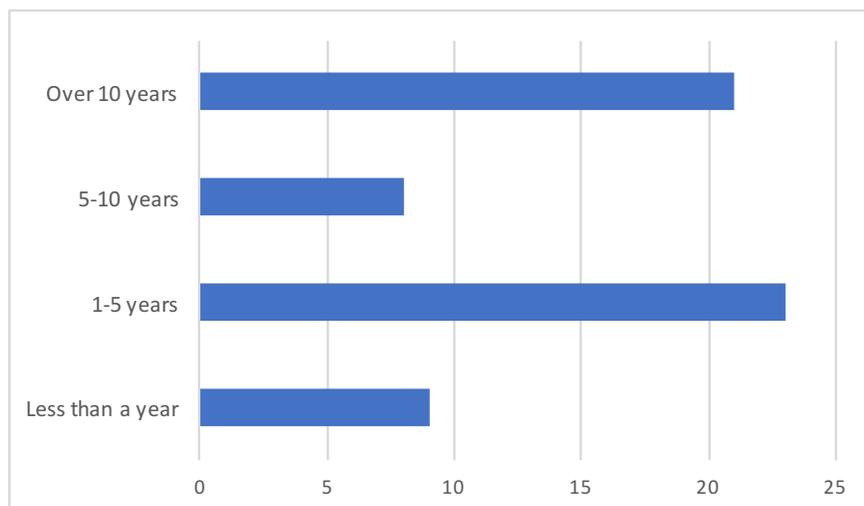


Figure 12: Participants' response to years worked at current organization (n=63)

4.2.2 International Survey: Excluding US Responses

The international survey data included 40 responses. Figure 13 illustrates the positions of participants who completed the survey. Eighty-five percent of the participants were either physicians, nurse practitioners, or physician assistants. The sample size must be expanded so that the analysis is more representative of licensed nurses, registered nurses, and medical assistants.

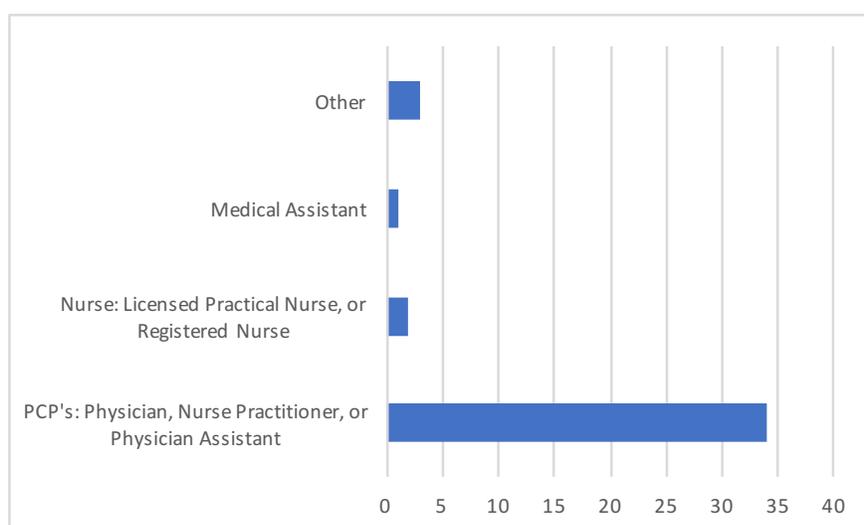


Figure 13: International participants' positions (n= 40)

Twenty-three of participants indicated they provide outpatient care, ten provide inpatient care, two in emergency care, and four work in specialty clinics. As illustrated by Figure 14, only five participants worked at their organization for less than five years. This indicates that at least 35 participants have worked at their organization long enough to experience workplace stressors.

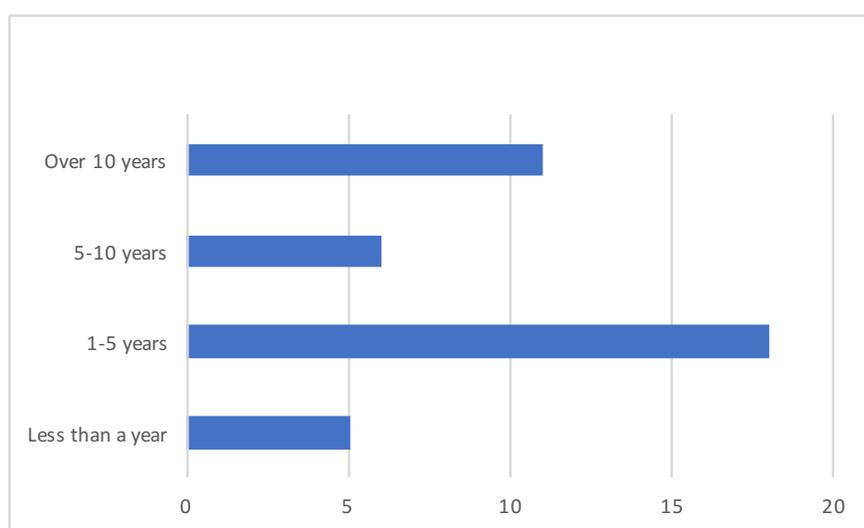


Figure 14: Number of years' participants worked at their organization (n=40).

4.2.3 US Responses

A total of 23 responses were included in the US analysis. The positions provided by the survey participants is illustrated in Figure 15. Fifty-two percent of the participants in this analysis were licensed nurses, registered nurses, medical assistants, and others. The data is more evenly distributed amongst care team positions than the international survey data. However, additional data is needed to determine validity of results.

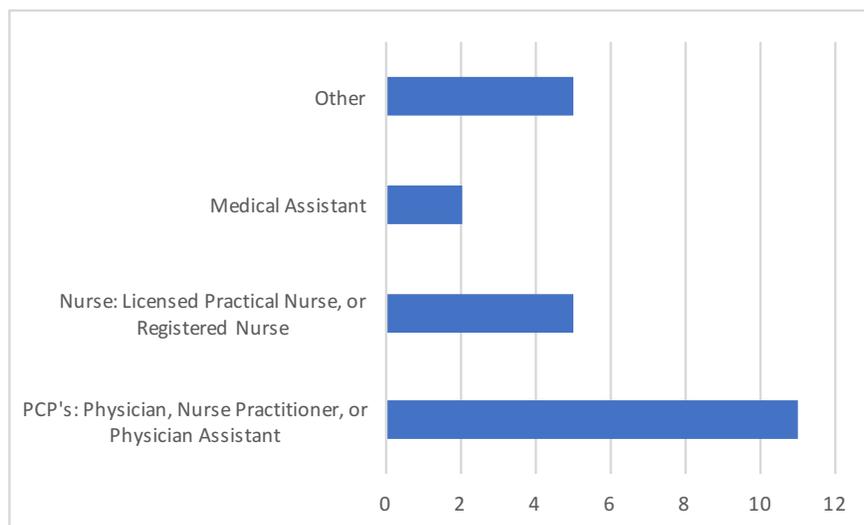


Figure 15: positions of US survey participants (n=23)

Sixteen participants from the US data work in outpatient care, three provide inpatient care, and two work in specialty clinics. The US data is heavily concentrated with responses from outpatient care settings. Future research should aim to include an equal number of participant from all care settings so that representative information can be drawn from the analysis.

Figure 16 illustrates that most the participants have at least 1-5 years' experience. This indicates that at least 87% of participants have been engaging with their work environment for a sufficient period, and therefore have longer exposure to stressors.

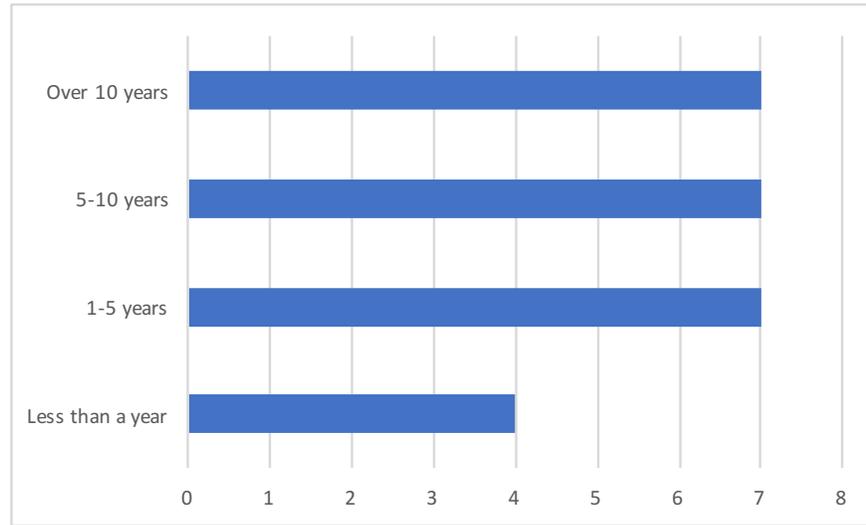


Figure 16: number of years worked at organization from US responses (n=23)

4.3 *Learning Behaviors and Burnout*

Three learning behavior questions were written so that high scores indicate single-loop behavior. Five questions from the survey were written so that high scores indicate double-loop behavior. Each of the participants' response for the learning behavior questions were scored. If the response provided they engage in the behavior "sometimes", or a score of 3 on the 0-6 Likert scale, a score of "1" was given to that behavior. For example, an individual answering sometimes for the question "my team fixes the problem quickly and moves on" was given a single-loop score of 1, consequently a double-loop score of 0, for the question. This was done for all eight questions. The scores for each question were then summed to provide a single measure of single-loop behavior, and a double-loop behavior value for each participant. These scores were used in the analysis.

