An In-depth Analysis of the Workforce Characteristics of Registered Dietitians in Ontario

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Abstract

The purpose of this study was to examine workforce characteristics of RDs in Ontario from 2003-2009. Descriptive statistics were used to determine: (1) What does the profession of dietetics look like? (2) What are the employment transition trends of RDs? Data analysis revealed two themes: (1) Succession planning for mid-career RDs- what are the priorities? (2) The shift to the community- who is paying the moving costs? Findings indicate the workforce of RDs aged 40-59 years has declined; these RDs represent the smallest proportion of the workforce with graduate-level education. There has been a shift of RDs out of government and public health settings into LTC/CCAC's and FHTs. Results indicate that while hospitals are the most attractive work setting, there are few RDs in the FSAD practice area. Recommendations include development of retention strategies for mid-career RDs and increasing understandings of RD workforce transition trends for future HHR planning.

Key words: workforce, dietitian, health human resources

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Table of Contents

List of Tables

List of Figures

List of Appendices

List of Abbreviations

The following abbreviations are used in this research:

Abbreviation	Meaning
AHP	Allied Health Professional
BC	British Columbia
CCAC	Community Care Access Centre
CD	Compact disc
CDE	Certified Diabetes Educator
CDO	College of Dietitians of Ontario
CDRE	Canadian Dietetic Registration Examination
CHC	Community Health Centre
CIHI	Canadian Institute for Health Information
CIHR	Canadian Institute of Health Research
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CINDAR	Canadian Inventory of Nutrition and Dietetic Associated Research
CNO	College of Nurses of Ontario
DAA	Dietitians Association of Australia
DC	Dietitians of Canada
DEC	Diabetes Education Centre
FHT	Family Health Team
FSAD	Food service and administration
GO/PH	Government/Public Health
HHR	Health human resources
HPDB	Health Professions Database
HPRAC	Health Professions Regulatory Advisory Council

IDPP	Internationally Educated Dietitians Pre-registration Program
LHIN	Local Health Integrated Network
LTC	Long Term Care
LTC/CCAC	Long Term Care/Community Care Access Centre
MLT	Medical Laboratory Technologist
MOHLTC	Ministry of Health and Long Term Care
MRT	Medical Radiation Technologist
N/A	Not available
OECD	Organization for Economic Cooperation and Development
OT	Occupational Therapist
PAC	Professional Advisory Committee
PDEP	Partnership for Dietetic Education and Practice
PEN	Practice-based Evidence in Nutrition
PH	Public Health
PHC	Primary Health Care
PI	Principal Investigator
PT	Physiotherapist
RA	Research Assistant
RHPA	Regulated Health Professions Act
RN	Registered Nurse
RT	Respiratory Therapist
SAS	Statistical Analysis Software
SW	Social Worker
UOIT	University of Ontario Institute of Technology

Chapter 1— Introduction

Registered dietitians (RDs) are uniquely qualified professionals dedicated to the management of nutrition for health promotion, disease prevention, and treatment of acute and chronic diseases (Dietitians of Canada, 2009a). There is a paucity of information regarding workforce characteristics of RDs in Ontario. Knowledge of demographic, education and practice settings will provide essential information for professional and policy decision-makers regarding the future of the profession.

This research coincides with the widespread reform to the organization and delivery of primary health care (PHC) in Ontario. These changes require examination and evaluation that can inform decision-making by policy-makers, health-system managers and practitioners (Lamont & Bruyere, 2007). Registered dietitians are integral members of PHC teams.

Labour market economics provides a theoretical framework to conceptualize factors that may affect labour supply and demand decisions made by individuals (Benjamin, Gunderson, Lemieux & Riddell, 2007). Using labour economic theory, this research project will examine the workforce characteristics of RDs in Ontario from 2003-2009. Specifically, this project will analyze trends related to age, area of dietetic practice and work setting, employment status and education of RDs. Additionally, implications of these trends related to vacancies, recruitment and retention will be examined.

1.01 Rationale

To better establish a framework to understand the profession of dietetics in Ontario, an examination of the workforce characteristics, over time is necessary. This study may establish the basis for similar work in other provinces as it represents the first

longitudinal research into the workforce characteristics of RDs in Canada. The paucity of data on RDs compared to other allied health professions (AHPs) further justifies the need for this research.

The route of academic preparation to become an RD is lengthy and often intense. Knowledge and understanding of the trends, shifts and gaps in the RD workforce in Ontario will provide dietetic educators with an increased understanding of the profession.

1.02 Purpose

The purpose of this study is to examine the workforce characteristics of RDs in Ontario from 2003-2009, while contributing to the body of literature on RDs and informing the dietetics profession.

1.02.1 Objectives.

The specific objectives of this study are:

- to identify trends related to age, area of practice, work setting, employment status and education of RDs in Ontario.
- to determine the implications of these trends related to vacancies, recruitment and retention and to identify those factors associated with retention in the profession.
- to provide information that will assist in establishing plans to ensure nutrition services match the needs of the community. This will inform health human resource (HHR) planning related to needs-based funding mechanisms that are critical to the long-term success of the dietetics profession in Ontario (Dietitians of Canada, 2009a).

1.03 Primary Research Questions

The workforce characteristics of RDs in Ontario from 2003-2009 will be examined through research questions informed by similar research with other AHPs. Previous work with occupational therapists (OTs), registered nurses (RNs) and physiotherapists (PTs) using longitudinal data from each of the respective college registration databases has provided valuable information on trends in the profession (Hastie, 2009), size of the workforce (Alameddine et al., 2006) and supply projections (Landry, Ricketts & Verrier, 2007).

Using a research design adapted from the work of Hastie (2009) including a longitudinal database, the workforce characteristics of RDs in Ontario from 2003-2009 will be examined through the following research questions:

1) What does the profession of dietetics look like in Ontario?
    a) What are the personal, educational and employment characteristics of RDs working in Ontario?
    b) How does age influence the workforce characteristics of registered dietitians in Ontario?
2) What are the employment transition trends of RDs in Ontario?
    a) What are the employment characteristics of RDs who stay or switch settings, and how do they compare across sectors?
    b) Which sectors are RDs moving to and from?

By addressing these research questions, this project will provide insights on RDs in Ontario for healthcare decision-makers in the following ways:

- Indicate whether retention strategies should be uniform or tailored to segments of the RD workforce.
- Provide information for the Partnership for Dietetic Education and Development (PDEP) as new education and practicum guidelines for Integrated Competencies for Dietetic Education and Practice are developed.
- Provide the basis for the development of similar RD databases in other provinces and territories in Canada.

1.04 Overview of the Research Project

This study examines the dietetics profession in Ontario from 2003-2009. There are seven chapters, including this introduction. Details presented in each chapter, follow.

Chapter two provides an introduction to the profession of dietetics in Ontario and presents detailed relevant background information. Labour market economics are introduced and reviewed as the theoretical framework upon which this work is based.

Chapter three comprises a review of the current literature on HHR, including issues related to labour supply and demand, education, recruitment, retention and work setting. Additional insight regarding HHR issues specific to RDs in Ontario is included.

Chapter four describes the data sources and variable selection process used in this study. A detailed description of the step-wise process used to create the longitudinal database is included. Limitations and strengths of the research design are reviewed as well as details related to data analysis.

Research findings are presented in chapter five. Included are descriptive statistics used to create a portrait of the RD workforce in Ontario from 2003 to 2009. Personal, education and employment variables are examined individually and in relation to age to provide a complete representation of the profession. Transition trends in the RD workforce are analyzed in relation to employment variables.

Chapter six comprises a discussion of major findings. Overarching themes related to workforce characteristics of RDs in Ontario are described, along with policy implications and suggestions for further research.

Chapter seven integrates research findings and presents conclusions and recommendations. Recommendations related to the profession of dietetics in Ontario are made, with specific emphasis on future HHR planning.

Chapter 2- Background and Theoretical Framework

While counting numbers of health care providers can provide important insights into a profession, it does not tell the whole story. Changes in the health of the population, shifting work and demographic patterns of health professionals, changes in technology, and perhaps most importantly, changes in how health care services are delivered, are all factors that need to be considered related to HHR planning (Zelmer & Leeb, 2001).

Provinces, including Ontario, have implemented major changes in the delivery of health care. Primary health care has been described as the foundation of the health care system, providing the first point of contact and ensuring continuity of care across the system (Health Canada, 2006). As members of the interprofessional team, RDs play an important role in PHC (Decter, 2008; Dietitians of Canada, 2009a). A strong PHC system is recognized as necessary to address changing population demographics and the challenges of increasing numbers of individuals with chronic illness and complex co-morbidities (Dietitians of Canada, 2009a).

The population of Ontario is aging and the prevalence of chronic disease is increasing (Decter, 2008; Dietitians of Canada, 2009a). It is estimated that by the year 2020, more than one million Ontario residents suffering from a chronic disease will be enrolled in formal disease management programs. Patient demands for higher quality care and the recognition that disease management cannot be administered in solo-physician settings will strengthen the need for structural changes in health care delivery (Decter, 2008). The success of these programs will be dependent on the use of multidisciplinary teams that include RDs (Decter, 2008). If there are insufficient

numbers of RDs as well as other AHPs, these programs will be unsuccessful (Decter, 2008).

There have been several PHC initiatives in Ontario involving RDs, including integrating RDs into family health teams (FHTs), developing strategies for enhancing collaborative care for RDs in mental health, and promoting and facilitating interdisciplinary collaboration in PHC (Dietitians of Canada, 2009a). Dietitians of Canada (DC) has a vision for 2020 which states that RDs will be

> …working collaboratively with teams in all communities to implement innovative strategies to improve access to personally acceptable, nutritious, safe foods for all. Dietitians will be seen as the 'go-to' providers of gold standard resources for the public, for health professionals, for decision-makers on matters of food and nutrition. (Dietitians of Canada, 2007)

A detailed workforce analysis of RDs in Ontario from 2003 to 2009 will provide value to the College of Dietitians of Ontario (CDO) and DC by addressing gaps in the evidence base. Further, it will contribute longitudinal data for the Canadian Institute for Health Information (CIHI) and provide a basis for assessing future population needs. Published research results on HHR of RDs will enhance the position of the profession for advocacy and education, and serve to form the basis for similar research in other provinces in Canada. In the most recent report from CIHI, there is a surprising lack of information related to RDs. This is in contrast to the detailed HHR data related to physicians, RNs, PTs, OTs and pharmacists (Canadian Institute of Health Information, 2010a). Aside from basic demographic data, there is little published information on the workforce characteristics of RDs in Ontario.

Dietitians of Canada, in collaboration with provincial regulatory colleges, conducted provincial workforce analysis surveys of RDs in Canada between 2007 and 2011 (Morley, 2011). These surveys represent a single point-in-time in the RD workforce in each province and include data based only on RDs that responded to the survey. Results for Ontario indicated that the supply of RDs entering practice was insufficient to keep pace with those leaving, as well as the creation of new positions. Ontario was identified as having the greatest proportion (34%) of RDs indicating they would retire within 10 years (Dietitians of Canada, 2009b; Morley, 2011). This represents a HHR crisis as a significant proportion of RDs will leave the workforce as baby-boom related retirements increase (Dietitians of Canada, 2009b; Morley, 2011). Results in Ontario further indicated that, at the time of the survey, there were 196 RD positions described as difficult to fill (vacant for more than 90 days). Dietitians of Canada concluded that there is a shortage of RDs in Ontario (Dietitians of Canada, 2009b). This data remains unpublished and available only to members of DC.

The College of Dietitians of Ontario currently has approximately 3,000 members (College of Dietitians of Ontario, 2010b). As is the case with all regulated health professions, membership in the regulatory college is mandatory for RDs to practice in the province of registration. The College of Dietitians of Ontario has a mandate to support the public's access to the services of RDs, including increasing the supply of RDs in Ontario (College of Dietitians of Ontario, 2010c). Information is collected annually from CDO members to determine the total number of members, current member employment status, and current work setting. The CDO annual report presents this information as a ‘snap-shot-in-time’. Comparison data from year to year is made only in relation to

growth in membership. There is no on-going analysis of data to determine trends or changes in the profile of the profession over time.

Effective planning and managing the RD workforce is essential to ensuring the health of Ontario residents. Ontario currently has the lowest number of RDs per capita of all Canadian provinces (Dietrich, 2009). Available published literature on the workforce characteristics of RDs in Ontario is limited, in comparison to other AHPs, leaving a significant gap in knowledge regarding factors associated with recruitment and retention in the profession. Representatives of DC acknowledge that complete information is lacking related to the number of RDs currently employed and what the ideal mix of public health and primary care services should be. Dietitians of Canada recognizes that "substantial research in this area is needed" (Dietitians of Canada, 2009a).

2.01 Background Information

2.01.1 Canadian Institute for Health Information.

The Canadian Institute for Health Information is an independent, not-for-profit organization that provides important data and analysis on Canada's health system and the health of Canadians. Data supplied by hospitals, regional health authorities, medical practitioners and governments is tracked and reported by CIHI. Government bodies, hospitals, health authorities and professional associations use CIHI information to assess the effectiveness of the health system and plan for the future. Researchers, the media and the general public use CIHI data to answer questions about the function and performance of Canada's health system (Canadian Institute for Health Information, 2010b).

Those professions with comprehensive national and provincial HHR data holdings at CIHI include RNs, physicians, pharmacists, OTs, PTs, medical laboratory

technologists (MLTs) and medical radiation technologists (MRTs) (Canadian Institute for Health Information, 2009, 2010a). Data sets include supply, distribution and migration, and (in some cases) education and service utilization of professions.

Information related to RDs at CIHI is limited to first year of provincial regulation, total provincial membership, average age of members and national provider-to-population ratio (Canadian Institute for Health Information, 2007). Information on supply, distribution, migration, education and service utilization of RDs is noticeably absent.

2.01.2 Local health integrated units.

In March, 2006, the government of Ontario passed the Local Health System Integration Act, 2006 (Local Health Integration Network, 2010a). Health care in Ontario is now planned and coordinated by 14 Local Health Integration Networks (LHINs), each functioning as an individual not-for-profit corporation (refer to Appendix A). Each LHIN has a professional advisory committee (PAC) consisting of 12 members, one of whom is a member of CDO. Each PAC has the responsibility to coordinate utilization of HHR in their respective region (Local Health Integration Network, 2010b). Accountability agreements between health care providers and LHINs, and between LHINs and government, ensure responsible use of health care resources and the sustainability of the health care system (Local Health Integration Network, 2010a). Funding for health service providers in each LHIN is based on individual community priorities (Local Health Integration Network, 2010c).

Over the past 15 years the number of hospital-based organizations in Ontario has been reduced by 25%, from 240 to 180. This shift from hospital-based care to

multidisciplinary community care teams will have a significant influence on HHR planning (Decter, 2008). Models effective in a hospital-based environment may be ineffective in the community; models that work in urban areas may not work in rural settings (Organization for Economic Cooperation and Development, 2008). It has been suggested that the LHINs will require staff with specialized skills not readily available in the current health care system (Decter, 2008).

2.01.3 Regulated health professions.

There are 23 self-regulated health professions in Ontario, each with a governing body called a *College* that sets the standards for skills, knowledge and behavior for their members (Ministry of Health and Long Term Care, 2009). Laws in Ontario administered by the Ministry of Health and Long Term Care (MOHLTC) set the legal framework for regulated health professions. The colleges however, are self-regulating and function independent of the ministry (Ministry of Health and Long Term care, 2009).

In Ontario, the Health Professions Regulatory Advisory Council (HPRAC) was established with the introduction of *The Regulated Health Professions Act, 1991* (RHPA) (Health Professionals Regulatory Advisory Council, 2007). Under this legislation, HPRAC has a legal mandate to advise the Minister of Health and Long Term Care on regulation or de-regulation of health professions, amendments to the RHPA and related acts and their regulations, and matters concerning quality assurance programs of health professional colleges (Health Professionals Regulatory Advisory Council, 2007).

2.01.4 The College of Dietitians of Ontario.

The College of Dietitians of Ontario was founded in 1991 through the *Dietetics Act* and became a regulatory body on December 31, 1993 (Dietetics Act, 1991). The College's obligation, under the RHPA and the Dietetics Act, is to regulate the dietetics

profession in Ontario in the interest of the public and public protection (College of Dietitians of Ontario, 2010b). The RHPA and the Dietetics Act set out the responsibilities, powers and procedures related to the regulation of RDs (Regulated Health Professionals Act 1991, Dietetics Act, 1991).

Standards for academic and practical training include completion of an accredited four-year undergraduate degree (or equivalent), completion of an accredited dietetic internship or equivalent supervised practical training and successful completion of the *Canadian Dietetic Registration Examination* (CDRE) (College of Dietitians of Ontario, 2010d). Additional standards are established and enforced for ethics, professional conduct, and continuing competence (College of Dietitians of Ontario, 2010d, 2010e, 2010f). Membership in CDO is mandatory to practice in Ontario and is renewed annually for a registration fee of $500.00 (College of Dietitians of Ontario, 2010g).

As members of a regulated health profession, RDs are required to practice within a defined scope that describes in broad terms what the profession does. The purpose of the scope of practice statement is to inform dietitians and the public about the focus of the dietetic profession. For RDs in Ontario, the scope of practice states, "the practice of dietetics is the assessment of nutrition and nutritional conditions and the treatment and prevention of nutrition related disorders by nutritional means" (College of Dietitians of Ontario, 2011a).

The practice of dietetics in Ontario is governed by the 14 controlled acts, defined by the Regulated Health Professions Act (College of Dietitians of Ontario, 2011a). The structure of controlled acts is essential to the health regulatory system and the ideals of public protection in Ontario health care. The statutes, limiting the practice of controlled

acts to authorized regulated professionals only, apply to everyone, including laypersons (College of Dietitians of Ontario, 2011a). Registered Dietitians in Ontario were recently afforded legal authority to perform two of the 14 controlled acts; to act as evaluators for the purpose of the Health Consent Act (College of Dietitians of Ontario, 2011b) and to perform skin pricks for the purpose of collecting blood samples for monitoring capillary blood readings, while practicing dietetics (College of Dietitians of Ontario, 2010a). Registered dietitians can perform the remaining controlled acts only if given the authority to do so from a regulated health professional authorized to perform the act by their profession-specific act, such as a physician. This transfer of authority is referred to a delegation of a legal controlled act (College of Dietitians of Ontario, 2011a).

Participation in HHR planning and research is a central mandate for CDO (College of Dietitians of Ontario, 2010h). The College has developed a strategic plan that will culminate at the end of 2010 which includes supporting the public's access to the services of RDs, with a specific objective to increase the supply of RDs in Ontario (College of Dietitians of Ontario, 2010c).

2.01.5 Dietitians of Canada.

Nationally, DC provides leadership and influences the direction of the profession through ethical and evidence-based best practice in dietetics (Dietitians of Canada, 2008). Formerly the Canadian Dietetic Association (1935-1996), DC is the national accrediting body for all baccalaureate and practicum training programs that credential RDs to practice in Canada (Dietitians of Canada, 2010b). With over 6,000 members, DC is the only national organization of RDs in Canada and is one of the largest organizations of dietetics professionals worldwide (Dietitians of Canada, 2010b). Dietitians of Canada

provides members with continuing education opportunities and publishes a peer-reviewed journal; *The Canadian Journal of Dietetic Research and Practice* (Dietitians of Canada, 2009c). Membership in DC is voluntary and is renewed annually for a registration fee of $415.00, plus $87.70 for malpractice insurance (Dietitians of Canada, 2010c, 2010d).

The Board of Directors of DC has identified four priorities, leading up to and including the year 2013: (a) expanding the leadership and profile for the profession, (b) growing the capacity in dietetic education to meet needs of the profession and society, (c) increasing recognition of DC's role as the profession's leading source of professional learning and development and (d) promoting better access to dietitians (Dietitians of Canada, 2008).

On November 5, 2010 the federal government confirmed labour mobility funding in support of the Partnership for Dietetic Education and Development (PDEP). This federal grant of $360,000 will support the creation of a standardized assessment process across Canada for RDs at entry-to-practice (Dietitians of Canada, 2010a). One of the goals of this project is to improve access to RDs (Dietitians of Canada, 2010a). To achieve this, knowledge of the current RD workforce is required.

2.01.6 Entering the profession of dietetics in Ontario.

There are 16 universities in Canada that offer an accredited undergraduate program in dietetic education. Of those universities, three are in Ontario: Brescia University College affiliated with The University of Western Ontario, University of Guelph and Ryerson University (Dietitians of Canada, 2010e). After successful completion of an undergraduate program, graduates can apply for an internship program or a combined master's practicum program. There are 28 internship programs in Canada

(12 in Ontario) and eight combined master's practicum programs, one of which is in Ontario (University of Ottawa) (Dietitians of Canada, 2010f). Dietetic internship and practicum programs range in length from 40 to 45 weeks (Dietitians of Canada, 2010f). Beginning in 2009, there was a moderate increase in the number of dietetic internship placements in Ontario (M. Wyatt, personal communication, May 12, 2011).

Graduates of internship or master's practicum programs apply to write the CDRE after completing their program. With the exception of Quebec, this exam is required by every province in Canada. Applicants must pay the $400.00 exam fee once they have received confirmation of their eligibility to write (College of Dietitians of Ontario, 2010h). An applicant who has not yet written the CDRE, but has completed the education requirements, or has written the exam and is awaiting results, may apply for a *Temporary* Certificate of Registration with CDO. An individual holding a Temporary Certificate of Registration is permitted to use the title 'RD', but not to supervise another dietitian. An applicant who has met all the requirements for registration in CDO practices under a *General* Certificate of Registration (College of Dietitians of Ontario, 2010h).

A limited number of RDs complete post-graduate education. The 2008 Ontario CDO workforce analysis survey indicated that 25% of RD respondents had a master's degree and 2% a doctorate (Dietitians of Canada, 2009b). As the survey did not ask whether a graduate degree was a requirement for employment, an individual RD's impetus for advanced level education cannot be determined (Morley, 2011). The College of Dietitians of Ontario collects and maintains member education data at the time of application.

2.01.7 Internationally trained registered dietitians.

Dietitians who complete their education and training outside of Canada can apply for membership with CDO. To register, international applicants must provide proof of permanent residency or citizenship in Canada or proof that they are authorized to work in Canada under the *Immigration Act*, and have the level of the degree received outside of North America assessed through the World Education Service (College of Dietitians of Ontario, 2010i). They must demonstrate proficiency in English or French, and meet the required competence standards by successfully completing a program of practical experience that is equivalent to a Canadian accredited internship program or practicum. Most internationally educated applicants will be required to complete an advanced clinical nutrition course and a Canadian Practical Training Program to achieve knowledge and experience related to the Canadian health care system and culture (College of Dietitians of Ontario, 2010i). These requirements can be met through completion of the Internationally Educated Dietitians Pre-Registration Program (IDPP) at Ryerson University in Toronto, Ontario (Ryerson University, 2010).

International applicants must pass the CDRE and meet CDO's standards for ethical and competent practice (College of Dietitians of Ontario, 2010i). The College of Dietitians of Ontario first began reporting internationally trained RDs in the 2007 annual report (College of Dietitians of Ontario, 2007). In 2009, 57 internationally educated RDs applied for registration in CDO (College of Dietitians, 2009a).

2.01.8 Where registered dietitians work.

Registered dietitians are highly qualified professionals, educated in science, management, human development, and health of populations (Dietitians of Canada,

2010g). Dietitians work in numerous and diverse settings, in collaboration with a variety of other health professionals to manage nutrition for health promotion, disease prevention, and treatment of acute and chronic diseases (College of Dietitians of Ontario, 2010j). Table 2.1 illustrates a number of settings where RDs work, including required qualifications and the funding or payment model used in each setting.

The College of Dietitians of Ontario annually reports member registration information including the district of Ontario (as defined by CDO) in which RDs work, employment status, work setting(s) and area(s) of practice (refer to Appendix B) (College of Dietitians of Ontario, 2009a). Registered dietitians often report more than one area of practice and, or work setting when completing registration renewal. The College of Dietitians of Ontario first reported the number of RDs working in more than one area of practice and, or work setting in 2003. That number has increased from 220 members in 2003 (College of Dietitians of Ontario, 2003) to 1,483 in 2009 (College of Dietitians of Ontario, 2009a).

2.01.9 The public and private mix of registered dietitians in Ontario.

The organization of health care delivery in Canada is the responsibility of each province or territory. The health care system in Ontario is highly decentralized with 11 different types of primary care organizations (Dietitians of Canada, 2009a). Services provided by RDs in the public health sector are included in the Canada Health Act (Health Canada, 2010a). However, public access to RD services is often restricted by institutional policy to those individuals affiliated (generally by physician referral) with that institution. Nutritional services provided in long term care (LTC) settings is limited by the current funding model of the MOHLTC (Dietitians of Canada, 2010h).

There are 14 Community Care Access Centres (CCAC) in Ontario. These are local organizations established by the MOHLTC to provide access to government-funded home and community services and LTC homes (Community Care Access Centre, 2011). Services provided by RDs in CCACs are restricted to those individuals who meet the eligibility criteria (Ministry of Health and Long Term Care, 2006).

Registered dietitians providing services in the private sector work in settings ranging from clinical nutrition education to product research and development. Those RDs providing individual nutrition education do so, on a fee-for-service basis which may or may not be covered by an individual's private health insurance (Dietitians of Canada, 2010j). The range of services provided by consulting RDs is limited only by their scope of practice. Consumers are limited only by what they can afford and what their private health insurance coverage will allow.

2.01.10 Family health teams.

In the year 2000, the Government of Ontario declared that improvements to PHC were vital to the renewal of health services (Health Canada, 2010b). Since that time a number of key initiatives designed to improve access to care have been implemented, including improving the quality and continuity of PHC, increasing patient and provider satisfaction and enhancing the cost-effectiveness of PHC services (Health Canada, 2010b). Specific initiatives included integrating pharmacists, nurse practitioners, RDs and other AHPs with family physicians, creating the FHT. The addition of AHPs facilitated earlier access to more comprehensive and effective health care and self-care support. Patients reported increased satisfaction with care received through

interdisciplinary teams and clinical outcomes were often improved (Health Canada, 2010b).

There are currently 200 FHTs across Ontario, each constructed based on local health and community needs (Ministry of Health and Long Term Care, 2010). Registered dietitians are a key component of FHTs, but as of January, 2009, only 65% of the approved full-time equivalent positions had been filled. Current salary guidelines set by the MOHLTC were, and remain, below industry averages and not equitable with other AHPs (Dietrich, 2009). As FHTs have become the new model of PHC delivery in Ontario, access to RDs in this setting is crucial to supporting the health promotion and health care management objectives of the provincial government (Dietrich, 2009).

