

Running head: DIABETES MANAGEMENT IN PERITONEAL DIALYSIS PROGRAMS

“WALKING THE TALK” IN THE
INTEGRATION OF CHRONIC DISEASE PREVENTION MANAGEMENT:
DIETITIANS’ PERSPECTIVES REGARDING DIABETES MANAGEMENT IN
ADULT PERITONEAL DIALYSIS PROGRAMS IN ONTARIO.

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

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Certificate of approval

CERTIFICATE OF APPROVAL

Submitted by Christina Vaillancourt

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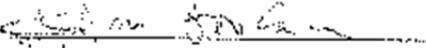
Thesis title: "Walking the talk" In the integration of chronic disease prevention management: Dietitians' perspectives regarding diabetes management in adult peritoneal dialysis in Ontario.

The undersigned certify that the student has presented [his/her] thesis, that the thesis is acceptable in form and content and that a satisfactory knowledge of the field covered by the thesis was demonstrated by the candidate through an oral examination. They recommend this thesis to the Office of Graduate Studies for acceptance.

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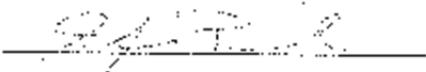


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Abstract

Ontario's Chronic Disease and Prevention Framework (CDPM) is a framework aimed at improving health outcomes and reducing costs. Currently, there is a paucity of data examining diabetes management (DM) in peritoneal dialysis (PD) programs. This study, carried out in 2010-11, describes dietitians' perspectives regarding DM in PD programs in Ontario. Purposeful sampling of dietitians employed in PD programs (n=18) resulted in a response rate of 86.6%. A web-based survey collected data on demographic characteristics of PD clients, program models, and program-specific data regarding facilitators and barriers to provision of dialysis-specific diabetes education. Statistical analysis was completed and responses to open-ended questions examined using thematic open-coding. Findings suggest three major themes: "*walking the CDPM talk*", dietitians as "*unrecognized CDPM champions*" and "*the missing pieces to the CDPM puzzle*". Results suggest that while many dietitians have embraced CDPM, their capacity to fully integrate it into their practices is limited by organizational- and system-level barriers.

Key words: dietitians, perspectives, diabetes, peritoneal dialysis

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Thomas Edison said: “Opportunity is missed by most people because it is dressed in overalls and looks like work.”

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List of abbreviations

- A1C: glycated hemoglobin
- BDDI: baseline diabetes dataset initiative
- CAND: Canadian Association of Nephrology Dietitians
- CCAC: Community Care Access Centres
- CDA: Canadian Diabetes Association
- CDE: Certified Diabetes Educator
- CDECB: Certified Diabetes Educator Certification Board
- CDPM: chronic disease prevention and management
- CDSB: Chronic Disease Surveillance Division, Centre for Chronic Disease Prevention
and Control
- CIHI: Canadian Institute of Health Information
- CKD: Chronic kidney disease
- CMHA: Canadian Mental Health Association
- CORR: Canadian Organ Replacement Registry
- CVD: cardiovascular disease
- DEC: diabetes education centre
- DEP: diabetes education program
- di hydroxy vitamin D3: 1, 25 dihydroxycholecalciferol
- DM: diabetes mellitus
- e-mail: electronic mail
- HCC: Health Council of Canada
- HD: hemodialysis

ICES: Institute for Clinical Evaluative Sciences

IT: information supports

K/DOQI: Kidney Disease Outcome Quality Initiative (National Kidney Foundation)

K: solute clearance

KFOC: Kidney Foundation of Canada

L: litre

LDL cholesterol: low density lipoprotein cholesterol

LHIN: Local Health Integration Network

Mg: milligrams

mL: millilitres

MOHLTC: Ministry of Health and Long-Term Care (Ontario)

NKF: National Kidney Foundation

ORN: Ontario Renal Network

PD: peritoneal dialysis

PI: principal investigator

PD program: peritoneal dialysis program

PPDCC: Provincial Peritoneal Dialysis Coordination Committee

PTH: parathyroid hormone

RCC: Regional Coordination Centre (diabetes)

REB: research ethics board

REB UOIT: Research and Ethics Board at the University of Ontario Institute of
Technology

RRT: renal replacement therapy

T: time

UOIT: University of Ontario Institute of Technology

V: volume

Vitamin D3: 1, 25 dihydroxycholecalciferol

Chapter One

Overview of the Study

1.01 Introduction

This thesis describes diabetes management in dialysis programs in Ontario offering peritoneal dialysis (PD) to adults with type 2 diabetes. Diabetes is a leading cause of chronic kidney disease (CKD) and dietitians are experts in the area of nutrition and play a primary role in assisting clients achieving optimal glycemic control. Thus, specific emphasis is placed on how diabetes is being managed and how dietetics is practiced in these programs.

Chapter one provides an introduction to the research and an overview of Chronic Disease Prevention and Management (CDPM), diabetes, CKD and PD in Ontario, as well as the purpose of the study and the primary research questions.

Chapter two is a review of the literature, highlighting the current body of knowledge related to the management of diabetes, the management of diabetes in the context of CKD, and the challenges of managing diabetes in adult clients receiving PD. The best practices, identified in the literature, are summarized related to managing diabetes in the context of CKD and PD.

Chapter three describes the research design and methods. The chapter is divided into sections that describe the role of the researcher, the conceptual framework utilized for the study, study design, survey instrument, study variables, and the methods utilized for data analysis.

Chapter four presents the findings of this study. Following a discussion regarding the response rate, the findings have been organized to describe the respondents and the

programs in which they are employed, and the major findings. The major findings of this study will be presented utilizing the three levels of capacity-building theory (i.e., individual, organizational, and system). Each theme will be discussed with emphasis on current barriers and facilitators dietitians are experiencing working in PD programs. As well, promising practices gleaned from the data analysis will be presented.

Chapter five will present conclusions of this study, outline the author's recommendations and future research opportunities. The CDPM logic model outlines three key areas of priority to focus the planning and evaluation of CDMP activities. Thesis recommendations have been organized according to these three categories, which are; activities that support the establishment of activating communities, activities aimed at increasing client and family engagement, and activities that facilitate the establishment of proactive, prepared health care teams. For each set of recommendations, key stakeholders are identified that should be engaged in their implementation.

1.02 Rationale of the Study

In Ontario, chronic diseases, such as cardiovascular disease, cancer, diabetes, and arthritis, account for 55% of total health care costs (Ministry of Health and Long-Term Care [MOHLTC], 2007). In 2003, 80% of Ontarians over the age of 45 years were living with a chronic condition, and 70% of these individuals had multiple chronic conditions (MOHLTC, 2007).

The prevalence of diabetes in Ontario is higher than the national average (Chronic Disease Surveillance Division, Centre for Chronic Disease Prevention and Control [CDS], 2009). Chronic kidney disease is a diabetic complication directly related to glycemic control (CDA, 2008). The prevalence of CKD in Ontario has

increased by 28% since 1998 (CIHI, 2009). Chronic kidney disease is a progressive disease, the end result being the need for renal replacement therapy (RTT). It can be postulated that, as CKD prevalence increases the demand for specialized, dedicated resources to address the complexity of managing diabetes in the context of CKD and PD will grow. Emily Harrison, Patient Care Manager for Lakeridge Health's PD program reports that in the past seven years, less than 50% of diabetic clients receiving PD have achieved the Canadian Diabetes Association's Clinical Practice Guideline for optimal glycemic control which is a glycated hemoglobin (A1C) of 7% or less (E. Harrison, personal communication, May 10, 2010). Dietitians working in Lakeridge Health's (LH) PD program report that glycemic management in the context of CKD and PD is challenging due to the glucose load associated with PD and due to the nutritional recommendations specific for PD which often conflict with those for diabetes management. This management is further complicated by the absence of published guidelines for the management of diabetes in the context of CKD and PD. Furthermore, LH dietitians emphasize that to support PD clients manage diabetes the PD team must possess expertise in the areas of both PD and diabetes (Y. Gharai, personal communication, May 10, 2010).

1.03 Background to the Study of Chronic Disease in Canada

Non-communicable diseases or chronic diseases are a major health concern in Canada. Chronic conditions such as cancer, cardiovascular disease, respiratory illnesses, genitourinary disease, and diabetes are the leading causes of death in Canada (Haydon, Roerecke, Giesbrecht, Rehm, & Kobus-Matthews, 2006). Numerous reports have shown that a significant portion of morbidity and mortality among Canadians is related to

chronic diseases. It is estimated that three-quarters of all deaths and 42% of total direct medical care expenditures in Canada are related to chronic diseases (Mirolla, 2004). Internationally, Canada's health care spending is among the highest in the world, representing 10% of the gross domestic product in 2002 (Institute for Health Information [CIHI], 2010). The Canadian Institute for Health Information (CIHI) predicts that health care spending will reach 191.6 billion in 2010 (CIHI, 2010). To address the rising costs of health care, governments have begun to focus on addressing the costs associated with chronic disease and their related risk factors. In 2005, the Public Health Agency of Canada acknowledged that a focus on CDPM was required to improve the health of the general public and more importantly to reduce health care expenditures (Patra et al., 2007). To address the escalating costs associated with chronic disease in Ontario, in May 2007, the MOHLTC, released a CDPM policy framework "Preventing and Managing Chronic Disease: Ontario's Framework" (see Figure 1.1).

Figure 1.1 Ontario's Chronic Disease Prevention and Management (CDPM) Framework.

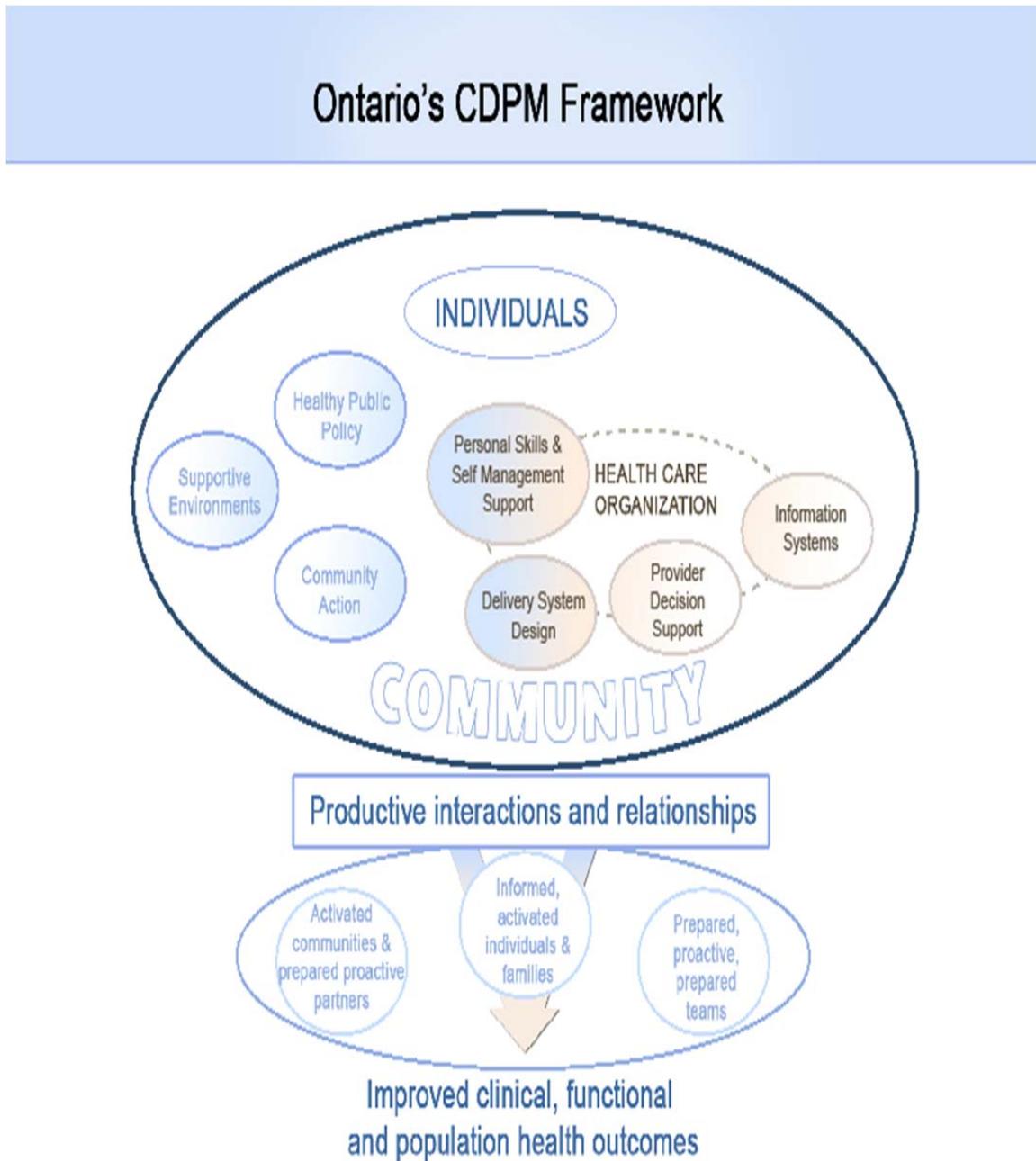


Figure 1.1 CDPM- chronic disease prevention and management. Source: MOHLTC, 2007. Ministry of Health and Long-Term Care. (2007, May). *Preventing and managing chronic disease: Ontario's framework* (White Paper). Retrieved from Ministry of Health and Long-Term Care: www.health.gov.on.ca

This framework is aimed at improving health outcomes and reducing health care costs by redesigning the health care system to be more responsive to the prevention, early detection and management of chronic diseases (MOHLTC, 2009). The framework has been widely disseminated across the health care system (Canadian Mental Health Association, Ontario [CMHA], 2008). As a result, many of the 14 Local Health Integrated Networks (LHIN's) in Ontario refer to chronic disease prevention and management (CDPM) in their integrated health service plans (CMHA, 2008).

Despite the current focus on improved chronic disease prevention management and the large body of knowledge regarding the management of diabetes and PD (independent of each other), there is a paucity of data available describing the management practices of type 2 diabetes in adult clients receiving PD and of the dietetics practice in these programs (Dasgupta, 2005; Dronovalli, Burney, & Bakris, 2009; Iglesias & Diez, 2008; Kalantar-Zadeh et al., 2009; Kovesdy, Sharma, & Kalantar-Zadeh, 2008). The findings of this study will contribute to the body of knowledge regarding diabetes management in the context of CKD and PD and the benefits of CDPM.

1.03.1 Ontario's CDPM Framework

The CDPM Framework recognizes that changing health behaviours and biological factors can significantly reduce chronic disease in Ontario. However, it also acknowledges that early detection of chronic diseases and quick intervention prevents or slows the progress of chronic conditions, ultimately improving health outcomes and reducing health care costs (MOHLTC, 2007). The framework is evidence-based, population-based, and client-centred; identifying the key elements required for establishing a health care system that can effectively and efficiently manage chronic

disease while reducing health care costs (MOHLTC, 2009). The goal of the framework is to enable those with chronic conditions to become self-managers of their health. A client that is a self manager is a key decision maker in the prevention and management process.

The eight key elements of the framework are:

- 1) health care organizations,
- 2) personal skills and self management supports,
- 3) delivery system design,
- 4) provider decision support,
- 5) information systems,
- 6) healthy public policy
- 7) supportive environments and
- 8) community action

While the framework acknowledges the important role of health care organizations, it does not place responsibility of health promotion, prevention and management primarily with these organizations. Rather, the framework depicts health care organizations working together with community organizations, using evidence and other information tools to provide comprehensive, well-coordinated client-centred services (CMHA, 2008). The key elements and associated characteristics are summarized in Table 1.1.

Table 1.1 Key elements of Ontario’s chronic disease prevention and management framework

Health care organizations	Personal skills and self-management supports	Delivery system designs	Provider decision support	Information systems	Healthy public policy	Creating supportive environments	Community action
<ul style="list-style-type: none"> • strong leadership • aligned resources and incentives • commitment to quality improvement • accountability for outcomes 	<ul style="list-style-type: none"> • clients are part of care team and engaged in shared decision making • individuals empowered to be self-managers • self-management support services organized for clients • shared clinical guidelines • follow-up • effective support services e.g. information and education, training behaviour modification • social marketing and other population health strategies • collaboration between community and health care organizations 	<ul style="list-style-type: none"> • interdisciplinary care teams with defined roles and responsibilities • innovative client interactions • care planning, care paths and care management • enhanced health promotion and prevention • outreach and population need-based care and culturally sensitivity 	<ul style="list-style-type: none"> • evidence-based guidelines embedded into daily practice • provider education • access to specialist expertise • clinical care and client management tools • provider alerts and prompts • measurement, evaluation routine reporting and feedback 	<ul style="list-style-type: none"> • client registries • electronic health records • provider portals • client portals • population health data 	<ul style="list-style-type: none"> • legislation and regulations • fiscal policies • guidelines • organization policies and programs 	<ul style="list-style-type: none"> • supportive physical environments • supportive social and community environments 	<ul style="list-style-type: none"> • building partnerships across sectors • public participation • enhancing local knowledge, skills and resources

Adapted from MOHLTC, 2007. Ministry of Health and Long-Term Care. (2007, May). *Preventing and managing chronic disease: Ontario’s framework* (White Paper). Retrieved from Ministry of Health and Long-Term Care: www.health.gov.on.ca

The integration of CDPM requires reorientation of the health system. Specifically, the system requires redesign regarding how services are organized and provided (CMHA, 2008). This reorganization will impact multiple stakeholders such as LHINs, primary care, public health, health human resources, and service provision strategies for certain chronic diseases such as CKD and diabetes (CMHA, 2008). Currently in Ontario, health services are organized in such a way that:

- Health care practitioners rely on clients to contact system.
- Clients are passive participants (e.g., health care practitioners are main decision makers).
- Visits are focused on symptoms or illness, not on the client.
- Prevention of disease, injury and disability, and ensuring continuity of care across providers is not a priority of the system (MOHLTC, 2009).

Furthermore, it has also been identified that service organization is currently planned to respond to acute illness, thus care is reactive not proactive (MOHLTC, 2009). In contrast, CDPM is a team-focused approach to care delivery in which continuity and integration of care are key components (Health Council of Canada [HCC], 2009a). The success of the CDPM approach is attributed to care that is evidence-based and client-centred, utilizes multiple interventions/strategies, promotes collaboration across the system, supports the client to become a self-manager, and establishes evaluation components (HCC, 2009a).

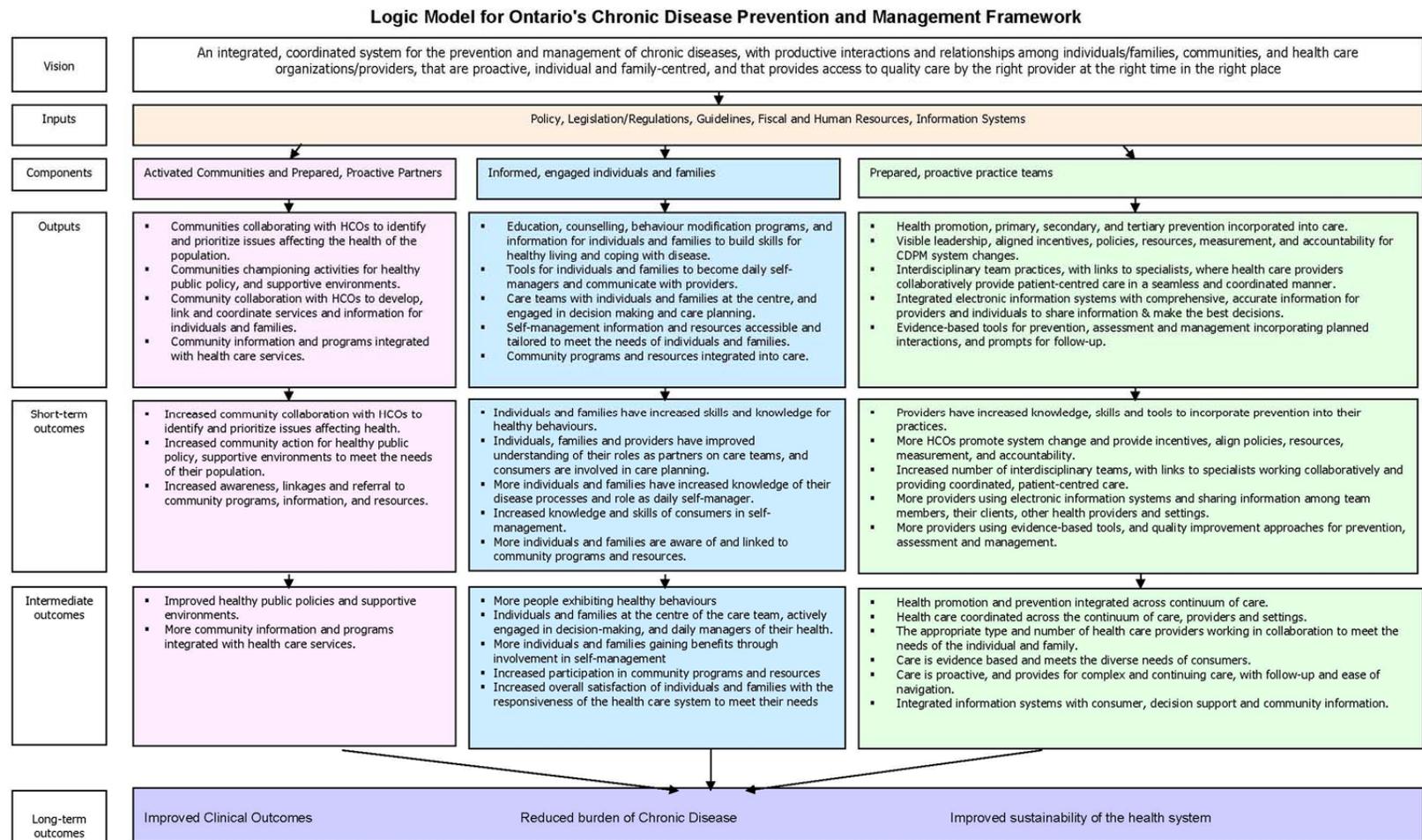
To facilitate the integration of the CDPM Framework the MOHLTC has developed a CDPM Logic Model and priority setting decision tool (Figure 1.2). The logic model visually represents the CDPM Framework and identifies activities associated

with improved health and improved system outcomes. The logic model highlights three vital priorities areas:

- 1) Developing activated communities and developing prepared proactive partners.
- 2) Supporting families and individuals to become engaged in CDPM.
- 3) Increasing the capacity of the system by establishing prepared, proactive practice teams (MOHLTC, n.d).

Activities aimed at achieving these three priorities will contribute to the improvement of the performance of the health care system and ultimately the improved health of Ontarians (MOHLTC, 2009).

Figure 1.2 Logic Model for Ontario’s Chronic Disease Prevention and Management Framework.



Source: MOHLTC, 2007. Ministry of Health and Long-Term Care. (2007, May). *Preventing and managing chronic disease: Ontario’s framework* (White Paper). Retrieved from Ministry of Health and Long-Term Care: www.health.gov.on.ca

The MOHLTC states that adoption of the CDPM Framework and subsequent redesign of Ontario's health care practices and systems will result in a health care structure that is more responsive to the prevention, early detection and management of chronic disease:

The framework is essentially a roadmap for effective chronic disease management which addresses the distinct needs of clients with chronic conditions as it aims to provide multi-faceted, planned, pro-active seamless care in which the clients are full participants in the management of their care and are supported to do this at all points by the system" (MOHLTC, 2007, p. 9).

A health care system in which CDPM is integrated will result in at-risk clients or those diagnosed with chronic conditions having the ability to be an active participant in their health by receiving support from the system to self-manage their risk factors or condition. Under the new framework, health care will be organized and delivered in a manner that provides expert care, when and where it is needed (MOHLTC, 2007). The system will support both the client and the provider in caring for the client, and prevention and health promotion will become integral strategies for addressing chronic conditions (CMHA, 2008). The adoption of this framework will also save health care system resources by improving the overall health of Ontarians, by reducing hospitalizations and use of emergency departments, and by eliminating duplication of services (MOHLTC, 2007).

1.03.2 Diabetes prevalence in Canada.

In Canada, over two million people have diabetes and that number is expected to reach three million by 2010 (CDA, 2008). By 2019, it is estimated that diabetes will cost the Canadian health care system \$15.6 billion annually and, by 2020, \$19.2 billion (CDA, 2008). In Ontario, diabetes prevalence has steadily increased across all of the LHINs.

Diabetes prevalence in Ontario (5.6%) is higher than the national average of 5.2% (Chronic Disease Surveillance Division [CDSO], 2009).

In an effort to lower the prevalence of diabetes and related health care costs the Ministry of Health and Long-term Care announced the Ontario Diabetes Strategy on July 22, 2008 (MOHLTC, July 22, 2008). The four year initiative (\$741 million in new funding), aims to create a comprehensive system of diabetes health care that will prevent, manage, and treat diabetes. Central to this strategy is the establishment of 14 Regional Coordination Centres (RCC) for diabetes (one for each LHIN) which are charged with the development of services and support systems that enables those living with diabetes to better self-manage and that gives health care providers the ability to easily check clients' records, access diagnostic information, and collaborate across the health care system to provide comprehensive diabetes care (MOHLTC Newsroom, 2009).

Between the years of 2008 to 2012, the Ontario Diabetes Strategy is charged with:

- Improving access to insulin pumps and supplies for more than 1300 adults with type 1 diabetes by funding these services for people over the age of 18.
- Expanding chronic kidney disease services, including greater access to dialysis services.
- Improving access to bariatric surgery.
- Developing and implementing educational campaigns to prevent diabetes by raising awareness of diabetes risk factors in high risk populations, such as the Aboriginal and South Asian communities.

- Increasing access to team-based care closer to home by mapping the prevalence of diabetes across the province and the location of current diabetes programs in order to align services and address service gaps (Stand up to diabetes, n.d).

In support of this strategy, several diabetes initiatives have been implemented. To improve awareness, the web site called *Stand up to Diabetes* (<http://www.health.gov.on.ca/en/ms/diabetes/en/>) was established. This new initiative provides those living with diabetes and health providers with up-dates regarding the strategy, and diabetes information.