The analysis performed provided insight on the relationship between learning behavior and the three burnout symptoms. The analysis performed in this section are derived from performing

Spearman's correlation coefficient analysis in SPSS. This section discusses the observed relationship between learning behaviors and burnout syndromes from the international survey (excluding US) data, US survey data, and combined survey results.

4.3.1 International Survey

The analysis between learning behaviors and burnout syndrome rates obtained by the international survey, excluding US responses, is indicative of a relationship between the variables. The analysis indicates that when care team members engage in reactive behavior, they tend to experience high disengagement and lower rates of personal accomplishment. Consequently, care team members engaging in proactive behavior tend to experience higher rates of personal accomplishment. Contradictory to what was expected, the analysis did not illustrate a relationship between learning behaviors examined and emotional fatigue experienced by the care team. This can be a limitation of our sample size.

Table 6 provides a summary of the results. The highlighted cells represent significant relationships ($p < 0.05$). A two-tailed 95% confidence level was used to determine significance in this analysis.

Table 6: Summary of relationship between learning behaviors and burnout syndromes for international data excluding US (n=40)

Burnout Syndromes	Learning Behaviors			
	Single Loop		Double-Loop	
	Rho	P-value	Rho	P-value
Emotional Exhaustion	-0.009	0.958	-0.081	0.621
Depersonalization	0.307	0.004	-0.307	0.054
Personal Accomplishment	-0.380	0.016	0.380	0.016

The scores of learning behaviors for the eight questions were further analyzed. It was noticed that care team members heavily engaged in one behavior or the other. For example, one participant scored “1” for single-loop and “7” for double-loop behavior. However, there were instances where care team members engaged equally in both behaviors, scoring “4” for each. This is expected, as human beings often engage in behavior on a spectrum rather than consistently conforming to one extreme or the other.

Another analysis was conducted to evaluate the difference between experienced burnout and care team members who in engage highly in single-loop or double-loop behavior, and care team members who were equally likely to engage in both. The scores from the questions were further broken down to indicate which behavior were the care team mostly engaging in. Care team members engaging “Usually”, or scored a 5 or higher, in single-loop behavior were given a total single-loop score of 1 and a total double-loop score of 0. Consequently, care team members engaging “Usually”, or scored a 5 or higher, in double-loop behavior were given a total double-loop behavior score of 1 and a total single-loop behavior score of 0. Care team members who engaged equally in both behavior were given a transitioning score of 1.

Table 7 provides a summary of the analysis between the learning behavior scores and burnout syndromes. When transitioning individuals are evaluated separately, it is observed that care team members engaging in proactive behavior tend to report high rates of personal accomplishment. Additionally, care team members engaged in reactive behavior tend to experience high rates of disengagement.

Table 7: Summary of relationship between learning behavior scores and burnout syndromes for international data excluding US (n=40)

Burnout Syndromes	Learning Behaviors					
	Single Loop		Double-Loop		Transitioning	
	Rho	P-value	Rho	P-value	Rho	P-value
Emotional Exhaustion	-0.005	0.976	-0.056	0.729	0.055	0.738
Depersonalization	0.350	0.027	-0.285	0.075	-0.094	0.566
Personal Accomplishment	-0.282	0.078	0.374	0.017	-0.055	0.738

Visual observation illustrates that with high scores of single-loop behavior, care team members tend to experience higher rates of emotional fatigue and disengagement, as shown in Figure 17. Consequently, care team members engaging in double-loop behavior tend to experience lower rates of emotional fatigue and disengagement. Additionally, the plots indicate that care team members engaging in reactive behavior tend to experience lower rates of personal accomplishment than care team members engaging in proactive behavior.

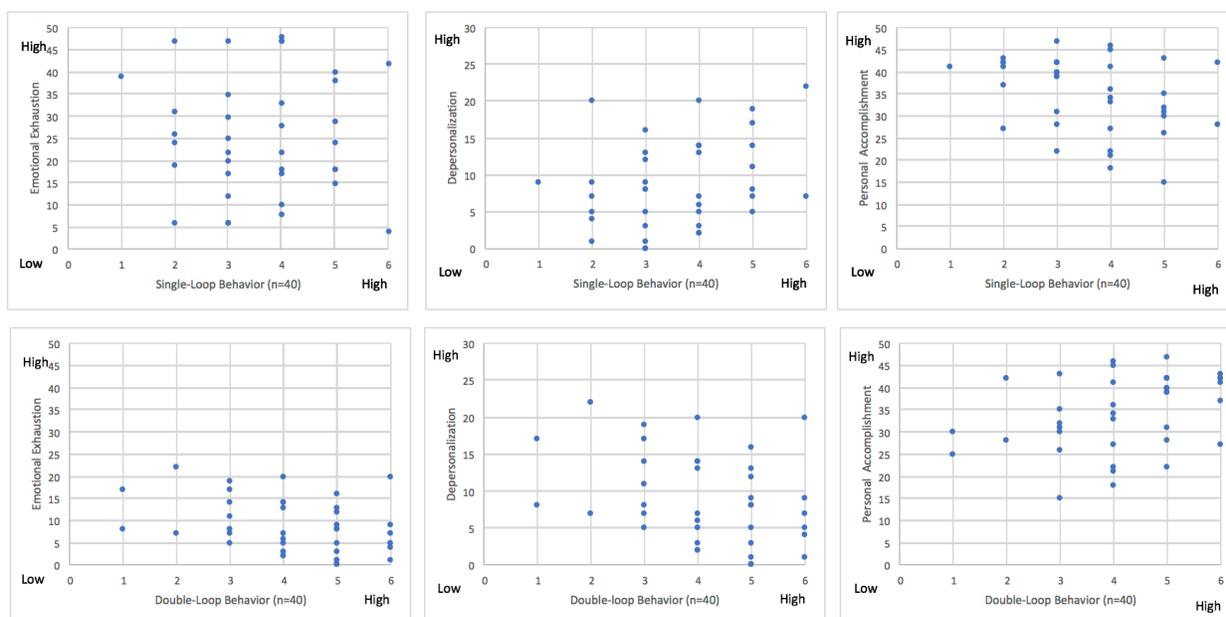


Figure 17: Participants' responses of burnout and learning behaviors (n=40)

4.3.2 US Survey

The analysis between learning behaviors and burnout syndrome rates obtained by the US survey data is indicative of a relationship between the variables. The analysis indicates that when care team members engage in reactive behavior, they tend to experience high emotional exhaustion and lower rates of personal accomplishment. Consequently, care team members engaging in proactive behavior tend to experience low rates of emotional fatigue and higher rates of personal accomplishment. Table 8 provides a summary of the analysis.

Table 8: Summary of relationship between learning behaviors and burnout syndromes for US survey data (n=23)

Burnout Syndromes	Learning Behaviors			
	Single Loop		Double-Loop	
	Rho	P-value	Rho	P-value
Emotional Exhaustion	0.424	0.044	-0.424	0.044
Depersonalization	0.337	0.116	-0.337	0.116
Personal Accomplishment	-0.441	0.035	0.441	0.035

The scores for single-loop and double-loop behavior for each participant were further analyzed. Most the participants engaged in one behavior or the other. For example, one participant scored “1” for double-loop and “7” for single-loop behavior. However, there were instances where care team members engaged equally in both single- and double-loop behaviors, scoring “4” for each. This is expected, as human beings often engage in behavior on a spectrum rather than consistently conforming to one extreme or the other.

Another analysis was conducted to explore the relationship between care team members engaging in single-loop behavior, double-loop behavior, and those who scored equally on both behaviors. The scores from the questions were re-evaluated and scored to indicate which

behavior were the care team mostly engaging in. Care team members engaging “Usually”, or scored a 5 or higher, in single-loop behavior were given a total single-loop score of 1 and a total double-loop score of 0. Consequently, care team members engaging “Usually”, or scored a 5 or higher, in double-loop behavior were given a total double-loop behavior score of 1 and a total single-loop behavior score of 0. Care team members who engaged equally in both behavior were given a transitioning score of 1. Table 9 provides a summary of this analysis.

Table 9: Summary of relationship between learning behavior scores and burnout syndromes for US survey data (n=23)

Burnout Syndromes	Learning Behaviors					
	Single Loop		Double-Loop		Transitioning	
	Rho	P-value	Rho	P-value	Rho	P-value
Emotional Exhaustion	0.342	0.110	-0.424	0.044	0.290	0.180
Depersonalization	0.359	0.092	-0.337	0.116	-0.032	0.884
Personal Accomplishment	-0.376	0.077	0.441	0.035	-0.227	0.298

When transitioning individuals are evaluated separately, it is observed that care team members engaging in proactive behavior tend to report high rates of personal accomplishment and low rates of emotional fatigue. However, we tend to lose information regarding the relationship between burnout syndromes and single-loop behavior. This is highly due to the small sample size used in this analysis.

Visual observation illustrates that US participants who engage in reactive behavior tend to have higher experiences of emotional fatigue and disengagement, as shown in Figure 18. Care team members who engage in proactive behavior tend to have lower experiences of emotional fatigue and disengagement. Additionally, care team members engaging in reactive behavior tend to have lower experiences of personal accomplishment than care team members who engage in proactive

behavior.