2.01.11 Health professions database.

In an effort to better understand AHPs in Ontario, the MOHLTC recently developed The Health Professions Database (HPDB). The MOHLTC acknowledged that "we knew very little about how many people were practicing in these professions, where they were working, and whether Ontario had the right combination of these professionals to meet future needs" (Health Force Ontario, 2011). The MOHLTC is now working with 20 regulatory colleges of Ontario (including CDO) to address this gap by creating a database that will provide evidence needed for future HHR planning. The work to create the minimum data set for the HPDB began in the summer of 2008. The results will be "standardized, consistent and comparable demographic, geographic, educational, and employment information on all of the regulated allied health professionals in Ontario" (Health Force Ontario, 2011).

The HPDB 2008 Stat Book was released in September, 2010 (Health Force Ontario, 2010a). Data collected for this document included that information already held by regulatory colleges that corresponded with the HPDB requirements. Much of the required information had not been previously collected, resulting in high unknown rates on the information tables. Information collected from CDO is shown in Table C.1, Appendix C (Health Force Ontario, 2010a).

The data collected in the HPDB will help to inform policy decisions for HHR related to relationships, identification of labour trends and the development of simulation models (e.g., adding new education programs) (Health Force Ontario, 2010a). This research will add to the available data that CDO is able to provide the HPDB, contributing to the development of the longitudinal database for RDs in Ontario.

Table 2.1 A selection of registered dietitian work settings

Work setting	Role	Comments/Examples	Qualifications	Public access to care	Funding/Payment model
Hospital	Direct patient care	Clinical nutrition specialists	RD, Certified diabetes educator (CDE),	Only as a patient of the hospital	Provincial Government
	Program management	Manage AHP team	RD, Graduate degree	No direct patient care	
	Research and education	Dietetic internship director	RD, Graduate degree	No direct patient care	
	Nutrition management	Clinical or Food Service	RD, Graduate degree	No direct patient care	Provincial Government or Private
Long term care (LTC)	Direct client care	Clinical nutrition specialists	RD	Only for residents	Provincial government
	Food service administration	Manage food service and production	RD	No direct patient care	
Community	Individual and group nutrition education	FHT	RD	Only for patients of FHT	Provincial government
		Diabetes education centres (DEC)	RD, CDE	Often only for patients of DEC	Provincial government
		Private practice	RD	Restricted by RD scope of practice	Private, fee for service; may be covered by insurance
		Community health centres (CHC), Community care access centres (CCAC)	RD	Restricted to clients in catchment area	Provincial government
Government	Policy-makers	School nutrition guidelines, advertising regulations	RD, Graduate degree	No direct patient care	Provincial government
Public health (PH)	Public Health Nutritionist		RD, Graduate degree	Public health planning and education	Provincial government
Food Service Management		Food safety, food security, food production and marketing	RD, Graduate degree preferred	No direct patient care	Private
Food Industry	Research, marketing, education	Product research and development	RD, Graduate degree preferred	No direct patient care	Private
Research	Researcher		RD, Graduate degree	Patients part of research studies	Private and/or publicly funded
Education	College and/or University		RD, Graduate degree	No direct patient care	Private and/or publicly funded
Sales/Marketing	Pharmaceutical companies	Nutrition support products, vitamins	RD	May provide patient/provider education	Private

2.02 Theoretical Framework: Labour Market Economics

Labour market economics involves the analysis of the determinants of labour *supply* and *demand* and their interaction to determine wages, employment and unemployment (Benjamin, Gunderson, Lemieux & Riddell, 2007). Labour supply includes dimensions of *quantity* and *quality*. Labour supply quantity dimensions encompass hours of work, including trends and cyclical patterns, overtime, part-time work, work sharing and flexible work time arrangements. Measures of quantity in labour economics can be related to demographics and personnel and human resource planning (Benjamin et al., 2007). Labour supply quality dimensions include education, training and health. These components can be analyzed as part of human capital investment decisions as they involve present day costs in exchange for future benefits. Measures of quality in labour economics can be related to personnel and human resource management as well as productivity (Benjamin et al., 2007).

Labour demand is influenced by global competition, privatization, public sector economizing, and technological change. There is increasing recognition that wages can affect incentive to acquire education and training, or to move or stay with a job (Benjamin et al., 2007; Pollard, Taylor & Daher, 2007). Other economic and market factors affecting labour markets include stress and burnout, management and leadership style, degree of workplace empowerment and promotional opportunities (Rondeau, Williams & Wagar, 2008).

From an economic perspective, skill imbalance in the labour market occurs when the quantity of a given skill supplied by the workforce and the quantity demanded by employers deviate from current market conditions (Zurn et al.,2004). Non-economic

issues of supply and demand are generally related to defined norms. In health care, these definitions are based on a value judgement, such as how much care someone should receive, or a professional judgement, such as determining the appropriate number of health care providers for a given population (Zurn et al.,2004).

Sociological factors can affect labour market economics. Family and community responsibilities can affect labour mobility, the role of women in the labour market and career and educational choices. Social norms may also influence wage structure and job or career choice (Benjamin et al., 2007). Research on women in the workforce indicates that participation may be dependent on changes in unearned income, spouse's wage, having children and costs associated with childcare and housework (Zurn et al., 2004). Other research has suggested that female-dominated occupations are often not given market value proportionate with skill level (Diallo et al., 2003).

Legislative constraints are an important component of labour markets (Benjamin et al., 2007). Individuals working in health labour markets, within a regulated health profession, must register with the regulatory college (Regulated Health Professions Act, 1991). Each regulatory college has a responsibility and obligation to maintain the standards of practice for the profession (Health Force Ontario, 2010b). The objectives of each regulatory college may however, not be in line with those of a government, ministry or hospital or institution. The regulatory college may want to increase members' market share and income whereas other stakeholders may support measures to limit health care expenditures (Zurn et al.,2004).

Labour market economists use a variety of data sets to explore the relationship between labour market variables. Data sets can provide information on the total supply

and composition of the health workforce as well as differences by regions, demographics and other socioeconomic characteristics such as education, income and sector (Diallo et al., 2003). Longitudinal data sets can combine the characteristics of cross-section and time-series data by following a sample of individuals for several years allowing economists to study individual behaviours such as transitions into and out of the labour market (Benjamin et al., 2007).

Labour market economics examines those factors that influence participation in the workforce. This framework emphasizes the number and diversity of elements which can create health workforce imbalances (Zurn et al., 2004). From a health policy perspective, it is important to identify those factors that policy-makers can influence in an effort to create a stronger more sustainable workforce. (Zurn et al., 2004). Important also is the ability to prioritize those factors to achieve the most significant benefit for all key stakeholders.

Chapter 3— Review of Literature

This chapter summarizes relevant literature related to labour market economics in health care settings. To support the objectives and theoretical framework of this research, the literature review includes issues of workforce supply and demand, issues related to education and clinical placements, issues of recruitment and retention of health care workers and the role of work settings in health care. Included, is relevant literature on the aforementioned issues specific to RDs.

A comprehensive review of five electronic databases was conducted to identify peer reviewed and grey literature examining HHR, RDs, health labour markets and workforce characteristics. Databases searched included OVID, ProQuest, Canadian inventory of nutrition and dietetic associated research (CINDAR), cumulative index to nursing and allied health literature (CINAHL) and Practice-based evidence in nutrition (PEN). An additional search for relevant literature was conducted in the journal *'Human Resources for Health'.*

3.01 Health Human Resources

3.01.1 Issues of supply and demand.

Health human resources play an essential role in health policy planning as well as in measures of quality of life (Landry et al., 2007; O'Brien-Pallas et al., 2001). "Having the right supply, mix and distribution of health care providers is critical in successfully creating and maintaining a stable, adequate health workforce in Canada" (Health Canada, 2009). A report from The Organization for Economic Cooperation and Development (OECD) suggests that many countries, including Canada, will face challenges responding to the demands for health workers over the next 20 years (Organization for Economic

Cooperation and Development, 2008). Forecasting future shortages is a difficult task, as changes in productivity are not easily measured (Organization for Economic Cooperation and Development, 2008). Various approaches to planning HHR supply and demand have been used, including descriptive and predictive analysis, epidemiology and economics (O'Brien-Pallas et al., 2001).

Health care differs from other workforce sectors because of the restrictions related to who can provide services (Organization for Economic Cooperation and Development, 2008). Assessing HHR related to the delivery of health services should take into account factors external to the health system, including the diversity of labour markets and the coordination between supply and demand for health personnel (Diallo, Zurn, Gupta, Dal Poz, 2003).

Previous research has estimated the supply of HHR for RNs (Alameddine et al., 2006; O'Brien-Pallas et al., 2001), physicians (Stoddart & Barer, 1999), PTs (Landry et al., 2007) and OTs (Hastie, 2009). With the emergence of PHC reform and a focus on inter-professional team practices (i.e., FHTs), the need to understand HHR within all health care professions is essential.

3.01.2 Issues of supply.

Measures of labour supply within a workforce are often expressed as a ratio of the absolute number of health professionals to a sub-set of the population (Diallo et al., 2003; Landry et al., 2007; Landry, Ricketts, Fraher, & Verrier, 2009). The origin of the HHR ratio can be traced back to the 1930s in the United States, when 134.7 physicians per 10,000 people was identified as a desirable target (Landry et al., 2007). This ratio did not however, distinguish between primary care and sub-specialties. Since that time, HHR

ratios have become a benchmark to measure access to health services (Landry et al., 2007) despite the fact that the measure is based on the assumption that need is synonymous with supply (O'Brien-Pallas et al., 2001). Table 3.1 illustrates the most current CIHI data for the HHR ratio per 10,000 people for a selection of health care professions in Ontario (Canadian Institute for Health Information, 2010a).

Table 3.1 Health human resource ratio for health care providers in Ontario

Profession	HHR per 10,000 people
Respiratory Therapists (RTs)	2.0
Social Workers (SWs)	9.0
MLTs	5.1
MRTs	4.1
OTs	3.2
Pharmacists	7.6
PTs	4.8
RNs	71.8
RDs	**2.2**

Note. Canadian Institute for Health Information (2010) *Canada's health care providers, 2008 Provincial Profiles: A look at 24 health occupations*. Ottawa, Ontario

Factors affecting labour supply of health professionals include training and education, participation in the health labour market, rates of retirement, interprovincial migration, working conditions, and job satisfaction (Basu & Gupta, 2007; Zurn, Dal Poz, Stilwell, & Adams, 2004). In research involving PTs, Landry et al. (2009) suggest that there are no needs-based, evidence-based benchmarks for the number of PTs relative to a population across clinical settings, disease conditions, countries or any combination thereof.

Decision-making in the education sector influences the number of health care professionals graduating annually (Vujicic & Zurn, 2006). If policy-makers hope to increase the number of graduates, adequate capacity for enrolment and sufficient numbers of individuals interested in pursuing education in a specific health care field must be ensured (Vujicic & Zurn, 2006). Migration levels also affect the number of available

health care providers. Developed countries are increasingly relying on migrant health care professionals to fill nursing and physician vacancies (Vujicic & Zurn, 2006). International research completed with physicians and nurses has shown that while the number of domestic graduates has remained flat in most countries (Canada, included), the number of foreign-trained, health care provider immigrants has increased markedly (Organization for Economic Cooperation and Development, 2008).

Employment status in the health labour market is an important determinant of supply. A simple head-count of health care workers does not accurately represent labour supply as not all providers work the same number of hours. Almost half of the total RN population works part-time (Basu & Gupta, 2007). A similar ratio is found with OTs, with the proportion of part-time workers increasing with increasing age (Hastie, 2009).

The average age of health care workers in Canada was 41.9 years in 2005; 2.3 years older than the average age of the general Canadian workforce (Canadian Institute for Health Information, 2007). Research on the ageing of the health workforce, in particular RNs, has indicated that the average age of practicing RNs is increasing at a higher rate than that of the workforce as a whole, and the proportion of younger RNs is decreasing significantly (Zurn et al., 2004). Research in a number of OECD countries confirms that younger age cohorts in the population are expected to decline over the next 20 years (Organization for Economic Cooperation and Development, 2008). Table 3.2 illustrates the average age of a selection of health care workers in Canada between 1995 and 2005 (Canadian Institute for Health Information, 2007).

Table 3.2 Average age of Canadian health care providers between 1995 and 2005

Profession	Average Age 1995	Average Age 2005	Change (Years)
RTs	33.6	39.0	+5.4
SWs	39.6	41.6	+2.0
MLTs	39.5	41.1	+1.6
MRTs	37.2	40.6	+3.4
OTs	34.7	37.0	+2.3
Pharmacists	38.7	41.4	+2.7
PTs	37.5	38.9	+1.4
RNs	39.6	42.9	+3.3
RDs	**38.7**	**41.7**	**+3.0**

Note. Canadian Institute for Health Information. (2007). *Canada's health care providers, 2007* Ottawa, Ontario

Geographical factors play a role in the distribution of HHR. Urban areas consistently have a higher concentration of health care providers than rural areas (Zurn et al., 2004). To improve the geographical distribution of physicians, governments have offered a range of incentives; however, there is virtually no country in the world that has solved the problem of an urban/rural imbalance in the physician workforce (Organization for Economic Cooperation and Development, 2008; Zurn et al., 2004).

Similar concerns have been found with AHPs. Recent work in rural Australia has shown that despite a steady increase in the number of AHPs trained over the past decade, there remains a 6% vacancy rate across all disciplines with rural areas having 60% fewer practicing AHPs per 100,000 population than urban areas (Struber, 2004). Table 3.3 identifies the proportion of AHPs working in rural areas in Canada in 2001 for a selection of health care providers (Canadian Institute for Health Information, 2007).

Table 3.3 Percent of allied health professionals in rural areas in Canada in 2001 and change from 1991-2001

Profession	Percent in rural areas in 2001	Percent change from 1991
RTs	9%	+1.9%
SWs	Not available (N/A)	N/A
MLTs	11%	-1.0%
MRTs	15.5%	+0.8%
OTs	9%	+1.1%
Pharmacists	14%	-1.6%
PTs	13%	+1.6%
RNs	17%	-0.6%
RDs	**N/A**	**N/A**

Note. Canadian Institute for Health Information. (2007). *Canada's health care providers, 2007* Ottawa, Ontario

3.01.3 Issues of demand.

The demand for health care services is affected by a variety of factors, including health needs of a population, cultural and sociodemographic characteristics and economic factors (Zurn et al., 2004; Vujicic & Zurn, 2006). Human resources account for the largest portion of health care budgets in most countries. Estimates of wage costs range from 65-80% of renewable health system expenditures (Vujicic & Zurn, 2006). Estimates of health labour market demand rely heavily on current HHR supply and vacancy rates (O'Brien et al., 2001).

Planning for HHR based on estimates of health needs of a population is difficult as the determination of health need can be defined in numerous ways, leading to a perception of either a HHR shortage or surplus (Zurn et al., 2004). Utilization approaches focus on demographic characteristics and service consumption patterns in the general population, in addition to market factors that influence service use (O'Brien et al., 2001). Market factors may include access to services and preferences of consumers (O'Brien et al., 2001).

Research has indicated that the demand for nursing services is determined by the size and demographics of the population. Age distribution of a population affects the

prevalence and patterns of disease. Research from Nova Scotia has indicated that over the next 20 years there will be a significant increase in treatment requirements for diseases of the circulatory and endocrine systems, cancer, nutritional and metabolic diseases and immunity disorders (Basu & Gupta, 2007).

Other factors influencing health labour market demand include access to services and community versus hospital-based services. Studies indicate that a 10% increase in patient travel time would induce a 6-10% reduction in the demand for health care (Zurn et al., 2004). As population age distribution continues to shift higher, there will be an increase in demand for hospital bed-days. This demand is expected to increase by 25% between 2006 and 2016 in Australia (Page & Willey, 2007). Staffing requirements for a fixed number of inpatient beds is more easily calculated than that for community services (Page & Willey, 2007). Data collection on the use of community services based on age is limited in both quantity and accuracy (Page & Willey, 2007). It is estimated that the demand for AHPs in Australia will increase by 11% between 2006 and 2016 (Page & Willey, 2007).

Political, economic and social factors also influence health labour market demand. Government funding, hospital budgets and HHR competition within various work sectors demonstrate that health care budget decisions are not based only on patient health needs (Vujicic & Zurn, 2006). Alternative payment models, practice patterns, levels of technology and type of organization can influence health labour market demand (Vujicic & Zurn, 2006).

3.01.4 Issues of education and clinical placements.

Assessing education and training levels of the health workforce is important for policy-makers. Essential for the success of health care systems is a workforce with the required skills, training and knowledge that can respond to the needs of the population. Health systems continue to change and as a result there is an on-going need for re-training and professional education (Organization for Economic Cooperation and Development, 2008). Health education programs are available in each province for many health occupations. The number and location of training programs provides information on the potential supply and mobility patterns of new graduates in the health labour market (Canadian Institute for Health Information, 2007). Table 3.4 illustrates the availability of training programs and graduate statistics across Canada for a selection of health care providers in 2004 (Canadian Institute for Health Information, 2007).

Clinical placements are an important component of the education process for many health care professions. Placements require skill and willingness of preceptors to provide student supervision. Many health professions struggle to ensure adequate access to appropriate training environments and preceptors (Dietrich, 2009). As patient care has moved away from the hospital to the community, the availability of clinical placements has become even more challenging (Canadian Institute for Health Information, 2007).

Table 3.4 Availability of training programs and graduate statistics across Canada, 2004

Profession	No. grads 1995	No. grads 2000	No. grads 2004	Availability of training programs across Canada										
				NL	PEI	NS	NB	Que	Ont	Man	Sask	Alb	BC	Y, NW
RTs														
SWs			2,856	√		√	√	√	√	√	√	√	√	
MLTs	545	265	725	√			√	√	√	√	√	√	√	
MRTs	630	575	855	√	√	√	√	√	√	√	√	√	√	
OTs	590	584	590			√		√	√	√		√	√	
Pharm*	787	875	686	√		√		√	√	√	√	√	√	
PTs	665	622	630			√		√	√	√	√	√	√	
RNs	7,203	4,816	7,910	√	√	√	√	√	√	√	√	√	√	√
RDs	**N/A**	**339**	**352**	√	√	√	√	√	√	√	√	√	√	

*Pharm = pharmacist

Note. Canadian Institute for Health Information. (2007). *Canada's health care providers, 2007* Ottawa, Ontario

The credentials required for entry-to-practice are profession-specific and continually evolve in response to changes in professional knowledge, technological advances, practice settings and increased professional accountability (College of Dietitians of Ontario, 2010a). It has become increasingly important for health professions, including the regulatory colleges, to partner with educational institutions to ensure program curriculums continue to meet the needs of the profession and the population (Morley, 2011).

In Australia, attention is being paid to the role of education in recruitment, retention and retraining of health care providers. In particular, rural workforce models that do not easily fit into existing academic structures, which are individual health discipline focused, necessitate the development of new models that emphasize a multidisciplinary, team-based approach to service delivery (Page & Willey, 2007). Interestingly, current award structures also do not recognize the higher level of skill and service required by health care providers working in rural settings (Page & Willey, 2007).

Current education-relevant indicators for HHR assessment include the proportion of health workers with tertiary-level educational achievements and those having completed continuing education courses (Diallo et al., 2003). Such indicators however, may fail to capture the importance of the quality of education and training and its adequacy regarding the needs of the population and the health care system (Diallo et al., 2003).

3.01.5 Issues of recruitment and retention.

Health care providers have been described as a mobile workforce (Canadian Institute for Health Information, 2007), migrating from one community to another. There are numerous factors that contribute to the movement in and out of the workforce as well as between sub-sectors within the workforce (Canadian Institute for Health Information, 2007). The ability to retain health care workers influences supply, workplace environment and job satisfaction (Organization for Economic Cooperation and Development, 2008).

Research indicates that employment status influences exit rates from the health workforce. Specifically, RNs employed in part-time and casual positions were more likely to exit than those working full-time (Basu & Gupta, 2007; Daniels, 2011). The conditions of work and job related stress are additional factors that could potentially affect retention (Basu & Gupta, 2007).

Research has shown that more women than men work in health care (Zelmer& Leeb, 2001). In Australia, over 90% of AHPs are women (Struber, 2004). Research involving RNs suggests that workforce participation is responsive to changes in wage-rate, other family income, presence of children and employment status. Increasing wages

and working full-time reduce workforce withdrawal whereas higher education levels, age and other family income increase the probability of withdrawal from the workforce (Zurn et at., 2004).

In response to RN turnover, a number of hospitals have implemented measures to increase job satisfaction of RNs, and more specifically, mid-career RNs (Coshow, Davis & Wolosin, 2009). Studies suggest that job-satisfaction follows a U-shaped curve when plotted against age. Employees are more satisfied at the beginning and end of their careers, while those in mid-career are least satisfied. Opportunities to increase RN job satisfaction focused on those at mid-career may be an effective strategy to increase retention (Coshow et al., 2009).

3.01.6 Issues related to work setting.

Changes in the nursing workforce were analyzed in a study using the College of Nurses of Ontario (CNO) registration database (Alameddine et al., 2006). The outcome of hospital downsizing initiatives on the size and distribution of the nursing workforce across various employment settings from 1993-2004 was analyzed. Fewer RNs were providing direct patient care in 2003 than 1993, both in hospitals and in community settings; however, the majority of RNs continued to work in institutional settings (Alameddine et al., 2006).

Similar studies have been conducted using regulatory college registration databases for OTs and PTs. Between 1997 and 2006, there was an increase in the absolute number of OTs working in Ontario. Results indicated that although OTs worked in hospital settings more than any other sector, that number decreased by over 8% while

the proportion of OTs employed in settings outside of the hospital sector increased by over 7% over the time period of the study (Hastie, 2009).

In contrast, there was a negative growth trend for PTs in Canada between 2000 and 2005, when measuring workforce supply as a ratio to population. Output from PT education programs decreased, while population growth increased, possibly altering the balance between supply and demand for PT services (Landry et al., 2007).

Similar to the issue of geographic distribution are concerns in recruiting health care workers to particular work settings. The matter of distribution across specialties may in some cases be more concerning than that of shortages and surpluses in aggregate numbers (Organization for Economic Cooperation and Development, 2008). Based on research in a number of OECD countries, appointing primary-care role models to academic positions influences student choices towards a career in primary care (Organization for Economic Cooperation and Development, 2008).

3.01.7 Issues specific to registered dietitians.

Registered dietitians are not evenly distributed across Canada. Although, provincially, Ontario has the highest absolute number of RDs, it has the lowest number of RDs per population ratio (Canadian Institute for health Information 2010a). Table 3.5 illustrates the provincial distribution of RDs in Canada (Canadian Institute for health Information 2010a).

As PHC in Ontario continues to undergo change, adequate numbers of RDs will be required to ensure the ongoing health of Ontario residents. Dietitians of Canada has recommended that models of PHC develop needs-based funding mechanisms to support and integrate nutrition services within all jurisdictions (Dietitians of Canada, 2009a).

Table 3.5 Distribution of registered dietitians across Canada

Province	# RDs 2004	#RDs 2008	RDs per 10,000 population
Newfoundland	142	151	3.0
Prince Edward Island	61	60	4.3
Nova Scotia	429	457	4.9
New Brunswick	309	320	4.3
Quebec	2,090	N/A	N/A
Ontario	**2,560**	**2,906**	**2.2**
Manitoba	322	351	2.9
Saskatchewan	251	284	2.8
Alberta	718	929	2.6
British Columbia	879	1,022	2.3

Note. Canadian Institute for Health Information (2010) *Canada's health care providers, 2008 Provincial Profiles: A look at 24 health occupations*. Ottawa, Ontario

The College of Dietitians of British Columbia (BC) collaborated on a HHR project in 2009 using information from its member registration database (British Columbia Ministry of Health, 2009). Analogous to Ontario (Dietitians of Canada, 2009b), it was determined that BC also has a shortage of RDs. However, in contrast to the Ontario study, BC calculated the projected demand for RDs up to and including the year 2021 (British Columbia Ministry of Health, 2009). Using a calculation that assumed the input and output of RDs would remain constant over the time period, it was forecasted that the number of RD vacancies in BC would increase from 26 to 165 between 2009 and 2021 (British Columbia Ministry of Health, 2009).

The Dietitians Association of Australia (DAA) completed a study of the workforce trends of dietitians in New South Wales from 1984 to 2000 using survey data collected from area RDs (Meyer, Gilroy & Williams, 2002). Similar to CDO, DAA publishes annual membership statistics including hours of work and main areas of employment; however, other detailed information on workforce characteristics are not analyzed (Meyer et al., 2002). Over the period of the DAA study, the total active workforce of RDs grew by 48%, yet remained below recommended levels. Notably, 83%

of new RD positions were part-time rather than full-time (Meyer et al., 2002). Although the majority of RDs continued to work in hospital settings, there was a continual increase in those employed in other sectors over the course of the study (20% in 1984 to 38% in 2000) (Meyer et al., 2002). The age structure of RDs in Australia also changed, with the greatest increase in the group with 16-20 years of work experience (i.e., RDs in the oldest age group) (Meyer et al., 2002).

It takes a total of five years to complete the post-secondary education requirements to become an RD. From an economic perspective, the decision to undertake professional education and training is considered an investment decision and based on the human capital approach, rate of return on education can be estimated. A lower and decreasing average rate of return will discourage individuals from choosing that profession (Zurn et al.,2004). Evidence suggests that the shortage of RDs in Ontario stems directly from lack of dietetic internships. Currently, only approximately 50% of graduates from accredited undergraduate university programs in Ontario will secure an internship placement (Dietrich, 2009).

The DC 2008 workforce analysis survey of Ontario RDs indicated that 27% of respondents had graduate level education (25% Masters, 2% Doctorate) (Dietitians of Canada, 2009b). Similar analyses across Canada indicated a range of 16% to 25% of RDs with graduate-level training. Unclear in these surveys was whether or not RDs pursued post-graduate level education as a requirement for employment or for other reasons (Morely, 2011). A collaborative project between DC and the Public Health Agency of Canada found that although many jurisdictions require or request PH RDs to

be Masters-trained, the pool of eligible candidates is limited to the extent that qualified candidates often cannot be recruited to these positions (Chenhall, 2006).