In an effort to support the use of "best practices" by health care providers, the *Diabetes Testing Report* (also referred to as the Baseline Diabetes Dataset Initiative [BDDI]) was announced by the MOHLTC in September 2009. The aim of this Ministry driven report is to inform primary care providers when their clients with diabetes last had an A1C test, a low density lipoprotein cholesterol test (LDL-C test), and a retinal eye exam. In addition, primary care providers will receive reports outlining how their practice compares to their Local Health Integration Network and provincial averages. As of November 2010, 5,500 providers had registered for this initiative, representing 570,000 Ontarians with diabetes (Government of Ontario Newsroom, December 2010).

In January 2011, *My Diabetes Passport* was released. This client management tool was created to support individuals' management of diabetes. In partnership with health care providers, Ontarians with diabetes can use the Diabetes Passport to record, track, and monitor important information such as key test results, medications, diabetes education sessions, personal goals and planned activities to assist in self management of

their diabetes. The passport supports the Ontario Diabetes Strategy's objective of improving management of diabetes and diabetes-related complications. The passports are available in French and English.

Finally, in January 2011, in support of the Ontario Diabetes Strategy, e-Health Ontario announced the establishment of a Diabetes Clinical Advisory Group. The Advisory Group will provide advice and recommendations to support the implementation and adoption of an electronic diabetes registry. The establishment of a diabetes registry will result in faster diagnoses and treatment and improved management for those living with diabetes (Stand up to diabetes, n.d).

1.03.3 Diabetes-related complications.

The development of diabetes complications is directly related to glycemic control (CDA, 2008). Diabetes is the leading cause of blindness, CKD, and non-traumatic amputation in Canadian adults (CDA, 2008). The CDA also states that 11% of Canadians living with diabetes also have three or more chronic health conditions (CDA, 2008). In comparison to those with a single diagnosis of diabetes, the combination of diabetes and CKD has a significant impact on the risk of cardiovascular disease (CVD) events and deaths from CVD (Cavanaugh, 2007). Hyperglycemia and the presence of impaired renal function increase risks for CVD (CDA, 2008). The Canadian Diabetes Association Clinical Practice Guidelines state that all individuals with diabetes and CKD should be considered at high risk of developing CVD (CDA, 2008).

1.03.4 Diabetes and chronic kidney disease.

In 2007 in Canada, 35% of new cases of CKD were diabetes-related (CIHI, 2009). In the same year, 5,434 individuals were newly diagnosed with CKD and 5,321

CKD clients initiated renal replacement therapy (CIHI, 2009). Overall, the incidence of CKD has increased 28% since 1998 (CIHI, 2009).

1.03.5 Renal replacement therapy in Canada.

In 2007, 82% of all new renal replacement therapy clients (RRT) received treatment with hemodialysis (HD), and the remaining 18% with PD (CIHI, 2009). Both forms of dialysis replace the kidney's functions of removing excess fluid and waste from the body (Provincial Peritoneal Dialysis Coordination Committee [PPDCC], 2006a). Hemodialysis involves removing excess fluid and wastes by filtering the client's blood through an artificial kidney or HD filter (PPDCC, 2006a). Hemodialysis is predominantly offered as an in-centre service, requiring clients to travel to a dialysis unit at least three times per week for a three- to four-hour treatment.

Peritoneal dialysis is a home-based RRT where clients complete dialysis in their place of residence. Peritoneal dialysis involves removing excess fluid and wastes from the body via glucose-containing fluid that is instilled into the abdomen and then drained after a several hours through a permanent PD catheter (PPDCC, 2006a). This process is typically repeated three- to four-times a day, or during the night, using a PD cycler while the client sleeps (PPDCC, 2006a). This type of dialysis mirrors the CDPM framework in that the client is the primary decision maker and the success of this type of treatment requires the coordination and collaboration of health care organizations and community supports.

1.03.6 Financial burden of renal replacement therapy.

Canada does not currently have a national dialysis database, thus costs associated with dialysis are extrapolated (Manns, Mendelssohn, & Taub, 2007). In 2002, it was

estimated that total Canadian health expenditures represented 9.3% of gross domestic product (Manns et al., 2007). The estimated total health care costs for treating a CKD client with in-centre HD is between \$66,000 to \$89,000 per year (Manns et al., 2007). In comparison, the estimated total health care costs for a PD client between \$43,000 to \$45,000 per year (Manns et al., 2007). In the absence of current data, it can be hypothesized that the costs associated with treating a diabetic, CKD client on dialysis would be higher due to the complexity of managing two chronic conditions instead of one.

1.03.7 Canadian peritoneal dialysis client demographics.

In 2007, 11% or 3,888 CKD clients were utilizing PD for RRT. The majority of these clients (84%) were age 45 years or older, and the largest increase (11%) was seen in the age group of 75 years and older (CIHI, 2009). In 2007, 55.9 % of dialysis clients were male and 29.8% had diabetes. This represents an increase of 7.2% since 2003 (CIHI, 2009).

1.03.8 Peritoneal dialysis programs in Ontario.

Dialysis is a specialized medical treatment, in Ontario it is offered solely by dialysis providers. At the time of this study, there were 38 dialysis providers in Ontario, of which 22 offered PD to adults clients. The health care facilities, location and the type of dialysis offered are summarized in Table 1.2.

Table 1.2 Location of dialysis programs in Ontario

Ontario health care facilities	Provides hemodialysis	Provides peritoneal dialysis to adults
Bayshore Centre Dialysis Brockville	X	
Bayshore Centre Dialysis Stoney Creek	X	
Brantford General Hospital	X	
Cornwall Dialysis Clinic	X	
Credit Valley	X	X
Dialysis Management Clinic Inc. Pickering	X	
Dialysis Management Clinic Inc. Markham	X	
Dialysis Management Clinic Inc. Peterborough	X	
Grand River	X	X
Halton Health Care Services	X	
Niagara Health System	X	X
Hotel-Dieu Grace	X	X
Humber River Regional	X	X
Kingston General	X	X
Lakeridge Health	X	X
LHSC-University and South Street Campus	X	
LHSC- Victoria Campus	X	X
North Bay General	X	
Orillia Soldiers' Memorial	X	X
Ottawa-Carleton Dialysis Clinic	X	
Ottawa Hospital	X	X
Peterborough Regional Health	X	X
Renfrew Victoria	X	
Sault Area Hospitals Plummer Memorial	X	X
Scarborough -General Division	X	X
Sheppard Centre	X	
St. Joseph's (Hamilton)	X	X
St. Joseph's (Toronto)	X	X
St. Michael's	X	X
Sudbury Regional Laurentian Site	X	X
Sunnybrook and Women's College	X	X
Sussex Centre	X	
Thunder Bay Regional Mckellar Site	X	X
Timmins and District	X	X
Toronto East General	X	
Toronto General-University Health Network	X	X
William Osler	X	
York Central	X	X
Totals	38	22

Adapted from Treatment of end-stage organ failure in Canada, 1998 to 2007- CORR 2009 Annual Report. (CIHI, 2009). Canadian Institute for Health Information. (2009). *Treatment of end-stage organ failure in Canada 1998 to 2007. 2009 annual report* (ISBN 978-1-55465-559-5 (PDF)). Retrieved from Canadian Institute for Health Information: http://secure.cihi.ca/cihiweb/products/cirr_annual_report_2009_en.pdf

Currently there is a paucity of data and published standards pertaining to staffing and services offered by PD programs in Ontario (PPDCC, 2006b). Peritoneal dialysis programs in Ontario vary with respect to size, hours of operation, client demographics (e.g., age, ethnicity) and staffing ratios (PPDCC, 2006b). The goal of peritoneal dialysis programs is to provide people with CKD the training, support, and health monitoring to receive PD as a RRT option. The Provincial PD Joint Initiative: Draft Manual on the delivery of PD in Ontario recommends a multidisciplinary approach to PD care and identifies the following as beneficial team members: nephrologists, nurses, social workers, dietitians, physiotherapists, pharmacists, and representatives of Community Care Access Centres (CCAC) and long-term care facilities (PPDCC, 2006b).

In 2009, the MOHLTC announced the establishment of the Ontario Renal Network (ORN). This network was established to lead a province-wide effort to better organize and manage the delivery of CKD services with the goal of improving the quality of kidney care across the province of Ontario. The ORN consists of the 26 regional CKD programs in Ontario. For each LHIN there is a Regional Director and a Medical Clinical Director, who are responsible to coordinate and facilitate the ORN initiatives at the LHIN level. The main focus of the ORN is to improve the quality of kidney care across the province. Current ORN priorities include:

- Promoting and growing independent dialysis for appropriate clients.
- Increasing the prevalence of functioning, complication free, vascular access in the hemodialysis population.

- Ensuring the establishment of systems, processes, and treatment guidelines that prevent, facilitate early detection and delay of the progression of CKD (Ontario Renal Network, n.d).

Overall, the ORN is charged with establishing standards of care and adoption of best practice in the delivery of quality CKD care, development of information systems and performance measures and the implementation of ongoing needs assessment and capacity planning for improved CKD care for Ontarians (Ontario Renal Network, n.d).

1.04 The Purpose of the Study

This study utilized web-survey methodology to describe dietitians' perspectives regarding the complex, multi-faceted management of diabetes in adults with diabetes receiving PD in Ontario.

1.05 Primary Research Questions

In an effort to better understand the management of diabetes in PD clients and the dietetics practices associated with these programs the following research questions were utilized:

1. What are the demographic characteristics of PD programs?
2. What are the demographic characteristics of dietitians with dietetics practice in PD programs?
3. How do PD teams manage diabetes?
4. What are the key facilitators and barriers that dietitians experience related to diabetes management?

These questions were utilized in the development of the study questionnaire, analysis of data, discussion of the findings, and thesis recommendations.

1.06 Significance of the Study

Ontario's Chronic Disease Prevention and Management framework is aimed at improving health care costs and outcomes and ultimately secure the sustainability of the Ontario health care system. The framework challenges the health care system to realign how services are provided in regard to the roles and responsibilities of health care organizations, health human resources, communities, and policy makers. There is currently a paucity of data regarding how diabetes is managed in PD programs and how effective this management is at reducing a client's of diabetes related complications. Understanding current management of diabetes in the context of CKD and PD and the dietetics practice associated with these programs is an important first step in the development of best-practice guidelines for the management of diabetes in clients receiving PD. This study investigates the degree of effect CDPM has had on dietetic practices in PD programs. This baseline information regarding dietetics practice can be used to strengthen diabetic management capacity in PD programs and ultimately improve the care provided to adults with diabetes receiving PD in Ontario.

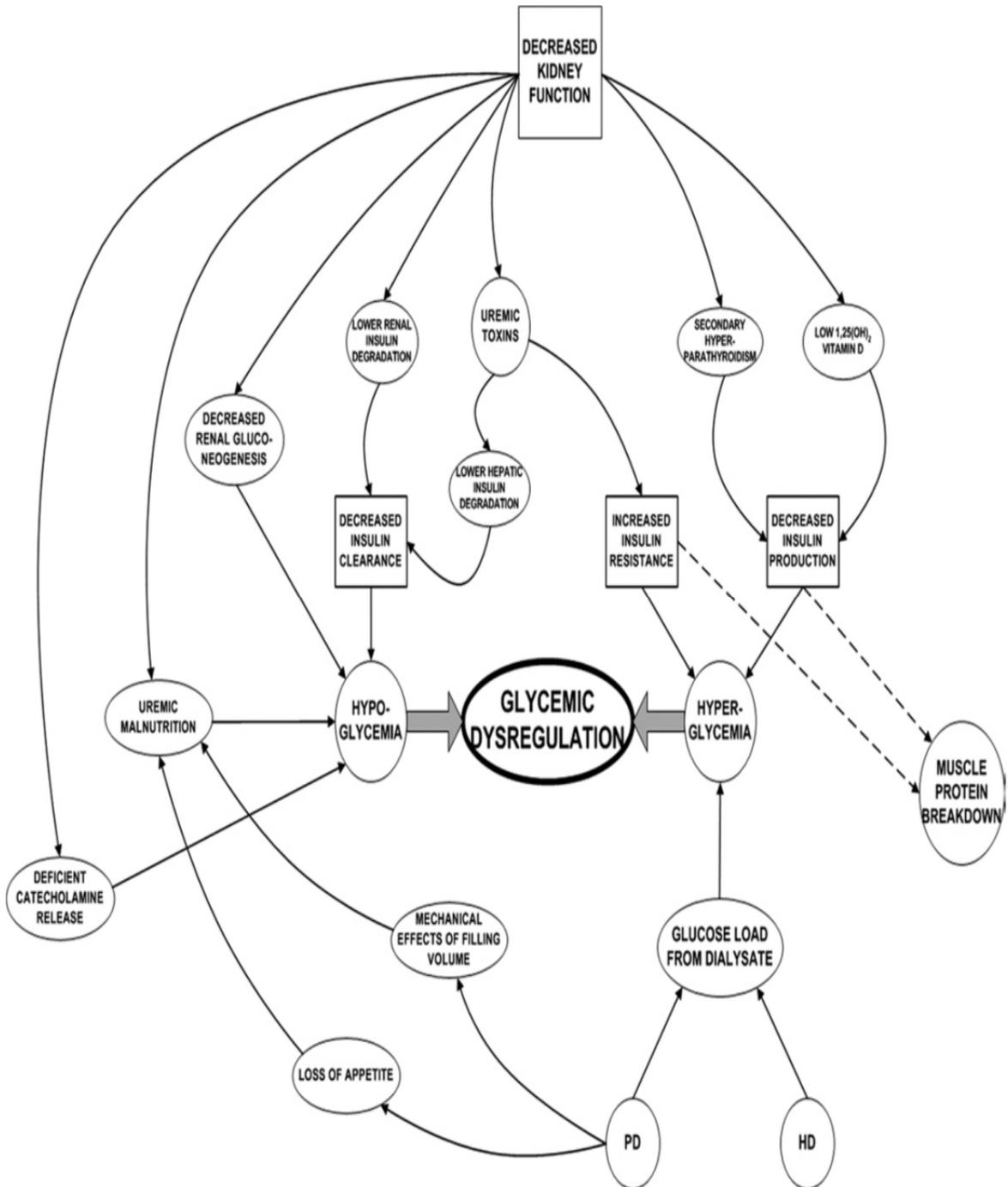
Chapter Two

Review of the Literature

2.01 Introduction

Glycemic control and the practice interventions being utilized to manage glycemia in the Ontario PD population have not been examined to date. The majority of the studies have been narrative in nature (Dasgupta, 2005; Dronovalli, Burney, & Bakris, 2009; Iglesias & Diez, 2008; Kalantar-Zadeh et al., 2009; Kovesdy, Sharma, & Kalantar-Zadeh, 2008), outlining the possible factors related to glycemic dysregulation in the context of CKD and PD. These factors are summarized by Kovesky et al. (2008) in Figure 2.1.

Figure 2.1. Mechanisms of action responsible for dysregulation of glycemic control in chronic kidney disease.



Note: PD- peritoneal dialysis, HD- hemodialysis .Reproduced with permission, Source: Kovesdy et al., 2008. Kovesdy, C. P., Sharma, K., & Kalantar-Zadeh, K. (2008, October). Glycemic control in diabetic CKD s: Where do we stand?. *American Journal of Kidney Diseases*, 52(4), 766-777.

2.02 Overview of Chronic Kidney Disease and Diabetes Management

Chronic kidney disease is associated with alterations to insulin and carbohydrate metabolism (Iglesias & Diez, 2008; Kalantar-Zadeh et al., 2009). The relationship between the kidney and carbohydrate metabolism has been recognized for years (Iglesias & Diez, 2008). The kidney is involved in insulin metabolism and at the same time, is one of insulin's target organs (Iglesias & Diez, 2008). Abnormal glycemic control is a known complication in clients with CKD and is postulated to be multi-factorial and inherent to CKD (Iglesias & Diez, 2008; Kalantar-Zadeh et al., 2009; Kovesdy et al., 2008).

2.02.1 Decreased insulin production and increased insulin resistance.

The cause of decreased insulin production in CKD clients is unclear. It has been postulated to be related to secondary hyperparathyroidism and 1, 25 dihydroxycholecalciferol (dihydroxy vitamin D3) deficiency (Iglesias & Diez, 2008; Kalantar-Zadeh et al., 2009; Kovesdy et al., 2008). The National Kidney Foundation's Clinical Practice Guidelines for the management of CKD states that to reduce the risk of CKD related complications (e.g., secondary hyperparathyroidism and disturbances in bone mineral metabolism) the following targets should be achieved: parathyroid hormone (PTH) of <21pmol/L; dihydroxy vitamin D3 of 48-110 pmol/L (K/DOQI Advisory Board, 2002, Guideline 8A.1).

The mechanism of increased insulin resistance in CKD clients is not well understood (Kovesdy et al., 2008). Studies suggest that uremia toxins may be involved, as these studies reported improved insulin sensitivity with the initiation of dialysis (Iglesias & Diez, 2008; Kalantar-Zadeh et al., 2009; Kovesdy et al., 2008). Uremic toxins are the waste products of metabolism, such as urea, in the blood that are normally cleared

by the kidney. Dialysis adequacy or solute clearance is a mathematical formula to express the adequacy of the dialysis regime in removing uremic toxins. Experts suggest that reducing the build-up of uremic toxins results in reduced insulin resistance in PD clients. Peritoneal dialysis adequacy or solute clearance is expressed as Kt/V (K/DOQI Advisory Board, 2006). Solute clearance (Kt/V) is as a unitless measure of the dose of dialysis treatment as determined by the solute clearance x time product normalized to the individual's body water; K represents urea clearance in either mL/minute or L/minute multiplied by time (t) in minutes divided by volume (V) of urea distribution (Council on Renal Nutrition of the National Kidney Foundation [NKF], 2009). The end product of this calculation is a measure of the total urea clearance provided by the peritoneal membrane and any residual urine output (NKF, 2009). The current PD Kt/V target is a minimum dialysis dose of at least 1.7 per week (K/DOQI Advisory Board, 2006).

2.02.2 PD dialysis and non-nutritional glucose absorption.

Nutrition therapy and weight control are integral components of diabetes management (CDA, 2008). The glucose load associated with PD and the management of co-morbid conditions such as hyperphosphatemia and or hyperkalemia may negatively impact glycemic control. A low phosphorous diet requires the avoidance of high fibre foods such as whole grains which have been shown to help improve glycemic control. Therapeutic actions related to PD such as dietary sodium restriction, use of non-glucose containing dialysate, and use of intraperitoneal therapy (insulin infusion into the abdominal cavity to treat hyperglycemia) may improve glycemic control (Dasgupta, 2004; Schatz, 2008).

Conventional PD dialysate solutions contain glucose (Dasgupta, 2004).

Managing glycemic control in PD clients is challenging due to the glucose absorbed from the dialysis solutions (Dasgupta, 2005; Huang, 2007). The continuous exposure to high concentrations of glucose make maintaining optimal glycemic control difficult (Huang, 2007). It has been estimated that 60-76% of the glucose contained in a PD dialysis solution is absorbed. Depending on the volume per exchange, the number of exchanges, and the glucose concentration used, this can represent approximately 100 grams of glucose per day or 20% of daily caloric intake (NKF, 2009; Pajek et al., 2008). A dietary sodium restriction of less than 1500 milligrams (mg)/day results in lower daily fluid gains, warranting the use of a dialysate with a lower glucose concentration, thus reducing the amount of glucose absorbed (Daugirdas, Blake, & Ing, 2007). Glucose load can be further reduced with the utilization of non-glucose containing dialysate solutions. These solutions are theorized to improve glycemic control by reducing the amount of glucose absorbed through the peritoneal membrane (Babazono et al., 2007).

Insulin therapy is a mainstay of glycemic control in type 1 diabetes and is an effective pharmacological agent on its own or in combination with oral antihyperglycemic agents for type 2 diabetes (CDA, 2008). However, the route of insulin delivery to address hyperglycemia in PD clients remains controversial (Dasgupta, 2004). Both subcutaneous and intraperitoneal insulin therapy can provide good glycemic control (Dasgupta, 2004; Lubowsky, Siegal, & Pittas, 2007). Intraperitoneal insulin therapy provides an intense delivery of insulin to the liver via the portal circulation (Dasgupta, 2004). This results in minimized peripheral insulin action, better insulin sensitivity, prevention of the formation of insulin antibodies, and prevention of major fluctuations in

blood glucose levels and less episodes of hypoglycemia (Dasgupta, 2004). However, intraperitoneal insulin delivery is not without its disadvantages. Intraperitoneal insulin may cost more as a result of the need for higher doses of insulin due to the dilution effect of the PD dialysate and the absorption of insulin to the plastic surfaces of the dialysis delivery system (Dasgupta, 2004; Lubowsky et al., 2007).

2.03 Glycemic Control and PD Client Survival

The effect of glycemia on survival is difficult to determine due to the confounding effects of malnutrition and wasting, inflammation, cardiovascular disease, and residual kidney function, all of which are common in PD clients (Fried, Bernardini, & Piraino, 2001; Kovesdy et al., 2008). In hemodialysis clients, higher A1C levels are associated with increased risk of death (Ishimura et al., 2009; Kalantar-Zadeh et al., 2007). There are few studies reporting on the effect of glycemic control on survival of PD clients (Dronovalli, Burney, & Bakris, 2009; Tzamaloukas et al., 1993). One such study by Duong et al., (2010) examined a PD cohort of 2,798 clients over five years and reported that an A1C of 10% or greater was associated with greater risk of death (relative risk of death of 1.43) in comparison to those with a lower A1C of 5 to 6%.

In the general diabetic population, the negative relationship between glycemic control and survival is well documented (Dronovalli et al., 2009; Kalantar-Zadeh et al., 2007). Improved glycemic control is associated with less frequent hospitalizations in the general diabetic population (Gold et al., 2008). Experts hypothesized that the association would be similar in the diabetic PD population (i.e., poor glycemic control in PD clients would also be associated with negative health outcomes).

2.04 Glycemic Targets for PD

Optimal glycemic control is fundamental to the effective management of diabetes (CDA, 2008). Microvascular disease (e.g., neuropathy, retinopathy, nephropathy) are known to be a direct consequence of the duration and the severity of hyperglycemia. For the general diabetic population, optimal control is defined as an A1C of less than 7% (CDA, 2008).

The benefits of intensive glucose control in clients receiving RRT is not well documented (Kalantar-Zadeh et al., 2007; Lubowsky, Siegal, & Pittas, 2007). While good glycemic control cannot reverse kidney damage, it can slow the progression of retinopathy, neuropathy, and possibly macrovascular disease (Kalantar-Zadeh et al., 2007; Lubowsky, Siegal, & Pittas, 2007; Schatz, 2008). In 2007, the National Kidney Foundation published Clinical Practice Guidelines and Clinical Practice Recommendations for Diabetes and Chronic Kidney Disease (National Kidney Foundation: KDOQI Clinical Practice Guidelines and Clinical Practice Recommendations for Diabetes and Chronic Kidney Disease, 2007). These guidelines acknowledge that hyperglycemia is the fundamental cause of vascular target-organ complications and that a target A1C should be 7% or less, irrespective of the presence of CKD.

2.05 Diabetes Best Practices

The Canadian Diabetes Association (CDA) is a national group that supports people living with diabetes through education, services, advocacy, and research (Canadian Diabetes Association, n.d). The Association is committed to bridging the gaps in the health care system that create barriers to accessing diabetes services and treatment

(Canadian Diabetes Association, n.d). The CDA supports this mission through regional office programming across Canada and web sites (i.e., www.diabetes.ca) for both the public and health care professionals. These initiatives provide those living with diabetes as well as health care providers access to information regarding how to prevent and manage the disease. The public web site offers information regarding the risks of developing the disease and how to manage the disease to reduce the risk of complications. The professional web site allows health care providers to access the latest research, best practice guidelines, and educational materials for client teaching. For example, with respect to diabetes/CKD, specific educational resources the Canadian Diabetes Association has published the following web-based resources:

- ***Practical Tips for People with Diabetes and Kidney Disease***

Available on the public web site, this resource explains why maintaining blood glucose level within the recommended target range is an important aspect of diabetes management. Individuals with diabetes and CKD often have to limit their intake of high potassium foods. Thus, treating hypoglycemia often requires careful consideration to avoid hyperkalemia. This resource provides direction on how to safely treat hypoglycemia in the presence of CKD.

- ***Diet for Diabetes and Chronic Kidney Disease: Tips for Educators***

This guide provides information regarding the management of CKD in those with diabetes. As well, it provides tips to help educators adapt the CDA's Beyond the Basics (a diabetes food guide) for people with diabetes and CKD to address CKD-related co-morbid conditions such as hyperphosphatemia.

While both of these resources provide some information on how to manage diabetes in the presence of CKD, neither is comprehensive nor culturally sensitive.

The Canadian Diabetes Association's Clinical Practice Guidelines state that successful diabetic management depends on a daily commitment of the person with diabetes to self management practice and on long-term support from organized diabetes care provided by diabetes experts (CDA, 2008). Organized diabetes care is multidisciplinary in nature and works with both health- and community-based systems to provide long-term support to a person with diabetes (CDA, 2008). The core diabetes health care team of organized diabetes care includes the client, clients' family, nurse, dietitian, family physician, and/or diabetes specialist such as an endocrinologist (CDA, 2008).

In Ontario, organized diabetes education is offered in numerous settings such as community health care centres, family health care teams, Diabetes Education Programs (DEPs) or Diabetes Education Centres (DECs). The most common setting for organized diabetes education is DEC/DEPs, which are funded by the Ministry of Health and Long-Term Care. In 2011, there were 22 PD programs (Table 1.2) and 223 DEPs located in Ontario (Stand up to diabetes, n.d). These education centres are staffed with diabetes teams (a nurse and a dietitian) and may also include a social worker, clinical psychologist, chiropodist, pharmacist and/or physiotherapist. The purpose of these programs is to provide diabetes self management education based on the Clinical Practice Guidelines for the Prevention and Management of Diabetes (CDA, 2008). Key components of self management education are health-teaching tailored to the client's individual needs and circumstances, peer support, on-going care to facilitate follow-up

and feedback regarding client progress, and care provided by a multidisciplinary team in a timely manner (CDA, 2008). Self management education is described by the CDA to have three distinct levels of learning. The three levels are: survival or basic, intermediate, and advanced and are outlined in Table 2.1.