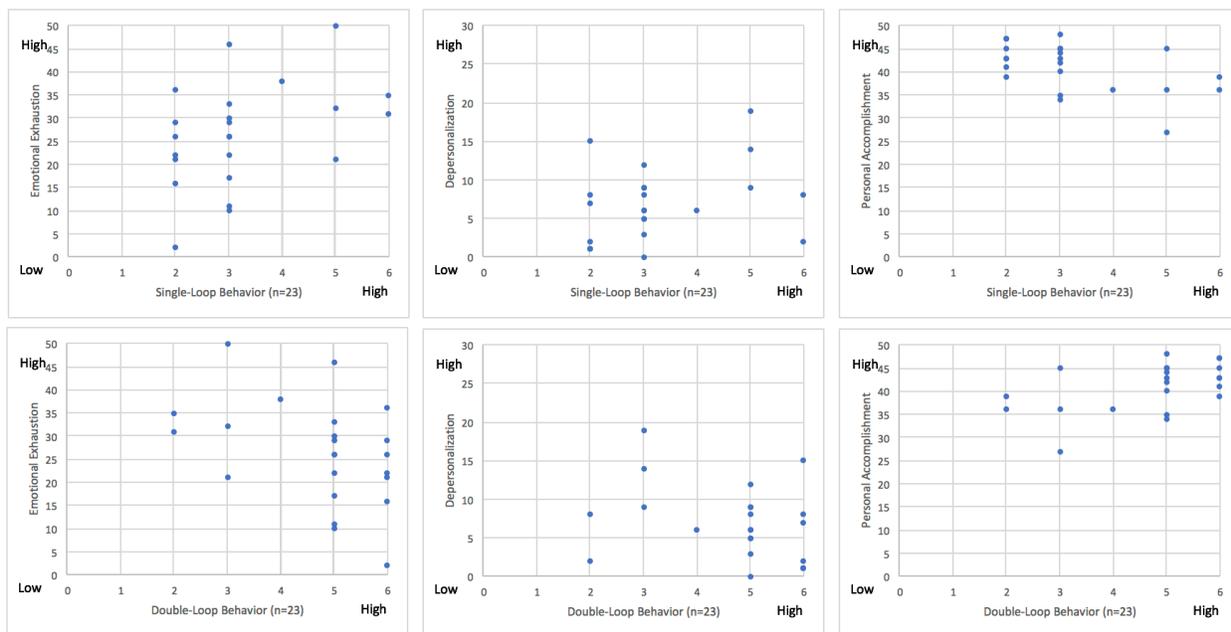


Figure 18: Participants' responses of burnout and learning behaviors (n=23)

4.3.3 Combined Response Analysis

The analysis of all complete survey responses (63 responses) indicate a relationship between learning behaviors and burnout syndromes. As care team members engage in proactive, double-loop behavior, the lower they seem to experience disengagement and higher rates of personal accomplishment. Consequently, care team members engaging in reactive behavior tend to have higher experiences of disengagement and lower experiences of personal accomplishment.

Contradictory to what is expected, the analysis illustrates no relationship between experiences of emotional fatigue and learning behaviors. An increase in sample size would improve our understanding of this relationship. Table 10 provides a summary of the results.

Table 10: Summary of relationship between learning behaviors and burnout syndromes for survey data (n=63)

Burnout Syndromes	Learning Behaviors			
	Single Loop		Double-Loop	
	Rho	P-value	Rho	P-value
Emotional Exhaustion	0.121	0.346	-0.121	0.346
Depersonalization	0.321	0.010	-0.321	0.010
Personal Accomplishment	-0.457	0.000	0.457	0.000

Another analysis was conducted to evaluate the difference between experienced burnout and care team members who in engage highly in single-loop or double-loop behavior, and care team members who were equally likely to engage in both. The results of this analysis is summarized in Table 11.

Table 11: Summary of relationship between learning behavior scores and burnout syndromes for survey data (n=63)

Burnout Syndromes	Learning Behaviors					
	Single Loop		Double-Loop		Transitioning	
	Rho	P-value	Rho	P-value	Rho	P-value
Emotional Exhaustion	0.109	0.393	-0.156	0.221	0.072	0.576
Depersonalization	0.359	0.004	-0.322	0.010	-0.041	0.751
Personal Accomplishment	-0.344	0.006	0.472	0.000	-0.160	0.209

When care team members engaging in both behaviors are evaluated separately, it is observed that care team members engaging in proactive behavior tend to report high rates of personal accomplishment and low rates of disengagement. Consequently, care team members engaging in reactive behavior tend to report high rates of disengagement and low rates of personal accomplishment. An increase in sample size would improve our understanding of experiences of

individuals that tend to experience both behaviors equally.

Visual observation of the data is shown in Figure 19. The plots illustrate that care team members engaging in reactive behavior tend to have higher rates of emotional fatigue and disengagement, and lower rates of personal accomplishment than care team members engaging in proactive behavior. The findings indicate that moving towards double-loop behaviors will reduce burnout. With an expanded sample size, the observations made in this exploration can be validated.

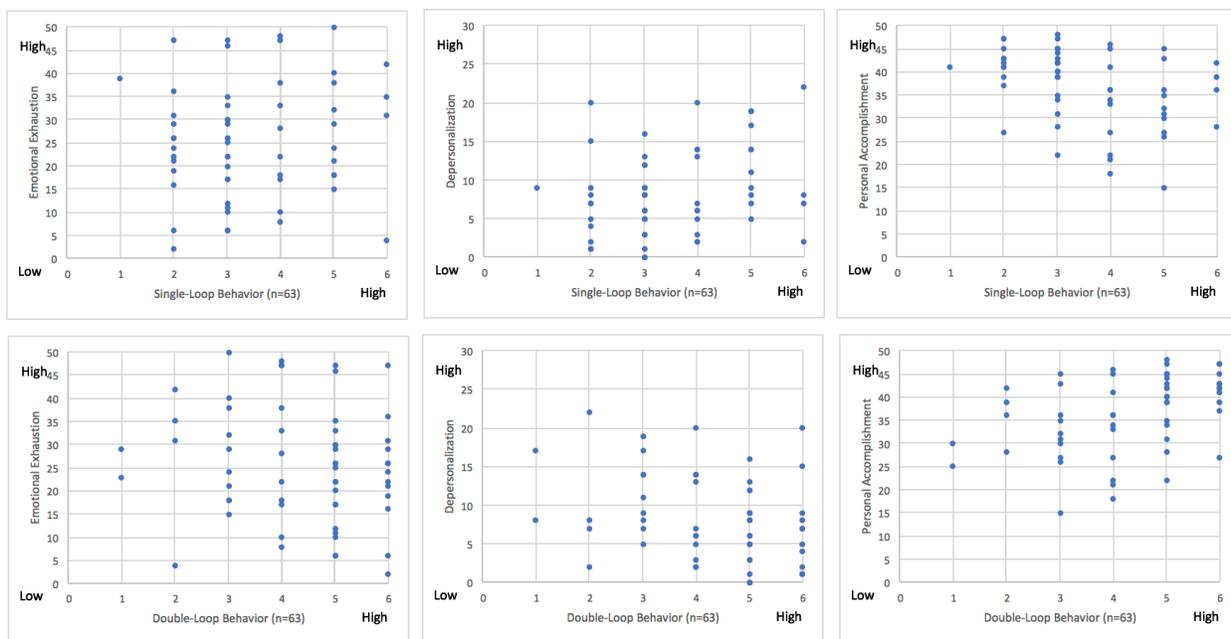


Figure 19: Participants' responses of burnout and learning behaviors (n=63)

4.4 Turnover Rate and Burnout

The analysis performed provided insight on the relationship of turnover rate estimates provided by participants and the three burnout syndromes. The analysis performed in this section are derived from performing Spearman's correlation coefficient analysis in SPSS. This section discusses the observed relationship between the estimates and burnout syndromes from the

international survey (excluding US) data, US survey data, and combined survey results.

4.4.1 International Survey

The Spearman's correlation coefficient analysis performed is indicative of a relationship between emotional exhaustion and the reported physician turnover estimates at both the organization and the region level. The observation made suggests that with the increase number of physicians leaving their position, both at the organization or region, the higher the reported sense of emotional fatigue by the care team. The observation made by the analysis of physician turnover rate estimates and emotional exhaustion was expected. However, this analysis does not conclude causation.

The literature suggests that physician's intent to leave the organization is associated with high rates of emotional exhaustion (Thanacoody, Newman, & Fuchs, 2013). Further research is needed to investigate whether increased physician turnover rate estimates is causing the increase of emotional exhaustion experienced by the care team or if high emotional exhaustion experienced by the care team is causing physicians to leave the organization.

Contradictory to what was expected, no other relationship was found between turnover rate estimates and burnout syndromes. The result of the analysis is summarized in Table 12. A two-tailed significance test was performed in this analysis. A 95% confidence level was used ($p < 0.05$).

Table 12: Summary of relationship between turnover rates and burnout syndromes for international data (n=40)

Burnout Syndrome	Physician				Care Team			
	Organization		Region		Organization		Region	
	Rho	P-value	Rho	P-value	Rho	P-value	Rho	P-value
Emotional Exhaustion	0.358	0.023	0.337	0.033	0.137	0.398	-0.040	0.805
Depersonalization	0.285	0.074	0.239	0.138	0.154	0.343	0.031	0.848
Personal Accomplishment	-0.223	0.166	-0.105	0.518	-0.120	0.460	-0.056	0.733

Visual observation of the data, presented in Figure 20, indicated that both organization and region rates are similar on average. With increased turnover, a decrease in sense of personal accomplishment is reported. With lower turnover estimates, a slight increase in sense of personal accomplishment occurs on average. As the turnover estimates reported fluctuate, it is observed that emotional exhaustion rates mimic the trend.

