

Running head: REDESIGNING THE ORAL HEALTHCARE TEAM

DENTISTRY'S ADOPTION OF A NEW TEAM MEMBER TO IMPROVE PATIENT  
OUTCOMES

By

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A dissertation/thesis submitted in partial fulfillment of the requirements for the degree of  
DOCTOR OF EDUCATION AND LEADERSHIP 2020

PACIFIC UNIVERSITY  
College of Education and College of Health Professions

AUGUST 2020

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# REDESIGNING THE ORAL HEALTHCARE TEAM

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## REDESIGNING THE ORAL HEALTHCARE TEAM

To the Faculty of Pacific University:

The members of the Committee appointed to examine the dissertation of  
KRISTEN LYNN SIMMONS find it satisfactory and recommend that it be  
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### Abstract

The dental healthcare profession is exemplified by high levels of interdependence and uncertainty, which critically expand the need for identification and evaluation of care coordination efforts. These efforts are not a one-size-fits-all solution within the dental healthcare system, and, therefore, require granular identification of the essential levers within each organization that can be adjusted to improve patient care and outcomes. Using the relational coordination theory, this research presents three studies designed to measure the relational interventions to improve care coordination efforts in dentistry.

Study One measures care coordinators' job engagement when organizational investments have been made in job design, fostering relational coordination attributes. The subsequent study seeks to understand the perceptions of the care coordinator's relationship with other members of the dental team through a corporate ethnographic lens. Lastly, Study Three quantifies the efforts of a dental care coordination role and the impact on attendance and non-attendance rates of the high-risk caries dental patient in a large accountable care dental organization.

For this research, all three studies are combined in an intentional, complementary approach, and tested the applicability of the Relational Coordination (RC) Framework's theoretical components - job design, workforce relationships, and improved organizational performance. When applied in an organizational setting, these components can strengthen or weaken performance outcomes. In these studies, the RC constructs have been tested in a large accountable care dental organization.

Through an examination of the dental care advocate (a care coordination role), this dissertation found the need for future investigative work to improve the job design of the dental care advocate, that relationships with other dental team members is vital to shared knowledge, shared goals, mutual respect with communication that is timely, frequent, accurate, and seeks problem-solving. Finally, the outcomes of job design and positive organizational job relationships of the dental care advocate are positively associated with high-risk dental caries patients scheduling and attending dental appointments.

Keywords: healthcare, dentistry, relational coordination theory, care coordination, corporate ethnography

## REDESIGNING THE ORAL HEALTHCARE TEAM

### Dedication

I dedicate this dissertation to early detection and awareness of oral cancer, and the work of coordinated teams to improve oral health outcomes.



My great aunt passed away from oral cancer; she was an educator who believed in education and prevention. Her story is shared in chapter one (Pictured above).

### Acknowledgments

I want to thank Taeler McGinnis and Ryan Brandon for their unwavering support and contribution to my professional growth. Every time I have had a setback, their help made the learning so much sweeter.

I want to thank my committee for their unwavering guidance and acceptance of a student balancing an executive job and the requirements of graduate school. Dr. Laura Dimmler, Dr. Andrew Saultz, Dr. Beth Mertz, and Dr. Joel White have made the learning journey rich and full of exploration to find my hill to stand on. Each one of them has contributed directly to the quality of the dissertation.

I want to thank Alfa-Ibrahim Yansane for teaching statistics in a way I will use for the rest of my career.

Lastly, I would like to thank Dr. Eugene Skourtes, Dr. Nicholas Skourtes, Yuen Chin, Lisa Rowley, Aubri Kottek, Donna Yemm, and my family for their confidence and support.

## Glossary

| Term                                 | Definition                                                                                                                                                                                                                        |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| axiUm                                | The dental electronic health record software application used by the large dental group practice (About Us: Exan Software, 2020).                                                                                                 |
| Active Patient                       | Any patient in the last 15 months seen at the large dental accountable care group practice (Willamette Dental Group, 2016a).                                                                                                      |
| CAMBRA                               | Caries management by risk assessment (CAMBRA) - is a tool developed by the University of California-San Francisco to weigh certain patient risk factors against evidence-based protective factors (Wikipedia contributors, 2019). |
| Contact Note                         | A dedicated space within the electronic health record where employees can document the interaction with a patient (Willamette Dental Group, 2018a).                                                                               |
| Dental Accountable Care Organization | The dental organization operating on a pay-for-performance structure by utilizing quality metrics and coordinated dental care (Goodell, 2018).                                                                                    |
| Dental Care Advocate (DCA)           | The name created by the large dental care organization, which parallels the care coordination defined by the Agency for Healthcare Research and Quality ([AHRQ], Willamette Dental Group, 2016b).                                 |
| Dental Team                          | Consists of the Dentist, Dental Hygienist, Dental Assistant, and Dental Care Advocate (All Willamette Dental Group Locations, n.d.).                                                                                              |
| Employee Engagement                  | The intensity employees feel about their place of work (Workplace, Q., n.d.).                                                                                                                                                     |

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|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Follow-Up Form                    | An electronic form housed in the patient's electronic health record that is completed by the Care Advocate at the time a patient is identified as having a High or Extreme risk of dental disease. The form is designed to document the patient's progress throughout their time working with the Care Advocate to lower their dental disease risk levels. The form is completed in full after the first visit with a Care Advocate. It contains information such as the patient's motivation level, therapeutic intervention use, health level changes, and plans for continued follow-up. The form is then updated after each patient interaction (Willamette Dental Group, 2017). |
| Full-Time Employment              | It is defined as an employee working more than 32 hours per week (Willamette Dental Group, 2015).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| PEMBRA                            | Periodontal Management by Risk Assessment (PEMBRA) is a decision support tool (located in axiUm) to facilitate periodontal diagnosis and standardize periodontal treatment based upon periodontal conditions and risks (Willamette Dental Group, 2018b).                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Proactive Dental Care Plan (PDCP) | The Proactive Dental Care Plan (PDCP) summarizes the patient's oral health profile, treatment plan, home care recommendations, and treatment outcomes. The information is reviewed with the patient at the new patient and recall exam appointments (Willamette Dental Group, 2016c).                                                                                                                                                                                                                                                                                                                                                                                                |
| Quantum Workplace Solutions       | Software solutions used by the large dental care organization to manage and report on employee engagement (Workplace, Q., n.d.).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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## **Chapter One**

### **Care Coordination: Extra-Ordinary Care**

#### **Introduction**

This is the story of my great aunt and my cause to champion care coordination efforts in dental healthcare and an illustrative example of a disorder in today's dental-healthcare system caused by the lack of care coordination. She was a beloved aunt, kindergarten teacher, and community citizen. She did not smoke or drink alcohol and faithfully practiced preventive health measures by visiting the dentist every six months with good dental hygiene habits. When my aunt could no longer take care of herself safely and was moved to assisted care, my mother, a retired registered nurse, became the designated guardian of my aunt's care to champion her needs when she could no longer advocate for herself. My mother attended the monthly care conferences with the facility providers and staff, believing the team would provide her oral care needs in addition to coordinating the primary care visits with her physician.

During several care conferences, Mom asked the staff to provide oral care to my aunt, because her mouth care was exceedingly lacking, and a toothbrush was often nowhere to be found. Armed with the knowledge that caregivers frequently hold oral hygiene as a low priority, Mom hoped for improved oral care. She thought the dentist would facilitate the coordination of the daily brushing, which was a priority for her overall health while in assisted care.

The news came as a shock upon one of the visits by the facility dentist. An oral lesion was detected, and my aunt needed to see an oral surgeon for a biopsy. The biopsy confirmed oral cancer, a very advanced malignant tumor due to its long-term presence. The prognosis was grave without a favorable outcome or possibility for treatment. As the neoplasm continued to grow, the last few weeks of her life were harrowing. She was unable to communicate, unable to eat, and

hardly recognizable from the tumor that disfigured her face. Our family watched her suffering and were enraged by the failure of the dental healthcare system to identify and intervene before her oral cancer became fatal. My aunt mercifully slipped into a coma before her suffering finally ended.

The malignant tumor that took her life was not related to any of the common risk factors associated with mouth cancer, except for her advancing age. This is not to say that controlling health risks prevents all disease or illness. However, her story is an illustration of the failures in the dental healthcare delivery system today, from the caregiver's lack of providing oral care when needed by the patient to a delay in the discovery of an oral growth until it was too late to influence a more positive outcome. The lack of early identification, intervention, communication, and coordination is not the responsibility of one person, patient, or provider. When individuals educated in different fields of the healthcare space work together through care coordination, undue suffering is lessened. The one dental healthcare team partner who suffers the most from the lack of care coordination efforts is the patient (and their families).

To improve the nation's delivery of high-quality healthcare, the Institutes of Medicine (2003) issued a report that relates and sets 20 priority areas for improvement in healthcare quality. One of the priorities recommended for improvement identifies care coordination to deliberately organize patient care needs and disseminate patient information across multiple providers spanning all aspects of the healthcare delivery space. Yet a complicating factor lies in dentistry; this profession delivering the care to the patient is predominately a cottage industry, which limits the ability of collaboration with medicine (Guay, 2006; Guay & Wall, 2016). Subsequently, this isolation reduces the opportunity for those working in dentistry to gain experience and understanding of how to acquire, grow, and retain a new dental care team

member specifically designed to coordinate the care of the patient, much less the capacity to measure system changes enabling improved oral health outcomes (Hupp, 2005).

Presently, patients with multiple healthcare needs must navigate a complex healthcare system to coordinate, track, and follow-up on their care, making the totality of accessing healthcare services challenging and costly. The lack of coordinated healthcare with various providers impedes the ability of patients to secure quality care by creating patient and provider confusion, misunderstandings, and mistakes, which have severe consequences for the patient. What has happened in the dental healthcare system to amplify the gaps and inconsistencies of patient care?

### **Significant Challenges Resulting from the Lack of Care Coordination**

**A fragmented system drives up the cost of healthcare.** In the United States, the cost of healthcare and dental care continues to rise. Overall, healthcare spending in 2017 increased by 3.9%, or \$3.5 trillion, translating to an annual cost of \$10,739 annually per person. Dentistry, as a healthcare service, represents 4% of overall healthcare costs, with a small increase in 2017 to \$129.1 billion, a 3.2 % increase (Centers for Medicare & Medicaid Services, 2017). Study findings in 2014 of 112,053 participants provided insight into the cost barriers of healthcare services: dental, medicine, mental health, vision, and prescription care (Vujicic, Buchmueller, & Klein, 2016). The study found that most of the respondents from the interviews reported more significant financial barriers to receiving dental care than medicine, mental health, vision, and prescription care. The study's dependent variable was a binary variable based upon the survey question, “During the past twelve months, was there ever a time when you needed (health care service) and didn’t get it because you could not afford it?” (Vujicic et al., 2016, p. 3). The study

illustrates the significant differences between dental care and other healthcare services, yet the limitation in the study could be the self-reported definition of need by participants.

Healthcare delivery in the United States is the consequence of a free-market system. Payment of most healthcare expenditures in the United States comes from one of three sources: employer-sponsored health plans, government programs, or out-of-pocket payments from consumers. Employers and government health plans will independently set the type and cost of insurance. The effects of a deregulated system, regardless of the style of health plan, be it medical or dental, can stimulate the underuse, overuse, and misuse of healthcare resources. This fragmented reimbursement system creates a wide variation in the quality of care, access to care, and disjointed patient care (Green, 2012). The unbridled impact of these challenges affects the total cost of care. Costly inefficiencies need mitigation to improve healthcare delivery and patient outcomes (Owens & Southeastern Consultants, Inc., 2010a). For instance, a study examined nine million Medicaid and dual-eligible Medicaid and Medicare participants within five large states and uncovered the extremes of uncoordinated care concerning the cost of care (Owens & Southeastern Consultants, Inc., 2010b). The findings indicated that the uncoordinated care participant sample represented 10% of all participants, yet accounted for 36% of the costs for the entire group. Furthermore, the study estimated that 10% of the overall healthcare plan spending “should be avoidable with improved care integration, enhanced and targeted interventions, and care coordination between providers” (Owens & Southeastern Consultants, Inc., 2010a, p.1).

**A decreased standard of living.** The increased cost of healthcare also poses significant consequences, including a lower standard of living for many individuals as well as potential

bankruptcies. At present, employers have held down wages and decreased coverage of healthcare insurance. Some employers have shifted healthcare insurance premium increases to employees, which affects the standard of living for United States workers (Alliance for Health Reform, 2012). A study by the Commonwealth Fund in 2012 found, “more than two out of five adults (41%) ages 19–64, or 75 million people, reported problems paying their medical bills or were paying off medical debt over time (National Patient Advocate Foundation, 2014, p. 3). Because of the rising cost of healthcare, individuals with healthcare insurance have higher out-of-pocket expenses, paying more significant premiums, co-pays, and deductibles. This shift in resources can compete with other essential household expenditures such as education, transportation, and housing. In addition, Mathur Aparna’s (2012) findings on health expenditures and personal bankruptcies are troubling;

A 10 percent increase in debts of households with credit card debt as the primary form of debt, along with some level of medical debt, would cause bankruptcy filings to go up by 36 percent on average. A 10 percent increase in debts of households with *primarily* medical debts would cause filings to go up by 27 percent on average (p. 1316).

**Dental insurance versus healthcare insurance.** While dental health insurance is not as diverse as health insurance, dental insurance is a siloed insurance product. At present, most dental insurance benefits exist outside of health benefit plans, and are typically afforded to the consumer as a stand-alone dental benefits plan. The word “stand-alone” is an insurance benefit term meaning the dental insurance plan is independent of medical insurance in the marketplace. When the cost of care and insurance premiums increase in medicine, less money is available for dental benefits plans, and the consumer incurs the increase in the form of higher deductibles and

co-pays. In some cases, the employer-sponsored plans drop the dental from the employee's benefits to offset the cost of increased medical premiums.

Furthermore, dental benefits for the elderly population are scarce. Until recently, Medicare did not have dental benefits in the insurance design. This ensures a problem when the consumer has had excellent preventative and restorative services but does not have access or resources to continue appropriate dental care. The lack of coverage forces the consumer to postpone care until the dental need is acute. Once the concern is critical, just as in medicine, many uninsured elders seek dental care in the emergency room (Brown, 2008).

As a result of rising healthcare costs, care coordination efforts are developing in many healthcare redesign strategies as a paradigm shift to drive health improvement across the U.S. dental healthcare system with the desire to improve outcomes and reduce costs.

### **Divided: Medicine and dentistry.**

**History.** It was not until the 1840s that dentistry was a recognized health profession. According to the father of modern dental education, Dr. William J. Gies (1926), who pioneered the concept of dentistry as a healing science:

Rejecting the view that dental surgery was or could be important enough to deserve such educational attention, medicine declined to admit dentistry into the fraternity of the healing art and presented conditions that forced dentists to conclude that such fellowship was unattainable. (p. 39)

The early pioneers of dentistry were educated as physicians first; these individuals rebuffed by medicine created a new profession, the revolutionary scholarship of dentistry. The newly formed occupation galvanized its ideologies, developed an identity, and established dental

schools apart from medicine. Today, in isolation, dental and medical scholarship have expressed little interest in merging to consider the broader context of whole-person care. The medical and dental professions have substantive paradigmatic differences, and the care delivery systems of each are structured around these differences. However, dentistry as a profession is not unlike medicine. The workforce in dentistry has specialists, general dentists, dental hygienists, dental assistants, and other ancillary types of roles similar to medicine.

To a greater extent than medicine, dentistry is struggling with evolving professional roles to meet the growing demand for services and a lack of dental care resources. Ward (2006) asserts that a contributing factor is the practice landscape; providers competing for the same resources – protectionism. When patients receive fragmented care from a variety of oral health providers, coordinating the care in an efficient trajectory becomes complex. Optimistically, these pressures are changing practice models and radically changing the way dentistry is practiced today. To put it another way, the increasing complexity of the dental healthcare system, rising costs, and access to care issues are creating the need for greater care coordination.

***The organization of dental care.*** The current dental care system consists of many small and informally organized cottage-industry components (Compton & Reid, 2008; Lipsitz, 2012; Mertz, 2011; Vuijcic, 2018). The cottage industry metaphor is defined as “the one to one relationship between the patient and the provider of the moment” (Levy, 2008, p. 7). While a one-to-one relationship is a simplified depiction of the dental care system, this relationship remains a significant limitation to overcome and a blockade for the patient. Additionally, the metaphor illustrates another gap, the isolation of one profession from another in the context of academic education (Geist, 2016). The present trajectory of dental and medical scholarship isolates the profession and practice of dentistry. The respective scholarship of medicine and

dentistry are independent of one another. This, in practice, generates collective cottages lacking an overall community of residence, leading to a silo of care for the patient, as well as a lack of sharing of convergent ideas generated from research. The independent nature of the healthcare industry leads to uncoordinated care for the patient, waste from inefficiently used resources, and increases in healthcare costs (Cebul, Rebitzer, Taylor, & Votruba, 2008; Schneider et al., 2016). Alain Enthoven (2009) describes the lack of coordination as a “clinical linkage deficiency” (p. S284). Atchison, Rozier, and Weintraub (2018) assert, “The lack of infrastructure, technology, and personnel to connect these separate systems leaves it to the public to navigate the care across the dental-medical divide on their own” (p. 850).

In addition, dentistry’s divide is similar to medicine, with the segregation of oral care into specific areas of specialization, creating complexity for the patient and the inability to provide whole-person care. For example, patient referrals are made to other providers, leading to confusion for the patient regarding who is the primary care provider of their care experience. Without care continuity, patients get lost in the transition of care between the general dentist and specialist. In dentistry, unlike medicine, dentists are not called primary care providers but are instead referred to as general dental providers.

**The dental workforce.** The dental workforce is composed of licensed providers, dentists-generalists and specialists, dental hygienists, dental assistants, as well as non-licensed staff, including managers and other operational support staff, such as a receptionist. Only a licensed dentist may own a dental practice; this premise is known as the corporate practice of dentistry doctrine, similar to medicine. In dentistry, the volume of patients in a dental office and pace of the dental practice, including support staff, is managed by the dentist.

***Job dissatisfaction.*** Within a complex dental-healthcare system, healthcare providers are interdependent; they must rely on one another. The desire of primary healthcare providers to include dentistry would improve patient care and serve as a source of job satisfaction. Patient care that is divided into specific and isolated parts is not efficient or useful, and a source of provider dissatisfaction. Consequently, providers in isolation lack the opportunity to coordinate with one another, ultimately influencing the care and overall treatment of the patient, and creating dissatisfied providers (Meredith et al., 2018).

Additionally, the lack of smooth transitions and handoffs between those providing total person care produces uncoordinated and wasted care. One way to measure the economic cost is from the impact of provider turnover generated by employee burnout. Maslach (1982) defines burnout as “a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment” (Maslach, 1982, p. 3). Literature is extant regarding the downstream effects on the healthcare workforce, the impact of disjointed care on employee job satisfaction, and general well-being of staff (Salyers et al., 2017). However, there is a myriad of possible causes of burnout, and it is difficult to identify which job-related tasks may be the cause (Schooley, Hikmet, Tarcen, & Yorgancioglu, 2016).

The obstacles to improving patient care, coupled with job dissatisfaction amongst the providers, subsequently provokes a loss of engagement, a symptom of burnout. Provider burnout is costly for organizations and harmful to patients (Felton, 1998; Medical Society of the State of New York [MSSNY], 2016). Prominently, dentists face stressful situations, dental school debt, the management of the dental practice, plus the financial implications of ownership of a dental practice. In combination, anxiety and burnout may be a result of stressful situations. Rada and

Johnson-Leong (2004) surveyed more than 3,500 dentists and found the dentists perceived, “dentistry as being more stressful than other occupations” (2004, p. 789). The troubling responses in the Rada and Johnson-Leong paper is echoed in a systematic review of the literature identifying the associations with anxiety and burnout. The findings suggest the “younger age of the dentist, personality type, and high job-strain/working hours” (Singh, Aulak, Mangat, & Aulak, 2016, p. 29.) are factors in burnout. Personal self-care is a remedy to mitigate professional burnout (Calvo et al., 2017; Huri, Bagis, Eren, Orhan, & Umaroglu, 2016; Kulkarni et al., 2016). An article countered these findings by Gregory (2018), which argued that more evidence is necessary to look at organizational interventions rather than self-care interventions to reduce provider burnout.

***Supply and demand.*** In the United States, the dentist-to-population ratio is a concern from a patient access perspective. Previously, there was a surplus of dentists in the marketplace, and as a result, the educational and private sectors made adjustments to curb the threat of oversaturation. Today, there are fewer dental schools than twenty years ago, and the cost to maintain dental schools is not sustainable long term (Thomas, 2009). Besides, Munson and Vujicic (2018) assert,

The aggregate supply of dentists may be adequate in size compared to the aggregate demand for dental care. However, there may be an insufficient number of dentists relative to need or demand for dental care among disadvantaged populations or in certain geographic areas (p. 2).

Overall, the result is crippling for those individuals who live in rural or inner-city communities which are sheltering the poor, elderly, and those possessing Medicaid or Medicare insurance.

Not only is the geographic dispersion of practicing dentists a challenge, but the types of providers within dentistry are not as diverse as in medicine. Medicine grappled with a lack of patient access to care, necessitating the need to design expanded roles for nurses. Nursing has developed an advanced practice registered nurse (APRN) and a licensed practical nurse (LPN). In addition, the physician assistant (PA) role was created to enable the physician to concentrate on more complex or acute cases of patient care. Workforce reform efforts in dentistry are challenging for policymakers, professions, and the public, due to intersections of training, types of individuals, location, and practice settings (The Pew Charitable Trusts, 2009). Consequently, because of dentist supply, sluggish emergence of mid-level providers, and an aging population, the projected increased cost of care could rise from 17.5 % in 2014 to 20.1 % of the U.S. gross domestic product (GDP) by 2025, creating unsustainable expenditures paid by federal, state, and local governments (Keehan et al., 2016).

**The rise of healthcare technology, a double-edged sword.** The growth of information technology, and the desire of the private and government sectors to drive healthcare into population health management, is a radical disruptor in healthcare, metaphorically a double-edge sword.

***Positive components.*** The ability to look at large data sets of the population by way of a digital patient record is a positive step forward according to Kruse, Stein, Thomas, and Kaur (2018), “Potential improvements in population health include EHRs ability to organize and analyze a large amount of patient information” (p.1.). The emergence of healthcare data, aggregated to populations, and applied at the individual patient level, is a force of pressure on the healthcare system (Cognizant, 2012; Koh and Tan, 2005). Furthermore, demand from

policymakers drives the ability of the electronic health records (EHRs) to compute population or aggregated data points to reveal waste and explore ways to make healthcare more effective and efficient (Buntin, Burke, Hoaglin, & Blumenthal, 2011; Cebul et al., 2008). Dawning is a new era of analytics, attempting to understand as much as possible about the patient as early in life as possible to avoid preventable illnesses and deaths. Care delivery teams can look at the population level as well as the individual patient-level data; in some cases, the EHRs offer clinical decision support, alerts, and flags to assist as reminders of focal areas for patient care.

From the patient's perspective, information technology affords the consumer a more considerable amount of health information than in the past to self-diagnose their condition. In a study by Hesse et al. (2005), 6369 adult patients participated in a survey concerning the health-related uses of technology and the internet use patterns by the end-user of the technology. The findings suggest the respondents reported going online first 48.6 % (95% CI, 48.1%-51.0%) before going to their physician 10.9% (95% CI, 9.5-12.3%).

***Negative Components.*** With patients having access to more information digitally, providers are facing informed patients, often self-diagnosed with suggested interventions and therapies. Unfortunately, the internet is an unregulated source of healthcare information, and the patient may not have access to quality information. According to Fahy, Hardikar, Fox and MacKay (2014), “In the mid-90s, approximately 10 million people had access to the internet, while current estimates exceed two billion users worldwide” (p. 25). With the growing patient use of online healthcare information, the consistency of quality information pose a challenge to the provider and their patient relationship. Additionally, the rise of technology has forced providers to input information into the digital chart, providing more information, but also

consuming more of the provider's time which reduces time for direct patient care. This finding is supported by Hill, Sears and Melanson (2013), in a 10-hour shift, a doctor makes 4,000 mouse clicks of data into the electronic health record in the emergency department resulting in more time devoted to the inputting information into the electronic health record than direct patient care.

**The increasing population with chronic diseases.** With a greater understanding of risk factors and diseases, the National Center for Chronic Disease and Health Promotions was formed in 1988 by the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, 2011). This agency's work identified certain behaviors such as smoking, alcohol consumption, diet, physical activity, sexual behavior, and illicit drug use, which can be predicting factors for diseases. These are predicting factors, and the sustained harmful actions over time by the patient can lead to long-lasting effects that are challenging to eradicate which gives rise to the term chronic disease (Centers for Disease Control and Prevention, 2011). Healthcare coverage costs for people with a chronic condition are five times higher than for people without a chronic condition (Partnership for Solutions, 2004). Developing interventions to improve patient outcomes using targeted surveillance databases, analysis of prevention, and control interventions, along with health policy advancement, continue to grow. In dentistry, the insurance benefit designs are starting to offer enhanced benefits for those patients who present with a chronic condition such as diabetes and providing an enriched benefit to the identified high-risk patient such as no-cost copayments or increased prevention visits and medications.

**The lack of consensus-based care coordination.** Novel approaches to care coordination efforts are radically changing the delivery of healthcare. A systematic review conducted in 2007

entitled, *Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies* prepared by the Agency for Healthcare Research and Quality (AHRQ) mentions: “While numerous factors may explain continued poor performance and variation, one commonly accepted belief is that improvements in care coordination can help reduce fragmentation in patient care, lead to better quality and potentially lower cost” (McDonald et al., 2007, p.13). However, a challenge in understanding coordination is how to define it. A significant finding of the systematic review from AHRQ that searched 4,730 publications, 75 of which were systematic reviews, found over 40 definitions of care coordination in the report. The breadth of the analysis exemplifies the efforts of evolving care coordination approaches and the current struggle to have a standard operational definition (Schultz et al., 2013). The AHRQ report (2007) provides a working definition of care coordination, taken from systematic reviews, and serves as the foundation to evaluate care coordination efforts. The working definition is:

Care coordination is the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient’s care to facilitate the appropriate delivery of health care services. Organizing care involves marshaling of personnel and other resources to carry out all required patient care activities and is often managed by the exchange of information among participants responsible for different aspects of care (McDonald et al., 2007, p. 5).

With a definition of care coordination, other typologies, such as teamwork and interprofessional frameworks, are essential to delineate from coordination, to avoid confusion with different terminologies.