Table 2.1 Self management education levels of learning as defined by the Canadian Diabetes Association

Survival/basic level	The knowledge, skills and motivation required for self-care to prevent, identify, and treat the acute short-term complications of hyperglycemia or severe hypoglycemia.
Intermediate level	The knowledge, skills and motivation required for self-care to achieve recommended metabolic control, reduce the risk of long-term complications and facilitate the adjustment of living with diabetes.
Advanced level	The knowledge, skills, and motivation required for self-care to support intensive diabetes management for optimal metabolic control, and the full integration of care into the individual's life activities and goals.

Adapted from the Canadian Diabetes Association 2008 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada (CDA, 2008). Canadian Diabetes Association 2008 clinical practice guidelines for the prevention and management of diabetes in Canada [Supplemental journal publication]. (2008, September). *Canadian Journal of Diabetes*, 32(Supplement 1), S1-S201.

The MOHLTC outlines the services DEPs are to provide. Currently, DEPs funded by the MOHLTC, offer initial and follow-up basic and intermediate diabetes education as either group classes or as individual counseling (Provincial Program: Acute Services and Chronic Disease Unit, Ministry of Health and Long-Term Care, 2011).

The Canadian Diabetes Association Clinical Practice Guidelines (2008) recommends that diabetes education be organized in a manner utilizing a chronic disease management approach (CDA, 2008). This approach organizes care around the client with diabetes and, using a multidisciplinary team, provides care founded in self management theory. A self management approach to health care provision is one in which the client is an equal partner in care planning and decision-making, with the health care provider

being a support to the client (CDA, 2008). The chronic disease model requires a system that is organized to allow for easy transfer of information among health care team members to ensure continuity of care and integration of services (CDA, 2008).

In summary, diabetes education in the context of CKD and PD is multifaceted. CKD is associated with alterations to insulin and carbohydrate metabolism and PD can result in glucose absorption as high as 20% of daily caloric intake (NKF, 2009; Kovesdy et al., 2008). Diabetes education for clients with CKD and receiving PD is further complicated by co-morbid conditions, such as hyperphosphatemia, which require additional dietary modifications (Cavanaugh, 2007). The complexity of dietary restrictions required for the management of both diabetes and PD warrants support from diabetes educators who are knowledgeable in both diabetes and CKD (Cavanaugh, 2007; Taillefer, 2008). Currently in Canada, there is not a certification process for dietitians to specialize in nephrology. In contrast, the Canadian Diabetes Educator Certification Board (CDECB) offers a certification program for registered health care members (e.g., nurses and dietitians) to become Certified Diabetes Educators (CDEs). The CDECB is separate from all other diabetes-related organizations and health provider associations in Ontario or Canada (e.g., CDA, Dietitians of Canada, Registered Nurses Association of Ontario) and provides an independent, standardized process whereby eligible health professionals can become CDEs and be recognized as diabetes experts (Canadian Diabetes Educator Certification Board, n.d).

2.06 Best Practices for the Management of Diabetes in PD Clients

In addition to the “best practices” (i.e., organized diabetes care that focuses on self management) outlined in the Canadian Diabetes Association’s Clinical Practice

Guidelines for the Prevention and Management of Diabetes in Canada (CDA, 2008), several dialysis-specific practice interventions related to PD have been identified in the literature that may result in improvements in A1C levels of PD clients. In total, eight best practices for the management of diabetes in the context of CKD and PD were identified and are listed below:

- organized diabetes education,
- multidisciplinary care (e.g., endocrinologist),
- reduction of glucose load via the use of non-glucose dialysate,
- reduction of glucose load via the implementation of a dietary sodium reduction,
- treatment of secondary hyperparathyroidism to improve insulin production,
- treatment of dihydroxy vitamin D3 deficiency to improve insulin production,
- maximizing Kt/V to address possible insulin resistance related to uremic toxins and
- intraperitoneal insulin therapy to treat hyperglycemia resulting from absorbed glucose from the dialysate.

These interventions represent the integration of CDPM based care into PD programs, the dietetic practices associated with these programs and the provision of dialysis-specific diabetes care.

2.07 Dietetics Practice, Interprofessional Collaboration and Capacity-building

Dietitians are experts in the area of nutrition and in the translation of scientific, medical, and nutritional evidence into individualized care plans for clients (College of Dietitians of Ontario, n.d). Currently in Ontario there are 3207 dietitians registered as

active members with the College of Dietitians of Ontario (College of Dietitians of Ontario, n.d). Dietitians work in a variety of health care settings (e.g., hospitals, diabetes education programs) in collaboration with other health care professionals such as medical doctors, pharmacists, and/or nurses (College of Dietitians of Ontario, n.d). Scope of practice of dietitians is dependant on work setting. It can be limited or expanded by employer and/or work setting. Successful diabetes management requires a multidisciplinary team working together to provide client-focused care. Job functions of dietitians working in CKD programs vary depending on the demographic characteristics of their practice, years of experience, program supports and the interprofessional collaboration that exists within the program in which they work (Thelen, Touger-Decker, O'Sullivan Maillet, & Khan, 2009). These differences often result in varying levels of dietetic practice within CDK programs (Thelen, Touger-Decker, O'Sullivan Maillet, & Khan, 2009). In order to describe dietetic practices in PD programs, and the facilitators and barriers dietitians experience related to diabetes management; the work setting (PD program) must also be considered. Currently, there is a paucity of data regarding the dietetics practice of dietitians working in the area of nephrology related to diabetes management

The use of interprofessional collaboration in chronic disease management is associated with positive outcomes for clients, providers, and the system (Barrett, Curran, Glynn, & Godwin, 2007; HCC, 2009a). These outcomes include enhanced self management, improved health outcomes, enhanced provider satisfaction and system performance such as better access, shorter wait times, reduced admission rates, and costs (Barrett et al., 2007; Dunn-Butterfoss, Goodman, & Wandersmann, 1996).

Collaborative practice can be described as a model of care that is client-centered, and involves the continuous interaction of two or more health disciplines, organized into a common effort to solve or explore a health issue or concern (HCC, 2009a). Successful collaboration requires the right mix of professionals for the clients being served and the supports required to enable shared planning and decision-making (Health Council of Canada [HCC], 2009b). Interprofessional collaboration is health providers working together, combining their knowledge and skills to enhance the care they provide. The Ontario CDPM Framework depicts a health care system in which all providers (i.e., health care and community organizations) work collaboratively to provide client-centered, comprehensive care.

The importance of interprofessional collaboration, and the positive effect it has on the health care system, is gaining recognition in Ontario. In recent years, interprofessional education has been added to the curricula of several Ontario academic institutions such as the School of Northern Medicine (www.nosm.ca) and the University of Ontario's Institute of Technology (www.uoit.ca). The integration of interprofessional collaboration is a recognized strategy to improve the performance of the system. Interprofessional collaboration improves the capacity of the health care system as it accentuates the client's individual health care goals and values, provides mechanisms for continuous communication between the providers and clients, optimizes health discipline participation in clinical decision making, and fosters respect for disciplinary contributions (Barrett et al., 2007). Furthermore, collaborative practice, has also been found to improve the knowledge and skills and job satisfaction of clinicians, which is also associated with enhanced capacity (HCC, 2009a)

Capacity within the health care system is an important consideration when assessing effectiveness of health practice and potential for enhancement (Bowen, 2000). Described as an approach that develops skills, organizational structures, and resources required to effectively promote health, capacity-building is an umbrella concept, linking previously isolated concepts such as organizational development and target audience engagement into a coherent long-term approach (Bowen, 2000; VicHealth, n.d.). Capacity-building theory provides a framework for examining the abilities of an individual, organization, or system to address health concerns and the identification of potential opportunities for enhanced health practice (Vogel, 2002). The theory of capacity has been used to assess effectiveness of health practice successfully in the past in the area of diabetes and dietetics practice. Vogel (2002) completed an overview of the capacities of diabetes educators in Canada. This study involved the completion of 20 key informant interviews in an effort to identify the current capacity of health care providers to provide diabetes education, as well as recommendations regarding addressing current and future needs.

The College of Dietitians of Ontario utilizes the theory of capacity-building in the Self-Directed Learning Tool. This Tool is part of a mandatory quality assurance program (College of Dietitians of Ontario, n.d). The Regulated Health Professions Act, 1991 requires all regulatory colleges in Ontario to implement a quality assurance program and that all members must meet the requirements of this program (College of Dietitians of Ontario, n.d). The Self-Directed Learning Tool requires dietitians to reflect on their current practice and identify current barriers and facilitators they face in their practice, identify areas of potential enhancement, and develop plans for professional improvement.

There are three levels of capacity-building: individual, organizational, and system. Individual capacity: "...focuses on strengthening the ability of the individuals as social or organizational actors (individually or collectively) to define, assess, analyze and act on health (or any other) concerns of importance, and extend these capacities in new directions as fresh opportunities appear" (VicHealth, n.d., p. 8). Organizational capacity can be defined as: "...the process that ensures the competence, capabilities, structures, systems, policies, procedures, practices and culture of an entity reflect its purpose, role, values and objectives and enable this entity to address new challenges as well as strengthen its position in society" (VicHealth, n.d., p. 8). System capacity is: "...a complex, holistic and interrelated intervention that encompasses multiple levels and actors, power relationships and linkages, inter-organizational relations and institutional culture, values, norms, paradigms, philosophy and mind sets"(VicHealth, n.d., p. 9). For the purpose of this study: factors that affect the ability of an individual, organization or system to address health concerns will be referred to as barriers and facilitators. Further, activities aimed at addressing current barriers to capacity-building or to enhance capacity will be referred to as "promising practices".

In summary, diabetes management in the context of CKD and PD is multifaceted requiring collaborative care from several health disciplines located in more than one component of the health care system. Diabetes treatment plans and client education must address the alterations to insulin and carbohydrate metabolism associated with CKD, the potential glucose load absorbed from PD, and the complexity of dietary restrictions required for the management of CKD. For clients to successfully self-manage a chronic diseases such as diabetes and CKD, the system must recognize the clients as being equal

partners in their health. The Ontario CDPM Framework outlines how diabetes and CKD services need to be organized to provide efficient, effective, client-centred care. The complexity of managing diabetes in the context of CKD and PD support the theory that there is a need for dialysis-specific diabetes education. That is, diabetes education for PD clients that consolidates the medical management of diabetes and PD into one care plan that is also client-focused and supports self management. However, there is currently a paucity of data regarding the extent to which the CDPM Framework has been integrated into PD programs and the capacity of the current system to manage diabetes in the PD population and the related dietetics practice. It can be postulated that poor diabetic management would result in increased morbidity, mortality, and health care costs. This study will contribute to the body of knowledge regarding diabetes management in adults receiving PD by identifying “promising practices” associated with improved glycemic control.

Chapter Three

Research design and methods

3.01 Introduction

Chapter three provides an overview of the research design including a discussion of the issues associated with web-based survey design and how these were addressed, relevant ethical considerations, and the methods utilized to collect and analyze the data.

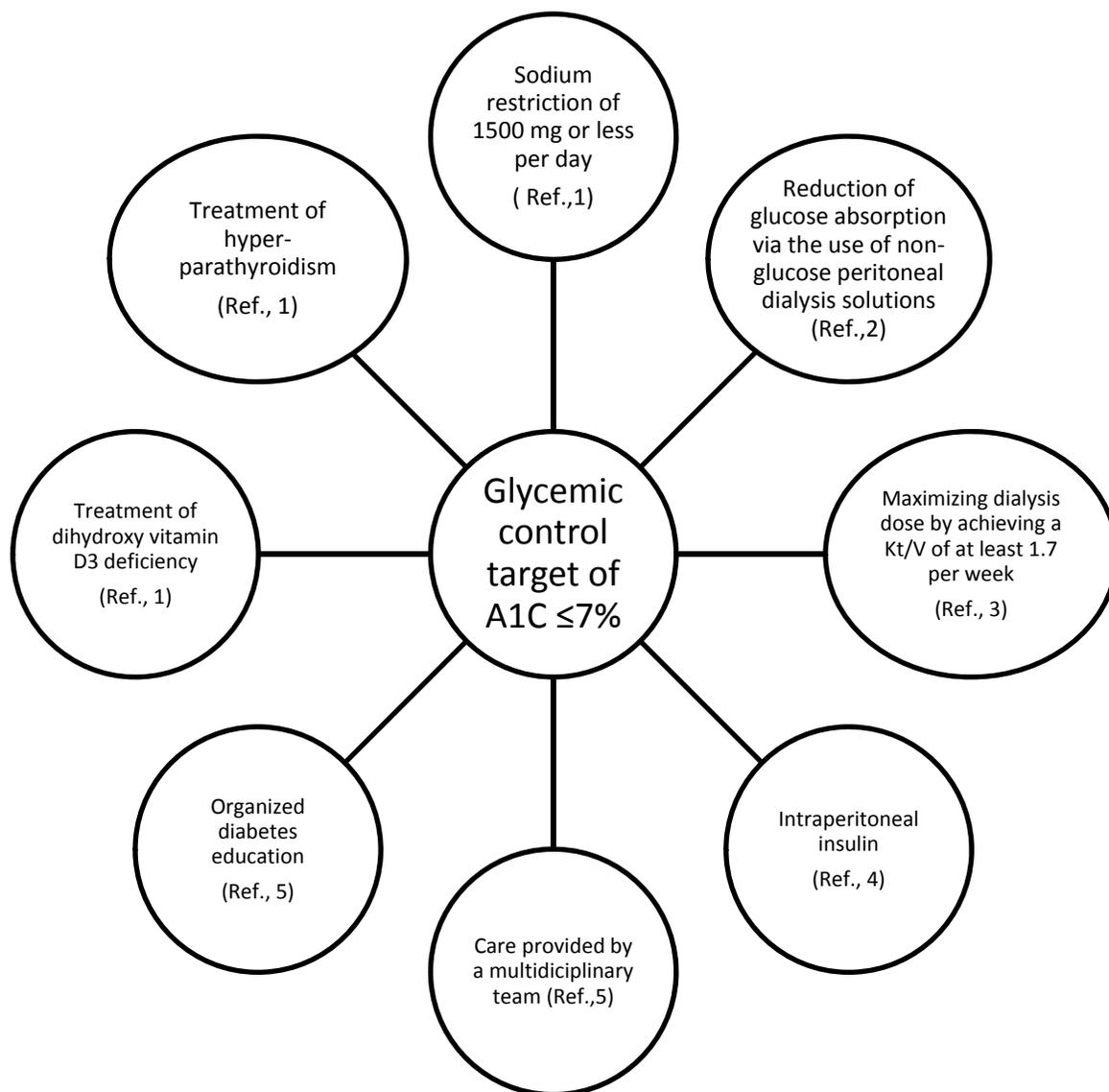
3.02 Role of Researcher and Research

The principal investigator (PI) of this study is a registered dietitian and a Certified Diabetes Educator with sixteen years of professional experience in a variety of work settings, including nine years in the area of adult CKD (i.e., PD and HD clients). Furthermore, the PI is currently a member of the management team for the Durham Regional Diabetes Network and Nephrology Clinics of Lakeridge Health, Oshawa and volunteers with the Canadian Diabetes Association and Canadian Association for Nephrology Dietitians. The PI's clinical observations and experiences provided a starting point for this research. For example, she observed that when adult clients with diabetes began PD, they often exhibited a corresponding increase in A1C levels. This condition was often difficult to manage for both the client and the health care team. Thus, the PI was motivated to examine the perspectives of dietitians working in PD programs regarding diabetes management in the context of CKD and PD and to identify promising practices that may enhance diabetes management in adults receiving PD.

3.03 Theoretical Framework

The conceptual model below (Figure 3.1) was developed to summarize the best practices identified in the literature (within the scope of practice of dietitians or to have an effect on nutritional care plans) that are theorized to result in improved A1C levels of PD clients. In essence, this model summarizes the key factors and concepts and was utilized to guide the design of the study, particular the web-based survey used for data collection.

Figure 3.1 Expanded conceptual model of best practices for the management of diabetes in adult peritoneal dialysis clients



Notes: dihydroxy vitamin D3- 1, 25 dihydroxycholecalciferol, A1C- glycated hemoglobin
 Kt/V measure of dose of dialysis- K= urea clearance, t= time and V = urea distribution
 Ref., 1-Iglesias & Diez, 2008,
 Ref., 2-Dasgupta, 2005; Schatz, 2008,
 Ref., 3- Iglesias & Diez, 2008; Kalantar-Zadeh et al., 2009; Kovesdy et al., 2008,
 Ref., 4- Dasgupta, 2004; Lubowsky et al., 2007),
 Ref., 5-CDA, 2008.

3.04 Research Ethics and Consent

Prior to initiation of any component of this study, approvals were obtained from Research Ethics Boards (REB) at University of Ontario Institute of Technology (UOIT) and The Scarborough Hospital (Appendix A). Participation in this study was free and voluntary (i.e., dietitians could choose not to answer questions). At any time, a dietitian could withdraw from the study by contacting the PI. Consent and ethics approval met Tri-Council of Canada Standards, with respect to full disclosure of risks and benefits, consent, and data collection.

3.05 Study Design

This study is non-experimental and descriptive in design. A closed web-based survey (i.e., only available to invited participants) was utilized to collect data. The sample included all dietitians with dietetic practices in adult PD programs located in Ontario. The survey collected quantitative data supplemented with 18 open-ended questions designed to allow the respondents to share their experiences and opinions regarding glycemic control in PD clients. The survey instrument is discussed later in this chapter.

Quantitative data collection focused on the demographics of the dietitians, the programs in which they work and the best practices utilized to manage diabetes. Quantitative data collection also included the collection of the following blood indices: A1C, dihydroxy vitamin D3, PTH, and Kt/V. Current Canadian Clinical Practice Guidelines for the prevention and management of diabetes identifies A1C as the standard blood fraction to assess glycemic control (CDA, 2008). These guidelines state that A1C should be measured at least every three months (CDA, 2008). Point-of-care A1C testing,

a recent advancement, is not recognized in the current CDA Clinical Practice Guidelines, thus A1C results obtained using this method of testing were not included in data analysis. Testing of dihydroxy vitamin D3 and PTH are standardized laboratory tests. As per current Clinical Practice Guidelines published by the National Kidney Foundation, Kt/V is to be calculated and assessed as part of routine dialysis care at an interval that best meets the care plan of the client (K/DOQI Advisory Board, 2006). These blood results, when available, assist dietitians in the assessment and development of nutritional care plans. This study did not require additional laboratory testing to be completed. Dietitians were not required to perform chart audits, dietitians associated with participating programs were asked to report aggregate results that were assessable from case load management tools and/or quality reports.

3.05.1 Web-based survey methodology.

Web-based survey methodology was utilized for this study as it offered several key advantages over a paper-based survey. In comparison to mail or fax surveys, web-based surveys offer time and cost savings (Braithwaite, Emery, de Lusignan, & Sutton, 2003; Cobanoglu, Warde, & Moreo, 2001; Schmidt, 1997; Solomon, 2001). While web-based surveys require initial set-up and compiling of e-mail addresses, the transmission of the survey to potential respondents takes minutes, and there are no paper or distribution costs (Cobanoglu et al., 2001; Schmidt, 1997).

The utilization of web-based surveys to collect data from health professionals regarding their knowledge, views and attitudes offer several key advantages (Braithwaite et al., 2003). Web-based surveys streamline the process of data collection, as the survey platform enters responses directly into a database, thus avoiding error associated with

data entry (Solomon, 2001). Furthermore, in comparison to paper-based surveys, the substance of responses has been reported to be improved in web-survey open-ended questions when care is given to the design and wording (Denscombe, 2008). In addition, web-based survey technology allows for the development of a survey that is dynamic and interactive which is associated with increased respondent motivation (Schmidt, 1997).

The literature has identified several challenges with web-based surveys such as non-response, incomplete responses, unacceptable responses, and multiple submissions (Schmidt, 1997; Sills & Song, 2002; Vicente & Reis, 2010). To address these issues the survey was piloted with a sub-group of the target population to ensure structure, length, visual presentation, and question format facilitated participation (Kaye & Johnson, 1999; Vicente & Reis, 2010). Details of the pilot process and how multiple submissions were addressed are presented later in this chapter.

Coverage bias (i.e., sample not representative of population) is also a concern associated with web-based surveys. However, there are specific populations in which Internet access is common such as health care. (Denscombe, 2008; Cobanoglu & Cobanoglu, 2003; Cook, Heath, & Thompson, 2000; Schmidt, 1997; Solomon, 2001). In particular, the use of the Internet and web-based surveys is common in the profession of dietetics. The College of Dietitians of Ontario and professional practice groups such as Dietitians of Canada and the Canadian Association of Nephrology Dietitians utilize the Internet as a primary means of contacting members and disseminating information. Web-based surveys have been utilized successfully to survey dietitians across Canada. Trudel et al., (2010) utilized a web-based survey to determine variables influencing the adoption

of practice-based guidelines in Canadian CKD dietetic practices and reported a response rate of 25%.

In summary, the challenges and concerns of web-based surveys are limited when utilized for research purposes in the profession of dietetics. Coverage bias is limited, as dietitians are familiar with web-based surveys and access to Internet is common in the profession. The web-based design of this study utilized the components outlined in the literature that are associated with enhancing response rates and the quality of responses. The final survey facilitated the collection of quantitative data that allowed for the description of the characteristics of the PD programs and dietetics practice, as well as qualitative data compilation regarding the facilitators (enhancers) and barriers these dietitians experience related to assisting their clients achieve a target A1C.

3.05.2 Sampling frame.

Dietitians play a primary role in the glycemic control of diabetic clients. In this study, the sampling frame was dietitians affiliated with the 22 adult PD programs located in Ontario (Table 1.2).

3.05.2.1 Inclusion criteria.

Dietitians working in programs providing PD to adults as a home-based therapy were sampled. In order to ensure the data collected reflected the management of stable diabetes and established PD. Dietitians were asked to report data and share their opinions and experiences regarding diabetes management in stable clients (those without acute medical issues that could potentially affect diabetes management). Dietitians were asked to report data on clients who met the following inclusion criteria: adults of any age, both genders, and diagnosis of diabetes, who had received PD for a minimum of three months.

This time frame is consistent with current guidelines for diabetes management which state glycemic control should be assessed every three months.

3.05.2.2 Exclusion criteria.

The client exclusion criteria were established to ensure data represented the effect of PD on the diabetes management in stable clients. To avoid misrepresenting the effect of PD on glycemic control/diabetes management (e.g., exposure to glucose, dialysis adequacy, need for increased clinic visits). Data were not collected on clients with the following characteristics:

- Received PD for less than three months.
- Received PD for more than three months, but had dialysis interrupted for more than a one week-period within three months of start of the study.
- Diagnosed with peritonitis within three months of the start of the study.

Clients with a diagnosis of diabetes insipidus were also excluded. While diabetes insipidus is characterized by diabetes like symptoms; by clinical definition it is not diabetes.

Dietitians who work in programs providing dialysis to children were excluded. The management of diabetes and CKD in the pediatric population is guided by best practices that are specific to the pediatric population and thus often differ from best practices for the management of diabetes in adults.

3.05.2.3 Recruitment strategies.

The PI initiated recruitment with an informal “ice breaker” telephone call (Appendix B). This call confirmed the individual was in fact the dietitian employed by the PD program to provide nutritional care to PD clients, confirmed the dietitian had e-

mail access, verified the work e-mail address, and briefly introduced the study. This call also identified that there was one dietitian associated to each of the 22 PD programs thus a potential of 22 respondents.

On launching the survey, reminder e-mails were sent out at two week intervals (Couper, 2000). All e-mail correspondence to dietitians included the PI's name and credentials. This strategy ensured the addressee could identify that the message was sent from a colleague and thus, would view the e-mail instead of deleting it (Porter & Whitcomb, 2005).

3.06 The Survey Instrument

3.06.1 Survey development.

The survey was developed and validated prior to data collection. The survey was developed to collect data on the variables identified in the literature (within the scope of practice of dietitians or to have an impact on dietetic practices or on the development of nutritional care plans) to have a positive influence on glycemic control and to describe the dietetics practice of dietitians working in PD programs (Appendix C).

The survey development was informed by work completed by Trudel et al., (2010) in which 288 dietitians working in dialysis programs completed a web-based Pan-Canadian survey. For this study, the developmental process was iterative, starting with a review of the literature to identify possible themes. The survey was pre-tested with a representative sample (n=3). The sample represented PD programs located in both teaching hospitals and community hospitals as well as programs that were large and medium sized. The draft survey was also reviewed by a dietitian who is an expert in the field of web-based survey methodology.

The survey was designed and launched using LimeSurvey® version 1.68+. This survey platform is located on a secure server at UOIT. LimeSurvey® is a platform that includes the features of design and implementation that have been identified in the literature to improve response and completion rates. These features include screen scrolling, inclusion of a progress indicator, controlling for the number of items per page, and adaptive questioning (Couper, 2000; Eysenback, 2004; Kaye & Johnson, 1999; Porter & Whitcomb, 2005). Adaptive questioning can significantly reduce the length and complexity of a survey as certain questions are conditionally displayed based on responses to other questions (Eysenback, 2004).

Potential challenges with incomplete responses, unacceptable responses, and multiple submissions were addressed via the survey platform. To enhance completion rates, dietitians were able to access the survey over multiple sessions. Unacceptable responses are also limited by LimeSurvey®. It allows for the development of a survey in which text can only be entered where appropriate and numbers only when requested. Furthermore, the survey was closed, thus only available to invited participants (e.g., only those dietitians with dietetic practices in adult PD programs in Ontario) were able to access the survey and enter responses. Adaptive questioning (questions conditionally displayed based on responses to other questions) was utilized to improve validity and reduce respondent burden. To avoid multiple submissions, when respondents backtracked and resubmitted their answers, LimeSurvey® resents and resaves the data, deleting their previous responses.

3.06.2 Survey Pilot.

The survey was piloted by three dietitians working in PD programs and these individuals were included in the sample. The initial pilot was completed by two dietitians working for PD programs located in community hospitals. The second pilot was completed by the original two plus a third dietitian working in a PD program located in a teaching hospital. Each dietitian received the invitation to participate via work e-mail and completed the survey using LimeSurvey®. Upon completion of the pilot, each dietitian provided the PI with feedback regarding the survey instructions, question wording and order, response categories, physical layout, and length of time it took to complete (Neutens & Rubinson, 2010). In this study, pilot-testing identified minor flaws and allowed for corrections to be made. This process also provided the PI with the opportunity to determine reliability and face-content-validity, that is, the survey measures what it purports to measure and produces a reasonable sample of all possible responses (Neutens & Rubinson, 2010; Trudel et al., 2010). Feedback from the dietitians involved in the pilot was very positive. Pilot-testing confirmed that the time required to complete the survey was 20-to-30 minutes and that the survey functioned on web browsers other than the one used for development. In response to pilot-testing, definitions of capacity-building were added to the “help” section of questions focused on facilitators and barriers. At the request of the dietitians involved in the pilot and because nil significant changes were made to the survey tool, the data collected during pilot-testing was included in the final data analysis.