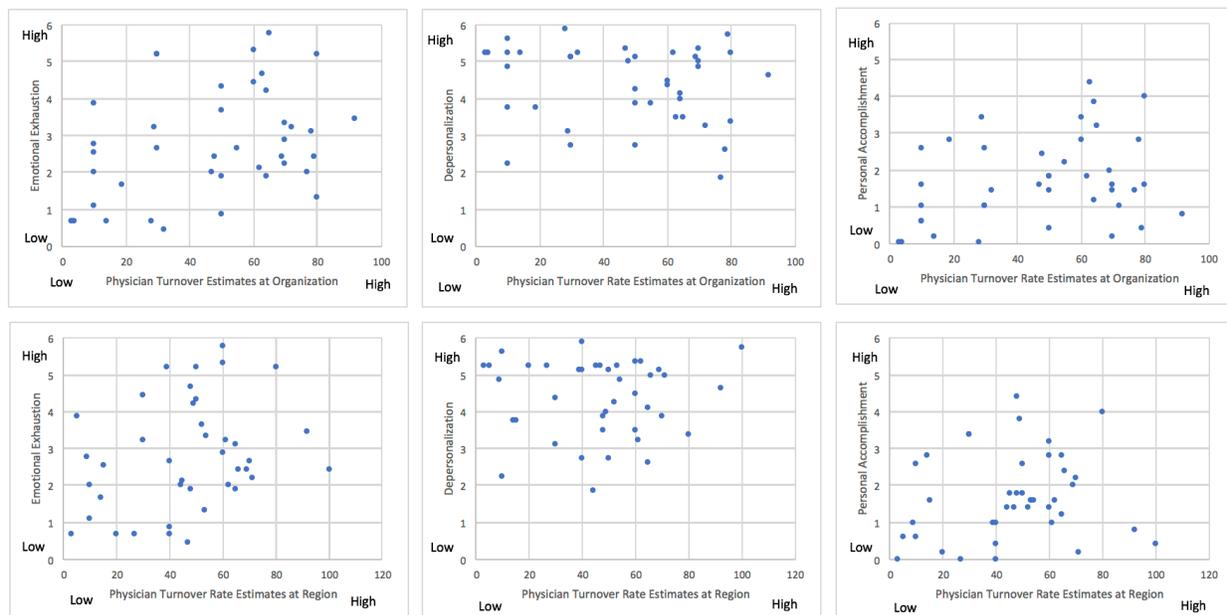


Figure 20: Participants' responses of burnout and reported physician turnover estimates (n=40)

Survey participants were also asked to rate the impact of the turnover estimates they had reported at their organization and region for both physician and care team turnover. The results showed that the impact of physician turnover rate at the organization level is indicative of the relationship with both emotional exhaustion and depersonalization. As physician turnover rates increase at the organization, the care team experienced increased emotional fatigue and disengagement. The analysis of the estimates differs from that of the impact of turnover rates. The results show that impact of physician turnover rates have a greater effect on burnout syndromes experienced by the care team than the turnover estimates themselves do. Estimates have shown a significant effect on one syndrome of burnout (emotional exhaustion), while impact of turnover rates show an effect on two (emotional exhaustion and depersonalization).

This is the only significant relationship observed by this analysis. The data obtained does not illustrate a relationship between care team burnout rates and burnout syndromes. However, the correlation coefficient and p-value obtained by the analysis for the relationship between care team burnout and emotional exhaustion at the organization level is close ($p = 0.056$) indicating that the relationship is weak. An increase in sample size is expected to improve the strength of the observed relationship. Table 13 provides a summary of the analysis.

Table 13: Summary of relationship between impact of turnover rates and burnout syndromes for international data (n=40)

Burnout Syndrome	Physician				Care Team			
	Organization		Region		Organization		Region	
	Rho	P-value	Rho	P-value	Rho	P-value	Rho	P-value
Emotional Exhaustion	0.357	0.024	0.281	0.079	0.304	0.056	0.230	0.153
Depersonalization	0.335	0.035	0.261	0.104	0.239	0.137	0.218	0.176
Personal Accomplishment	-0.115	0.480	-0.092	0.573	-0.041	0.803	-0.070	0.669

Visual observation of the data indicates that both impact of physician turnover at the organization and region are similar. Even though the statistical analysis only demonstrated a relationship between turnover rate estimates at the organization, Figure 21 illustrates that on average the same can be concluded for the organization level. As depersonalization increases, so do the reported impact of turnover rate. Additionally, the figure illustrates that on average respondents experience low sense of accomplishment (average of 17%) with the maximum sense of accomplishment falling below 50%.

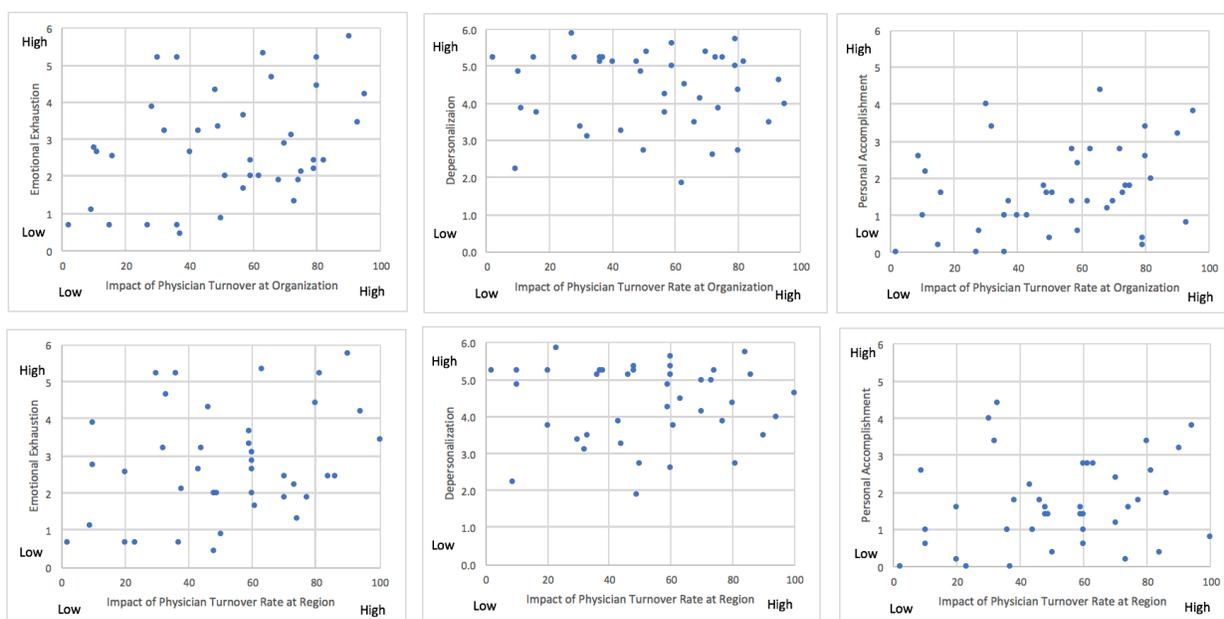


Figure 21: Participants' responses of burnout and impact of reported physician turnover estimates (n=40)

4.4.2 US Survey

As discussed earlier, one of the US survey responses was incomplete. The impact on turnover rate questions were answered, but not the turnover rate questions. The analysis in this section

uses the 22 responses to examine turnover rate estimates. The 23 complete responses were used to examine the impact of turnover rate.

The analysis is indicative of a relationship between personal accomplishment and care team turnover rates estimates at the organization level. The higher the care team turnover at the organization, the lower the sense of accomplishment experienced by the care team at the organization. However, this analysis does not imply causation. Further research is needed to investigate whether one variable causes the other. That is, if care team turnover produces a lower sense of personal accomplishment at the organization or if the experienced low sense of accomplishment produces higher care team turnover rates.

Contradictory to what is expected, no additional significant relationship was observed from this analysis. However, the relationship between physician turnover estimates and personal accomplishment at both the organization and region were close ($p = 0.07$ and 0.052 respectively). At a lower set confidence interval, the analysis would be indicative of a relationship. The 95% confidence level was chosen so that strong observations were made where a relationship is present. The results are summarized in Table 14.

Table 14: Summary of relationship between turnover rates and burnout syndromes for US data (n=22)

Burnout Syndrome	Physician				Care Team			
	Organization		Region		Organization		Region	
	Rho	P-value	Rho	P-value	Rho	P-value	Rho	P-value
Emotional Exhaustion	0.242	0.278	0.370	0.090	0.309	0.162	0.219	0.327
Depersonalization	0.133	0.566	0.266	0.232	0.268	0.227	0.211	0.346
Personal Accomplishment	-0.394	0.070	-0.420	0.052	-0.509	0.016	-0.347	0.113

Visual observation illustrates that care team burnout reported by participants are similar at both the organization and region. Figure 22 illustrates that with an increase of reported rates, a slight

decrease in personal accomplishment occurs on average. Additionally, the reported rates show a slight increase in emotional exhaustion and depersonalization with care team turnover increase.