Additional factors of labour supply and demand influencing the RD workforce include job satisfaction and prevalence of job-related "burnout". Previous research related to job and career satisfaction indicated that RDs in management positions were more satisfied with their careers than non-management RDs (Sauer, 2009). Other research indicated that age and number of years as an RD where positively associated with a sense of personal accomplishment (Gingras, de Jonge & Purdy, 2010). This same study found that RDs in the youngest age groups experienced higher burnout levels than their older colleagues (Gingras et al., 2010). Worth noting, RDs were found to experience emotional exhaustion and job depersonalization less than RNs, physicians and social workers (Gingras et al., 2010).

Dietitians of Canada recently launched two initiatives to assess the education and curriculum needs of the profession. The Partnership for Dietetic Education and Practice (PDEP), and the Task Force on Dietetic Practical training have been established to develop Integrated Competencies for Dietetic Education and Practice (Partnership for Dietetic Education and Practice, 2009) and determine a preferred model for dietetic practicum education in Ontario (personal communication, February 8, 2010). The Integrated Competencies for Dietetic Education and Practice project was recently awarded a substantial grant through the Labour Mobility fund of the federal government (Dietitians of Canada, 2010a). This project represents a collaboration between dietetic regulatory bodies, educators and DC to address issues related to dietetic education and practice (Dietitians of Canada, 2010a). The Task Force on Dietetic Practical Training has

been awarded funding from the MOHLTC to address the increasing demands and evolving practice areas for dietitians in the province's health care system (Dietitians of Canada, 2010a). Although both of these projects will no doubt provide valuable information into the educational needs of the profession, without an analysis of the workforce of RDs in Ontario, these initiatives will not produce the desired outcome: increasing the workforce of RDs in Ontario.

Chapter 4—Data Sources and Variable Selection

This chapter describes the research design, ethics and confidentiality and the database used for the research. Also described, are the steps that were required to determine the research variables, clean the data and create the longitudinal data set. Statistical analyses performed on the data are described along with the limitations and strengths of the research design.

4.01 Study Design

A framework of labour market economics are used to investigate the workforce characteristics of RDs in Ontario from 2003-2009. Secondary data analysis was conducted using the annual registration files from the CDO registration database. The registration files were merged to form a longitudinal database for the purpose of the analysis.

4.02 Ethics and Confidentiality

This study was completed in collaboration with CDO. The research protocol was approved by the University of Ontario Institute of Technology (UOIT) Research Ethics Board (file # 10-001).

For the purpose of this research, and to protect the privacy of CDO members, CDO registration numbers were anonymized by replacing them with a unique identifier. The master list and the formula used to anonymize registration numbers were retained by CDO. Once anonymized, data files were copied to a compact disc (CD) by CDO. The CD was then sent by courier to the research team. The files were then downloaded to a password-protected computer not linked to a network. These steps were taken to protect the privacy of individuals in the database. Without these measures, the combination of

variables in the database could potentially lead to the identity of individual members of CDO.

4.03 Description of the Database

There are currently 2,908 members of CDO (College of Dietitians of Ontario, 2009a). This research encompasses membership years from 2003-2009. The precise number of members changes as new members join and other members retire, or discontinue their membership. The database used in this study includes RDs that have been members throughout the entire study period, those that joined during the study period and members that retired or discontinued their CDO membership during the study period.

When an RD becomes a member of CDO they are provided with a unique four or five digit registration number. This registration number remains with that RD for the entire time they are a member of CDO. When an RD discontinues membership in CDO their membership number remains with them, as a former member. Membership numbers are unique and used only once for an individual RD and are not duplicated.

From the time of inception to 2005/06, CDO annual registration renewal corresponded with member birth dates (month and day) and membership renewal forms were completed on paper and mailed to CDO. Beginning with the 2005/06 registration year, the CDO membership renewal date changed to November 1-October 31, with an annual registration renewal submission deadline of October 15. At the same time, optional on-line membership renewal was introduced for the first time (College of Dietitians of Ontario, 2005). By 2009, 94% of CDO members renewed their membership

on-line (College of Dietitians of Ontario, 2009a). Paper renewals have been discontinued for the registration year 2010 (College of Dietitians of Ontario, 2010a).

The College of Dietitians of Ontario registration database contains information collected from completed annual registration renewal forms. For each of the seven years of data collection (2003-2009) a sub-set of data was created containing a specified set of variables for RDs registered in that year. A description of the variables and how they were selected follows.

4.03.1 The annual registration renewal form.

The use of the CDO annual registration database for this project forms an efficient and cost effective means to analyze the workforce characteristics of RDs in Ontario. The use of secondary data sources for outcome research has become increasingly common (Best, 1999). Using an established database allows researchers to analyze existing data without the time and expense of collecting it independently (Best, 1999). Secondary databases are however, subject to the limitations chosen by the original designers.

The CDO registration renewal form was modified five times between 2003 and 2009. Categories were added, modified or deleted. Details of the changes are described the sections that follow. This research is subject to the decisions made by CDO regarding the predetermination of categories and the process of data collection and entry. The researcher consulted with the Director of Professional Affairs at DC and conducted an in-depth review of the DC 2008 workforce analysis survey (Dietitians of Canada, 2009b) as a means of validation of study design, variable selection and data analysis.

In collaboration with the research supervisor, the decision was made to use the 2009 registration renewal form to determine the variables for analysis of the CDO

registration database. Reasons for this decision included that there was a complete electronic data set for the year 2009, of which 94% had been personally submitted by members (College of Dietitians of Ontario, 2009a). This data set also included detailed descriptions of areas of practice and work settings, which aided in the process of collapsing variable categories for the remaining data sets (College of Dietitians of Ontario, 2009b).

4.03.2 The paper registration files: 2003-2004.

To make use of the data from the years 2003/04 and 2004/05, an electronic version had to be created. The Canadian Institute of Health Research (CIHR) research team grant has established procedures for data protection, cleaning and entry (R. Deber, personal communication, July 27, 2011). A graduate student, not affiliated with CDO or this research was hired by the research supervisor, funded by the CIHR team grant and trained by the CIHR team's research assistant (RA) to transfer the registration data for 2003 and 2004 from the paper files onto a Microsoft Excel® (Excel) spreadsheet. This process, supervised by the RA, involved the removal of some personal information (name, address, but not postal code and CDO registration number), and included the following: replacement of CDO registration number with a unique identifier, year of birth, year of start, language of service (2004), gender, education, employment status, area of practice and work setting.

Quality assurance checks, by the RA, were completed periodically to ensure data entry steps were completed accurately. Once the data entry was completed and transferred to the research team, the data was imported into the Statistical Analysis Software (SAS®) for analysis (described in detail in section 4.05).

4.03.3 The change logs: 2005-2007.

A number of changes were made to the CDO annual registration renewal form between 2004 and 2005. Space was added for multiple employers and questions related to upgrading education were added. Options related to areas of dietetic practice increased from six in 2004 to ten in 2005; work setting options increased from 14 in 2004 to 26 in 2005. From 2005 to 2006, a question related to working in another province was added. No changes were made to the form from 2006 to 2007.

The transition to electronic registration in 2005 created a number of challenges for the research team. For the first three years of electronic data collection (2005-2007), CDO created electronic files containing only changes in member information. These annual changes were captured in delimited change log text files and saved by CDO. For members that continued to use paper registration renewal forms, CDO manually entered changes in registration status into the change logs during this three year period.

The CIHR research team's RA assisted with the conversion of the change log text files into Excel spreadsheets. A separate Excel file was created for each of the variables (described in detail below) for each of the years 2004-2008. The years 2004 and 2008 were included in the change log files to ensure that changes made in the latter portion of 2004 and the beginning of 2008 were allocated to the correct registration year (explained below). Once complete, the individual variable files for each of the five years were imported into SAS then merged (described in detail below) to create a complete data set for each year.

4.03.4 Separating the change log files into years.

Beginning with the 2005/06 registration year the CDO membership renewal date was moved to November 1-October 31, with an annual registration submission deadline of October 15 (College of Dietitians, 2005). Prior to this, annual registration renewal corresponded with member birth dates (month and day). This created an additional challenge when creating the year files from the change log data. As the CDO registration year does not correspond to the calendar year (January, 1- December, 31) and the 'new' registration renewal date was set after the first two years of the log files (2003, 2004) a decision had to be made as to how to divide the change log data by year. Additionally, under the RHPA, RDs are required by law to inform CDO within 30 days of any changes in their contact or employment information (College of Dietitians of Ontario, 2010f).

In collaboration with the research team, data files for the years 2005-2007 were divided as shown in Table 4.1. The decision to divide the year from September of one year to August of the following year was based on the assumption that the majority of changes made by RDs in the first year would be correctly allocated and renewal information for the following year would also be accurately allocated. This process included the years 2004, to ensure that data from January-August, 2005 was included, and 2008, to ensure that changes from that latter part of 2007 were correctly allocated.

Table 4.1 Division of data years from change log files

Change log data year	Months, year	Data allocated to year
2005	January 1- August 31, 2005	2004
2005-2006	September 1, 2005-August 31, 2006	2005
2006-2007	September 1, 2006-August 31, 2007	2006
2007-2008	September 1, 2007-August 31, 2008	2007
2008-2009	September 1, 2008-August 31, 2009	2008

4.03.5 The electronic registration files: 2008 and 2009.

As CDO members were encouraged to complete registration renewals on-line, paper renewals gradually decreased. For members that continued to use paper renewal forms, CDO completed an electronic renewal. Beginning with the registration year 2008, CDO retained all electronic member registration information (rather than only changes).

The CDO registration renewal form changed considerably in 2008. Four new options were added to area of dietetic practice (including population health, health promotion, communication and food security), increasing the categories from ten to 13 (two categories were consolidated into one); practice setting options were modified and consolidated from 26 to 19 categories.

In 2009, the form was again modified and for the first time, CDO provided members with an on-line renewal guide for completing the registration renewal form (College of Dietitians of Ontario, 2009b). Details were added to questions related to education, including a question about the IDDP program at Ryerson University. Options related to areas of dietetic practice were increased from 13 in 2008, to 23 in 2009; practice setting options increased from 19 in 2008 to 25 in 2009. Information regarding employment profile, practice activities and record-keeping were added to the 2009 registration renewal form.

For the purposes of this study, complete electronic registration files were available for 2008 and 2009. These files, initially in Excel format, were imported into SAS for analysis.

4.03.6 The education and last membership year files.

Information regarding education, including undergraduate and graduate level education is collected from all RDs at the time of application to CDO. Only information regarding upgrading education is collected on annual registration renewals.

For the registration renewal year 2009, CDO was required to collect detailed information regarding initial and continuing education of members. This information was required by the MOHLTC for the HPDB (College of Dietitians of Ontario, 2009b). To accomplish this, CDO added questions related to education on the 2009 registration renewal form. For the purpose of this research, CDO created a separate Excel spreadsheet containing only member education information and the unique identifier. This information was imported into SAS for further analysis.

In order to determine the date RDs resigned or retired their CDO membership an additional file was required. The College of Dietitians of Ontario created an Excel spreadsheet containing only the unique identifier and the year RDs resigned or retired their CDO membership. This file was imported into SAS, and then merged to the longitudinal data set.

4.03.7 The complete data set: 2003-2009.

The complete data set, consisting of one file for each year of study was created from the separate annual and individual variable files as shown in Table 4.2. Additionally, CDO provided two separate Excel files containing only the unique identifier and date of birth and the unique identifier and date of start. These two files, once imported into SAS, were used to cross check the annual and change log files to ensure that no member information was omitted or duplicated.

Table 4.2 Summary of initial format of complete data set (2003-2009)

Year	Original format of data	Comments
2003	Excel spreadsheet	Created from paper files, imported into SAS
2004	Excel spreadsheet	Created from paper files and separate Excel spreadsheets created for each variable to capture change log data: imported into SAS
2005	Delimited text files: Change log data	Separate Excel spreadsheets created for each variable: each imported separately into SAS
2006	Delimited text files: Change log data	Separate Excel spreadsheets created for each variable: each imported separately into SAS
2007	Delimited text files: Change log data	Separate Excel spreadsheets created for each variable: each imported separately into SAS
2008	Excel spreadsheet	Electronic data set and separate Excel spreadsheets created for each variable to capture change log data: each imported separately into SAS
2009	Excel spreadsheet	Electronic data set: imported into SAS
Education	Excel spreadsheet	Undergraduate and graduate education variables created: imported into SAS
Date of birth	Excel spreadsheet	Imported into SAS then cross checks done to ensure no missing or duplicate data in complete data set
Date of start	Excel spreadsheet	Imported into SAS then cross checks done to ensure no missing or duplicate data in complete data set
Last membership year	Excel spreadsheet	Imported into SAS, and then merged into the longitudinal data set.

4.04 Determining the variables.

Decisions related to the final selection of variables and how to collapse variable categories were made in consultation with the research team. The result was a standardized list of variable categories that could be used across all seven years of data. Final variables chosen for analysis are shown in Appendix D, Tables D.1-D.3.

4.04.1 Inclusion/exclusion criteria.

The CDO registration database includes all current members. Members that retire or discontinue their membership are removed from the database; new members are added

at the time of application. Although the precise membership number fluctuates, it includes only current members.

Over the time period of this research, the CDO annual registration renewal form changed five times (2004, 2005, 2006, 2008 and 2009) contributing to the complexity of the data. Questions were added, changed or removed from the registration renewal form. Those variables not available for the entire study period were excluded from the analysis.

4.04.2 Demographic and education variables.

Demographic variables captured by the CDO registration database include age, gender and language of practice (Appendix D, Table D.1). Age was created from the year of birth variable and treated as a categorical variable. Gender and language were treated as dichotomous variables. Complete data for language was unavailable for all years in the study; as a result it was not examined in the analysis.

Education variables used in the analysis included undergraduate and graduate education, including year of graduation, university attended and country of education for each. Education and country of education were treated as dichotomous variables. University attended was treated as a categorical variable with specific universities coded as Ryerson University, University of Guelph, University of Western Ontario, other university in Canada and other university outside of Canada (Appendix D, Table D.2).

4.04.3 Employment status, area of practice and work setting variables.

Employment information was captured in a number of variables (Appendix D, Table D.3). Start date was determined from first year of registration with CDO. Employment status was treated as a categorical variable. As the category ‘casual’ employment status was available in only the 2009 data set, to standardize the data, those

RDs in the casual category were included in the part-time category and the casual category was 'dropped'.

Full-time employment is defined by CDO as equal to or greater than 30 hours of work per week; part-time employment status is defined as less than 30 hours per week; casual employment status is defined as employment that does not have a fixed number of hours per week (College of Dietitians of Ontario, 2009b).

The College of Dietitians of Ontario changed the sub-categories for area of practice and work setting a number of times over the period of this study. In addition to changing the number of categories, category names were also changed. To ensure that area of practice and work setting variables were collapsed in a way that reflects as closely as possible the profession of dietetics in Ontario, the research team consulted with the Director of Professional Affairs/Professional Standards at DC (M. Wyatt, personal communication, January 27, 2011). Once collapsed, area of practice and work setting were treated as categorical variables. It is necessary to view area of dietetic practice along with work setting for each variable to accurately represent the RD workforce. It is also important to emphasize that individual RDs define their unique role when completing the CDO annual registration renewal (i.e., one RD working in a community-based work setting, such as FHTs, may identify her area of practice as clinical, another RD may define a similar work setting as community). These types of distinguishing characteristics cannot be determined through this analysis.

To prevent duplicate entries and ultimately duplicate information in the analysis, those RDs working in more than one area of practice and work setting had to be allocated to a single area and a single work setting (Appendix D, Table D.4). The research team

consulted with the Director of Professional Affairs/Professional Standards at DC to ensure that allocating RDs to a single area of practice and work setting accurately reflected the profession (M. Wyatt, personal communication, January 27, 2011).

4.05 Statistical Analysis Software

In collaboration with the research team, it was determined that the SAS system be used for data analysis. The SAS system is "a modular, integrated and hardware-independent system of software" (Hatcher & Stepanski, 1994, p 21). The SAS system has the capacity to perform a variety of statistical analyses used in social science research (Hatcher & Stepanski, 1994). A SAS program is made up of a set of statements written by the researcher which provide the SAS system with the data to be analyzed and specifies which statistical analysis be implemented on the data (Hatcher & Stepanski, 1994).

The SAS system was used for data analysis in similar research with the CIHR research team, involving RN's (Alameddine et al., 2006, 2009) OTs (Hastie, 2009) and PTs (K. Onate, personal communication, November 25, 2010). The Canadian Institute for Health Information stores and analyzes data on AHPs using the SAS system. Using SAS in this research allows for continuity in research design and analysis, potential further analysis of the data at a later date and potential comparative analysis with other AHPs in the future. The SAS system allows for storage of all program statements ensuring that all data steps can be reviewed and, or replicated as required.

4.05.1 Data cleaning.

Prior to importing any of the data into SAS, extensive data cleaning was completed. Commas, dashes, hyphens and parentheses present in the Excel spreadsheets

were removed. Once imported into SAS, further data cleaning was required. Each variable, for each year of data (including the change log data files) was checked for duplicate entries. This process was completed by running duplicate checks by research-id (unique identifier) for each variable. For every duplicate entry discovered, entries were reviewed for errors in data (i.e., errors in the completion of registration renewal forms), omissions of data (blanks left on registration renewal forms), or duplicate entries. Duplicates were deleted and duplicate checks were re-run.

During the data cleaning process, all variable names were reviewed and standardized. Identical variable names were used for matching variables across each year of the data; a code indicating the year was added for each variable for each year of study.

4.05.2 The longitudinal data set.

After data cleaning was completed for each variable, for each year of the database, the data was merged using the unique identifier, in a step-wise fashion to create a longitudinal database. 'Keep' statements were used to keep variables of interest in each of the merge steps. The steps taken to merge the data are shown in Figure 3.1. A final challenge related to both SAS and the nature of the data was discovered when creating frequency tables in the aggregated database. Unless a 'where' statement was included in the frequency codes, SAS counted every individual in the database (i.e., including those members that had retired or resigned their membership) with each frequency step. The resulting tables included all members in the database, rather than just those members working in each specific year. The research team chose to use a 'where' statement indicating to SAS to include only those members working full-time, part-time or that are self-employed; excluding members not working or on-leave. The results presented in

chapter four represent values for those RDs that indicated they were working in one of the three capacities for the designated year.

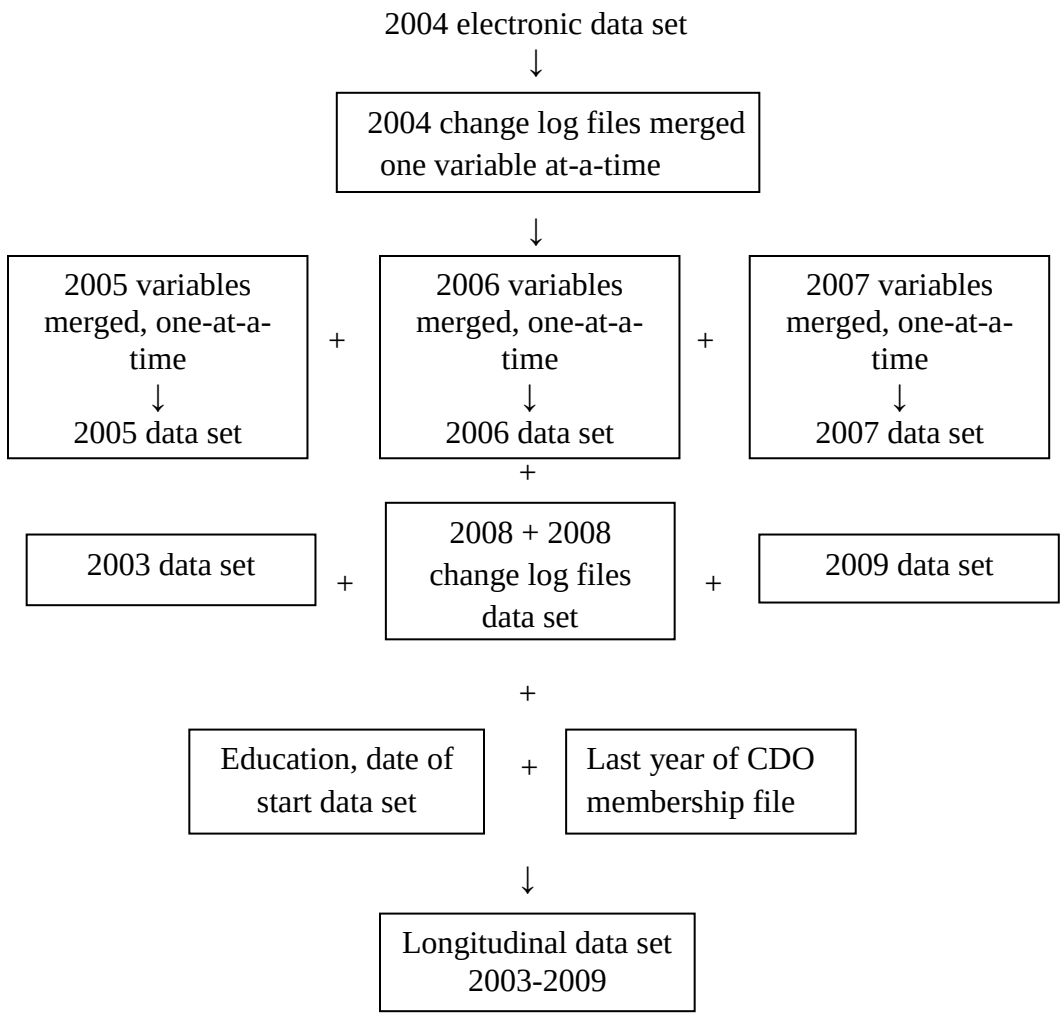
4.06 Data Analysis

The longitudinal database contained CDO member information for each variable, for each year of study. A variety of data analyses were conducted to determine answers for each of the research questions. Once frequency distributions were performed in SAS, the aggregated data was exported from SAS, to Excel. In aggregate form, the data contained information related to the RD workforce as a collective (rather than of individuals RDs). Tables, charts and graphs were then developed to illustrate the results.

4.06.1 Descriptive statistics.

To answer the first research question (What does the profession of dietetics look like in Ontario?) descriptive statistics were used to analyze variables for each year of the longitudinal database (2003-2009). Frequencies were tabulated to determine the distribution of RDs across personal, educational and employment characteristics. To construct descriptive statistics by age group, two-way frequency tables were used. Frequency tables were calculated for each year of data for the variables gender, area of practice, work setting and employment status. Additional tables were created by creating cross tabulations of each of the variables with age.

Figure 4.1 Flow chart of merge steps to create the longitudinal data set



4.06.2 Stay, switch, leave.

The second research question (What are the employment transition trends of RDs in Ontario?) was answered by categorizing RDs as *'stayers', 'switchers' or 'leavers'*. Those RDs in the same work setting in the year *t* as in the year *(t-1)* are referred to as stayers. Those RDs that move from one work setting to another in years *(t-1)* and *t* are switchers. Leavers refer to those RDs who are registered in the database in year *(t-1)* but not in year *t.*

4.07 Limitations and Strengths of Research Design

4.07.1 Limitations of research design.

Limitations of this research primarily relate to challenges with the data, including the standardization of the variables, the limitations of SAS and the ability to generalize the results beyond this research. Understanding the complexity of HHR requires a variety of tools. No single data source can reflect the intricacy of HHR issues (Diallo et al., 2003).

The limitations associated with the use of a secondary database for this research included challenges related to the format of the data (paper and electronic files), errors and duplicated data in the electronic data sets and changes made in the registration renewal form over the study period.

The electronic registration database contained errors and duplicated data that had to be 'cleaned'. The PI reviewed each error and duplicate entry prior to removing them from the database. The PI's extensive knowledge of the profession facilitated the interpretation and decision making required to clean the database.

The capacity for SAS to manage large volumes of data is just one of the features that make it ideal for the analysis of longitudinal data sets. That RDs had to be placed in a single area of practice and a single work setting for analysis represents a limitation of the software for this research. Those RDs working in more than one area of practice and more than one work setting had to be prioritized to a single area and a single work setting for analysis in SAS. The research team undertook measures to ensure that this process of prioritization reflects the profession as closely as possible.

As the number and names of variable options changed on the CDO registration renewal form, variables had to be collapsed and standardized for the purpose of analysis. Steps were taken to make certain that this was done to accurately mirror the profession of dietetics in Ontario.

The data analysis in this study includes only those RDs that are working. Members of CDO that reported not to be working in any of the years studied have been excluded from the analysis for the years that they were not working. These results cannot determine the cause and, or effects of changes in the workforce characteristics of RDs in Ontario, nor can these results predict future trends in the profession. It is anticipated that this research will facilitate future HHR planning for the profession of dietetics.

Although the research team endeavoured to standardize the variables to represent the profession of dietetics in Ontario, they may not reflect the profession in other provinces or those of other allied health professions. This may limit the generalizability of this research to RDs outside of Ontario or to other AHPs in Ontario or Canada.

4.07.2 Strengths of research design.

Strengths associated with the research design include the proven track record of the research team and the collaborative affiliation with CDO. The PI's knowledge and understanding of the profession of dietetics in Ontario proved invaluable over the course of this research. Prior work between the PI and CDO and DC facilitated the collaborative association with CDO required for this study. The PI's diverse experience in dietetics helped to ensure the selection and collapsing of the variables, and interpretation of the data as it was cleaned, reflected the profession as accurately as possible. The College of

Dietitians of Ontario generously provided the research team with additional data as requested. This support ensured a more complete and accurate database for this study.

It is a strength of this research that RDs, as a regulated health profession, are required to accurately complete the CDO annual registration renewal form within a specified time period, to avoid a late fee or suspension of registration (College of Dietitians of Ontario, 2009b). Additionally, CDO provided members with a registration guide for use with the 2009 registration renewal form. The registration guide included instructions and definitions of terms used on the registration renewal form, to assist RDs in completing the form as accurately as possible.

Chapter 5—Results

This chapter presents the analysis of workforce characteristics of Ontario RDs based on the CDO registration database from 2003-2009. The first section includes findings related to single variables. The number of RDs working in Ontario, the age structure of the RD workforce, gender, education, employment status and dietetic practice setting results are presented. The second section comprises an analysis of variables in relation to age. The final section includes an analysis related to employment characteristics to determine transitions in the workforce of RDs in Ontario. Charts and figures are used to illustrate trends over time related to variables studied. Key figures are provided in this chapter, complete supplementary data tables are found in Appendices E and F (Tables E.1- E.15; Tables F.1-F.5).

Results, unless otherwise indicated, are based on RDs that were identified as working full-time, part-time or self-employed. Registered dietitians who were members of CDO but were identified as "not working" have not been included in this analysis.