***Teamwork in context.*** A definition of teamwork is ambiguous in the healthcare literature, and different professionals hold different viewpoints on the meaning of the term (Baker, Day, & Salas, 2006). One publication by Xyrichis and Ream (2008) found nursing and medicine topologies do not define a team, instead, they refer to “team practice” (p. 234). Additionally, in

the paper by Xyrichis and Ream (2008), the authors used a concept analysis underpinned by theory to present the healthcare definition of teamwork. The description from the paper is:

A dynamic process involving two or more health professionals with complementary backgrounds and skills, sharing common health goals and exercising concerted physical and mental effort in assessing, planning or evaluating patient care. This is accomplished through interdependent collaboration, open communication, and shared decision-making. This, in turn, generates value-added patient, organizational and staff outcomes (Xyrichis & Ream, 2008, p. 238).

To improve the clarity of future research, this definition of teamwork provides a theoretical typology to generalize the findings to build theory, add to theory, or modify an existing theory.

***Interprofessional collaboration in context.*** Teamwork is a central tenet to interprofessional collaboration and touted as an effective strategy for healthcare improvements in complex systems (D'Amour, Sicotte, & Levy, 1999; Orchard, 2010; Peduzzi, Carvalho, Mandu, Souza, & Silva, 2010). However, another term used in the literature is interprofessional collaboration. A systematic review from Sangaleti, Schweitzer, Peduzzi, Zoboli, & Soares (2017) evaluated the outcomes of interprofessional collaboration over five decades and reported on five randomized control trials. The findings present a significant limitation. The authors suggest that interprofessional collaboration efforts can improve with precise terminology. Furthermore, the systematic review asserts, “these limitations compromise the generation and generalization of evidence on the usefulness of collaborative practice teams” (Sangaleti et al. 2017, p. 2726). Reeves, Freeth, Goldman, Perrier, and Zwarenstein (2013) define interprofessional collaboration as, “a type of interprofessional work which involves different health and social care professions who regularly come together to solve problems or provide services” (p. 8).

***Care coordination as research typology.*** Care coordination, in the context defined by the AHRQ (2007), is the vehicle to advance cooperative teamwork and interprofessional collaboration. Coordination of oral healthcare is the support mechanism to foster teamwork and interprofessional collaboration. Care coordination as a typology is inclusive of the patient, while teamwork and interprofessional collaboration are drivers for the work within the groups. This dissertation uses the definition of care coordination as a clear and explicit typology to guide the research design. In addition to the typology of care coordination applied to the study, a theoretical lens using the relational coordination theory also underpins the overarching research question.

## **The Problem**

The fragmentation in the healthcare delivery system needs to be fixed. The changing healthcare landscape, due in part to increasing provider specialization, the rise of chronic diseases, the aging U.S. population, the overall cost and financial reimbursement systems of care delivery, and the increase in digital technology is causing the lack of cohesion in the healthcare delivery infrastructure. It creates a gap in the coordination of care between the provider and the patient.

A significant gap exists in the measurement and evaluation of care coordination efforts. The Agency for Healthcare Research and Quality (2007) report suggests that the problem lies with the lack of clarity around the methods, definitions, and lack of theory in the studies of care coordination to date (McDonald et al., 2007). Dentistry needs studies to understand and measure new types of dental care coordination roles and the effects they have on the dental healthcare delivery system, which is a complex system, heightened by human-centered service of people

dependent on each other, and the patient, to preserve health or treat illness (Guyton, LeBeau, & Sorci, 2016; Lamster & Myers-Wright, 2017; Aschenbrener, Blue, Schmitt, & Viggiano, 2011; Sedrak, & Doss, 2018; Silk, 2018; Tien & Goldschmidt-Clemont, 2009). Because of the complex nature of the dental healthcare system, evaluating and replicating the best practices of care coordination efforts are continuing to evolve.

A comprehensive study is needed to advise the dental profession and oral health delivery systems on approaches to employ a new dental team member, a dental care coordinator, embarking on steps towards interprofessional collaborative practice. The relational coordination theory is the framework of choice for this investigation. Therefore, the purpose of this dissertation is to examine a new care coordination role, a dental care advocate, within the context of an accountable-care dental group practice encompassing three broad areas of inquiry, job design, the experiences of the employee in a new care coordination role, and the impact of care coordination efforts on patient care.

**Job design of a care coordination role.** The human resource management field has studied the implications of job design on employee engagement (Christian, Garza, & Slaughter, 2011) and, human resource managers realize the importance of job design to influence productivity and satisfaction. For a new role, a career is being shaped and crafted to include advancement, compensation, performance expectations, and salaries. For a new novel care coordination role, their identity formation is twofold. First, the role is structured in form. The second being the boundary-span with other existing types of employees. “Boundary-spanning essentially reaches across organizational structures to build relationships, interconnections and interdependencies” (Gilbert, 2016 p. 7). New care coordination types of roles come with a job-

designed identity in addition to the promotion of coordination and knowledge facilitation to bridge the gap between the provider and the patient. Measuring the engagement of the employee in the new coordination role can be a strong predictor of organizational performance (Markos & Sridevi, 2010).

Consequently, measurement of engagement of the employee in the care coordination role can provide insight into increasing organizational performance within the large accountable care dental organization (Coffman, 2000; Ellis & Sorensen, 2007). Yet, a baseline measurement of engagement for the new role needs evaluation. One of the first guideposts in the relational coordination theory asserts that job designs created intentionally with attributes of shared knowledge, goals, and mutual respect add or detract from coordination with different job groups. Raising the question, is there a difference in engagement scores of a care coordination role versus the other members of a well-established dental team, given the structural design of the care coordination role to encompass shared knowledge, shared goals, and mutual respect?

**Lived experience of care coordinators in a dental team.** Relationships across workgroups can enhance or detract from positive organizational performance. Yet, what are the mechanisms in play to determine the contexts necessary to evaluate the strength or weakness of role-to-role relationships? The relational coordination theory provides a fully validated teamwork instrument to measure the strength of the relationship within groups. Since the inception of the care coordination role in 2016, what are the lived experiences of the care coordinator, called a dental care advocate, when the entire dental team shares a focal work process?

**Impact of care coordination efforts.** Measuring the impact of care coordination efforts to schedule and attend dental appointments of high-risk dental caries patients has not been

studied by risk-stratified classifications using data extracted out of a standardized electronic patient record. Gittell (2006) asserts that the byproduct of structural designs of job roles and relationships across the workgroups leads to improved performance. The relational coordination theory asserts when the structures of the employee's job are designed for collaboration with other job families, and together they embody shared goals, shared knowledge, and mutual respect, positive outcomes improve the organization's performance.

**Toward interprofessional practice and application.** As dentistry moves toward collaboration with other health professions, an opportunity exists to study the intra- professional relations within dentistry from a systems point of view. Evaluation of the care coordination role from the inception of a new job description to the structures that enhance or detract from relationships with other job families has the potential to generate a step forward in our understanding of the intra-professional dynamics at play. The relational coordination theory offers a quality improvement blueprint, similar to the Donabedian (1988) model used in evaluating the quality of healthcare (structure, process, and outcome). The relational coordination theory is specific to the relationships people have with other groups in different job roles to improve organizational performance. Lessons learned from the application of this theory through research will prepare dentistry to embrace interprofessional practice and education.

### **Theoretical Application to Redesigning the Oral Healthcare Team**

**The relational coordination theory.** Mary Parker Follett is credited with the origination of the relational coordination theory in the early 1900s (Fry & Thomas, 1996). The following quote best summarizes her theoretical lens:

There are three ways of dealing with difference: domination, compromise, and integration. By domination, only one side gets what it wants; by compromise, neither side gets what it wants; by integration, we find a way by which both sides may get what they wish (Shapiro, 2011, p. 44).

The act of coordination requires collaboration as a mechanism of integration to foster higher workplace performance.

The relational coordination theory has two infrastructure assertions, the job designed structures for sharing information, and the relationships with one another to foster positive collaboration and teamwork, which together produces an array of outcomes in the workplace. The relational coordination theory illuminates the invisible network of interdependencies of job roles when uncertainty and time constraints exist, which is a common trait in dentistry. Gittell (2006) asserts that the relational coordination theory “expands our understanding of the relational ties that underpin effective coordination” (p. 75).

The inception of the relational coordination theory transpired through a field study by Dr. Jodi Gittell, who observed 12 different job roles coordinating the flight departure process (Gittell, 2001; Gittell, 2003). The theory also has been tested in the settings of surgical care (Gittell et al., 2000), nursing homes (Gittell et al., 2008), nursing (Havens, Vasey, Gittell, & Wei-Ting, 2010), care providers, and managed care (Gittell, 2008) in medicine. Additionally, an empirical assessment of the relational coordination theory conducted in 69 studies and 16 different industries, along with 18 countries, finds that relational coordination can influence financial performance, worker-wellbeing, efficiencies and quality, and, with mixed evidence, safety outcomes (Gittell & Logan, 2015). Furthermore, the paper asserts:

We find organizational structures such as hiring for teamwork, training for teamwork, shared conflict resolution, shared accountability and shared rewards support relational coordination in the expected ways, while other structures like boundary spanner roles, shared protocols, shared information systems, and union representation have mixed effects that appear to depend on their implementation (Gittell & Logan, 2015, p. 2).

The relational coordination theory begins with structures to produce the work.

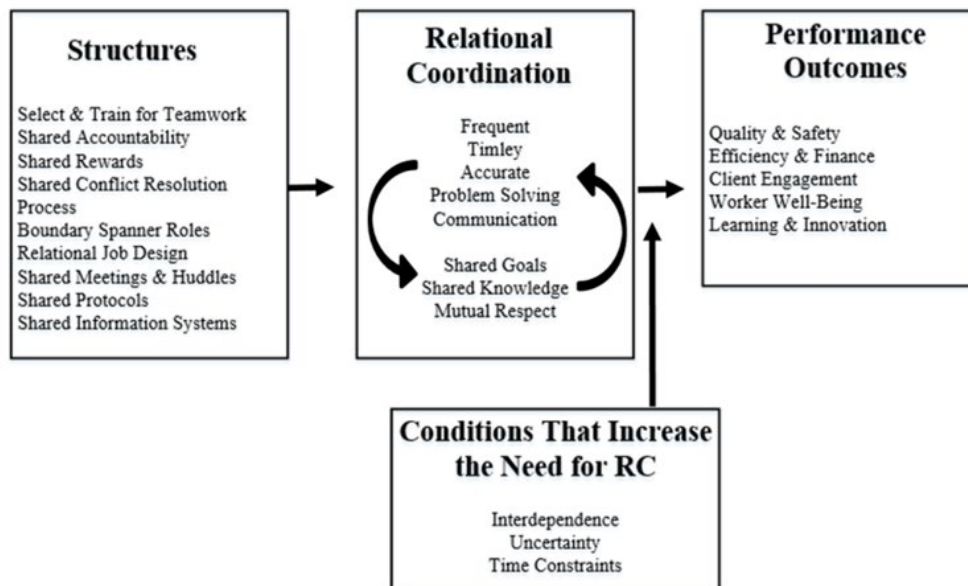
The design of a job structure, such as hiring and training practices, job design, and information systems, can promote or destroy relational coordination, depending on how well the role purposefully incorporates these components. Gittell (2001) claims that structure design strengthens the relationships across job role boundaries if goals, knowledge, and mutual respect are shared through deliberate forms of communication that are: frequent, timely, accurate, and solve problems (Figure 1.1).

Gittell (2006) asserts that job role relationships are essential and form the “basis for collective identity and for coordinated collective action” (p. 75). Policymakers, leaders, and professionals have a basis for evaluating the coordinated collective action of the dental team with the postulation that coordination of care improves dentistry’s capacity to perform intricate, interdependent work.

Of the studies reviewed soliciting the relational coordination framework, the focus of the study is on the primary contributor roles to an organization; a gap exists in the extant literature on the non-core roles and their contributions to team functioning (Bolinger, Klotz, & Leavitt, 2018; Gardner, Coglisier, Davis, & Dickens, 2011). Gittell (2012) supports the argument “by expanding the non-core personnel; the whole organization may benefit from improved coordination through a greater understanding of the organization’s core purpose, particularly in environments of change and uncertainty” (Cameron & Spreitzer, 2012, p. 407).

The three research questions, using the relational coordination theory, act as guideposts to evaluate and provide a baseline measurement of the dental organization's care coordination efforts. Backed by the AHRQ, this theory is one of seven validated frameworks that provide a linear structure of the components that are needed to elucidate an array of outcomes and provides a methodological approach to the study of care coordination efforts (McDonald et al., 2007). (Table 1.1).

Figure 1.1

*Relational Coordination Theory*

Note. Theory of Performance. Adapted from The Heller School, Brandeis University (Producer). (2015). What is relational coordination? Retrieved from <https://heller.brandeis.edu/relational-coordination/about-rc/theory-performance.html>

This dissertation will extend the application of the relational coordination theory to the field of dentistry as the underpinning for the three studies. The analysis will summarize the findings and discuss the overall implications. Finally, a lens of interprofessional practice will be

applied, and an evaluation of intra-professional dental practice will be considered as a step forward to interprofessional healthcare collaborative practice.

Table 1.1

*Validated frameworks in the study of care coordination efforts*

| Key concepts                                                   | Andersen Behavioral Model | Donabedian Quality Framework | Organizational Design Framework | Relational Coordination Framework | Multilevel Framework | Five phases of team coordination | Interaction Model | TIP Theory* | Interorganisational Network Theory | Cognitive Workflow Model | Framework of team performance | Integrative model | Number of theories that include theme |
|----------------------------------------------------------------|---------------------------|------------------------------|---------------------------------|-----------------------------------|----------------------|----------------------------------|-------------------|-------------|------------------------------------|--------------------------|-------------------------------|-------------------|---------------------------------------|
| External factors                                               | X                         |                              |                                 |                                   |                      |                                  |                   |             | X                                  |                          |                               |                   | 2                                     |
| Structure                                                      |                           | X                            | X                               | X                                 | X                    |                                  |                   |             | X                                  |                          | X                             | X                 | 7                                     |
| Task characteristics                                           |                           | X                            | X                               | X                                 | X                    |                                  |                   |             | X                                  |                          | X                             |                   | 5                                     |
| Cultural factors                                               | X                         |                              |                                 |                                   |                      |                                  |                   |             |                                    |                          |                               |                   | 1                                     |
| Knowledge and technology                                       | X                         |                              | X                               | X                                 | X                    |                                  |                   |             |                                    | X                        | X                             |                   | 6                                     |
| Need for coordination                                          | X                         |                              | X                               | X                                 | X                    |                                  |                   |             | X                                  |                          | X                             |                   | 4                                     |
| Administrative operational processes                           |                           |                              | X                               | X                                 | X                    |                                  |                   |             | X                                  |                          | X                             |                   | 6                                     |
| Exchange of information/communication                          |                           |                              | X                               | X                                 | X                    | X                                | X                 | X           |                                    | X                        | X                             | X                 | 9                                     |
| Goals                                                          |                           |                              |                                 | X                                 | X                    | X                                |                   |             | X                                  |                          | X                             | X                 | 6                                     |
| Roles                                                          |                           |                              |                                 | X                                 | X                    | X                                |                   |             |                                    |                          | X                             | X                 | 4                                     |
| Quality of relationship                                        |                           | X                            |                                 | X                                 | X                    |                                  | X                 |             |                                    |                          |                               |                   | 4                                     |
| Patient outcome                                                | X                         | X                            | X                               | X                                 | X                    |                                  | X                 |             |                                    |                          | X                             |                   | 7                                     |
| Team outcome                                                   |                           |                              |                                 |                                   |                      | X                                |                   | X           |                                    | X                        | X                             | X                 | 5                                     |
| Organizational or inter-organizational outcome                 |                           |                              | X                               | X                                 | X                    |                                  |                   |             | X                                  |                          |                               |                   | 4                                     |
| Total number of concepts included in the theoretical framework | 5                         | 3                            | 8                               | 11                                | 11                   | 3                                | 3                 | 3           | 6                                  | 3                        | 9                             | 5                 |                                       |

\*TIP theory=Time, Interaction, and Performance theory.

Note. Adapted from McDonald, et al. (2007). *Closing the quality gap: A critical analysis of quality improvement strategies [Technical Reviews, No. 9.7.]. Conceptual frameworks and Their Application to Evaluating Care Coordination Interventions*. Retrieved from Agency for Healthcare Research and Quality (US): <https://www.ncbi.nlm.nih.gov/books/NBK44008/>

## Literature Informing the Study

**A guide to the literature review.** Care coordination mechanisms are one strategy for quality improvement in healthcare. However, questions about the type of care coordination, the personnel involved in care coordination, and the outcomes of coordination efforts are still in an evolutionary state, providing limited information to clinicians, and policymakers regarding the best practices. The literature review addresses five questions focusing on the problem statements

in dentistry. The searches extend to medicine and the social sciences in the absence of dental publications. The questions are as follows:

1. What is the training and experience required for dental care coordination roles?
2. What are the settings found in dental care coordination efforts?
3. Of the studies reviewed regarding dental care coordination efforts, are the theoretical and methodological underpinnings present?
4. Do the studies identify the outcome measures of dental care coordination efforts specific to a dental care coordinator type of role?
5. Of the studies within the dental literature, is job engagement measured for dental care coordination type roles?

PubMed, Google Scholar, and CINAHL search engines were used searching terms “care coordination,” “care navigation,” “case manager,” and “dentistry” to review the dental literature. Dentistry and medicine have an opportunity to contribute to the advancement of care coordination efforts by providing quality studies of new care coordination roles that coordinate, connect, and navigate patient care.

**Training and experience of care coordination roles in dentistry.** Studies focusing on the training and experience of dental care coordination roles are sparse in the dental literature.

The following authors were reviewed to assess the training and experience of dental care coordinators. Binkley (2010) observed, a care coordinator, called a case manager, with an undergraduate degree in psychology without dental experience (Binkley, Garrett, & Johnson, 2010). Doris et al., (2009) found three full-time master’s level social workers without dental experience who manage and coordinate the care without defining the care coordination role. Greenburg (2008) studied a case manager to recruit dentists as a coordination strategy to improve

access (Greenburg, Kumar, & Stevenson, 2008). However, the study failed to identify the training or experience of the case manager. Harrison et al. (2003) investigated a facilitator of three lay workers who represented the communities' ethnic groups to coordinate patient care (Harrison, Li, Pearce, & Wyman, 2003). In a study by Lemay et al. (2013), two dental case managers of different ethnicities, having bilingual language skills, and some college education facilitated the completion of treatment plans for HIV/AIDS patients. However, neither received medical nor dental training and were not overseen by a supervisor who had experience in social work. Jones, Bednarsh, Gambrell, Mofidi, and Tobias (2012) worked with a dental hygiene academic institution and the student dental hygienists to expand the services to HIV/AIDS patients (Jones et al., 2012). Metsch et al. (2015) examined a dental case interventionist, yet did not describe the training or experience of the interventionist. Northridge et al. (2016) employed dental hygienists and dentists around primary care coordination. The article considered the barriers to care coordination when the patient was in the dental chair at the dental office. Yet, some readers would call this an opinion piece. Zittel-Palamara et al. (2005) use case managers who were trained social workers in a dental school. Lastly, Wyses, Hennessy, Lieberman, Garland, and Johnston (2004) analyzed community agency staff as case managers in medical clinics who coordinate the services. However, the paper does not state what type of education was required for the community agency staff.

Of the papers reviewed, dentistry has a variety of care coordinator roles offering multiple types of coordinators from providers to lay public, which makes the type of coordinator role challenging to evaluate. Of the papers reviewed, there was not a consistent pattern to the application of care coordination in dentistry. Yet collectively, the care coordination connecting the patient to dental services and information was improved.

**The settings found in dental care coordination efforts.** In the literature, it is difficult to find commonality between academic dental institutions and the various dental practice types that use a coordinator type of role due to the inconsistency of the coordination definition. Interestingly, publications are emerging that identify the need to close the medical-dental silo of patient care to improve patient care. Atchison et al. (2018) explored four case studies and conducted in-person interviews to study integrated care. One of the four cases employed a dedicated care coordinator to navigate across different healthcare settings. The dentist and the physician mutually agreed upon performance measures for diabetic patients to receive routine periodontal care. The care coordinators in the study scheduled appointments, monitored follow-up appointments with the patient's treatment, and communicated to the physician and dentist teams. The coordination aimed to "convert episodic or emergency department users into users of routine care" (Atchison et al. 2018 p. 855). Eventually, the program expanded to include maternal care as well.

In a different context, related to medical-dental integration and care coordination, Hummel and Gandra (2011) presented a different approach to care coordination by way of healthcare information technology. The findings provide a model for information exchange between medicine and dentistry to facilitate referrals, to allow shared information with different types of specialty providers, surveillance, and tracking of patients to ensure they receive necessary care. In addition, the study identified effective integrated workflows, provider alerts, and flags in the electronic health record that can be used to inform the provider about essential interventions the patient may need. Ultimately, the model in this study of coordination is tailored to the diabetic patient, with oral implications to close the medical-dental gap.

In Scotland, a national health improvement project was launched in 2005 to improve oral health and reduce inequities; the project also imparted community resources as care coordinators to patients and their families, which exemplified care coordination efforts. This study implemented a quasi-experimental approach, and attendance was used as the outcome variable. The sample representing 35,236 children encompassing 31% of the total population found the attendance rates of the intervention group (receiving coordination) were 88% compared to 82% for the control group (Hodgins, Sherriff, Gnich, Ross, & Macpherson, 2018) This is the first study of magnitude on a population-wide scale to evaluate care coordination efforts with lay and health support workers.

Of the studies conducted in the United States, Maryland and Washington D.C. leveraged a dental program called the Mission of Mercy to an elevated program called the Health Equity Festival (HEF). The festival was a two-day event bringing hospitals, non-profits, the private sector, and academic intuitions together to serve the community (Jackson et al., 2018). The typical services provided were an array of primary care, dental care, education, and legal consultations. Over the two-day event, 1,018 participants received treatment. Findings from the study suggest that participants who received care, and specifically those with one or more chronic diseases, including the effects of tobacco use, obesity, and diabetes, had high dental needs. The coordination of care at the event consisted of emergency care, oral healthcare services, and primary healthcare follow-up. This is a good step forward as a healthcare policy solution. Interestingly, the study found that the most frequently used procedure codes were the dental restorative procedure codes ( $n = 362, 35.9\%$ ). However, a limitation of the study is the descriptive attributes of the care coordinator, such as current education, the training within the role, and continuing education of the care coordinator.

Similarly, the State of New York increased the access to care for the state Medicaid and Children's Health Insurance Program by initiating a dental case management program (DCMP). The DCMP case manager has the responsibility to acquire more dentists to participate in delivering Medicaid services in their practice and to reduce the amount of canceled or no-showed appointments at the dental office (Greenburg et al., 2008). The case manager worked through the county department of social services. Furthermore, the case manager worked with Medicaid eligibility and billing adjudication for the participating dentist. The case manager collected data every three months to include: number of patient visits and no-shows, along with the number of participating dentists and the geographical location of the practices. The results demonstrated improvements in reducing the no-show rates, increasing dental utilization, and improved provider participation. The Medicaid reimbursement rates increased during the study duration, possibly causing a confounding factor in the coordination of care efforts. Lastly, the study lacked a clear depiction of the education and training of the case manager, other than employment by the social services department.

The Veterans Administration investigating homelessness of veterans and the complexity to navigate the health benefits provided by multiple payers reviewed a massive urban Northeast program serving 1,200 homeless veterans per year (LaCoursiere, Zuccherro, McDannold, & McInnes, 2016). A dentist, physician, psychologist, social worker, and care manager were invited to participate in a focus group. The focus group aims were to elucidate the experiences of the participants related to the gaps in care and areas for improvement in the Veterans Administration. Four perspectives for improvement came from the group: communication, the electronic health record, education, and interprofessional partnerships. The findings in the study are consistent with the AHRQ care coordination framework.

Dentistry's professional association, the American Dental Association (ADA), introduced a community dental health coordinator (CDHC) in 2006. The CDHC is a certificate program sponsored by the American Dental Association to allow community citizens to participate in an oral health role to advance community-based oral health needs. The CDHC goes beyond scheduling appointments, coordination, and education to provide oral health care services to include dental sealants, coronal polishing, and fluoride applications (American Dental Association, 2012). The outcome is that the program increases access to oral healthcare and improved oral health outcomes. However, the outcome dataset in the evaluation of the CDHC is limited to billable services and utilization. The data do not indicate whether the patients have less dental caries or periodontal disease as a specific outcome of care.

**Theory and methodology underpinning care coordination efforts.** The literature review found sparse studies referencing a theoretical framework in care coordination endeavors. This finding is supported by the AHRQ (McDonald, et al., 2007) systematic review, citing four theoretical frameworks suited to measure care coordination efforts.

One paper by Binkley et al. ((2010) applied the Margolis theory, which in medicine identifies the economic, structural, and human challenges affecting the outcome of patient care. In the Binkley et al. (2010) study, children were randomized into two groups, and the study measured service utilization from April 2004 to March 2005 in Kentucky. Of the participants in the study, there was 136 children, ages four to 15 years, in the control and intervention groups. The primary group of participants was African American, who were 10 years of age, with 70% of household family incomes below \$15,000 per year. The dental care coordinator had in-person, telephone, and email sessions with the families. The findings demonstrated that 43% of the intervention group received care during the duration of the study, compared to 26% of the

control group with annual income as a variable of positive influence. However, the authors cited limitation concerns about the sample and potential selection bias affecting the generalizability of the results. Interestingly, the Binkley et al. (2010) study suggests that providing care for children with the highest need may result in greater cost-effectiveness with the prevention of more costly dental services.

Another dental article by Rhee Kim (2005) applied the social-ecological theory to study the influences of social factors and the dental services of low-income urban Hispanic children, four to eight years of age. The study examined the barriers in the dental healthcare system to include provider availability and care coordination efforts. A focus group of 69 Mexican American and Puerto Rican caregivers participated in voicing their attitudes and beliefs about children's oral care. The questions were developed in English, translated to Spanish, then converted back to English to ensure consistency. Findings suggest the participants' views were not as important as the provider's availability, insurance, and the economic resources of the family. Care coordination was not as significant as the extended office hours for receiving oral healthcare for working caregivers.

In Sweden, a qualitative study was conducted, interviewing 22 nursing staff who assisted the elderly with oral healthcare treatments, and found the team did not feel qualified to administer oral care services, and other patient priorities lessened the priorities of oral care services (Wardh, Hallberg, Berggren, Andersson, & Sorensen, 2000). In this study, grounded theory methodology is presented clearly in the research design by way of the collection of the qualitative data.