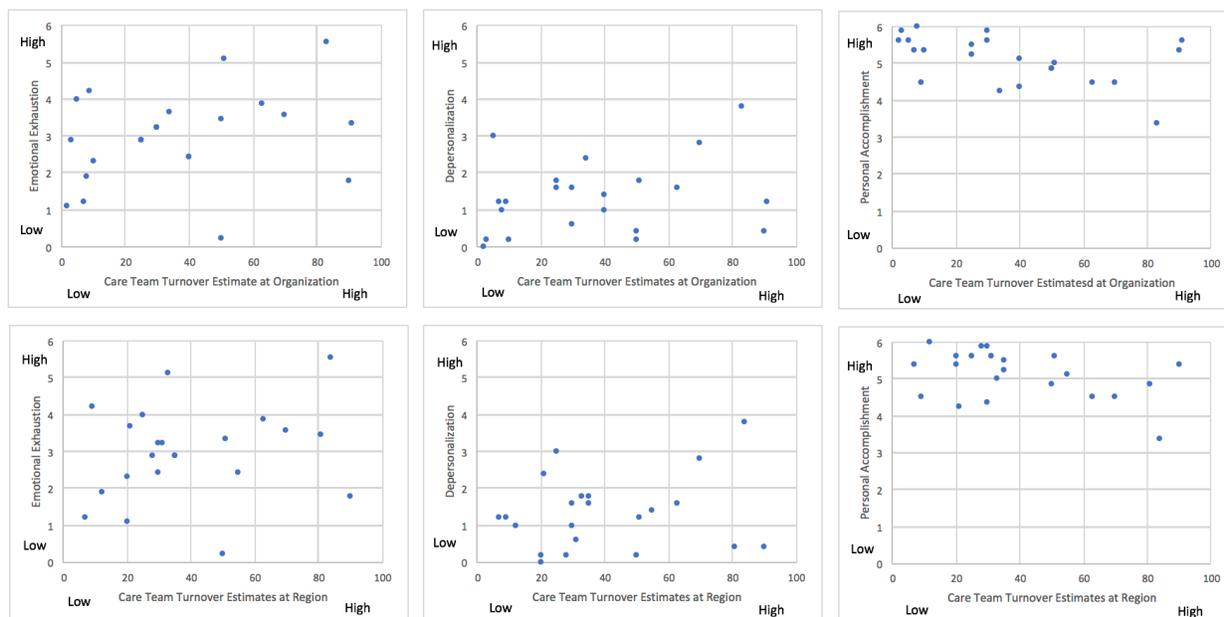


Figure 22: Participants' responses of burnout and impact of reported physician turnover estimates (n=22)

Participants were also asked to rate the impact of the turnover rate estimates reported. The analysis illustrated a relationship between the impact of physician turnover rates and emotional exhaustion. As physician turnover rates increase at the organization, the higher reported experiences of emotional fatigue by the care team. However, the estimates of physician turnover rates did not have a significant relationship on emotional exhaustion. This implies that the impact of turnover has a stronger relationship with burnout syndromes than the reported estimates themselves.

The analysis is also indicative of a relationship between the impact of care team turnover rates

and personal accomplishment at the organization. A lower sense of accomplishment reported by the care team is accompanied with higher care team turnover. The relationship between care team turnover and personal accomplishment at the region appears to be weak according to the confidence level set for this analysis. An increase in sample size may improve the strength of the observed relationship. Table 15 provides a summary of the analysis.

Table 15: Summary of relationship between impact of turnover rates and burnout syndromes for US data (n=22)

Burnout Syndrome	Physician				Care Team			
	Organization		Region		Organization		Region	
	Rho	P-value	Rho	P-value	Rho	P-value	Rho	P-value
Emotional Exhaustion	0.507	0.014	0.588	0.003	0.260	0.231	0.092	0.677
Depersonalization	0.364	0.088	0.344	0.109	0.134	0.543	-0.129	0.559
Personal Accomplishment	-0.123	0.590	-0.199	0.362	-0.514	0.012	-0.399	0.059

Visual observation indicated that reported impact of physician turnover rate at the organization and region are similar. Figure 23 shows that with increase in reported impact, slight dips occur in reported personal accomplishment. Additionally, the sense of reported emotional fatigue and disengagement is shown to follow the same trends as the turnover rate impact reported. With high physician turnover, care team members tend to experience higher rates of emotional fatigue and disengagement.

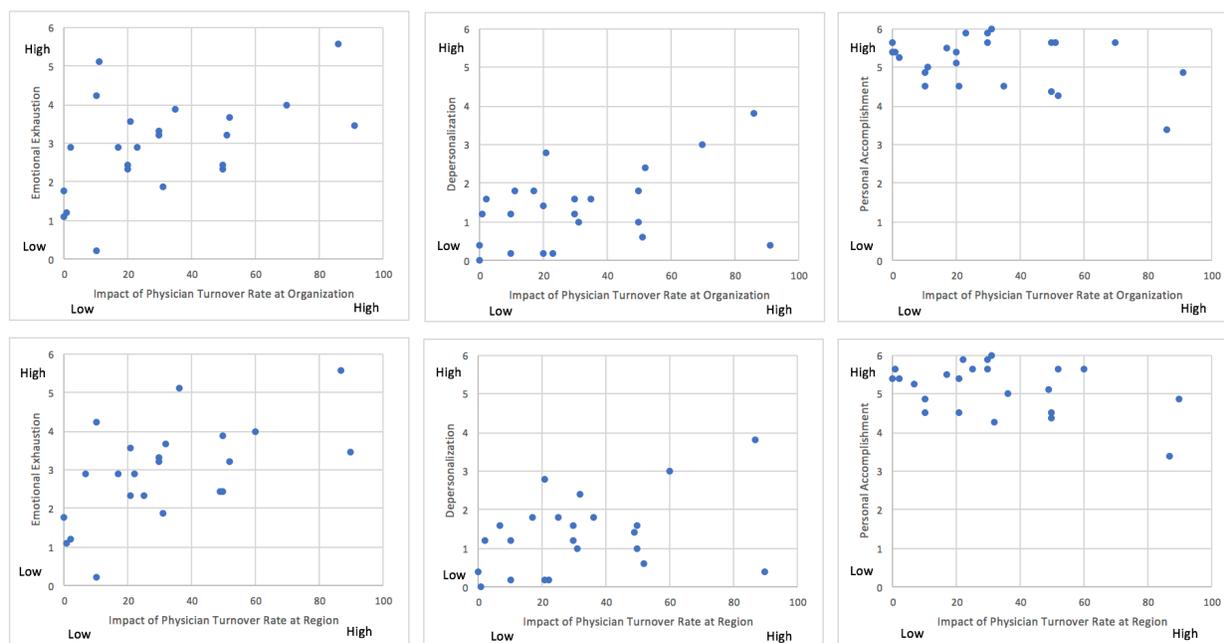


Figure 23: Participants' responses of burnout and impact of reported physician turnover estimates (n=23)

4.4.3 Combined Survey

An analysis was performed on all complete survey responses (63 responses) to explore the relationship between turnover rate and burnout. The Spearman's correlation coefficient is indicative of a relationship between the reported physician turnover rate estimates and each of the burnout syndromes at both the organization and region level. As physician turnover rate increases, the sense of emotional fatigue and disengagement increases as well. When this occurs, we see lower reported rates of personal accomplishment. The relationship between reported physician turnover rates and emotional exhaustion remained significant throughout the three analyses performed. The relationship between depersonalization and physician turnover rate became prevalent with analyses containing larger sample size. An increase in sample size in both US and international data is predicted to produce similar results to the ones made by this

analysis.

However, even with the increase in sample size the observations made earlier on care team turnover rate estimates and burnout syndromes in this analysis did not change. The analysis suggests that care team burnout is a good indicator of personal accomplishment experienced by the care team, at both the organization and region level. As care team turnover rates increase, lower scores of personal accomplishment is being reported by the care team. Further research is needed to examine the relationship between care team turnover and emotional exhaustion and depersonalization at both the organization and region. Table 16 provides a summary of the statistical analysis performed.

Table 16: Summary of relationship between turnover rates and burnout syndromes for survey data (n=62)

Burnout Syndrome	Physician				Care Team			
	Organization		Region		Organization		Region	
	Rho	P-value	Rho	P-value	Rho	P-value	Rho	P-value
Emotional Exhaustion	0.330	0.009	0.314	0.013	0.188	0.143	0.055	0.671
Depersonalization	0.318	0.012	0.293	0.021	0.238	0.063	0.148	0.250
Personal Accomplishment	-0.401	0.001	-0.343	0.006	-0.319	0.011	-0.258	0.043

The impact of turnover rates reported by participants reflect the results of the analysis of the relationship between the estimates and burnout as illustrated in Table 17. As physician turnover rates increase, the impact of turnover increases as well. The care team reports increased rates of emotional fatigue and disengagement and low sense of accomplishment. The observations made do not differ for physician turnover at the organization and region level. This suggests that turnover rates and its impact on the organization are consistent with that of the region.

Table 17: Summary of relationship between impact of turnover rates and burnout syndromes for survey data (n=63)

Burnout Syndrome	Physician				Care Team			
	Organization		Region		Organization		Region	
	Rho	P-value	Rho	P-value	Rho	P-value	Rho	P-value
Emotional Exhaustion	0.354	0.004	0.331	0.008	0.272	0.031	0.182	0.153
Depersonalization	0.364	0.003	0.320	0.010	0.208	0.101	0.143	0.263
Personal Accomplishment	-0.293	0.020	-0.319	0.011	-0.290	0.021	-0.276	0.028

The analysis indicates that the impact of care team turnover could be a good indicator of experienced personal accomplishment at the organization and region. With increased turnover rates, the impact of turnover rates increases, and reports of personal accomplishment by the care team are low while reported experiences of emotional fatigue are high. Further investigation is needed to explain the lack of relationship between the syndromes and care team turnover.

Visual observation illustrates that impact of care team turnover is similar for organization and region levels. Figure 24 illustrates that with higher turnover rates, slight dips in reported personal accomplishments occur. Additionally, the figure illustrates that emotional exhaustion and depersonalization tends to decrease with lower care team turnover. Additional data is needed to validate the observed relationship.