3.06.3 Description of the final survey.

The survey contained 64 questions of which 33 were standard questions and 31 adaptive release questions. The content was divided into seven sections as outlined in Table 3.1.

Table 3.1 Survey content area and question type of related items

Section	Content area	Standard questions	Adaptive release questions
1	Demographic characteristics of dietitian	Q.1-5	Q. 6-10
2	Demographic characteristics of program	Q.11, 13-16	Q. 12
3	Program staffing	Q.17, 20, 23, 26, 29, 32, 35	Q. 18-19, 21- 22, 24- 25, 27- 28, 30-31, 33-34, 36-37
4	Diabetes management- A1C tracking	Q. 38, 41, 43-44	Q. 39-40, 42, 45-46
5	Diabetes education offered to clients	Q. 47, 51,	Q. 48-50, 52-54
6	Best practices utilized to manage diabetes	Q. 55	
7	Dietetics practice and capacity-building (barriers and facilitators)	Q. 56-64	

Of the seven sections in the survey, one through six collected predominantly quantitative data. Section seven contained eleven open-ended questions focused on examining dietitians' current practice and capacity-building at multiple levels. These questions asked dietitians to describe components of their practice (e.g., average age, ethnicity of their clients), education programs (how clients access diabetes education) and their beliefs regarding the benefits of becoming a Certified Diabetes Educator.

Question answer type (closed-ended versus open-ended) is summarized in Table 3.2.

A complete summary of questions and answer types by survey section is included as Appendix D.

Table 3.2 Survey content area and answer type for related items

Section	Content area	Closed-ended answers	Open-ended questions
1	Demographic characteristics of dietitian	Q.1-5,7,9	Q. 6, 8,10
2	Demographic characteristics of program	Q.11,13, 16	Q. 12, 14, 15
3	Program staffing	Q.17-37	
4	Diabetes management- A1C tracking	Q. 38-41, 43-46	Q. 42,
5	Diabetes education offered to clients	Q. 47, 50, 51,54	Q. 48-49, 52-53,
6	Best practices utilized to manage diabetes	Q. 55	
7	Dietetics practice and capacity-building (barriers and facilitators)	Q. 58, 63	Q. 56-57, 59-62, 64

The survey was distributed over nine screens, with five to eight items per page. None of the items were randomized and none of the questions were mandatory. The survey allowed for participants to complete the survey over multiple sessions, provided the respondent with feedback regarding their progress (i.e., how much of the survey they had completed), and allowed respondents to backtrack and review/change their answers.

3.07 Study Variables

The survey collected information on several key variables gleaned from the literature to have a role in the management of diabetes in the context of CKD and PD (see Figure 3.1). To describe the individual capacity of dietitians to manage diabetes in PD programs (i.e., level of dietetics expertise that currently exists in PD programs in Ontario), the number of years practicing as a dietitian, number of years as a dietitian in a PD setting and certification as a diabetes educator were also collected (VicHealth, n.d.). To describe the organizational (i.e. PD programs) and system capacity of managing diabetes in PD programs and across the health care system, data regarding the size, location of the programs (teaching hospital versus community hospital), membership of

the multidisciplinary team, tracking outcome measures (A1C), diabetes education, and best practices were collected (CDA, 2008; VicHealth, n.d.). Finally, the opinions' of dietitians were sought regarding diabetes management in PD programs using the three levels of capacity-building (VicHealth, n.d). Dietitians were asked to identify specific examples of actions that could be implemented to address barriers to improve client care and outcomes. This data illuminated barriers and facilitators within dietetics practice in PD programs and potential areas for future enhancement. Content area of the survey and the key variables collected are summarized in Table 3.3.

Table 3.3 Survey content area and related key variables

Section	Content area	Variables
1	Demographic characteristics of dietitian	age number of years practicing as dietitian number of years practicing as PD dietitian sole dietitian working in PD program Certified Diabetes Educator
2	Demographic characteristics of program	program location size of PD program demographics of client population
3	Program staffing	membership of multidisciplinary team; nursing pharmacists dietitians social workers physiotherapists occupational therapists endocrinologists
4	Diabetes management- A1C tracking	percentage of clients with diabetes frequency of A1C testing percentage of clients with target A1C
5	Diabetes education offered to clients	type of diabetes education offered to PD clients, including provider, type (group/individual), frequency, length and clinicians involved
6	Best practices utilized to manage diabetes	dialysis prescription low sodium diet instruction intra-peritoneal insulin therapy treatment of hyperparathyroidism and dihydroxy vitamin D3 deficiency target Kt/V organized diabetes education care from endocrinologist
7	Dietetics practice and capacity-building	individual barriers and facilitators organizational barriers and facilitators system barriers and facilitators

3.08 Survey Methods

3.08.1 Data collection.

The final survey was launched on October 26, 2010, and was open for invited respondents to complete over a four-week period. The full timeline of this study is outlined in Appendix E. The Letter of Introduction and Consent (Appendix F) was sent to

the work e-mail address of the dietitians at each of the 22 PD programs. The letter identified the following: UOIT as the organization conducting the study, PI, purpose of the study, the length of time it would take to complete the survey, the date of return, and how to withdraw from the study. Further, respondents were provided with contact information in the event that they had questions, as well as a contact who could offer technical assistance in completing the survey, as required (Neutens & Rubinson, 2010). The Letter of Information also assured the dietitian of anonymity and that all data would be kept confidential and would not be used to assess the individual performance of the participating dietitian or program in which they worked (Neutens & Rubinson, 2010).

3.08.2 Anonymity, security and data integrity.

Privacy and control of personal information is a primary concern of ethics (Cho & LaRose, 1999). Based on feedback received from the Research Ethics Board at UOIT to ensure anonymity, security, and data integrity, a survey platform located in Canada was chosen instead of other common web-survey platforms that are based in the United States. Data collected from the survey is stored on a secure server located at UOIT and ID and password protected.

The data collected from the participating dietitians did not contain information that would enable the identification of their clients (e.g., Ontario Health Card numbers, addresses, names). LimeSurvey® contains a “token management” system. This system generates a unique token (ID) for each participant. This ensures the anonymity of each participating dietitian and program in which he/she works, as all identification characteristics related to each participating dietitian are removed by this management system.

The list of dietitian names and related token IDs are stored separately from data files and are password protected. As per UOIT REB guidelines, hard copy and electronic data will be stored at UOIT for five years. The hard copy data is stored in a locked office and the electronic data will be stored on a secure server at UOIT and is password protected. All unneeded materials were destroyed upon completion of the study. Access to the data was limited to the PI and her research advisor. The names of the participating dietitians or the programs in which they work have not been, nor will be included in any reports or publications emerging from the research.

To ensure data integrity, response restraints were utilized such as drop down lists. Furthermore, the use of adaptive questioning ensures that respondents only provided answers to questions where certain conditions were met.

3.09 Data Analysis

Tabulation of results was completed using LimeSurvey®. This process allowed for a frequency count to be conducted to ascertain how many answers were made in each answer category for each question. The frequency count for each of the standard questions per content area of the survey can be found in Appendix G.

Quantitative data was exported into Microsoft Excel™ (2007) for descriptive statistical analysis. Descriptive analysis was used to characterize basic sample characteristics. Descriptive statistical analysis involved the calculation of measure of central tendency (Neutens & Rubinson, 2010). The process of data mining, using conditional descriptive statistical analysis to look for trends and or patterns related to particular variables, was completed using Microsoft Excel™ (2007). In regard to data

assumptions, no assumptions were made (e.g. if a question was not answered it was not assumed that the answer was yes or no).

The data collected regarding the implementation of PD related best practices (i.e., survey question 58), a weight reverse point score analysis was completed (e.g. first choice was assigned a weight score of seven, second choice a weight score of six and so one). This enabled the analysis of all of the best practices collectively instead of individually.

Qualitative data collected from the open-ended questions was analysed using a thematic process of open-coding in which common themes and patterns are identified (Strauss & Corbin, 1989). Open-coding involved closely examining the data, breaking them down into discrete categories, comparing similarities and differences, and asking questions about the phenomena being investigated (Strauss & Corbin, 1989). All data from open-ended questions was exported into Microsoft Office™ (2007). Prior to examination of data, all personal identifiers were removed. To improve readability, all medical terms and short-forms were removed and grammar errors corrected (without compromising meaning).

Data was initially examined by looking for common themes relating to barriers and facilitators. The codes were then collapsed into sub-groupings related to the users and providers within the health care system. The sub-groupings included clients, health care disciplines, PD and diabetes programs, location of the program and the overall health care system. In consultation with the PI's research advisor, these sub-groupings were then analysed looking for common patterns at the individual, program, and system

levels consistent with capacity-building theory (VicHealth, n.d). Finally, these were collapsed into three main themes and two sub-themes.

To ensure the trustworthiness of data interpretation, an audit trail was maintained through-out analysis. This audit trail detailed the process utilized to export the data from LimeSurvey® into Microsoft Word™ (2007) for analysis. As well, the audit trail documented the common themes, codes, and sub-groupings identified (Glesne & Peshkin, 1992). To address possible personal bias and subjectivity, the PI's research advisor and a fellow graduate student reviewed the aggregate data coding, sub-groupings, and main themes (Glesne & Peshkin, 1992).

Overall, these processes facilitated the investigation of the relationship of the variables in question (e.g., glucose load, PTH, dihydroxy vitamin D3, diabetes education, endocrinologist care, intraperitoneal insulin, Kt/V, and dietetics practice facilitators and barriers as identified by dietitians) to the provision of dialysis-specific diabetes education (Neutens & Rubinson).

3.10 Strengths of Study

Web-based survey research costs less and requires fewer resources to complete in comparison to individual interviews or focus groups (Austin, Richter, & Reinking, 2008) The data entry stage is eliminated for the survey administrator, as the on-line platform compiles the data, thus eliminates data-entry error. Online survey methodology enhances participation and completeness of responses as respondent can enter data in intervals. For this study, the PI's professional contacts and networking experience were of benefit to the development and implementation of this study. Furthermore, the research team, comprised of two faculty advisors and a research advisor, were also major contributors to

the success of this study. The faculty advisors provided extensive expertise in the areas of web-based survey methodology, statistical analysis, and provincial dialysis practice. The study research advisor has dietitian expertise in dietetics research, health policy, and qualitative methodology. Finally, this study was completed at UOIT, a lap top based university, in which the learning and research environment is technology-rich. This facilitated the development and implementation of a web-based survey that incorporated the components of design highlighted in the literature to enhance response rate and data integrity.

3.11 Limitations of Study

The reliability of the data collected is dependent on the quality and quantity of the responses. Dietitians were not required to perform chart audits, dietitians associated with participating programs were asked to report aggregate results that were assessable from case load management tools and/or quality reports. Thus, the quantitative results must be interpreted cautiously. Participation in this study was voluntary. Completion of this survey may have required the respondents to schedule time outside their regular work hours. The survey tool included both open-ended and close-ended questions. Responses for the open-ended questions focused on capacity-building were lower and less detailed in comparison to the other open-ended questions. The reduced response rates and detail for these questions may be the result of respondents possessing limited knowledge regarding capacity or perhaps the result of respondent overload (capacity questions were located in last section of survey).

This study design is also limited by the psychological burden required to complete the study, the technology skills of each of the respondents, and the availability of the data at each of the participating programs.

Finally, while this study sought to describe dietetics practice in PD programs, it is important to note that the data collected regarding individual work settings is limited and thus may not fully describe this general work setting or how nutritional care is provided to PD clients. Further, the scope of data collection was limited to Ontario, and thus may not represent dietetic practice and diabetes management in PD programs across Canada.

Chapter Four

Findings

4.01 Introduction

This chapter describes the findings gleaned from data analysis and discusses these findings in relation to the literature. The primary research questions this study strived to answer were:

1. What are the demographic characteristics of PD programs?
2. What are the demographic characteristics of dietitians with dietetics practice in PD programs?
3. How do PD teams manage diabetes?
4. What are the key facilitators and barriers that dietitians experience related to diabetes management?

As previously noted, in the literature review, capacity within the health care system is an important consideration when assessing health practice (Bowen, 2000). Capacity theory allows for the evaluation of health practice at the individual, organization and system levels; assessing effectiveness of health practice and the potential for enhancement (Bowen, 2000). Thus, the theory of capacity was utilized during data analysis. Data analysis identified three major themes each one representing a level of capacity theory. These themes will be discussed in relation to Ontario's CDPM framework. In addition to discussing the three major themes; promising practices gleaned from the findings will also be presented. The three overarching themes that will be discussed are:

- “*Walking the CDPM talk*”: Client-focused care (individual-level of capacity).

- “*The unrecognized CDPM champions*”: Dietitians as change agents (organizational-level of capacity).
- *The missing CDPM puzzle pieces*”: The CDPM approach to care delivery (system-level of capacity).

The chapter has been organized into two major sections. The first section, in reference to research question one and two, discusses the response rate followed by a description of the sample and PD programs in Ontario. The second section, utilizing the theory of capacity, presents the major findings in reference to research questions three and four.

4.02 Response Rate

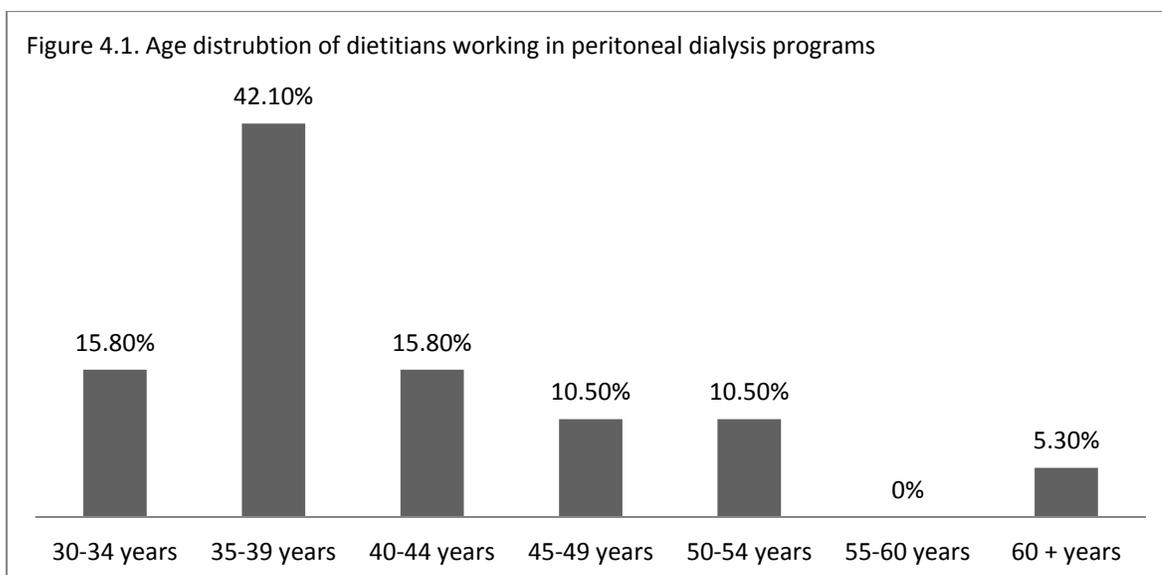
At the time of this study there were 22 dialysis programs in Ontario offering PD to adults. Each dialysis program had one dietitian employed to provide nutritional care to PD clients. All twenty-two dietitians were sent invitations to participate, 19 participated, thus resulting in a response rate of 86.6%. The high response rate (86.6%) can be partly attributed to the study design. All potential respondent e-mail addresses were verified prior to the survey implementation. As well, respondents received reminder e-mails during data collection to enhance participation. Furthermore, the timing of data collection was planned to avoid shortened work weeks due to statutory holidays.

The high response rate can also be attributed to certain characteristics of the nephrology community such as geographical distribution of the programs and the level of interaction among dietitians working in CKD/PD programs. The majority of the programs are located along the Highway 401 corridor and in close proximity of one another. This geographic proximity facilitates participation in educational events such as

Canadian Association of Nephrology Dietitians (CAND) education days and professional networking. Further, CAND, a professional practice group, publishes quarterly newsletters and maintains a members-only Internet web page in which dietitians working in the area of CKD can network and share practice innovations. All of which results in a “tight-knit” community, that routinely participates in research and other activities aimed at improving dietetic practice in the area of CKD. The combination of study design and sample frame characteristics, as noted above, contributed to the high response rate of this study.

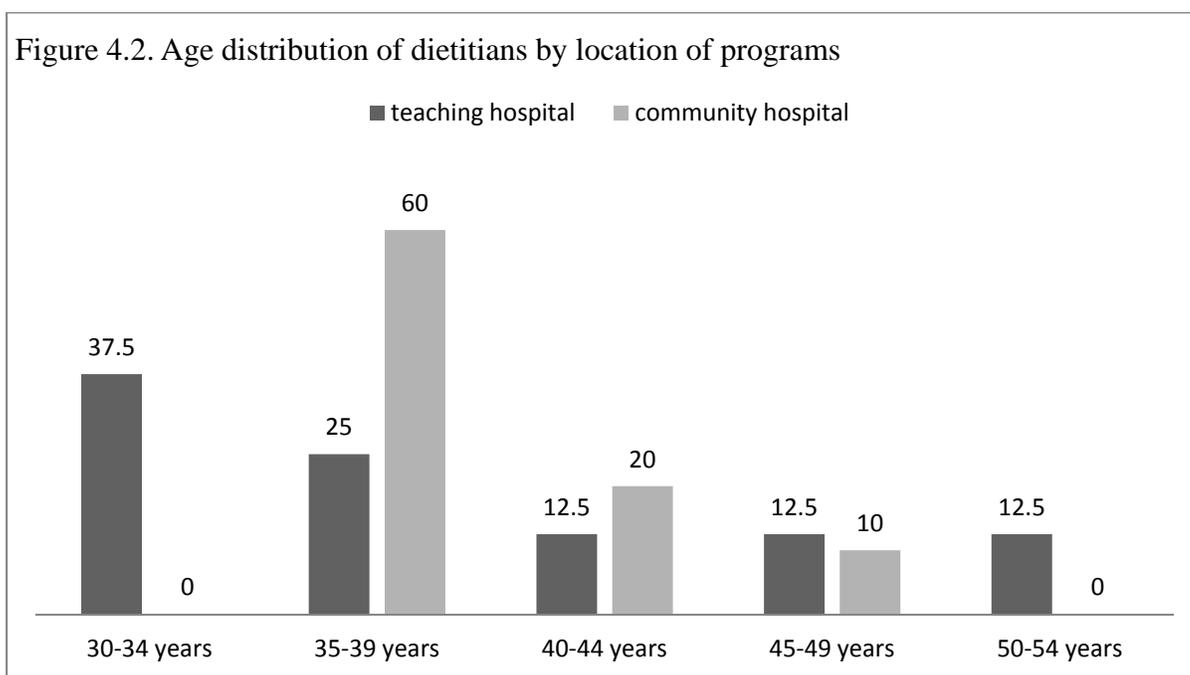
4.03 Description of Sample

In this study, nil respondents were less than 30 years of age. The majority of respondents (57.8%) were in the age ranges of 30-34 years of age (15.8%) and 35-39 years of age (42.10%). Age of dietitians is illustrated in Figure 4.1.



Peritoneal dialysis programs are located in either community or teaching hospitals. The details regarding program location are discussed later in this chapter. Dietitians working in community hospitals appear to be older than their teaching hospital

counterparts. The majority (60%) of dietitians in community hospitals are 35-39 years. In comparison, only 25% of dietitians working in teaching hospitals were in this age group. The predominant age group (37.5%) of dietitians employed in teaching hospitals was 30-34 years. The community hospital work setting appears to be more attractive to dietitians between 35-39 years. This study did not collect data regarding work setting preferences however; this phenomenon may be the result of external forces such as location of community hospitals in urban areas or family responsibilities. The age distribution of dietitians working in PD programs, presented by program location, is outlined in Figure 4.2.



In regards to experience, respondents were asked to report how many years they had been practicing as a dietitian (in any practice setting) and how many years they had been employed as a dietitian for a PD program. According to findings, the majority of respondents have extensive work experience as 84% had been dietitians for more than five years. Dietitians employed in programs located in community hospitals appear to

have slightly longer dietetic careers (53% had more than 5 years experience in comparison to 47% in teaching hospital locations). In regards to the number of years employed by a PD program, survey results identified that 58% of respondents had been working as dietitians in PD programs for five or more years. Interestingly, when reviewed by program location, dietitians employed by programs in community had more PD experience (64% reported greater than five years) than those in teaching hospitals (36%).

Overall, these findings suggest that dietitians working in community programs are older and possess more years of experience working in PD programs in comparison to their teaching hospital colleagues. This also suggests PD programs in teaching hospitals are more likely to employ younger dietitians and that retention rates are higher.

This study did not collect data regarding the clinical skills and work experience required to be employed in a PD program. However, it can be hypothesized that due to the complexity of nutritional management the area of PD, candidates for these positions require prior work experience. These findings draw attention to the level of dietetics experience that exists in many PD programs in Ontario. However, these findings also raise several questions regarding the age distribution and experience of dietitians working in PD programs:

- Why are there no dietitians younger than the age of 30 working in PD programs?
- Why is there such a large cohort of dietitians of the age 35-39 years working in community hospital PD programs?

- What are the minimum dietetic skills and expertise are required to manage diabetes in the context of CKD and PD?

More research is needed in this area to determine what if any affect age and experience have on dietetic practices in PD programs or on the care provided to PD clients?

Sixty-eight percent of respondents reported being the sole dietitian providing nutritional expertise to the PD program. Of these dietitians, 75% were employed in PD programs in teaching hospitals and 60% were working in community-based programs. It appears programs located in teaching hospitals are more likely to hire dietitians with less experience in PD and that these dietitians are more likely to practice as sole practitioners. While it can be postulated that teaching hospitals, as a result of being very large facilities with a focus on training health care providers, have the supports required for dietitians with limited experience, it is unclear if these resources do exist in these facilities. This study did not collect data regarding the employment supports available to dietitians working in PD programs, the effect of sole versus group practices, nor as to whether the level of experience affects client care or outcomes. However, as noted by Thelen et al (2009), job functions of dietitians working in CKD programs are dependent on years of practice and program supports. Thus, limited experience and lack of mentorship most likely has a negative effect on the level of dietetic practice (i.e., ability to consolidate the nutritional management recommendations of diabetes and CKD into one client care plan and provide dialysis-specific diabetes education) and client care and health outcomes.

In regards to diabetes-related expertise, 10.5% respondents reported to have achieved the designation of Certified Diabetes Educator (CDE). The rate of CDE certification did not appear to vary between teaching and community hospital programs.

In response to the question enquiring why this certification was beneficial to PD clients, one dietitian stated: "...clients on PD are using sugar to do their dialysis. This further creates challenges for the diabetic clients. Being a CDE helps with teaching clients how to better manage their diabetes..."

While only 10.5% of respondents reported having achieved the designation of CDE, 77% of those who had not, reported they would consider becoming a CDE in the future. When asked to reflect on how this certification would be beneficial, respondents indicated that the prevalence of diabetes was high in PD programs and that it would help them assist their clients with diabetes management and improve the care they provide to their clients. At the time of this survey nil respondents reported to be actively pursuing certification.

Overall, these findings suggest that many dietitians working in PD programs possess extensive work experience and remain in these positions for extended periods of time. Data analysis also suggested an association between program location, the age, years of experience, and type of practice (i.e., sole or group practitioner). Furthermore, the capacity of dietitians to provide dialysis-specific diabetes care appears limited as diabetes certification in PD programs was rare. While dietitians working in these programs identify the need for and the benefits of obtaining diabetes certification, very few have achieved certification and nil were pursuing certification. These results highlight that potential exists to enhance dietetics practice in PD programs. Barriers and facilitators related to dietetics practice in PD programs are discussed later in this chapter.

4.04 Description of PD Programs in Ontario

This survey collected data from 19 dietitians, representing 19 PD programs and a total of 1200 PD clients. Dietitians described the PD population as diverse in regards to age, education and literacy, income, social and physical environment, and ethnicity. Some clients live close to the PD program while others live several hours drive away. Some clients are young, working and have family to support, while others live in retirement or long-term care facilities. In response to the question: “Describe the demographics of the clients,” one dietitian described the clients as: “...20-86 years of age and everything in between,” another stated: “...live in residences ranging from single family home to apartment,” and a third stated: “...my clients come from a variety of backgrounds, education etc. We have several in long-term care facilities as well as those who work full- time. Some live as far away as four hour drive.” Finally one dietitian described PD clients as: “...most clients not working only one in five works -education of at least high school; ethnicity of African, European, South Asian, South-East Asian - residence of apartment, house, long-term care facility, family support of spouse, children, relatives and Community Access to Care.”