Lastly, using a consolidated framework for implementation science as the theoretical underpinning, a pilot study of ten dental offices in New York consisted of interviews with

dentists and dental hygienists. The participating dental hygienists in the study were employed as oral health care managers working with other healthcare professionals. The findings present an opportunity for the use of evidence-based guidelines to screen for chronic conditions and primary care participation with diabetes, effects of tobacco use, and hypertensive patients (Theile, Strauss, Northridge, & Birenz, 2016). Interestingly, the authors discuss interprofessional care and the Interprofessional Education Collaborative core competencies for the oral care manager.

Of the theories underpinning care coordination and dentistry, the literature using search engines PubMed, CINAHL, or Google Scholar, did not find articles using the relational coordination theory.

**Care coordination outcome measures.** Most articles, specific to the profession of dentistry and care coordination, describe a quantifiable methodology to evaluate the interventions of a care coordinator (Binkley et al. 2010; Casaverde & Douglass, 2007; Greenberg, Kumar, & Stevenson, 2008; Harrison et al., 2003; Jones et al., 2015; Zittel-Palamara et al., 2005). Within the studies, the dependent variable generally measures the number of patients attending their appointments. However, the detailed approach to support the methodology in the publications is often missing.

**Job engagement in dental care coordination type of roles.** Presently, dental literature measuring care coordination engagement is lacking. In nursing, Havens, Warshawsky, and Vasey (2013) recruited nurses from five rural hospitals in Pennsylvania. The study aimed to understand three levels of engagement: the descriptive level of engagement, the generation of an employee in the cohort, and the engagement levels compared to other generational groups. Descriptive analytics considered tenure, age, and the highest degree level obtained in the field of

nursing. The authors found age and the highest level of the nursing degree associated with positive engagement, while tenure was negatively associated with engagement necessitating more studies in the future.

In the literature, there are no studies at this time that have extended the relational coordination theory to dentistry. The relational coordination theory informs the scope of the research questions, beginning with the outcome of care coordination efforts; this assumes the care coordinator's efforts in the large accountable care organization have an impact positively on patient care. When job designs are created to encompass shared goals, shared knowledge, and mutual respect, the assumption is the engagement score of the individual serving in a care coordination role increases compared to those positions that do not have job designs with these attributes. Lastly, when the entire team shares in a focal activity collectively, the relationships existing within a team that has shared goals, mutual respect, and shared knowledge lead to co-productive collaborative work.

### **Research Questions, Design, and Orientation to the Dissertation**

#### **Research questions.**

1. Is there a difference in the engagement scores of a care coordination type of role versus the other members of a well-established dental team, given the structural design of the care coordination role that encompasses shared knowledge, shared goals, and mutual respect?
2. What are the care coordinator's experiences with others on the dental care team when they have a shared focal activity in their workflow?

3. What is the impact of care coordination efforts to influence the high-risk caries dental patients to schedule and attend a dental appointment to achieve defined patient care outcomes?

**Design and orientation of the dissertation.** The dissertation has five chapters: 1) Introduction and literature review; 2) A quantitative study ( Research Question [RQ] #1: Is there a difference in engagement scores of a care coordination type of role versus the other members of a well-established team given the structural design of the care coordination role that encompasses shared knowledge, shared goals and mutual respect?; 3) A qualitative study (RQ #2: What are the care coordinator's experiences with others on the dental care team when they have a shared activity in their workflow?; 4) A quantitative study (RQ #3: What is the impact of care coordination efforts to influence the high-risk dental caries dental patients to schedule and attend a dental appointment to achieve defined patient care outcomes?; 5) Summarizing all studies and discussing future work, and the implications for interprofessional practice.

## Chapter Two

### The Job Design of Care Coordination Roles and Employee Engagement

#### Introduction

Care coordination, a patient-centered methodology to improve the care experience of the patient, converges the work environment, the operational constructs, and human capital configurations within a healthcare delivery system to promote safe, effective, timely, equitable, and patient-centered care (Meyer, 2002). In the discharge of a job function, care coordinators are a new job role in healthcare spanning from a highly-skilled professional to a community-appointed individual without healthcare experience. Various types of care coordination roles exist depending upon need, the kind of knowledge required, and available economic resources (McDonald, et al., 2007). While any job design intended to coordinate the care of the patient is principled, finding a generalizable identity of a care coordination role is underdeveloped in healthcare. While this presents a significant limitation, an additional complexity with a new role is the integration with other group members. The care coordination role was designed to bridge gaps in communication between the providers and the patients. The bridge is called a *boundary-spanning* component added to the new role. This study measures the care coordinator's job engagement when organizational investments have been made in the job design to foster relational coordination attributes to answer the question: Is there a difference in engagement scores of a care coordination type of role versus the other members of a well-established team given the structural design of the care coordination role that encompasses shared knowledge, shared goals, and mutual respect?

## Significance

Dentistry's approach to care coordination roles is varied, from a dental hygienist case manager (Northridge et al., 2016; Theile, Birenz, Northridge, & Strauss, 2016) to the American Dental Association's novel role of a community dental healthcare worker (McKinnon, Bresch, Luke, Moss, & Valachovic, 2007). Simultaneously, the AHRQ's systematic review: *Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies*, asserts that diverse types of care coordination efforts exist to include adjusting to a changing environment, operational and workflow designs, structuring and utilizing human capital investments, and leveraging technology (McDonald et al., 2007). While the efforts of care coordination provide utility, evaluating care coordination efforts is in its infancy. To explore the effectiveness of care coordination efforts, health services research (HSR) necessitates a contextualized definition of care coordination, theoretical underpinnings, and empirical evaluations to close a significant academic and practice gap. For instance, the literature suggests several theoretical frameworks from behavioral science, healthcare management, and organizational development as robust interdisciplinary methodologies that decisionmakers can utilize to assess care coordination efforts (McDonald et al., 2007). This study draws from the theoretical framework of the management sciences field, the relational coordination (RC) theory, to deepen the contribution of positive organizational scholarship.

The relational coordination theory is an untested approach that is applied to study the utility of care coordination efforts of a newly designed care coordinator role within an accountable care dental group practice. One of the hypotheses in the RC theory contends that job design is critical in fostering coordination between job groups by intentional design in the

care coordinator's job description, including the components such as shared work processes, incentives, and goals. The first step in evaluating care coordination efforts begins with the assessment of the care coordination role. To accomplish this, the organization has employee engagement data stratified by job type since 2009. Understanding the job design serves as a baseline measure, and is the first guidepost of the relational coordination theory. This component in the RC theory hypothesizes job designs created with shared goals, shared knowledge, and mutual respect will foster more robust engagement within the group and extend to other members in a group. The literature suggests job designs can increase or decrease employee engagement, satisfaction, burnout, and individual performance, which in turn, produce unnecessary costs to an organization if job descriptions are inaccurate (Kular, 2008, Onimole, 2015) This study measures the care coordinator's job engagement score using the employer's third-party employee engagement instrument, retrospectively over three years, and compares the engagement scores of other long-standing job designs within a dental practice.

### **New Role in Dentistry: The Dental Care Advocate (DCA)**

The dental care coordination role evolved from the desire to improve patient education, follow-up care, timely communication between the patient and the dental team, alongside the expectation from a state Medicaid program to offer an enhanced dental benefit for patients identified as diabetic. A 2016 pilot study trained a selected set of employees called patient service representatives (PSR), known as front-office receptionists, to radically change the social group structure from front office and back office to one "in-group" with a shared goal of providing care to the patient predicated on the patient's specific care needs (Appendix A). The role envisioned boundary-spanning principles to promote coordination among the dental team and facilitate problem-solving to bridge the gaps of knowledge between providers and patients.

The starting point was in the redesign of the job description of a care coordination type of role. The creation of the job description was a collaborative process to include the organization's administration and multiple types of providers in the large accountable care dental organization. The pilot-training program curriculum included basic dental terminology, anatomy, oral health education, motivational interviewing techniques as well as how to read the patient chart notes in the electronic dental record. The organization designed specific forms and areas in the patient record to afford the care coordinators to input information from the patient and recommendations from the providers. Likewise, the electronic dental record assigned a provider type code to associate the employee with the care coordination role. Prominent in the design of the role was to connect with the patient through a greater understanding of basic dental knowledge of interventions that improve oral health. These interventions include the use of homecare products, tobacco cessation, stopping advancing decay, and periodontal diseases with guidance from the provider. The pilot moved the entire core of frontline employees (PSRs) into a new care coordination role: the dental care advocate (DCA). To assure the provider's support and continued knowledge transfer, the DCA role requires a certification process supported by the supervising dentist and practice manager at every location (Appendices B and C). The certification process serves as a means to hardwire the DCA role into the organization to assure the summative learning experience of the DCA. Also, a set of performance measures were developed and evaluated by the providers to support the DCA's performance at 90 days and one year, respectively.

As a result, the DCA role has become a part of the existing dental team and networks with the dentist, dental hygienist, dental assistant, and the patient to improve the oral risk profile of the patient. The entire team, including the DCA, shares one standardized, structured electronic

dental record, AxiUm, organizational, clinical guidelines, organizational improvement metrics, and team rewards or incentives from the organization. With these types of structural designs spanning the entire team, as Kellogg, Orlikowski, and Yates (2006) assert, companies and industries are moving away from a rigid way of organizing work and are rapidly organizing the work to account for time constraints, uncertainty, and in some sectors, a growing limited workforce, to foster a high-performance work practice.

With the cost of labor being the most substantial portion of the healthcare dollar spent by organizations, the evidence from the research indicates that the job design of healthcare employees have significant implications regarding cost, quality, and advancing or diminishing care coordination efforts (Noe, Hollenbeck, Gerhart, & Wright, 2016). Also, with the increasing influence of health policy, creating accountable care organizations (ACOs) that drive improved patient outcomes through payment reform, healthcare providers are not as autonomous as in the past. For example, highly specialized healthcare professionals often tend to work autonomously, such as dentists. A dentist can deliver the care independently; however, to become more efficient, the dentist has access to different types of roles designed to increase the efficiencies of work, namely a dental assistant. Additionally, with the rise of computers and increased efficiencies in the healthcare delivery system, the *Taylorism* way of job design is outdated in an organization that must rely upon others to accomplish the work.

*Taylorism* designed by Fredrick W. Taylor in 1911 with the publication of his book: *The Principles of Scientific Management*, is based on the premise that to achieve the desired efficiency, the tasks of the individual are set by management and measured (Taylor, 1998). According to Stoller (2015), “Taylor’s system was deeply teleological at the level of the system

and the individual, operating under the assumption that the proper approach was to make workers conform to pre-determined narrowly defined ends” (Stoller, 2015, p. 321). In a system like healthcare, time constraints and uncertainty are often present in the delivery of patient care, suggesting that Tayloristic job designs are insufficient to mitigate the randomness of treating a patient (Adler, 1997). Supportive of this argument is Lindbeck and Snower (2000) implying, “more and more employees came to resent monotonous fragmented jobs of traditional organizations and prefer more varied and multi-faceted work” (p. 3). Yet, job designs in healthcare are often structured with the job description of the individual contributor in mind, with little awareness of the shared aspirations or expectations of the entire team. Additionally, measuring job engagement among the healthcare staff, “will be important to consider when implementing innovations since healthcare work environments are associated with job satisfaction and burnout” (Bir, Chang, Cohen, Koethe, & Smith, 2017, p. 265).

## **Background**

**Contextualized definition of care coordination.** The Agency for Healthcare Research and Quality (AHRQ) definition of care coordination within the relational coordination theory is applied to this study and directs the intent to measure the care coordinator’s job engagement score using the employer’s third-party employee engagement instrument, retrospectively over three years, and compare the engagement scores of other long-standing job designs within a dental practice. The AHRQ report (2007) working definition of care coordination is:

Care coordination is the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient’s care to facilitate the appropriate delivery of health care services. Organizing care involves marshaling of personnel and other resources to carry out all required patient care activities and is often

managed by the exchange of information among participants responsible for different aspects of care (McDonald et al., 2007, p. 5).

**The contextualized difference in engagement versus satisfaction.** Often the two definitions of engagement versus satisfaction share similarities. Therefore, the distinction of engagement is defined by Wefald and Downey (2009), “engagement propoerts to tap into a cognitive aspect of work and satisfaction does not” (p. 98).

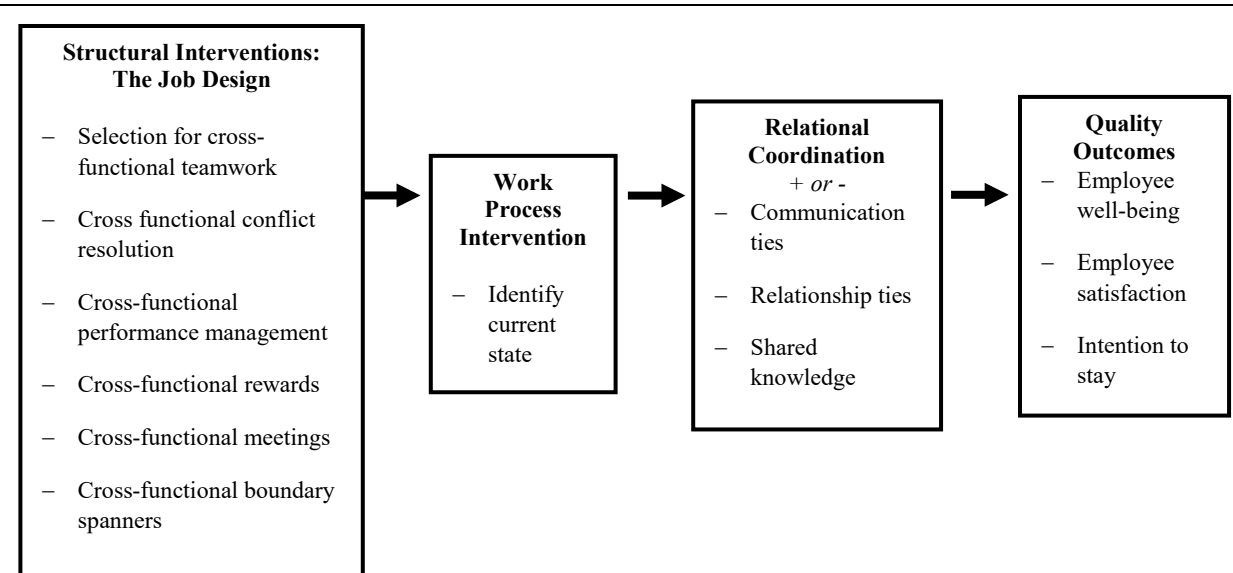
**The theoretical underpinning: the relational coordination theory.** The Broad overview of the Relational Coordination (RC) theory is rooted in the relational “invisible” forces of coordinating work (Gittell, 2011). Gittell further asserts, “relational coordination is a mutually reinforcing process of interaction between communication and relationships carried out for the purpose of task integration” (Gittell, 2002, p. 301). According to the theory, a relationship exists between communication (frequent, timely, accurate, and problem solving) and relationship ties of shared knowledge, shared goals, and mutual respect (Gittell, 2009). The strength of RC is dependent on the architecture of the job design and the relationships within job roles that employees have with one another. Literature illustrates that a link exists between employee satisfaction with work and engagement (Harter & Schmidt, 2002; May, Gilson & Harter, 2004). According to Quantum Workplace’s Model of Engagement (2017), “employee engagement is the strength of mental and emotional connection employees feel toward their places of work” (Quantum Workplace Solutions, 2017 p. 2). The definition provided by the Quantum Workplace Model of Engagement is the context (proxy) of engagement used with the RC theory, a structural component, for role satisfaction of the care coordinators within a dental care advocate role in dentistry for this study.

*Structural components of the relational coordination theory.* A structural component of the job design facilitates shared knowledge, shared goals, and mutual respect with other members within the workgroup. Illustrative examples of the job design structural components include the job responsibilities designed to enhance teamwork and on-going professional development, employing shared electronic health information systems, shared accountability and incentives within the entire group, team meetings, and shared clinical guidelines and operational processes. The structural interventions are crucial for care coordination efforts across different workgroups in work settings with a high degree of interdependencies, time constraints, uncertainty, and resource constraints most notably present in healthcare systems (Gittell & Logan, 2015).

Redesigning these structural components of the job design can reinforce the coordination among members of the existing dental team. The structural interventions identified in the RC theory mediate the desired relationships needed for care coordination efforts to occur. This is guidepost one; the structural interventions within the RC theory, the second guidepost, are discussed in Chapter Three. (Figure 2.1). The care coordinators and the relationship with the other team members are mediated by the structures designed in the care coordinator's job design to foster the relational components called positive or negative relational coordination leading to employee wellbeing and engagement in the redesigned role.

Figure 2.1

*Process Map of the Components: Structural, Relationship, and Performance Outcomes of the Relational Coordination Theory*



Note. Adapted from Gittell, Seidner, & Wimbush, (2009). A relational model of how high-performance work systems work. *Articles in Advance*, 1-17. doi:10.1287/orsc.1090.0446

The findings support the structures (job design components) for the organization to identify the responsibility, authority, and accountability of the human capital within the healthcare system to operate efficiently. These structures and social capital are interrelated, or a part of a whole, with the whole having a specific purpose (Kim, 1999). The RC theory provides an approach to identify specific structural components that may be adjusted to improve the relational dynamics of communication and relationships among the workforce. Gittell (2016) asserts, “In organizations with traditional bureaucratic structures, relationships tend to be strong within functions and weak between functions, resulting in fragmentation and poor handoffs between workers in distinct functions whose tasks are highly interdependent” (Gittell, 2016, p. 60). This suggests that a redesign of the structures in the healthcare system can support or detract from the RC dynamics across job groups, which could result in enhanced teamwork, care

coordination efforts, and patient care outcomes (Gittel, Weinberg, Pfefferle & Bishop, 2008; Romero, Senaris, Heresero, & Nuijten, 2014; Manski-Nankervis, Blackberry, Young, O’Neal, Patterson, & Furler, 2014). The RC theory drives the hypothesis that the structures in the job design can foster or detract from employee engagement of the DCA.

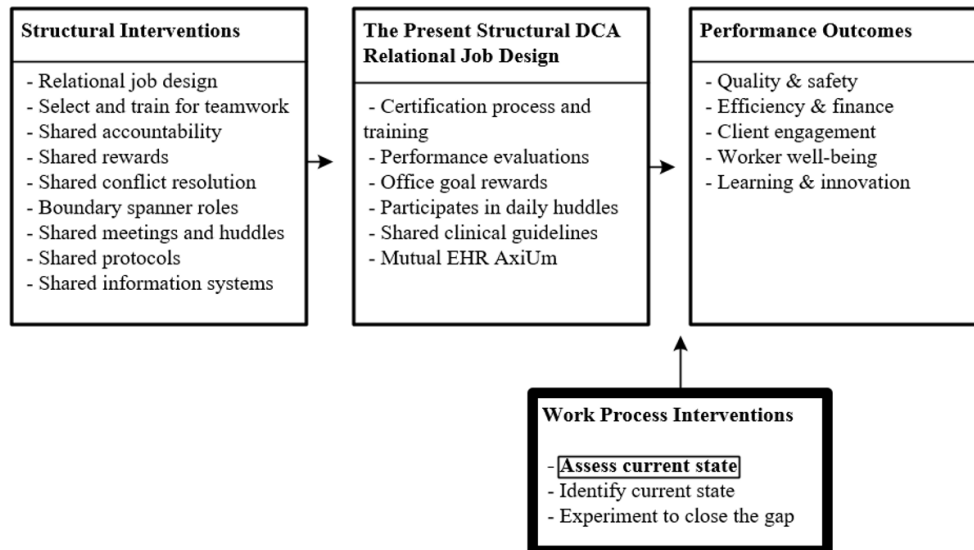
### **Research Design**

The DCA role, at present, has a robust set of structural elements, including selection and training for coordination; shared incentives across the entire team (office performance goals); participation in office team meetings; clinical guidelines and best practice standards; and a shared information system. Evaluating the engagement of the DCA serves as a benchmark to evaluate the efforts of a new job design encompassing relational coordination structural components and compare the results to other job families that have not been redesigned with the relational coordination structural elements (Figure 2.2).

To accomplish the aim of the DCA's worker engagement, the organization's employee engagement data, collected from the annual engagement survey-instrument from the large accountable care dental practice, is to be used as a proxy. In theory, if the role of the DCA is engaging, the role itself lends well to coordination efforts within the dental team to improve patient outcomes. Gant (2002) insists that high-performance teams have organizational structures defined by leadership endorsement, training, job design, and problem-solving characteristics within the teams.

Figure 2.2

*Structural interventions of the relational coordination theory in a large dental accountable care dental group*



Note. Workflow design using the Relational Coordination framework, the existing structures of the DCA, and performance outcomes. Structural interventions and performance outcomes adapted from The Heller School, Brandis University (Producer). (2015). What is relational coordination? Retrieved from <https://heller.brandis.edu/relational-coordination/about-rc/theory-performance.html>

**Quantum – the employee engagement instrument.** The Quantum Workplace model engagement instrument (QWMEI) is composed of thirty-six standard questions, eight custom questions and three open-ended questions, reported on a six-point Likert scale from strongly agree, agree, somewhat agree, somewhat disagree, disagree and strongly disagree (Appendix D). The engagement instrument is composed of three engagement domains: the organization, the team, and the work (Quantum Workplace, 2017) Figure 2.3. Following a standardized protocol by the dental care organization, the engagement instrument has been used every year since 2009, with the results distributed annually by Quantum vendor to the dental offices, administration departments, middle, and executive management.

Figure 2.3

*Quantum Workplace Engagement Instrument in Three Domains – Work, Team, and the Organization*



Note. Quantum Workplace Employee Engagement Factors adapted from Quantum Workplace Solutions. (2017). *Engagement at Willamette Dental*. 2017 Executive Report – Willamette Dental.

**Administration of the employee engagement instrument.** Invited employees participate by email, but participation is voluntary and non-compensated within the large dental organization. Approximately 50 clinical locations across Oregon, Washington, and Idaho are sampled once in a calendar year. Departments can review responses for any employee group with an  $n > 5$  responses per employee group as well as the size of the staff in an office. The Quantum employee engagement instrument used by the large dental group averages about 90% participation, compared to the healthcare industry, the benchmark levels are at 80% participation (Quantum Workplace, 2017). The feedback received from the instrument provides foundations of strengths and opportunities to influence structural interventions such as job descriptions,

group incentives, and recognition, shared administrative protocols and clinical guidelines, and ultimately, collaboration and coordination.

**Isolation of the Work Domain Variables.** Of the thirty-six questions composing the entire engagement instrument, only three questions are highly correlated to work engagement (Table 2.1). The analysis of the data tests for convergent validity meaning, the three sets of drivers related to the engagement factors to overall employee engagement.

This study uses three questions under the work engagement category extracted from the entire Quantum Workplace survey during 2016, 2017, and 2018 of the whole participant pool of dental care advocates, dentists, dental assistants, and dental hygienists. The three areas of inquiry are:

1. My job allows me to utilize my strengths.
2. I find my job interesting and challenging.
3. I see professional growth and career development opportunities for myself in this organization.

## **Research Design**

### **Research Hypothesis.**

$H_{01}$ : There is no difference between favorable employee engagement scores and the dental care advocate, dentist, dental assistant, and dental hygienist.

$H_{a1}$ : The employee engagement scores of the dental care advocate are associated positively with the scores of the dentist, dental assistant, and dental hygienist.

Table 2.1

*Quantum Workplace's Model of Engagement: A Technical Report**Top Three Correlates of Factor-Level and Overall Engagement*

| Items                                                                                           | Work Engagement | Team Engagement | Organizational Engagement | Overall Engagement |
|-------------------------------------------------------------------------------------------------|-----------------|-----------------|---------------------------|--------------------|
| My job allows me to utilize my strengths.                                                       | 1<br>(0.772)    |                 |                           | 1<br>(0.792)       |
| I find my job interesting and challenging.                                                      | 2<br>(0.769)    |                 |                           |                    |
| I see professional growth and career development opportunities for myself in this organization. | 3<br>(0.674)    |                 |                           |                    |
| The people I work with most closely are committed to producing top quality work.                |                 | 1<br>(0.767)    |                           |                    |
| I know I can depend on the other members of my team.                                            |                 | 2<br>(0.732)    |                           |                    |
| The people I work with treat each other with respect.                                           |                 | 3<br>(0.686)    |                           |                    |
| I trust our senior leaders to lead the company to future success.                               |                 |                 | 1<br>(0.762)              | 2<br>(0.758)       |
| The senior leaders of the organization value people as their most important resource.           |                 |                 | 2<br>(0.762)              |                    |
| I believe this organization will be successful in the future.                                   |                 |                 | 3<br>(0.758)              |                    |
| If I contribute to the organization's success, I know I will be recognized.                     |                 |                 |                           | 3<br>(0.750)       |

Note. The first number is rank, and the number in parentheses is the correlation coefficient.

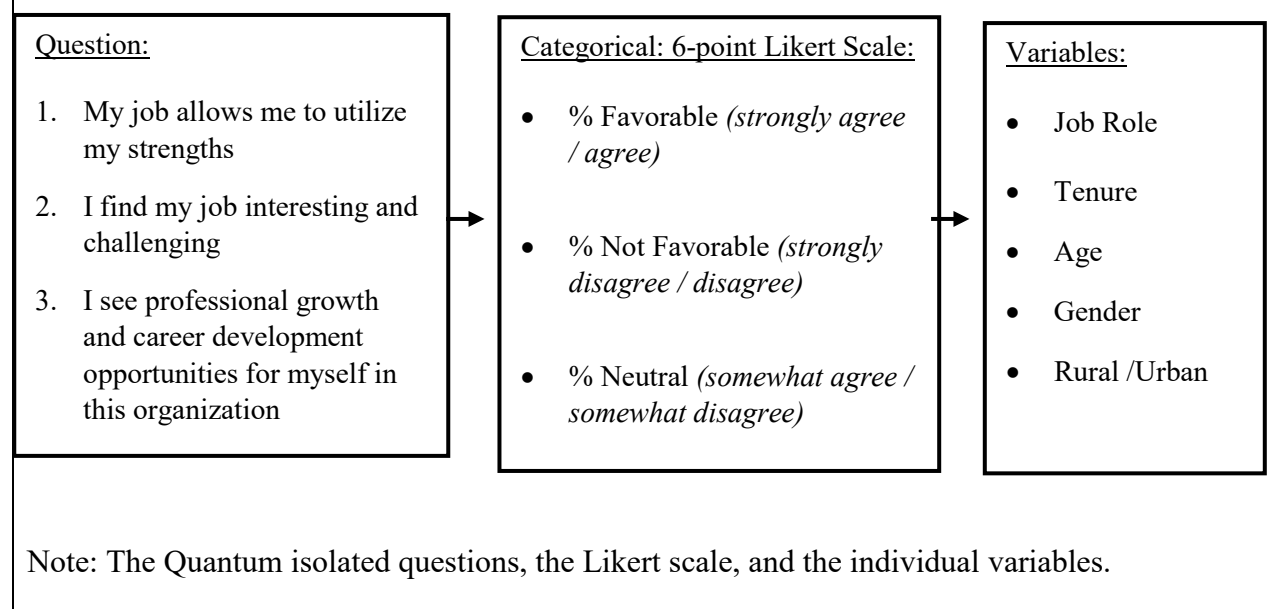
Note. The variables used to measure overall engagement. The report provided by Quantum of the factor loadings from the initial exploratory analysis. Adapted from Quantum Workplace Solutions. (2017). *Engagement at Willamette Dental*. 2017 Executive Report – Willamette Dental.