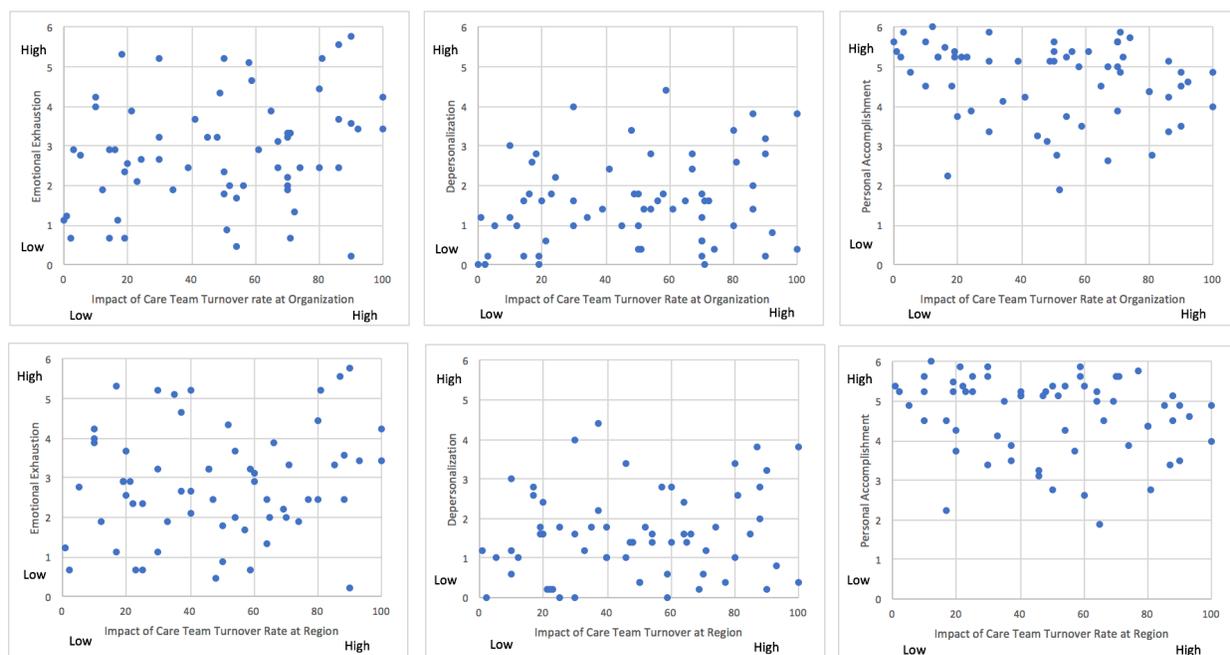


Figure 24: Participants' responses of burnout and impact of reported care team turnover estimates (n=63)

4.5 Validity and Reliability

4.5.1 International Survey

Cronbach's alpha was obtained using SPSS to determine the reliability of the survey. The obtained values are provided in Table 18. Depersonalization was reported to produce a Cronbach's alpha of 0.70 in the Maslach Burnout Inventory Manual (Maslach, Jackson, & Leiter, 2016). However, the survey analysis produced a Cronbach's alpha of 0.62. This variation can be due to the number of depersonalization questions provided by the MBI (5 questions) and the sample size (40). All other variables produced a Cronbach's alpha value greater than 0.70 deeming the survey reliable. Redundancy is observed in turnover rate question. This is because the investigation aimed to explore the relationship between physician and care team turnover rates at both the organization and region level. Future research can choose to use only

organization based question to measure turnover and reduce redundancy.

Table 18: Summary for Cronbach's alpha values obtained from international survey data

Variables	Cronbach's alpha value
Burnout (EE, DP, PA)	0.76 (0.91, 0.61, 0.76)
Learning behaviors (SL, DL)	0.84
Reported turnover rates	0.94
Reported impact of turnover rates	0.96

4.5.2 US Survey

The Cronbach's alpha results obtained from the US survey analysis is provided in Table 19. The results show that the survey is reliable. The Cronbach's alpha results obtained for burnout match the values provided by the MBI. Depersonalization, however, falls beneath the reliability criteria of being at least 0.70. This is due to number of depersonalization questions asked by the MBI and the sample size. An increase in sample size should increase the reliability of the measurement. Additionally, redundancy in turnover rates questions were produced by examining both organization and region levels. Future research can reduce redundancy by focusing on one or the other.

Table 19: Summary for Cronbach's alpha values obtained from US survey data

Variables	Cronbach's alpha value
Burnout (EE, DP, PA)	0.76 (0.89, 0.67, 0.76)
Learning behaviors (SL, DL)	0.80
Reported turnover rates	0.91
Reported impact of turnover rates	0.87

4.5.3 Combined Survey

Table 20 provides a summary of Cronbach's alpha obtained for burnout, learning behaviors, and turnover rates questions. All Cronbach's alpha values obtained exceed 0.70 deeming the data

consistent and reliable. However, the MBI derived depersonalization questions produces a Cronbach's alpha of 0.63. This is due in part to the number of depersonalization questions provided by the MBI and the survey's sample size.

Table 20: Summary for Cronbach's alpha values obtained in this research data

Variables	Cronbach's alpha value
Burnout (EE, DP, PA)	0.76 (0.9, 0.63, 0.79)
Learning behaviors (SL, DL)	0.84
Reported turnover rates	0.93
Reported impact of turnover rates	0.93

This finding also suggests that there exists a redundancy in the questions regarding turnover rate. However, redundancy in this instance was not able to be removed. The redundancy is induced by asking the same question for care team and physician rates. Future research can choose to include a single measure that questions either the care team as a whole or specific positions at either the region or organization depending on the type and goal of their research.

Additionally, a 95% confidence level was used for all analyses in this thesis research. All significant relationships observed in this research imply that these relationships are to reoccur if the sample is to be replicated. The results have 0.05% probability of having occurred by chance.

4.6 Result Summary

The responses obtained from the survey were used to explore the relationship between learning behaviors and burnout syndromes for international care team members (40 responses), US care team members (23 responses), and combined analysis (63 responses). The analysis is indicative of a relationship between learning behaviors and burnout syndromes. A summary of the results is

provided in Table 21. A “+” is placed where a positive correlation was observed, and a “-” for negative correlation.

Table 21: learning behaviors and burnout syndromes result summary

Burnout Syndromes	International (40 responses)		US (23 responses)		Combined (63 responses)	
	Single Loop	Double-Loop	Single Loop	Double-Loop	Single Loop	Double-Loop
Emotional Exhaustion			+	-		
Depersonalization	+				+	-
Personal Accomplishment	-	+	-	+	-	+

The responses obtained from the survey were also used to explore the relationship between turnover rates and burnout syndromes. The analysis is indicative of a relationship between turnover rate and burnout syndrome. Table 22 provides a summary of the results.

5 CONCLUSION AND FUTURE WORK

5.1 *Summary*

Medical errors, a partial consequence of burnout, impose costs up to \$17.1 billion US dollars (Van Den Bos, et al. 2011). In 2016, the Physician Foundation reports that nearly 90% of physicians indicated experiencing burnout at some point in their career. Roughly a 35% increase from the 2014 data reported by Mayo Clinic (the Physician Foundation, 2016; Shanafelt, 2015). Reported care team burnout in the literature range from 40-60% (Bodenheimer, & Sinsky, 2014; Halfrich, 2017).

The literature proposes interventions to alleviate burnout such as EHR modifications and improving patient flow (Linzer et al., 2015). However, a deeper analysis showed that such interventions often fail to reduce burnout in the long run. Research displayed that burnout improvement interventions begin to deteriorate within a six to twelve months' period after implementation (Awa, Plaumann, & Walter, 2010).

A literature review revealed a potential explanation as to why the interventions fail. Improvement interventions were defined to belong to one of two groups individual- and culture-driven intervention strategies (Kahill, 1981). An analysis of implemented burnout interventions showed that up to 80% of implementations occur as individual-level strategies (Awa, Plaumann, & Walter, 2010). Culture-driven intervention strategies have shown higher success rates in comparison to individual-driven interventions (Panagioti et al., 2017). Culture-driven intervention strategies found in the literature are rare and often include highly simplified modifications to workload or schedule changes (Panagioti et al., 2017).

This study includes: (a) literature review on burnout in healthcare, intervention tools, and

burnout predictors; (b) an investigation of causes of burnout failure; (c) an exploration of the potential root causes of burnout; (d) and an analysis of identified potential factors. This thesis research calls for the validation of the observed relationships. The results of which provide evidence for a tool to be utilized to alleviate burnout and address burnout improvements' deterioration.

5.2 Conclusions

This thesis research set out to investigate new potential factors that may have an effect on burnout. It was observed from the literature review that cognitive-behavioral techniques work best in alleviating burnout when implemented using culture-driven strategies (Panagioti, et al., 2017). The Conceptual Change Model was considered as a potential cognitive-behavioral culture-driven technique. From that, the research deduced that the relationship between the potential tool and burnout needs to be investigated. The research sought to infer if there is a relationship between learning behaviors (both single- and double-loop) and burnout.

Additionally, the research investigated if turnover rate has an impact on care team experienced burnout.

The literature review also shed light on the method to use in measuring burnout. A survey was created to measure burnout, learning behaviors, and turnover rate. The Maslach Burnout Inventory served as a valid tool to measure burnout in this survey. Learning behaviors and turnover rate questions were developed in this thesis research.

Additionally, burnout was measured using three syndromes: emotional exhaustion, depersonalization, and personal accomplishment. Learning behaviors were measured in term of single- and double- loop learning behavior. Turnover rate was measured based on rate estimates

and impact provided by participants. Spearman's correlation coefficient was used to analyze the relationship between all variables considered in this study. Survey findings are divided in terms of US responses (23), International responses (40), and one combining both data sets (63).

A relationship between turnover rates and burnout was observed in the analysis of this thesis research. The findings are indicative that the impact of physician turnover rates have an effect on experienced emotional fatigue, disengagement, and professional inefficacy experienced by the care team at both the organization and the region. Research findings also suggest that there exists a relationship between care team turnover rates and the care team's sense of personal accomplishment. Further research is needed to validate the observations made by this exploratory analysis. Future research needs to investigate causation as the statistical method used only provides information regarding the direction of the significant relationships.