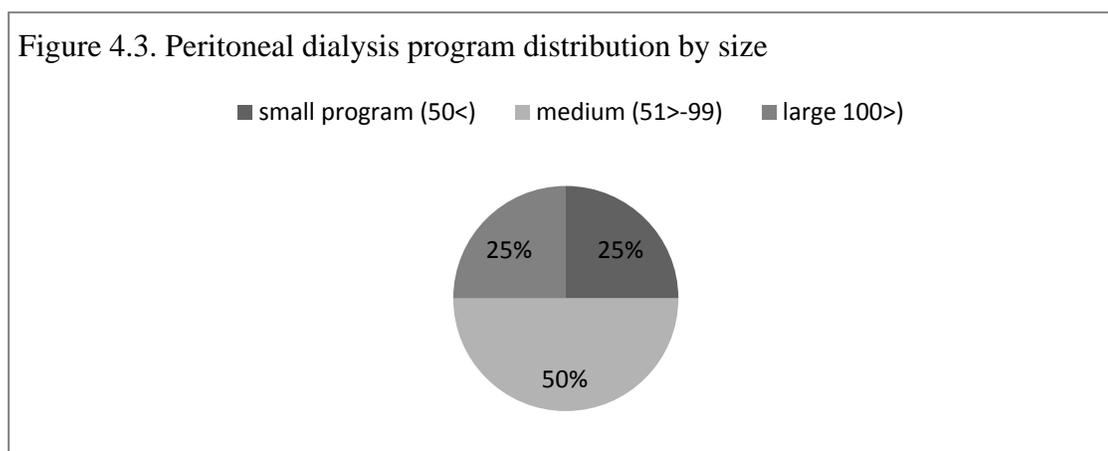
Peritoneal dialysis programs in Ontario are located in either a teaching or community hospital and the number of clients registered with these programs varied. Forty-four percent of PD programs in Ontario are located in teaching hospitals and the remaining 56% are located in community hospitals. The average number of clients registered in each program was 75 (standard deviation 53.07); some programs were providing care to a small number of clients (i.e., smallest program reported 18) while others cared for a large clientele (i.e., largest program had 219 PD clients). When client

number was analysed by program location, the average number of clients registered in a program located in a teaching hospitals was 73 (standard deviation 38.28). In comparison, the average number of clients for community-based programs was 76 (standard deviation 63.07). Table 4.1 summarizes program size across Ontario as well as by location of the program.

Table 4.1 Summary of the number of clients registered in peritoneal dialysis programs.

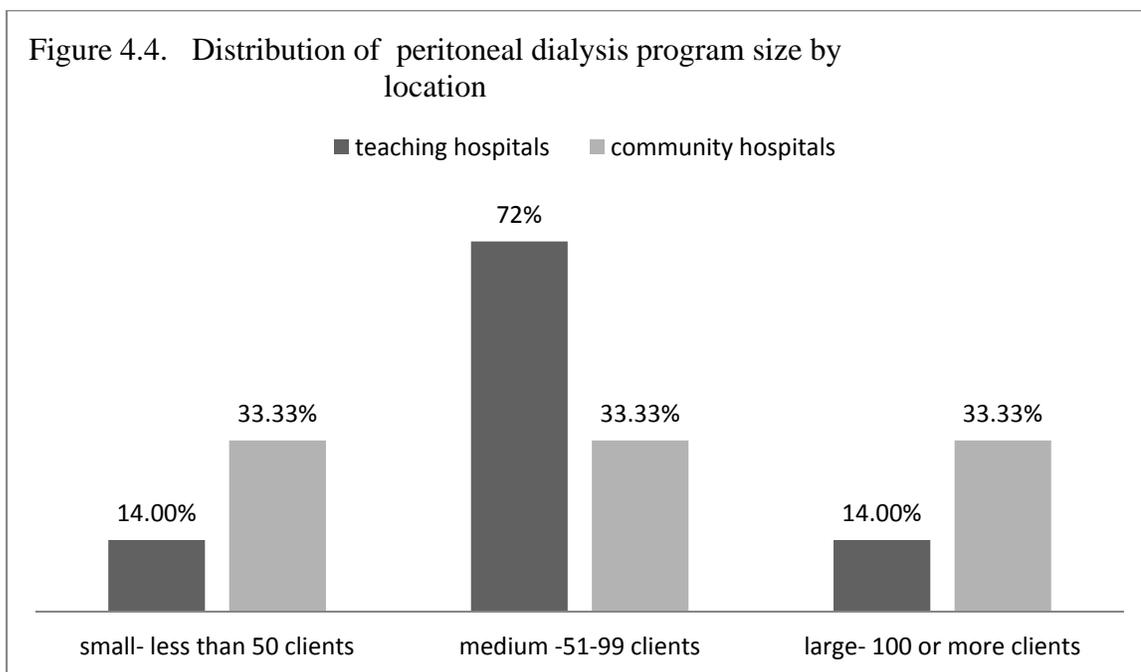
	All programs	Teaching hospitals	Community hospitals
Total number of clients	1200	511	689
Average	75	73	76.55
Standard deviation	52.07	38.28	63.07
Minimum	18	35	18
Maximum	219	152	219

When client numbers were categorized into small, medium and large, 25% of PD programs were small in size (50 clients or less), 50% were medium in size (51-99 clients) and 25% were large in size (greater than 100 clients) see Figure 4.3.



Based on location, the majority (72%) of programs located in teaching hospitals are medium in size, with the remaining 28% evenly distributed between small and large size. The size of programs located in community hospitals is evenly distributed at 33% for small, medium, and large. Overall the smallest and the largest PD programs in

Ontario are both located in community hospitals. The distribution based on location is illustrated in Figure 4.4.



Upon initial review, the data suggests that there is very little difference in program size across the system (i.e., average of 73 registered clients in teaching hospitals versus 76 in community hospitals). However, closer examination revealed that size of PD programs varies greatly across the system (i.e., programs as small as 18 and as large as 219). These results highlight the diversity in the size of PD programs across Ontario.

In summary, PD programs in Ontario are either located in teaching hospitals (44%) or in community hospitals (56%). Fifty percent of programs in Ontario are medium in size, a higher percent (72% in comparison to 33%) of medium-sized programs are located in teaching hospitals. While it is unclear why, these findings identified that the greatest concentration of small- and large-sized programs are located in community hospitals. In regards to diabetes expertise, Diabetes Educator Certification is limited. Data analysis suggested that dietitians working in PD programs located in teaching

hospitals are younger in age, are more slightly more likely to work as sole practitioners, and possess slightly less PD experience in comparison to their community counterparts. It is undistinguishable at this time, what effect if any, these findings have on dietetic practice, the capacity of PD programs or the dietitians employed in these program to provide dialysis-specific diabetes care or on client outcomes. It can be theorized that program size, diabetes certification, a dietitian's work experience and access to mentorship affects the capacity of a dietitian to provide care to PD clients with diabetes. Thus, younger dietitians, with less work experience, working as sole practitioners would have less capacity to provide dialysis-specific diabetes care. Furthermore, program size most likely affects staffing, resources and defines how care is provided to clients (e.g., those programs that are larger in size most likely have more clients with diabetes, thus warranting the provision of PD care that also focuses on addressing diabetes management). These findings highlight the need for further research in this area to determine the work-force characteristics of dietitians working in PD programs and how program size and location affect how care is provided. This data will help to distinguish whether these variables have an effect on client outcomes.

4.05 Major Findings

In answering the following research questions: “How do PD teams manage diabetes?” and “What are the key facilitators and barriers that dietitians experience related to diabetes management?” three overarching themes were identified. These themes were:

- “*Walking the CDPM talk*”: Client-focused care (individual-level of capacity).

- “*The unrecognized CDPM champions*”: Dietitians as change agents (organizational-level of capacity).
- “*The missing CDPM puzzle pieces*”: The CDPM approach to care delivery (system-level of capacity).

Each of the themes will be discussed individually and the promising practices garnered from the data analysis will be presented.

The first theme “*walking the CDPM talk*”- client-focused care; addresses what needs to be in place, as identified by the dietitians, for integrated nutritional care (i.e., dialysis-specific diabetes care) to be provided in a client-focused manner. For the purpose of this study, client-focused care will be defined as care that is provided in a manner that recognizes the client as a key decision-maker and is organized in such a way, that it considers the age, education, and culture of the client, and is sensitive to the client’s financial resources and social environment (MHLTC, 2009).

The second theme, “*the unrecognized CDPM champions*”- dietitians as change agents; investigates dietetics practice in PD programs utilizing the CDPM Framework. As well, facilitators and barriers to the adoption of diabetes best practice into PD programs and dietetic practices (as identified by dietitians), will be presented.

The final theme “*the missing puzzle pieces*”- the CDPM approach to care delivery; addresses how the current health care system (as reported by dietitians) is supporting the integration of diabetes best practice into PD programs. This theme also addresses how care was organized and delivered with the goal of providing expert care to PD clients when and where needed. This theme has been divided into two sub-themes: “*collaborative practice*” which investigates how multiple clinicians are/can work

together across the system to provide care and “*integration of care*” which investigates the process of providing care that integrates both diabetes and PD into care plans.

4.05.1 Individual level of capacity: “*Walking the CDPM Talk*”: Client-focused care.

A key component of the CDPM framework is care that is client-focused and supports self management. When asked: “What needs to be in place for clients to achieve a target A1C?”, respondents suggested that clients must be able to access health services and supports close to home and that services must enhance the clients’ abilities to self-manage (e.g., client-focused education and materials). Supports such as family, Community Care Access Centres (CCAC), and financial supports were identified. In particular, the Ontario Disability Special Diet Benefit funding (a Government of Ontario benefit program) was identified as a key support.

Given the diversity of the PD client population (as discussed earlier), it can be hypothesized that providing nutritional care to PD clients is challenging and requires a care team that possesses knowledge regarding the availability of social supports, the medical management of PD and diabetes, and self management theory. In regards to dietetic practice, these findings highlight that dietitians must possess knowledge and skills regarding the medical management of CKD/PD and diabetes. In addition, in order for care to be provided that supports self-management, dietitians must have the skills and knowledge required to develop care plans customized to a clients’ literacy level, social/financial supports and culture. Furthermore, care must be organized in a manner that facilitates the client’s access to the PD team and to other social supports. As outlined in Ontario’s CDPM Framework, effective care is “client-focused.” Thus, in order for

diabetes education to be effective, it must utilize multiple approaches to address differences in age, education and culture (i.e., available in first language and at appropriate language level) and be sensitive to the financial resources (i.e., clients must have the money to follow recommendations) and social environment of the client. As noted previously in the literature review, the CDA, as well as other organizations (e.g., Kidney Foundation of Canada and MOHLTC) develop and print client materials to support self management. These materials focus on the management of diabetes or PD, and some have been translated into French, Chinese, Tamil, Hindi and Punjabi. However, currently none of these organizations produce client materials that are diabetes and PD appropriate, as well culturally sensitive. A key component of CDPM is a health care system that supports clients in self-managing their health. Diabetes, CKD-friendly, culturally diverse, client materials that are easily accessed by clients would strengthen the client's ability to act on health concerns and thus support self management. The current lack of diabetes educational materials that are PD appropriate creates a barrier to effective care.

These findings also highlight the current lack of coordination and collaboration that exists among diabetes and PD stakeholders. It can be theorized that a coordinated process for the development and revision of education materials would result in client-focused education materials that address the complexity of managing diabetes in the context of PD and would ensure consistent messaging. Furthermore, this coordination could help ensure the sustainability of these resources and facilitate the translation of education materials into other languages.

4.05.2 Organizational level of capacity:

“The recognized CDPM champions”: Dietitians as change agents.

Dietitians play a key role in the management of both diabetes and CKD as both diseases require modifications to nutritional intakes. Results from this study highlighted that dietitians are highly engaged in assisting their clients self-manage their chronic diseases. However, barriers which affect dietitian’s abilities to fully integrate CDPM principals into their dietetic practice and thus fully support the concept of self management exist. The following section discusses findings related to the access dietitians have to clients to provide care, the role dietitians have assumed in regards to the integration of CDPM and the barriers they currently face in their efforts to integrate CDPM into their dietetic practices and offer dialysis-specific diabetes education.

All respondents described PD programs as being organized using “primary nursing models”, and that care was provided by a multidisciplinary health care team. The primary nursing model, as described by the respondents, places the nurse as central to the client’s care (i.e., nurses are responsible for client training and monitoring of client’s health status related to PD and diabetes) and are responsible for coordinating the client’s visits to the PD clinic. Nursing may also be responsible for identifying which clients require nutrition education, as described by one dietitian: “...patients are assessed by the nurse ...dietitian is present as needed.”

Dietitians were asked to provide the average number of visits per year a PD client would attend as part of routine care. It appears that clients attend PD clinics for face-to-face assessments, an average of 7.63 times per year (standard deviation 2.99) with a minimum of two visits per year and a maximum of 12 visits per year. Based on program

location, PD programs located in teaching hospitals, on average, see their clients less frequently at six visits per year in (standard deviation 3.20) comparison to community hospitals which average 8.95 visits per year (standard deviation 2.16). Distribution of assessment frequency for all programs and by location is summarized in Table 4.2.

Table 4.2 Summary of the frequency of face-to-face* client assessments per year.

	All programs	Teaching hospitals	Community hospitals
Average	7.63	6	8.95
Standard deviation	2.99	3.20	2.16
Minimum	2	2	6
Maximum	12	12	12

Note:*Face-to-face assessment refers to the number of times a client reports to PD clinic for routine follow-up care. This does not include other forms of interventions such as telephone, mail or e-mail. It also did not include additional visits due to acute illnesses such as peritonitis.

Dietitians and/or other health-care staff such as social workers and pharmacists often utilize these PD clinic visits as their primary access to PD clients to complete assessments and provide education. Clients are identified as requiring nutritional interventions either by a nurse or a dietitian. A nurse may ask a dietitian to see a client or the dietitian screens available client data to determine which clients should be seen and in what priority. One respondent reported that the on-going care of clients also required members of the health care team to travel either to the client's place of residence or satellite clinic locations.

As reported above, in many cases, the clients' visits to the PD clinic is the primary access point of care for dietitians. Thus, the frequency of these visits may affect the level of access a client has to the dietitian and/or other health care team members. Clients who attend clinics in which face-to-face assessment frequency is low would have limited access to the dietitian and or other health care team members which, in turn, may

affect their ability to self-manage their diabetes and PD. Further, lower frequency of visits (less than every three months) may affect the ability of the team to follow best practice for the management of diabetes. Current diabetes best practice states that A1C testing be completed at a three month interval.

All PD clinics were staffed with dedicated nurses, dietitians, and social workers. However, client access to pharmacists appears to be more limited (82% of programs had dedicated pharmacists). The inclusion of pharmacists as dedicated members of the PD team was dependent on the program location and size. Programs located in teaching hospitals were slightly more likely to have dedicated pharmacy services at 85.7% in comparison to community hospitals at 80%. Dedicated pharmacy support appears to be reduced in medium-sized programs in teaching hospitals and in small programs located in community hospitals. This study found 20% of the medium-sized programs (51-99 clients) located in teaching hospitals and 66.6% of small programs (less than 50 clients) located in community hospitals did not have dedicated pharmacists as part of the PD health care team (see Table 4.3). These statistics are worth noting as the majority of programs located at teaching hospitals are medium in size (72%) and the 33% of programs located in community hospitals are small in size. These findings suggest many PD clients have limited access to a pharmacist in comparison to access to nursing, dietitians or social workers.

Table 4.3 Distribution of dedicated pharmacist staffing by peritoneal dialysis program size and location

Teaching hospital locations		Community hospital locations	
Small programs (less 50 clients)	100%	Small programs (less 50 clients)	33.30%
Medium programs (51-99 clients)	80%	Medium programs (51-99 clients)	100%
Large programs (100 or more)	100%	Large programs (100 or more)	100%

Endocrinologists, as dedicated members of the PD team, were limited to two community hospital locations. Both of these programs were large, with client populations greater than 100. Nil programs located in teaching hospitals were reported to have an endocrinologist as part of the PD care team. Endocrinologists specialize in the management of endocrine disorders such as diabetes. Thus, dedicated endocrinology support in PD programs would greatly enhance the capacity of PD programs to provide dialysis-specific diabetes care.

Both occupational therapists and physiotherapists are identified in the Provincial PD Joint Initiative to be beneficial members of the PD health care team as it contributes to client-centred care and supports the concept of self management. Physiotherapists were reported to be part of one PD team located in a teaching hospital. Nil community hospital-based PD programs had dedicated physiotherapists and nil programs (neither teaching nor community) had dedicated occupational therapists. These findings highlight that while a multidisciplinary approach to care has been identified in the Provincial PD Initiative, CDA diabetes best practice guidelines and Ontario's CDPM Framework as key components of chronic disease management, it has not been fully implemented across the province.

As noted earlier, PD team membership varies across programs. Study findings revealed that the number of dedicated hours of a health discipline per PD client varied when expressed per client, per week. Overall, nursing was available the most hours per week, per client, at 1.70 hours/client/week (n=12), followed by dietitian at 0.19 (n=13), social work at 0.19 (n=12) and finally pharmacist at 0.12 (n=10). The number of hours of nursing was unchanged when reviewed by location. However, the hours of dietitian, social worker, and pharmacist were dependent on program location (community hospital location versus a teaching hospital location). Programs located in teaching hospitals were reported to have a higher rate of dedicated health discipline hours per client, per week for dietitians, pharmacists and social workers than programs located in community hospitals. Dedicated hours of care from an endocrinologist was reported to be available only in one community hospital-based programme in a very limited amount (e.g., less than 3 hours per week). Access to a physiotherapist was available in one teaching hospital program at a rate of 8 hours per week. These results are summarized in Table 4.4.

Table 4.4 Summary of number of hours of dedicated staffing per client per week by peritoneal dialysis program location

Discipline	All programs	Teaching hospitals	Community hospitals
Nursing (n=12)	1.70	1.72	1.70
Dietitians (n=13)	0.19	0.27	0.15
Social workers (n=12)	0.19	0.34	0.12
Pharmacists (n=10)	0.12	0.19	0.09

Notes: Calculations completed on available data. No data assumptions made (i.e., if question left blank it was not assumed that dedicated hours existed or not). Calculation completed for comparative purposes the number of hours per client per week per discipline is most likely determined by client needs.

In summary, these findings suggest that the primary nursing model may affect the access dietitians have to PD clients. Furthermore, the location of the PD program partly determines the composition of the PD multidisciplinary team, the amount of time various professional services are available to the client and how often the client is offered face-to-face assessments with the PD team. Programs located in teaching hospitals were reported to have a higher number of hours per client for dietitian, social work and pharmacists in comparison to programs located in community hospitals. However, in regard to diabetes expertise, some programs located in community hospitals were reported to have endocrinologists as members of the PD team. This variation suggests there are differences across Ontario in regards to how care is provided to PD clients. These findings highlight disparities within the system in regards to which health disciplines PD clients can access for support to successfully manage their diabetes. However, while these results highlight that variations exist in regards to how care is organized, it should also be noted that the scope of the study was limited. This study did not determine if frequency of client assessment or health care team membership had a direct effect on the client's ability to access health care expertise. It was not within the scope of this study to collect data regarding the utilization of alternative methods of assessing health care expertise (e.g., telephone, Internet).

A key element of the CDPM Framework is delivery and system designs in which care is provided by a multidisciplinary team. This approach is purported by experts to ensure collaborative, client-centred care that contributes to improved health outcomes and health care cost savings. While there are published recommendations for PD and Diabetes team membership (CDA and Provincial PD Joint Initiative), there are no

published standards regarding who should be the “core or required team” to manage diabetes in PD program nor the amount of dedicated time per client for each health discipline. These findings suggest variation of PD team membership across the province. It is unclear from these findings, the effect this may have on the capacity of PD teams and dietitians to provide dialysis-specific diabetes support. Nor if this variation represents a barrier or a facilitator to the establishment of effective, efficient diabetes care in PD programs.

At the organizational level, respondents identified several barriers to providing PD clients with care that is associated with improved glycemic control. One barrier was the lack of PD health care team consensus regarding roles/responsibilities at the team or program level. One respondent stated: “...some team members do not believe that they (i.e., all members of PD health care team) have a role in addressing poor diabetic control.” She elaborated further suggesting that this belief limited her ability to address diabetes-related issues with clients.

Others reported that a lack of support at the program level limited their access to professional development and negatively affected their ability to provide care consistent with best practices. One dietitian stated: “...the program does not support/recognise that diabetes is an important component of PD.” Another described how: “...becoming a Certified Diabetes Educator or attending other education was not supported,” by her program and finally a third dietitian expressed that the: “...lack of insulin protocols/medical directives,” limited her ability to address diabetes-related issues. These findings suggest that many dietitians working in PD programs have or are willing to assume the responsibilities of diabetes care. These findings highlight that dietitians

acknowledge the need to transform the health care system based on CDPM framework. And that they have or are willing to accept the role of a CDPM “champion” and promote the adoption of the CDPM Framework at a “grass roots” level but are unsupported by their programs. Furthermore, this commitment to increase their knowledge and expertise in the areas of PD and diabetes management and expand their responsibility in this regard could be leveraged to enhance the capacity of the system to provide dialysis-specific diabetes care. Which overall, would facilitate the continued integration of the CDPM framework and ultimately improve health outcomes.

Also at the organizational level, program models (organization of clinic, roles and responsibilities), staffing, and workload were also identified as barriers to care. As noted earlier, the primary nursing model limited the dietitian’s access to clients. One dietitian stated: “...nursing determines who the dietitian sees.” When asked to identify: “What needs to be in place for adults with diabetes receiving peritoneal dialysis to achieve a target A1C?,” dietitians suggested that program staffing must be adequate to provide client-focused care. Respondents stated the team (e.g., nursing, dietitian and pharmacist) must concur on their role regarding diabetes and must be consistent in regards to the information they provide the clients. One dietitian stated: “...clients need education from whole team,” and another stated: “all team members must believe they have a role in addressing poor diabetic control.”

Dietitians reported that the majority of care was provided during the PD clinics and the associated workload is often a barrier to providing diabetes care. One respondent shared: “...after discussing the dialysis related blood work there is not often time to

discuss diabetes.” Reflecting on current staffing levels and workload one dietitian commented:

...less workload for CKD dietitians to be able to manage this more independently and aggressively with our clients is required. Until this happens, we do not have the time available to put the effort required into stricter/tighter management.

Another dietitian shared that diabetes-related education was: “...at the lower end of our priority list due to the workload.”

According to these findings, a dietitian’s access to clients and scope of practice is often limited by program models. As discussed previously, all PD programs were reported to have a dedicated dietitian, however the rate (i.e., number of hours/client/week) was much lower (0.19) in comparison to nursing (1.70). As defined by the College of Dietitians of Ontario, dietitians are experts in the area of food and nutrition, and in developing individualized nutrition care plans. Considering the complexity of the nutritional management of diabetes in the context of CKD, these findings highlight the need for a review of current PD program models, team membership and rates of dedicated staffing. Successful CDPM requires a system which provides clients with access to the information, health expertise and education. These findings suggest that current PD program models may not be providing these key elements of CDPM and thus not supporting clients in self-managing their diabetes.

In this study, lack of information technology (IT) was also highlighted as a barrier to care. Dietitians have limited ability to identify clients with diabetes and to track outcomes of treatment plans. In response to the question: “Does your program track how many PD clients also have a diagnosis of diabetes?”, only 57% of programs were actively tracking the prevalence rate of diabetes. Seventy-five percent of programs tracking

diabetes prevalence were located in community hospitals. Current best practice for diabetes management and prevention of complications is to measure A1C levels at an interval of every three months. In this study, only one respondent reported that the program in which she worked (i.e., community hospital) had the technological support to track A1C results. These results suggest that in the majority of PD programs, monitoring glycemic control is not routine. These findings also highlight how other forms of IT support such as the implementation of electronic documentation may improve the efficiency and effectiveness of care. Electronic documentation allows for the development and implementation of automated quality improvement programs. The data stored in electronic records can be leveraged to support care by allowing screening of clients at risk of developing diabetes and tracking the outcome of diabetes/PD related interventions in those with diabetes. Ultimately, the implementation of electronic documentation will facilitate case load prioritization and the adoption of diabetes best practice as per the CDA's Clinical Practice Guidelines within the PD programs. The implementation of electronic health records may also allow PD programs to benefit from other electronic initiatives such as the MOHLTC's Diabetes Testing Report and the proposed diabetes registry.

The lack of IT supports was further highlighted by a question asking which dialysis-specific interventions (as per Figure 3.1) were being utilized to improve glycemic control. While some respondents indicated that these interventions were utilized within the programs, they were unable to access the data to describe how often or for how many clients these interventions had been implemented. This data suggests that dietitians are aware of the recommended "best practices" to manage diabetes in those

clients receiving PD and that in some programs these recommendations have been implemented. However, due to lack of IT support it is unclear as to what extent these “best practices” had been implemented nor what impact these interventions had on glycemic control.

As noted above, workload was also identified as a barrier to providing diabetes care. The lack of IT mostly likely contributes to this issue. Effective, efficient care requires support such as IT, to facilitate day-to-day caseload prioritization and on-going evaluation of processes and services for the purpose of program evaluation and development. This data suggests that most dietitians are unable to identify those clients with diabetes, or assess care plan outcomes.

In summary, Ontario’s CDPM Framework is focused on redesigning the health care system so that it is client-centred, providing timely, accessible care, where and when required by the clients. PD care in Ontario, is provided by a multidisciplinary team comprised of nurses, dietitians, social workers and often a pharmacist. Currently, the PD team membership, dedicated staffing (i.e., hours per client, per week) and frequency of assessment appears to vary significantly in the 22 programs and appears to be dependent on location of the program. Findings suggest PD programs in teaching hospitals have larger teams; clients are seen by these teams less frequently. In comparison, PD teams located in community hospitals appeared to have less dedicated hours of dietitians, social workers and pharmacists but see their registered clients more frequently.

Programs are organized in what was described by respondents as a primary nursing model (i.e., the nurse is the primary contact for the client and is responsible for

organizing the clients care). In some instances, dietitians relied on nursing to identify those client's that are at nutritional risk.

It was highlighted by respondents that diabetes management is not always a primary concern of the program and that the team is not in agreement regarding the importance of diabetes management or regarding roles and responsibilities related to diabetes care. In some programs, nurses, dietitians, pharmacists, and nephrologists work together to address diabetes management, while in other situations, dietitians work in isolation.

The capacity of dietitians to provide nutritional care that integrates both dialysis and diabetes best practice is reduced due to limited access to clients and to professional development, workload, and lack of team consensus regarding roles and responsibilities. Finally, the lack of quality improvement initiatives such as data collection tools to allow for the tracking of diabetes management outcomes limits the dietitian's ability to assess current practice and facilitate care improvements. These findings suggest that, the management of diabetes in PD programs is not consistently addressed, which may result in clients having to seek assistance elsewhere (e.g., Diabetes Education Program) or not seeking support at all.

These findings highlight that dietitians are aware of CDPM and in some instances have or wish to integrate CDPM into their dietetics practice. However, these findings also highlight that many barriers exist to the adoption of the CDPM Framework.

4.05.2.1 Organization level of capacity: Promising practices.

Data analysis identified two promising practices that may facilitate the enhancement of diabetes management in PD programs.