**Research method.** The research method used is a nonexperimental multivariate inferential test to measure the engagement score differences of the four job roles, the dental care advocate, dentist, dental assistant, and the dental hygienist, for the period 2016 through 2018. The dental care advocate job design has the structural components to foster positive coordinational relationships with the other job groups. Additionally, for the dental care advocate group, comparisons based on age, gender, tenure, and geographic location identify demographic differences that influence positive engagement.

**The research variables.** The three topics of inquiry from the Quantum Workplace survey were used and calculated by the percent favorable responses to the agree or strongly agree on a Likert scale and compared over 2016-2018 the tenure of the job group, age, gender, tenure, and geography, rural or urban over 2016–2018 to evaluate differences of the engagement scores for each of the variables (Figure 2.4).

Figure 2.4

*The Research Variables and the Workflow Process – Engagement*



**Participants.** In the study, an open cohort of dental care advocates, dentists, dental hygienists, and dental assistants employed during 2016, 2017, 2018, voluntarily participated in the Quantum Workplace employee engagement survey. The sample size is the entire full-time population of dental care advocates, dental assistants, dentists, and dental hygienists employed between 2016–2018. The population sample year-over-year is not homogeneous due to organizational growth and churn (Table 2.2).

Table 2.2

*Survey of Participants by Year and Job Title*

| Job Title        | 2016 | 2017 | 2018 |
|------------------|------|------|------|
| Care Advocate    | 532  | 580  | 608  |
| Dental Assistant | 1009 | 1124 | 1250 |
| Doctor           | 387  | 384  | 416  |
| Hygienist        | 477  | 540  | 581  |
| TOTAL            | 4421 | 4645 | 4873 |

Note. Retrieved from Workplace, Q. (n.d.). Employee Engagement Software. Retrieved from <https://www.quantumworkplace.com/>

**Materials.** Upon IRB approval from Pacific University, a limited data use agreement provided from the large accountable care dental group practice provided a Microsoft Excel data file with information sourcing the job role, gender, age, tenure with the organization, and rural or urban office (Appendix E). The data set is a census, the entire targeted population in the study. For each of the variables, job role, gender, age, tenure, and rural/urban office, the data includes aggregates of the number of responses of each type on the 6-point Likert scale to each question in each of the survey years. The limited data set from the organization's data warehouse is used by the organization annually for strategic business decisions. Access to associate the data to an individual is not permitted due to the contract with the third-party vendor, Quantum Workplace Solutions. A Chi-square test was performed in Stata software (Version 14); all remaining analysis was performed in Microsoft Excel (Version 16.0.12624.20348).

## Procedure

**Data analysis plan.** Using the Microsoft Excel dataset, an assessment of the percentage of favorable responses was calculated for each of the variables. As this is not a longitudinal study, instead, the study is cross-sectional with the data looking for job role engagement favorable

scores in all three years to assess any change in engagement. All of the responses from all three years were combined into a single aggregate for the analysis. Similarly, as each of the questions is considered a measure of employee work role measure of engagement (Table 2.1), the responses to each of the questions were amalgamated for each variable. Favorable responses were measured as any strongly agree and agree response. Other responses, somewhat agree, somewhat disagree, disagree, and strongly disagree, were not counted as favorable responses and were sequestered from the analysis.

The analysis then aggregated the number of favorable responses for all years and all questions by variable and divided the sum of favorable responses by the total survey responses by the same variable. For example, all favorable responses by male care advocates in 2016, 2017, or 2018 to any of the three survey questions were divided by the total number of responses by male care advocates in 2016, 2017, or 2018. This produced the percentage of favorable responses by male care advocates and was compared with the percentage of favorable responses by female care advocates (Table 2.3). A Chi-square test determined whether there is an association between any of the five categorical variables and the percentage of favorable responses. All hypothesis tests were conducted at the standard significance level of 0.05 ( $\alpha = 0.05$ ).

### **Study Findings**

The Pearson Chi-squared test shows that there is a significant association between “job title” and favorable responses,  $X^2(3, N = 7,888) = 183.1, p < 0.0001$ . Measuring by job role, 69.4% of responses from care advocates were favorable, compared to 83.4% of dental assistants, 83.7% of doctors/dentists, and 85.0% of hygienists.

Among the dental care advocate responses, age categories were significantly associated with favorable responses,  $X^2(4, N = 1,702) = 13.8, p = 0.008$ . As the age categories increased, the percentage of favorable responses decreased, except for the outlying age group of 50–59, which had the highest percentage of favorable responses. Among responses from dental care advocates, 70.1% were favorable in the age group of 20–29, while 62.7% were favorable in the 40–49-year-old category, and only 55.6% were favorable from respondents over 60. However, the 50–59-year-old category reported 77.6% favorable responses.

Among the dental care advocates' responses, the years of tenure were significantly associated with favorable responses,  $X^2(5, N = 1,720) = 16.3, p = 0.006$ . The percentage of favorable responses was 73.6% for care advocates in their first year of tenure but dropped to 64.6% for care advocates in their second year. The percentage of favorable responses was highest, 76.2%, for care advocates tenured 10–14 years and lowest, 63%, for care advocates tenured more than 15 years.

The percentage of favorable responses did not vary by the gender of the care advocate,  $X^2(1, N = 1,720) = 3.2, p = 0.074$ . Lastly, there was no association between urban/rural status and favorable responses among care advocates,  $X^2(1, N = 1,720) = 0.13, p = 0.720$ .

Table 2.3

*Summary Tables of Favorable by Percent for each of the Five Variables*

| Job Title                 | Description      | Responses (n) | Favorable | Favorable (%) | $\chi^2$ | df | p-value |
|---------------------------|------------------|---------------|-----------|---------------|----------|----|---------|
| By Job Role               |                  |               |           |               | 183.1    | 3  | <0.0001 |
| CA                        | Care Advocate    | 1720          | 1194      | 69.4%         |          |    |         |
| DA                        | Dental Assistant | 3383          | 2823      | 83.4%         |          |    |         |
| DR                        | Doctor/Dentist   | 1187          | 994       | 83.7%         |          |    |         |
| HYG                       | Hygienist        | 1598          | 1358      | 85.0%         |          |    |         |
| By Age Group (DCA only)   |                  |               |           |               | 13.8     | 4  | 0.008   |
| CA                        | 20–29            | 726           | 509       | 70.1%         |          |    |         |
| CA                        | 30–39            | 517           | 361       | 69.8%         |          |    |         |
| CA                        | 40–49            | 276           | 173       | 62.7%         |          |    |         |
| CA                        | 50–59            | 147           | 114       | 77.6%         |          |    |         |
| CA                        | 60–64            | 36            | 20        | 55.6%         |          |    |         |
| By Gender (DCA only)      |                  |               |           |               | 3.2      | 1  | 0.074   |
| CA                        | Female           | 1639          | 1145      | 69.9%         |          |    |         |
| CA                        | Male             | 81            | 49        | 60.5%         |          |    |         |
| By Tenure (DCA only)      |                  |               |           |               | 16.3     | 5  | 0.006   |
| CA                        | Less Than 1 Year | 451           | 332       | 73.6%         |          |    |         |
| CA                        | 1–2 Years        | 492           | 318       | 64.6%         |          |    |         |
| CA                        | 3–5 Years        | 243           | 163       | 67.1%         |          |    |         |
| CA                        | 6–9 Years        | 222           | 154       | 69.4%         |          |    |         |
| CA                        | 10–14 Years      | 231           | 176       | 76.2%         |          |    |         |
| CA                        | 15 Years or more | 81            | 51        | 63.0%         |          |    |         |
| By Rural/Urban (DCA only) |                  |               |           |               | 0.13     | 1  | 0.720   |
| CA                        | Rural            | 90            | 64        | 71.1%         |          |    |         |
| CA                        | Urban            | 1630          | 1130      | 69.3%         |          |    |         |

Note. Microsoft spreadsheet: Job title, gender, response, and 5 of response.

## Discussion

Job design is one of the essential structural components within the organization's human capital management processes. A well-designed job brings satisfaction to an employee, and ultimately the employee's alignment with an organization's mission and vision resulting in an engaged employee. The purpose of the study was to isolate three areas of inquiry within the standardized engagement survey to compare the dental care advocates' engagement scores to other existing members within the dental office engagement scores: dentist, dental hygienist, and dental assistant to see if there are differences. The DCA role is a new member of the dental team with knowledge, shared rewards and incentives, and direct access to the electronic patient record. The DCA role was implemented into the organization in 2016. The findings suggest the DCA favorable engagement is significantly lower as compared to the other members of the dental team. One possible reason is the relatively new development of the role versus long-standing roles of the other groups. Studies suggest the unique position of the DCA has additional complexity; not only does the DCA have to master the individual job description, the role itself is primarily designed as an interdependent coordination role, but the DCA also must integrate with the rest of the existing team (Gabarro, 1990). The DCA has to find fit in two dimensions; the job role and team dynamics by boundary-spanning. This is an important finding to consider, both as a retention strategy for each individual DCA, and as a critical part of care coordination efforts to improve the care experience trajectory of the patient.

With the inception of the dental care advocate role in 2016, there is a significant difference in the care advocate favorable responses and the other members of the dental team by 14.6 to 15.6 % over three years. The baseline data suggest a more in-depth analysis would offer an opportunity to look at the other teams and repeat the same analysis to consider age, gender,

tenure, and location for comparison. The distribution of favorable responses by age is favorable in the 20–29 and 50–59 age ranges, while less favorable in 30–39 and 40–49 age ranges, and least favorable in the 60–64 years. While this is an excellent overview of the age distribution and favorability, a deeper analysis of the DCA tenure is an area of future exploration. This was not possible due to the Quantum’s privacy policy identifying an individual within the dataset.

Additionally, the tenure of the dental care advocate is interesting; the 1–2 years measure is one of the lowest-ranked in favorability. A honeymoon period may be in effect, where the employee, after 12 months, feel the effects of working more autonomously, with reduced support (Morse, 2017). Finally, although other studies suggest that people who live in urban areas are happier than rural areas (Phillips, 2018), the analysis found no significance in rural-urban geographical location.

**Scope and limitations of the methodology.** Using a company-wide engagement instrument is central to the consistency of year-to-year comparisons, yet the dental organization is in a state of consistent change. Depending on the severity of and the time of the organization’s change, the instrument acts as a bell weather of the organization’s impacts. The limitation of the methodology has not considered these changes in the analysis. The time and frequency of the employee engagement survey is a limitation.

In addition, even though the employee's participation is voluntary, the collective results are shared with the management teams. The DCA may feel uncomfortable with responding in an unbiased way. Having a third-party focus group of the DCA to gain qualitative data may provide valuable additional insight.

**Conclusion**

This study shows that creating a new team member specific to care coordination between the patient and the dental care team is complex to evaluate. However, three critical aspects - engagement relative to the other dental team members, age, and tenure - are important considerations to improve. Specifically, the DCA is less engaged than the other care delivery team members, and the DCA's level of engagement drops significantly in the second year of employment. By taking strides to improve these aspects, care coordination is strengthened from the provider to the patient and patient to provider, influencing the quality of the care experience for the patient.

### **Chapter Three**

#### **The Dental Care Advocate's Relationship with other Roles within the Dental Team**

Wherever men or groups think of themselves not only as responsible for their own work but as sharing in a responsibility for the whole enterprise, there is much greater chance of success for that enterprise (Mary Parker Follett, 1949, p. 50).

#### **Introduction**

Workplace ethnographies provide a rich insight into the culture, interactions between professional groups, and workplace behaviors (Yanow, Ybema & van Hulst, 2012). This type of ethno-methodological paradigm is often referred to as corporate or business ethnography (Brigitte, 2016). This study investigates the lived experiences of people in a care coordination role within a dental organization using a validated, structured questionnaire designed from the relational coordination theory.

#### **Significance**

A care coordination role was conceived in the accountable care dental organization in 2016. The role is called the dental care advocate (DCA) and involved upskilling the current position of a front-desk patient service representative. The goal of upskilling was to better link the patient to the care team to disseminate reciprocal information both ways, from the care team to the patient, and from the patient to the care team. The objective of this transformative role was to allow the care teams to work at the highest level of their scope of practice and enable the DCA to become more involved in the patient care experience by fostering coordinated communication to and from the patient. While a great deal of work has been invested in the structural design of the role to accentuate teamwork as presented in Chapter Two, how the DCA perceives the position and the working relationship with the other members of the dental team has not been explored.

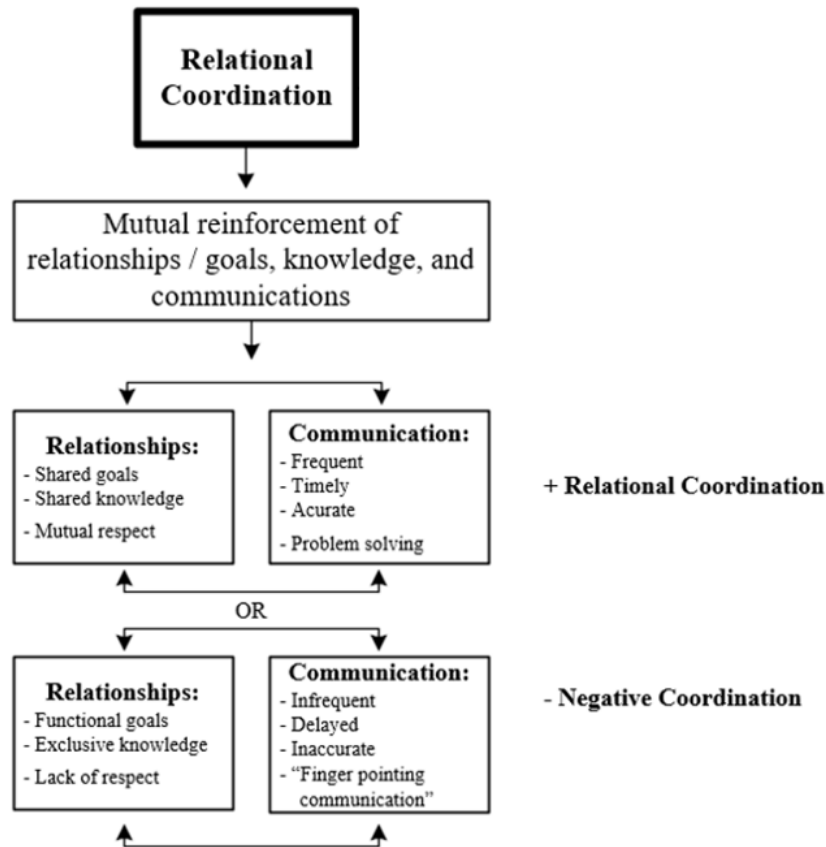
Preventive dentistry seeks to avoid and prevent the diseases of dental decay, periodontal disease, and oral cancers. One of the most critical focal processes in the large dental care practice is the knowledge transfer from the provider to the patient about recommendations to achieve the result of avoiding future oral disease. The patient chart is a structured electronic health record, aggregating the inputs from the patient history, provider findings, care planning, and recommendations into a form in the EHR called the proactive dental care plan (PDCP); (see Appendix F). Every patient in the dental practice receives a PDCP when the patient comes into the practice for a comprehensive or ongoing oral examination. This plan is the mainstay for the patient to understand what, when, where, and how to improve and maintain optimal oral health, and acts as a mediating mechanism of connecting the patient and the care team to the goals and treatments of the patient. The PDCP is a focal process among all employees with the dental office, and the primary method in which to measure relational communication.

## **Background**

**Relational coordination theory.** The study focuses on one context within the relational coordination theory: Relational Coproduction. Relational coproduction relates to when “workers and their clients produce desired outcomes together by engaging in high-quality communication supported by relationships of shared goals, shared knowledge and mutual respect” (Gittell, 2016, p. 33; Figure 3.1). When negative coproduction exists, desired outcomes of performance are not obtained. Research shows that quality communication and shared objectives lead to increased organizational performance (Gittell, 2000; Gittell, 2006; Gittell, 2008; Gittell, 2016). When groups of workers manage interdependence with other groups, coordination exists.

Figure 3.1

*The Relational Component; Relationship and Communication, of the Relational Coordination Theory*



Note. Explanation of the factors influencing or detracting coordination as perceived by the DCA. Adapted from Gittell, J. H. (2016). Transforming relationships for high performance: The power of relational coordination. Stanford, CA: Stanford University Press.

Learning about the lived experience and perspective of the DCA is essential to understand their communication and relationships with the dentist, dental hygienist, and dental assistant. Extending the relational coordination theory to include the relationship component within the dental care advocate role is insightful because it clarifies the factors that influence or detract from effective coordination. Gittell states:

The theory has evolved, through the studies that have been conducted, to focus on workers in the ‘operating core’ of the organization, thereby neglecting participants who may be perceived to have “peripheral” roles but who nevertheless have tasks that are highly interdependent with the operating core (Cameron & Spreitzer, 2012, p. 406).

**Corporate ethnography and the researcher.** This study used an approach frequently used in corporate ethnography, applying a short-term field method called rapid appraisal (Rowa-Dewar et al., 2008). In rapid appraisal, the field data are predetermined to focus on a specific area of interest to the organization. The participant selection is purposeful, and the portrait of the participants is checked with the participants, which means the interview notes are returned to the participant for review before data analysis begins. As a researcher in the study, I have a very close interest in the experiences of the DCA. I was part of the team that developed the role in 2016. I am situating myself in the research context as a realist, without giving any personal accounts to the analysis, to present the real and objective statements of the DCA.

#### **Research Design: Pacific University Provided IRB Approval for the Study**

**Structured interviews.** A set of structured focal process questions were developed based on the organizational relational coordination theory. Relational coordination theory is a validated measure of teamwork first tested in healthcare to determine the quality of care, pain of the patient, and length of stay in a nine-hospital study (Gittell et al. 2000; Valentine, Nemphard, & Edmondson, 2013; Appendix G). The relationship of the DCA in the dental office with other dental roles is an essential component of care coordination. The rationale for using structured questions is the second guidepost in the RC theory; the quality of the relationships between one group to another taken together with good job structural designs improves organizational performance. The structured qualitative method design provides the ability for methodological replication of future studies to evaluate relationships within healthcare teams. Weiss (1993) supports: "A set of formal questions which are organized according to internally consistent rules that govern the content of questions asked of an interviewee, the order in which topics are covered, and the specific kind of information sought" (p. 179).

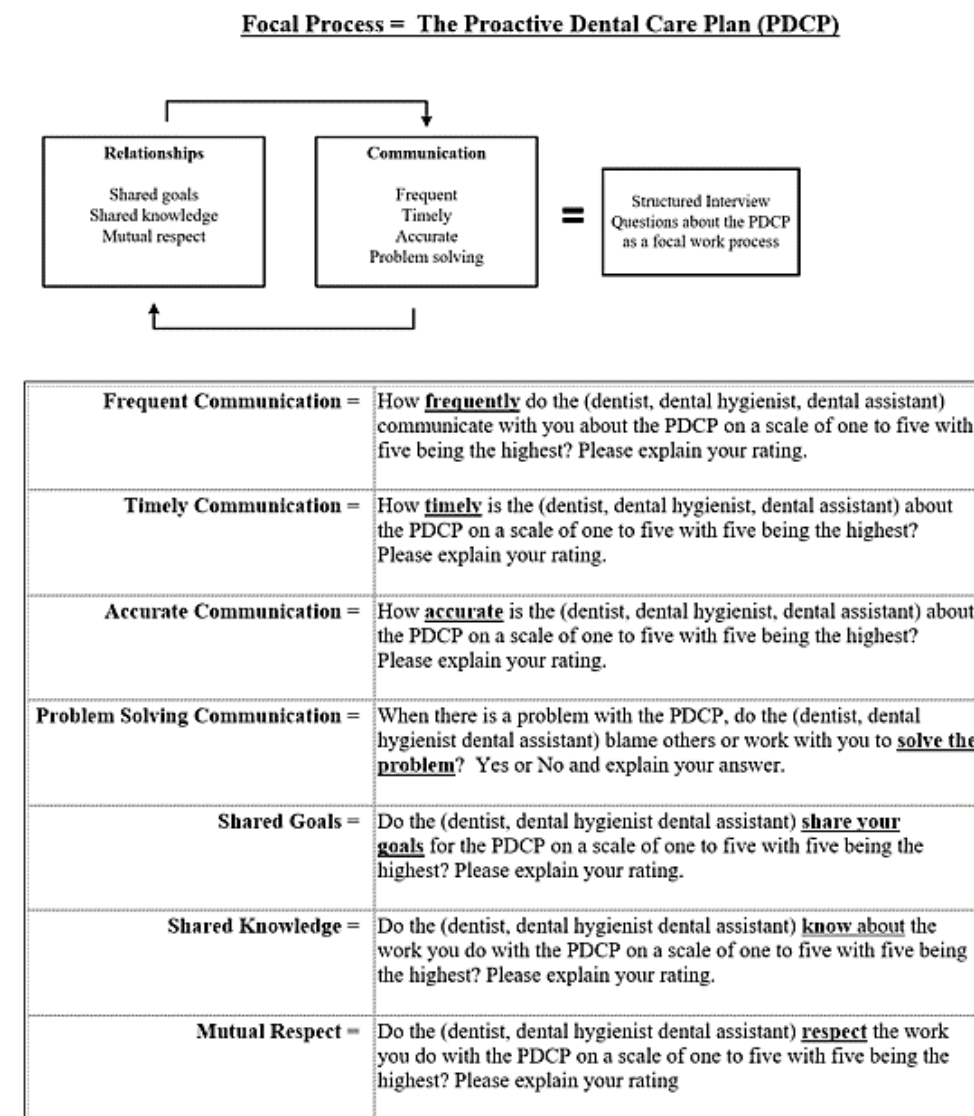
The design of the structured interview instrument elicits the lived experience of the DCA at a dental office. The structured interview follows seven questions in the relational coordination theory, and the validated instrument allows the researcher to insert a focal work process in which the DCA describes the experiences of their relationships with the other dental team members (Appendix H). In addition to the pre-specified questions, the interviewer asked the participant to rate their experience first. The scale is adapted from the quantitative measurement on a five-point Likert scale: never, rarely, occasionally, often, and consistently (Gittell, 2011b, p. 42). The experience focuses the respondent on thinking about what causes the rating and how the rating might change (positive or negative) with each member of the dental team. The Likert ratings are not used in the analysis; during the interview, several participants asked the investigator to quantify the meaning of the scale ratings. A summary of the descriptive data is in Appendix I. Each of the questions focused attention on their experiences with the dentist, dental hygienist, and dental assistant to the PDCP. Applying this approach can serve as a protocol for elucidating the experiences of the other team members in a role rather than a person. The consent to participate is in accord with specific language to reflect the risk benefits and potential harms (Appendix J). The interviews were conducted face-to-face with the researcher in a private room. The interviews each took approximately 60 minutes and were recorded with a dedicated recording device. The researcher used an interview guide to gain a maintain the consistency of the seven questions asked. This is not to be used as part of the analysis, but rather as a way to ensure all participants are given the same structure to answer the questions (Figure 3.2).

The questions did not solicit historical experiences; the participants were asked to describe current working conditions. This minimized the problem of recall bias. The researcher instructed the participants to comment on the communication and relationships displayed by

other group members towards him or her in the role of the DCA, rather than the person to avoid the bias of socially desirable responses to survey questions (Rosenthal & Rosnow, 1991).

Figure 3.2

*The Structured Questions for DCA Participants*



Note. The structure of the semi-structured interview questions for the Dental Care Advocate. Adapted from the Heller School, Brandeis University (Producer). (2015). What is relational coordination? Retrieved from <https://heller.brandeis.edu/relational-coordination/about-rc/theory-performance.html>

**Participant selection strategies.** The dental organization measures employee engagement yearly. The 2019 Quantum Workforce Solutions survey was used to gain the sample offices with high and low engagement ratings to select sites for soliciting the DCA's participation in the interviews. A purposeful selection strategy for participant selection assured a cross-section of responses of DCA's from offices associated with high engagement scores to offices with low engagement scores. The site selection process was in equal proportion (five low engagement and five high engagement) for participation. Importantly, the dental offices were of different scale and geographic location, rural versus urban, were included in the location selection process to ensure some diversity across the dental offices. Once the offices were identified, a third-party administrator, blinded to the researcher, reached out to the DCA to gain voluntary participation. The list of interested participants, totaling 20, was given to the researcher who consented to participate and engage in face-to-face interviews. The participant selection closed once the data revealed no additional themes.

## **Data Analysis**

The context of analysis is not the individual; the analysis is the role of the DCA and the relationships with other team members fostering or deterring care coordination as represented in their perceptions of the existing relationship and communication. The participant interviews were transcribed using Rev.com and returned for member checking (Transcribe Audio to Text | Transcription Company & Website - Rev, 2020). Once returned, the DCA de-identification code was linked to one of the ten sites for analysis. A grid of classifications or themes called a set of nodes was created in NVivo (Version 11.4); these included 14 nodes (Figure 3.3) directly from the relational coordination theory (Qualitative Data Analysis Software | NVivo, 2020).

**Thematic analysis.** Thematic analysis was used to categorize the participant experiences overall and examined for differences between the high engaged offices' scores and low engaged offices' scores based on the 2019 Quantum survey instrument. All other exemplars and the representative themes appeared in a non-linear fashion. Line-by-line coding was done by labeling the phrases with code names. These codes are pieces of information that relate to the constructs of the organizational relational theory: relationships and communications. Like codes from each of the organizational relational methods were placed side-by-side for the high and low scoring offices for further analysis to determine how these relate. Exemplars were determined to represent themes.