Additionally, the findings of this study indicate a relationship between learning behaviors and experienced emotional exhaustion, depersonalization, and personal accomplishment. The research results suggest that as participants engage in double-loop learning behavior, they experience lower rates of disengagement, and professional inefficacy. Consequently, as participants engage in single-loop learning behavior, they experience higher rates of disengagement, and professional inefficacy. However, further research is needed to explore the relationship between emotional fatigue and learning behaviors. Additionally, future research can choose to measure learning behaviors differently (i.e. interviews).

This exploratory thesis research provided evidence that double-loop learning behavior impacts experienced burnout in healthcare. However, the sample size needs to be expanded to improve representativeness and validity of data. The findings from this research contribute to healthcare

burnout literature by filling the gaps identified in Table 23.

Table 23: Fulfillment of gaps in the literature

Gap in the literature	Relevant finding
Lack of understanding regarding driver of burnout in healthcare	Common themes from the literature identified and discussed
Lack of studies on burnout and turnover	Exploratory survey analysis revealed a relationship between physician and care team turnover and burnout
Temporary interventions in relieving burnout in healthcare	Identification of effective strategies to reduce burnout
Lack of understanding regarding learning behaviors and burnout	Observations of relationship between learning behaviors and burnout through an exploratory survey

5.3 Future Research Opportunities

The findings are based on the results of 63 responses. Future work will expand this sample size to further support the findings presented in Chapter 4. Future work will test the implication of the findings in a healthcare environment. Case studies will be used to quantify the effectiveness of the Conceptual Change Model as a culture-driven cognitive-behavioral technique. Additionally, the Conceptual Change Model case study should test the impact the implementation has on turnover rate at the organization.

Future research opportunities also include an investigation of other factors that contribute to individual experiences such as cultural expectations effect in healthcare settings. This can be done by investigating the relationship between the factors in organizations located in countries with differing cultures. An investigation between turnover rates and burnout to identify causation is also needed as this would help improve the knowledge of burnout.

5.4 *Weakness and Improvement*

The study findings were based on 63 survey responses. Twenty-three of which were from the US and forty from other countries in the world. Future studies should seek to expand the sample size to include equal response results from all countries used in the analysis. Additionally, future research should include an equal number of care team members from both outpatient and inpatient settings. This will help provide additional information regarding the analysis per appropriate setting.

Sampling in this study was not random. Sample size was obtained using convenience sampling. Participants were approached based on their interest in the research. Additionally, care team members approached were in direct contact with the researcher. Future research should explore implementing a randomized collection strategy to improve representativeness of the results obtained.

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7 APPENDICES

Appendix A: MBI Questions by Syndrome

Questions in this table have been blacked out for copyright reasons. Contact author for further information.

	Question	EE, DP, or PA?*
1	[REDACTED]	EE
2	[REDACTED]	EE
3	[REDACTED]	EE
4	[REDACTED]	PA
5	[REDACTED]	DP
6	[REDACTED]	EE
7	[REDACTED]	PA
8	[REDACTED]	EE
9	[REDACTED]	PA
10	[REDACTED]	DP
11	[REDACTED]	DP
12	[REDACTED]	PA
13	[REDACTED]	EE
14	[REDACTED]	EE
15	[REDACTED]	DP
16	[REDACTED]	EE
17	[REDACTED]	PA
18	[REDACTED]	PA
19	[REDACTED]	PA
20	[REDACTED]	EE
21	[REDACTED]	PA
22	[REDACTED]	DP

*EE = Emotional Exhaustion; DP= Depersonalization; PA= Personal Accomplishment.

Appendix B: Learning Behaviors Questions by Behaviors

	Questions: When a disruptive event (unexpected events that cause disruption to workflow excluding emergencies like fire or an earthquake) occurs...	Single- vs Double- loop
1	my team fixes the problem quickly and moves on.	Single
2	I quickly fix the problem fast and move on	Single
3	my team tries to understand why it occurred by revisiting the issue after completing our tasks.	Double
4	I try to understand why it occurred by revisiting the issue after completing my tasks.	Double
5	my team quickly identifies workarounds to get the job done	Single
6	I quickly identify workarounds to get the job done	Single
7	employees can access standard response procedures that my organization provides.	Double
8	my organization has easily accessible processes for seriously considering employee suggestions	Double
9	my organization has procedures for considering employee suggestions, but I prefer keeping my opinion to myself.	Single
10	I look for ways to improve workflow in my organization	Double
11	My team looks for ways to improve workflow in my organization	Double
12	I follow standard procedures provided by my organization.	Single
13	My team follows standard procedures provided by my organization.	Single
14	I often find quicker ways to complete tasks than what is provided in standard operating procedures	Single
15	My team often finds quicker ways to complete tasks than what is provided in standard operating procedures.	Single

Appendix C: Survey Questions (Complete)

Questions have been blacked out for copyright reasons. Contact author for further information.

Maslach Burnout Inventory questions are obtained from Mind Garden Inc. (Copyright ©1981, 2016 by Christina Maslach & Susan E. Jackson. All rights reserved in all media. Published by Mind Garden, Inc., www.mindgarden.com).



On a scale from 0-6, how often are the following statements true?

	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel used up at the end of the workday.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How would you classify **physician** turnover rate within the last 3-5 years at your...

Low %	0	10	20	30	40	50	60	70	80	90	High %	100
organization	<input style="width: 100%; height: 20px;" type="range"/>											
region	<input style="width: 100%; height: 20px;" type="range"/>											

How would you classify **care team** (including nurses, MAs, and everyone involved with direct patient care) turnover rate within the last 3-5 years at your...

Low %	0	10	20	30	40	50	60	70	80	90	High %	100
organization	<input style="width: 100%; height: 20px;" type="range"/>											
region	<input style="width: 100%; height: 20px;" type="range"/>											





On a scale from 0-6, how often are the following statements true?

	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day
[Redacted]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
[Redacted]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
[Redacted]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
[Redacted]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
[Redacted]	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel I'm positively influencing other people's lives through my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



>>



When a disruptive event (unexpected events that cause disruption to workflow excluding emergencies like fire or an earthquake) occurs...

	Never	Rarely	Occasionally	Sometimes	Frequently	Usually	Always
my team fixes the problem quickly and moves on.	<input type="radio"/>						
I quickly fix the problem fast and move on.	<input type="radio"/>						
my team tries to understand why it occurred by revisiting the issue after completing our tasks.	<input type="radio"/>						
I try to understand why it occurred by revisiting the issue after completing my tasks.	<input type="radio"/>						
my team quickly identifies workarounds to get the job done.	<input type="radio"/>						
I quickly identify workarounds to get the job done	<input type="radio"/>						
employees can access standard response procedures that my organization provides.	<input type="radio"/>						





In a few words, how would you describe your organization?

On a scale from 0-6, how often are the following statements true?

	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

0% 100%





On a scale from 0-6, how often are the following statements true?

	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day
I don't really care what happens to some patients.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working with people directly puts too much stress on me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can easily create a relaxed atmosphere with my patients.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel exhilarated after working closely with my patients.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have accomplished many worthwhile things in this job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel like I'm at the end of my rope.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my work, I deal with emotional problems very calmly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel patients blame me for some of their problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

0%  100%

>>

A single question from this page differed for the US/INT survey. Below is the international survey question page (a) followed by (b) US-specific survey question.



Oregon State University

How long have you been working at your current organization?

- Less than a year
- 1-5 years
- 5-10 years
- Over 10 years

What type of healthcare facility do you work in? (i.e. primary care, emergency room, inpatient, outpatient specialty, etc.)

In what country is your healthcare organization located?

Country

What is your position?

- PCP's: Physician, Nurse Practitioner, or Physician Assistant
- Nurse: Licensed Practical Nurse, or Registered Nurse
- Medical Assistant
- Other

0% 100%

(a) International survey

In what region of the US is your healthcare organization located?

Region

State

(b) US-Specific Survey Question



How would you classify the **impact** of **physician** turnover rate at your...

Low % High %
0 10 20 30 40 50 60 70 80 90 100

organization



region



How would you classify the **impact** of **care team** turnover rate at your...

Low % High %
0 10 20 30 40 50 60 70 80 90 100

organization



region



Appendix D: Consent Page



Thank you for your willingness to participate in this research on understanding Care Team Burnout. The purpose of this research study is to investigate the relationship between learning behaviors and burnout. We will ask questions focused on your opinion of the workplace. These questions will quantify burnout and identify learning behaviors at the organization. We will use the data collected from the research study as the basis for a Master's Thesis and journal publication.

Voluntary: While participation is voluntary, we will be unable to use your responses if any questions are skipped. This will provide a more complete picture to guide discussions on care team burnout. The survey **consists of 15 questions most of which are multiple choice.** The survey **should take approximately 10 minutes or less to complete.**

Anonymity: You are not required to provide your name or other identifying information. However, we invite you to provide general information about your work location and the nature of your work. This will help us match your responses with the right work area and improve our understanding. We appreciate that your time is very valuable and thank you for your help in shaping our knowledge of care team burnout. The principal investigator (Dr. Eseonu) and student researcher (Rawan Alshajji) will have access to individual survey results. Results will be anonymous.

The team will adjust qualtrics settings to avoid IP address and geolocation collection/storage. The security and confidentiality of information collected from you online cannot be guaranteed. Confidentiality will be kept to the extent permitted by the technology being used. Information collected online can be intercepted, corrupted, lost, destroyed, arrive late or incomplete, or contain viruses.