5.01 A Portrait of Dietetics in Ontario

The study included a total of 3,178 RDs in the CDO registration database at any time for the period between 2003 and 2009. Accordingly, included in the database are RDs who retired or resigned their CDO membership at some point, along with those who joined during the study (i.e., new graduates, international RDs etc.).

Registered dietitian employment characteristics were separated by area of practice and work setting, with four and six sub-components respectively (described in detail in Chapter 3). As noted in the methodology, measures were taken to control for changes made to sub-sector definitions on the CDO registration renewal form over the course of

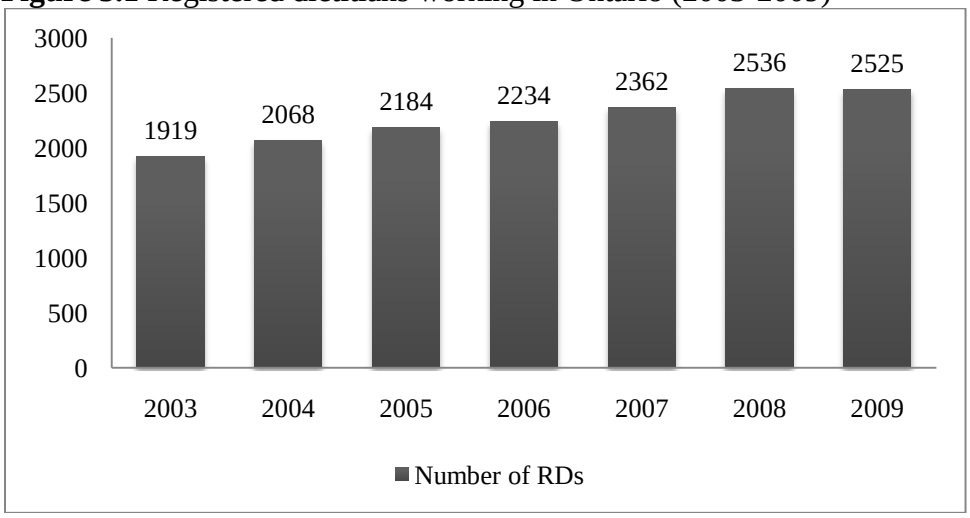
the study. These modifications may have resulted in variations in the distribution of RDs across practice areas and work settings and are discussed in relation to individual variables.

5.01.1 How many registered dietitians are in the workforce in Ontario?

The active workforce of practicing RDs in Ontario grew from 1,919 in 2003 to 2,525 in 2009, an increase of 31.58% over the seven year study period (Figure 5.1). The largest increase (7.76%) occurred in 2004, while there was a slight decrease (-0.43%) in the RD workforce in 2009. There was an average annual increase of 4.72% in the RD workforce from 2003 to 2009 (Appendix E, Table E.1).

Because not all RDs are working, it is worth noting that reports published by CDO indicated a net growth in membership in 2009 (College of Dietitians of Ontario, 2009a), whereas the number in the workforce (as indicated by this research) showed a slight decrease. This relates to a 93% increase in the number of CDO members who reported not working from 2008 to 2009 (n=135 to n=261) (College of Dietitians of Ontario, 2008, 2009a). Reasons for the increase in non-working RDs are beyond the scope of this research.

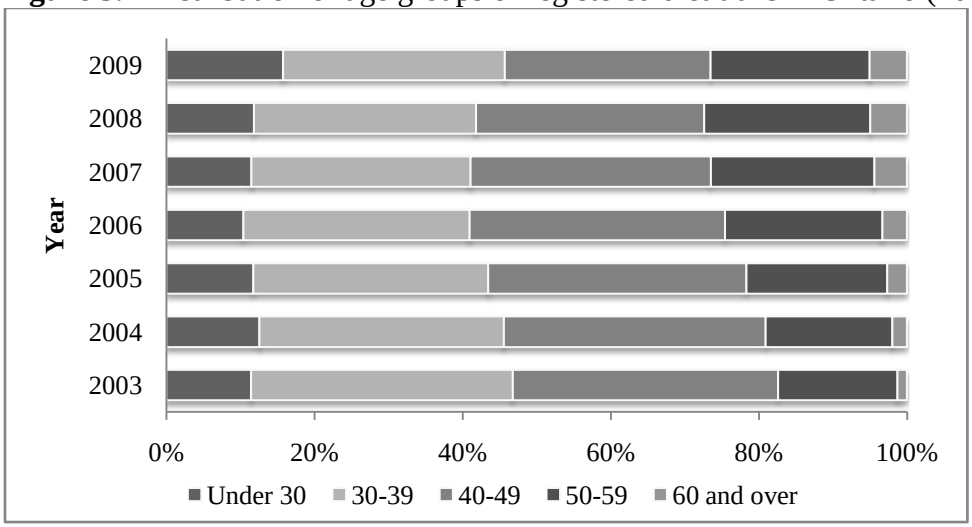
Figure 5.1 Registered dietitians working in Ontario (2003-2009)



5.01.2 What is the age structure of the registered dietitian workforce in Ontario?

Although findings, in absolute numbers indicated an increase in growth in the RD workforce across all age groups, there was a decline in the proportion of the workforce in RDs aged 40-49 years and 50-59 years. This decline was most pronounced in the 40-49 year cohort and was noticeable from 2007-2009. The proportion of RDs aged 60-years and over increased from 1.26% (n = 24) in 2003 to 5.03% (n = 127) in 2009 (Figure 5.2). The workforce of RDs age 30-39 years remained stable from 2008 to 2009 (Appendix E, Table E.2). The proportion of young RDs in the workforce fluctuated between 2003 and 2009. There was a 10% (n = 29) increase in RDs under 30 years-of-age from 2007 to 2008 and a further increase of 33% (n = 99) in 2009. Ongoing analysis will determine if the increase in young RDs in the workforce continues or stabilizes over time.

Figure 5.2 Distribution of age groups of registered dietitians in Ontario (2003-2009)



The largest overall proportion of RDs were between 30 and 59 years of age (84.47%, M = 1,896), with just over half of the RD workforce between 40 and 59 years of age (53.2%, M = 1,192). These results are consistent with previous research in

Ontario and British Columbia (BC) where 50% and 54% of RDs were between 41 and 60 years of age respectively (Dietitians of Canada, 2009b; British Columbia Ministry of Health, 2009). The most recent data from the Canadian Institute for Health Information (CIHI) reported the average age of RDs in Canada to be 41.7 years (Canadian Institute for Health Information, 2007).

5.01.3 What are the gender characteristics of the registered dietitian workforce in Ontario?

Dietetics is a female dominated profession. Results indicated that over 98% (M = 2,224) of the RD workforce in Ontario is female. There was a slight increase in the proportion of male RDs over the study period, from 1.25% (n=24) in 2003 to 1.7% (n=43) in 2009. Detailed results are provided in Appendix E, Table E.3.

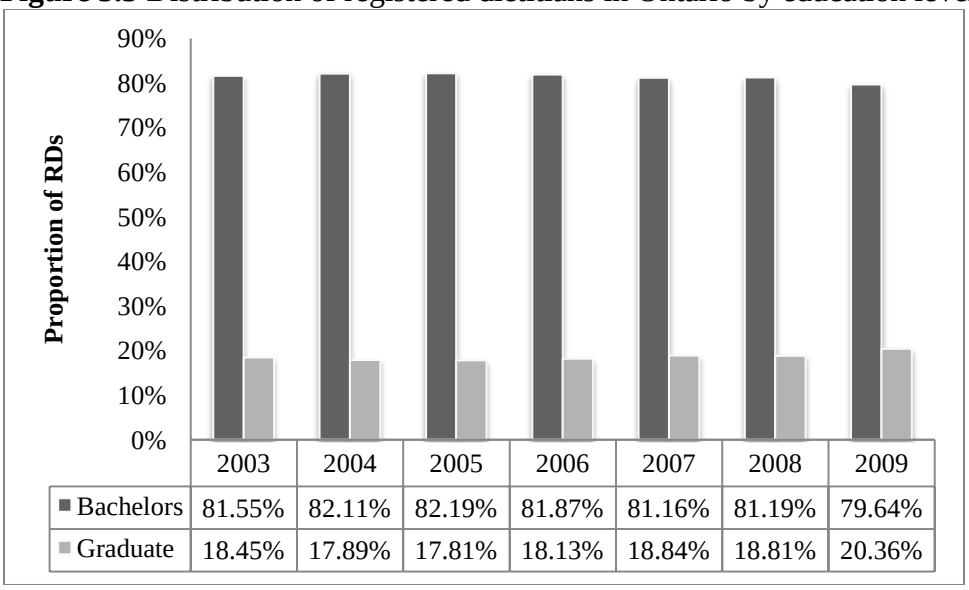
5.01.4 What are the education characteristics of the registered dietitian workforce in Ontario?

Findings in this study indicated an overall average proportion of 18.61% (M =422) of the RD workforce having a graduate degree (Figure 5.3). Worth noting was that the overall proportion of RDs with graduate-level education remained unchanged from 2003 to 2009 (Appendix E, Table E.4).

The vast majority of Ontario RDs received their undergraduate education in Canada (93.56%, M = 2,114). The number of internationally educated RDs remained constant from 2003-2007(6.27%, M =135) then increased in 2008 and 2009 (6.88%, M=174) (Appendix E, Table E.5). The increase was credited to a “remarkable” rise in the number of applications from internationally educated candidates (College of Dietitians of Ontario, 2009a) and attributed to the Internationally Educated Dietitians

Pre-registration Program (IDDP) at Ryerson University (College of Dietitians of Ontario, 2009a).

Figure 5.3 Distribution of registered dietitians in Ontario by education level (2003-2009)



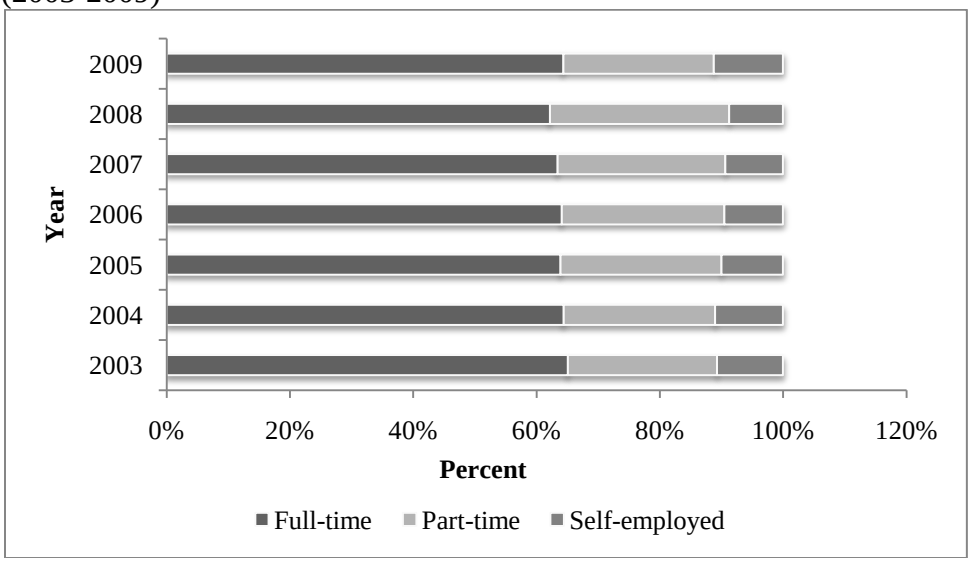
	2003	2004	2005	2006	2007	2008	2009
Bachelors	81.55%	82.11%	82.19%	81.87%	81.16%	81.19%	79.64%
Graduate	18.45%	17.89%	17.81%	18.13%	18.84%	18.81%	20.36%

Proportionately more RDs attended the University of Guelph (25.36%, M =546) than the other DC accredited undergraduate programs in Ontario (Appendix E, Table E.6). Graduates from Ryerson University and the University of Western Ontario represented an average proportion of 16.71% (M = 320) and 17.92% (M = 333) respectively, of the RD workforce of over the course of the study. The proportion of RDs attending a DC-accredited university in Ontario was 59.99% (M =1,200). Approximately 36% (M = 914) of Ontario RDs received their undergraduate education in Canada, but outside of Ontario. With the exception of Newfoundland and the Territories, all provinces in Canada have at least one accredited university undergraduate program in dietetics (Dietitians of Canada, 2011).

5.01.5 What are the employment status characteristics of the registered dietitian workforce in Ontario?

The proportion of RDs that were self-employed, worked full-time and part-time remained stable from 2003-2009 (Figure 5.4). Approximately 64% (M = 1,444) of RDs in Ontario worked full-time, 26.0% worked part-time (M = 590) and the remainder (10.08%, M = 227) were self-employed. Detailed results are presented in Appendix E, Table E.7.

Figure 5.4 Distribution of registered dietitians in Ontario by employment status (2003-2009)

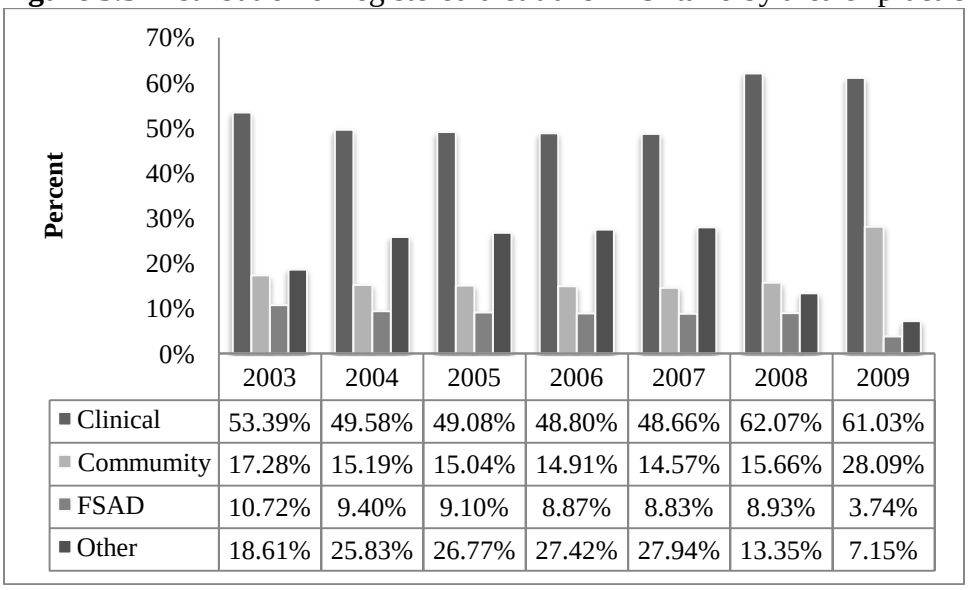


5.01.6 What is the distribution of Ontario registered dietitians by area of dietetic practice?

The College of Dietitians of Ontario modified area of practice sub-sector definitions on the registration renewal form in 2008 and 2009. These modifications resulted in proportionately more RDs in the clinical nutrition practice area in 2008 and 2009. As no further changes were made to the registration renewal form in 2010, ongoing surveillance will identify RD workforce trends related to area of dietetic practice. Results in this study indicated an average of 53% (M = 1,121) of Ontario RDs

were employed in clinical nutrition practice areas (Figure 5.5) (Appendix E, Table E.8). These findings are consistent with previous research in Ontario and Australia which indicated 50% of the RD workforce was employed in clinical nutrition practice areas (Dietitians of Canada, 2009b; Meyer et al., 2002).

Figure 5.5 Distribution of registered dietitians in Ontario by area of practice (2003-2009)



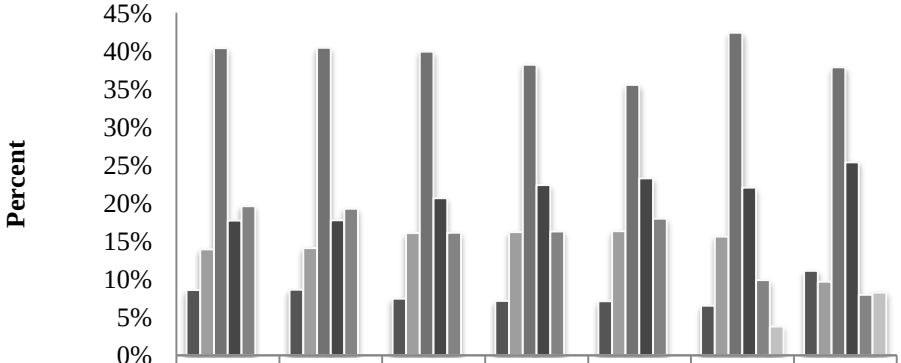
	2003	2004	2005	2006	2007	2008	2009
Clinical	53.39%	49.58%	49.08%	48.80%	48.66%	62.07%	61.03%
Commumity	17.28%	15.19%	15.04%	14.91%	14.57%	15.66%	28.09%
FSAD	10.72%	9.40%	9.10%	8.87%	8.83%	8.93%	3.74%
Other	18.61%	25.83%	26.77%	27.42%	27.94%	13.35%	7.15%

The proportion of RDs working in community nutrition increased from 2008 to 2009 (15.66%, n=379 to 28.09%, n=684). This practice area includes RDs employed in program planning, population health and communication (Appendix D, Table D.3). Concurrent with these increases in clinical and community nutrition practice areas were decreases in the proportion of RDs in the food service and administration (FSAD) and 'other' areas of practice. Included the 'other' category are RDs employed in policy development, education and research. The RD workforce in the 'other' practice area decreased from 13.35% (n=323) in 2008 to 7.15% (n=174) in 2009. There was a 57% decrease in the proportion of RDs working in the FSAD practice area from 2008 (n = 216) to 2009 (n = 91), with only 3.74% of the RD workforce remaining in this practice area.

5.01.7 What is the distribution of Ontario registered dietitians by work setting?

These findings indicated variations within work settings in the RD workforce between 2003 and 2009 (Appendix E, Table E.9). There was a gradual, consistent increase in the proportion of RDs working in long term care/community care access centres (LTC/CCAC), from 17.68% (n=300) in 2003 to 25.33% (n=622) in 2009 (Figure 5.6). This increase is expected to continue, corresponding with the July, 2010 increase in funding by the Ministry of Health and Long Term Care (MOHLTC) for RDs in Long Term Care (LTC) homes in Ontario (Ministry of Health and Long Term Care, 2007).

Figure 5.6 Distribution of registered dietitians in Ontario by work setting (2003-2009)



	2003	2004	2005	2006	2007	2008	2009
Business	8.54%	8.58%	7.44%	7.11%	7.06%	6.49%	11.07%
Gov/PH	13.91%	14.08%	16.01%	16.17%	16.29%	15.59%	9.65%
Hospital	40.31%	40.38%	39.88%	38.16%	35.50%	42.33%	37.79%
LTC/CCAC	17.68%	17.72%	20.61%	22.33%	23.21%	22.00%	25.33%
Other	19.56%	19.24%	16.06%	16.22%	17.94%	9.84%	7.94%
FHT						3.76%	8.22%

The College of Dietitians of Ontario began reporting the number of RDs employed in family health teams (FHTs) in 2008. The workforce in this setting, more than doubled from 2008 to 2009 (n=92 to n=202). Concurrent with the increase in the workforce in FHTs (and LTC/CCAC) was a proportional decrease in the

government/public health (GO/PH) and 'other' work settings (including RDs working in private practice, research and education).

These findings indicated there was minimal change in the proportion of the RD workforce within the hospital work setting from 2003 to 2009. Overall, an average of 39% (M = 808) of the Ontario RD workforce were employed in hospital settings. These results suggest that the increasing demand for RDs in community-based work settings is being met by RDs from GO/PH and 'other' work settings. This is in contrast to previous research with RNs and OTs in Ontario where increases in the community workforce occurred concurrently with decreases in the hospital workforce (Alameddine et al, 2006; Hastie, 2009).

5.01.8 What are the personal, employment and education characteristics of Ontario registered dietitians in relation to dietetic practice area and work setting?

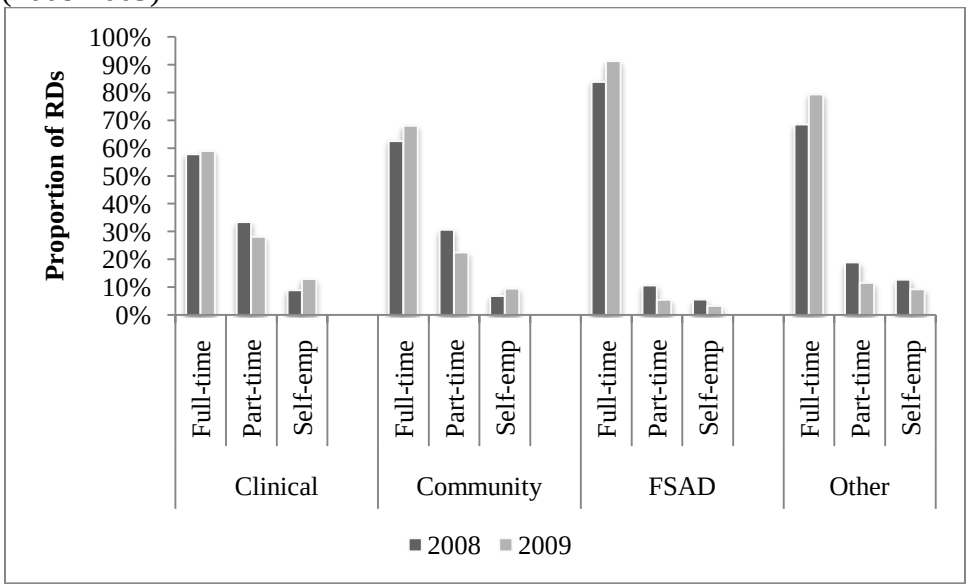
Area of practice and work setting were further analyzed in relation to gender, employment status and education. Male RDs primarily work in clinical nutrition practice areas (53.34%, M = 16) and hospital work settings (37.56%, M = 11). There were proportionately fewer male RDs found in community nutrition practice areas, FHTs and GO/PH work settings. Detailed results are found in Appendix E, Table E.10; Table E.11.

These findings indicated that proportionately more RDs working in the FSAD practice area, worked full-time in comparison to the other practice areas (88.88%, M = 154). Although the absolute number of RDs in this area decreased, the proportion of full-time, part-time and self-employed RDs remained relatively stable from 2003 to 2009 (Appendix E, Table E.12). This practice area includes RDs who manage food service operations in hospitals and LTC homes. These findings are consistent with previous

research which found that 96% of RDs in management positions worked full-time (Sauer, 2009).

Approximately two-thirds of RDs employed in clinical and community nutrition practice areas worked full-time, one-quarter worked part-time and the remainder (less than 10%) were self-employed (Appendix E, Table E.12). While the number of full-time RDs in clinical nutrition practice areas remained stable from 2008 to 2009 (n= 867, 2008; n = 876, 2009), there was a 96% increase in full-time RDs in community nutrition practice areas (n = 237, 2008; n = 465, 2009) (Figure 5.7).

Figure 5.7 Registered dietitian employment status in relation to area of practice (2008-2009)

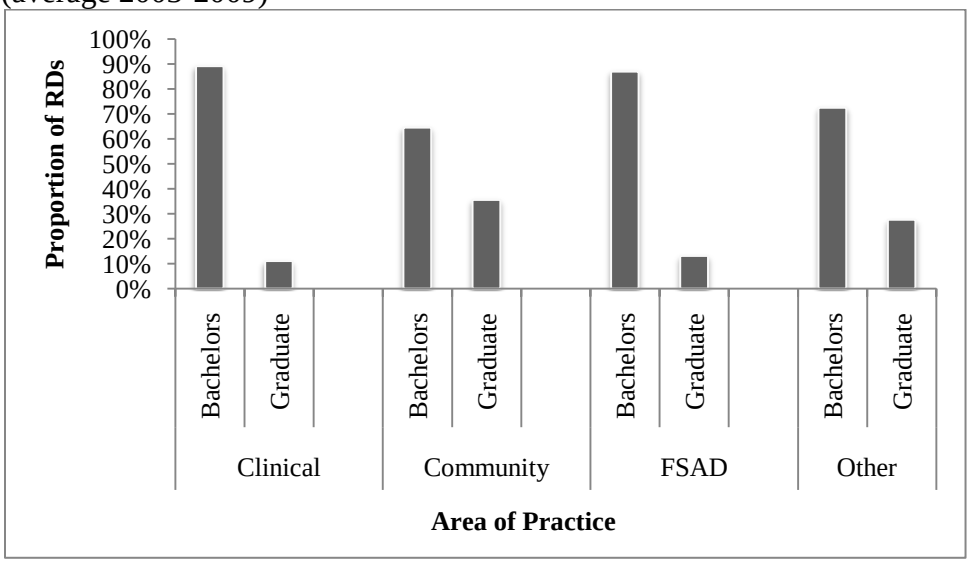


The proportion of full-time, part-time and self-employed RDs in hospital work settings remained stable over the period of study (73.75%, M = 595) (Appendix E, Table E.13). Approximately 50% of RDs working in FHTs are employed on a full-time basis (M = 75). This proportion remained unchanged from 2008 to 2009. On-going surveillance of this work setting will determine employment status trends. Although there was a substantial increase in the number of RDs working in LTC/CCAC over the

study period, there was little variation in their employment status, with just under 50% (M = 220) working on a full-time basis. These results are consistent with those found with OTs, in both proportions and trends over time (Hastie, 2009).

When area of practice and work setting were examined relative to education level a number of distinctions were noted (Appendix E, Table E.14; Table E.15). Overall, a greater proportion of RDs with graduate-level education worked in the community nutrition practice area and the GO/PH work setting in comparison to other practice areas and work settings (32.69%, M=130 and 29.8%, M=114 respectively) (Figure 5.8, 5.9). These findings may reflect the shifting qualifications for RDs in public health settings, where Masters-level education is now required in most jurisdictions (Chenhall, 2006).