- Certification as a Diabetes Educator (CDE) enhances a dietitian's capacity to assist PD clients in managing diabetes. One dietitian stated: "...being a CDE helps with teaching clients how to better manage their diabetes."
- Information systems which enhance provider decision support and facilitate quality improvement are recognized by the CDPM Framework to be key elements to improving chronic disease management. Electronic record keeping was provided as an example of an information system that enhances client care. Dietitians who were employed by PD programs that utilized electronic client record systems were able to provide data regarding diabetes prevalence and number of clients that achieved target A1C levels. These systems also allow for sharing of client information with other health care providers which, in turn, results in improved care. One dietitian discussed how nutrition documentation is shared between the PD clinic and the diabetes education centre. She stated: "...the diabetes education centre...will use the CKD dietitian's diet and patients' records ...this ensures (sic) consistent client education."

These promising practices illustrate that while the CDPM Framework has not been formally integrated into the whole health care system. Dietitians have embraced this approach, and are championing the integration of CDPM through professional development and leveraging health care innovations such as the electronic health record to promote the continued integration of the CDPM framework.

4.05.3 System capacity level:

***“The missing CDPM puzzle pieces”*: CDPM focused care.**

Ontario’s CDPM Framework requires a system that is client-centred, not disease-specific or symptom focused. Key to this approach is a system that is collaborative and integrated resulting in client-focused care that that is multi-faceted, planned, and seamless. Both diabetes and PD care are services provided in community settings; however, findings suggest the current PD and diabetes service delivery models do not mirror this vision. Both are focused on one disease or set of symptoms (i.e., either diabetes or CKD). Findings identified that collaboration and integration between PD and diabetes education programs is not standard practice. Respondents reported that current service delivery models for PD and diabetes lack collaboration and integration. One respondent shared: “...we have found that a client seeing a dietitian in PD and a dietitian in the diabetes program is too confusing, so the PD dietitian covers both (diabetes and PD).” Another dietitian stated: “...the diabetes centre will see our PD clients however many of our clients do not want to go to the centre because it is another appointment.” The lack of collaboration and integration results in clients that are confused or resistant to attending organized diabetes education, all of which negatively affects the client’s ability to self-manage diabetes.

4.05.3.1 System level of capacity sub-theme: Collaborative practice.

Collaborative practice is defined as a model of care that is client-focused, and involves the continuous interaction of two or more health disciplines, organized into a common effort to solve or explore a health issue or concern (Barrett et al., 2007). The

design of this approach improves the capacity of the health care system as it enhances the client's goals and values, provides mechanisms for continuous communication between the providers and clients, optimizes health discipline participation in clinical decision making, and fosters respect for disciplinary contributions (Barrett et al., 2007).

Currently in Ontario, health care services are organized on the basis of the health care concern they address. For example, diabetes education is provided primarily in Diabetes Education Programs (DEPs) and PD care is provided by nephrology programs. Diabetes is a leading cause of CKD, thus many PD clients also have a diagnosis of diabetes. The findings of this study indicated a diabetes prevalence rate of 43.71%. (see Table 4.5). Thus, PD clients have diabetes and are also at risk of developing other diabetes-related complications such as cardiovascular disease and neuropathy, all of which are directly related to glycemic control (CDA, 2008). The lack of collaboration, as documented in this study's findings, suggests that best practice guidelines are not always followed and thus places clients at risk of poor health outcomes.

Current best practice for diabetes management recommends A1C testing every three months. However, survey participants reported that A1C testing is often not completed at the intervals outlined in the CDA Clinical Practice Guidelines for the Prevention and Management of Diabetes. Some dietitians reported the primary cause for A1C testing not being completed was lack of coordination and collaboration. Peritoneal dialysis clients with diabetes are reported to have several health care providers involved in their diabetes and CKD management. One respondent stated: "...diabetic clients in our program often do have an endocrinologist who follows them. For those who do not

have an endocrinologist, diabetes is often followed by general practitioner, the A1C is ordered by endocrinologist not the PD program.”

The lack of collaboration results in uncoordinated care. Currently, it is unclear where responsibility lies (i.e., PD program or DEP) regarding the provision of diabetes education and management. This is further complicated by there being no formal system for providers to communicate or collaborate regarding care plans. In many PD programs, dietitians provide nutritional care for both PD and diabetes. However, clients must still attend appointments at the local DEP to receive nursing-related care such as insulin starts. Three dietitians reported they were employed by programs in which both the dietitian and nurse provided diabetes education. However, this education was not comprehensive. It was described as “basic” diabetes education thus requiring the transfer of the client to the DEP for more advanced education.

In the majority of programs, dietitians reported that diabetes-related medications were not managed consistently. Medications may be adjusted by the nephrologists/PD team, DEP team, by the community endocrinologist, or by the client’s family doctor. One dietitian provided the following description of how diabetes medications may be changed for PD clients:

...either the client sees their own endocrinologist or they come to the dialysis-specific clinic to see the endocrinologist or the nephrologist. Any of these doctors may adjust medications during clinic visits. There is also a nurse practitioner in the CKD program who is involved with our PD clients and may follow the client too.

While this quote illustrates that many PD teams are committed to providing diabetes care, the lack of collaboration, within PD teams and across the health care system, results in

fragmented care. Findings infer that clients are left to coordinate and implement the recommendations of numerous health care providers on their own.

When asked to identify barriers to effective diabetes care that follows best practices, many of the dietitians discussed the lack of collaboration between care providers. This results in care that does not follow best practice guidelines, such as missed diagnostic tests (e.g., A1C) and lack of information sharing (e.g., recommendations not available to all clinicians). A few dietitians stated, the lack of collaboration between clinicians resulted in confused and frustrated clients. A small number of dietitians stated in an effort to reduce the burden of care resulting from multiple appointments and multiple health care providers, PD clients were not referred to DEPs. However, this approach to reduce client confusion and burden may not serve the client in the long run. Successful diabetes management requires care that is based on best practices. As previously noted, diabetes expertise is limited in PD programs; only 10.5% of respondents had achieved CDE certification and standard best practices such as A1C testing was often missed. While this study did not attempt to assess the quality of diabetes care in PD programs, these findings suggest that not all diabetes care provided in PD programs follows best practices. Thus, clients may not be provided with the appropriate education and support required to optimally manage their diabetes.

Currently in Ontario, there is no formal process which provides caregivers access to testing results (from multiple providers at multiple locations) or facilitates collaboration across the system (e.g., primary care, diabetes education centres, PD programs and community supports such as foot care and home care). The outdated system currently relies on the client to gather and convey information. The diabetes

strategy includes initiatives such as the Diabetes Testing Report also referred to as the Baseline Diabetes Data Initiative (BDDI) and a diabetes registry. The Diabetes Testing Report gives feedback to primary care providers regarding the intervals of the certain blood tests related to diabetes management and whether the testing interval follows current practice guidelines. In respect to the announced Diabetes Registry, very few details are available to date, especially those outlining how this registry will work or who will have access to the data within the registry.

Collaborative practice is associated with enhanced self management, improved health outcomes, and enhanced provider satisfaction all of which ultimately improve overall system capacity. These findings indicate that, dietitians actively pursue this approach to enhance the care they provide to their PD clients. Furthermore, these findings highlight the advocacy role that the PD/diabetes communities can have in the development of initiatives that will formalize interprofessional collaboration across the health care system, such as the proposed Diabetes Registry.

4.05.3.1.1 Collaborative practice: Promising practices.

Three examples of collaborative practices were gleaned from study findings in which both the PD and diabetes education teams work collectively to provide con-current client care.

- One dietitian described a collaborative approach in which endocrinology support was provided as part of the dialysis program: "...one of the hospital's endocrinologists has two or three clinics per month specifically for dialysis patients."

- A second dietitian described how the PD team works in collaboration with the DEP to incorporate the CKD needs into the diabetes plan to ensure client safety and congruency of information: "...we (PD team) work with the endocrine dietitian, nurse, and doctor to incorporate the CKD needs into their diabetes plan to ensure client safety and congruency of information."
- A third dietitian described a collaborative approach in which the DEP staff coordinated care with the PD team by coming to the PD clinic and seeing the client as part of the PD clinic visit: "...diabetes centre staff...co-ordinate their visit with their (client) monthly visit with PD nurse."

These promising practices illustrate that while the system is not organized to formally support collaboration, dietitians as well as other health care providers recognize the value of this approach and are actively pursuing it.

4.05.3.2 System level of capacity: Sub-theme integration of care.

Diabetes is the leading cause of CKD (CDA, 2008). Findings indicated that the prevalence of diabetes in PD programs is monitored routinely in 57% of the programs. Prevalence of diabetes in these programs was calculated to be 43.7%. Of the programs monitoring prevalence of diabetes, 66.6% were located in community hospitals. Dietitians working in programs not tracking prevalence estimated the prevalence rate to be slightly less at 47.3%. These findings are consistent with the MOHLTC (2007) findings regarding chronic disease in Ontario (i.e., those chronically ill are also likely to be living with more than one chronic condition). The tracking of diabetes prevalence in PD programs located in community hospitals hints of the early integration of diabetes

management into these programs. Diabetes prevalence expressed as a percent of client population is presented in Table 4.5.

Table 4.5 Summary of diabetes prevalence in peritoneal dialysis programs expressed as percent of total client population.

	Actual	Estimated by dietitians
Average	43.71	47.2
Standard deviation	5.43	13.7
Minimum	37	27
Maximum	50	65

Whether measured or estimated, the prevalence of diabetes in PD programs exceeds 40% of total client population. The successful management of both diabetes and PD requires nutrition interventions. It can be hypothesized that, due to the high prevalence of diabetes in PD clients, dietitians working in PD programs are routinely required to develop nutritional care plans that integrate both diabetes and PD best practices. These findings suggest it is beneficial, if not essential, for dietitians working in PD programs to become diabetes experts.

The CDA Clinical Practice Guidelines for the Prevention and Management of diabetes states that A1C levels should be monitored routinely to assess the effectiveness of treatment regimes and to assess the client's risk of developing diabetes-related complications. Only one respondent (located in a community hospital) reported that the program in which she worked had the capacity to monitor A1C levels. This respondent reported that 59.5% of PD clients with diabetes had achieved a target A1C level of 7% or less. Dietitians working in programs that do not have a formal method to track A1C levels estimated that 30% of their clients had achieved a target A1C of 7% or less. This data indicates that dietitians believe a significant portion of PD clients with diabetes have

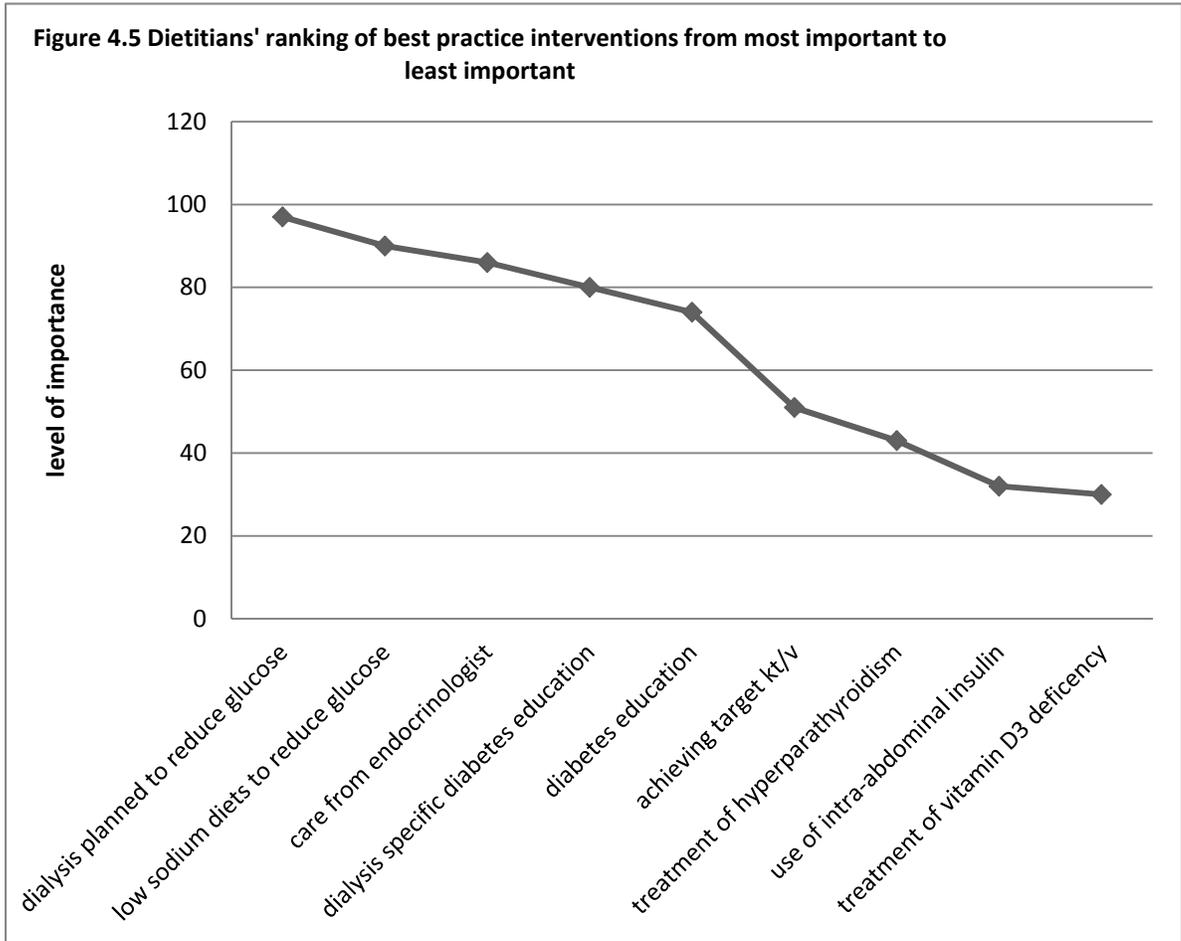
not achieved target A1C. Thus, these clients are at an increased risk of developing diabetes-related complications such as neuropathy, CVD, blindness, and lower leg amputation. These findings, although limited, suggest that when a program implements a formal process to track A1C levels, implementation may result in a higher percent of clients achieving a target A1C.

The management of diabetes in the context of CKD and PD proves to be challenging for both the clinician and the clients. Diabetes management is taxing due to the use of glucose-containing dialysis solutions, the CKD related alterations to insulin and carbohydrate metabolism, and the contradictory nutritional management recommendations. The CDPM logic model identifies the development of prepared and proactive teams as a priority to the integration of CDPM. PD clients require access to PD and DEP teams that possess the knowledge and skills (i.e., best practices) for the management of both PD and diabetes.

This study strived to collect data regarding how the challenges of managing diabetes in the context of CKD and PD are being addressed. The integration of diabetes knowledge in PD programs appears limited, in that, only 10.5% of respondents reported to having achieved CDE certification. The above findings illustrate that a need exists for “hybrid” diabetes education programs (i.e., dialysis-specific diabetes education that addresses the complex nature of diabetes management in the context of CKD and PD).

The level of CDE certification appears to be limited within PD programs. The data collected highlighted that dietitians working in PD programs are aware of many of diabetes best practices. In response to: “Which best practices in their opinion were the

most important to implement in an effort to manage diabetes?”, dietitians ranked “dialysis planned to reduce glucose,” “sodium-reduced diets to reduce glucose load,” “care from an endocrinologist,” and “diabetes education,” as the most important (Figure 4.5).



Notes: assessed using weight reverse point score.

Interestingly, three of the top four-ranked best practices were dialysis-related (i.e., dialysis planned to reduce glucose, low sodium diets to reduce glucose, and diabetes education that integrates PD recommendations). These findings further support the

hypothesis that PD clients would benefit from the integration of diabetes care into PD programs.

Respondents were also asked to identify which best practices (as noted in Figure 4.6) were being utilized and how many of their clients had achieved target A1C as a result of the implementation of these interventions. Importantly, all of the dietitians who answered this question reported, due to lack of information technology (IT) supports, they could not identify the number of clients in which these interventions had been implemented, nor the number of clients that had achieved a target A1C as a result of the implementation of these best practices. These results, while limited, suggest that integration of diabetes management in PD programs could be further enhanced with the implementation of IT supports that would allow clinicians to track interventions and outcomes. These supports would enable dietitians to link best practice interventions to outcomes and identify areas of potential enhancement.

When asked: “Does your PD program offer dialysis-specific diabetes education to PD clients?” 25% of respondents reported that the program in which they worked provided dialysis-specific diabetes education. Of these programs, 75% of them are programs located in community hospitals. Of the programs offering dialysis-specific diabetes education, nil reported having staff that were CDE certified. Of the programs currently not offering dialysis-specific diabetes education, 20% stated it was something that was being considered as a service to offer in the future. Nil respondents described a formal program that integrated diabetes and PD best practices or followed the MOHLTC diabetes service standards. Instead, respondents described how they have integrated diabetes into their dietetic practice (i.e., enquired about diabetes management during

client assessment at routine PD clinic visit) as workload and program supports allowed. One program, located in a community hospital, provided dialysis-specific diabetes care by the addition of an endocrinologist as part of the client's routine PD clinic visit. The dietitian working in this program described the care as follows:

...one of the hospital's endocrinologists has two or three clinics per month specifically for dialysis clients (PD and HD). One or two PD nurses facilitate the clinic. Clients are assessed by the nurse and then seen by the endocrinologist. Dietitian is present as needed.

Other programs provide specific diabetes care, described as, "individualized" education provided by the PD team. One respondent described the dialysis-specific education offered in her program as:

...the education is client specific as opposed to diabetes specific, in that a PD client who has diabetes would have their education tailored to meet their needs. It is done on an individual basis and would involve the dietitian, nurse, pharmacist and nephrologist in the PD clinic, not done by Diabetes Education Centre.

The term "dialysis-specific diabetes education" varies from program to program. The term may be used to describe several approaches to providing diabetes care in an attempt to address the complex nature of diabetes management in the context of CKD and PD. However, in this study, none of the dialysis-specific programs described were facilitated by staff that were CDE-certified, followed diabetes best practices or followed the MOHLTC guidelines for diabetes education.

In the absence of dialysis-specific diabetes education offered by the PD program, respondents were asked: "How is diabetes education provided to your diabetic peritoneal dialysis clients?" Respondents described several approaches. Basic diabetes education may be provided by the PD team as part of routine PD education and/or clients are referred to the local endocrinologist. One dietitian reported: "...some are done by

nursing, dietitian and pharmacist. Those with high A1C are referred to be seen by an endocrinologist affiliated with the program.” Other programs manage diabetes with the assistance of the nephrologists who manage diabetes medications. One dietitian stated: “...most of our clients will have their medications such as insulin adjusted by the nephrologist at their bi-monthly clinic visits and would have dietary teaching as needed based on blood work with the dietitian at their clinic visits.” Twenty percent of dietitians in this study reported that their local diabetes education centre provided dialysis-specific diabetes education; however, they did not provide a description of the program. Of the dietitians that reported their local DEP currently did not provide dialysis-specific diabetes education, nil reported that it was something the DEP was considering developing in the short-term.

Reflecting on the integration of diabetes care in PD programs, the majority of respondents highlighted that level of knowledge and experience of health care providers determines the level of integration. To provide care that is client-focused instead of disease-focused, both the PD and DEP teams must have knowledge and expertise in diabetes and PD. However, as highlighted by one dietitian, this shared knowledge is not currently available across the system. She reported that: “...diabetes clinic isn’t comfortable with their (PD client) care.” This lack of shared knowledge requires the client to seek care from multiple providers over multiple visits.

Some DEPs provide care to PD clients described by one respondent as: “...diabetes health in the community provides individual assessments and interventions.” Many dietitians also reported that the complexity of diabetes in the context of CKD/ PD cannot be addressed by DEPs due to workload issues or service organization gaps. One

dietitian stated: "...the diabetic education centres don't have enough time to dedicate to our dialysis clients', they are already overwhelmed with non-CKD diabetics". Another dietitian highlighted that in an effort to address the high demand for diabetes education, diabetes education is often provided in a group setting, which can pose challenges: "...clients attend the program and are told that they need to be careful of certain foods which are not CKD-friendly such as nuts/seeds and whole grains. Otherwise, the class is tailored towards those who only have diabetes."

In response to the question: "What needs to be in place for PD clients to achieve target A1C?", a few respondents identified key components of the chronic disease model such as client-focused care and access to specialized care. One dietitian stated that the: "...initiation of CDPM in the PD program model" enhanced her ability to provide diabetes care to her PD clients. Other respondents highlighted the importance of the client's role. One dietitian concluded: "...education that is client specific as opposed to diabetes specific" was an important facilitator to clients achieving a target A1C. Finally, another dietitian emphasized that clients must be willing to participate in care. She reported that their local diabetes education centre is willing to see PD clients and work in collaboration with the PD team to provide dialysis-specific diabetes education. However, some clients refuse the referral: "...the diabetes centre will see our dialysis clients however many do not want to go to the centre because it is another appointment."

To summarize, findings suggest that some critical components (i.e., puzzle pieces) of the CDPM Framework are missing at this time. Findings highlight that several system-level barriers to chronic disease integration exist in the current system. As a result, the CDPM Framework cannot be fully integrated into the system effectively. This

lack of integration undermines the access of PD clients to care that addresses their specific requirements. Respondents identified and supported the benefits of a chronic disease approach. Diabetes-specific expertise in PD programs and PD expertise in DEP was highlighted as important catalysts for enhanced diabetes care across the system. Respondents also identified that the current system's organization (workload and care delivery) limits the ability of DEPs to provide dialysis-specific diabetes education. Overall, neither PD nor DEPs teams have the requisite expertise for the management of diabetes in the context of CKD, nor is the current system is not set up to support care integration. It can be postulated that these flaws translate into poor care and compromised patient outcomes.

4.05.3.2.1 Integration of care: Promising practices.

The CDPM Framework has not been fully incorporated into the system, which integrated care is a fundamental component of service delivery. However, respondents highlighted several informal promising practices to care integration including:

- Peritoneal dialysis dietitians with CDE certification, acting as diabetes champions for PD teams and providing dialysis-specific diabetes client education that follows best practices for PD and diabetes (e.g., providing nutritional care that addresses the complexity of diabetes in the context of CKD and PD).
- Dialysis-specific diabetes education provided by either PD clinics or in DEPs
- Peritoneal dialysis planned to reduce glucose load in clients with diabetes
- Dietitians encouraging clients to follow a low sodium diet to reduce PD glucose load.

These examples illustrate how diabetes care can be successfully integrated into PD programs. Further, these examples highlight several areas in which a diabetes focus can have a direct effect on dialysis care plans (i.e., reduced glucose load, low sodium diets, and PD diets that are also diabetes friendly). Overall, these examples emphasize the importance of a diabetes focus in PD programs.

Chapter five

Conclusions and recommendations

5.01 Introduction

Currently in Ontario a provincial dialysis database that tracks diabetes outcomes, does not exist and the body of knowledge regarding glycemic control in PD is limited and narrative in nature. This study is the first to survey dietitians in PD programs and gather information regarding how diabetes is managed in the context of CKD and PD.

5.02 Conclusions

At the time of this study, there were 22 peritoneal dialysis programs in Ontario located in either teaching or community-based hospitals. The size of these programs ranged from small (18 clients) to large (over 200 clients). The clients registered with these programs can be described as “diverse” (i.e. varied in age, gender, culture, socio-economic status, and education level). This diversity requires dietitians to utilize multiple educational approaches. Care in these programs is organized utilizing a “primary nursing model”. In this study, all PD programs were staffed with dedicated hours of nursing, social workers and dietitians. In contrast, the number of dedicated hours of pharmacists, endocrinologists, and physiotherapists that were available to provide care to clients was dependent on program location. Nil programs were reported to have occupational therapists. It appears that programs located in teaching hospitals have higher rates of staffing per discipline per client and assessed clients less frequently in comparison to their community counterparts.

The majority of dietitians working in PD programs are 30 to 40 years of age and has been a dietitian for more than five years. Age and work experience appears to be determined by program location. Dietitians working in PD programs in community

hospitals are older and possess more PD experience. Dietitians employed in PD programs located in teaching hospitals, are younger, possess less PD experience and are more likely to work as “sole” practitioners. Findings suggested that teaching hospitals appear to be more likely to hire dietitians with slightly less PD experience in comparison to community hospitals.

This study found that 40% of adults receiving PD also had a diagnosis of diabetes and that diabetes expertise (e.g., Certified Diabetes Educators and endocrinology support) in PD programs appears to be limited. Due to the lack of IT supports in the majority of programs, this study could not determine the glycemic control of these clients nor the utilization or effect of “best practices” identified in the literature to have a positive effect on glycemic control.

Respondents reported current service delivery models for diabetes and PD make the management of diabetes in the context of CKD and PD challenging. Currently the system lacks consistent integration of the CDPM Framework. This lack of integration makes collaboration between diabetes and PD care providers difficult, interferes with the ability of health care providers to adopt best practice guidelines, and limits the client’s ability to self-manage his/her conditions.

In an effort to address these challenges, some dietitians have become Certified Diabetes Educators. Further, some PD programs have added endocrinologists to their team or have developed relationships with Diabetes Education Programs to enhance the education available to PD clients. However, these initiatives are limited and crippled by the lack of supports at multiple levels (i.e. the client, health care provider, program and system). Dietitians reported their abilities to support PD clients with diabetes

management were limited due to clients' limited access to supports that enhance self management (financial, health, social and family). These abilities were further hampered by their limited access to clients during routine client visits due to current workload levels and program models.

Additionally, access to IT supports that would facilitate case load prioritization and outcome tracking is also limited. Furthermore, due to lack of consensus at the team and program levels, dietitians reported they are often not supported in their efforts to address diabetes in the context of CKD and PD, and that the current health care system is not organized in a manner that supports interprofessional/inter-program collaboration that would formalize roles/responsibilities, collaboration and the integration of CDPM.

In summary, at least 40% of adults receiving PD also have a diagnosis of diabetes. The management of diabetes in the context of CKD and PD is challenging due to the alterations to insulin and carbohydrate metabolism associated with CKD, the potential glucose absorbed from PD and the complexity of dietary restrictions required for the management of CKD. This management is further complicated by lack of the integration of the CDPM Framework. Despite the recent focus on CDPM in Ontario, programs focused on the management of chronic diseases such as chronic kidney disease and diabetes continue to provide services in a manner that mirrors that of the acute care system. Key components of the CDPM Framework are missing (e.g., delivery system design, information systems, and healthy public policy). In particular, this study identified that the manner in which diabetes and PD care is provided, often results in disjointed care that is not client-focused.