Figure 3.3

*Themes: 14 NVivo Nodes*

| <b>Relationships (+)</b>                                                                                                       | <b>Communication (+)</b>                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Shared goals</li> <li>• Shared knowledge</li> <li>• Mutual respect</li> </ul>         | <ul style="list-style-type: none"> <li>• Frequent</li> <li>• Timely</li> <li>• Accurate</li> <li>• Problem-solving</li> </ul>                      |
| <b>Relationships (-)</b>                                                                                                       | <b>Communication (-)</b>                                                                                                                           |
| <ul style="list-style-type: none"> <li>• Exclusive knowledge</li> <li>• Lack of respect</li> <li>• Functional goals</li> </ul> | <ul style="list-style-type: none"> <li>• Infrequent</li> <li>• Delayed</li> <li>• Inaccurate</li> <li>• "Finger-pointing" communication</li> </ul> |

Note. Adapted from Gittell, J. H., Seidner, R., & Wimbush, J. (2009). A relational model of how high-performance work systems work. *Articles in Advance*, 1-17.  
doi:10.1287/orsc.1090.0446

The themes inform the experience of the DCA in the context of the relational components. Finally, the output of the themes provided a greater understanding of the relationships of the DCA on the existing dental team.

As each interview was read, the highlighted portion relating to the theme was dropped into a node in NVivo for analysis, and all summary counts were placed into an Excel spreadsheet with the high and low performing offices (Table 3.1).

Table 3.1

*The Stratification of Sites and the NVIVO nodes of Relationships and Communication*

| Row Labels    | Negative Communication | Negative Relationships | Positive Communication | Positive Relationships | Unrelated but Interesting | Grand Total |
|---------------|------------------------|------------------------|------------------------|------------------------|---------------------------|-------------|
| <b>Top</b>    | 25                     | 22                     | 74                     | 100                    | 48                        | 269         |
| Site A        | 0                      | 0                      | 2                      | 5                      | 0                         | 7           |
| Site B        | 14                     | 6                      | 39                     | 48                     | 11                        | 118         |
| Site C        | 0                      | 0                      | 6                      | 6                      | 4                         | 16          |
| Site D        | 5                      | 9                      | 24                     | 34                     | 29                        | 101         |
| Site E        | 6                      | 7                      | 3                      | 7                      | 4                         | 27          |
| <b>Bottom</b> | 31                     | 17                     | 62                     | 88                     | 46                        | 244         |
| Site F        | 9                      | 3                      | 3                      | 2                      | 5                         | 22          |
| Site G        | 14                     | 6                      | 6                      | 9                      | 14                        | 49          |
| Site H        | 8                      | 7                      | 19                     | 17                     | 10                        | 61          |
| Site I        | 0                      | 1                      | 32                     | 60                     | 17                        | 110         |
| Site J        | 0                      | 0                      | 2                      | 0                      | 0                         | 2           |
| Grand Total   | 56                     | 39                     | 136                    | 188                    | 94                        | 513         |

Note: Microsoft Excel Spreadsheet populated with NVIVO sum of the reference count.

## Findings

**DCA relationships.** As with any work role in which the employees depend on one another, fostering and sustaining a positive relationship can help carry out the work in times of uncertainty and time constraints. Dentistry is no different in how it manages the interdependencies with all of the team members. When interviewed, the DCA provided rich insight into positive and negative relationships with the other members of the dental team when

they all share a focal activity giving the patient the results of their dental risk assessment and treatment plan.

***Shared Goals.*** To foster a positive relationship, shared goals allow the team to participate collaboratively to meet the needs of the patient. Shared goals are the greater good than the individual role-based goals. In a highly engaged office, the DCAs relate:

We have a sense of; it is all of our responsibility to make sure everything is proper. I know I am not a dentist or a hygienist, but I feel like it's a consistent thing that we are all responsible.— DCA B1, Site B

I think, as a care advocate, we take a lot of ownership of our team, of our doctor, and how it affects our overall office. So, we work pretty closely with our doctor teams here, and I think that's a huge part of it. Just having ownership, accountability, and truly wanting your patients to come to be healthy, to get healthy, and to keep them healthy. I think that's a big part of it.— DCA D4, Site D

In offices ranking less engaged, the experiences of shared goals of the DCAs include:

I would say they do, but there's times where I hear, comments like, "Oh, I didn't know that or that is new to me." Sometimes, I feel like we're in two separate worlds. At times, there are things that they will expect us to know or vice versa. I do wish [we] could be a little bit more in tune with one another. -DCA I16, Site I

But if we have a question, I would just like to see the dental assistants more active, more knowledgeable with it instead of like, Oh, I just have to bring the patient up to the patient representative and then hand them a piece of paper and be on my way.— DCA H12, Site H

***Shared knowledge.*** Shared knowledge enables the DCA to understand how the dentist, dental hygienist, and dental assistant's tasks interrelate into the complete process of care for the patient. Without shared knowledge, teamwork, and effective coordination, team performance and patient care are hampered. In offices rated highly engaged, the experiences of the DCAs include:

And the other part is because, though I'm hungry to learn, they are hungry to teach. They don't mind teaching me or sharing the knowledge behind it. Because ultimately, they know the more informed I am upfront, the better I can help them. It's just a very continuous circle. -DCA D5, Site D

Our Hygienist, she has so much knowledge, and she will explain. She explained to us the difference between a prophylaxis and the scaling and root planning. She explains the importance of coming back, especially for the perio- re-eval and why it's so important for those pockets to heal. I did not know any of that before. I want to say, a few years ago, She just... I said, "let me ask you some questions." She answered all of them, and now I feel I have more knowledge. -DCA C6, Site C

In offices with a lower overall office engagement rating related to shared knowledge, the response of the DCA:

But, as far as the assistants and the clinical side of things, I do not think that the hygienists or the dental assistants understand exactly what the care advocates do. Or that they do as much as they do. -DCA F1, Site F12 Site

***Mutual respect.*** Mutual respect reduces workplace stress, resolves conflict, and engages proactive problem solving and is an important component in care coordination efforts. Fostering mutual respect increases knowledge and understanding by overcoming status barriers preventing a lack of understanding of the work of others. In both, high and low engaged offices, DCAs reflected:

It was a little intimidating at first just because, doctor, so just going up to them, but honestly, they're our leaders, so they really set the tone for this office. They make it, so we know we're all one big team and we can all go to each other. At lunch, for example, we all sit together, there is no divide between us and we all get along so they kind of just made us so we're all on one level and we're all one team. It's not like doctors, hygienists, DAs, CAs. It's just like we're all one team, and they really set the tone for that. I don't feel weird going up to a doctor and being like, hey, I need this, or feeling timid about it. I got over that so fast because they just made it so comfortable. -DCA D10, Site D

I think they really respect us, and they know that we're trying our best up front to help move everything smoother and easier for them and the patient. I think they respect that we're trying to help them just as much as they're trying to help us. -DCA I14 Site I

I feel like, within my own peers, there's times when things are well respected, of the information and the knowledge that I do hold. And other times when it's kind of like, "Meh. Looks good. Okay." You know, it's just not taken seriously. -DCA H12, Site H

**Communication and the perception from the DCA.** The relational dimensions of shared goals, shared knowledge, and mutual respect are reinforced by particular communication dimensions (Cameron & Spreitzer, 2011). These dimensions of communication consist of frequency, timeliness, accuracy, problem solving, and supporting positive coordination leading to improved team performance.

***Frequency of communication.*** Frequent communication allows for trust to develop among co-workers as well as increased proficiency to complete the patient experience positively. What follows are the dental care advocates' experiences in this regard:

Well, throughout the day, we have a lot of questions that I don't 100% know the answer. I usually seek their advice to what's best for the patient. It's usually on a daily basis, and it happens multiple times a day where (the) patient wants to talk to the doctor and gives me a list of things that are going on. I want to make sure the patient is taken care of. – DCA A11, Site A

I think that as far as other offices versus where I am now, communication was not necessarily always a big thing. It was kind of just bring your patient, do your work, send them on their way. And I think that's part of it, the communication and the timely timeliness with the practice. If we need the extra time, we can use the extra time, and the doctor's not pushing you to get those patients out or anything like that. One of the offices that I was at, I felt like that was kind of a thing. It was like, "Okay, we'll go over that later, just bring your next one back," and things like that. And I think that that's helpful in a way, and not helpful in a way, just because you don't want your patients waiting for a long time, but you also don't want to just push your patients out and then have them come back later to do something you could've already done. -DCA I15, Site I

***Timely communication.*** When communication is delayed or postponed, not only does the patient experience the effects of the poor timeliness of the communication, teamwork within the group is hampered. In offices rated highly engaged the experience of the DCAs include:

Dr. X and Dr. Y are very good at responding to IM (instant messaging). It's almost when they see the light flash on their computer screen they answer it so fast. Yeah, they are really good at it. -DCA C6, Site C

I feel like the doctors are really upfront with what they're doing for the patients with us, so that we can be informed so that we can watch their schedules better or so that we can tell the patients because then that keeps the doctors from having to talk to the patients on the phone. -DCA B2, Site B

In offices that with a lower overall office engagement rating related to timely communication, the response of the DCAs include:

And, because it was missed, then the doctor didn't get the prescription called in that night. The patient called back the next day and said, "Hey, I haven't heard from you yet. You said doctor was going to call in a prescription; there's nothing there." Then I had to call the doctor at home, and then I also basically... You know, I was the responsible party, because I should have confirmed with doctor face-to-face "Yes, this is what needs to happen. Yes, the patient wants the prescription. Yes, you're calling the patient's prescription in, and call the patient back. So, there was several confirms that needed to be done that didn't get communicated". -DCA F12, Site F

I think the communication with us is more of on the back burner at times on those really busy hectic days. -DCA H19, Site H

***Accurate communication.*** Communication is vital when groups of providers rely on one another for information. Communication of information that is inaccurate can have severe consequences for the patient. The reliance on accurate information built over time fosters trust in a team when groups of individuals are interdependent on one another. In offices rated highly engaged the experience of the DCAs include:

All of our doctors, for the most part, are very thorough in how they communicate verbally to us. We have a good handful of hygienists and who will come up and kind of go through bullet point by bullet point, of what we need to do for that patient. -DCA B3, Site B

In an office with lower overall engagement, the DCAs respond:

If they walk up there, and they release the patient and just say, "Check out at the front desk." A lot of times, I would say probably seven out of ten times, patients like, "Already paid, I don't need nothing, nobody told me I need an appointment." They walk out the

door, they don't care to get their statements. You know, "See you." Then the doctor comes up and says, "Did you get so-and-so appointed for dadadadada?" "Well, nobody told us, and patient just left, they didn't even checkout. -DCA F12, Site F

***Problem Solving Communication.*** Problem-solving communication is a form of communication focused on solving the issue as a group, rather than finger-pointing or blaming. Problem-solving communication fosters team unity, a big part of coordination and collaboration. In offices rated highly engaged the experience of the DCAs include:

No, they always work with us, we don't like the blame game here at all. We all just want to solve it because the patient doesn't care who's fault it was, it's all of our fault if something goes wrong. We kind of just embrace that and fix it together. –DCA B10, Site B

Personally, I've never had either of our doctors here just dismiss it. We have strong communication, and I feel like we usually solve problems because we want to make sure the patients are taken care of. So I feel like if there was something wrong, we fix it so that we give them the correct information. –DCA A11, Site A

In offices with a lower overall engagement score, the DCAs report:

When fingers are being pointed at you, it's not a good feeling. Especially when you feel like you did everything you could at that time to make sure something happened, and there was a breakdown in something. -DCA F12, Site F

No, I definitely think that if there's a miscommunication... There's always some people in the office that, "I'm not going to take responsibility for that." You know, there's always people at different times for different things, because that's a feeling that you have. It's like, "No, I wasn't responsible for that, so-and-so was responsible for that. – DCA F12, Site F

## **Discussion**

The ethnographic investigation based upon interviews with 20 dental care advocates from a cross-section of high to low engaged offices has shown that relationships and communication are essential to the overall health of a newly formed team. While the only training and education

the DCA receives are during the credentialing process, the highly engaged offices present the dentist, dental hygienist, and dental assistant as valuable resources for their continued growth and development. All of the sites shared one universal connector to their continued growth, the shared electronic dental record (EDR). The EDR is a critical enabler of information to all of the dental team members. In the high and low engaged offices, it is a mediator enabling communication across the groups.

Most all of the DCA participants suggested a formal growth and development process to continue their education and found the most crucial characteristic of a successful DCA is the ability to ask many questions. This should be considered a part of the recruitment strategy for the DCA role by the dental organization. In all groups, the dental care advocates still related to themselves as being front office and the dentist, dental hygienist, and dental assistant as the back office. In the highly engaged offices, the perception was just a matter of geography, while in the low scoring offices, the impression was an acknowledgment of power.

Recommendations from the DCA in ways to improve their experience was repeated in need to enhance technology. Most of the time, the DCA has to walk to the person to retrieve information or use a sticky note to leave questions. The instant messaging (IM) system in the offices does not allow for the continued connections from the provider to the DCA due to the providers switching treatment rooms during the day. Additionally, the DCAs felt a better connection to the provider team when they were assigned to one care team. Working with one care team affords the DCA to know the preferences of the team, all of the members and allows the provider one place to go to for care coordination.

The DCA, in general, felt the offices should have meetings and have all of the job groups explain what their daily activities are in the process of caring for a patient. Knowing the other

provider's job roles enables the team to have more empathy when the office is in stages of time constraints and uncertainty.

Of particular findings in the thematic analysis and comparisons to the high and low engaged offices presented is an office outlier. The site was selected due to the annual engagement score showing a lower end of employee engagement. Yet, the thematic analysis qualitatively revealed higher positive communication and relationship themes. Future work, looking at the reasons for the difference, is recommended.

Lastly, future work should include the other team members in the qualitative analysis; the dentist, dental hygienist, and dental assistant to gain in-depth perspectives of how the overall team is functioning with positive communication and role relationships.

## **Conclusion**

The dental care advocate role affords the patient and care team a workforce asset to connect information back and forth. When relationships of shared knowledge, shared goals, and mutual respect are present alongside effective communication in specific dimensions, the entire team benefits to include the patient, this is the internal process of care coordination for the patient, and the presumption of the relational coordination theory at work.

## Chapter Four

### Care Coordination – Measuring Care Coordination Efforts

#### Introduction

Poor oral health, and the biological impact of oral disease, impacts a person's general health and well-being (National Institutes of Health, 2018). Implementing care coordination practices in our healthcare system presents a possible way to lower healthcare costs and improve the treatment outcomes of the patient (Bodenheimer, Ghorob, Grumbach, & Willard-Grace, 2014). At the same time, the multiple definitions of care coordination impede our evaluation of the patient's treatment outcomes (Schultz et al., 2013; Solberg, 2011). The Agency for Healthcare Research and Quality (2007) recommends clear theoretical study designs to drive the methodology in the analysis of care coordination efforts. Notably, the AHRQ technical report yielded 4,730 publications to include 75 systematic reviews ((McDonald, et al., 2007, p. v.). Of the 4,730 publications, five theoretical frameworks were suitable to demonstrate how theoretical thinking can strengthen the study of care coordination (Van Houdt, Heyrman, Vanhaecht, Sermeus, & Lepeleire, 2013). This study uses one of the five recommended theoretical frameworks, the Relational Coordination (RC) theory, to baseline measure care coordination efforts by a dedicated care coordinator.

#### Significance

When patients receive different types of care depending on the provider, the location, and timeliness, variations of care exist in the U.S. healthcare system. The Institutes of Medicine's (IOM) 2001 report, *Crossing the Quality Chasm* posits, that improving healthcare quality requires changing the design of the healthcare system (Baker, 2001). Since this landmark article, digital technology has opened the doors for measuring and analyzing healthcare data at the

individual and population levels. In addition, digital technology can act as a coordinating mechanism between the provider and the patient (Bates, 2015; Digital Square, 2019; O'Malley, Cohen, Grossman, Kemper, & Pham, 2010). Leveraging digital information opens the door for the rapid dissemination of data into implementation, intended to improve the healthcare system. Dentistry, a component of the healthcare system, is slowly adopting a digital patient chart called an electronic dental record (EDR; Acharya, Schroeder, Schwei, & Chyou, 2017; Jason, 2017). However, of the dental practices employing EDRs, the extraction of standardized patient data in a structured way, to target quality improvements, is in its infancy (Atkinson, Shah, & Zeller, 2002; Walji et al., 2013).

This study extracted EDR data from appointment scheduling and dental appointment attendance for patients at high-risk for caries. A high-risk caries patient needs interventions from the provider teams to arrest and prevent the development and progression of carious lesions. To accomplish a positive oral health impact for the high-risk caries patient, follow-up care, and appointment attendance, are vital. A dental care coordinator can provide the coordination from the patient to the provider team. Illustratively, a 2012 practice and application study using a care coordinator type of care manager in dentistry reported an impressive 10% to 65% increase in the proportion of patients receiving dental care in addition to the drop in the non-attendance rate from 40% to 10% over three years (Jones et al., 2012). While the study design and program authors assert the generalizability of the findings, the study did not detail the mechanism of data collection by describing the instrument used to harvest the data such as an electronic dental record or by other means.

Furthermore, Casaverde and Douglas (2007) acknowledge that “compared to medicine, limited information exists on the use of care coordination in dentistry to facilitate appointment

attendance” (p.125). However, in the retrospective study, routine appointments increased by 8%. The Casaverde and Douglas (2007) study is significant from a risk assessment standpoint; the authors suggest the “Patients with lower caries status (dmft) or better behavior (Frankl behavior rating = 3-4) recorded at the recall visit prior to the sedation appointment showed a tendency toward better attendance” (p. 126).

This study is significant to understand the high-risk caries patients of all ages using the data recorded in the EDR. Studies have not been conducted using structured data from the patients’ EDR and scheduling and attendance as fostered by a dental care coordinator role. The implications of this study aim to measure the care coordinators’ efforts with the identified high-risk caries patients. Using the relational coordination framework linking well-designed job structures and positive intra-organization relationships, the outcomes of care should positively benefit the patient. The data from the study enables the dental organization to understand the impacts of care coordination efforts on high-risk caries patients as one type of patient outcome measure of dental care. This type of patient outcome measure in dentistry is missing in the context of care coordination.

## **Background**

**Dental caries.** Mostly preventable, dental caries and periodontal diseases are the two most significant and common chronic diseases in the United States (Benjamin, 2010). Education efforts promoting the importance of disease prevention are vital to raising awareness to stop or prevent the progression of the disease. At the same time, Accountable Care Organizations (ACO’s) were created to improve health by holding the health systems responsible for the cost, quality, and outcomes of care for the population. Care coordination efforts, documenting the responsiveness of the patient and provider from a dental care delivery standpoint, is one way to

deliver high-performance outcomes to reduce the dental disease burden in a population (Leavitt Partners, 2015). However, studies of the intervention efforts using care coordinator type roles and follow-up of the patient's dental care are limited. For instance, Binkley, Garrett, and Johnson (2010) sampled 10,000 Medicaid-insured children ages 4 to 15 in West Louisville, Kentucky, to assess the effects of a dental care coordinator intervention among Medicaid-eligible children. Findings from the study determined utilization was higher in the intervention group (43%) to the control group (26.5%);  $P = 0.047$  (95% CI 1.0-4.25). The intervention consisted of telephone calls and a 45–60 minute in-person home visit.

**Risk assessment - dental disease.** In dentistry, the two common oral diseases are dental caries (tooth decay) and periodontal diseases (gum disease). Science has evolved to attribute the risk of caries to “physical, biological, environmental, behavioral, and lifestyle factors such as high numbers of cariogenic bacteria, inadequate saliva flow, insufficient fluoride exposure, poor oral hygiene, inappropriate methods of feeding infants, and poverty (Pitts, Ismail, & Selwitz, 2007 p. 51.) Periodontal disease can be attributed to non-modifiable risk factors, such as genetics, and modifiable risk factors, such as pathogenic microorganisms (Van Dyke & Sheilesh, 2005). By looking at the elements in each of the oral diseases, caries and periodontal, risk profiles can be created to determine the patient's level of risk from a low range, attributed to minimal factors, to high, with significant factors intensifying the disease.

The sizeable dental organization has developed and standardized risk assessment tools for each oral disease, caries (caries management by risk assessment, CAMBRA), and periodontal (periodontal management by risk assessment, PEMBRA), to support treatment and outreach efforts to patients. Both risk assessment tools operate in the electronic dental record, with enhancing clinical decision support to measure the completion of the risk assessment profile by

the primary care dentist of record for each patient. Risk profiles are reviewed and updated at each regular dental examination visit. The risk assessment profile determines the level of risk from low to the extreme range for the patient. With the risk assessment profile complete, the variables generated go into a summary given to the patient, called the proactive dental care plan (PDCP; Petersen & Ogawa, 2012).

**Role of the dental care advocate.** The purpose of the dental care advocate (DCA), a care coordination role, is to oversee patient flow and coordinate effective communication between patients, dentists, practice managers, and clinical staff (Willamette Dental Group, 2018c). The dental care advocate acts as a liaison to foster patient oral health improvement initiatives and engagement with the patient (Appendix A, B, and C). The DCA training program is built on the 70 –20 –10 model of learning. Seventy percent of the teaching takes place on the job through experiential learning. Twenty percent of the education takes place through coaching, mentoring, and interaction with peers in a standard format. Lastly, 10% of the instruction occurs in a formally structured way to include instructor-led and online courses along with self-directed experiences. All DCAs go through a certification process evaluated by the lead dentists at the practice. The organization has an enterprise peer, the dental care advocate development specialist, to sustain the certification process, continued growth, and learning and instruction.

**The electronic dental record – axiUm.** The large dental care organization adopted an electronic dental record across 53 offices in Oregon, Washington, and Idaho in 2013. The EDR, axiUm, can leverage specified forms and structured data specifically for the DCA. Two types of forms in the EDR are designed for DCA use in the care coordination of high-risk patients; these are the follow-up form and patient contact notes. When a high-risk caries patient is identified, needing an intervention for treatment or behavior adherence, the DCA is trained to use

motivational interviewing techniques in coordination with the follow-up form while discussing follow-up treatment planning and scheduling. The objective is to engage the patient in fostering a partnership with their continuing care. The contact note is a central area of axiUm where the DCA and other operational personnel can leave notes about attempts to contact the patient, left voicemails, automated appointment reminder data, patient grievance activities, and insurance information. There are over 35 different note types in the contact notes. The DCA can use each of the note types within the EDR (Appendix K).

In the same way, a follow-up form is designed for use by the DCA (Appendix L). The form is used when a DCA places an intervention call. Each section is comprised of a set of standardized questions, a field to record the patient's response, and date. There is a free text field added to the form to record any other information resulting from the interaction the DCA has with the patient. The form allows the DCA to track each high-risk patient and their customized treatment plan, with the understanding that the DCA follows the progress of multiple high-risk caries patients over an extended period. The follow-up form is attached to the patient's electronic dental record and is accessible to the DCA through a module in the EDR that retains assigned forms. The DCA can review the form anytime they are connected to the EDR- axiUm. Updates and any additional information happen each time a conversation is encountered (an intervention), with patients moving from high, extreme-risk to moderate-risk or low caries risk.

Lastly, the impact of DCA-patient coordination efforts to improve the patient's adherence to care can be measured using data collected in these DCA interactions. A DCA intervention is measured as communication between the DCA, the patient and is recorded in the EDR as either a contact note or a follow-up form. To evaluate the overall outcome of improvement in the patient's disease assessment, a critical appraisal of the interaction the DCA has with the patient

to influence adherence is essential. This study uses care coordination at the appointment and attendance level as a proxy for adherence to risk reduction efforts to improve the risk profile of the high-risk caries patient.

**Relational Coordination (RC) Theory.** The relational coordination theory provides a lens to understand the relational importance of job groups to impact the coordination of care for the patient (Havens et al., 2010). Gittell (2002) asserts that relational coordination differs from other approaches to coordination by three specific relationship dimensions that are needed for effective coordination. Gittell states:

These dimensions—shared knowledge, shared goals, and mutual respect—can be seen as characteristics of the relationships between participants in a work process that influence and are influenced by the nature of their communication. Shared knowledge situates participants cognitively, shared goals situate participants motivationally, and mutual respect situates participants socially vis-à-vis other participants in the work process (Gittell, 2002, p.302.).

The relational coordination theory assumes improved efficiencies, quality, and safety outcomes when the design of employee jobs is supported with strong communication attributes among teams and cohesive relationships across team members (Bae, Mark & Fried, 2010; Cramm, Hoeljmakers & Nieboer, 2014; Cramm & Nieboer, 2012; Gittell, Weinberg, Pfefferle, & Bishop, 2008; Lundstrom, 2014). To illustrate, the care coordination function is embedded in the ACO dental organization through a defined role of the dental care advocate (DCA) with the commencement of a job design built to share knowledge, share goals, and foster communication between the dental team and the patient. In theory, when these components are in place, the patient to provider performance improves. The outputs of the redesigned organizational structure and improved relationships through the job design of the DCA may influence the outcomes of patient care.

This chapter investigates the activities of the DCA, called interventions, a measure of care coordination efforts, and compare to uncoordinated care, as measured by the absence of an intervention by the DCA on all high-risk dental caries patients.

### **Research Hypotheses**

$H_{01}$ : Dental care coordinators do not affect high-risk caries patients scheduling an appointment.

$H_{a1}$ : Dental care coordinators affect high-risk caries patients scheduling an appointment.

$H_{02}$ : Dental care coordinators do not affect high-risk caries patients attending an appointment.

$H_{a2}$ : Dental care coordinators affect high-risk caries patients attending an appointment.

### **Research Method**

The research methods for this study use a retrospective correlational design to determine whether the dental care advocate interaction (contacting the patient and recording the efforts in the EDR) resulted in a scheduled and attended appointment, using archival data from the EDR, longitudinally over three years – 2016, 2017 and 2018.