Figure 5.8 Education level of registered dietitians in relation to area of practice (average 2003-2009)

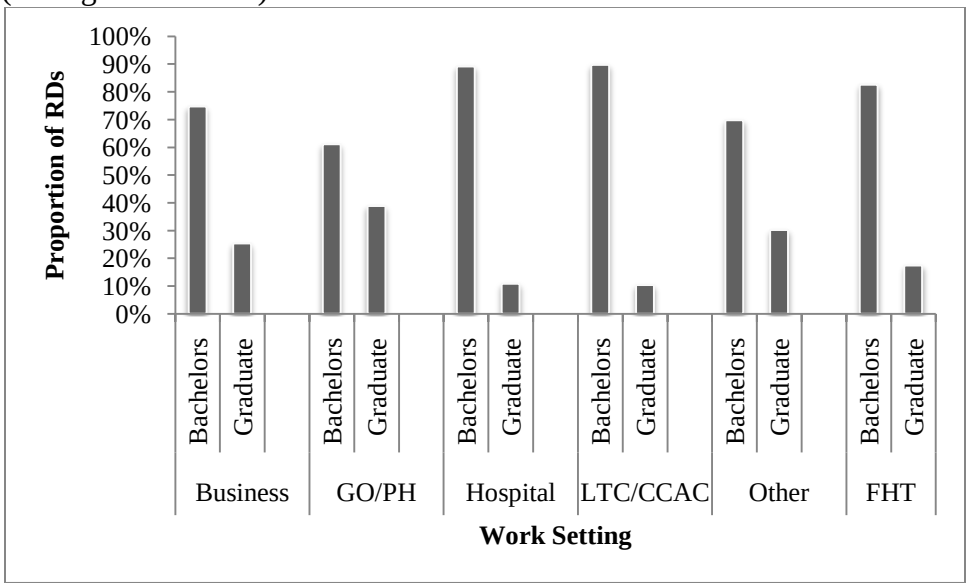


There was a decrease in the number of RDs with graduate degrees working in the FSAD practice area from 2008 to 2009 (n= -17, -77.27%). Although there was an overall decrease in the workforce in this practice area during this time, the decrease in the number of RDs with graduate degrees is worth further exploration. These results are in

contrast to other research involving management RDs where 55% were found to have graduate-level education (Sauer, 2009).

Findings indicated an increase in the number of RDs with graduate degrees working in LTC/CCAC (n=+34, +57%) and FHT (n=+16, +94%) work settings between 2008 and 2009. These work settings often employ RDs on a contract or part-time basis, and in the case of FHTs, remuneration levels have been below industry standards (Dietrich, 2009). Further research involving RDs with graduate degrees working in LTC/CCAC and FHTs is warranted to understand labour market factors influencing this cohort of RDs.

Figure 5.9 Education level of registered dietitians in relation to work setting (average 2003-2009)



5.02 What is the relationship between age and the workforce characteristics of registered dietitians in Ontario?

Examining variables of interest in relation to age groups can provide more detailed information regarding trends in the workforce of RDs in Ontario. Understanding

trends related to age may facilitate future HHR planning and assist in determining curriculum and practicum training requirements for the profession.

5.02.1 What is the relationship between age and gender in the registered dietitian workforce in Ontario?

The largest average proportion of male RDs was found in the age group 30-39 years (1.97%, M = 14). This age cohort was also the only one to show measurable growth in the workforce of male RDs over the period of study (Appendix F, Table F.1). Findings also indicated that RDs aged 60-years and over are exclusively female.

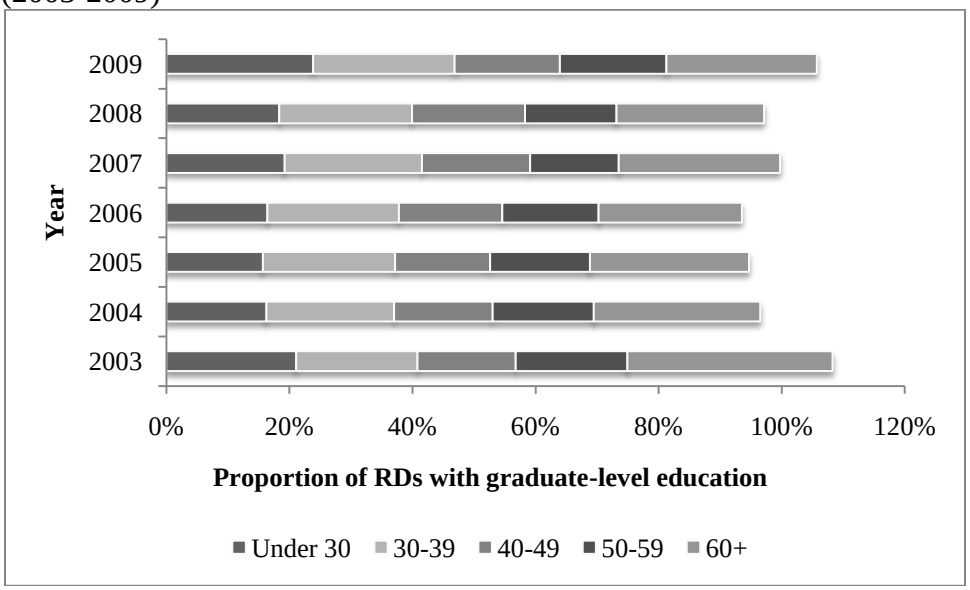
5.02.2 What is the relationship between age and education in the registered dietitian workforce in Ontario?

The largest average proportion of RDs with graduate-level education was found in those over 60 years of age (26.3%, M = 20) (Appendix F, Table F.2). This age group represents only of 3.36% of RDs working in Ontario, suggesting there is a limited 'pool' of HHR from which RDs qualified to teach at the undergraduate and graduate-level can be drawn from. Conversely, the age category with proportionately the fewest RDs with graduate degrees were those aged 40-59 years (16.48%, M =197). Additionally worth noting, was the 16% (-n=23) decrease in the number of RDs age 40-49 years with graduate degrees from 2008 to 2009 (Figure 5.10).

In contrast to RDs in the older age groups, the proportion in the youngest age groups (under 30 and 30-39 years, 45.7% of the RD workforce) with graduate-level education increased slightly from 20.6% (n=218) in 2008 to 23.3% (n= 269) in 2009. With more universities in Ontario offering nutrition-related graduate programs, and the addition of the Masters Practicum program, perhaps more young RDs are choosing to

continue their post-graduate education immediately following their undergraduate and internship programs.

Figure 5.10 Registered dietitians with graduate-level education in relation to age group (2003-2009)



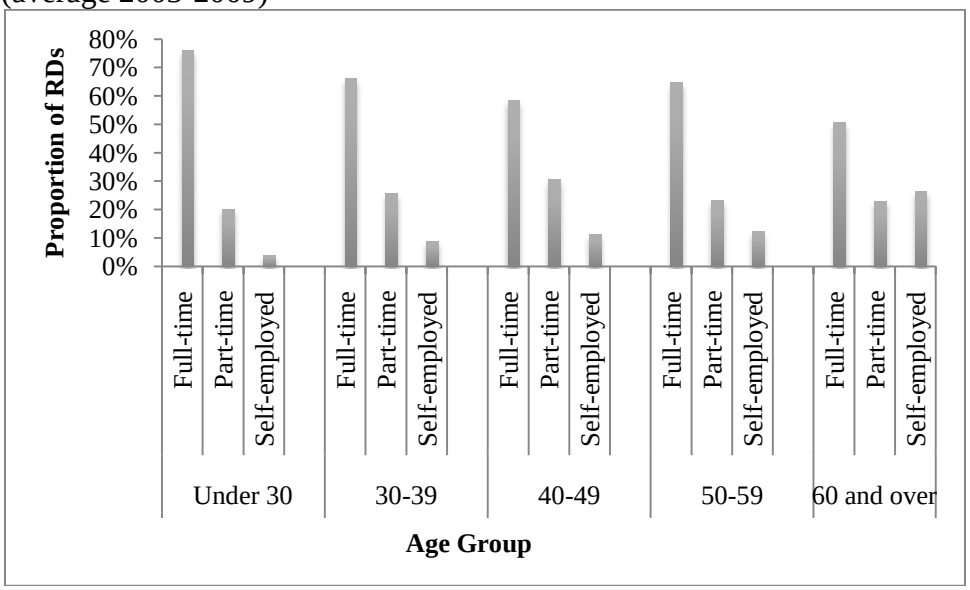
5.02.3 What is the relationship between age and employment status in the registered dietitian workforce in Ontario?

Employment status in relation to age remained relatively stable within each age category over the study period. However, differences were noted between age groups (Appendix F, Table F.3). The largest average proportion of RDs working part-time were found in those aged 40-49 years (30.55%, M = 226) (Figure 5.11). As age increased to 50-59 years, more RDs worked full-time (64.62%, M= 293) in comparison to part-time (23.0%, M = 105). Similar trends in employment status and age were found in previous research involving OTs (Hastie, 2009).

It is worth noting that over 50% of RDs in the oldest and (proportionately) smallest age group continue to work full-time. Research related to RD 'burnout' suggests that those RDs in the profession the longest (i.e., in the highest age group) have a high

sense of personal accomplishment (Gingras et al., 2010), conceivably leading to increased job satisfaction and reluctance to retire.

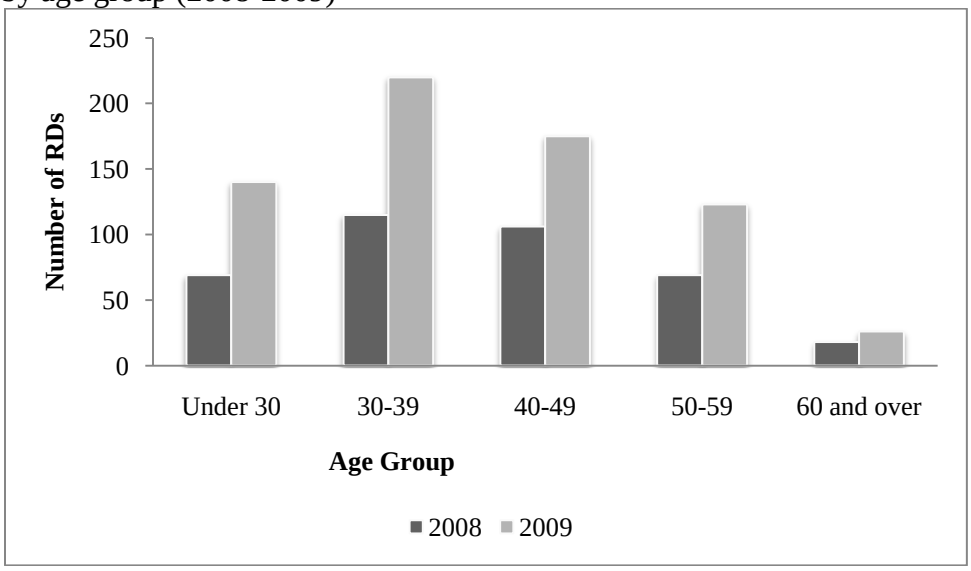
Figure 5.11 Employment status of registered dietitians by age group (average 2003-2009)



5.02.4 What is the influence of age on area of dietetic practice and work setting in the registered dietitian workforce in Ontario?

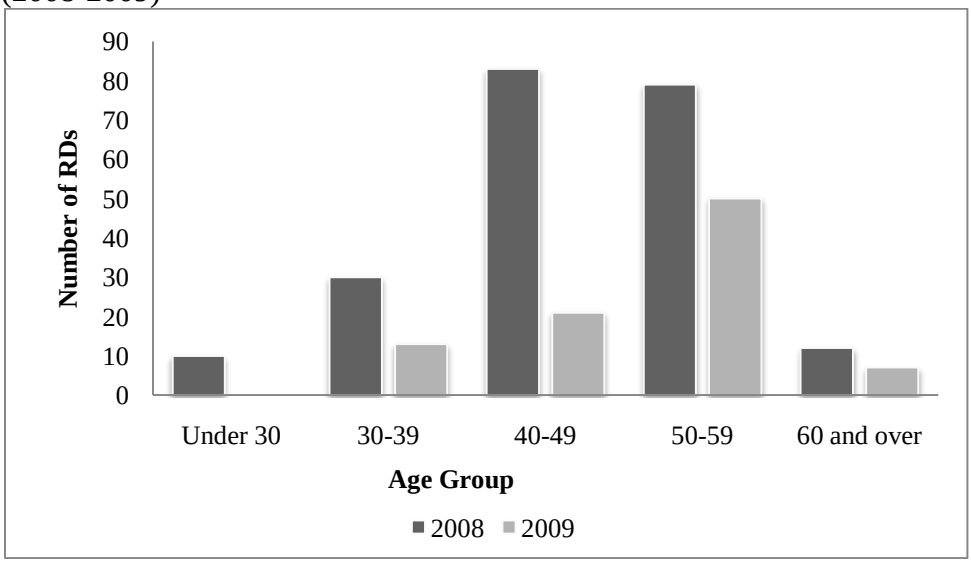
Area of dietetic practice and work setting were examined to determine variations related to age groups. Proportionately more RDs across all age groups were employed in clinical nutrition practice areas, than all other areas of practice (Appendix F, Table F.4). Findings also indicated an increase in the RD workforce in the community area of practice across all age groups from 2008 to 2009 (Figure 5.12).

Figure 5.12 Number of registered dietitians in the community nutrition area of practice by age group (2008-2009)



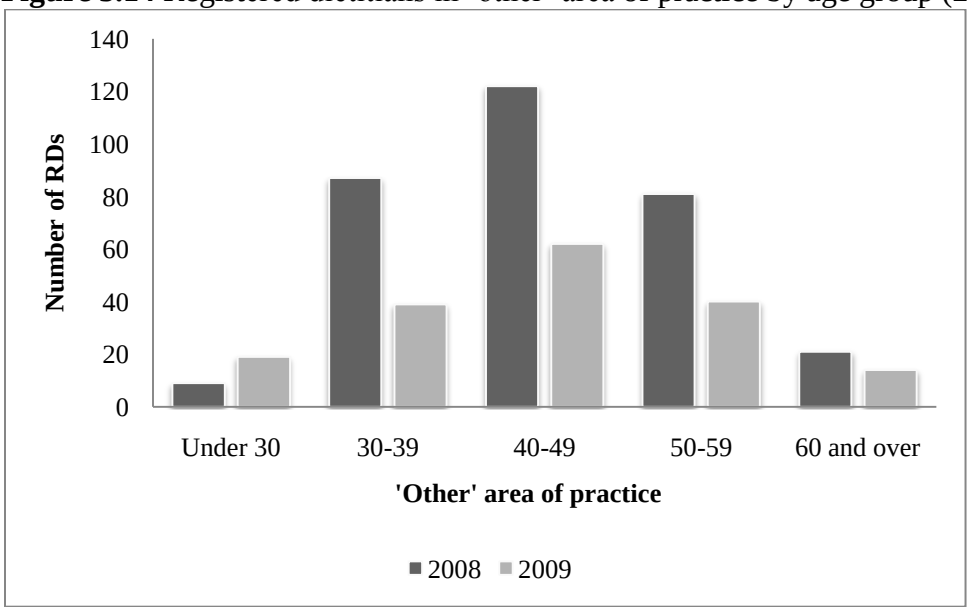
Important for workforce sustainability, results indicated an absence of young RDs in the FSAD practice area in 2009 (Figure 5.13). This has significant implications related to education and curriculum development for RDs. Further research with this cohort is recommended to increase understandings related to both job interest and preparedness for this dietetic practice area.

Figure 5.13 Number of registered dietitians in FSAD area of practice by age group (2008-2009)



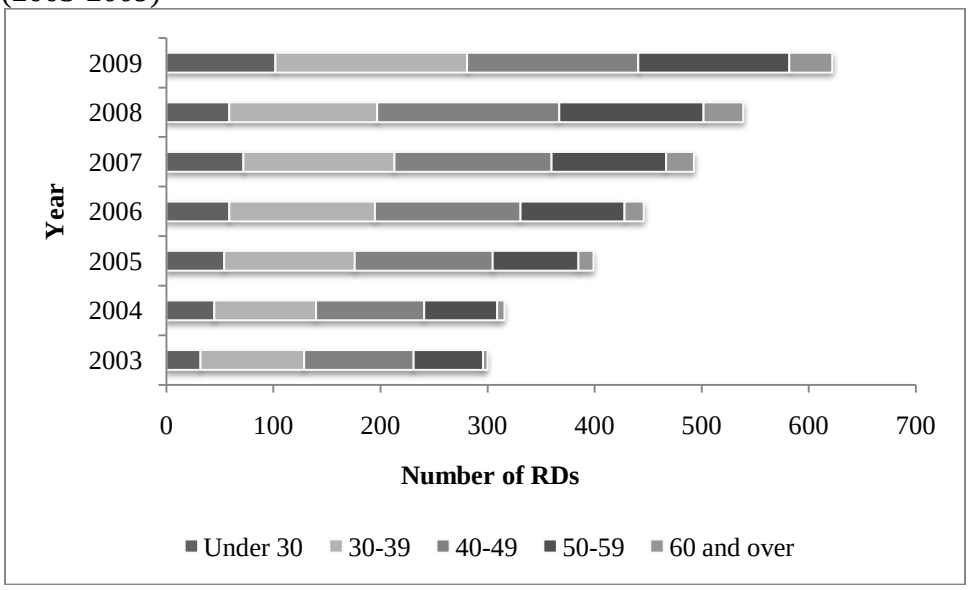
Despite a greater average proportion of older RDs (50-59 years and 60 years and over) in the 'other' area of practice (22.95%, M= 97; 29.84%, M =17 respectively), findings indicated an overall decline in the workforce from 2008-2009 (Figure 5.14). These age groups (50-59 years and 60 years and over) represent 23% (M= 531) of the RD workforce and include RDs working in areas including teaching, research, sales and marketing and policy development.

Figure 5.14 Registered dietitians in 'other' area of practice by age group (2008-2009)



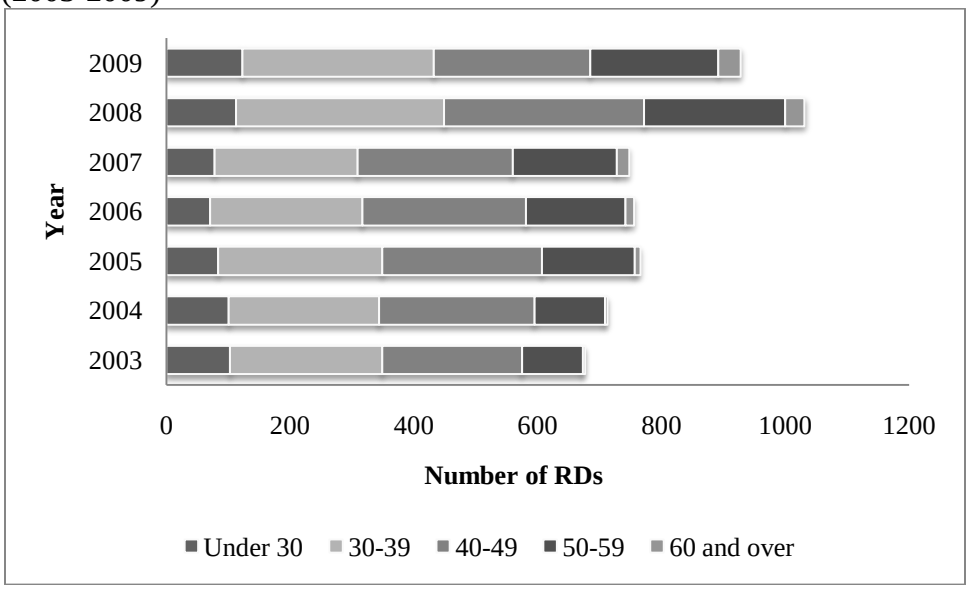
Variations in work settings relative to age were observed over the course of the study. Overall, there was a consistent increase across all age groups, in the proportion of RDs in the LTC/CCAC work setting over the course of the study (Appendix F, Table F.5) (Figure 5.15). Further research to understand characteristics of this work that setting appeal to RDs across all age groups and levels of experience is warranted.

Figure 5.15 Number of registered dietitians in LTC/CCAC work setting by age group (2003-2009)



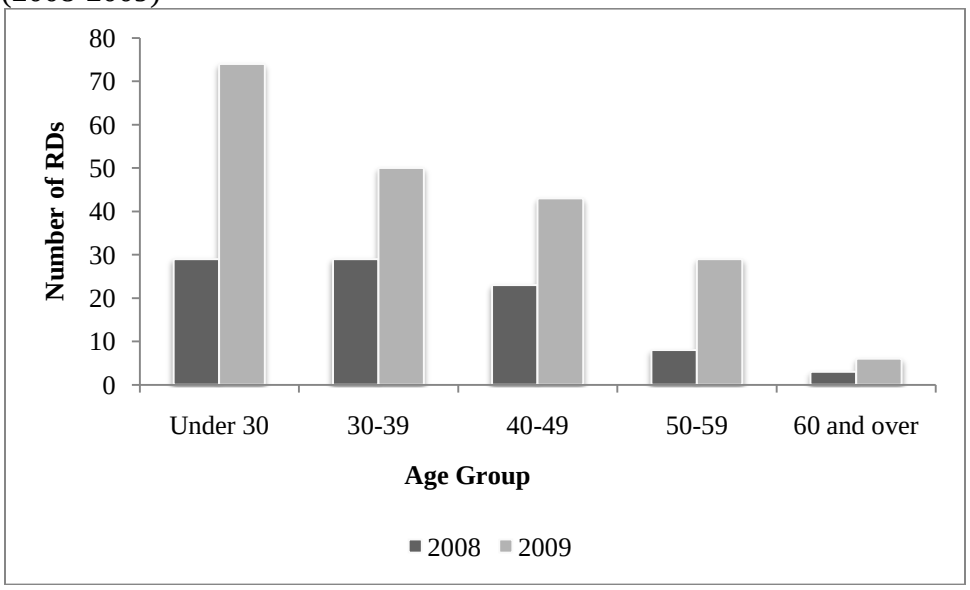
The proportion of RDs within and between age groups, employed in hospital settings changed minimally over the course of the study (Figure 5.16). Hospitals remain the primary employer for RDs across all age groups (with the exception of RDs 60 years of age and over). These results are in contrast to research completed with OTs, indicating a consistent gradual decline in the proportion of OTs in hospital work settings with increasing age (Hastie, 2009). Additional research is recommended to understand the role of labour market factors (i.e., job satisfaction, wages and/or benefits) in RD workforce retention in hospitals.

Figure 5.16 Number of registered dietitians in the hospital work setting by age group (2003-2009)



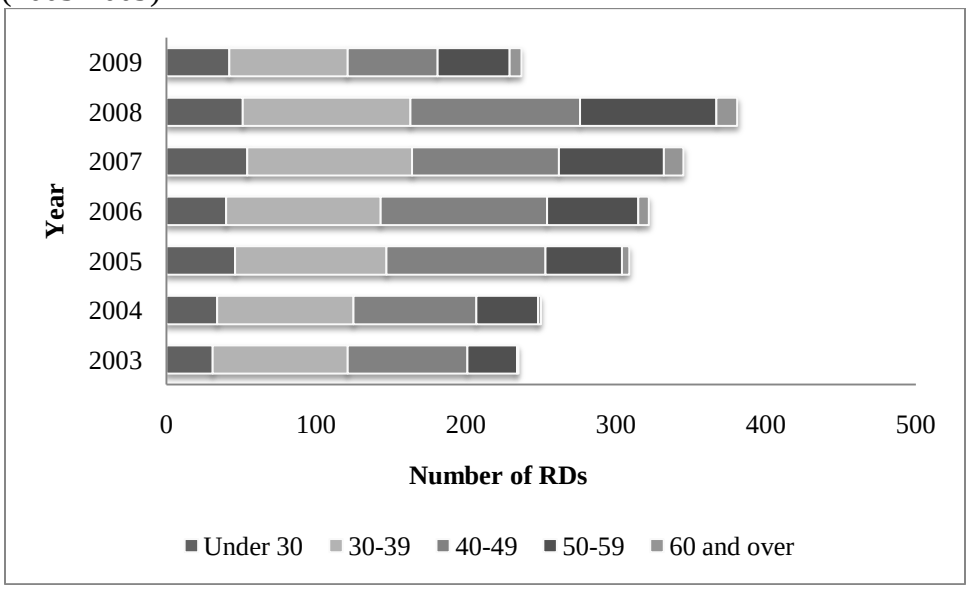
These findings indicated that proportionately more younger RDs (under 30 years and 30-39 years) worked in FHTs as compared to older RDs (9.29%, M= 91) (Figure 5.17). Evidence suggests that salary ranges for RDs in FHT are lower than industry average, perhaps discouraging RDs with more experience, from working in this setting (Dietrich, 2009). Interestingly, approximately 40% of FHT RDs are employed on a part-time basis (a higher proportion than any other work setting). This may be related to the allocation of funds by the MOHLTC for RDs in individual FHTs. Given that more of these positions are part-time, they may appeal to younger RDs with young families.

Figure 5.17 Number of registered dietitians in the FHT work setting by age group (2008-2009)



These findings indicate a dramatic decline in the number of RDs in the GO/PH work setting in 2008 and 2009 (Figure 5.18). This change is most evident in RDs between 40 and 59 years of age where there was a reduction of 47% (-M = 96) in the RD workforce from 2008 to 2009.

Figure 5.18 Number of registered dietitians in GO/PH work setting by age group (2003-2009)



These results suggest a number of possibilities related to the profile of the RD workforce in Ontario. In aggregate form, the findings suggest that RDs displaced by the FSAD and 'other' areas of practice, and the GO/PH work setting are being absorbed by the community nutrition practice area and the LTC/CCAC and FHT work settings. The implication of these trends is critical in many ways, for the profession of dietetics in Ontario and will be discussed in detail in Chapter 6.

5.03 What are the transition trends in the registered dietitian workforce in Ontario?

This section will further explore the profession of dietetics in Ontario from 2003-2009 in relation to transitions within the workforce. Registered dietitian retention related to employment status, area of dietetic practice and work setting was examined. To complete this analysis, the data was disaggregated to determine shifts in the workforce of individual RDs. Understanding the movement of RDs within the profession will facilitate future HHR planning.

Registered dietitians were classified as *stayers, switchers,* and *leavers* based on the setting they worked in year *t* and year *t-1*. If there was no change from one year to the next, RDs were categorized as stayers. When there was a change, it was determined if RDs switched to another setting or left entirely. Registered dietitians classified as *returners* were not working in year *t-1*, but returned to work in year *t* (i.e., RDs returning to work after a leave of absence). Stay, switch and leave were determined based on employment status, area of practice and work setting from 2003-2009. This analysis cannot determine reasons for RDs who stay, switch or leave.

5.03.1 Employment status transition trends of registered dietitians in Ontario.

Findings indicated variations in stay, switch, and leave proportions in 2008-2009. These changes may be the result of modifications made to CDO registration renewal form in 2009. Sub-section definitions of employment status were changed in 2009 to meet the requirements for the health professions database (HPDB). Two sub-categories were created, where previously (2003-2008) there had only been one. In addition, there was some overlap in the terminology used between the two categories on the 2009 form. Worth noting, these findings are unable to distinguish between part-time and casual employment status. On-going surveillance of employment status is recommended to identify trends over time.