Findings suggested that dietitians are aware of CDPM and, in some instances, have embraced and are championing its integration. However, the full adoption of a CDPM approach in dietetics practice requires support from the programs in which dietitians are employed and by the system in which they practice. The continued integration of the CDPM Framework is the key to the continued transformation of the current health care structure into a system that can address the distinct needs of PD clients with diabetes with the goal of providing multi-faceted, seamless care that is organized around the client.

5.03 Recommendations

The vision of the CDPM logic model is:

...an integrated, coordinated system for the prevention and management of chronic diseases, with productive interactions and relationships among individuals/families, communities, and health care organizations/providers, that are proactive, individual and family-centred, and that provides access to quality care by the right providers at the right time in the right place. (MOHLTC, 2009).

To achieve this vision, policy, legislation, fiscal and human resources, and information systems that support CDPM must be established and fully incorporated within the health care system. The continued integration of CDPM into the Ontario health system is hinged on the engagement of the PD and diabetes communities (i.e., key stakeholders). This would include but not be limited to: the Canadian Diabetes Association (CDA), Kidney Foundation of Canada (KFOC), Ministry of Health and Long-Term Care (MOHLTC), Ontario Renal Network (ORN), Regional Coordination Centres for Ontario's Diabetes Strategy (RCC), Diabetes Education Programs (DEPs), PD programs, Canadian Diabetes Educator Certification Board (CDECB), Canadian Association of Nephrology Dietitians (CAND) and those living with diabetes and their families. The successful integration of

the CDPM Framework is reliant on engaging key stakeholders in the planning, delivery, and evaluation of health services.

The recommendations of this study are presented utilizing the three key components of the MOHLTC Logic Model for Ontario's CDPM Framework which was developed to help set chronic disease priorities.

5.03.1. Recommendations to support the development of activated communities and prepared, proactive partners.

Improved clinical outcomes related to PD and diabetes management requires the collaboration of communities and health care providers. This will result in the identification and prioritization of issues and the establishment of “champions” to advocate for healthy public policy and health care provided in supportive environments that meet the needs of the clients being served. The end result will be the integration of community and health care services.

- a) Ontario Renal Network, RCC, KFOC, and the CDA work to establish client advisory groups to facilitate collaboration with PD and diabetes care providers to identify and prioritize opportunities for enhanced care.
- b) PD and diabetes communities (e.g., RCC, DEP, PD Programs) advocate for healthy public policy such as the revision of the Ontario Disability Special Diet funding so that it provides adequate funding to support clients in meeting their nutritional needs.
- c) PD/diabetes communities and health care providers advocate for the establishment of health care programs and information systems that support collaboration among multiple care providers across the system.

5.03.2. Recommendations to support increased knowledge and engagement of clients and families.

The CDPM Framework, places the client as central to care. This approach requires clients that are activated and engaged in their care and health care providers that have an understanding of and commitment to CDPM. This is achieved by increasing the knowledge and skills of clients regarding diabetes and PD so they can actively participate in the decision making and the daily management of their health, and providing health care providers with CDPM training.

- a) Regional Coordination Centres for diabetes, KFOC and CDA facilitate the establishment of client support groups for those living with diabetes and receiving PD. The establishment of client support groups would provide a venue for adults receiving PD with diabetes to meet and share their lived experiences, increase their knowledge regarding diabetes and PD, and ultimately enhance self management skills.
- b) Canadian Association of Nephrology Dietitians, CDA, KFOC, clients and families advocate for the revision of the current Ontario Disability Special Diet funding formula to address the cost and complexity of the combination of diabetes and PD diet and the vast cultural diversity of clients with diabetes receiving PD. Successful adoption of treatment recommendations requires adequate supports. Clients must be able to afford the nutrition recommendations suggested by their health care team and have access to food that is culturally appropriate.

- c) Canadian Diabetes Association, MOHLTC and RCC work collectively for the coordination of the development of diabetes and PD client education materials.
- d) RCC and ORN work collectively for the development and implementation of complex diabetes education programs that would provide integrated care for those with diabetes and PD.
- e) PD and diabetes communities advocate for the continued integration of CDPM into all diabetes and PD programs in Ontario.

5.03.3. Recommendations to support the development of prepared, proactive practice teams.

Chronic disease prevention and management requires a system with the capacity to support clients with chronic disease and to develop and maintain the health care expertise required to provide care. The PD and diabetes communities should advocate for:

- a) Canadian Diabetes Education Certification Board's revision of the current Diabetes Education Certification curriculum to include management of diabetes in the context of CKD and PD and the theory of CDPM.
- b) Cultural competency training for health human resources working in PD and diabetes programs. A culturally competent health care system is an important component of CDPM as it provides clients with health care teams that are prepared to tailor the delivery of health care services to meet the clients' social, cultural, and linguistic needs.

- c) The successful integration of CDPM requires the system to “embrace” CDPM and to champion the implementation. A key component to this is the adoption of interprofessional collaboration. To continue to build on early CDPM successes, CDPM and interprofessional collaboration training should be provided to all health human resources working in PD and diabetes programs. This training should provide opportunities that increase the knowledge of CDPM and interprofessional collaboration principles, and skills required to provide care that is based on these principals.
- d) The continued development of methods/processes that would allow multiple clinicians from multiple service points to access diagnostic test results and consultation records to facilitate interprofessional collaboration across the health care system.
- e) Development of interprofessional practice mentorship programs to facilitate knowledge transfer of best practices for diabetes and PD across the system. Currently the CDA and Dietitians of Canada have very successful professional practice networks (e.g., CDA Diabetes Educator sections and Dietitians of Canada CAND), focused on the mentorship and the establishment of best practices. The CDA, KFOC, and Dietitians of Canada should consider partnering to provide those working in the areas of PD and diabetes a similar professional network that would focus on diabetes and peritoneal dialysis.
- f) Revision of current PD program models to facilitate the incorporation of diabetes best practices.

- i. Peritoneal dialysis programs to review current program staff models in an effort to determine the most appropriate team membership to support integration of diabetes care and interprofessional collaboration into PD programs and across the system.
 - ii. Dietitians and PD program leadership advocate for access to professional development funds for dietitians to complete CDE certification to support the integration of diabetes best practices into dietetic practices in PD programs.
 - iii. Peritoneal dialysis program leadership to support dietitians in obtaining CDE certification by providing the resources (study materials and time) required for exam preparation and the promotion of CDE certified dietitians as preferred candidates for dietitian postings for PD programs.
- g) Peritoneal dialysis program leadership to advocate for the continued implementation of the electronic health care records within PD programs
- h) MOHLTC review current DEP program models to develop and test new service delivery models that facilitate the development of DEP teams with expertise in the provision of advanced diabetes education in addition to the current provision of basic and intermediate diabetes education. The provision of advanced level diabetes education that would provide PD clients with the specialized diabetes knowledge required to self-manage diabetes in the context of CKD and PD.

5.04 Future Research Recommendations

This study has collected data that has facilitated a limited description of diabetes management in PD programs in Ontario. The continued improvement of PD care requires on-going investigation. Listed below are future research recommendations in the area of diabetes management in the context of CKD and PD.

- a) Complete a more in depth investigation with dietitians (qualitative research study) to further investigate dietetics practice in PD programs explore the barriers and facilitators dietitians face in the day-to-day care of PD clients with diabetes.
- b) Complete a workforce analysis of dietitians working in PD programs to improve the understanding of the distinguishing characteristics of dietitians working in this practice setting.
- c) Survey dietitians employed in Ontario DEPs to explore how diabetes education is provided to adults receiving PD and the dietetics practice in these programs.
- d) Investigate the effectiveness (i.e., client outcomes and cost) of current PD models (e.g., team membership, frequency of face-to-face assessment, number of hours of dedicated staff, IT supports and diabetes certification) to identify innovative care models and facilitate the enhancement of existing models of dialysis-specific diabetes care.
- e) Investigate how best to engage PD clients in the design, delivery, and evaluation of diabetes services with the goal of improving care for adults receiving PD.

This study has highlighted the commitment that health care providers possess in regards to providing quality care to their clients as well as the potential areas for enhancement. The future of health care lies within the engagement of both those that provide care and those that access care and services. This commitment will ensure the continued improvement of the system and its sustainability.

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Appendix A

Research Ethics Approvals

To: Christina Vaillancourt/Jay Wilson
From: The Scarborough Hospital Research Ethics Board
Date: June 24, 2010
Re: Glycemic control in adults with diabetes receiving peritoneal dialysis in Ontario (working title)
Study No: NCPH-47

This is to acknowledge that the Full Research Ethics Board has approved

Protocol: Glycemic control in adults with diabetes receiving peritoneal dialysis in Ontario (working title)

Investigator Brochure Version Date: N/A

Protocol Version Date: June 16, 2010

Online Consent Form Version Date: June 16, 2010

Letter of Invitation Version Date: June 16, 2010

Questionnaire Version Date: June 16, 2010

Health Canada No Objection Letter Dated: N/A

Delegated Review By The Research Ethics Board On: June 9, 2010

Effective From: June 9, 2010 to June 8, 2011

The Research Ethics Board of the Scarborough Hospital agrees with the principles for ethical research found in the TRI-Council Policy Statement: Ethical Conduct for Research Involving Humans, the Declaration of Helsinki, the ICR Guideline for Good Clinical Practice, and the Code of Federal Regulations: Title 45, Part 46. The Research Ethics Board of the Scarborough Hospital adheres to the regulations found within these documents, as appropriate.

During the course of the research, any significant deviations from the approved protocol and/or any unanticipated developments within the research or significant adverse events should immediately be brought to the attention of the Research Ethics Board. Please advise the board annually on the progress of your research.


L. Castagna, MD, FRCP (C)
Chairman, Research Ethics Board
The Scarborough Hospital
3050 Lawrence Avenue East
Scarborough, Ontario, M1P 2V5

27/06/10
Date



Date: June 30, 2010
To: Christina Vaillancourt (PI), Ellen Vogel (Co-PI)
From: Raymond Cox, REB Chair
File #: 09-148
Title: Glycemic control in adults with diabetes receiving peritoneal dialysis

The University of Ontario Institute of Technology Research Ethics Board has reviewed the above research proposal. The application in support of the above research project has been reviewed by the Research Ethics Board to ensure compliance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS) and the UOIT Research Ethics Policy and Procedures.

DECISION: Approved

COMMENTS AND CONDITIONS:

This project has been approved for the period of **June 30, 2010 until June 30, 2011** subject to full REB ratification at the Research Ethics Board's next scheduled meeting. The approval may be extended upon request.

Please note that the Research Ethics Board (REB) requires that you adhere to the protocol as last reviewed and approved by the REB. The Board must approve any modifications before they can be implemented. If you wish to modify your research project, please contact REB Administration, to obtain the Change Request Form.

Adverse or unexpected events must be reported to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants and the continuation of the protocol.

If research participants are in the care of a health facility, a school, community organization or other institution it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research protocols.

Section F, Article 1.13, Review Procedures for Ongoing Research of the TCPS <http://www.pre.ethics.gc.ca/english/policystatement/policystatement.cfm> requires that ongoing research be monitored. A Final Report is required for all projects, with the exception of undergraduate projects, upon completion of the project. Researchers with projects lasting more than one year are required to submit a Renewal Request annually. Contact REB Administration to obtain a copy of the Renewal Request/Final Report form.

Please quote your REB file number on all future correspondence. Thank you.

REB Chair Dr. Raymond Cox, Faculty of Business & Information Technology Raymond.cox@uoit.ca	Sascha Tuuha, Compliance Officer 905 721 8668 ext 3693 compliance@uoit.ca
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Appendix B.
Verbal script for “icebreaker” telephone call

Hello my name is Christina Vaillancourt, I am a registered dietitian. I am currently enrolled in the Masters of Health Sciences program at the University Of Ontario Institute of Technology. I am currently in the process of developing a research study for my thesis. The research will be in the area of peritoneal dialysis and glycemic control. I am contacting you today to confirm that you are the dietitian responsible for the care of the PD clients at (name of program location), that you have access to e-mail and to confirm your work e-mail address. Once the study has been approved by the Research Ethics Board of UOIT you will be sent a letter of Invitation and Consent for your consideration.

Appendix C.

Final survey

The purpose of this study is to investigate glycemic control in adults with diabetes receiving peritoneal dialysis (PD) and the dietetics practice of dietitians working on PD programs.

The glycemic control and practice interventions being utilized by PD programs to manage glycemia in the Ontario PD population has never been surveyed

This study aims to survey Ontario's adult diabetic PD population and describe i) the glycemic control, ii) the type of interventions being utilized by their health care team in an effort to achieve an A1C of 7% and iii) facilitators and barriers that dietitians working in PD currently experience related to assisting their clients achieve a target A1C.

Your participation in this study will assist in the collection of data to facilitate the description of the glycemic control of Ontario's PD population and the interventions being utilized to manage glycemia in this population and contribute to the body of knowledge regarding possible facilitators and barriers experienced by RD's working in a PD programs related to assisting their clients achieve target A1C. All of which may result in possible improvements to the care of these clients

There are 63 questions in this survey

Demographics-Dietitian

1 Please state your age.

Please choose **only one** of the following:

- 20-24 years
- 25-29 years
- 30-34 years
- 35-39 years
- 40-44 years
- 45-49 years
- 50-54 years
- 55-59 years
- 60 + years

2 How many years have you been practicing as a registered dietitian?

Please choose **only one** of the following:

- less than 1 year
- more than 1 year but less than 2 years
- 2-5 years
- greater than 5 years

3 How many years have you been working as a registered dietitian in the area of peritoneal dialysis?

Please choose **only one** of the following:

- less than 1 year
- more than 1 year but less than 2 years
- 2-5 years
- greater than 5 years

4 Are you the only dietitian working in your peritoneal dialysis program?

Please choose **only one** of the following:

- Yes
- No

5 Are you a Certified Diabetes Educator?

Please choose **only one** of the following:

- Yes
- No

6 If yes please explain why you believe this is beneficial to your clients.

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '5 [A6a]' (Are you a Certified Diabetes Educator?)

Please write your answer here:

7 Are you in the process of becoming a Certified Diabetes Educator?

Only answer this question if the following conditions are met:

° Answer was 'No' at question '5 [A6a]' (Are you a Certified Diabetes Educator?)

Please choose **only one** of the following:

- Yes
- No

8 If yes please explain why you believe this is beneficial to your clients.

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '7 [A6c]' (Are you in the process of becoming a Certified Diabetes Educator?)

Please write your answer here:

9 Would you consider becoming certified in the future?

Only answer this question if the following conditions are met:

° Answer was 'No' at question '5 [A6a]' (Are you a Certified Diabetes Educator?) *and* Answer was 'No' at question '7 [A6c]' (Are you in the process of becoming a Certified Diabetes Educator?)

Please choose **only one** of the following:

- Yes
- No

10 If yes please explain why you believe this is beneficial to your clients.

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '9 [A6e]' (Would you consider becoming certified in the future?)

Please write your answer here:

Demographics-Program

11 Where is the peritoneal dialysis program that you work based?

Please choose **only one** of the following:

- program is based in community hospital
- program is based in teaching hospital
- other

12 You have indicated that your program is not based in a community or teaching hospital, please describe where your program is based.

Only answer this question if the following conditions are met:

° Answer was 'other' at question '11 [A7]' (Where is the peritoneal dialysis program that you work in based?)

Please write your answer here:

13 As of today, how many clients does your peritoneal dialysis program currently have enrolled?

Please write your answer here:

If your program does not compile these statistics enter 999 for unknown

14 In general terms, describe the demographics of these clients (e.g., average age, income, education, ethnicity, place of residence, family supports, access to health services etc.)

Please write your answer here:

15 Describe how services are typically delivered to clients. In your answer, include how nursing is organized, how the clients access the multidisciplinary team and how the visits are organized (e.g., where the visits take place and the type of visit, length of visits etc.).

Please write your answer here:

16 On average, how many times per year does the PD team assess the clients?

Please write your answer here:

Indicate the frequency of routine assessments or clinic visits per year e.g., if clients are scheduled for routine clinic visits every 3 months enter 4 for 4 times per year.

Demographics- Program Staffing

The following questions are related to the members of the peritoneal dialysis team. Please do not include Individuals/services that are not part of your team that provide care to your peritoneal dialysis clients. For example, if your program has a diabetes team that visits the peritoneal dialysis clinic and sees peritoneal dialysis clients do not include these positions or hours.

17 Does your peritoneal dialysis health care team include nursing?

Please choose **only one** of the following:

- Yes
- No

18

Indicate how many hours per week of this (these) positions are allocated to the care of peritoneal dialysis s?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '17 [A10a]' (Does your peritoneal dialysis health care team include nursing?)

Please write your answer here:

Indicate the total number of hours allocated to the care of peritoneal dialysis clients. If the position is five days per week, 7.5 hours per day then the allocated hours are 37.5 per week. If there are two positions working 7.5 hours, five days per week then the total hours are 37.5 x 2 or 75 hours.

19 Are these individuals certified diabetes educators?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '17 [A10a]' (Does your peritoneal dialysis health care team include nursing?)

Please choose **only one** of the following:

- Yes
- No

20 Does your peritoneal dialysis health care team include a pharmacist(s)?

Please choose **only one** of the following:

- Yes
- No

21 Indicate how many hours per week of this (these) positions are allocated to the care of peritoneal dialysis s?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '20 [A11a]' (Does your peritoneal dialysis health care team include a pharmacist(s)?)

Please write your answer here:

Indicate the total number of hours allocated to the care of peritoneal dialysis clients. If the position is five days per week, 7.5 hours per day then the allocated hours are 37.5 per week. If there are two positions working 7.5 hours, five days per week then the total hours are 37.5 x 2 or 75 hours.

22 Are these individuals Certified Diabetes Educators?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '20 [A11a]' (Does your peritoneal dialysis health care team include a pharmacist(s)?)

Please choose **only one** of the following:

- Yes
- No

23 Does your peritoneal dialysis health care team include a dietitian(s)?

Please choose **only one** of the following:

- Yes
- No

24 Indicate how many hours per week of this (these) positions are allocated to the care of peritoneal dialysis?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '23 [A12a]' (Does your peritoneal dialysis health care team include a dietitian(s)?)

Please write your answer here:

Indicate the total number of hours allocated to the care of peritoneal dialysis clients. If the position is five days per week, 7.5 hours per day then the allocated hours are 37.5 per week. If there are two positions working 7.5 hours, five days per week then the total hours are 37.5 x 2 or 75 hours.

25 Are these individuals Certified Diabetes Educators?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '23 [A12a]' (Does your peritoneal dialysis health care team include a dietitian(s)?)

Please choose **only one** of the following:

- Yes
- No

26 Does your peritoneal dialysis health care team include a social worker(s)?

Please choose **only one** of the following:

- Yes
- No

27 Indicate how many hours per week of this (these) positions are allocated to the care of peritoneal dialysis s?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '26 [A13a]' (Does your peritoneal dialysis health care team include a social worker(s)?)

Please write your answer here:

Indicate the total number of hours allocated to the care of peritoneal dialysis clients. If the position is five days per week, 7.5 hours per day then the allocated hours are 37.5 per week. If there are two positions working 7.5 hours, five days per week then the total hours are 37.5 x 2 or 75 hours.

28 Are these individuals Certified Diabetes Educators?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '26 [A13a]' (Does your peritoneal dialysis health care team include a social worker(s)?)

Please choose **only one** of the following:

- Yes
- No

29 Does your peritoneal dialysis health care team include a physiotherapist(s)?

Please choose **only one** of the following:

- Yes
- No

30 Indicate how many hours per week of this (these) positions are allocated to the care of peritoneal dialysis s?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '29 [A14a]' (Does your peritoneal dialysis health care team include a physiotherapist(s)?)

Please write your answer here:

Indicate the total number of hours allocated to the care of peritoneal dialysis clients. If the position is five days per week, 7.5 hours per day then the allocated hours are 37.5 per week. If there are two positions working 7.5 hours, five days per week then the total hours are 37.5 x 2 or 75 hours.

31 Are these individuals Certified Diabetes Educators?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '29 [A14a]' (Does your peritoneal dialysis health care team include a physiotherapist(s)?)

Please choose **only one** of the following:

- Yes
- No

32 Does your peritoneal dialysis health care team include an occupational therapist(s)?

Please choose **only one** of the following:

- Yes
- No

33 Indicate how many hours per week of this (these) positions are allocated to the care of peritoneal dialysis?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '32 [A15a]' (Does your peritoneal dialysis health care team include an occupational therapist(s)?)

Please write your answer here:

Indicate the total number of hours allocated to the care of peritoneal dialysis clients. If the position is five days per week, 7.5 hours per day then the allocated hours are 37.5 per week. If there are two positions working 7.5 hours, five days per week then the total hours are 37.5 x 2 or 75 hours.

34 Are these individuals Certified Diabetes Educators?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '32 [A15a]' (Does your peritoneal dialysis health care team include an occupational therapist(s)?)

Please choose **only one** of the following:

- Yes
- No

35 Does your peritoneal dialysis health care team include an endocrinologist(s)?

Please choose **only one** of the following:

- Yes
- No

This would be an endocrinologist who is part of your peritoneal dialysis team, who sees s as part of their routine peritoneal dialysis care.

36 Indicate how many hours per week of this (these) positions are allocated to the care of peritoneal dialysis s?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '35 [A16a]' (Does your peritoneal dialysis health care team include an endocrinologist(s)?)

Please write your answer here:

Indicate the total number of hours allocated to the care of peritoneal dialysis s. If the position is five days per week, 7.5 hours per day then the allocated hours are 37.5 per week. If there are two positions working 7.5 hours, five days per week then the total hours are 37.5 x 2 or 75 hours.

37 Are these individuals Certified Diabetes Educators?

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '35 [A16a]' (Does your peritoneal dialysis health care team include an endocrinologist(s)?)

Please choose **only one** of the following:

- Yes
- No

Peritoneal Dialysis Population- A1C

The following clients should be excluded from your responses:

- a. those that have received peritoneal dialysis for less than 3 months
- b. those that have had their peritoneal dialysis interrupted for more than 1 week in the past 3 months
- c. those that have had a diagnosis of peritonitis in the past 3 months
- d. those that have a diagnosis of diabetes insipidus

38 Does your program track how many of your peritoneal dialysis clients also have a diagnosis of diabetes?

Please choose **only one** of the following:

- Yes
- No

39 You have indicated that your program tracks the number of clients who also have a diagnosis of diabetes. Enter below, as of today, what percentage of peritoneal dialysis clients also have a diagnosis of diabetes.

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '38 [B1a]' (Does your program track how many of your peritoneal dialysis clients also have a diagnosis of diabetes?)

Please write your answer here:

40 You have indicated that your program currently does not track the number of peritoneal dialysis clients that also have a diagnosis of diabetes. In your estimation, as of today, what percentage of your clients also have a diagnosis of diabetes?

Only answer this question if the following conditions are met:

° Answer was 'No' at question '38 [B1a]' (Does your program track how many of your peritoneal dialysis clients also have a diagnosis of diabetes?)

Please write your answer here:

41 Does your program check the A1C levels of diabetic clients every three months?

Please choose **only one** of the following:

- Yes
- No

42 You have indicated that A1C levels are not tested every three months. Please indicate the factors related to A1C testing that result in testing not be completed every three months.

Only answer this question if the following conditions are met:

° Answer was 'No' at question '41 [B2a]' (Does your program check the A1C levels of diabetic clients every three months?)

Please write your answer here:

43 Is point of care testing used to test A1C levels?

Please choose **only one** of the following:

- Yes
- No

Point of care testing of A1C is a system of testing A1C levels at the bedside instead of sending a blood sample to the laboratory for processing.

44 Does your program currently track how many diabetic clients have target A1C levels?

Please choose **only one** of the following:

- Yes
- No

45 You have indicated that your program tracks how many of the diabetic peritoneal dialysis clients have achieved target A1C. Below enter, as of today, the percent of diabetic peritoneal dialysis clients in your program that have a target A1C of less than 7%.

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '44 [B3a]' (Does your program currently track how many diabetic clients have target A1C levels?)

Please write your answer here:

46 You have indicated that your program does not track A1C levels. In your estimation, as of today, how many of your diabetic peritoneal dialysis clients have a target A1C of 7% or less?

Only answer this question if the following conditions are met:

° Answer was 'No' at question '44 [B3a]' (Does your program currently track how many diabetic clients have target A1C levels?)

Please write your answer here:

Peritoneal Dialysis- Diabetes Education

The following questions relate to how diabetes education is provided to your peritoneal dialysis clients.

47 Does your peritoneal dialysis program currently offer a dialysis-specific diabetes education?

Please choose **only one** of the following:

- Yes
- No

This would be an educational program or initiative that was specifically developed for and offered to dialysis clients by your dialysis program.

48 Please describe the program or initiative. Include in your answer the clinicians involved in assessment and/or education, the type of intervention (group or individual) and the referral process. If it is an education program the number of weeks and length of sessions.

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '47 [B8a]' (Does your peritoneal dialysis program currently offer a dialysis-specific diabetes education?)

Please write your answer here:

49 You have indicated that your program does not offer dialysis-specific diabetes education or interventions within your program. Please describe how diabetes education is provided to your diabetic peritoneal dialysis clients.

Only answer this question if the following conditions are met:

° Answer was 'No' at question '47 [B8a]' (Does your peritoneal dialysis program currently offer a dialysis-specific diabetes education?)

Please write your answer here:

50 Is a dialysis-specific diabetes education program something that your program is considering for the future?

Only answer this question if the following conditions are met:

° Answer was 'No' at question '47 [B8a]' (Does your peritoneal dialysis program currently offer a dialysis-specific diabetes education?)

Please choose **only one** of the following:

- Yes
- No

51 Does your local diabetes education centre offer dialysis-specific diabetes education programs?

Please choose **only one** of the following:

- Yes
- No

This would be diabetes education offered to dialysis clients by your local diabetes education centre that was developed specifically for dialysis clients.

52 Please describe program (e.g., the referral process, group, individual, number of sessions, length of sessions and clinicians involved).

Only answer this question if the following conditions are met:

° Answer was 'Yes' at question '51 [B9a]' (Does your local diabetes education centre offer dialysis-specific diabetes education programs?)