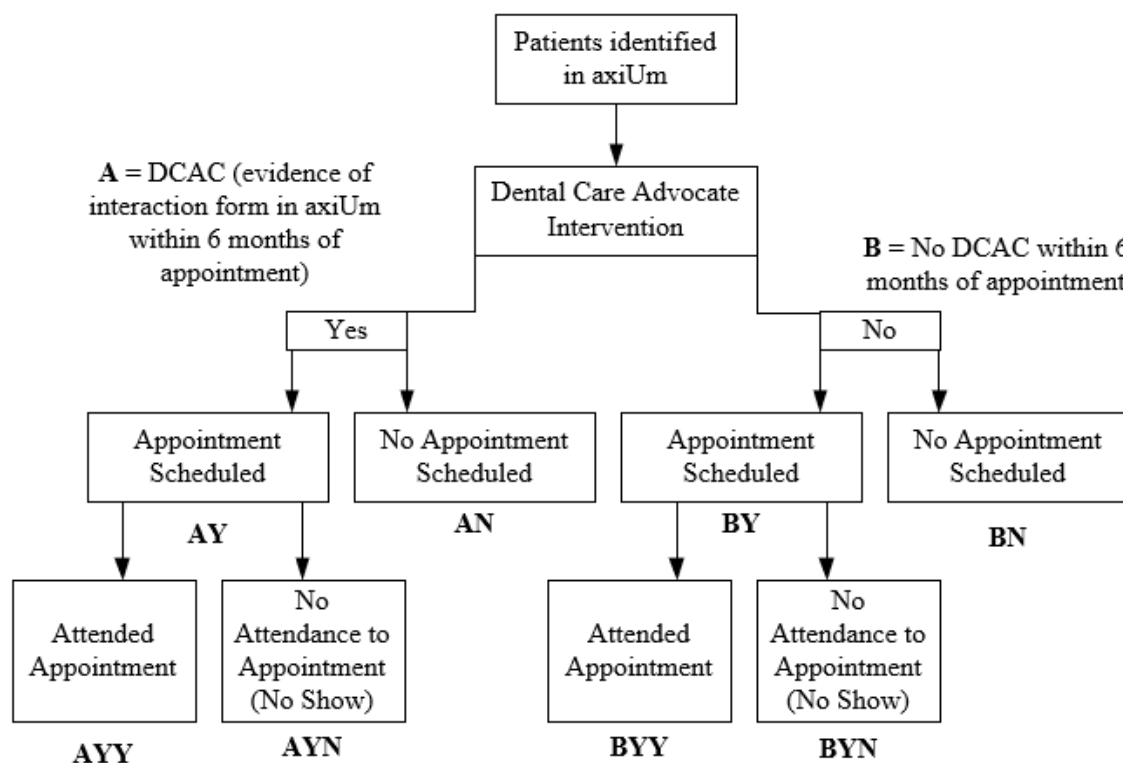
### **Design**

The research design uses the DCA coordination activities, called an interaction, as the independent variable (IV) and the patient's behavior (the individual scheduling and attending an appointment) as the dependent variable (DV). The design includes the general scheduling and attendance during 2016, 2017, and 2018 for patients without the interaction of the DCA. Specifically, all of the patients identified as high-risk caries patients seen in the dental office in 2016, 2017, and 2018, are divided into two groups A and B (Figure 4.1). In the A group, the patient has at least one interaction with the DCA; in the B group, the patient does not have any

interaction with the DCA. Both the A and B groups follow the same analysis plan listed in the section covering the analysis structure. The analysis determines the impact (negative or positive) of the DCA's care coordination efforts on the scheduling and attendance of a dental appointment in high-risk caries dental patients.

Figure 4.1

*The Workflow of Research Variables of the Dental Care Advocates Interaction with a High-Risk Caries Patient*



Note. The DCAC interaction includes contact notes and follow-up forms reported in axiUm.

**Participants.** A de-identified participant list ( $n = 86,025$ ) provided from archival data, including all high or extreme risk caries patients of all ages, and genders, who were assigned to one accountable care insurance group, and who had a dental exam that included a risk profile in

the EDR within six months of the DCA intervention during 2016, 2017, and 2018. Medicaid data from the large accountable care organization was not included in the data set, and the analysis is drawn from the most significant proportion of the organization's book of business.

**Materials.** Upon Institutional Review Board (IRB) approval from Pacific University, de-identified Excel spreadsheets were provided to the principal investigator. Included in the spreadsheets are all patients of high-risk caries levels attending a new patient appointment or a return (recall) appointment called continuing care. The spreadsheet contains descriptive variables, including the number of caries (decayed surfaces) the patient's age and gender (Appendix M). The Excel data reports the DCA interaction as the number of contact and follow-up notes recorded by the DCA within six months of the exam visit. Exam visits are identified by procedure codes provided by the American Dental Association Code on Dental Procedures and Nomenclature (CDT) 2019; dental procedure codes D0150 and D0120 were used to generate the *N* number of participants for the study (American Dental Association [ADA], 2019) as shown in Figure 4.2.

Moderate and low-risk caries patients with D0150 and D0120 CDT procedure codes were excluded from the sample. All the data in the study were from the EDR and extracted from the scheduling system to identify the type, date, and time of an appointment scheduled and attendance (show or no-show) of the patient.

Figure 4.2

*CDT 2019 Dental Procedure Codes Definitions***D0120 Periodic Oral Evaluation - Established Patient**

An evaluation performed on a patient of record to determine any changes in the patient's dental and medical health status since a previous comprehensive or periodic evaluation. This includes an oral cancer evaluation and periodontal screening where indicated and may require interpretation of information acquired through additional diagnostic procedures. Report additional diagnostic procedures separately.

**D0150 Comprehensive Oral Evaluation - New or Established Patient**

Used by a general dentist and/or specialist when evaluating a patient comprehensively. This applies to new patients; established patients who have had a significant change in health conditions or other unusual circumstances, by report, or established patients who have been absent from active treatment for three or more years. It is a thorough evaluation and recording of the extraoral and intraoral hard and soft tissues. It may require interpretation of information acquired through additional diagnostic procedures. Additional diagnostic procedures should be reported separately.

Note. American Dental Association. (2019). *CDT 2019 Dental Procedure Codes*: American Dental Association. Retrieved from <https://www.ada.org/en/publications/ada-news/2018-archive/august/cdt-2019-now-available-to-aid-accurate-coding>

**Procedure.** Scheduling and contact data from January 2016 through to December 2018, extracted from axiUm, were used in the analysis of the DCA's involvement in care coordination, as identified by the interaction of the DCA with a patient (IV), and if this influenced a patient to schedule a dental appointment and attend a scheduled dental appointment (DV). An interaction is defined as a call or oral communication between the DCA and the high-risk patient or responsible party recorded in the EDR. Two groups were assigned; Group (A) were the patients with whom a DCA had interacted, as listed in the EDR. Group (B) were the patients who met the inclusion criteria, but did not have a DCA interaction recorded in the EDR. The research methodology quantifies the interaction the DCA has with the patient to schedule an appointment and the patient's attendance for the scheduled appointment. The analysis adjusts using

descriptive elements such as the patient's age, gender, and the number of caries for each patient. The study's interaction (a coordinating-communication component), contributing to improved efficiencies, is the outcome variable of interest supporting the enhanced quality of care for the patient espoused as a positive or negative effect of excellent communication and relationships as the two mutual reinforcing guideposts within the relational coordination theory.

The analysis plan is not comparing insurance-employer groups; the study is designed to consider all the accountable-care plan types within the three years, and investigate the potential relationships of gender, age, or decayed surfaces. All patients, regardless of socioeconomic status or geography, if they have an accountable care plan are included in the analytical plan.

#### **Data Analysis Plan.**

1. Of all high-caries-risk, accountable-care plan insured patients seen for an examination (N), how many had a DCA (A) interaction within six months after the exam, and how many patients had no interaction with the DCA (B)? The analysis considers the proportion of yes (A) DCA interactions or no (B) DCA interactions. For all further data analyses, A is the interaction group, and B is the non-interaction group.
2. Among the patients with a DCA interaction (A), how many patients had an appointment scheduled (AY) within six months of the exam? The analysis looks at the proportion of patients scheduling an appointment after contact with the DCA.
3. Among the patients without a DCA interaction, (B) how many had an appointment scheduled (BY) within six months of the exam? The analysis looks

at the proportion of patients without DCA interaction (B) that had an appointment scheduled (BY).

4. Compare the relationship of the DCA interaction with scheduling an appointment (AY to BY). Compare the outcomes from numbers two and three to see if there are differences in the proportion of patients being scheduled in the DCA interaction group (A) and the non-DCA interaction group (B).
5. Among the patients with a DCA interaction (A) and an appointment scheduled (AY), how many of the patients attended at least one of the scheduled appointments (AYY)?
6. Among the patients without a DCA interaction (B) and an appointment scheduled (BY), how many of the patients attended at least one of the scheduled appointments (BYY)?
7. Compare the relationship of the DCA interaction on attending at least one appointment (AYY to BYY). Compare the outcomes from number five and six to see if there are any differences in the proportion of patients attending an appointment in the DCA interaction group (A) and the non-DCA interaction group (B).
8. Among the patients with a DCA interaction and an appointment scheduled (AY), what percentage of their appointments were not attended (AYN)?
9. Among the patients without a DCA interaction and an appointment scheduled (BY), what percentage of their appointments were not attended (BYN)?
10. Compare the relationship of the DCA interaction to the likelihood of the patient not attending (AYN to BYN). Compare the outcomes from number eight and nine

to see if there are differences in the proportion of patients that ‘no show’ in the DCA interaction group (A) and the non-DCA interaction group (B).

11. For comparison, calculate the overall no-attendance rate (as a percentage of patients scheduled) for each year of the study for the entire dental organization.

### **Calculation of the Variables**

In Step One, a calculated aggregate *N* of high caries risk, accountable care dental insurance patients seen for an exam is identified in the EDR (Table 4.1). High-risk patients are typically scheduled for exams at no more than six-month intervals. Each qualifying exam visit is included in the *N*. For each of the qualifying exam visits, the following elements from the EDR were extracted to a Microsoft (MS) Excel spreadsheet for initial analysis: Exam Date, Exam Type (new patient or continuing care exam), Caries Risk Level (High or Extreme only included), Oral Health Level (measured as “Phase”), number of decayed surfaces, patient age, patient gender, patient home address/zip code, rural/urban, health literacy level, race, and number of DCA interactions within six months after the exam, number of appointments scheduled within six months after the exam, and number of appointments attended within six months after the exam. The patient cases are grouped as either no DCA interaction or DCA interaction based on the presence of at least one contact note or follow-up form indicating a DCA interaction occurred.

The data analysis includes two independent samples for proportions tests. The first analysis is the percentage of patients scheduling for at least one appointment (AY vs. BY). The second is the percentage of patients attending at least one appointment (AYY vs. BYY). A Wilcoxon signed-rank test is used to test for normal distribution of the data. A binary logistic

regression is used to model the binary dependent variable's scheduling and attendance. The analysis adjusts for baseline covariates, including number of decayed surfaces, patient age, patient gender, rural/urban home address, health literacy level, race, gender, and age. Lastly, an odds ratio established the strength of the association between contact with a DCA and scheduling and attendance behavior.

Table 4.1

*The percentages of all high-risk caries dental patients in the comparison groups for 2016, 2017, and 2018*

| Year                                                     | 2016         | 2017         | 2018         |
|----------------------------------------------------------|--------------|--------------|--------------|
| Number of Pt Exams (N)                                   | 26941        | 27750        | 31334        |
| <b>DCA Interaction (A)</b><br>(At least one DCA contact) | 498 (2%)     | 6312 (23%)   | 10361 (33%)  |
| Scheduled Appt (AY)                                      | 449 (90%)    | 4987 (79%)   | 8379 (81%)   |
| Attended (AYY)                                           | 441 (89%)    | 4819 (76%)   | 8046 (78%)   |
| No-showed (AYN)<br>(as a percentage of AY)               | 8 (2%)       | 168 (3%)     | 333 (4%)     |
| <b>No DCA Interaction (B)</b>                            | 26443 (98%)  | 21438 (77%)  | 20973 (67%)  |
| Scheduled Appt (BY)                                      | 16480 (62%)  | 12708 (59%)  | 12646 (60%)  |
| Attended (BYY)                                           | 15844 (60%)  | 12048 (56%)  | 11858 (57%)  |
| Non-attendance (BYN)<br>(as a percentage of BY)          | 636 (4%)     | 660 (5%)     | 788 (6%)     |
| Overall no-attendance Rate<br>(entire organization)      | 35604 (5.5%) | 44554 (6.3%) | 51532 (6.6%) |

Note. Data retrieved from axiUm.

All analyses performed using the standard significance level of 0.05 ( $\alpha = 0.05$ ). All study data is stored in an Oracle database, and analysis employs a combination of SQL (Standard Query

Language), Microsoft Excel spreadsheets (version 16.0.12624.20348), R Statistics (version 6.3.1).

### **Study Findings**

The  $n = 86,025$  patient exams in the cohort. Females represented 49.5% (42,619) of the high-risk assessed examinations, 50.4% (43,358) were male, and 0.1% (48) identified as no gender. Patients ranged in age from 1 to 97, with an average age of 34. The number of decayed surfaces of the patients ranged from 0 to 128, with an average of 5.6 decayed surfaces (Table 4.2).

There were two primary outcomes of interest measured as binary variables: appointments scheduled, and appointments attended. To determine whether there was an association between DCA contacts and the appointments scheduled/attended, a multivariate logistic regression method was used. Each model adjusted for gender, age, decayed surfaces, race, health literacy level, rural/urban home address, and reported the odds ratio along with the corresponding 95% confidence intervals.

Table 4.2

*Descriptive Statistics for Variables Collected*

| <b>Patient Exams</b><br>(N = 86,025)                   | <b>No DCA</b><br><b>Interaction</b><br>(N = 68,854) | <b>DCA</b><br><b>Interaction</b><br>(N = 17,171) | <b>Test</b> | <b>p-value</b> |
|--------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------|-------------|----------------|
| <b>Gender</b>                                          |                                                     |                                                  |             |                |
| Female                                                 | 49.4% (34,028)                                      | 50.0% (8,591)                                    | -0.99 (z)   | 0.32           |
| Male                                                   | 50.5% (34,790)                                      | 49.9% (8,568)                                    | 0.99 (z)    | 0.32           |
| <b>Age</b>                                             |                                                     |                                                  |             |                |
| Mean                                                   | 33.4                                                | 36.3                                             | -18.05 (t)  | < 0.0001       |
| Median                                                 | 32                                                  | 35                                               |             |                |
| Range                                                  | 1-97                                                | 1-95                                             |             |                |
| Standard deviation                                     | 18.8                                                | 18.2                                             |             |                |
| <b>Decayed Surfaces</b>                                |                                                     |                                                  |             |                |
| Mean                                                   | 5.2                                                 | 7.3                                              | -26.21 (t)  | < 0.0001       |
| Median                                                 | 3                                                   | 4                                                |             |                |
| Range                                                  | 0-128                                               | 0-128                                            |             |                |
| Standard deviation                                     | 7.4                                                 | 9.9                                              |             |                |
| <b>Rural/Urban</b>                                     |                                                     |                                                  |             |                |
| Rural                                                  | 10.8% (7,418)                                       | 11.3% (1,937)                                    | -0.6287     | 0.5295         |
| Urban                                                  | 89.0% (61,296)                                      | 88.6% (15,206)                                   | 1.4066      | 0.1595         |
| Unknown                                                | 0.2% (140)                                          | 0.2% (28)                                        | --          | --             |
| <b>Race</b>                                            |                                                     |                                                  |             |                |
| White                                                  | 67.5% (46,740)                                      | 67.2% (11,536)                                   | 0.6158      | 0.538          |
| Non-white                                              | 19.7% (13,580)                                      | 21.5% (3,695)                                    | -2.4214     | 0.0115         |
| Unknown                                                | 12.8% (8,804)                                       | 11.3% (1,940)                                    | 1.8066      | 0.0708         |
| <b>Need Help With</b><br><b>Instructional Material</b> |                                                     |                                                  |             |                |
| Never need help                                        | 64.3% (44,252)                                      | 67.0% (11,509)                                   | -5.4049     | <0.0001        |
| Rarely need help                                       | 17.4% (11,966)                                      | 17.7% (3,036)                                    | -0.3889     | 0.6974         |
| Sometimes need help                                    | 6.3% (4,328)                                        | 5.8% (994)                                       | 0.5892      | 0.5557         |
| Often need help                                        | 2.3% (1,578)                                        | 1.8% (306)                                       | 0.5434      | 0.5868         |
| Always need help                                       | 9.5% (6,510)                                        | 7.4% (1,263)                                     | 2.3679      | 0.0179         |
| Unknown                                                | 0.3% (220)                                          | 0.4% (63)                                        | -0.1235     | 0.9017         |

Note. Microsoft Excel spreadsheets (version 16.0.12624.20348)

Table 4.3 shows the results of a logistic regression that models the odds of scheduling an appointment. Patients with at least one DCA contact were significantly associated with an increased odds of patients scheduling an appointment compared with those who had no DCA contact, adjusting for other factors in the model (odds ratio [OR] = 2.41 (95% CI: 2.31, 2.51). Further, female patients were significantly more likely to schedule an appointment than male patients [OR] = 1.06 (95% CI: 1.03, 1.09). Increasing patient age [OR] = 1.02 (95% CI: 1.01, 1.02) was significantly associated with scheduling an appointment. In terms of geographical location, patients living in rural areas were significantly less likely to schedule an appointment than those living in urban areas [OR] = 0.85 (95% CI: 0.81, 0.89). Patients who reported rarely needing help with instructional materials were statistically more likely to schedule an appointment [OR] = 1.11 (95% CI: 1.04, 1.18). Patients who reported always needing help with instructional materials were statistically more likely to schedule an appointment [OR] = 1.07 (95% CI: 1.02, 1.13). Non-White patients had an increased odds of scheduling an appointment compared with White patients [OR] 1.07 (95% CI: 1.03, 1.11). Decayed surfaces were associated with an increased odds of scheduling a dental appointment [OR] = 1.05 (95% CI; 1.05, 1.05).

Table 4.4 shows the results of a logistic regression that models the odds of attending an appointment. Patients with any DCA interactions are significantly associated with increased odds of attending an appointment, compared with those who had no DCA interactions, adjusting for other factors in the model [OR] = 2.31 (95% CI: 2.22, 2.34). Further, female patients were significantly more likely to attend an appointment than male patients [OR] = 1.08 (95% CI: 1.05, 1.12). Older patients had increased odds of attending an appointment [OR] = 1.02 (95% CI: 1.02, 1.02). Patients living in rural areas were significantly less likely to attend an appointment than those living in urban areas [OR] = 0.87 (95% CI: 0.83, 0.91). Patients who reported rarely

needing help with instructional materials were statistically more likely to attend an appointment [OR] = 1.13 (95% CI: 1.08, 1.17). Patients who reported sometimes needing help with instructional materials were statistically more likely to attend an appointment [OR] = 1.15 (95% CI: 1.08, 1.23). Patients who reported always needing help with instructional materials were statistically more likely to attending an appointment [OR] = 1.07 (95% CI: 1.02, 1.13). Non-White patients had increased odds of attending an appointment [OR] = 1.07 (95% CI: 1.03, 1.11). Decayed surfaces were associated with an increased odds of attending a dental appointment [OR] = 1.04 (95% CI: 1.04,1.04).

Table 4.3

*Logistic Regression Modeling the Odds of a Scheduled Appointment of a High-Risk Caries Patient with an Interaction from the Dental Care Advocate*

| <b>Appointment Scheduled</b>                 | <b>Odds Ratio</b> | <b>Std. Err.</b> | <b>z</b> | <b>p-value</b> | <b>95% Conf. Interval</b> |      |
|----------------------------------------------|-------------------|------------------|----------|----------------|---------------------------|------|
| <b>Any Interaction</b><br>(N = 86,025)       | 2.41              | 0.05             | 41.56    | < 0.0001       | 2.31                      | 2.51 |
| <b>Gender</b>                                |                   |                  |          |                |                           |      |
| Male                                         | --                | --               | --       | --             | --                        | --   |
| Female                                       | 1.06              | 0.02             | 3.89     | < 0.0001       | 1.03                      | 1.09 |
| <b>Patient Age</b>                           | 1.02              | 0.00             | 33.16    | < 0.0001       | 1.01                      | 1.02 |
|                                              |                   |                  |          |                |                           |      |
| <b>Rural/Urban</b>                           |                   |                  |          |                |                           |      |
| Urban                                        | --                | --               | --       | --             | --                        | --   |
| Rural                                        | 0.85              | 0.02             | -7.01    | < 0.0001       | 0.81                      | 0.89 |
| Unknown                                      | 0.94              | 0.23             | -0.28    | 0.78           | 0.58                      | 1.50 |
|                                              |                   |                  |          |                |                           |      |
| <b>Need Help With Instructional Material</b> |                   |                  |          |                |                           |      |
| Never                                        | --                | --               | --       | --             | --                        | --   |
| Rarely                                       | 1.11              | 0.02             | 4.98     | < 0.0001       | 1.06                      | 1.15 |
| Sometimes                                    | 1.11              | 0.03             | 3.20     | < 0.0001       | 1.04                      | 1.18 |
| Often                                        | 1.04              | 0.05             | 0.77     | 0.44           | 0.94                      | 1.15 |
| Always                                       | 1.07              | 0.03             | 2.55     | <b>0.01</b>    | 1.02                      | 1.13 |
|                                              |                   |                  |          |                |                           |      |
| <b>Race</b>                                  |                   |                  |          |                |                           |      |
| White                                        | --                | --               | --       | --             | --                        | --   |
| Non-White                                    | 1.12              | 0.02             | 5.85     | < 0.0001       | 1.08                      | 1.16 |
| Unknown                                      | 0.76              | 0.02             | -12.65   | < 0.0001       | 0.72                      | 0.79 |
|                                              |                   |                  |          |                |                           |      |
| <b>Decayed Surfaces</b>                      | 1.05              | 0.00             | 36.91    | < 0.0001       | 1.05                      | 1.05 |
| <b>Constant</b>                              | 0.73              | 0.02             | -14.11   | < 0.0001       | 0.70                      | 0.76 |

Note: Microsoft Excel spreadsheets (version 16.0.12624.20348)

Table 4.4

*Logistic Regression Modeling the Odds of an Attended Appointment of a High-Risk Caries Patient with an Interaction from the Dental Care Advocate*

| Appointment Attended                         | Odds Ratio | Std. Err. | z     | p-value  | 95% Conf. Interval |       |
|----------------------------------------------|------------|-----------|-------|----------|--------------------|-------|
| <b>Any Interaction</b><br>(N = 86,025)       | 2.306      | 0.047     | 41.24 | < 0.0001 | 2.216              | 2.399 |
| <b>Gender</b>                                |            |           |       |          |                    |       |
| Male                                         | --         | --        | --    | --       | --                 | --    |
| Female                                       | 1.083      | 0.016     | 5.48  | < 0.0001 | 1.053              | 1.115 |
| <b>Patient Age</b>                           | 1.017      | 0.000     | 38.31 | < 0.0001 | 1.016              | 1.018 |
| <b>Rural/Urban</b>                           |            |           |       |          |                    |       |
| Urban                                        | --         | --        | --    | --       | --                 | --    |
| Rural                                        | 0.867      | 0.020     | -6.15 | < 0.0001 | 0.829              | 0.907 |
| Unknown                                      | 0.955      | 0.226     | -0.2  | 0.845    | 0.600              | 1.519 |
| <b>Need Help With Instructional Material</b> |            |           |       |          |                    |       |
| Never                                        | --         | --        | --    | --       | --                 | --    |
| Rarely                                       | 1.127      | 0.022     | 6.03  | < 0.0001 | 1.084              | 1.171 |
| Sometimes                                    | 1.153      | 0.036     | 4.58  | < 0.0001 | 1.085              | 1.225 |
| Often                                        | 1.124      | 0.056     | 2.36  | 0.018    | 1.020              | 1.239 |
| Always                                       | 1.193      | 0.033     | 6.38  | < 0.0001 | 1.130              | 1.260 |
| <b>Race</b>                                  |            |           |       |          |                    |       |
| White                                        | --         | --        | --    | --       | --                 | --    |
| Non-White                                    | 1.071      | 0.020     | 3.69  | < 0.0001 | 1.033              | 1.111 |
| Unknown                                      | 0.726      | 0.016     | -14.6 | < 0.0001 | 0.695              | 0.758 |
| <b>Decayed Surfaces</b>                      | 1.041      | 0.001     | 32.6  | < 0.0001 | 1.039              | 1.044 |
| Constant                                     | 0.613      | 0.014     | 21.97 | < 0.0001 | 0.587              | 0.640 |

Note: Microsoft Excel spreadsheets (version 16.0.12624.20348)

## Discussion

This quantitative investigation has shown the DCA contact effects on high-risk patients' scheduling and attending a dental appointment ( $n = 17,171$ ), and patient scheduling and

attendance with no DCA contact ( $n = 68,854$ ). Studies have found that regular dental appointment attendance by patients results in better oral health (Bullock, Boath, Lewis, Gardam & Croft, 2001). While age, gender, race, health literacy level, rural/urban home address, and the number of decayed surfaces each had some level of significance, the overall focus of the study is on the DCA's impact on the scheduling and attendance of the patient to continue care. Additional studies investigating attendance and scheduling patterns with an outcome of disease-decay reduction at the tooth level within a patient population are needed in dentistry.

Findings from this study indicate that the scheduling and attendance of a dental appointment for those patients with a DCA interaction are more than 130% greater than those in the non-interaction DCA group. Year-over-year data indicate an increasing rate of patients having contact with the DCA role. Several factors may influence this. The 2016 data is included in the analysis as a baseline measurement year and included in the analysis to mark the inauguration of the role. The investigator included 20 days of data in the analysis to reflect the year the role officially started. The widely dispersed sites within the dental organization may have influenced the slow dissemination of the interaction expectations of the DCA as the forms and contact notes were not measured or monitored for performance. Through enhancements in the EDR and the introduction and sharing of quality measurement within the dental organization, more DCA interactions of the high-risk patients occurred.

Additionally, the advent of accountable care healthcare payment reform and measurement has driven enhanced targeted dental benefits for those patients who have been identified as high-risk. As the organization is compensated for the additional benefit, the influence of the outreach-intervention may be influenced by the change in the dental benefit

design. As dental plan benefits are typically deployed on a year-to-year basis, this may have impacted the focus of the DCA interaction.

Overall, of the high-risk dental patients who had an interaction with the DCA, 80% scheduled, and over 75% attended an appointment within their risk-appropriate interval. The positive direction of the high-risk patient to schedule and attend dental treatment is in alignment with the disease prevention strategies to delay or avoid future extensive dental trauma. However, with the current dental payment system that focuses on payment for procedures rather than diagnosis, treatment, and outcomes measures, the profession is at odds with embedding disease mitigation efforts into the mainstream of dental practice due to the financial cost. The cost of a DCA to do the interaction versus automation of the interaction process via patient portals may influence the adoption rate from an employee expense side.

While any interaction strategy may produce positive results, there are several existing limitations. The systematic review of McLean et al., (2016) that studied appointment reminder systems found the accuracy of the patient record is often out of date, lacking current phone numbers or contact information indicating the intervention is mitigated by information in the health record. To improve advocacy for the patient, the updates to the data are critical. This will influence the likelihood of scheduling and attendance interaction efforts by the DCA. The ramifications to the patient who do not get contacted by the DCA means they must hold the burden of scheduling their care independently.

Another cause for the lack of scheduling and attendance maybe with the lack of understanding of the need for continued care by the dental patient. Socio-economic status data were not available for analysis as a covariate. This may provide insight into the scheduling and

attendance patterns of a capitated insurance plan with the large accountable care dental organization.