Overall, the majority of RDs (86.05%) maintained the same employment status (full-time, part-time or self-employed) from 2003-2008 (Table 5.1). Findings indicated only 4.66% of RDs switched employment status. These results are important for HHR planning as they suggest minimal variation in employment status patterns in the RD workforce. Labour market efficiencies in one work setting (i.e., eliminating full-time employment opportunities in favour of part-time or contract work) may result in RDs switching work settings rather than changing employment status.

Table 5.1 Proportion of Ontario registered dietitians that stay, switch, leave and return in relation to employment status (2003-2009)

	03-04	04-05	05-06	06-07	07-08	08-09	Ave
Stayers	85.54%	87.55%	89.73%	83.04%	84.42%	56.50%	81.13%
Switchers	4.46%	4.85%	3.88%	5.23%	4.91%	15.70%	6.51%
Leavers	2.81%	2.24%	2.42%	4.65%	3.08%	13.48%	4.78%
Returners	7.18%	5.36%	3.97%	7.08%	7.60%	14.32%	7.58%

As this study was unable to distinguish RDs employed in multiple work settings, results related to employment status, specifically full-time employment may be the product of individual RDs working in more than one position where total hours worked are equivalent to full-time. It is recommended that future research be conducted to differentiate RDs employed in a full-time position from those employed in two or more part-time positions that comprise hours equivalent to full-time employment status.

Employment status was further analyzed to determine differences in stay, switch and leave proportions within full-time, part-time and self-employed categories over time (Table 5.2). Findings indicated that over 90% of RDs employed on a full-time basis remained (i.e., stayed) full-time from 2003-2008. The proportion of self-employed RDs and those working part-time switched their employment status by 7.1% and 10.1% respectively. Results also indicated minimal differences between employment status categories in the proportion of RDs that left the workforce.

Table 5.2 Proportion of Ontario registered dietitians who stay, switch and leave by employment status (2003-2009)

Em status*		03-04	04-05	05-06	06-07	07-08	Ave 2003-2008	08-09	Ave 2003-2009
Full-time	Stay	93.73%	95.19%	95.83%	92.15%	92.95%	93.94%	74.98%	90.81%
	Switch	3.54%	2.48%	1.87%	4.06%	4.56%	3.33%	10.24%	4.46%
	Leave	2.73%	2.33%	2.30%	3.78%	2.48%	2.73%	14.77%	4.73%
Part-time	Stay	88.96%	90.51%	90.32%	88.55%	92.48%	90.25%	52.86%	83.95%
	Switch	8.01%	6.92%	7.57%	7.69%	5.64%	7.10%	32.64%	11.41%
	Leave	3.03%	2.57%	2.11%	3.76%	1.88%	2.65%	14.50%	4.64%
Self-em*	Stay	91.18%	82.46%	89.67%	87.20%	86.88%	87.37%	52.15%	81.59%
	Switch	5.39%	16.67%	7.51%	11.37%	9.95%	10.31%	30.14%	13.51%
	Leave	3.43%	0.88%	2.82%	1.42%	3.17%	2.32%	17.70%	4.90%

*em status = employment status, self-emp = self-employed

Further analysis was completed to understand transitions in RD employment status (Table 5.3). The most attractive employment status category was full-time, indicated by the higher overall proportion of RDs that stayed and/or switched into this category over the course of the study. Registered dietitians working part-time most frequently switched to full-time opportunities. With the exception of the year 2008-2009, RDs that were self-employed switched to part-time work more often than full-time. Transitions related to employment status require further research to determine whether the changes observed in 2008-2009 were related only to changes in the CDO registration renewal form, or whether they were related to changes in labour market factors.

Table 5.3 Registered dietitian employment status transitions (2003-2009)

Employment status		2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Full-time	Stay	96.36%	97.46%	98.09%	95.78%	95.98%	87.98%
	Switch to p/t*	2.56%	2.08%	1.69%	3.06%	2.91%	8.86%
	Switch to s/e*	1.07%	0.46%	0.22%	1.17%	1.11%	3.16%
Part-time	Stay	91.74%	92.90%	92.27%	92.01%	94.25%	61.83%
	Switch to f/t*	6.70%	6.09%	6.29%	7.10%	5.27%	25.29%
	Switch to s/e	1.56%	1.01%	1.44%	0.89%	0.48%	12.89%
Self-emp*	Stay	94.42%	83.19%	90.95%	88.46%	89.72%	63.37%
	Switch to f/t	2.54%	3.54%	5.24%	3.85%	3.74%	22.67%
	Switch to p/t	3.05%	13.27%	3.81%	7.69%	6.54%	13.95%

*p/t = part-time, s/e = self-employed, f/t = full-time, self-emp = self-employed

5.03.2 Area of practice and work setting transition trends of registered dietitians in Ontario.

Transitions in the RD workforce were examined in relation to area of dietetic practice and work setting. Overall, approximately 75% of RDs remained (i.e., stayed) in the same area of practice (Table 5.4)

Table 5.4 Proportion of RDs that stay, switch, leave and return in relation to area of practice (2003-2009)

	03-04	04-05	05-06	06-07	07-08	08-09	Average
Stayers	76.32%	91.94%	93.04%	88.27%	54.62%	49.58%	75.63%
Switchers	13.68%	0.46%	0.57%	0.00%	34.71%	22.59%	12.00%
Leavers	2.81%	2.24%	2.42%	4.65%	3.08%	13.51%	4.79%
Returners	7.18%	5.36%	3.97%	7.08%	7.60%	14.31%	7.58%

When stay, switch and leave were determined within specific areas of practice, distinctions were noted. However, due to changes in the CDO registration renewal form and the nature of the data (i.e., change log files for 2005-2007, described in detail in Chapter 3) this analysis is unable to determine if distinctions between specific areas of practice are the result of an artefact of the data.

Overall, the clinical nutrition practice area was the most attractive, having the highest proportion of RDs stay over the course of the study (87.77%) (Table 5.5). The 'other' and FSAD practice areas were the least attractive with 45% of the RD workforce switching practice areas from 2008 to 2009. Additionally, approximately 18% of the RD workforce in the 'other and FSAD practice areas left between 2008 and 2009. These findings are consistent with the decline in the RD workforce observed in the FSAD and 'other' practice area in the descriptive statistics.

Table 5.5 Proportion of Ontario registered dietitians who stay, switch and leave by area of practice (2003-2009)

Area of practice		03-04	04-05	05-06	06-07	07-08	08-09	Average
Clinical	Stay	92.10%	96.52%	96.59%	94.61%	83.25%	63.58%	87.77%
	Switch	5.41%	0.30%	0.20%	0.00%	12.01%	15.31%	5.54%
	Leave	2.16%	2.68%	2.40%	4.09%	2.02%	11.84%	4.20%
	Return	0.32%	0.50%	0.80%	1.30%	2.72%	9.27%	2.49%
Comm	Stay	86.96%	96.45%	96.08%	91.21%	50.83%	53.48%	79.17%
	Switch	7.36%	0.32%	0.98%	0.00%	42.57%	23.98%	12.54%
	Leave	5.35%	2.26%	2.29%	6.19%	2.31%	12.71%	5.18%
	Return	0.33%	0.97%	0.65%	2.61%	4.29%	9.83%	3.11%
FASD	Stay	90.81%	95.79%	95.68%	94.02%	67.98%	30.97%	79.21%
	Switch	4.86%	1.05%	0.54%	0.00%	29.21%	45.13%	13.47%
	Leave	3.78%	3.16%	3.24%	4.89%	0.56%	18.58%	5.70%
	Return	0.54%	0.00%	0.54%	1.09%	2.25%	5.31%	1.62%
Other	Stay	92.45%	95.34%	94.76%	93.16%	39.47%	28.02%	73.87%
	Switch	4.40%	0.56%	0.18%	0.00%	55.26%	45.13%	17.59%
	Leave	3.14%	1.31%	2.53%	4.39%	2.11%	17.99%	5.24%
	Return	0.00%	2.80%	2.53%	2.46%	3.16%	8.85%	3.30%

Overall, transitions between RD dietetic practice areas were minimal from 2003-2007 (Table 5.6). Between 2007 and 2009, RDs switching from the FSAD and 'other' practice areas moved first to clinical and second to community nutrition practice areas. Switches from the community practice area were primarily made to the clinical practice area, with a smaller proportion of RDs switching to the 'other' practice area. Registered dietitians that switched from the clinical nutrition practice area between 2008 and 2009, transitioned into the community practice area.

Table 5.6 Registered dietitian area of practice transitions (2003-2009)

Area of practice		2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Clinical	Stay	92.40%	97.00%	97.37%	95.85%	85.58%	71.22%
	Switch to Comm	0.98%	0.00%	0.00%	0.00%	4.56%	13.60%
	Switch to FSAD	0.22%	0.10%	0.00%	0.00%	4.25%	0.41%
	Switch to Other	4.23%	0.20%	0.20%	0.00%	3.53%	1.50%
	Leave	2.17%	2.70%	2.42%	4.15%	2.07%	13.26%
Comm	Stay	87.25%	97.39%	96.71%	93.65%	53.10%	59.95%
	Switch to Clinical	3.02%	0.33%	0.33%	0.00%	36.55%	22.31%
	Switch to FSAD	0.34%	0.00%	0.00%	0.00%	0.69%	0.27%
	Switch to Other	4.03%	0.00%	0.66%	0.00%	7.24%	3.23%
	Leave	5.37%	2.28%	2.30%	6.35%	2.41%	14.25%
FSAD	Stay	91.30%	95.79%	96.20%	95.05%	69.54%	34.31%
	Switch to Clinical	2.72%	0.00%	0.54%	0.00%	18.97%	30.88%
	Switch to Comm	0.00%	1.05%	0.00%	0.00%	6.32%	6.86%
	Switch to Other	2.17%	0.00%	0.00%	0.00%	4.60%	7.35%
	Leave	3.80%	3.16%	3.26%	4.95%	0.57%	20.59%
Other	Stay	92.45%	98.08%	97.22%	95.50%	40.76%	34.17%
	Switch to Clinical	2.83%	0.58%	0.00%	0.00%	40.94%	13.31%
	Switch to Comm	1.26%	0.00%	0.19%	0.00%	10.33%	28.06%
	Switch to FSAD	0.31%	0.00%	0.00%	0.00%	5.80%	2.52%
	Leave	3.14%	1.34%	2.60%	4.50%	2.17%	21.94%

Approximately 75% of RDs remained (i.e., stayed) in the same work setting over the period of the study (Table 5.7). Overall, the hospital was the most attractive employment setting with an average of 85.11% of RDs staying, and only 8.5% switching from 2003-2009. These findings also indicated that the hospital setting had the fewest RDs to leave over the course of the study (Table 5.8). The LTC/CCAC setting was the

second most attractive work setting (79.23% stay), however there was a higher proportion of RDs who switched (13.43%) or left (4.54%) the workforce from this setting.

Table 5.7 Proportion of RDs that stay, switch, leave and return in relation to work setting (2003-2009)

	03-04	04-05	05-06	06-07	07-08	08-09	Average
Stayers	81.51%	80.40%	87.79%	79.79%	60.43%	54.84%	74.13%
Switchers	8.49%	12.00%	5.82%	8.48%	28.62%	21.01%	14.07%
Leavers	2.81%	2.24%	2.42%	4.65%	3.38%	9.10%	4.10%
Returners	7.18%	5.36%	3.97%	7.08%	7.57%	15.04%	7.70%

Consistent with earlier findings presented in this thesis, was the dramatic decline in the proportion of RDs to stay in the GO/PH work setting from 2008 to 2009. Findings indicated 35.59% of RDs switched from this work setting from 2008 to 2009. Similarly, the 'other' work setting (including RDs working in private practice, research and education) had a dramatic decrease in the proportion of RDs that stayed from 2007 to 2009. However in contrast to the GO/PH setting, the 'other' work setting had fewer RDs leave between 2008 and 2009. The business work setting had the highest overall proportion of RDs leave over the course of the study, followed closely by the GO/PH setting.

Table 5.8 Proportion of Ontario registered dietitians who stay, switch and leave by work setting (2003-2009)

Work setting		03-04	04-05	05-06	06-07	07-08	08-09	Average
Business	Stay	88.36%	78.48%	87.76%	83.33%	68.42%	48.52%	75.81%
	Switch	7.53%	17.09%	6.80%	7.33%	28.95%	23.67%	15.23%
	Leave	3.42%	3.80%	3.40%	7.33%	1.97%	14.79%	5.79%
	Return	0.68%	0.63%	2.04%	2.00%	0.66%	13.02%	3.17%
GO/PH	Stay	91.56%	92.06%	92.31%	80.47%	75.21%	41.60%	78.87%
	Switch	5.06%	5.16%	4.17%	9.47%	17.63%	35.59%	12.85%
	Leave	2.95%	2.38%	2.56%	6.51%	3.31%	12.78%	5.08%
	Return	0.42%	0.40%	0.96%	3.55%	3.86%	10.03%	3.20%
Hospital	Stay	91.97%	91.02%	91.26%	85.71%	83.59%	67.10%	85.11%
	Switch	5.40%	5.66%	5.53%	7.78%	10.05%	16.64%	8.51%
	Leave	2.48%	2.76%	2.31%	4.72%	2.67%	8.46%	3.90%
	Return	0.15%	0.55%	0.90%	1.79%	3.69%	7.81%	2.48%
LTC/CC	Stay	87.04%	87.38%	90.15%	83.55%	63.14%	64.09%	79.23%
	Switch	9.63%	9.15%	5.17%	10.39%	30.78%	15.44%	13.43%
	Leave	2.99%	3.15%	3.20%	4.11%	3.73%	10.05%	4.54%
	Return	0.33%	0.32%	1.48%	1.95%	2.35%	10.41%	2.81%
Other	Stay	83.78%	76.01%	89.49%	85.42%	38.69%	46.09%	69.91%
	Switch	10.81%	20.81%	7.32%	7.44%	53.52%	36.09%	22.66%
	Leave	5.11%	2.31%	2.23%	5.06%	4.27%	7.83%	4.47%
	Return	0.30%	0.87%	0.96%	2.08%	3.52%	10.00%	2.95%
FHT	Stay						69.23%	
	Switch						11.54%	
	Leave						4.81%	
	Return						14.42%	

Findings related to transitions in RD work settings indicated a number of trends relevant to labour market models. Registered dietitians switching from GO/PH work settings between 2008 and 2009 were found to most frequently switch to business work settings (Table 5.9). Those in business switched to ‘other’ work settings, RDs in ‘other’

work settings switched to business. Registered dietitians working in hospitals switched to LTC/CCAC, and those working in LTC/CCAC switched to hospitals. These findings may provide some insight into mobility patterns of the RD workforce illustrating that RDs switch between some, but not all work settings. These results further support the diversity of the RD workforce in Ontario. Important for HHR planning is the understanding that dietetics is not a 'one-size-fits-all' profession.

Table 5.9 Registered dietitian work setting transitions (2003-2009)

Setting		03-04	04-05	05-06	06-07	07-08	08-09
Business	Stay	90.21%	81.05%	89.58%	85.03%	68.87%	72.57%
	Switch to GO/PH	1.40%	1.31%	2.08%	0.68%	4.64%	2.65%
	Switch to Hosp	0.00%	8.50%	2.78%	2.04%	10.60%	0.88%
	Switch to LTC/CCAC	0.70%	5.88%	1.39%	3.40%	4.64%	8.85%
	Switch to Other	4.20%	1.96%	0.69%	1.36%	7.95%	9.73%
	Switch to FHT					1.32%	3.54%
	Leave	3.50%	1.31%	3.47%	7.48%	1.99%	1.77%
GO/PH	Stay	94.35%	92.43%	93.20%	83.44%	78.22%	46.63%
	Switch to Bus	0.43%	0.80%	0.00%	0.92%	1.15%	20.79%
	Switch to Hosp	0.43%	0.40%	0.32%	2.15%	4.01%	4.49%
	Switch to LTC/CCAC	0.87%	1.99%	2.27%	2.45%	4.30%	4.21%
	Switch to Other	0.87%	1.99%	1.62%	4.29%	3.44%	7.02%
	Switch to FHT					5.44%	2.53%
	Leave	3.04%	2.39%	2.59%	6.75%	3.44%	14.33%
Hosp	Stay	94.31%	91.53%	92.09%	87.27%	86.79%	74.13%
	Switch to Bus	0.45%	0.28%	0.52%	0.52%	1.72%	2.87%
	Switch to GO/PH	0.60%	0.69%	0.26%	1.17%	0.53%	0.51%
	Switch to LTC/CCAC	0.75%	3.33%	2.46%	2.60%	4.36%	8.93%
	Switch to Other	1.35%	1.39%	2.33%	3.64%	1.72%	1.33%
	Switch to FHT					2.11%	2.87%
	Leave	2.54%	2.78%	2.33%	4.81%	2.77%	9.34%
LTC/CCAC	Stay	91.29%	87.66%	91.50%	85.21%	64.66%	72.41%
	Switch to Bus	1.05%	0.32%	0.25%	1.77%	1.41%	2.23%
	Switch to GO/PH	0.35%	1.90%	0.75%	1.10%	4.82%	1.22%
	Switch to Hosp	2.79%	4.11%	3.00%	4.42%	20.28%	6.49%
	Switch to Other	1.39%	2.85%	1.25%	3.31%	1.81%	1.22%
	Switch to FHT					3.21%	5.07%
	Leave	3.14%	3.16%	3.25%	4.19%	3.82%	11.36%

Table 5.9 Registered dietitian work setting transitions (2003-2009): continued

Work setting		03-04	04-05	05-06	06-07	07-08	08-09
Other	Stay	89.42%	76.68%	90.35%	87.23%	40.10%	56.08%
	Switch to Bus	0.96%	1.46%	0.32%	0.91%	3.65%	13.23%
	Switch to GO/PH	0.64%	7.00%	1.93%	3.04%	6.77%	2.65%
	Switch to Hosp	2.56%	5.54%	2.25%	0.30%	21.09%	9.52%
	Switch to LTC/CCAC	0.96%	7.00%	2.89%	3.34%	19.27%	8.99%
	Switch to FHT					4.69%	0.00%
	Leave	5.45%	2.33%	2.25%	5.17%	4.43%	9.52%
FHT	Stay						80.90%
	Switch to Bus						1.12%
	Switch to GO/PH						2.25%
	Switch to Hosp						1.12%
	Switch to LTC/CCAC						6.74%
	Switch to Other						2.25%
	Leave						5.62%

Chapter 6—Discussion of Major Findings

This chapter discusses the major findings of the analysis of the RD workforce in Ontario from 2003-2009. Descriptive statistics were calculated on the aggregated longitudinal database for individual variables to determine trends over time. Variables were further examined to ascertain the influence of age on workforce characteristics. The data was disaggregated to determine transitions in employment variables for individual RDs.

The findings revealed two overarching themes related to workforce characteristics of RDs in Ontario: "Succession planning for mid-career RDs- what are the priorities?" and The shift to the community-"who is paying the moving costs?" These themes are presented below, along with policy implications and suggestions for further research.

6.01 Discussion of Overall Findings

Although there was an average annual increase of 4.72% in the workforce of Ontario RDs from 2003 to 2009, there was a small net decrease in the number of RDs working from 2008 to 2009. This decrease in the RD workforce coincided with perceptible changes in the profile of the profession. Expansion of the RD workforce in some sectors occurred concurrently with a contraction in others. Understanding whether changes in dietetic practice areas and work settings have been in response to the needs of the community and, or population, if they are due to changes in labour market economics within the dietetic workforce or, if they are the result of an absolute shortage of RDs is essential for HHR planning. If the former circumstances are correct, then the implications related to curriculum and practicum training and HHR planning for RDs will be far reaching. If the latter situation is more reflective of the changes, then strategies

related to retention of the RD workforce may be the more pressing concern. These results cannot establish reasons for these trends, nor can they predict if they will continue. The findings can however, be used to guide further research and to facilitate HHR planning.

6.01.1 The age structure of the registered dietitian workforce in Ontario.

These results revealed an increase in the number of young RDs (less than 30 years of age) from 2008 to 2009, in the workforce. This is in contrast to previous research in Ontario in involving OTs (Hastie, 2009) and RNs (Alameddine et al., 2006) where the HHR pool in the youngest age groups (18-44 years) has steadily decreased. The increase in young RDs in the workforce may be related to a moderate increase in the number of dietetic internship placements in Ontario beginning in 2009 (M. Wyatt, personal communication, May 12, 2011).

6.01.2 The gender structure of the registered dietitian workforce in Ontario.

Findings indicated there has been little change in the proportion of male RDs in the workforce in Ontario. These results are consistent with those described by CDO (College of Dietitians of Ontario, 2009a) and found in previous research involving RDs in Ontario and the United States (Gingras et al., 2010; Sauer, 2009). This group of RDs is distinct in practice and because they number so few, male RDs have not been analyzed separately from females in research involving RDs (Gingras et al., 2010; Sauer, 2009). This study found male RDs were employed primarily in clinical nutrition practice areas and hospital work settings. While specific reasons for the stability in the male RD workforce cannot be determined, perhaps one explanation may be that there are few male RD role models in the profession. Further research with this group of RDs, in

collaboration with DC accredited undergraduate universities may elucidate facilitators and, or barriers to entry to practice dietetics for males in Ontario. Important HHR factors related to female dominated professions include planning for maternity leave of absences and child care needs in the RD workforce (Morley, 2011). Perhaps, with a more active program of recruitment for males to enter the profession, the proportion of male RDs in the workforce may increase.

6.01.3 The education structure of the registered dietitian workforce in Ontario.

The distribution of RDs in the workforce in relation to university attended for undergraduate education (including the proportion of RDs attending university outside of Ontario) changed minimally over the course of this study. What cannot be determined from this research is the number of successful graduates from these universities that were unable to secure a dietetic internship position. It has been suggested that the limiting factor to increasing the RD workforce is related more to the availability of internship placements, than that of spaces in undergraduate programs (M. Wyatt, personal communication, May 12, 2011).

The DC 2008 Ontario workforce analysis survey indicated that 25% of RDs (n=211 of 846 respondents) completed graduate-level education (Dietitians of Canada, 2009b). Results of this study were slightly lower at 18.61%. Discrepancies in findings may be related to differing characteristics of RDs that completed the DC survey (i.e., it is possible that proportionately more RDs with graduate degrees completed the survey). As an increasing number of RD positions require Masters-level education, further research is

recommended to increase understanding of facilitators and barriers for RDs to complete post-graduate education.

6.01.4 The employment status structure of the registered dietitian workforce in Ontario.

Results of this study indicated that over two-thirds of RDs are employed on a full-time basis. These proportions are similar to those found in the DC workforce analysis (Morley, 2011; Dietitians of Canada, 2009b). In contrast to these findings, research involving RDs in Australia indicated 83% of new RDs positions created between 1991 and 2000 were part-time rather than full-time, resulting in an almost even distribution between part-time and full-time RDs in the workforce (Meyer et al., 2002).

These findings indicated that RDs in Ontario infrequently change their employment status. This may indicate that in the event of economic downsizing, RDs may change their work setting to maintain their employment status, potentially creating an imbalance in the RD skill-mix in the workforce. This has important implications for HHR planning.

Two overarching themes were revealed through the analysis of the longitudinal database and informed by a detailed review of the literature (Chapter 2). These themes provide critical information for future HHR, education and curriculum planning for the profession of dietetics in Ontario. The two themes are described as: Succession planning for mid-career RDs- what are the priorities? and The shift to the community-"who is paying the moving costs"? These themes are discussed in relation to research results, implications for practice and HHR policy development.

6.02 Succession Planning for Mid-career Registered Dietitians- What are the Priorities?

Findings in this research indicated that over 50% of the RD workforce was between 40 and 59 years of age. This age cohort represents mid-career RDs with 15 to 25 years of experience in the profession. Previous research involving RNs suggested that health care organizations need to focus on the relative career satisfaction of mid-career health care providers as a strategy to increase retention (Coshow et al., 2009).

When this cohort of RDs (age 40-59 years) was examined in relation to a number of variables a distinct pattern emerged. Understanding this pattern will be critical to succession planning in the profession of dietetics in Ontario. As RDs in their 60's begin to retire and those aged 40-59 years move into the oldest cohort, the profile of dietetics in Ontario is likely to change.

The number of RDs in the workforce between the ages of 40 and 59 years decreased by 7% (n=100) between 2008 and 2009. This research is unable to determine if these RDs left the profession, where they went or if they are still working, but in a different or new capacity (i.e., not as an RD). Some of these RDs may have moved into the older age category (age 60 years and over), others may still be members of CDO but not working and therefore not included in this analysis. Further research with mid-career RDs may increase understanding of factors that lead this group RDs to exit the workforce. This knowledge may facilitate future retention strategy planning for the profession.

The proportion of RDs with graduate-level education is the lowest between the ages of 40-59 years, suggesting that a limited pool of experienced RDs is available for

teaching future students. The Director of Professional Affairs at DC recently stated that "the sky is falling out" regarding succession planning in undergraduate teaching and education for dietetics in Ontario (M. Wyatt, personal communication, May 12, 2011). The limited number of RDs in this age group with graduate degrees may be related to the number of nutrition-related, post-graduate programs that were available to these RDs at the 'right time'. As the number and variety of graduate programs has advanced so has the number of young RDs pursuing graduate degrees (as indicated by these findings). The addition of the combined Master's practicum programs to the profession has contributed to greater numbers of young RDS with Master's degrees. Further research with RDs age 40-59 years is essential to understand facilitators and barriers related to the pursuit of graduate-level education (and in particular Doctoral-level degrees) for RDs in Ontario.

Also related to education levels of 'new' and mid-career RDs are differences between 'returners' to school (i.e., mid-career RDs) and 'continuers' (i.e., young RDs that pursue graduate school immediately following undergraduate education or internship). Family, financial and other responsibilities at different stages of life may influence decisions to pursue post-graduate education. Impediments to return to school need to be removed if the number of mid-career RDs with graduate-level education is to increase. Designing programs to fit working RDs (i.e., part-time, on-line or distance education) may facilitate this process. As this analysis was unable to distinguish between Master's and Doctoral degrees, further empirical research is recommended where these groups are analyzed as distinct and separate individuals to determine specific facilitators and barriers to pursuing graduate-level education.

Findings related to patterns in employment status varied with age, following an S-shaped curve. The youngest cohort in the study had the highest proportion of RDs employed on a full-time basis. That proportion decreased in the second and third age cohorts (aged 30-39 years and 40-49 years) resulting in a larger proportion of RDs working part-time. Responsibilities related to family life may be the impetus for the change in employment status in these age groups. Important for future HHR planning is the knowledge that few RDs switched their employment status over the course of the study. This knowledge may be of particular significance for RDs aged 50-59 years, as the majority of this cohort was employed on a full-time basis.