Information shared and stored in a manner that provides access only to authorized individuals. If information is stored on a computer, the system will have fully patched operating systems and applications, and current antivirus software with current virus definitions. Information may be stored on cloud-based servers.

Study contacts: If you have any questions about this research project, please contact: Chinweike Eseonu at (541) 737-0024 or by email at chinweike.eseonu@oregonstate.edu. If you have questions about your rights or welfare as a participant, please contact the Oregon State University Institutional Review Board (IRB) Office, at (541) 737-8008 or by email at IRB@oregonstate.edu

DN 100%

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Appendix E: IRB Documents



Human Research Protection Program
 Institutional Review Board
 Office of Research Integrity
 B308 Kerr Administration Building, Corvallis, Oregon 97331-2140
 (541) 737-8008
IRB@oregonstate.edu | <http://research.oregonstate.edu/irb>

**EXEMPT
 DETERMINATION**

Date of Notification	09/29/2017	Date Acknowledged	09/29/2017
Principal Investigator	Chinweike Eseonu	Study ID	8258
Study Title	Care Team Burnout		
Study Team Members	Rawan Alishajji		
Review Level	Exempt	Category(ies)	2
Submission Type	Initial Application		
Funding Source	None	PI on Funding	N/A
Proposal #	N/A	Cayuse #	N/A

The above referenced study was reviewed by the OSU Human Research Protection Program (HRPP) office and determined to be exempt from full board review.

EXPIRATION DATE: 09/28/2022

The exemption is valid for **5 years** from the date of approval.

Annual renewals are not required. If the research extends beyond the expiration date, the investigator must request a new exemption. Investigators should submit a final report to the HRPP office if the project is completed prior to the 5 year term.

Comments:

Please note when applicable, if the PI has not already done so, the HRPP staff will update the version date on the protocol and consent document(s).

Principal Investigator responsibilities:

- Certain amendments to this study must be submitted to the HRPP office for review prior to initiating the change. These amendments may include, but are not limited to, changes in funding, study population, study instruments, consent documents, recruitment material, sites of research, etc. For more information about the types of changes that require submission of a project revision to the HRPP office, please see: http://oregonstate.edu/research/irb/sites/default/files/website_guidancedocuments.pdf
- All study team members should be kept informed of the status of the research. The Principal Investigator is responsible for ensuring that all study team members have completed the online ethics training requirement, even if they do not need to be added to the study team via project revision.
- Reports of unanticipated problems involving risks to participants or others must be submitted to the HRPP office within three calendar days.
- The Principal Investigator is required to securely store all study related documents on the OSU campus for a minimum of three years post study termination.

RESEARCH PROTOCOL

RESEARCH PROTOCOL

September 29, 2017

1. Title: Care team Burnout

PERSONNEL

2. Principal Investigator: Chinweike Eseonu
3. Student Researcher(s): Rawan Alshaiji
4. Co-investigator(s): N/A
5. Study Staff: N/A
6. Investigator Qualifications

Dr. Eseonu is an Assistant Professor in the School of Mechanical, Industrial, and Manufacturing Engineering. Dr. Eseonu conducts research on socio-technical process optimization, with a focus on factors that lead to sustained acceptance of an idea or innovation (which includes methods, technologies, etc).

Ms. Alshaiji is a Masters student in the School of Mechanical, Industrial, and Manufacturing Engineering. Ms. Alshaiji completed her undergraduate degree in Industrial Engineering at Oregon State University. She works with Dr. Eseonu in the Process Improvement Group.

7. Training and Oversight

The PI has verified that all study researchers have completed the required IRB training in the ethical use of human participants in research. The PI has reviewed all IRB related documents before submission and will continue to review any future documents that require IRB approval.

The PI will hold weekly meetings with the team to ensure compliance with protocol.

8. Conflict of Interest

To the knowledge of the study team, no members of the study team, or any of their family members, have a financial or business interest in the source(s) of funding, materials, or equipment related to this research study.

FUNDING

9. Sources of Support for this project (unfunded, pending, or awarded)

Unfunded.

DESCRIPTION OF RESEARCH

10. Description of Research

The OSU researchers are interested in investigating the relationship between learning behaviors and burnout in medical providers. Specifically, if single loop learning behaviors, from the conceptual change model, contribute to burnout. In this model, single loop learners are individuals that address



issues they encounter without addressing the root cause of why the problem came about (Mirdad, Hille, & Melamed, 2015). The OSU researchers will be conducting an online survey to quantify burnout. The survey includes copyrighted questions from the Maslach Burnout Inventory (MBI) along with questions to assess learning behaviors. The focus of the research is on both individual and organizational level behaviors and their effect on burnout. No personal employee information will be collected. Journal articles, conference proceedings, and theses summarizing significant findings are anticipated.

11. Background Justification

Literature proposes several intervention methods to alleviate physician burnout. Eighty percent of the interventions are implemented at the individual level and succeed in reducing burnout temporarily for up to 6-12 months (Awa, 2010). Interventions that rely on the individual to take action towards the intervening change are defined as individual level interventions. On the other hand, interventions that rely on the organization to take action towards the change are identified as organization level interventions. Literature also recognizes that organization level interventions are rare but have a better chance in establishing a long-term burnout reduction (Maricutoiu, Sava, & Butta, 2014). Furthermore, cognitive-behavioral techniques serve best in sustaining burnout interventions (Richardson, & Rothstein, 2008). The conceptual change model, developed by Mirdad et al. (2015), has not been considered as a cognitive-behavioral intervention technique to reduce burnout. The relationship between burnout and learning behaviors also has not been investigated.

12. Multi-center Study

N/A – this study involves OSU researchers only.

13. External Research or Recruitment Site(s)

a) Name or description of each research site:

The survey is to be distributed online via email to medical personnel.

b) Name and role of appropriate authority from each site providing a letter of support or permission (when applicable): N/A

c) Name of each recruitment site: N/A

d) If recruitment method involves more than an advertisement (newspaper classified, flier, listserv email), name and role of appropriate authority from each site providing a letter of support: N/A

e) Attach or include the final content of the ad or correspondence to be used for recruitment See attachment

14. Subject Population

- Participants include any medical personnel involved in the process being studied. These are largely employees of healthcare organizations at which existing PIGroup projects are conducted.
- Total target enrollment number: 5000
- We do not envision participants under the age of 18. It is possible an employee may be:



- Pregnant
- An OSU student
- Of American Indian ethnicity
- Of Alaska Native ethnicity

None of the populations are specifically targeted in this study, but may be participants. It is anticipated that all respondents/potential participants will be able to respond in English. Employees at these companies are assumed to be English speakers, as English is the formal language of business at these companies.

- Inclusion and exclusion criteria: English speaking, adult employees of healthcare related organizations
- Recruitment: An email will be sent out to potential candidates with a link to the Qualtrics survey.

Dear Participant,

Dr. Chinweike Eseonu and the Process Improvement Group at Oregon State University need your help in a research study that aims to improve our understanding of care team burnout in organizations like yours. You are being contacted because, as an integral part of this organization, your input will help us get a true picture of your daily operations and experiences. Our aim is to learn and subsequently discuss findings with you.

Participation in this study involves a time commitment of 10 minutes for a brief survey. (SURVEY LINK)

For more information about this study, please contact the principal investigator, Dr. Eseonu, by phone at 541-737-0024 or email at Chinweike.eseonu@oregonstate.edu.

Thank you,

Chinweike I. Eseonu, PhD
Oregon State University

Study Title: Care Team Burnout

15. Consent Process

It is anticipated that all participants will have capacity to consent. The introductory survey page will serve as a consent document. An individual will be assumed to have provided consent if s/he proceeds to the survey after reviewing the introductory page.

16. Assent Process



N/A

17. Eligibility Screening

An eligibility screening process is not anticipated as being necessary.

18. Methods and Procedures

Student researchers will distribute the survey via email. The medical staff can access the Qualtrics based survey using the link in the email.

19. Compensation

No compensation will be given to participants.

20. Costs

No foreseen participation costs (beyond time spent completing the survey) are associated with this research.

21. Drugs or Biologics

N/A – no drugs or biologics are utilized in this study.

22. Dietary Supplements or Food

N/A – this study does not involve dietary supplements or food.

23. Medical Devices

N/A – this study does not involve any medical devices.

24. Radiation

N/A – this study does not involve radiation.

25. Biological Samples

N/A – this study does not involve biological samples.

26. Anonymity or Confidentiality

Survey responses is anonymous. All study information will be stored for 3 years post-study termination by the PI. Data will be stored on an encrypted computer in the PI's office, or in the OSU Library database. Information stored on computers will have current anti virus software, updated security protocols, and encryption. Results from the study including statistics and final reports that include general observations will be provided to the compansis. No individual level information will be shared. The journal articles, conference proceedings, or theses will not identify any participants, including any companies involved.

The team will adjust qualtrics settings to avoid IP address and geolocation collection/storage. The security and confidentiality of information collected from you online cannot be guaranteed. Confidentiality will be kept to the extent permitted by the



technology being used. Information collected online can be intercepted, corrupted, lost, destroyed, arrive late or incomplete, or contain viruses.

Information shared and stored in a manner that provides access only to authorized individuals. If information is stored on a computer, the system will have fully patched operating systems and applications, and current antivirus software with current virus definitions. Information may be stored on cloud-based servers.

27. Risks

The research team is unaware of any foreseeable risk to participants. The PI Group will not collect identifying information.

28. Benefits

The research will potentially provide information on causes of provider burnout. The research may be published in accessible journals, conference proceedings and/or theses.

29. Assessment of the risks and benefits.

Benefits in #28 outweigh risks in #27.