Future work will be critical to measure the human contact versus the available technology to connect the patient through a digital space such as a patient portal offering online support and connectedness with the provider in real-time. These types of systems may be leveraged in ways to increase scheduling and attendance patterns in the future by providing direct access to a provider and patient. However, one point of future study must compare the cost of automated systems versus a DCA staff member with the possible advantage of more patients scheduling and attending appointments when they have experienced direct human contact.

## **Conclusions**

The DCA is a useful initiative to improve scheduling and attendance of high-risk caries patients. Dental Care Advocates play a vital role in care coordination by assisting the patient to schedule and improve patient attendance. For dental care organizations seeking to improve the scheduling and attendance of their patients, dental care advocates play a vital role in coordinating patient care. With increased patient appointment attendance, health outcomes will improve, and the cost of care will decrease.

## Chapter Five

### **The Connection Across the Three Studies: Discussion and Implications for Interprofessional Practice**

#### **Introduction**

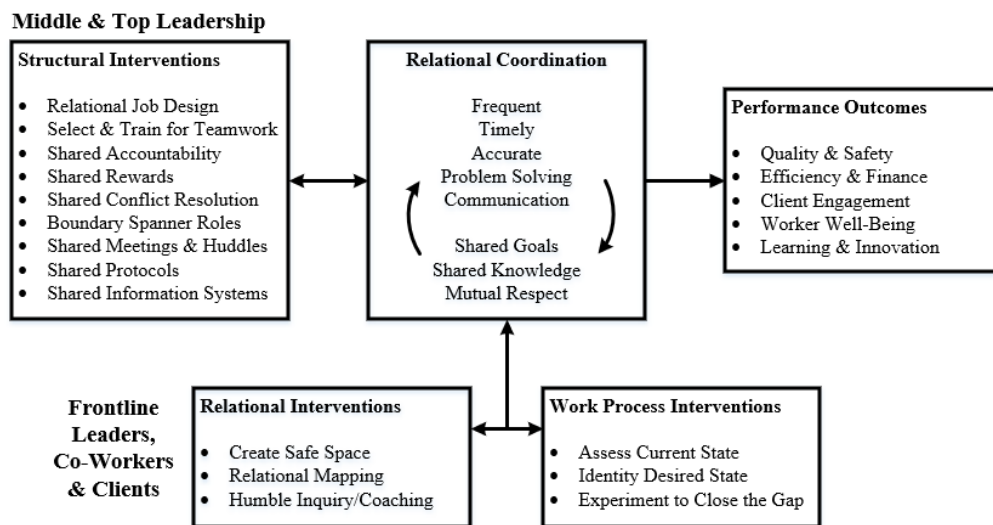
Redesigning the oral healthcare team requires a change in coordination efforts across the entire organizational system. The inception of the dental care advocate (DCA) job design is a disruptor to the existing relationship patterns of the dental team, which provides an opportunity to improve the coordination of care from provider to patient. Yet, the vast array of care coordination approaches found in the literature, and lack of contextual clarity, poses a limitation. Using the relational coordination (RC) theory as a guidepost to evaluate care coordination efforts, this research clarifies the job design of the DCA and the relationships the DCA has with other job families. When positive team dynamics are in play, a higher level of performance develops within the organization. The findings of this research confirm the three key elements – structure, relational coordination, and performance – are connected across all three studies and are essential to enhance team and organizational performance. These elements are: 1) the importance of job design; 2) the importance of role-to-role relationships; and 3) the synergy in performance when role and relationships are strong. See Figure 5.1.

**The importance of job design.** Central to coordination efforts is the notion of connecting the patient closer to the providers. The structure of job design can undermine or enhance this relationship. The central hypothesis of the RC theory contends that the job design is critical to foster coordination between job groups. The first step in evaluating care coordination efforts begins with the assessment of the structural components encompassing the care coordination role, better known as the job description. Using the organization's existing resources, the employee engagement survey, a measure of engagement of each job family group

results, provided the composite score of three questions: 1) My job allows me to utilize my strengths; 2) I find my job interesting and challenging; 3) I see professional growth and career development opportunities for myself in this organization. The results indicate a negative direction compared to the other existing job families. Building off of these questions to qualify the responses affords the organization direct feedback to improve upon the job-design of the DCA, and a measurement methodology for continuous improvement. The relational coordination model of organizational change calls this a work process intervention (Gittell, 2016).

Figure 5.1

*Theory of Change: The Relational Coordination Theory*



Note. Brandeis University. (2019). Relational coordination research collaborative: Transforming relationships for high performance. *The Heller School for Social Policy and Management, Brandeis University*. Retrieved from <https://heller.brandeis.edu/relational-coordination/about-rc/theory-change.html>

**The importance of role-to-role relationships.** Relationship patterns exist in groups; with the addition of a newly designed coordination role, those patterns are disrupted. The relational coordination theory maintains that job structures create sustainability of the roles.

However, by itself, the job design is not sufficient for improved organizational performance, the relationships built upon shared goals, shared knowledge, mutual respect and communication reflective of timeliness, accuracy, frequency, and problem-solving are equally important and necessary for improved organizational outcomes. To understand the experience of the DCA, interviews were conducted with seven questions called the relational interventions. The findings confirm that when relationships are strong, the engagement scores of the entire office are higher. While the instrument was used to qualify the experience of the DCA, to leverage the full depths of relationships from the viewpoint of each job family type, future studies can be enriched by a mixed-method approach to quantify and qualify the relational experience of the entire team.

**Synergy in performance when role and relationships are strong.** The ultimate measure of the redesign of a job structure and collaborative relationships is improved performance, and it is performance outcomes that are either supported or derailed by this interconnected linkage. The DCA job design and role relationships with other dental team members, in theory, improve the care for the patient. Finding a suitable measure directly tied to the DCA is complex; most of the literature centers on attendance patterns. The outcome study of the DCA provided insight consistent with other studies that care coordination improves attendance and decreases the no-show situation. Future work to evaluate care coordination efforts in dentistry may involve direct feedback from the patient. A patient experience measure would enable the patient to be a part of the coordination process, and this approach is supported in the relational coordination framework.

**Future work.** Based on the review of the literature conducted for this research, the framework of the relational coordination theory, and the findings of these three studies, there are several areas of potential future research. First, absent in the three studies is the theme of

leadership. This is a fundamental component to drive, sustain, or initiate organizational change.

Without relational leadership, the relational model of organizational change is incomplete.

Organizational leadership needs to minimize the constraints of collaborative practice by creating a culture that is safe, encourages a continuous flow of new knowledge, and represents an attitude of servant leadership. While the work of the DCA has strong leadership support, the clinical team roles within the organization need the same type of redesign. Currently, our identities as providers are steeped in the current professional paradigms of power and hierarchy, which inhibit the full integration of collaborative practice. This only can be achieved through effective and sustained leadership that is focused on culture change within the organization. Future studies might evaluate the influence of leadership on each of the three elements of the relational coordination theory to determine the most critical points of leverage that can be applied through leadership to improve organizational performance.

Second, another significant area for future research is the linkage between the relational coordination theory and interprofessional practice. There are a number of areas to investigate at the intersection of the relational coordination framework and interprofessional practice.

**Implications for Interprofessional Practice.** Because the three studies measured the components of the relational coordination framework in dentistry, these lay the groundwork for future valuable insights that can enhance interprofessional practice.

*Mending the medical-dental divide.* Dentistry still has an identity apart from the healthcare system. Allowing the profession to redesign and still maintain a professional identity is essential to interprofessional collaborative practice within dentistry. The relational coordination framework enables professional identities to remain intact; it connects the various

professional identities to elevate these efforts through a greater understanding of each of the distinct clinical team roles.

*Acceptance of new healthcare roles.* As new healthcare roles emerge or expand, understanding how these play into the organization's structure and culture is critical. For example, the DCA is a new role, yet engagement in the role needs improvement. If we create new roles and do not retain the employees in the role, not only will the performance of the organization suffer, the financial expense accrued to the organization can be staggering.

*Co-creation with interprofessional practice.* Often an important stakeholder is absent in the co-creation process, the patient. While interprofessional practice is about professions working together, I argue that the patient must be part of the redesign. The relational coordination theory is ultimately about transforming relationships, and the patient is a part of this relational transformation. Interprofessional practice can benefit from system redesign and ideation with the patient's input.

*Advancing integrated technology.* When structures are created to account for shared information systems and facility design built to learn with and from one another, the professions become interconnected, the essential core of interprofessional practice (Gittel, Godfrey & Thistlethwaite, 2012). As technology continues to improve, finding ways to connect the technology to other professions that are meaningful improves the care coordination for the patient. The rudimentary goal of technology integration in healthcare is to improve patient outcomes and reduce costs. Because improved care coordination leads to better patient outcomes, which can lower costs, advancing integrated technology to facilitate interprofessional practice makes fundamental sense.

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*Appendix A*

## Inauguration of the Dental Care Advocate Role



LEVEL 3  
FYI Only  
No Action Required  
Routine Information

## INTEROFFICE MEMO

To: All Employees

From: Kristen Simmons COO & Care Advocate  
Team  
Subject: PSR Transition

Date: 12/12/2016

## Message:

In the 45 years Willamette Dental Group has been providing excellent service to our patients, the Patient Service Representative position has gone through many transformations. From its humble beginnings as a receptionist through its progression to our current-day Patient Service Representative role, these individuals are the front line of patient care and communication. Now, we are excited to announce that the PSR role is evolving once again.

Our Patient Service Representatives will now be known as Care Advocates. Care Advocates will be taking a greater role in the overall care of our patients, including patient education and patient compliance. Each of our PSRs will undergo a training and evaluation process to become a certified Care Advocate. This transition will take time, but our expectation is that all current PSRs will be certified Care Advocates by the end of 2017. This title change is effective immediately – all of our PSRs can now be called Care Advocates, regardless of their certification status.

We ask that you be patient with this transition as we update documents, official titles and other business related items. If you have any questions or concerns please contact the Care Advocate team at [careadvocateteam@willamettedental.com](mailto:careadvocateteam@willamettedental.com), or you can contact our Care Advocate Development Specialist, Nicole Willers at [nwillers@willamettedental.com](mailto:nwillers@willamettedental.com) ext. 810179.

Congratulations to our new Care Advocates!

Director or Executive Approval:

Date:

Collaborated with applicable dept(s):

Date:

Willamette Dental Management Corp. | Willamette Dental Insurance, Inc. | Willamette Dental of Idaho, Inc. | Willamette Dental of Washington, Inc. | Willamette Dental Group, P.C.

## Appendix B

## Job description Care Advocate

## Job Description

## Care Advocate

Willamette Dental

|                               |                  |                   |            |
|-------------------------------|------------------|-------------------|------------|
| <b>Job Title:</b>             | Care Advocate    | <b>Job Code:</b>  |            |
| <b>Reports to (position):</b> | Practice Manager | <b>Pay Grade:</b> |            |
| <b>Date Last Updated:</b>     | 11/7/16          | <b>FLSA:</b>      | Non-exempt |

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|                  |                         |                                  |              |           |
|------------------|-------------------------|----------------------------------|--------------|-----------|
| <b>APPROVALS</b> | <b>Department:</b>      | Practices                        | <b>Date:</b> | 11/7/2016 |
|                  | <b>Human Resources:</b> | Kim Miller, Compensation Manager | <b>Date:</b> | 11/7/2016 |

## Job Summary

In partnership with the clinical team, the Care Advocate provides quality customer service through the coordination of patient flow and effective communication with patients, doctors, practice managers and clinic staff. The Care Advocate acts as the bridge for communication between patients, clinic staff and appointment center representatives by monitoring treatment completion, facilitating oral health improvement initiatives, and focusing on patient engagement. The Care Advocate helps to strengthen the therapeutic alliance between clinicians and patients by supporting provider recommendations, interventions, prescriptions and recalls.

## Job Responsibilities

- Oversees the daily schedule. Seeks opportunity to maximize scheduling efficiencies. Maintains awareness of schedule changes; promptly identifies and corrects scheduling errors.
- Understands payment methods and communicates fee requirements to patients. Collects and documents payments for dental services.
- Responsible for proper handling of monies. Accurately balances daily payment ledger and reconciles payments. Properly completes M.O.O.L.A.H. form and forwards to Accounting Department. Accurately completes deposit slips, and makes timely daily bank deposits.
- Updates patient card, confirms and verifies insurance information. Schedules treatment as directed by clinicians.
- Ensures charts are organized, prepared and available for patient appointments. Uses proper chart routing processes. Performs chart maintenance, as needed. Prepares new patient charts, according to current WD guidelines. Duplicates charts and records as requested.
- Complies with Company's safety, hazard communication and OSHA standards.
- Works with practice Manager to ensure adequate inventory for all patient products.
- Responsible for opening and closing the clinic. Responsible for keeping reception area neat and clean to instill patient confidence and comfort.
- Takes incoming calls and makes outgoing calls when necessary. Works closely and communicates regularly with other departments and clinics within the Company.

- Initiates a partnership and builds rapport with patients by providing thorough and accurate information and addressing any patient questions or concerns related to their treatment plan, as well as provides Statement of Services at each visit.
- Partner with clinical team to enhance understanding of dental procedures, treatment series, and interventions to enhance patient understanding.
- Partners with clinical team to understand provider's expectations and reiterate communication directives to the patient.
- Partners with clinical team to triage incoming emergency and unplanned treatment calls.
- Ensures coordination of care by scheduling and reinforcing recalls, referrals to internal and external providers, and answering patient questions related to their care.
- As directed by the provider, prescriptions and products are handed off – reviewing directions and answering patient questions.
- Able to identify patients that need additional care coordination, reach out to them via phone or other methods to encourage successful treatment outcomes.
- Utilizes Complaint Management System in order to timely document patient relation incidents.
- Additional duties as assigned.

#### EDUCATION, LICENSES, & CERTIFICATIONS

- High school diploma or equivalent required.
- Post-secondary coursework is desirable.

#### CERTIFICATION REQUIREMENTS

- Able to successfully demonstrate educational requirements regarding care advocacy in the form of an electronic exam.
- Able to successfully demonstrate case presentations regarding care advocacy to the Managing Doctor and Practice Manager.

#### EXPERIENCE, SKILLS & KNOWLEDGE

- Minimum 2 years customer service experience.
- Warm, friendly, engaging personality.
- Medical/Dental clinic or healthcare experience desirable, including strong knowledge of HIPAA compliance procedures.
- Strong computer skills including Microsoft Windows applications, and experience with electronic medical or dental records system.
- Knowledge of cash handling and payment procedures. Ability to learn different types of insurances and apply benefits accordingly.
- Excellent customer service skills; ability to manage conflict; identify alternative means of communication as needed; and communicate effectively and professionally with patients and team members.
- Skilled at listening to patient needs, building rapport and making personal connections.
- Utilize motivational interviewing techniques to identify patients' barriers to care and identifying solutions and alternatives.

- Able to work without supervision but know when to consult with manager for assistance.
- Strong organizational skills with ability to prioritize and meet deadlines. Strong attention to details and producing accurate work.
- Ability to interpret and follow guidelines accurately.
- Ability to adapt, accept and apply changes in policies, procedures, and department requirements.
- Working knowledge of dental terminology, risk factors, diagnosis, treatment plans, and recalls.
- Working knowledge of CAMBRA/PEMBRA philosophy and guidelines, and ability to review information presented on the PDCP.
- Ability to embrace and promote company's model of practicing dentistry.
- Ability to uphold and exemplify the company's core values.
- Ability to change work schedules. Is flexible and willing to work at any location on a temporary basis when the need arises.

*Appendix C*

The Dental Care Advocate Certification Process  
(Retrieved from the Dental Organizations Learning and Development Department)

When it comes to Care Advocacy, there is a lot of information to learn. Each Care Advocate will go through a certification process to ensure their understanding of Care Advocacy and how to be an advocate is sufficient. The process takes time, work with your Practice Manager and Lead Care Advocate to ensure you are completing each step of the following process.

1. CA has completed Clinical Training with Managing Doctor or delegate
2. CA has completed Motivation Interviewing with Lead PSR or delegate
3. CA has completed and passed the Care Advocate Test in SPOKE
4. PM has received Care Advocate packet, packet contains:
  - a) Instruction sheet for each step in the Care Advocacy certification process
  - b) CA Core Competency Matrix – 2 copies
  - c) 2 Care Advocate Case Presentation
  - d) 1 Unplanned Treatment Case Presentation
  - e) Certificate
  - f) Lapel Pin
5. CA has dedicated time to review and complete case presentation
6. CA presents case presentation to Practice Manager and Managing Doctor or delegate
7. PM makes a copy of the completed checklist and completed Matrix.
  - a) Copies go into the employee file
  - b) The original sent to Care Advocate Development Specialist

## Appendix D

## Item analysis Quantum Workplace Solutions

## Engagement

BY QUANTUM WORKPLACE

## Items Analysis for Willamette Dental

Team Selected: Willamette Dental | Slice By: {no slice}

Current Team Filters

Job Family Care Advocate



future success.



## Appendix E

Excel spreadsheet of the variables; job title, age, gender, tenure, rural/urban favorability

| Job  |       |                                                                                                    | Gender | Count of  |       | Strongly |       | Somewhat |          | Somewhat |          | Strongly |          |
|------|-------|----------------------------------------------------------------------------------------------------|--------|-----------|-------|----------|-------|----------|----------|----------|----------|----------|----------|
| Year | Title | Q# Q Text                                                                                          |        | Responses | Agree | Agree    | Agree | Disagree | Disagree | Disagree | Disagree | Disagree | Disagree |
| 2018 | CA    | 6. I find my job interesting and challenging.                                                      |        | 203       | 43    | 106      | 40    | 9        | 5        | 0        |          |          |          |
| 2018 | CA    | 6. I find my job interesting and challenging.                                                      | Female | 192       | 41    | 104      | 35    | 7        | 5        | 0        |          |          |          |
| 2018 | CA    | 6. I find my job interesting and challenging.                                                      | Male   | 11        | 2     | 2        | 5     | 2        | 0        | 0        |          |          |          |
| 2018 | CA    | 5. I see professional growth and career development opportunities for myself in this organization. |        | 203       | 46    | 71       | 54    | 20       | 8        | 4        |          |          |          |
| 2018 | CA    | 5. I see professional growth and career development opportunities for myself in this organization. | Female | 192       | 44    | 66       | 52    | 19       | 7        | 4        |          |          |          |
| 2018 | CA    | 5. I see professional growth and career development opportunities for myself in this organization. | Male   | 11        | 2     | 5        | 2     | 1        | 1        | 0        |          |          |          |
| 2018 | CA    | 39. My job allows me to utilize my strengths.                                                      |        | 202       | 62    | 85       | 40    | 10       | 4        | 1        |          |          |          |
| 2018 | CA    | 39. My job allows me to utilize my strengths.                                                      | Female | 191       | 60    | 80       | 37    | 9        | 4        | 1        |          |          |          |
| 2018 | CA    | 39. My job allows me to utilize my strengths.                                                      | Male   | 11        | 2     | 5        | 3     | 1        | 0        | 0        |          |          |          |
| 2018 | DA    | 6. I find my job interesting and challenging.                                                      |        | 419       | 185   | 184      | 37    | 5        | 5        | 3        |          |          |          |
| 2018 | DA    | 6. I find my job interesting and challenging.                                                      | Female | 397       | 176   | 175      | 34    | 5        | 5        | 2        |          |          |          |
| 2018 | DA    | 6. I find my job interesting and challenging.                                                      | Male   | 22        | 9     | 9        | 3     | 0        | 0        | 1        |          |          |          |
| 2018 | DA    | 5. I see professional growth and career development opportunities for myself in this organization. |        | 418       | 147   | 159      | 82    | 16       | 7        | 7        |          |          |          |
| 2018 | DA    | 5. I see professional growth and career development opportunities for myself in this organization. | Female | 396       | 140   | 151      | 78    | 15       | 6        | 6        |          |          |          |
| 2018 | DA    | 5. I see professional growth and career development opportunities for myself in this organization. | Male   | 22        | 7     | 8        | 4     | 1        | 1        | 1        |          |          |          |
| 2018 | DA    | 39. My job allows me to utilize my strengths.                                                      |        | 413       | 176   | 179      | 45    | 8        | 2        | 3        |          |          |          |
| 2018 | DA    | 39. My job allows me to utilize my strengths.                                                      | Female | 391       | 168   | 169      | 44    | 7        | 1        | 2        |          |          |          |
| 2018 | DA    | 39. My job allows me to utilize my strengths.                                                      | Male   | 22        | 8     | 10       | 1     | 1        | 1        | 1        |          |          |          |
| 2018 | HYG   | 6. I find my job interesting and challenging.                                                      |        | 193       | 107   | 71       | 10    | 1        | 4        | 0        |          |          |          |
| 2018 | HYG   | 6. I find my job interesting and challenging.                                                      | Female | 175       | 95    | 66       | 9     | 1        | 4        | 0        |          |          |          |
| 2018 | HYG   | 6. I find my job interesting and challenging.                                                      | Male   | 18        | 12    | 5        | 1     | 0        | 0        | 0        |          |          |          |
| 2018 | HYG   | 5. I see professional growth and career development opportunities for myself in this organization. |        | 194       | 94    | 57       | 34    | 3        | 5        | 1        |          |          |          |
| 2018 | HYG   | 5. I see professional growth and career development opportunities for myself in this organization. | Female | 176       | 85    | 52       | 31    | 3        | 5        | 0        |          |          |          |
| 2018 | HYG   | 5. I see professional growth and career development opportunities for myself in this organization. | Male   | 18        | 9     | 5        | 3     | 0        | 0        | 1        |          |          |          |
| 2018 | HYG   | 39. My job allows me to utilize my strengths.                                                      |        | 194       | 100   | 80       | 12    | 1        | 1        | 0        |          |          |          |
| 2018 | HYG   | 39. My job allows me to utilize my strengths.                                                      | Female | 176       | 89    | 75       | 10    | 1        | 1        | 0        |          |          |          |
| 2018 | HYG   | 39. My job allows me to utilize my strengths.                                                      | Male   | 18        | 11    | 5        | 2     | 0        | 0        | 0        |          |          |          |
| 2018 | DR    | 5. I see professional growth and career development opportunities for myself in this organization. |        | 140       | 65    | 38       | 29    | 7        | 0        | 1        |          |          |          |
| 2018 | DR    | 5. I see professional growth and career development opportunities for myself in this organization. | Female | 58        | 28    | 18       | 9     | 2        | 0        | 1        |          |          |          |
| 2018 | DR    | 5. I see professional growth and career development opportunities for myself in this organization. | Male   | 82        | 37    | 20       | 20    | 5        | 0        | 0        |          |          |          |
| 2018 | DR    | 6. I find my job interesting and challenging.                                                      |        | 140       | 81    | 44       | 12    | 3        | 0        | 0        |          |          |          |
| 2018 | DR    | 6. I find my job interesting and challenging.                                                      | Female | 58        | 33    | 21       | 3     | 1        | 0        | 0        |          |          |          |
| 2018 | DR    | 6. I find my job interesting and challenging.                                                      | Male   | 82        | 48    | 23       | 9     | 2        | 0        | 0        |          |          |          |
| 2018 | DR    | 39. My job allows me to utilize my strengths.                                                      |        | 136       | 67    | 60       | 7     | 2        | 0        | 0        |          |          |          |
| 2018 | DR    | 39. My job allows me to utilize my strengths.                                                      | Female | 56        | 29    | 24       | 2     | 1        | 0        | 0        |          |          |          |
| 2018 | DR    | 39. My job allows me to utilize my strengths.                                                      | Male   | 80        | 38    | 36       | 5     | 1        | 0        | 0        |          |          |          |
| 2017 | CA    | 6. I find my job interesting and challenging.                                                      |        | 194       | 45    | 95       | 38    | 10       | 3        | 3        |          |          |          |
| 2017 | CA    | 6. I find my job interesting and challenging.                                                      | Female | 184       | 43    | 92       | 34    | 9        | 3        | 3        |          |          |          |
| 2017 | CA    | 6. I find my job interesting and challenging.                                                      | Male   | 10        | 2     | 3        | 4     | 1        | 0        | 0        |          |          |          |
| 2017 | CA    | 5. I see professional growth and career development opportunities for myself in this organization. |        | 194       | 41    | 75       | 41    | 14       | 18       | 5        |          |          |          |
| 2017 | CA    | 5. I see professional growth and career development opportunities for myself in this organization. | Female | 184       | 38    | 72       | 38    | 14       | 18       | 4        |          |          |          |
| 2017 | CA    | 5. I see professional growth and career development opportunities for myself in this organization. | Male   | 10        | 3     | 3        | 3     | 0        | 0        | 1        |          |          |          |
| 2017 | CA    | 39. My job allows me to utilize my strengths.                                                      |        | 192       | 49    | 92       | 36    | 10       | 3        | 2        |          |          |          |
| 2017 | CA    | 39. My job allows me to utilize my strengths.                                                      | Female | 182       | 48    | 87       | 32    | 10       | 3        | 2        |          |          |          |
| 2017 | CA    | 39. My job allows me to utilize my strengths.                                                      | Male   | 10        | 1     | 5        | 4     | 0        | 0        | 0        |          |          |          |
| 2017 | DA    | 6. I find my job interesting and challenging.                                                      |        | 374       | 174   | 157      | 30    | 5        | 4        | 4        |          |          |          |
| 2017 | DA    | 6. I find my job interesting and challenging.                                                      | Female | 356       | 166   | 151      | 27    | 5        | 3        | 4        |          |          |          |
| 2017 | DA    | 6. I find my job interesting and challenging.                                                      | Male   | 18        | 8     | 6        | 3     | 0        | 1        | 0        |          |          |          |
| 2017 | DA    | 5. I see professional growth and career development opportunities for myself in this organization. |        | 376       | 147   | 143      | 58    | 13       | 5        | 10       |          |          |          |
| 2017 | DA    | 5. I see professional growth and career development opportunities for myself in this organization. | Female | 358       | 142   | 134      | 57    | 12       | 4        | 9        |          |          |          |
| 2017 | DA    | 5. I see professional growth and career development opportunities for myself in this organization. | Male   | 18        | 5     | 9        | 1     | 1        | 1        | 1        |          |          |          |

*Appendix F*

## The Proactive Dental Care Plan

## Proactive Dental Care Plan

Your Dental Report Card



Willamette  
Dental Group  
www.willamettedental.com

Example TestPatient
September 27, 2016

### A Lifetime of Healthy Teeth and Gums

We want you to enjoy a lifetime of healthy teeth and gums. In order to reach that goal, we need a long-lasting partnership with you. We have put together some personalized recommendations for you that will help to lower your risk for dental disease and the need for major dental treatment in the future. This plan maps out how you can achieve great oral health and shows you how to maintain it.

### Your Current Oral Health

After examining you, we have found that your current oral health puts you at **High** risk for tooth decay and your gum diagnosis is **Healthy Periodontium**.