Although full-time employment was found to be the most attractive, these results suggest that employment status did not influence the proportion of RDs to leave the workforce. These findings are in contrast to previous research in Ontario involving RNs that demonstrated part-time and casual RNs were more likely to exit the profession than those working full-time (Daniels, 2011). Additional research is recommended involving RDs that leave the workforce to determine labour market factors that influence their decision to leave, with a specific goal of developing retention strategies.

Trends related to area of dietetic practice indicated a substantial decline in the RD workforce in the FSAD and 'other' (teaching, education, research, sales, marketing, and policy development) areas of practice. Despite this, proportionately more RDs aged 40-59 years (11.2%, M= 128) were employed in the FSAD area of practice than any of the other age groups. These results are similar to previous research, where 65% of RDs in management positions were between 40-59 years of age (Sauer, 2009).

Findings in this study indicated an absence of RDs in the youngest age group in the FSAD practice area. This raises questions related to education and training and whether or not this group of RDs have the required skills to work in this sector, or whether the investment in training might be better 'spent' in other dietetic practice areas. Understanding if the decline in young RDs in the FSAD practice area is related to career preference, education and training or other labour market factors is essential to HHR planning. Perhaps there are few RD mentors to encourage or influence young RDs to pursue employment in the FSAD practice area.

Also important for HHR planning is the knowledge related to how positions in the FSAD practice area are being filled, if not by RDs. Has the labour market in hospital and, or LTC food service management changed in that senior positions no longer require an RD, or are changes due to a shortage of RDs with the required skill-set? Immediate empirical research is warranted with RDs 40-59 years of age, working in the FSAD practice area. This research should include representatives from DC accredited universities and practicum training programs. Strategies regarding curriculum development and the sustainability of the RD workforce in the FSAD practice area are essential.

The recent decline in the number of RDs age 40-59 years in the 'other' area of practice also has potential education and HHR implications. This cohort of RDs is employed in education, research, sales, marketing and policy development in the profession. These positions require more experience and are perhaps better suited to RDs who have been in the workforce longer. These findings indicate that RDs in the 'other' practice area are switching to clinical and community nutrition practice areas. Further

research is required to determine labour market factors influencing RDs to leave these positions.

Findings of this study indicated that while the number of RDs aged 40-59 years in GO/PH work settings declined, it increased in business, LTC/CCAC and FHT work settings. Additional research in these areas is needed to distinguish whether the decline in the GO/PH workforce is related to changes in labour market models (i.e., RDs no longer being hired to fill these positions, public sector economizing) or if this cohort of RDs are making employment decisions related to other aspects of labour market economics (i.e., job satisfaction, flexibility in hours of work).

Other factors influencing RDs age 40-59 years employed in GO/PH, include education and employment status. Registered dietitian positions in public health settings increasingly require Masters-trained RDs. This age cohort has proportionately the fewest RDs with graduate-level training. As requirements for employment in this sector have changed, so have the workforce characteristics of RDs.

Given the recent shrinking RD workforce between the ages of 40-59 years, further research is required to identify trends that influence the personal, education and employment characteristics of this group of RDs. This may facilitate the development of strategies to increase overall retention within this cohort, and specifically in areas of dietetic practice and work settings where experience as a mid-career RD is essential for succession planning in the profession.

6.03 The Shift to the Community—"Who is Paying the Moving Costs?"

Results of this research indicate a trend in the RD workforce out of FSAD and the 'other' practice areas and into clinical and community nutrition practice areas.

Additional shifts in the RD workforce were observed out of the GO/PH work setting into the business setting, and between hospitals and LTC/CCACs. Interestingly, despite changes related to PHC reform, there were minimal changes observed in the RD workforce in clinical nutrition practice areas and hospital work settings.

The decline in the FSAD and 'other' practice areas are worthy of further review for a number of reasons. Essential to increased understanding is whether there was a 'push' out of the FSAD and 'other' areas of practice or a 'pull' into the workforce in the community and if so, what those 'push' and, or 'pull' factors were (i.e., economic downsizing vs. job creation). Also important for education and curriculum planning is knowledge related to how or by whom these positions are now being filled. As the Partnership for Dietetic Education and Practice (PDEP) and the Task Force on Dietetic Practical training establish new Integrated Competencies for Dietetic Education and Practice (Partnership for dietetic education and practice, 2009), understanding the influence of labour market economics related to this dietetic practice area will facilitate planning education and practicum requirements.

The recent decline in the RD workforce in the GO/PH work setting also warrants further examination as it is this group of RDs that participate in decision making and advocacy for the profession at federal and provincial levels of government. As indicated by the stay, switch and leave analysis, the GO/PH work setting had the highest proportion of RDs to switch and leave in 2009. Additionally, this analysis indicated that RDs, when switching work settings, infrequently switch into the GO/PH setting. Whether this is related to elimination of RD positions, changes in employment requirements

(i.e., graduate-level education), hours of employment (part-time vs, full-time) or other factors is beyond the scope of this research and warrant further examination.

The shift in the RD workforce into the LTC/CCAC work setting has similar implications as those in the FSAD practice area. Registered dietitians in all age groups and education levels are switching into the LTC/CCAC work setting, from all other work settings. However, this work setting was second only to GO/PH in the proportion of RDs to leave. Further research (specifically related to retention strategies) is recommended to determine whether RDs stay in this setting for more than one year. The proportion of young RDs in LTC/CCAC appears to be increasing. Ensuring education and training models are designed to provide these RDs with necessary skills to work in this setting will be essential if these trends continue.

Other factors to consider as the RD workforce shifts from the 'other' practice area and work setting (including RDs employed in research and education) to community practice areas and LTC/CCAC work settings include the potential influence on HHR for teaching and research. Strategies need to be developed that encourage retention of RDs currently in these roles as a means of succession planning for the profession. Also important is increased understanding of factors that influence mid-career RDs (and in particular, those with post-graduate degrees) to move from GO/PH positions into LTC/CCAC and FHTs where neither extensive work experience nor graduate-level education are requirements for success.

Although these findings indicated minimal movement in the RD workforce in the clinical nutrition practice area and hospital work setting, these segments of the profession require on-going surveillance as the proportion of RDs working in the community

increases. It is crucial that RDs, as essential members of interprofessional health care teams, are included in policy development, HHR planning and the development of education and training models within clinical nutrition practice areas and hospital settings.

Registered dietitians work in numerous and diverse settings (as illustrated in Table 1.1). Mobility within the profession may be a natural and progressive element of an individual RD's career path. Additional research is recommended to increase understanding of facilitators and barriers to changes in dietetic practice areas and work settings from the time of entry into practice. Further research is also recommended to determine new or emerging areas of dietetic practice and the influence these practice areas have on HHR planning in the workforce of RDs in Ontario.

Chapter 7- Conclusions and Recommendations

The purpose of this study was to examine the workforce characteristics of RDs in Ontario from 2003-2009, while contributing to the body of literature on RDs and informing the dietetics profession. To accomplish this, two research questions, outlined in Chapter 1, were examined using a longitudinal database created from the annual CDO registration files from 2003 to 2009. This chapter presents conclusions and recommendations of the analysis.

There is a paucity of published literature related to workforce characteristics of RDs in Ontario. Evidence indicates that the supply of RDs entering the workforce is insufficient to keep pace with those leaving as well as the creation of new positions (Dietitians of Canada, 2009b). Knowledge of demographic, education and practice settings will provide essential information for professional and policy decision-makers regarding the future of the profession.

Secondary data analysis was conducted using the annual registration files from the CDO registration database. Following extensive and complex steps to 'clean' and merge multiple separate registration files, a longitudinal database was created for analysis in this study. Labour market economics was the theoretical framework used to guide this analysis.

Two overarching themes related to the profile of the RD workforce in Ontario arose from the findings. These themes, informed by the literature review, help provide a greater understanding of the distinct aspects of the profession of dietetics in Ontario. They can be used to support the creation of effective, targeted, market level RD HHR

policies. Overall conclusions are presented first, followed by recommendations for the dietetic profession in Ontario, in the final section of this chapter.

7.01 Conclusions

The results of this research are encouraging in relation to PHC reform in Ontario. As community-based health care in Ontario has expanded, so has the RD workforce in these settings. Important for this study and perhaps more so for the profession of dietetics, is that the movement of the RD workforce to community-based settings did not result in shrinkage of the workforce in hospitals. Conversely, as these findings illustrate, RDs left GO/PH and 'other' work settings to move into the community.

This examination of workforce characteristics of RDs in Ontario revealed two overarching themes. The first theme related to demographic differences found between mid-career RDs in comparison to younger and older RDs. The second theme related to the shift within the RD workforce to community nutrition practice areas and work settings.

Registered dietitians at mid-career are a distinct group of health professionals. The RD workforce between to ages of 40 and 59 years has declined in numbers. This group of RDs are almost exclusively female and the majority are employed on a full-time basis. This age cohort (40-59 years) has proportionately the fewest RDs with graduate-level education, suggesting there is a limited pool of RDs available to teach undergraduate and graduate-level nutrition programs. These RDs work primarily in clinical nutrition practice areas, with increasing numbers working in the community, and declining numbers in FSAD and the 'other' areas of practice (including RDs employed in

education, research and policy development). Registered dietitians in this age group represent the remaining few RDs working in the FSAD practice area.

Findings indicated that hospitals continue to be the most attractive work setting for RDs in all age groups. Second to hospitals, RDs 40-59 years of age most frequently work in LTC/CCAC settings. These results suggest movement of experienced, mid-career RDs out of GO/PH and 'other' work settings (including RDs working in private practice, research and education) into business, LTC/CCAC and FHTs. Whether these trends are related to changes in labour market models in these work settings (i.e., requirements for Masters trained RDs in PH, labour market efficiencies), cannot be determined through this analysis and warrant further research.

Understanding the demographic variations in labour market trends in mid-career RDs may facilitate the development of retention strategies targeted towards this group of RDs. Future research involving the RD workforce should treat mid-career RDs as a distinct group. The development of education and training programs that meet the needs of this group of RDs is imperative for succession planning in the profession.

The second theme revealed in this research identified a shift in the RD workforce to community nutrition practice areas and work settings. This shift did not occur in isolation. Findings indicated a dramatic decline in the RD workforce in the FSAD practice area. This finding was most noticeable in young RDs where there was a complete absence of RDs under the age of 30 in this practice area in 2009. The declining RD workforce in this practice area raises many questions related to succession planning in the profession.

In addition to the declining FSAD practice area was the overall decline in the GO/PH work setting. Despite increasing numbers of RDs in the youngest two age groups (under 30 years and 30-39 years) with graduate-level education, fewer RDs in these age groups are working in dietetic practice areas requiring a Masters degree. Instead, findings revealed these young RDs worked first in hospitals, second in LTC/CCACs and in 2009, third in FHTs.

Findings related to the stay, switch and leave analysis revealed that RDs switch between some, but not all, dietetic practice areas and work settings. Importantly, the FSAD practice area had the highest proportion of RDs to leave the workforce and few RDs switched into this practice area, confirming the declining workforce in this area. Registered dietitians tended to switch between clinical and community nutrition practice areas, but not to the 'other' area of practice.

Results indicated that the hospital work setting was the most attractive, followed closely by LTC/CCAC. Family health teams were also a highly attractive work setting, however longer term studies are required to determine workforce trends in this setting. Registered dietitians switched between hospitals and LTC/CCACs, RDs in GO/PH switched to business, however business RDs switched to 'other' and LTC/CCAC. Those RDs in the 'other' work setting switched to business first, then to hospitals and LTC/CCAC. Few RDs overall, switched to GO/PH, and the largest proportion of RDs to leave the workforce were in the GO/PH work setting.

These results suggest that the dietetic profession in Ontario is not a "one-size-fits-all" labour market. Some RDs may choose preferred employment status over a work setting and others may choose specific characteristics of one work setting over another.

Additionally, transitions in the RD workforce suggest that, although qualified to work in one work setting, an RD may not have the requisite skills to work in another. This may lead to shortages of RDs in some settings and a surplus in others. Further research in relation to these distinct characteristics of RDs is warranted related to the shortage of RDs in Ontario, the increasing numbers of RDs not working (as reported by CDO) and an increase in the number of difficult-to-fill RD positions in Ontario (Morley, 2011).

Understanding whether these trends are related to labour market economization, if they are a reflection of the changing needs of communities/populations, or if they are the result of an imbalance in RD skill mix, will enhance future HHR planning in the profession. This knowledge may facilitate the PDEP as they undertake the task of developing education and practicum guidelines for Integrated Competencies for Dietetic Education and Practice (Partnership for dietetic education and practice, 2009).

7.02 Recommendations

The following prioritized recommendations are offered for consideration by the regulatory college (CDO) and the national professional association (DC), dietetic educators and government policy makers and RDs in Ontario. These recommendations are based on the results of the analysis of the CDO registration renewal files from 2003-2009, the emergent themes and the relevant literature.

7.02.1 Recommendations for the College of Dietitians of Ontario and Dietitians of Canada.

- Standardize definitions of dietetic practice areas and work settings on annual registration renewal forms, with as much detail as possible. Recommendations include pilot-testing all changes to the registration renewal form with key

stakeholders from PDEP, DC, MOHLTC (HPDB), CIHI and individual RDs from a variety of practice areas and work settings. This will enhance accuracy of future analysis of the workforce characteristics of RDs and ensure consistency in data collection.

- Enhance the annual CDO registration renewal form through the addition of questions regarding location of internship/practicum placements and employment related mobility patterns of RDs in Ontario. This information could be used in the development of retention strategies in areas where there is a shortage of RDs.
- Continue to analyze workforce trends of RDs in Ontario with specific attention paid to patterns of mid-career RDs, FSAD and community nutrition practice areas and FHTs and GO/PH work settings. Information gleaned from this analysis can be used to guide targeted, in-depth research related to labour market trends in the RD workforce in Ontario.
- Collaborate with key stakeholders in community and FSAD dietetic practice areas and GO/PH and 'other' work settings to enhance understanding of changes in the RD workforce in these sectors. Recommendations include needs assessment analysis, observational reviews and focus group interview research to determine reasons for changes in the RD workforce. This may facilitate the development of retention strategies, education and training guidelines, with a goal to prevent further decline in the RD workforce in these essential dietetic practice sectors.
- Conduct research involving RDs in Ontario that are not working to first, create a portrait of the personal, education and employment (history) characteristics of

this group of RDs, and second, to understand facilitators and barriers to employment.

7.02.2 Recommendations for dietetic educators.

- Continue in the development of a needs-based dietetic education curriculum. Focus group research with young RDs is suggested to understand gaps in education/training in specific dietetic practice areas and work settings.
- Collaborate with DC and CDO to provide encouragement and mentorship to undergraduate students and dietetic interns in areas where there are RD shortages.
- Conduct qualitative research studies with mid-career RDs, DC and CDO to increase understanding of facilitators and barriers to completing Masters and/or Doctoral-level education. This may guide the development of graduate-level education programs that meet the needs of mid-career RDs.
- Collaborate with key RD stakeholders in areas where the RD workforce is expanding with a goal to ensuring adequate numbers of practicum placements for dietetic students in these sectors. This will involve increasing understandings of current facilitators and barriers to participating in practicum programs. This information will become increasingly important in community-based settings (LTC/CCAC and FHTs).

7.02.3 Recommendations for government policy makers.

- Proactively provide funding for on-going research related to the workforce characteristics of RDs and other AHPs in Ontario and across Canada.
- Collaborate with CDO and DC in research related to the role of RDs in GO/PH work settings. The importance of these research partnerships cannot be

overestimated as RDs must remain at the forefront in the development of policies related to population health, nutrition education and knowledge, and nutrition research and inquiry. These practice areas (GO/PH) require RDs with graduate-level education, and years of profession-related experience. It is only through the involvement of key stakeholders in CDO, DC and the government that these essential RDs positions can be preserved.

- Challenges associated with continuing education for mid-career RDs need to be considered and funding models developed, to facilitate the pursuit of Masters and Doctoral-level education for RDs aged 40-59 years of age. This is essential for succession planning for the profession of dietetics in Ontario.
- Ensure that regulations, standards and funding in health care institutions (i.e., hospitals, LTC homes) continue to require and provide for, RDs in food service management positions. This will ensure that standards of nutrition, food safety and health promotion are maintained in these settings.
- Continue to collaborate with CDO, DC and PDEP in the development of the HPDB. The HPDB will facilitate the development of standardized and comparable demographic, geographic, educational, and employment information on all of the regulated AHPs in Ontario.
- Collaborate with CIHI, CDO, DC, PDEP and MOHLTC to publish longitudinal data related to workforce characteristics of RDs in Ontario.

7.02.4 Recommendations for registered dietitians.

- Registered dietitians in Ontario are encouraged to participate in research related to the workforce characteristics of the profession. Community-based research is a

shared responsibility of researchers and RDs. Registered dietitians need to take ownership of the profession and participate in research that will enhance dietetics in the future.

- Registered dietitians in Ontario are encouraged to continue to advocate for the profession in all areas of dietetic practice, but with specific emphasis in areas where the workforce of RDs is declining.
- Registered dietitians in Ontario are encouraged to continue to support dietetic practicum placements for dietetic interns, and to become mentors to students and young RDs. This may encourage young RDs to work in areas they might not otherwise have considered, perhaps strengthening dietetic practice areas that are in decline.
- Mid-career RDs are encouraged to advocate for, and explore opportunities for continuing education and graduate degrees.

7.02.5 Recommendations for future research

The following recommendations for research are suggested:

- It is important that these findings (and those of future research) be communicated throughout the profession. Dissemination strategies involve universities that provide undergraduate and graduate-level education in nutrition, hospitals that provide internship/practicum programs and the MOHLTC (HPDB) and CIHI. This research represents leading edge work within the profession of dietetics in Ontario and Canada.
- Collaborate with PDEP in the creation of a similar longitudinal data database from the annual registration databases from provincial dietetic regulatory colleges

throughout Canada, with a goal to developing a national longitudinal database for the profession.

- Ongoing analysis with the longitudinal database created from the annual CDO registration renewal files is recommended, including more detailed analysis related to transitions within the RD workforce.
- Further research is recommended with RDs that identified more than one area of practice and/or work setting on their CDO registration renewal form. As it was necessary to prioritize these RDs into a single category for analysis in this study, any distinct characteristics regarding this cohort were not detected. It is important to understand the workforce characteristics of RDs that work in more than one dietetic practice sector. Understanding the role of labour market factors related to economic efficiencies (i.e., part-time vs. full-time employment) may facilitate the development of retention strategies. Increasing awareness related to the transferability of RD skills across practice areas and work settings may enhance planning in education and curriculum development.

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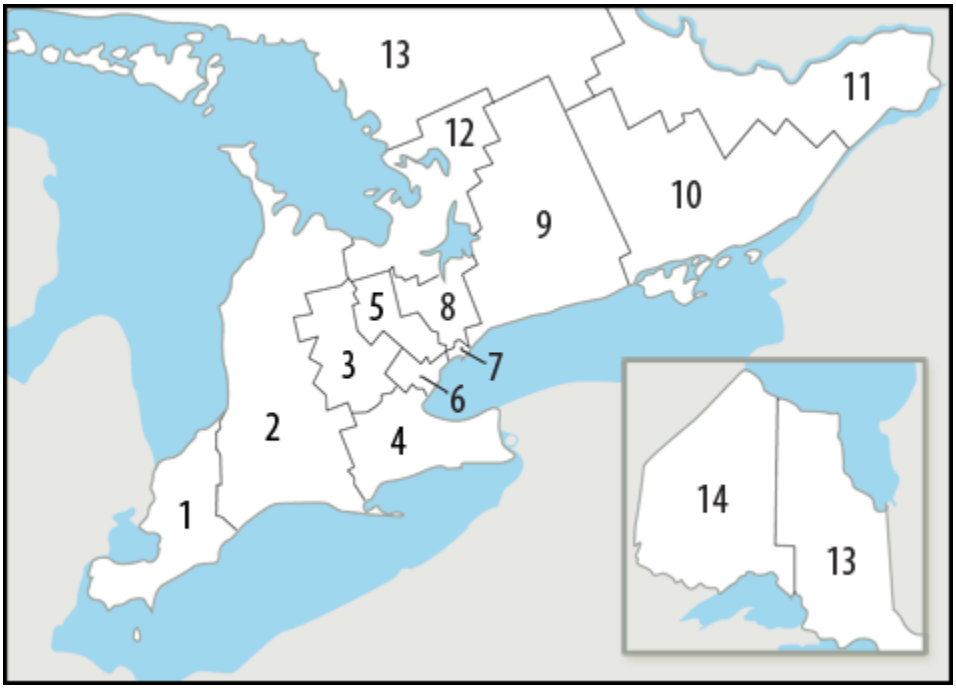
Appendices

Appendix A

Local Integrated Health Networks in Ontario



1. Erie St Clair
2. South West
3. Waterloo Wellington
4. Hamilton Niagara Haldimand Brant
5. Central West
6. Mississauga Halton
7. Toronto Central
8. Central
9. Central East
10. South East
11. Champlain
12. North Simcoe Muskoka
13. North East
14. North West

(Local Health Integration Network, 2010d).

Appendix B

CDO Annual Report 2009 (adapted from College of Dietitians of Ontario, 2009a)

Record Growth in Membership
In 2008/09: membership increased by 132 members. Usual growth in members: 75-100 dietitians annually.

25% Increase in Applications
Increase in applications from internationally educated applicants: due to the success of the Internationally Educated Dietitians Pre-Registration Program (IDPP).

New Registration Program Manager Position
The Registration Manager position was created this year help respond to the increasing demands on the Program for reporting and accountability, including work on the Health Professions Database.

Total applications: 238	**Total Admitted 204**	**Total RD:** 2953
Professional Corporation: 0	Resignations/Retired: 72	Female: 2,899 -98.2%
Canadian Educated Applicants: 183		Males 54 - 1.8%
Internationally Educated Applicants: 57		

Number of RDs by district:

1 South Western: 346	4 Eastern: 425	7 Central: 424
2 Central Western: 584	5 North Eastern: 120	8 Out of province: 51
3 GTA/York: 864	6 North Western: 67	9 Out of Country: 72

Distribution of RDs by district and area of practice

District	Clinical	FNM*	Sales	Comm*	CNM*	Education & Res	Other
1	229	40	9	180	49	81	60
2	373	66	28	342	84	167	99
3	547	99	58	466	137	310	198
4	262	46	19	270	62	120	84
5	84	12	0	81	20	18	17
6	44	7	0	51	13	13	8
7	261	77	29	266	68	102	89
8	24	10	3	18	6	22	7
10	26	10	4	64	5	24	17
Total	1,850	367	150	1,390	444	709	579

*FNM= Food nutrition and Management
*Comm= Community
*CNM= Clinical Nutrition Management
Members, in Ontario that have more than one area of practice= 1,483

Work settings

Work setting	% RDs
Hospital including Chronic Care Institutions (Adult & Pediatric)	29.98%
Long-Term Care Organization	11.47%
Public Health Department	6.76%
Community Health Centre/Health Service Organization	6.61%
Business and Industry	5.84%
Private Practice-Clinical	4.81%
University / Community College	4.49%
Home Care Agency (CCAC case management or in-home service)	3.69%
Diabetes Education Centre	3.67%
Government (Federal and Provincial)	3.47%
Private Practice	3 .44%
Family Health Team or Family Health Network	3.29%
Other	3.24%
Non-Governmental Organization and Association	2.37%
Media, Public Relations and Communications Agencies	1.85%
Occupational Health/Corporate Wellness	1.42%
Rehabilitation Centre	1.27%
Research Facility	1.22%
Elementary/Secondary Schools	1.12%

Appendix C

Health Professions Database

Table C.1 Statistical Fact Sheet – Dietitians

Total number of active members (excluding students) : 2906

Data Element	**Value**	**Total**	**Percentage**
Age distribution	Less than 45	1,794	62
	45-54	745	26
	55 and greater	367	13
	Unknown	**0**	**0**
Sex	Female	2,852	98
	Male	54	2
Practice Status	Practising in Profession	0	0
	Not Practising in Profession	0	0
	Unknown	2,906	100
Work Status	Full-time	0	0
(First practice site only)	Part-time	0	0
	Casual	0	0
	Unknown	2,906	100
	Not applicable	0	0
Practice setting	**Unknown**	2,906	100
(First practice site only)	Not applicable	0	0
Highest level of education	Diploma	0	0
in profession	Baccalaureate	0	0
	Masters	0	0
	Doctorate	0	0
	None of the above	0	0
	Unknown	2,906	100
Employment site by LHIN	**Unknown**	**2,906**	**100**

Note. Adapted from- Health Force Ontario. (2010a). *Health professionals database 2008 stat book.* Ministry of Health and Long Term Care.

Appendix D

Final selection of variables

Table D.1 Demographic variables

Variable	Coding specifics	Notes
Age Group	Under 30 years of age 30-39 years of age 40-49 years of age 50-59 years of age 60 years of age and over	Coded as a categorical variable: Under 30= 1 30-39=2 40-49=3 50-50=4 60 and over =5
Gender	Female Male	Coded as a dichotomous variable: F= female M= male
Language of practice	English French	Coded as a dichotomous variable: E= English F= French

Table D.2 Education variables

Variable	Coding specifics	Notes
Highest level of education	Bachelors degree Graduate degree (Masters, PhD) Bridging program (IDDP program)	
Country of education	Canada International	
University attended	Ryerson University University of Guelph University of Western Ontario Other university in Canada Other university outside of Canada	Accredited undergraduate programs in dietetics.