Please write your answer here:

53 You have indicated that your local diabetes education centre does not offer dialysis-specific diabetes education. Please describe how diabetes education is provided to your diabetic peritoneal dialysis clients.

Only answer this question if the following conditions are met:

° Answer was 'No' at question '51 [B9a]' (Does your local diabetes education centre offer dialysis-specific diabetes education programs?)

Please write your answer here:

54 Is a dialysis-specific diabetes education program something that your local diabetes education centre considering for the future?

Only answer this question if the following conditions are met:

° Answer was 'No' at question '51 [B9a]' (Does your local diabetes education centre offer dialysis-specific diabetes education programs?)

Please choose **only one** of the following:

- Yes
- No

Peritoneal Dialysis-Interventions utilized to address hyperglycemia

The following clients should be excluded from your responses: a. those that have received peritoneal dialysis for less than 3 months b. those that have had their peritoneal dialysis interrupted for more than 1 week in the past 3 months c. those that have had a diagnosis of peritonitis in the past 3 months d. those that have a diagnosis of diabetes insipidus

55 The following question relates to treatment interventions utilized at your facility to address elevated A1C levels in peritoneal dialysis clients with diabetes.

As of today how many of your diabetic clients that have target A1C levels...

Please write your answer(s) here:

- Have a dialysis prescription that was planned to reduce glucose absorption (e.g., use of non-glucose dialysate solutions)?
- Have been instructed to follow a sodium restricted diet to reduce need for strong dialysate solutions ?
- Receive intra abdominal insulin to manage hyperglycemia due to peritoneal dialysis?
- Have parathyroid hormone levels of less than 21 pmol/L?
- Have a target 1,25 dihydroxycholecalciferol level of 48-110pmol/L?
- Have a target Kt/v of 1.7 per week or less?
- Participate in organized diabetes education?
- Receive care from an endocrinologist?

If the intervention is not used at your facility, enter **NU**.

If the intervention is used at your facility, but the data regarding the intervention is not available (you do not know the actual number of clients nor would it be easy for you to determine) enter NA.

Peritoneal Dialysis Dietetics Practice and Capacity-building

The following questions are related to your peritoneal dialysis dietetics practice and capacity-building.

Capacity-building is a process that enhances the ability of the individual, entity or a broader social system to perform effectively in the functions for which they exist, identify and address new challenges or improve control over their practices in a sustainable manner within dynamic contexts.

Capacity can be assessed at three levels;

56 Describe your philosophy regarding the management of diabetes for adults receiving peritoneal dialysis.

Please write your answer here:

57 What needs to be in place for adults with diabetes receiving peritoneal dialysis to achieve a target A1C of 7% or less?

Please write your answer here:

58 Based on your experience, rank the following interventions to manage hyperglycemia in peritoneal dialysis clients from most important to the least important (1 being most important and 9 being the least important).

Please number each box in order of preference from 1 to 9

- Treatment of secondary hyperparathyroidism to address reduced insulin production
- Treatment of vitamin D deficiency to address reduced insulin production
- Achieving a Kt/v of at least 1.7 per week to address insulin resistance
- Sodium reduction to reduce use of dialysate with a high glucose concentration
- Use of intra-abdominal insulin to address hyperglycemia related to glucose absorption from dialysate
- Dialysis prescriptions that are planned to reduce the absorption of glucose
- Clients attending diabetes education program
- Clients attending dialysis-specific diabetes education program
- Clients receiving care from an endocrinologist

It does not matter if your program currently does not use all of the interventions listed. Include all of the listed interventions in your ranking.

59 Please explain your rationale for your ranking.

Please write your answer here:

60 For each of the following below identify what is currently in place in your dietetics practice that assists you in helping your clients achieve a target A1C. And briefly describe how these facilitators (enhancers) assist you in helping your clients achieve a target A1C.

Please write your answer(s) here:

- individual facilitators to capacity-building
- organizational facilitators to capacity-building
- system facilitators to capacity-building

Capacity-building: a process that enhances the ability of the individual, entity or a broader social system to perform effectively in the functions for which they exist, identify and address new challenges or improve control over their practices in a sustainable manner within dynamic contexts.

Individual Capacity: focuses on strengthening the ability of the individuals as social or organizational actors (individually or collectively) to define, assess, analyze and act on health (or any other) concerns of importance, and extend these capacities in new directions as fresh opportunities appear.

Organizational Capacity: is defined as the process that ensures the competence, capabilities, structures, systems, policies, procedures, practices and culture of an entity to reflect its purpose, role, values and objectives and enable this entity to address new challenges as well as strengthen its position in society.

System Capacity: is a complex, holistic and interrelated intervention that encompasses multiple levels and actors, power relationships and linkages, inter-organizational relations and institutional culture, values, norms, paradigms, philosophy and mind sets.

Source:

[www.vichealth.vic.gov.au/.../Capacity%20building%20for%20whom%20in%20wh%20at%](http://www.vichealth.vic.gov.au/.../Capacity%20building%20for%20whom%20in%20wh%20at%20)

61 For each of the following below identify barriers to building capacity you are currently experiencing in your dietetics practice and briefly describe how these barriers affect your ability to assist your clients achieve a target A1C.

Please write your answer(s) here:

- individual barriers to building capacity
- organizational barriers to building capacity
- system barriers to building capacity

Capacity-building: a process that enhances the ability of the individual, entity or a broader social system to perform effectively in the functions for which they exist, identify and address new challenges or improve control over their practices in a sustainable manner within dynamic contexts.

Individual Capacity: focuses on strengthening the ability of the individuals as social or organizational actors (individually or collectively) to define, assess, analyze and act on health (or any other) concerns of importance, and extend these capacities in new directions as fresh opportunities appear.

Organizational Capacity: is defined as the process that ensures the competence, capabilities, structures, systems, policies, procedures, practices and culture of an entity to reflect its purpose, role, values and objectives and enable this entity to address new challenges as well as strengthen its position in society.

System Capacity: is a complex, holistic and interrelated intervention that encompasses multiple levels and actors, power relationships and linkages, inter-organizational relations and institutional culture, values, norms, paradigms, philosophy and mind sets.

Source:

[www.vichealth.vic.gov.au/.../Capacity%20building%20for%20whom%20in%20wh%20at%](http://www.vichealth.vic.gov.au/.../Capacity%20building%20for%20whom%20in%20wh%20at%20)

62 In light of the barriers to capacity-building you identified above, give examples and describe specific actions that could be implemented to improve your ability to assist your clients achieve target A1C levels.

Please write your answer here:

63 Considering the following list of facilitators (enhancers) and barriers to quality dietetics services indicate which ones you are currently experiencing and how they affect your practice.

Please choose the appropriate response for each item:

Facilitators (enhancer) Barrier neither apply

- Workload and staffing
- Facility, equipment
- Continuing education
- Increased complexity of clients
- Communication structures and processes
- Teamwork in health care and collaborative practice
- Program models or models of care delivery
- Autonomy, decision-making opportunities
- Cultural competence
- Increased administrative requirements such as charting and workload measurements
- Working in isolation from other health professionals, including dietitians

64 Do you have anything else (perspectives/comments) you wish to share regarding the management of glycemia in adults with diabetes receiving peritoneal dialysis?

Please write your answer here:

Please fax your completed survey to: 905-721-3179.

Thank you for completing this survey.

**Appendix D.
Summary of questions and answer types by survey section**

Section One: demographic characteristics of dietitians			
Close-ended questions and answer categories		Open-ended	
Question number	Question	Question number	Question
1	Age 1 20-24 years 2 25-29 years 3 30-34 years 4 35-39 years 5 40-44 years 6 45-49 years 7 50-54 years 8 55-59 years 9 60 + years	6 (AR)	Explain why being CDE beneficial to clients
2	Years of practice as dietitian 1. less than 1 year 2. more than 1 year but less than 2 years 3. 2-5 years 4. greater than 5 years	8(AR)	Why becoming a CDE would benefit your clients
3	Years working as an dietitian in PD 1. less than 1 year 2. more than 1 year but less than 2 years 3. 2-5 years 4. Greater than 5 years	10(AR)	Why becoming a CDE would benefit clients in response to Q. 9(considering becoming in future- not current pursuing)
4	Works as sole dietitian in PD y/n		
5	Is a CDE y/n		

DIABETES MANAGEMENT IN PERITONEAL DIALYSIS PROGRAMS

7(AR)	In process of becoming CDE y/n		
9	Wishes to become a CDE in future y/n		
Section two: demographic characteristics of program			
Close-ended questions and answer categories		Open-ended questions	
Question number	Question	Question number	Question
11	Location of PD program 1. Community 2. Teaching 3. Other	12(AR)	Explanation of location as not a community or teaching hospital
13	Number of clients in PD program Number string (enter 999 for unknown)	14	Demographics of clients
16	Average number of client visits per year Number string	15	How PD services are provided to clients
Section three: program staffing			
Closed-ended questions		Open-ended questions	
Question number	Question	Question number	Question
17	Nursing part of PD team y/n		
18(AR)	Hours of nursing per week Number string		
19(AR)	Are nurses CDE y/n		
20	Pharmacist part of team y/n		
21(AR)	Hours of pharmacist time per week Number string		
22(AR)	Pharmacists are CDE y/n		
23	Dietitian are part of the team y/n		
24 (AR)	Hours of dietitian time per week Number string		

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25 (AR)	Dietitian is CDE y/n		
26	Social worker is part of team y/n		
27(AR)	Hours of social worker hours per week Number string		
28(AR)	Social worker is CDE y/n		
29	Physiotherapist is part of team y/n		
30(AR)	Hours of physiotherapist hours per week Number string		
31(AR)	Physiotherapist is CDE y/n		
32	Occupational therapist is part of team y/n		
33(AR)	Hours per week of occupational therapist Number string		
34(AR)	Occupational therapist is CDE y/n		
35	Endocrinologist is part of team y/n		
36(AR)	Hours per week of endocrinologist Number string		
37(AR)	Endocrinologist is CDE y/n		
Section four: diabetes management- A1C tracking			
Close-ended questions and answer categories		Open-ended questions	
Question number	Question	Question number	Question
38	Does program track number of diabetic PD clients y/n	42(AR)	Why A1C not checked Q 3 months
39(AR)	% of PD clients that are diabetic Number string		
40(AR)	Dietitian estimating % of clients that are diabetic Number string		

DIABETES MANAGEMENT IN PERITONEAL DIALYSIS PROGRAMS

41	A1C checked Q 3 months y/n		
43	Point of care testing used? y/n		
44	Does program track A1C values y/n		
45(AR)	% of diabetic clients with target A1C Number string		
46(AR)	RD estimating % of clients with target A1C Number string		
Section five: diabetes education offered to clients			
Close-ended questions and answer categories		Open-ended questions	
Question number	Question	Question number	Question
47	PD program offers dialysis-specific diabetes education y/n	48(AR)	Description of dialysis-specific diabetes education offered by PD program
50(AR)	Is dialysis-specific diabetes education something program is considering for the future y/n	49(AR)	Description of how diabetes education is provided to clients as program does not offer specific education
51	Local organized diabetes care program offers dialysis-specific diabetes education y/n	52(AR)	Description of dialysis-specific diabetes education offered by local organized diabetes care program
54(AR)	Is dialysis-specific diabetes education something your local organized diabetes care program is considering for the future y/n	53(AR)	Description of how diabetes education is provided to clients as local organized diabetes care program does not offer dialysis-specific education
Section six: Best practices to manage diabetes			
Close-end questions and answer categories		Open-ended questions	
Question number	Question	Question number	Question
55	Interventions used to address elevated A1C a) Have a dialysis prescription that was planned to reduce glucose absorption (e.g., use of non-glucose dialysate solutions)? b) Have been instructed to follow a sodium restricted diet to reduce need for strong		

DIABETES MANAGEMENT IN PERITONEAL DIALYSIS PROGRAMS

	<p>dialysate solutions?</p> <p>c) Receive intra abdominal insulin to manage hyperglycemia due to peritoneal dialysis?</p> <p>d) Have parathyroid hormone levels of less than 21 pmol/L?</p> <p>e) Have a target 1,25 dihydroxycholecalciferol level of 48-110pmol/L?</p> <p>f) Have a target Kt/v of 1.7 per week or less?</p> <p>g) Participate in organized diabetes education?</p> <p>h) Receive care from an endocrinologist?</p> <p>Number string or NU for not used or NA for number not available</p>		
Section seven: Dietetics practice and capacity-building			
Close-ended questions and answer categories		Open-ended questions	
Question number	Question	Question number	Question
58	<p>Ranking of interventions used to address elevated A1C from most important to least important (1 most important)</p> <ol style="list-style-type: none"> 1. Treatment of secondary hyperparathyroidism to address reduced insulin production 2. Treatment of vitamin D deficiency to address reduced insulin production 3. Achieving a Kt/v of at least 1.7 per week to address insulin resistance 4. Sodium reduction to reduce use of dialysate with a high glucose concentration 5. Use of intra-abdominal insulin to address hyperglycemia related to glucose absorption from dialysate 6. Dialysis prescriptions that are planned to reduce the absorption of glucose 7. Clients attending diabetes education program 8. Clients attending dialysis-specific diabetes education program 	56	Dietitians philosophy of diabetic management

DIABETES MANAGEMENT IN PERITONEAL DIALYSIS PROGRAMS

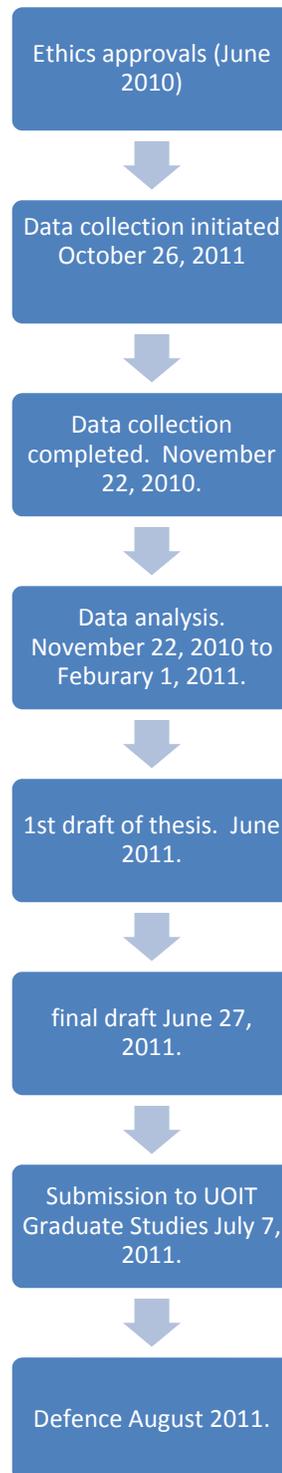
	9. Clients receiving care from an endocrinologist		
63	<p>Identification of facilitators and barriers dietitian currently faced in practice Facilitators(enhancer) (1), Barrier (2), Neither apply(3)</p> <p>Workload and staffing Facility, equipment Continuing education Increased complexity of s Communication structures and processes Teamwork in health care and collaborative practice Program models or models of care delivery Autonomy, decision-making opportunities Cultural competence Increased administrative requirements such as charting and workload</p> <p>Identification of facilitators and barriers currently faced in practice Facilitators(enhancer) (1), Barrier (2), Neither apply(3)</p> <p>Workload and staffing Facility, equipment Continuing education Increased complexity of s Communication structures and processes Teamwork in health care and collaborative practice Program models or models of care delivery Autonomy, decision-making opportunities Cultural competence Increased administrative requirements such as charting and workload</p>	57	What needs to be in place for PD clients to achieve target A1C
		59	Explanation of ranking for Q. 58
		60	Identification of facilitators that currently exist in dietetics practice that enhance dietitians ability to assist clients achieve

DIABETES MANAGEMENT IN PERITONEAL DIALYSIS PROGRAMS

			target A1C
		61	Barriers Identification of barriers that currently exist in dietetics practice that affect the dietitians ability to assist clients achieve target A1C
		62	Dietitian identifies actions to address identified barriers
		64	Is there anything else you would like to add

Appendix E.

Study timeline



Appendix F.

Letter of invitation and Consent

Glycemic control in adults with diabetes receiving peritoneal dialysis in Ontario

Letter of Invitation

Title of Research Project: “Glycemic control in adults with diabetes receiving peritoneal dialysis in Ontario”

You are being invited to complete an online survey designed to collect data regarding the glycemic control of adults with diabetes receiving peritoneal dialysis (PD), the practice interventions utilized by PD programs to manage glycemic control in this population and the facilitators and barriers in your dietetics practice that you experience while assisting your clients achieve a target A1C of 7% or less.

This study is a thesis research project for a Faculty of Health Sciences graduate student enrolled at University of Ontario Institute of Technology (UOIT). The Principal Investigator is supervised by Dr. Ellen Vogel, Associate Professor, in the Faculty of Health Sciences.

What is the purpose of the study?

The glycemic control and practice interventions being utilized by PD programs to manage glycemia in the Ontario PD population has never been surveyed. Published studies to date have been narrative in nature, describing possible treatment interventions that are postulated to have a positive effect on the glycemic control of adults with diabetes receiving PD. This study aims to survey Ontario’s adult diabetic PD population and describe i) the glycemic control, ii) the type of interventions being utilized by their health care team in an effort to achieve an A1C of 7% and iii) facilitators and barriers that dietitians working in PD currently experience related to assisting their clients achieve a target A1C.

This study does not require any additional client education or interventions (e.g., blood work). Each dietitian will submit existing data that can be obtained from client charts or other program data such as quality assurance reports. Your participation will ensure that the data collected represents the Ontario PD population.

The findings will be used in poster presentations, research conference presentations, and peer-reviewed publications. Participation in the study is voluntary and you may withdraw at any time by contacting the principal investigator and stating your ID number. If you choose to participate, the estimated time to complete the online survey is 20-30 minutes. The online survey will be made available to you over a four-week period (Oct 25- Nov 22, 2010).

Completion of the online survey will indicate your consent to participate in the study. Each participating dietitian will receive an executive summary of results.

What is your role?

Your involvement in the study is voluntary and there are no negative consequences to your participation. All data collected will be both anonymous and confidential. This means that data gathered through the online survey cannot be linked to you or to your program. All electronic data will be stored on a secure server located at UOIT and will be ID and password protected. All printed versions of results will be shredded and all electronic copies will be destroyed after five years. Any printed information associated with the study will be kept in a locked, safe place and your name or your program's name will not appear on any paper materials. Your name or your program's name will not be identified in any reports or publications emerging from the research.

The risks of participating in this study are minimal but could include anxiety related to completing the on-line survey.

The potential benefits of participating in this study include assisting in the collection of data to facilitate the description of the glycemic control of Ontario's PD population and the interventions being utilized to manage glycemia in this population and contributing to the body of knowledge regarding possible facilitators and barriers experienced by RD's working in a PD programs related to assisting their clients achieve target A1C. All of which may result in possible improvements to the care of these clients.

The study has been reviewed by the University of Ontario Institute of Technology and The Scarborough Hospital Research Ethics Board (UOIT 09-148, TSH NEPH-47).

This study does not require you to submit data that contains any client identifiers, however prior to completing the consent form, it is recommended that you confirm with your program that you are authorized to access quality reports, electronic or paper client records to complete this survey. If your program requires further information regarding this study please contact the principal investigator at the coordinates listed below.

Should you have concerns related to the study, please contact University of Ontario Institute of Technology Research Ethics Board compliance officer at (905)721-8668 ext 3693 or E-mail:compliance@uoit.ca

In the event that you have questions related to the study, please contact the principal investigator or her supervisor at the coordinates below.

If you wish to participate in this study, please review the consent form attached below.

Consent Form

Title of Research Project:

“Glycemic control in adults with diabetes receiving peritoneal dialysis in Ontario”

- I understand this study involves research, and that I am being invited to participate
- I have confirmed that I am authorized to access quality reports and/or electronic or paper client records to complete this survey.
- I understand the purpose of this study is to explore the glycemic control of the diabetic PD population in Ontario, the practice interventions being used to manage glycemic control in these clients and the facilitators and barriers related to glycemic control experienced by RD's working in PD programs

- I understand that I am being asked to complete an online survey and that the task of entering the data into the on-line survey will require approximately 20-30 minutes
- I understand all data will be confidential, and that both my identity and the dialysis program that I work will be kept completely anonymous. My name nor the program's name will not be identified in any reports or publications emerging from the research.
- I understand only the research team will have access to the data, and that all electronic information will be stored on a secure server located at UOIT and will be ID and password protected. Any printed information associated with the study will be kept in a locked, safe place and my name nor the program's name will not appear on any paper materials. All printed versions of results will be shredded and all electronic copies will be destroyed after five years.
- I understand my participation is voluntary, and that I can discontinue my participation at any time without penalty
- I understand the results of this study may be published in academic journals in the future
- I understand if I have any questions about the program's rights as a research participant, that I may contact the University of Ontario Institute of Technology Compliance Officer at (905) 721. 8668 ext. 3693 or by E-mail :compliance@uoit.ca

By choosing the link below I am providing consent to participate in the study and verifying that I;

- 1. Have read and understood the relevant information regarding this research project*
- 2. Understand I may ask questions in the future*
- 3. Indicate free consent to research participation. The electronic submission of the online survey is considered as consent to participate in the study.*

On behalf of the research team listed below, thank you for considering this request.

Sincerely,

Principal Investigator

Christina Vaillancourt, RD, CDE, MHSc Candidate

Faculty of Health Sciences

University of Ontario Institute of Technology

E-mail: christina.vaillancourt@UOIT.ca

Supervisor

Ellen Vogel, PhD, RD, FDC

Associate Professor,
Faculty of Health Sciences
University of Ontario Institute of Technology
Tel. (905) 721-8668 (ext. 2180)
E-mail: ellen.vogel@UOIT.ca

Appendix G

Frequency summary of answers for standard survey questions

Section	Content area	Question	Frequency
1	Demographic characteristics of dietitian	1	19
		2	19
		3	19
		4	19
		5	19
2	Demographic characteristics of program	11	18
		13	16
		14	14
		15	17
		16	18
3	Program staffing	17	17
		20	17
		23	17
		26	14
		29	16
		32	15
		35	16
4	Diabetes management- A1C tracking	38	15
		41	16
		43	16
		44	13
5	Diabetes education offered to clients	47	16
		51	15
6	Best practices utilized to manage diabetes	55	17
7	Dietetics practice and capacity-building (barriers and facilitators)	56	13
		57	12
		58	6
		59	9
		60	6
		61	6
		62	6
		63	2
		64	6

Glossary of terms

A1C: glycated hemoglobin is the standard blood fraction to assess glycemic control in diabetics.

Best practices: treatment interventions identified in the literature to have possible positive benefits when implemented as part of a clients care plan.

Capacity-building: a process that enhances the ability of the individual, entity or a broader social system to perform effectively in the functions for which they exist, identify and address new challenges or improve control over their practices in a sustainable manner within dynamic contexts.

Individual Capacity: focuses on strengthening the ability of the individuals as social or organizational actors (individually or collectively) to define, assess, analyze and act on health (or any other) concerns of importance, and extend these capacities in new directions as fresh opportunities appear.

Organizational Capacity: is defined as the process that ensures the competence, capabilities, structures, systems, policies, procedures, practices and culture of an entity to reflect its purpose, role, values and objectives and enable this entity to address new challenges as well as strengthen its position in society.

System Capacity: is a complex, holistic and interrelated intervention that encompasses multiple levels and actors, power relationships and linkages, inter-organizational relations and institutional culture, values, norms, paradigms, philosophy and mind sets (Vichealth, 2005, p. 8-9)

Certified Diabetes Educator: certification awarded by the Canadian Diabetes Educator Certification Board to registered health care members, which indicates they have obtained the knowledge, skills and abilities required to be recognized as a diabetes specialist.

Content validity: study instrument will produce a reasonable sample of all possible responses, attitudes and behaviours.

Chronic Disease Prevention and Management Framework (Ontario) identifies a cluster of interconnected and mutually dependent practice and system changes that have been found to be effective in preventing and managing chronic disease.

Cultural sensitivity: Cultural sensitivity begins with recognition that there are differences between cultures. These differences are reflected in the ways that different groups communicate and relate to one another, and they carry over into interactions with health care providers. A culturally competent clinician views all patients as unique individuals and realizes that their experiences, beliefs, values, and language affect their perceptions of clinical service delivery, acceptance of a diagnosis, and compliance

Dialysis-specific diabetes education: diabetes education that consolidates the medical management of diabetes and CK/PD into one care plan that is CDPM based.

Dietitian: uniquely trained food and nutrition experts. They are the recognized experts in translating scientific, medical and nutrition information into practical individualized therapeutic diets, healthy meal plans for people, and building the capacity of individuals and communities to access nutrition for health and wellbeing.

Face validity: instrument measures what it purports to measure.

Endocrinologist: physician that specializes in the diagnosis and treatment of conditions related to the endocrine system.

Glycemic dysregulation: a metabolic disturbance in the regulation of blood glucose.

Hemodialysis: a renal replacement therapy that removes excess fluid and waste by filtering the blood through an artificial kidney or hemodialysis filter.

Interprofessional collaboration: model of care that is client-focused, and involves the continuous interaction of two or more health disciplines, organized into a common effort to solve or explore a health issue or concern.

Intraperitoneal insulin infusion: the infusion of insulin into the peritoneal cavity via a peritoneal dialysis catheter.

Kt/V- expresses dialysis adequacy or solute clearance. It is a unit less measure of the dose of dialysis treatment where K represents urea clearance in either mL/minute or L/minute multiplied by time in minutes (T) divided by urea distribution volume (V).

Non-nutritional glucose: source of glucose not from food.

Organized diabetes care: diabetes education centre or diabetes education program operating in the community that is funded by the Ministry of Health and Long-Term Care.

Peritoneal dialysis: a renal replacement therapy that involves removing excess fluid and wastes from the body via glucose containing fluid that is instilled in the abdomen and then drained after a few hours through a permanent peritoneal dialysis catheter.

Peritoneal dialysis Program: organized care setting, involving a multidisciplinary team that provides training, support and health monitoring to enable those diagnosed with chronic kidney disease the option of peritoneal dialysis as a renal replacement therapy, Promising practice successful interventions identified via data collections that have a positive impact on the prevention and management of diabetes.

Renal replacement therapy: a medical intervention to replace kidney function.

Secondary hyperparathyroidism: high levels of parathyroid hormone in the blood due to chronic kidney disease.