Tooth Decay Risk 

Low

Moderate

High

Extreme

 Gum Disease

#### Healthy Teeth?

|                             |                                                                                                                                                                                                                                                                   |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current cavities            | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #e74c3c;"></div></div> |
| Recent cavities             | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #e74c3c;"></div></div> |
| Low plaque                  | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #2e8b57;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div></div> |
| Early signs of active decay | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #e74c3c;"></div></div> |
| No dry mouth                | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #2e8b57;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div></div> |
| Diet high in sugar/acid     | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #e74c3c;"></div></div> |
| Active bacteria score       | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div></div>    |

#### Healthy Gums?

|                          |                                                                                                                                                                                                                                                                   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current smoker <10       | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #e67e22;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div></div> |
| Not diabetic             | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #2e8b57;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div></div> |
| Low plaque               | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #2e8b57;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div></div> |
| Probing <4mm             | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #2e8b57;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div></div> |
| No bone loss             | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #2e8b57;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div></div> |
| Bleeding on probing <25% | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #e67e22;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div></div> |
| No loose teeth           | <div style="display: flex; gap: 5px;"><div style="width: 20px; height: 10px; background-color: #2e8b57;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div><div style="width: 20px; height: 10px; background-color: #ccc;"></div></div> |

## Your Treatment Plan

Your oral health is a partnership between you and your dental team.



### What We Do

#### Your Planned Treatment

- Fluoride Varnish
- Tooth-colored filling (18, 30)
- Nitrous Oxide Sedation

Automatic reminders will be sent to you when it is time to **schedule your upcoming appointment(s)**:

Your next Caries Risk Assessment is due **December 27, 2016**.

Your next cleaning, exam and x-rays are due **September 27, 2017**.



### What You Do

#### Recommendations

- Brush 2 times a day for 2 minutes each time and floss at least once a day

#### Therapeutic Prescriptions

- High fluoride paste prescribed
- Chlorhexidine prescribed

#### Recommended Products

- Sonicare Toothbrush

## What is a Caries Risk Assessment?

We need to see you back in **3 months** to complete further treatment to lower your risk for cavities. The purpose of this appointment is not a cleaning. Instead, here is what to expect at this appointment:

- Take a saliva test to check the bacteria levels in your mouth
- Oral exam & review of home care success
- Re-assessment of cavity risk
- Fluoride varnish treatment
- Pick up refills of medications (if needed)

### Online Patient Instructions

Go online to view detailed patient instructions that are specific to your risk levels. You can also request printed copies from your provider.

#### Tooth Decay Risk Instructions



[willamettedental.com/toothdecay-high](http://willamettedental.com/toothdecay-high)

#### Gum Disease Instructions



[willamettedental.com/healthygums](http://willamettedental.com/healthygums)

*Appendix G*

## Relational Coordination Theory to Teamwork Measures

## Comparing RC to Other Validated Measures of Teamwork in Healthcare

**Bounded and Validated**

1. Team Survey (Millward and Jeffries)
2. Team Effectiveness (Pearce and Sims)
3. Cross-functional Team Process (Alexander et al.)
4. Teamwork Quality Survey (Hoegl and Gemenden)
5. Team Emergency Assessment Measure (TEAM) (Cooper et al.)

**Unbounded and Validated**

1. Relational Coordination (Gittell)
2. Nursing Teamwork Survey (Kalisch et al.)

**Bounded and Not Yet Validated**

1. Team Process Scale (Brannick et al.)
2. Team Member Exchange (TMX) Quality Scale (Seers)
3. Collaboration Scale (Kahn and McDonough)
4. Team Climate Inventory (Anderson and West)
5. Team Process Quality (Hauptman and Hirji)
6. Team Functioning (Strasser et al.)
7. Teamwork Scale (Friesen et al.)
8. Team Organization (La Duckers et al.)
9. Primary Care Patient Safety Climate Measure (PC-SafeQuest)
10. Team Functioning Survey (Strasser et al.)

**Unbounded and Not Yet Validated**

1. ICU Nurse-Physician Collaboration (Shortell et al.)
2. Collaboration and Satisfaction about Care Decisions (Baggs)
3. Professional Working Relationships (Adams et al.)
4. Hospital Survey on Patient Safety (Sorra and Nieva)
5. Perceptions about Interdisciplinary Collaboration Scale (Copnell et al.)
6. Teamwork Scale (Hutchinson et al.)
7. Safety Attitudes Questionnaire (Sexton et al.)
8. Leiden Operating Theater and Intensive Care Safety (LOTICS) (Van Beuzekom et al.)
9. Collaboration Scale (Masse et al.)
10. Nurse-Physician Collaboration (Ushiro)

11. Collaborative Practice Assessment Tool  
(CPAT) Schroder et al.)

Based on findings reported in Valentine, M., Nembhard, I. & Edmondson, A. (2013). Measuring teamwork in health care settings: A review of survey instruments. *Medical Care*.

*\*Two of the original 30 measures they considered were neither bounded nor unbounded and are therefore not shown on this table. Neither was validated.*

*Appendix H*

## Interview Guide: Study Three

**Interview Guide: Code #**

Thank you for meeting with me. I would like to hear your experience with other team members about the Proactive Dental Care Plan. I ask you to rate your responses in relation to the dentist, dental hygienist, the dental assistant; then, I will ask for you to explain why you gave the rating. As stated in the consent form, all your responses will be confidential, and your participation is voluntary. You can skip a question or stop participating at any time. I would like to record our interview; may I have your permission to do so?

1. On a Likert like scale of never, rarely, occasionally, often, or constantly how frequently does the (dentist, dental hygienist, dental assistant) communicate with you about the PDCP?

Dentist Rating\_\_\_\_\_ (Explain why)

Dental Hygienist Rating\_\_\_\_\_ (Explain why)

Dental Assistant Rating\_\_\_\_\_ (Explain Why)

2. On a Likert like scale of never, rarely, occasionally, often, or constantly how timely is the (Dentist, Hygienist, Dental Assistant) with you about the PDCP?

Dentist Rating\_\_\_ (Explain Why)

Dental Hygienist Rating \_\_\_\_ (Explain Why)

Dental Assistant Rating\_\_\_\_\_ (Explain Why)

3. On a Likert like scale of never, rarely, occasionally, often, or constantly how accurate is the (Dentist, Hygienist, Assistant) with you about the PDCP?

Dentist Rating\_\_\_ (Explain Why)

Dental Hygienist Rating \_\_\_\_ (Explain Why)

Dental Assistant Rating\_\_\_\_ (Explain Why)

4. On a Likert like scale of never, rarely, occasionally, often, or constantly when there is a problem with the PDCP do (Dentist, Hygienist, Assistant) blame others or work with you to solve the problem?

Dentist Rating\_\_\_ (Explain Why)

Dental Hygienist Rating \_\_\_\_ (Explain Why)

Dental Assistant Rating\_\_\_\_ (Explain Why)

5. On a Likert like scale of never, rarely, occasionally, often, or constantly does the (Dentist, Hygienist, Assistant) share your goals for the PDCP?

Dentist Rating\_\_\_ (Explain Why)

Dental Hygienist Rating \_\_\_\_ (Explain Why)

Dental Assistant Rating\_\_\_\_ (Explain Why)

6. On a Likert like scale of never, rarely, occasionally, often, or constantly do the (dentist, Hygienist, Assistant) know about the work you do with the PDCP?

Dentist Rating\_\_\_ (Explain Why)

Dental Hygienist Rating \_\_\_\_ (Explain Why)

Dental Assistant Rating\_\_\_\_ (Explain Why)

7. On a Likert like scale of never, rarely, occasionally, often, or constantly does the (Dentist, Hygienist, Assistant) respect the work you do with the PDCP?

Dentist Rating\_\_\_ (Explain Why)

Dental Hygienist Rating \_\_\_\_ (Explain Why)

Dental Assistant Rating \_\_\_\_ (Explain Why)

*Appendix I*

## Descriptive Data of the Relational Coordination Questions

| Question                                                                                                                       | Provider Type    | Number of Responses |       |              |        |       | Percentages of Responses |       |              |        |       |
|--------------------------------------------------------------------------------------------------------------------------------|------------------|---------------------|-------|--------------|--------|-------|--------------------------|-------|--------------|--------|-------|
|                                                                                                                                |                  | Constantly          | Often | Occasionally | Rarely | Never | Constantly               | Often | Occasionally | Rarely | Never |
| How frequent does the (dentist, dental hygienist, dental assistant) communicate with you about the PDCP?                       | Dentist          | 3                   | 8     | 5            | 4      | 0     | 15%                      | 40%   | 25%          | 20%    | 0%    |
| How frequent does the (dentist, dental hygienist, dental assistant) communicate with you about the PDCP?                       | Hygienist        | 3                   | 8     | 6            | 2      | 0     | 16%                      | 42%   | 32%          | 11%    | 0%    |
| How frequent does the (dentist, dental hygienist, dental assistant) communicate with you about the PDCP?                       | Dental Assistant | 5                   | 5     | 7            | 2      | 0     | 26%                      | 26%   | 37%          | 11%    | 0%    |
| How timely is the (Dentist, Hygienist, Dental Assistant) with you about the PDCP?                                              | Dentist          | 9                   | 6     | 3            | 2      | 0     | 45%                      | 30%   | 15%          | 10%    | 0%    |
| How timely is the (Dentist, Hygienist, Dental Assistant) with you about the PDCP?                                              | Hygienist        | 6                   | 10    | 4            | 0      | 0     | 30%                      | 50%   | 20%          | 0%     | 0%    |
| How timely is the (Dentist, Hygienist, Dental Assistant) with you about the PDCP?                                              | Dental Assistant | 5                   | 11    | 4            | 0      | 0     | 25%                      | 55%   | 20%          | 0%     | 0%    |
| How accurate is the (Dentist, Hygienist, Assistant) with you about the PDCP?                                                   | Dentist          | 13                  | 5     | 1            | 0      | 0     | 68%                      | 26%   | 5%           | 0%     | 0%    |
| How accurate is the (Dentist, Hygienist, Assistant) with you about the PDCP?                                                   | Hygienist        | 12                  | 8     | 0            | 0      | 0     | 60%                      | 40%   | 0%           | 0%     | 0%    |
| How accurate is the (Dentist, Hygienist, Assistant) with you about the PDCP?                                                   | Dental Assistant | 7                   | 8     | 5            | 0      | 0     | 35%                      | 40%   | 25%          | 0%     | 0%    |
| When there is a problem with the PDCP do (Dentist, Hygienist, Assistant) work with you, or blame others, to solve the problem? | Dentist          | 14                  | 2     | 1            | 3      | 0     | 70%                      | 10%   | 5%           | 15%    | 0%    |
| When there is a problem with the PDCP do (Dentist, Hygienist, Assistant) work with you, or blame others, to solve the problem? | Hygienist        | 13                  | 3     | 0            | 2      | 2     | 65%                      | 15%   | 0%           | 10%    | 10%   |
| When there is a problem with the PDCP do (Dentist, Hygienist, Assistant) work with you, or blame others, to solve the problem? | Dental Assistant | 12                  | 3     | 2            | 2      | 1     | 60%                      | 15%   | 10%          | 10%    | 5%    |
| Does the (Dentist, Hygienist, Assistant) share your goals for the PDCP?                                                        | Dentist          | 4                   | 3     | 7            | 4      | 2     | 20%                      | 15%   | 35%          | 20%    | 10%   |
| Does the (Dentist, Hygienist, Assistant) share your goals for the PDCP?                                                        | Hygienist        | 3                   | 4     | 6            | 4      | 3     | 15%                      | 20%   | 30%          | 20%    | 15%   |
| Does the (Dentist, Hygienist, Assistant) share your goals for the PDCP?                                                        | Dental Assistant | 3                   | 6     | 6            | 2      | 3     | 15%                      | 30%   | 30%          | 10%    | 15%   |
| Do the (dentist, Hygienist, Assistant) know about the work you do with the PDCP?                                               | Dentist          | 6                   | 5     | 5            | 3      | 1     | 30%                      | 25%   | 25%          | 15%    | 5%    |
| Do the (dentist, Hygienist, Assistant) know about the work you do with the PDCP?                                               | Hygienist        | 7                   | 7     | 2            | 3      | 1     | 35%                      | 35%   | 10%          | 15%    | 5%    |
| Do the (dentist, Hygienist, Assistant) know about the work you do with the PDCP?                                               | Dental Assistant | 7                   | 7     | 2            | 2      | 2     | 35%                      | 35%   | 10%          | 10%    | 10%   |
| Does the (Dentist, Hygienist, Assistant) respect the work you do with the PDCP?                                                | Dentist          | 11                  | 7     | 2            | 0      | 0     | 55%                      | 35%   | 10%          | 0%     | 0%    |
| Does the (Dentist, Hygienist, Assistant) respect the work you do with the PDCP?                                                | Hygienist        | 11                  | 7     | 2            | 0      | 0     | 55%                      | 35%   | 10%          | 0%     | 0%    |
| Does the (Dentist, Hygienist, Assistant) respect the work you do with the PDCP?                                                | Dental Assistant | 12                  | 6     | 2            | 0      | 0     | 60%                      | 30%   | 10%          | 0%     | 0%    |

*Appendix J*

## Research Consent Form

**PACIFIC UNIVERSITY  
CONSENT TO PARTICIPATE IN A RESEARCH STUDY****Study Title: Redesigning the Oral Healthcare Team: Dentistry's Adoption of a New Team Member to Improve Patient Outcomes**

This is a research study designed to gain insight into the experiences of the dental care advocate about the proactive dental care plan and the relationship the dental care advocate has with the dentist, dental hygienist, and dental assistant in a large dental group practice. The study Principal Investigator, Kristen Simmons, RDH, MHA, will explain this study to you.

You are being asked to take part in this study because you are a dental care advocate, having real-world experience treating a patient at a large dental group practice.

Research studies include only people who choose to take part. Please take your time to make your decision about participating. If you have any questions, you may ask the researcher.

**Why is this study being done?**

The purpose of this study is to gain insight into the experiences of dental care advocates and the relationship with the dentist, dental hygienist, and dental assistant using the Proactive Dental Care Plan. This study will improve our current understanding of the relationship of the dental care advocate has with the dentist, dental hygienist, and dental assistant. This disclosure is made so that you can decide if this relationship will affect your willingness to participate in this study.

**How many people will take part in this study?**

About 20 dental care advocates will take part in the study as interviewees.

**What will happen if I take part in this research study?****If you agree, the following procedures will occur:**

- The researcher will interview you for about an hour in a private room. The researcher will ask you to describe your experiences within the proactive dental care plan and the relationship you have with the dentist, dental hygienist, and dental assistant.
- The transcript is returned to the participant for approval of the content.

- The researcher will make a digital audio recording of your conversation.
- After the interview, the researcher will type into a computer transcription of what's on the tape and will remove any mention of names. The sound recording will be destroyed at the end of the study.
- **Study location:** All of these procedures will occur at the place of your work during your work time.

**How long will I be in the study?**

Participation in the study will take a total of about an hour in one sitting. This study is expected to be completed by December 2019.

**Can I stop being in the study?**

Yes. You can decide to stop at any time. Just tell the study researcher right away if you wish to stop being in the study.

Also, the study researcher may stop you from taking part in this study at any time if she believes it is in your best interest, if you do not follow the study rules, or if the study is stopped.

**What side effects or risks can I expect from being in the study?**

- Participation in this study will not influence your employment.
- Any disclosed information about the name of another employee, the researcher will ask for a de-identified name as a substitute.

**Are there benefits to taking part in the study?**

There will be no direct benefit to you from participating in this study. However, the information that you provide may help gain insight into the role of the dental care advocate to help improve the role within the large dental group practice.

**What other choices do I have if I do not take part in this study?**

You are free to choose not to participate in the study. If you decide not to take part in this study, there will be no penalty to you.

**Will information about me be kept private?**

The personal information gathered in the study is specific to the job role, not the individual person. The participant interviews are private and are returned to the participant to reflect the accuracy of the interview. The participant can retract the interview and the written transcript at

any time. Once the participant validates the transcription, the interview is referred to by dedicated code. The code is kept with the researcher in a secure place. However, we cannot guarantee total privacy. Your personal information may be given out if required by law. If information from this study is published or presented at scientific meetings, your name and any other personal information will not be used. At no time will the principal investigator seek to identify the names of the participants.

**Will I be paid for taking part in this study?**

The dental organization will compensate you for the hour you take out of your workday to participate in the study as if it were a regular work hour. You will not receive additional compensation for participation.

**What are my rights if I take part in this study?**

Taking part in this study is your choice. You may choose either to take part or not to take part in the study. If you decide to take part in this study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you in any way.

**Who can answer my questions about the study?**

You can talk to the researcher(s) about any questions, concerns, or complaints you have about this study. Contact the research Principal Investigators Kristen Simmons RDH, MHA at 503 952 2536.

If you wish to ask questions about the study or your rights as a research participant to someone other than the researcher or if you wish to voice any problems or concerns you may have about the study; please call the Privacy Officer Russ House, J.D. at 503-952-2585.

The investigator(s) will be happy to answer any questions you may have at any time during the duration of the study. If you are not satisfied with the answers you receive, please call the Pacific University Institutional Review Board at 503-352-1478 to discuss your questions or concerns further. If you have questions about your rights as a research subject, or if you experience a Research-related injury of any kind, please contact the investigator(s) and/or the IRB office. All concerns and questions will be kept in confidence.

**CONSENT**

YES ☐ NO ☐

I am 18 years of age or over.

All my questions have been answered.

I have read and understand the description of my participation duties.

I have been offered a copy of this form to keep for my records.

I voluntarily agree to participate in this study and understand that I may withdraw at any time without consequence

You have been given a copy of this consent form to keep.

PARTICIPATION IN RESEARCH IS VOLUNTARY. You have the right to decline to be in this study or to withdraw from it at any point without penalty or loss of benefits to which you are otherwise entitled.

---

Date

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Participant's Signature for Consent

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Date

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Person Obtaining Consent

## Examples of a Contact Notes in axiUm

Example of contact note in axiUm the dental care advocate uses.

| Contact Note Codes                                                                                                                                                  |                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
|   |                                                                   |
| Contact Note Code                                                                                                                                                   |                                                                   |
| Code                                                                                                                                                                | <input type="text"/>                                              |
| Text                                                                                                                                                                | <input type="text"/>                                              |
| Code                                                                                                                                                                | Text                                                              |
| ACMSG                                                                                                                                                               | Appt Ctr - Message:                                               |
| ACOC                                                                                                                                                                | Patient has OHP Open Card                                         |
| ACOHP                                                                                                                                                               | Current " OHP Website                                             |
| ACOR                                                                                                                                                                | Outreach Patient                                                  |
| ACORA                                                                                                                                                               | Outreach Patient Attempts                                         |
| ACORD                                                                                                                                                               | Outreach Declined                                                 |
| ACPTAW                                                                                                                                                              | Patient is aware to bring insurance info to appt.                 |
| AETDMO                                                                                                                                                              | Aetna DMO-Dependent coverage confirmed on Aetna DMO file for      |
| ALIAS                                                                                                                                                               | Patient has an alias                                              |
| APRREF                                                                                                                                                              | Approved Referral                                                 |
| APTRMD                                                                                                                                                              | Care Advocate Appt Reminder Call                                  |
| CAMSG                                                                                                                                                               | Care Advocate Message:                                            |
| CANPOL                                                                                                                                                              | Patient aware of 24 hour cancel policy and missed appointment fee |
| ELIG                                                                                                                                                                | Eligibility:                                                      |
| FFEXT                                                                                                                                                               | Family & friends extended list sponsoring dentist                 |
| FFSBEN                                                                                                                                                              | FFS Benefit Details:                                              |
| INS-                                                                                                                                                                | Insurance-                                                        |
| LAB                                                                                                                                                                 | Contacted Patient Regarding Lab Case:                             |
| LM2SRA                                                                                                                                                              | Left message to schedule/reschedule appointment regarding:        |
| LMT CAB                                                                                                                                                             | Left message to cancel appointment because:                       |
| MERGE                                                                                                                                                               | Account to be Merged                                              |
| MISSED                                                                                                                                                              | Remainder of year scheduling provided at office                   |
| MSLTR                                                                                                                                                               | Mbr Serv - Sent Letter                                            |
| MSMSG                                                                                                                                                               | Mbr Serv - Message:                                               |
| MUREM                                                                                                                                                               | EasyMarket patient contact note.                                  |
| OSMSG                                                                                                                                                               | Other Message:                                                    |

A listing of the contact note codes in axiUm.

Completed Contact Note by the Dental Care advocate

*Appendix L*

Example of the follow-up form used by the Dental Care Advocate

| Care Advoc Follow Up                                                                                                                                      |        |      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|
| Form Question                                                                                                                                             | Answer | Date |
| Type of Contact                                                                                                                                           |        |      |
| Additional Info                                                                                                                                           |        |      |
|  Products Dispensed:                                                     |        |      |
| Additional Product Info                                                                                                                                   |        |      |
| PDCP/Instruction Sheets Reviewed with Patient?                                                                                                            |        |      |
| Additional Info                                                                                                                                           |        |      |
| OHI Reviewed?                                                                                                                                             |        |      |
| OHI Details                                                                                                                                               |        |      |
| Patient Motivation Level                                                                                                                                  |        |      |
| Additional Info                                                                                                                                           |        |      |
|  Are there any obstacles that would affect the outcome of treatment?   |        |      |
| Additional Info on Patient Obstacles                                                                                                                      |        |      |
|  Patient Compliance: Did the patient fill their prescription products? |        |      |
| Patient Compliance: Did the patient use the products as directed?                                                                                         |        |      |
| Patient Compliance: What is the plan to improve patient compliance?                                                                                       |        |      |
| Additional Info                                                                                                                                           |        |      |
| Additional Notes                                                                                                                                          |        |      |



*Appendix M*

## The DCA intervention Data – Microsoft Excel spreadsheet

The spreadsheet of all qualifying exam visits in the three years (2016-2018).

| Year                                                        | Patients<br>in Study<br>N | DCA<br>contact<br>A | Appt<br>Scheduled<br>AY | % with<br>Appt<br>AY% | Appt No-<br>showed<br>AYN | % with No-<br>show<br>AYN% | Appt<br>Attended<br>AYY | % with<br>Attended<br>AYY% | No DCA<br>Contact<br>B | Appt<br>Scheduled<br>BY | % with<br>Appt<br>BY% | Appt No-<br>showed<br>BYN | % with No-<br>show<br>BYN% | Appt<br>Attended<br>BYY | % with<br>Attended<br>BYY% | % with<br>DCAC that<br>Attended<br>AAY2% | % w/o<br>DCAC that<br>Attended<br>BYY2% |
|-------------------------------------------------------------|---------------------------|---------------------|-------------------------|-----------------------|---------------------------|----------------------------|-------------------------|----------------------------|------------------------|-------------------------|-----------------------|---------------------------|----------------------------|-------------------------|----------------------------|------------------------------------------|-----------------------------------------|
| <b>Care Advocate Followup Only</b>                          |                           |                     |                         |                       |                           |                            |                         |                            |                        |                         |                       |                           |                            |                         |                            |                                          |                                         |
| 2016                                                        | 26930                     | 148                 | 127                     | 86%                   | 28                        | 22%                        | 124                     | 98%                        | 26782                  | 16797                   | 63%                   | 2583                      | 15%                        | 16157                   | 96%                        | 84%                                      | 60%                                     |
| 2017                                                        | 27738                     | 1364                | 975                     | 71%                   | 172                       | 18%                        | 943                     | 97%                        | 26374                  | 16711                   | 63%                   | 2774                      | 17%                        | 15915                   | 95%                        | 69%                                      | 60%                                     |
| 2018                                                        | 31324                     | 931                 | 706                     | 76%                   | 134                       | 19%                        | 682                     | 97%                        | 30393                  | 20313                   | 67%                   | 3719                      | 18%                        | 19216                   | 95%                        | 73%                                      | 63%                                     |
| <b>Care Advocate Followup or Care Advocate Contact Note</b> |                           |                     |                         |                       |                           |                            |                         |                            |                        |                         |                       |                           |                            |                         |                            |                                          |                                         |
| 2016                                                        | 26930                     | 498                 | 449                     | 90%                   | 95                        | 21%                        | 441                     | 98%                        | 26432                  | 16475                   | 62%                   | 2516                      | 15%                        | 15840                   | 96%                        | 89%                                      | 60%                                     |
| 2017                                                        | 27738                     | 6307                | 4982                    | 79%                   | 954                       | 19%                        | 4814                    | 97%                        | 21431                  | 12704                   | 59%                   | 1992                      | 16%                        | 12044                   | 95%                        | 76%                                      | 56%                                     |
| 2018                                                        | 31324                     | 10358               | 8377                    | 81%                   | 1779                      | 21%                        | 8044                    | 96%                        | 20966                  | 12642                   | 60%                   | 2074                      | 16%                        | 11854                   | 94%                        | 78%                                      | 57%                                     |

| Variable | Criteria                                                              | Explanation                                       | Used for              |
|----------|-----------------------------------------------------------------------|---------------------------------------------------|-----------------------|
| N        | Patient with an exam and is high CRA                                  | This is our set of distinct patients to work with |                       |
| A        | Patient has a DCA follow-up form within 6 months of exam              | DCA form found in EHR                             |                       |
| AY       | Patient had an appointment scheduled within 6 months of exam          | DCA and appointment scheduled                     | % to compare with BY  |
| AYN      | Patient failed at least 1 appointment (no-showed)                     | DCA, appt, no-showed                              | % to compare with BYN |
| AYY      | Patient attended at least 1 appointment                               | DCA, appt, showed                                 | % to compare with BYY |
| B        | Patients with no DCA follow-up form within 6 months of exam           | DCA form not found in EHR (= N - A)               |                       |
| BY       | Patient had an appointment scheduled within 6 months of exam          | No DCA and appointment scheduled                  | % to compare with AY  |
| BYN      | Patient failed at least 1 appointment (no-showed)                     | No DCA, appt, no-showed                           | % to compare with AYN |
| BYY      | Patient attended at least 1 appointment                               | No DCA, appt, showed                              | % to compare with AYY |
| AY%      | % of patients with DCA followup and appt scheduled                    | DCA, appt scheduled (as % of A)                   | compare with BY%      |
| AYN%     | % of patients with DCA followup and appt scheduled that no-showed     | DCA, appt, no-showed (as % of AY)                 | compare with BYN%     |
| AYY%     | % of patients with DCA followup and appt scheduled that attended appt | DCA, appt, showed (as % of AY)                    | compare with BYY%     |
| AAY2%    | % of patients with DCA followup that attended appointment             | DCA, showed for appt (as % of A)                  | compare with BYY2%    |