Table D.3 Employment variables

Variable	Specifics	Notes
Date of Start		First year of practice in Ontario
Employment status	Full-time	Self-reported employment status. Coded as: Full-time =1 Part-time= 2 Self-employed= 4 On leave= 5
	Part-time	
	Casual- only available in 2009; combined with part-time	
Area of Practice	Clinical	e.g., acute, cancer, mental health, geriatric, critical care, palliative, cancer-care, diabetes education
	Community	e.g., program planning, population health, communication, food security,
	Food Service and Administration (FSAD)	e.g., nutrition management, quality management, food service management
	Other	e.g., teaching/education, research, sales, marketing, policy development
Work Sector	Hospital	e.g., diabetes education centre, cancer centre, rehab centre, hospital
	Family Health Team (FHT)	CDO began tracking RDs in FHTs in 2008
	Business	e.g., business and industry, occupational health
	Government/Public Health (GO/PH)	e.g., correction services, public health, government services
	Long term care/ Community care access centre (LTC/CCAC)	e.g., community health centre, home care, long term care, CCAC, home for the aged
	Other	e.g., media, private practice, recreational facilities, research, education

Table D.4 Collapsing area of practice and work setting for registered dietitians in multiple areas/settings

Area of practice #1	Area of practice #2	Area coded in SAS
Community	Clinical	Community
Community	Food service and admin	Community
Community	Other	Community
Clinical	Food service and admin	Clinical
Clinical	Other	Clinical
Food service and Admin	Other	Food service and Admin

Work setting #1	Work setting #2	Work setting coded
Family Heath Team	Hospital	Family Health Team
Family Heath Team	Business	Family Heath Team
Family Heath Team	Government/Public Health	Family Heath Team
Family Heath Team	LTC/CCAC	Family Heath Team
Family Heath Team	Other	Family Health Team
Government/Public Health	Hospital	Government/Public Health
Government/Public Health	Business	Government/Public Health
Government/Public Health	LTC/CCAC	Government/Public Health
Government/Public Health	Other	Government/Public Health
LTC/CCAC	Hospital	LTC/CCAC
LTC/CCAC	Business	LTC/CCAC
LTC/CCAC	Other	LTC/CCAC
Business	Hospital	Business
Business	Other	Business
Hospital	Other	Hospital

Appendix E

Descriptive statistics of the workforce characteristics of registered dietitians in Ontario (2003-2009)

Table E.1 Number of registered dietitians in Ontario (2003-2009)

Year	Number of RDs
2003	1919
2004	2068
2005	2184
2006	2234
2007	2362
2008	2536
2009	2525
# change 2003-2009	+606
% change 2003-2009	+31.5
% annual change 2003-2009	+4.72

Table E.2 Registered dietitian age trends in Ontario (2003-2009)

Age Group	2003		2004		2005		2006		2007	2007	2008		2009		Average
(years)	n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Under 30	218	11.43	258	12.55	255	11.74	231	10.40	270	11.49	299	11.85	398	15.76	12.17
30-39	674	35.34	679	33.04	689	31.72	679	30.56	695	29.57	756	29.95	756	29.94	31.45
40-49	683	35.82	726	35.33	757	34.85	766	34.47	763	32.47	778	30.82	702	27.80	33.08
50-59	308	16.15	352	17.13	413	19.01	473	21.29	519	22.09	566	22.42	542	21.47	19.94
60 and over	24	1.26	40	1.95	58	2.67	73	3.29	103	4.38	125	4.95	127	5.03	3.36

Table E.3 Registered dietitian gender trends in Ontario (2003-2009)

Gender	2003		2004		2005		2006		2007		2008		2009	2009	Average
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Female	1891	98.75	2035	98.59	2151	98.67	2201	98.70	2322	98.47	2492	98.42	2482	98.30	98.56
Male	24	1.25	29	1.41	29	1.33	29	1.30	36	1.53	40	1.58	43	1.70	1.44

Table E.4 Registered dietitian education trends in Ontario (2003-2009)

Education	2003	2003	2004	2004	2005	2005	2006	2006	2007	2007	2008	2008	2009	2009	Average
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Bachelors	1565	81.55	1698	82.11	1795	82.19	1829	81.87	1917	81.16	2059	81.19	2011	79.64	81.39
Graduate	354	18.45	370	17.89	389	17.81	405	18.13	445	18.84	477	18.81	514	20.36	18.61

Table E.5 Registered dietitian country of education trends in Ontario (2003-2009)

	2003		2004		2005		2006		2007		2008		2009		Average
Country of Education	n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Canada	1796	93.59	1939	93.81	2051	93.95	2092	93.69	2210	93.60	2364	93.25	2348	92.99	93.56%
International	123	6.41	128	6.19	132	6.0	141	6.31	151	6.40	171	6.75	177	7.01	6.44%

Table E.6 Registered dietitian institute of undergraduate education trends in Ontario (2003-2009)

	2003		2004		2005		2006		2007		2008		2009		Average
Institute	n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Ryerson	265	16.93	293	17.27	301	16.78	307	16.79	318	16.60	346	16.81	307	15.76	16.71
Western	282	18.02	299	17.62	312	17.39	323	17.67	334	17.43	367	17.83	380	19.51	17.92
Guelph	428	27.35	441	25.99	450	25.08	453	24.78	475	24.79	502	24.39	490	25.15	25.36
Other-Canada	528	33.74	599	35.30	666	37.12	677	37.04	716	37.37	759	36.88	686	35.22	36.09
International	62	3.96	65	3.83	65	3.62	68	3.72	73	3.81	84	4.08	85	4.36	3.91

Table E.7 Registered dietitian employment status trends in Ontario (2003-2009)

	2003		2004		2005		2006		2007		2008		2009		Average
Employment Status	n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Full-time	1249	65.09	1332	64.41	1396	63.92	1432	64.10	1498	63.42	1577	62.18	1625	64.36	63.93
Part-time	464	24.18	508	24.56	570	26.10	589	26.37	643	27.22	738	29.10	617	24.44	26.00
Self-employed	206	10.73	228	11.03	218	9.98	213	9.53	221	9.36	221	8.71	283	11.21	10.08

Table E.8 Registered dietitian area of practice trends in Ontario (2003-2009)

Area of Practice	2003		2004		2005		2006		2007		2008		2009		Ave
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Clinical	921	53.39	1002	49.58	992	49.08	979	48.80	965	48.66	1502	62.07	1486	61.03	53.23
Community	298	17.28	307	15.19	304	15.04	299	14.91	289	14.57	379	15.66	684	28.09	17.25
FSAD	185	10.72	190	9.40	184	9.10	178	8.87	175	8.83	216	8.93	91	3.74	8.51
Other	321	18.61	522	25.83	541	26.77	550	27.42	554	27.94	323	13.35	174	7.15	21.01
n (excludes missing)	1725		2021		2021		2006		1983		2420		2435		

Table E.9 Registered dietitian work setting trends in Ontario (2003-2009)

Work Setting	2003		2004		2005		2006		2007		2008		2009		Ave
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Business	145	8.54	153	8.58	144	7.44	142	7.11	150	7.06	159	6.49	272	11.07	8.04
GO/PH	236	13.91	251	14.08	310	16.01	323	16.17	346	16.29	382	15.59	237	9.65	14.53
Hospital	684	40.31	720	40.38	772	39.88	762	38.16	754	35.50	1037	42.33	928	37.79	39.19
LTC/CCAC	300	17.68	316	17.72	399	20.61	446	22.33	493	23.21	539	22.00	622	25.33	21.27
Other	332	19.56	343	19.24	311	16.06	324	16.22	381	17.94	241	9.84	195	7.94	15.26
FHT											92	3.76	202	8.22	5.99
n (excludes missing)	1697		1783		1936		1997		2124		2450		2456		

Table E.10 Distribution of registered dietitian gender by area of practice (2003-2009)

Gender	Area of practice	2003	2004	2005	2006	2007	2008	2009	Ave
		%	%	%	%	%	%	%	%
Female	Clinical	53.44	49.55	49.02	48.71	48.59	62.25	61.01	53.23
	Community	17.48	15.34	15.18	15.04	14.70	15.64	28.29	17.38
	FSAD	10.59	9.36	9.05	8.81	8.76	8.87	3.59	8.43
	Other	18.48	25.75	26.75	27.44	27.96	13.24	7.10	20.96
	n (excludes missings)	1699	1988	1989	1975	1953	2379	2393	
Male	Clinical	45.45	51.72	53.57	55.56	53.85	51.35	61.90	53.34
	Community	4.55	3.45	3.57	3.70	3.85	16.22	16.67	7.43
	FSAD	22.73	13.79	14.29	14.81	15.38	13.51	11.90	15.20
	Other	27.27	31.03	28.57	25.93	26.92	18.92	9.52	24.02
	n (excludes missings)	22	29	28	27	26	37	42	

Table E.11 Distribution of registered dietitian gender by work setting (2003-2009)

Gender	Work setting	2003	2004	2005	2006	2007	2008	2009	Average
		%	%	%	%	%	%	%	%
Female	Business	8.31	8.33	7.24	6.96	6.90	6.27	10.98	7.86
	GO/PH	14.06	14.26	16.21	16.32	16.39	15.75	9.78	14.68
	Hospital	40.37	40.44	39.82	38.08	35.46	42.42	37.78	39.20
	LTC/CCAC	17.70	17.80	20.72	22.47	23.33	21.98	25.23	21.32
	Other	19.56	19.17	16.00	16.17	17.92	9.76	8.00	15.22
	FHT						3.82	8.24	6.03
	n (excludes missings)	1672	1753	1906	1967	2087	2407	2414	
Male	Business	28.57	26.92	23.08	19.23	18.18	20.51	16.67	21.88
	GO/PH	4.76	3.85	3.85	7.69	12.12	7.69	2.38	6.05
	Hospital	33.33	34.62	42.31	42.31	36.36	35.90	38.10	37.56
	LTC/CCAC	14.29	15.38	15.38	15.38	18.18	25.64	30.95	19.32
	Other	19.05	19.23	15.38	15.38	15.15	10.26	4.76	14.17
	FHT						0.00	7.14	3.57
	n (excludes missings)	21	26	26	26	33	39	42	

Table E.12 Distribution of registered dietitian area of practice by employment status (2003-2009)

Area of practice	Emp status*	2003		2004		2005		2006		2007		2008		2009		Ave
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Clinical	Full-time	586	63.63	640	63.87	626	63.10	638	65.17	620	64.25	867	57.72	876	58.95	62.38
	Part-time	287	31.16	307	30.64	318	32.06	295	30.13	299	30.98	502	33.42	418	28.13	30.93
	Self-emp	48	5.21	55	5.49	48	4.84	46	4.70	46	4.77	133	8.85	192	12.92	6.68
Comm*	Full-time	204	68.46	209	68.08	207	68.09	200	66.89	183	63.32	237	62.53	465	67.98	66.48
	Part-time	71	23.83	74	24.10	74	24.34	74	24.75	78	26.99	116	30.61	154	22.51	25.30
	Self-emp	23	7.72	24	7.82	23	7.57	25	8.36	28	9.69	26	6.86	65	9.50	8.22
FSAD	Full-time	170	91.89	172	90.53	164	89.13	157	88.20	153	87.43	181	83.80	83	91.21	88.88
	Part-time	8	4.32	10	5.26	10	5.43	12	6.74	14	8.00	23	10.65	5	5.49	6.56
	Self-emp	7	3.78	8	4.21	10	5.43	9	5.06	8	4.57	12	5.56	3	3.30	4.56
Other	Full-time	173	53.89	292	55.94	311	57.49	312	56.73	313	56.50	221	68.42	138	79.31	61.18
	Part-time	43	13.40	101	19.35	114	21.07	130	23.64	138	24.91	61	18.89	20	11.49	18.96
	Self-emp	105	32.71	129	24.71	116	21.44	108	19.64	103	18.59	41	12.69	16	9.20	19.85

* Self-emp = self-employed, Comm = Community

Table E.13 Distribution of registered dietitian work setting by employment status (2003-2009)

Work setting	Emp status*	2003		2004		2005		2006		2007		2008		2009		Ave
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Business	F/T*	114	78.62	119	77.78	105	72.92	106	74.65	105	70.00	115	71.88	191	70.22	73.72
	P/T	13	8.97	12	7.84	15	10.42	17	11.97	24	16.00	24	15.00	39	14.34	12.08
	S/E	18	12.41	22	14.38	24	16.67	19	13.38	21	14.00	21	13.13	42	15.44	14.20
GO/PH	F/T	189	80.08	197	78.49	230	74.19	233	72.14	252	72.83	295	77.23	195	82.28	76.75
	P/T	40	16.95	47	18.73	62	20.00	68	21.05	75	21.68	73	19.11	38	16.03	19.08
	S/E	7	2.97	7	2.79	18	5.81	22	6.81	19	5.49	14	3.66	4	1.69	4.17
Hosp*	F/T	521	76.17	543	75.42	566	73.32	573	75.20	554	73.47	713	68.76	686	73.92	73.75
	P/T	162	23.68	172	23.89	197	25.52	176	23.10	189	25.07	311	29.99	230	24.78	25.15
	S/E	1	0.15	5	0.69	9	1.17	13	1.71	11	1.46	13	1.25	12	1.29	1.10
LTC/CC*	F/T	140	46.67	148	46.84	205	51.38	232	52.02	258	52.33	254	47.12	300	48.23	49.23
	P/T	86	28.67	96	30.38	129	32.33	147	32.96	160	32.45	198	36.73	177	28.46	31.71
	S/E	74	24.67	72	22.78	65	16.29	67	15.02	75	15.21	87	16.14	145	23.31	19.06
Other	F/T	157	47.29	164	47.81	150	48.23	160	49.38	192	50.39	106	43.98	105	53.85	48.71
	P/T	98	29.52	100	29.15	94	30.23	101	31.17	119	31.23	70	29.05	36	18.46	28.40
	S/E	77	23.19	79	23.03	67	21.54	63	19.44	70	18.37	65	26.97	54	27.69	22.89
FHT	F/T											48	52.17	102	50.50	51.33
	P/T											34	36.96	82	40.59	38.78
	S/E											10	10.87%	18	8.91%	9.89%

* Emp status = employment status, F/T = full-time, P/T = part-time, S/E = self-employed, Hosp = Hospital, LTC/CC = LTC/CCAC

Table E.14 Distribution of registered dietitian education level by area of practice (2003-2009)

Education	Area of practice	2003		2004		2005		2006		2007		2008		2009		Ave
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Bachelors	Clin	826	58.50	897	54.26	888	53.69	878	53.54	862	53.41	1311	66.89	1308	67.53	58.26
	Comm	187	13.24	199	12.04	200	12.09	195	11.89	188	11.65	246	12.55	430	22.20	13.67
	FSAD	158	11.19	162	9.80	156	9.43	150	9.15	147	9.11	194	9.90	86	4.44	9.00
	Oth	241	17.07	395	23.90	410	24.79	417	25.43	417	25.84	209	10.66	113	5.83	19.07
Graduate	Clin	95	30.35	105	28.53	104	28.34	101	27.60	103	27.91	191	41.52	178	35.74	31.43
	Comm	111	35.46	108	29.35	104	28.34	104	28.42	101	27.37	133	28.91	254	51.00	32.69
	FSAD	27	8.63	28	7.61	28	7.63	28	7.65	28	7.59	22	4.78	5	1.00	6.41
	Oth	80	25.56	127	34.51	131	35.69	133	36.34	137	37.13	114	24.78	61	12.25	29.47

Table E.15 Distribution of registered dietitian education level by work setting (2003-2009)

Education	Work setting	2003		2004		2005		2006		2007		2008		2009		Average
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	%
Bachelors	Business	110	7.96	117	8.01	111	6.99	108	6.62	112	6.50	119	5.99	184	9.42	7.36
	GO/PH	137	9.91	148	10.13	203	12.79	211	12.94	224	13.00	236	11.87	127	6.50	11.02
	Hospital	614	44.43	647	44.28	682	42.97	674	41.32	667	38.71	928	46.68	834	42.68	43.01
	LTC/CCAC	273	19.75	290	19.85	363	22.87	399	24.46	445	25.83	480	24.14	529	27.07	23.43
	Other	248	17.95	259	17.73	228	14.37	239	14.65	275	15.96	150	7.55	111	5.68	13.41
	FHT											75	3.77	169	8.65	6.21
Graduate	Business	35	11.11	36	11.18	33	9.46	34	9.29	38	9.48	40	8.66	88	17.53	10.96
	GO/PH	99	31.43	103	31.99	107	30.66	112	30.60	122	30.42	146	31.60	110	21.91	29.80
	Hospital	70	22.22	73	22.67	90	25.79	88	24.04	87	21.70	109	23.59	94	18.73	22.68
	LTC/CCAC	27	8.57	26	8.07	36	10.32	47	12.84	48	11.97	59	12.77	93	18.53	11.87
	Other	84	26.67	84	26.09	83	23.78	85	23.22	106	26.43	91	19.70	84	16.73	23.23
	FHT											17	3.68	33	6.57	5.13

Appendix F

Tables of the influence of age on the workforce characteristics of registered dietitians in Ontario (2003-2009)

Table F.1 Registered dietitian age group by gender (2003-2009)

		2003	2004	2005	2006	2007	2008	2009	Average
Age Group	Gender	%	%	%	%	%	%	%	%
Under 30	Female	98.62	98.45	98.43	99.13	98.15	98.33	98.99	98.59
	Male	1.38	1.55	1.57	0.87	1.85	1.67	1.01	1.41
n (excludes missings)		218	258	255	231	270	299	398	
30-39	Female	98.37	98.23	98.40	98.23	97.84	97.88	97.22	98.03
	Male	1.63	1.77	1.60	1.77	2.16	2.12	2.78	1.97
n (excludes missings)		674	679	689	679	695	756	756	
40-49	Female	98.83	98.48	98.68	98.56	98.43	98.20	98.01	98.46
	Male	1.17	1.52	1.32	1.44	1.57	1.80	1.99	1.54
n (excludes missings)		683	726	757	766	763	778	702	
50-59	Female	99.35	99.43	99.03	99.15	99.23	99.12	99.26	99.23
	Male	0.65	0.57	0.97	0.85	0.77	0.88	0.74	0.77
n (excludes missings)		308	352	413	473	519	566	542	
60+*	Female	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	Male	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
n (excludes missings)		24	40	58	73	103	125	127	

*60+= 60 and over

Table F.2 Registered dietitian age group by education (2003-2009)

Age Group	Education	2003	2004	2005	2006	2007	2008	2009	Average
		%	%	%	%	%	%	%	%
Under 30	Bachelors	78.90	83.72	84.31	83.55	80.74	81.61	76.13	81.28
	Graduate	21.10	16.28	15.69	16.45	19.26	18.39	23.87	18.72
n (excludes missings)		218	258	255	231	270	299	398	
30-39	Bachelors	80.27	79.23	78.52	78.65	77.70	78.44	76.98	78.54
	Graduate	19.73	20.77	21.48	21.35	22.30	21.56	23.02	21.46
n (excludes missings)		674	679	689	679	695	756	756	
40-49	Bachelors	84.04	84.02	84.54	83.16	82.44	81.62	82.91	83.25
	Graduate	15.96	15.98	15.46	16.84	17.56	18.38	17.09	16.75
n (excludes missings)		683	726	757	766	763	778	702	
50-59	Bachelors	81.82	83.52	83.78	84.36	85.55	85.16	82.66	83.83
	Graduate	18.18	16.48	16.22	15.64	14.45	14.84	17.34	16.17
n (excludes missings)		308	352	413	473	519	566	542	
60+*	Bachelors	66.67	72.50	74.14	76.71	73.79	76.00	75.59	73.63
	Graduate	33.33	27.50	25.86	23.29	26.21	24.00	24.41	26.37
n (excludes missings)		24	40	58	73	103	125	127	

*60+= 60 and over

Table F.3 Registered dietitian age group by employment status (2003-2009)

Age Group	Emp status	2003	2004	2005	2006	2007	2008	2009	Average
		%	%	%	%	%	%	%	
Under 30	Full-time	85.78	77.52	74.12	74.03	72.59	72.58	75.63	76.03
	Part-time	11.01	19.77	22.35	22.94	21.48	24.41	18.84	20.12
	Self-employed	3.21	2.71	3.53	3.03	5.93	3.01	5.53	3.85
	n (excludes missings)	218	258	255	231	270	299	398	
30-39	Full-time	65.28	65.39	66.18	67.30	66.91	64.29	66.40	65.96
	Part-time	24.18	23.42	23.95	24.74	27.05	29.63	25.40	25.48
	Self-employed	10.53	11.19	9.87	7.95	6.04	6.08	8.20	8.55
	n (excludes missings)	674	679	689	679	695	756	756	
40-49	Full-time	58.86	59.92	59.18	57.83	56.88	56.94	58.97	58.37
	Part-time	30.01	29.61	30.52	31.07	31.72	32.26	28.63	30.55
	Self-employed	11.13	10.47	10.30	11.10	11.40	10.80	12.39	11.08
	n (excludes missings)	683	726	757	766	763	778	702	
50-59	Full-time	64.61	63.35	63.68	67.23	66.28	64.49	62.73	64.62
	Part-time	21.75	20.74	24.70	22.41	23.51	25.97	21.96	23.00
	Self-employed	13.64	15.91	11.62	10.36	10.21	9.54	15.31	12.37
	n (excludes missings)	308	352	413	473	519	566	542	
60 and over	Full-time	54.17	52.50	53.45	46.58	48.54	45.60	53.54	50.63
	Part-time	4.17	17.50	22.41	30.14	30.10	32.80	23.62	22.96
	Self-employed	41.67	30.00	24.14	23.29	21.36	21.60	22.83	26.41
	n (excludes missings)	24	40	58	73	103	125	127	

Table F.4 Registered dietitian age group by area of practice (2003-2009)

Age group	Area of practice	2003	2004	2005	2006	2007	2008	2009	Ave
		%	%	%	%	%	%	%	%
Under 30	Clinical	60.56	62.61	59.88	63.48	59.70	65.63	58.59	61.49
	Comm*	23.00	19.75	19.76	19.13	16.42	26.95	36.46	23.07
	FSAD	2.35	1.68	2.40	3.48	4.48	3.91	0.00	2.61
	Other	14.08	15.97	17.96	13.91	19.40	3.52	4.95	12.83
	n*	[213]	[238]	[167]	[115]	[67]	[256]	[384]	
30-39	Clinical	54.00	50.74	51.61	51.95	53.29	67.87	62.84	56.04
	Comm	18.21	17.26	17.76	18.89	18.89	15.93	30.05	19.57
	FSAD	8.79	7.29	6.13	5.21	4.22	4.16	1.78	5.37
	Other	19.00	24.70	24.50	23.94	23.61	12.05	5.33	19.02
	n*	[637]	[672]	[653]	[614]	[593]	[722]	[732]	
40-49	Clinical	51.99	47.84	47.17	47.33	48.49	59.56	61.49	51.98
	Comm	15.54	13.49	13.48	13.20	12.47	13.78	26.12	15.44
	FSAD	12.95	11.13	10.38	9.20	9.45	10.79	3.13	9.58
	Other	19.52	27.54	28.98	30.27	29.59	15.86	9.25	23.00
	n*	[579]	[719]	[742]	[750]	[730]	[769]	[670]	
50-59	Clinical	49.81	43.19	44.72	44.49	43.38	58.21	59.43	49.03
	Comm	14.61	11.88	11.56	10.57	11.61	12.59	23.43	13.75
	FSAD	17.60	15.36	14.57	14.54	13.85	14.42	9.52	14.27
	Other	17.98	29.57	29.15	30.40	31.16	14.78	7.62	22.95
	n*	[267]	[345]	[398]	[454]	[491]	[548]	[525]	
60+*	Clinical	42.11	38.24	44.90	40.98	41.11	54.87	62.10	46.33
	Comm	15.79	11.76	14.29	19.67	17.78	15.93	20.97	16.60
	FSAD	5.26	5.88	6.12	8.20	8.89	10.62	5.65	7.23
	Other	36.84	44.12	34.69	31.15	32.22	18.58	11.29	29.84
	n*	[19]	[34]	[49]	[61]	[90]	[113]	[124]	

*Comm = Community, n= excludes missings, 60+ = 60 and over

Table F.5 Registered dietitian age group by work setting (2003-2009)

Age Group	Work setting	2003	2004	2005	2006	2007	2008	2009	Ave
		%	%	%	%	%	%	%	%
< 30*	Business	7.55	6.58	5.14	4.55	1.69	2.95	7.75	5.17
	Gov/PH	14.62	14.91	21.50	20.20	22.88	18.8	10.85	17.68
	Hospital	48.58	44.30	39.25	35.86	33.05	41.70	31.78	39.22
	LTC/CCAC	15.09	19.74	25.23	29.80	30.51	21.77	26.36	24.07
	Other	14.15	14.47	8.88	9.60	11.86	4.06	4.13	9.59
	FHT						10.70	19.12	14.91
	n*	[212]	[228]	[214]	[198]	[236]	[271]	[387]	
30-39	Business	11.94	11.63	9.44	9.42	9.23	6.69	11.59	9.99
	Gov/PH	14.33	14.70	15.63	16.17	16.92	15.30	10.65	14.82
	Hospital	39.17	39.26	41.02	38.62	35.54	45.90	41.64	40.16
	LTC/CCAC	15.45	15.35	18.89	21.35	21.69	18.85	24.12	19.39
	Other	19.11	19.06	15.02	14.44	16.62	9.29	5.26	14.11
	FHT						3.96	6.74	5.35
	n	[628]	[619]	[646]	[637]	[650]	[732]	[742]	
40-49	Business	6.75	8.11	8.32	7.95	8.44	8.45	13.37	8.77
	Gov/PH	14.21	13.58	16.04	16.35	14.26	14.69	8.92	14.01
	Hospital	40.14	41.56	39.03	38.88	36.54	42.00	37.59	39.39
	LTC/CCAC	18.12	16.72	19.52	20.03	21.40	22.11	23.77	20.24
	Other	20.78	20.03	17.10	16.79	19.36	9.75	9.96	16.25
	FHT						2.99	6.39	4.69
	n	[563]	[604]	[661]	[679]	[687]	[769]	[673]	
50-59	Business	4.96	5.08	4.18	4.14	5.30	5.63	9.83	5.59
	Gov/PH	12.60	13.90	14.21	14.84	15.45	16.52	9.07	13.80
	Hospital	37.40	38.64	41.78	39.17	37.09	41.38	39.13	39.23
	LTC/CCAC	24.81	23.05	22.28	23.60	23.62	24.50	26.65	24.07
	Other	20.23	19.32	17.55	18.25	18.54	10.53	9.83	16.32
	FHT						1.45	5.48	3.47
	n	[262]	[295]	[359]	[411]	[453]	[551]	[529]	
60+*	Business	14.29	8.00	4.44	3.28	4.60	5.17	11.20	7.28
	Gov/PH	4.76	8.00	11.11	11.48	14.94	12.07	6.40	9.82
	Hospital	19.05	16.00	20.00	22.95	22.99	26.72	28.80	22.36
	LTC/CCAC	19.05	28.00	31.11	29.51	29.89	31.90	32.00	28.78
	Other	42.86	40.00	33.33	32.79	27.59	21.55	16.80	30.70
	FHT						2.59	4.80	3.69
	n	[21]	[25]	[45]	[61]	[87]	[116]	[125]	

*<30 = under 30, n= excludes missings